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Linking the ACT Aspire[®] Assessments to ISIP[™] Reading and Math

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Linking the ACT Aspire[®]
Assessments to ISIP[™]
Reading and Math

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Abstract

This study provides the proficiency projection of Istation's Indicators of Progress (ISIP) Reading and ISIP Math on the ACT Aspire Arkansas state reading and math assessments for second and third grade students. A classification accuracy is also provided. All data came from students in second grade in the 2017-2018 school year and third grade in the 2018-2019 school year in the state of Arkansas.

Using multinomial logistic regression, ISIP scores are the predictor variable, and the ACT Aspire performance levels are the outcome variable. Results show that second graders who obtained an ISIP Reading score around the 75th percentile or higher at the end of the year (EOY) had a high probability of achieving the *Ready* performance level on the ACT Aspire. Third graders who obtained an ISIP Reading score around the 65th percentile rank or higher at the middle of the year (MOY) had a high probability of achieving the *Ready* performance level. Students in Levels 4 and 5 have a high probability of achieving *Ready* performance on the ACT Aspire Reading assessment in the spring.

In math, second graders who obtained an ISIP Math score around the 45th percentile rank or higher at EOY and third graders who obtained an ISIP Math score around the 40th percentile rank or higher at MOY had a high probability of achieving the *Ready* performance level. These results show that students in Tier 1 or Levels 3, 4, and 5 have a high probability of achieving *Ready* performance on the ACT Aspire Math assessment in the spring.

Introduction

ISIP assessments (ISIP Reading, ISIP Math, and ISIP Español) are web-delivered computer-adaptive testing (CAT) assessments. The purpose of this research is to explore how well performance on the ISIP Reading and ISIP Math assessments predicts performance on the ACT Aspire assessment used by the state of Arkansas in the spring as an end-of-year summative assessment. The predictability of the ISIP assessments can inform students, parents, teachers, and administrators of the likelihood that a student will be successful on the spring ACT Aspire assessment and provide information needed to give students personalized instruction.

Literature Review

Computer-adaptive testing adjusts to a student's individual ability. The first time a student takes a CAT assessment, they will typically receive an item that is of medium difficulty. If the student gets the question correct, they will receive a more difficult item. If the student gets the question incorrect, they will receive an easier item. In this manner, the assessment adjusts to the student's level of ability or knowledge. The ISIP assessments fall into this category (Mathes et al., 2015).

ISIP Assessments

ISIP assessments are built using two-parameter Item Response Theory. ISIP gathers and reports frequent information about student progress in the critical domains throughout and across academic years (Patarapichayatham et al., 2013). ISIP accomplishes this by delivering monthly tests that target critical areas to inform instruction. With adequate computer resources, it is possible to administer ISIP assessments to an entire classroom, school, or district in a single day. Student results are immediately available online for teachers and administrators, illustrating each student's past and present performance and skill growth. Teachers are alerted

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when students are not making adequate progress so that the instructional program can be modified before a pattern of failure becomes established (Mathes, 2011).

ISIP Reading and ISIP Math measure students' ability and identify deficits in critical areas to provide continuous differentiated instruction. ISIP Early Reading (ER) is available for prekindergarten through 3rd grade students, and ISIP Math is designed for students in prekindergarten through 8th grade. Istation provides teachers and other school personnel with easy-to-interpret, web-based reports that detail student strengths and deficits and provide links to teaching resources and targeted intervention strategies (Istation, 2018).

ISIP ER has strong predictability with several state assessments including the Virginia Standards of Learning (Campbell et al., 2019), the PARCC (Cook & Ross, 2020), the Idaho ISAT (Wolfe & Ross, 2020), the Renaissance Star (Campbell et al., 2019), the Colorado Measures of Academic Success (Patapichayatham, 2019), and the Ohio AIR (LePlante, 2018). ISIP Math also has predictability with the Ohio AIR (LePlante, 2018).

ACT Aspire

The state of Arkansas requires public school students in grades 3 through 10 to participate in a statewide program of educational assessments in the spring. Each student will participate in English, reading, writing, mathematics, and science end-of-year testing. The state uses the ACT Aspire assessments as the end-of-year tests. The ACT Aspire assessments are vertically scaled assessments that are aligned with content standards that target college and career readiness (ACT, 2019).

The purpose of this study is to predict students' performance on the ACT Aspire based on their ISIP scores in reading and math. There are four objectives in this current study.

- 1) Using the end-of-year assessment month (EOY) of second grade ISIP Reading to predict students' third grade ACT Aspire Reading outcome

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- 2) Using the middle-of-year assessment month (MOY) of third grade ISIP Reading to predict students' third grade ACT Aspire Reading outcome
- 3) Using the end-of-year assessment month (EOY) of second grade ISIP Math to predict students' third grade ACT Aspire Math outcome
- 4) Using the middle-of-year assessment month (MOY) of third grade ISIP Math to predict students' third grade ACT Aspire Math outcome

ACT Aspire overall scale score performance levels are used to place students' assessment scores in one of four levels of achievement: level 1 – In need of support; level 2 – Close; level 3 – Ready; or level 4 – Exceeding. The scale scores of each performance level in reading and math of the third grade are in Table 1.

Table 1: Scale Scores for ACT Aspire Performance Levels in Third Grade

Assessment	Level 1 In need of support	Level 2 Close	Level 3 Ready	Level 4 Exceeding
ACT Aspire Reading	400–410	411–414	415–418	419–442
ACT Aspire Math	400–408	409–412	413–416	417–460

All data used in this study were obtained from the state of Arkansas. The data were collected from students who were in third grade during the 2018-2019 academic year with ISIP Reading or Math and ACT Aspire scores and had also taken the ISIP Reading or ISIP Math assessment in second grade in the 2017-2018 academic year. The ISIP Math assessment was renormed using data from the 2019-2020 school year, and the scores were put on a vertical scale. For this analysis, we converted the old score to the new score using the equating constants from the new norms (Istation 2020, forthcoming).

Data and Methods

Our analytic plan first consisted of evaluating the Pearson correlation between the ISIP assessments and the ACT Aspire, and then we used multinomial logistic regression to determine probabilities for reaching the *Ready* or above levels on the ACT Aspire. Finally, we conducted a classification accuracy to determine cut points that best predict whether or not the student will meet the *Ready* or above level on the ACT Aspire.

Analytic Samples

ISIP Reading

We obtained data from the Arkansas Department of Education for this analysis. We included students that had both an ISIP score and an ACT Aspire score.

The second-grade sample consisted of 8,399 students: 49.0% were female and 51.0% were male. Slightly over two thirds (68.4%) of the sample consisted of students who were White, while 12.2% of the sample consisted of students who were Black or African American. Thirteen percent (13.2%) consisted of students who were Hispanic or Latino, and 6.2% were students who were Asian or other race/ethnicities including Native American/Alaska Natives, two or more races, and others. Most of the students (88.5%) use English as their primary language, 10.0% use Spanish as their primary language, and 1.5% use another language. Approximately 10 percent of the students (9.8%) were identified as English language learners (ELLs). The mean ISIP ER score was 236.62, and the mean ACT Aspire Reading score was 417.11. Complete results are available in Table 2, which also provides percentages for the entire state of Arkansas, based on data available from the National Center for Education Statistics, and the Arkansas Bureau of Legislative Affairs. The sample in these analyses have a higher percentage of students who are White, and a lower percentage of students who are Black or African American. The percentage of students who are Hispanic or Latino/a is similar to the state average.

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Table 2. Demographics of the Analytic Sample

	Reading 2nd grade N=8,399	Reading 3rd grade N=5,089	Math 2nd grade N=8,381	Math 3rd grade N=4,774	Arkansas NCES 2017-18
Gender					
<i>Female</i>	49.0%	48.9%	48.9%	48.7%	48.7%*
<i>Male</i>	51.0%	51.1%	51.1%	51.3%	51.3%*
Race/Ethnicity					
<i>White</i>	68.4%	72.4%	68.6%	66.9%	59.8%*
<i>Black or African American</i>	12.2%	8.6%	12.4%	8.9%	20.5%*
<i>Hispanic or Latino/a</i>	13.2%	16.9%	13.3%	17.0%	13.5%*
<i>Asian or Other</i>	6.2%	7.1%	5.7%	7.2%	6.4%*
Language					
<i>English</i>	88.5%	84.3%	88.6%	84.3%	91.9%**
<i>Spanish</i>	10.0%	13.6%	9.9%	13.6%	7.3%**
<i>Other Language</i>	1.5%	2.1%	1.5%	2.1%	0.8%**
ELL	9.8%	11.6%	9.7%	11.5%	8.31%**
Mean (SD) ISIP score	236.62 (18.43)	244.35 (20.81)	501.54 (46.45)	513.17 (52.34)	
Mean (SD) ACT Score	417.11 (5.41)	417.23 (5.43)	413.26 (4.15)	413.40 (4.18)	

*Source: National Center for Education Statistics, Common Core Data file 2017-18 school year.

**Source: Arkansas Bureau of Legislative Research, data based on the 2016-2017 school year.

In third grade the sample consisted of 5,089 students, of which 48.9% were female and 51.1% were male students. Students who were White comprised 72.4% of the sample. Students who were Black or African American comprised 8.6% of the sample, followed by students who were Hispanic or Latino at 16.9%, and 7.1% who were Asian or other race/ethnicities. Most of the students (84.3%) use English as their primary language, and 13.6% use Spanish as the primary language. ELLs were 11.6% of the sample. The mean ISIP ER score was 244.35, and the mean ACT Aspire Reading score was 417.23.

ISIP Math

The analytic sample for the math study contained 8,381 students in second grade, of which 48.9% were female and 51.1% were male students. Sixty eight percent (68.6%) of the sample consisted of students who were White, 12.4% of the sample consisted of students who were Black or African American, 13.3% were Hispanic or Latino, and 5.7% were Asian or other race/ethnicities. Most of the students (88.6%) use English as their primary language, 9.9% use Spanish as their primary language, and 1.5% use another language as their primary language. In the analytic sample, 9.7% of the students were ELL students. The mean ISIP Math score was 501.54, and the mean ACT Aspire Math score was 413.26.

The third-grade sample consisted of 4,774 students: 48.7% were female and 51.3% were male. Demographics are similar to the second-grade sample: 66.9% of the sample were White, 8.9% were Black or African American, 17.0% were Hispanic or Latino, and 7.2% were Asian or other race/ethnicities. Slightly over eleven percent (11.5%) of these students were ELL students. Most of these students (84.3%) use English as their primary language, 13.6% use Spanish as their primary language, and 2.1% use other languages as their primary language. The mean ISIP Math score was 513.17, and the mean ACT score was 413.40.

Analytic Plan

To provide teachers and administrators with the information they need to determine if a student is likely to reach the *Ready* or above status on the ACT Aspire, we first evaluated the Pearson product-moment correlations to establish that the performance on the assessments was correlated. Next, we used multinomial logistic regression to determine the probabilities of reaching the *Ready* or *Exceeding* levels of the ACT Aspire. The ISIP scores are the predictor, and the ACT Aspire performance levels are the outcome variable. Students who had ISIP scores between the 1st and 99th percentile ranks were included in the analysis. The model is fitted for each grade separately.

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We computed probabilities for the four performance levels for selected ISIP Reading scores. A total of 99 ISIP Reading scaled scores in EOY of second grade and 99 ISIP Reading scaled scores in MOY of third grade are selected, which correspond to the 1st through 99th percentile ranks with an increment of one. For the outcome variable in the multinomial logistic regression, performance levels are defined by the ACT Aspire proficiency cut points (see Table 1). There are four ACT Aspire performance levels, but this study investigates performance levels 2, 3, and 4.

The probability of ACT Aspire performance level 2 (*Close*) or above is computed by adding the probabilities of levels 2, 3, and 4. The probability of ACT Aspire performance level 3 (*Ready*) or above is computed by adding the probabilities of levels 3 and 4. The probability of ACT Aspire performance level 4 (*Exceeding*) is the probability of level 4 itself. The analyses are computed using *R* software with the *nnet* package.

Finally, we conducted a classification accuracy to determine ISIP cut points that could help differentiate students who would or would not attain level 3 (*Ready*) or higher on the ACT Aspire. True positives consist of students who are predicted to reach *Ready* or higher, and true negatives consist of students who are predicted to meet *Close* or lower.

Results

Table 3 shows the Pearson product-moment correlation coefficients between ISIP Reading scores and ACT Aspire Reading scores. They were 0.71 and 0.73 for EOY of second grade and MOY of third grade. ISIP Reading and ACT Aspire Reading assessments show a strong relationship, meaning that if students do well on ISIP Reading, it is likely that they will do well on the ACT Aspire in the spring of third grade.

Table 2: Pearson Product-Moment Correlation Coefficients between ISIP and ACT Aspire

Grade	Reading	Math
2	0.71	0.76
3	0.73	0.77

Correlations between the ISIP Math scores and ACT Aspire Math scores show a strong relationship between the two assessments. The Pearson product-moment correlation coefficients were 0.76 and 0.77 for EOY of second grade and MOY of third grade. These results confirm that if students do well on ISIP Math, it is likely that they will do well on ACT Aspire Math in the spring.

ISIP Reading and ACT Aspire-ELA

Second Grade

Table 4 shows the probability projection of second grade EOY ISIP Reading scores to predict ACT Aspire Reading performance levels. Low probability is defined as a less than 33.3% chance of attaining a proficiency level, medium probability is defined as between 33.3% and 66.7%, and high probability is defined as greater than 66.7%. Students in second grade who obtained an ISIP Reading score of 194 to 215 (2nd to 15th percentile ranks) had a medium probability of achieving ACT Aspire performance level 2 (*Close*) or higher. Students who obtained an ISIP Reading score lower than 194 had a low probability of *Close* or higher, and students who obtained an ISIP Reading score higher than 215 had a high probability of achieving *Close* or higher.

Students who obtained an ISIP Reading score of 231 to 247 (41st to 74th percentile ranks) had a medium probability of achieving ACT Aspire *Ready* or higher. Students who obtained an ISIP Reading score lower than 231 had a low probability, whereas students who obtained an ISIP Reading score higher than 247 had a high probability of achieving ACT Aspire *Ready* or higher. Students who obtained an ISIP Reading score of 247 to 262 (73rd to 92nd

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percentile ranks) had a medium probability of achieving ACT Aspire performance level 4 (*Exceeding*). Students who obtained an ISIP Reading score higher than 262 (92nd percentile rank) had a high probability of achieving ACT Aspire *Exceeding*.

Table 4: EOY of Second Grade ISIP Reading to Predict ACT Aspire Reading

ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
185	1	0.328	Low	0.014	Low	<0.001	Low
194	2	0.421	Medium	0.028	Low	0.001	Low
198	3	0.465	Medium	0.038	Low	0.001	Low
200	4	0.488	Medium	0.044	Low	0.002	Low
203	5	0.523	Medium	0.055	Low	0.003	Low
205	6	0.547	Medium	0.064	Low	0.003	Low
206	7	0.559	Medium	0.069	Low	0.004	Low
208	8	0.583	Medium	0.079	Low	0.005	Low
209	9	0.594	Medium	0.085	Low	0.006	Low
210	10	0.606	Medium	0.091	Low	0.007	Low
211	11	0.618	Medium	0.097	Low	0.008	Low
212	12	0.630	Medium	0.104	Low	0.009	Low
213	13	0.642	Medium	0.112	Low	0.010	Low
214	14	0.654	Medium	0.119	Low	0.011	Low
215	15	0.666	Medium	0.128	Low	0.013	Low
216	16	0.677	High	0.136	Low	0.014	Low
217	17	0.689	High	0.146	Low	0.016	Low
217	18	0.689	High	0.146	Low	0.016	Low
218	19	0.700	High	0.155	Low	0.019	Low
219	20	0.712	High	0.166	Low	0.021	Low
219	21	0.712	High	0.166	Low	0.021	Low
220	22	0.723	High	0.176	Low	0.024	Low
221	23	0.734	High	0.188	Low	0.027	Low
221	24	0.734	High	0.188	Low	0.027	Low
222	25	0.746	High	0.200	Low	0.030	Low
223	26	0.756	High	0.212	Low	0.034	Low
223	27	0.756	High	0.212	Low	0.034	Low
224	28	0.767	High	0.226	Low	0.038	Low
224	29	0.767	High	0.226	Low	0.038	Low
225	30	0.778	High	0.239	Low	0.043	Low
226	31	0.789	High	0.254	Low	0.048	Low
226	32	0.789	High	0.254	Low	0.048	Low
227	33	0.799	High	0.269	Low	0.054	Low
227	34	0.799	High	0.269	Low	0.054	Low
228	35	0.809	High	0.285	Low	0.061	Low
228	36	0.809	High	0.285	Low	0.061	Low
229	37	0.819	High	0.301	Low	0.068	Low
229	38	0.819	High	0.301	Low	0.068	Low

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ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
230	39	0.829	High	0.318	Low	0.075	Low
230	40	0.829	High	0.318	Low	0.075	Low
231	41	0.838	High	0.336	Medium	0.084	Low
231	42	0.838	High	0.336	Medium	0.084	Low
232	43	0.847	High	0.354	Medium	0.093	Low
232	44	0.847	High	0.354	Medium	0.093	Low
233	45	0.857	High	0.373	Medium	0.103	Low
233	46	0.857	High	0.373	Medium	0.103	Low
234	47	0.865	High	0.392	Medium	0.114	Low
234	48	0.865	High	0.392	Medium	0.114	Low
235	49	0.874	High	0.412	Medium	0.125	Low
235	50	0.874	High	0.412	Medium	0.125	Low
236	51	0.882	High	0.433	Medium	0.138	Low
236	52	0.882	High	0.433	Medium	0.138	Low
237	53	0.890	High	0.453	Medium	0.151	Low
237	54	0.890	High	0.453	Medium	0.151	Low
238	55	0.898	High	0.474	Medium	0.166	Low
238	56	0.898	High	0.474	Medium	0.166	Low
239	57	0.905	High	0.496	Medium	0.181	Low
239	58	0.905	High	0.496	Medium	0.181	Low
240	59	0.912	High	0.518	Medium	0.197	Low
240	60	0.912	High	0.518	Medium	0.197	Low
241	61	0.919	High	0.539	Medium	0.215	Low
241	62	0.919	High	0.539	Medium	0.215	Low
242	63	0.925	High	0.561	Medium	0.233	Low
242	64	0.925	High	0.561	Medium	0.233	Low
243	65	0.931	High	0.583	Medium	0.251	Low
243	66	0.931	High	0.583	Medium	0.251	Low
244	67	0.937	High	0.605	Medium	0.271	Low
244	68	0.937	High	0.605	Medium	0.271	Low
245	69	0.943	High	0.626	Medium	0.291	Low
245	70	0.943	High	0.626	Medium	0.291	Low
246	71	0.948	High	0.648	Medium	0.312	Low
246	72	0.948	High	0.648	Medium	0.312	Low
247	73	0.953	High	0.669	Medium	0.334	Medium
247	74	0.953	High	0.669	Medium	0.334	Medium
248	75	0.957	High	0.689	High	0.356	Medium
249	76	0.961	High	0.709	High	0.378	Medium
249	77	0.961	High	0.709	High	0.378	Medium
250	78	0.965	High	0.728	High	0.401	Medium
250	79	0.965	High	0.728	High	0.401	Medium
251	80	0.969	High	0.747	High	0.424	Medium
252	81	0.972	High	0.765	High	0.447	Medium
253	82	0.975	High	0.783	High	0.470	Medium
253	83	0.975	High	0.783	High	0.470	Medium
254	84	0.978	High	0.799	High	0.493	Medium
255	85	0.980	High	0.815	High	0.516	Medium

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ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
256	86	0.982	High	0.830	High	0.539	Medium
257	87	0.984	High	0.844	High	0.561	Medium
258	88	0.986	High	0.857	High	0.583	Medium
259	89	0.988	High	0.869	High	0.604	Medium
260	90	0.989	High	0.881	High	0.625	Medium
261	91	0.991	High	0.891	High	0.645	Medium
262	92	0.992	High	0.901	High	0.664	Medium
263	93	0.993	High	0.911	High	0.683	High
265	94	0.995	High	0.927	High	0.718	High
266	95	0.995	High	0.934	High	0.734	High
268	96	0.996	High	0.946	High	0.765	High
270	97	0.997	High	0.957	High	0.793	High
273	98	0.998	High	0.969	High	0.830	High
277	99	0.999	High	0.980	High	0.869	High

Third Grade

Table 5 shows the probability projection of third grade MOY ISIP Reading scores to predict ACT Aspire Reading performance levels. Students in third grade who obtained an ISIP Reading score of 200 to 286 (1st to 99th percentile ranks) had a high probability of achieving ACT Aspire *Close* or higher.

Students who obtained an ISIP Reading score of 235 to 252 (31st to 66th percentile ranks) had a medium probability of achieving ACT Aspire *Ready* or higher. Students who obtained an ISIP Reading score lower than 235 (31st percentile rank) had a low probability; whereas students who obtained an ISIP Reading score higher than 252 (66th percentile rank) had a high probability of achieving ACT Aspire *Ready* or higher.

Students who obtained an ISIP Reading score of 255 to 268 (71st to 89th percentile ranks) had a medium probability of achieving the ACT Aspire *Exceeding* level. Students who obtained an ISIP Reading score lower than 255 had low probability, whereas students who obtained an ISIP Reading score higher than 268 had a high probability of achieving the ACT Aspire *Exceeding* level.

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Table 5: MOY Third Grade ISIP Reading to Predict ACT Aspire Reading

ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
200	1	0.700	High	0.047	Low	0.001	Low
203	2	0.746	High	0.058	Low	0.001	Low
207	3	0.801	High	0.076	Low	0.002	Low
209	4	0.824	High	0.086	Low	0.002	Low
212	5	0.856	High	0.104	Low	0.003	Low
214	6	0.875	High	0.117	Low	0.004	Low
215	7	0.884	High	0.124	Low	0.005	Low
217	8	0.899	High	0.138	Low	0.006	Low
218	9	0.907	High	0.146	Low	0.007	Low
219	10	0.913	High	0.154	Low	0.008	Low
220	11	0.920	High	0.163	Low	0.009	Low
221	12	0.926	High	0.172	Low	0.010	Low
222	13	0.931	High	0.181	Low	0.011	Low
223	14	0.937	High	0.191	Low	0.013	Low
224	15	0.941	High	0.201	Low	0.015	Low
225	16	0.946	High	0.211	Low	0.017	Low
226	17	0.950	High	0.222	Low	0.019	Low
226	18	0.950	High	0.222	Low	0.019	Low
227	19	0.954	High	0.234	Low	0.022	Low
228	20	0.958	High	0.245	Low	0.024	Low
228	21	0.958	High	0.245	Low	0.024	Low
229	22	0.961	High	0.258	Low	0.027	Low
230	23	0.965	High	0.270	Low	0.031	Low
230	24	0.965	High	0.270	Low	0.031	Low
231	25	0.968	High	0.283	Low	0.035	Low
232	26	0.970	High	0.297	Low	0.039	Low
232	27	0.970	High	0.297	Low	0.039	Low
233	28	0.973	High	0.311	Low	0.044	Low
233	29	0.973	High	0.311	Low	0.044	Low
234	30	0.975	High	0.326	Low	0.049	Low
235	31	0.978	High	0.341	Medium	0.055	Low
235	32	0.978	High	0.341	Medium	0.055	Low
236	33	0.980	High	0.356	Medium	0.062	Low
236	34	0.980	High	0.356	Medium	0.062	Low
237	35	0.981	High	0.372	Medium	0.069	Low
237	36	0.981	High	0.372	Medium	0.069	Low
238	37	0.983	High	0.389	Medium	0.077	Low
238	38	0.983	High	0.389	Medium	0.077	Low
239	39	0.985	High	0.406	Medium	0.085	Low
239	40	0.985	High	0.406	Medium	0.085	Low
240	41	0.986	High	0.423	Medium	0.095	Low
240	42	0.986	High	0.423	Medium	0.095	Low
241	43	0.988	High	0.441	Medium	0.105	Low
241	44	0.988	High	0.441	Medium	0.105	Low

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ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
242	45	0.989	High	0.459	Medium	0.117	Low
242	46	0.989	High	0.459	Medium	0.117	Low
243	47	0.990	High	0.478	Medium	0.129	Low
243	48	0.990	High	0.478	Medium	0.129	Low
244	49	0.991	High	0.497	Medium	0.142	Low
244	50	0.991	High	0.497	Medium	0.142	Low
245	51	0.992	High	0.517	Medium	0.156	Low
245	52	0.992	High	0.517	Medium	0.156	Low
246	53	0.993	High	0.536	Medium	0.171	Low
246	54	0.993	High	0.536	Medium	0.171	Low
247	55	0.994	High	0.556	Medium	0.188	Low
247	56	0.994	High	0.556	Medium	0.188	Low
248	57	0.994	High	0.576	Medium	0.205	Low
248	58	0.994	High	0.576	Medium	0.205	Low
249	59	0.995	High	0.596	Medium	0.223	Low
249	60	0.995	High	0.596	Medium	0.223	Low
250	61	0.996	High	0.616	Medium	0.242	Low
250	62	0.996	High	0.616	Medium	0.242	Low
251	63	0.996	High	0.636	Medium	0.263	Low
251	64	0.996	High	0.636	Medium	0.263	Low
252	65	0.997	High	0.656	Medium	0.284	Low
252	66	0.997	High	0.656	Medium	0.284	Low
253	67	0.997	High	0.676	High	0.306	Low
253	68	0.997	High	0.676	High	0.306	Low
254	69	0.997	High	0.696	High	0.329	Low
254	70	0.997	High	0.696	High	0.329	Low
255	71	0.998	High	0.715	High	0.352	Medium
255	72	0.998	High	0.715	High	0.352	Medium
256	73	0.998	High	0.734	High	0.376	Medium
256	74	0.998	High	0.734	High	0.376	Medium
257	75	0.998	High	0.752	High	0.401	Medium
258	76	0.999	High	0.769	High	0.425	Medium
258	77	0.999	High	0.769	High	0.425	Medium
259	78	0.999	High	0.786	High	0.450	Medium
259	79	0.999	High	0.786	High	0.450	Medium
260	80	0.999	High	0.803	High	0.475	Medium
261	81	0.999	High	0.818	High	0.501	Medium
262	82	0.999	High	0.833	High	0.525	Medium
262	83	0.999	High	0.833	High	0.525	Medium
263	84	0.999	High	0.847	High	0.550	Medium
264	85	0.999	High	0.860	High	0.574	Medium
265	86	>0.999	High	0.873	High	0.598	Medium
266	87	>0.999	High	0.884	High	0.621	Medium
267	88	>0.999	High	0.895	High	0.643	Medium
268	89	>0.999	High	0.905	High	0.665	Medium
269	90	>0.999	High	0.914	High	0.686	High

ISIP™ AND ACT ASPIRE LINKING STUDY

ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
270	91	>0.999	High	0.923	High	0.706	High
271	92	>0.999	High	0.931	High	0.725	High
272	93	>0.999	High	0.938	High	0.743	High
274	94	>0.999	High	0.950	High	0.777	High
275	95	>0.999	High	0.956	High	0.793	High
277	96	>0.999	High	0.965	High	0.821	High
279	97	>0.999	High	0.972	High	0.846	High
282	98	>0.999	High	0.981	High	0.878	High
286	99	>0.999	High	0.988	High	0.910	High

ISIP Math and ACT Aspire-Math

Second Grade

Table 6 shows the probability projection of the second grade EOY ISIP Math scores and ACT Aspire Math performance levels. Students in second grade who obtained an ISIP Math score of 387 to 625 (1st to 99th percentile ranks) had a high probability of achieving ACT Aspire performance *Close* or higher.

Students who obtained an ISIP Math score of 454 to 499 (16th to 44th percentile ranks) had a medium probability of achieving ACT Aspire performance *Ready* or higher. Students who obtained an ISIP Math score lower than 454 had a low probability, whereas students who obtained an ISIP Math score higher than 499 had a high probability of achieving a level of *Ready* or higher.

Students who obtained an ISIP Math score of 534 to 578 (70th to 91st percentile ranks) had a medium probability of achieving performance level *Exceeding*. Students who obtained an ISIP Math score lower than 534 had a low probability, whereas students who obtained an ISIP Math score higher than 578 had a high probability of achieving the *Exceeding* level.

ISIP™ AND ACT ASPIRE LINKING STUDY

Table 6: EOY of Second Grade ISIP Math to Predict ACT Aspire Math

ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
387	1	0.871	High	0.071	Low	0.001	Low
400	2	0.879	High	0.100	Low	0.001	Low
409	3	0.885	High	0.126	Low	0.002	Low
416	4	0.890	High	0.150	Low	0.003	Low
421	5	0.893	High	0.169	Low	0.004	Low
426	6	0.896	High	0.191	Low	0.005	Low
430	7	0.899	High	0.209	Low	0.006	Low
433	8	0.901	High	0.223	Low	0.007	Low
437	9	0.904	High	0.244	Low	0.008	Low
440	10	0.905	High	0.260	Low	0.010	Low
442	11	0.906	High	0.271	Low	0.011	Low
445	12	0.907	High	0.289	Low	0.012	Low
448	13	0.908	High	0.307	Low	0.014	Low
450	14	0.908	High	0.319	Low	0.016	Low
452	15	0.909	High	0.332	Low	0.017	Low
454	16	0.909	High	0.345	Medium	0.019	Low
457	17	0.910	High	0.365	Medium	0.022	Low
459	18	0.910	High	0.379	Medium	0.024	Low
461	19	0.911	High	0.392	Medium	0.026	Low
462	20	0.911	High	0.399	Medium	0.028	Low
464	21	0.911	High	0.414	Medium	0.030	Low
466	22	0.911	High	0.428	Medium	0.033	Low
468	23	0.911	High	0.442	Medium	0.036	Low
469	24	0.911	High	0.449	Medium	0.038	Low
471	25	0.912	High	0.464	Medium	0.041	Low
473	26	0.912	High	0.479	Medium	0.045	Low
474	27	0.912	High	0.486	Medium	0.047	Low
476	28	0.912	High	0.501	Medium	0.051	Low
477	29	0.913	High	0.508	Medium	0.053	Low
479	30	0.913	High	0.523	Medium	0.058	Low
480	31	0.914	High	0.531	Medium	0.060	Low
482	32	0.914	High	0.546	Medium	0.065	Low
483	33	0.915	High	0.553	Medium	0.068	Low
485	34	0.915	High	0.568	Medium	0.073	Low
486	35	0.916	High	0.575	Medium	0.076	Low
488	36	0.917	High	0.590	Medium	0.082	Low
489	37	0.917	High	0.598	Medium	0.085	Low
490	38	0.918	High	0.605	Medium	0.088	Low
492	39	0.919	High	0.619	Medium	0.095	Low
493	40	0.920	High	0.627	Medium	0.099	Low
494	41	0.920	High	0.634	Medium	0.102	Low
496	42	0.922	High	0.648	Medium	0.110	Low
497	43	0.922	High	0.655	Medium	0.114	Low
498	44	0.923	High	0.662	Medium	0.118	Low
500	45	0.925	High	0.676	High	0.127	Low

ISIP™ AND ACT ASPIRE LINKING STUDY

ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
501	46	0.925	High	0.683	High	0.131	Low
502	47	0.926	High	0.690	High	0.135	Low
504	48	0.928	High	0.703	High	0.145	Low
505	49	0.928	High	0.710	High	0.150	Low
506	50	0.929	High	0.716	High	0.155	Low
508	51	0.931	High	0.729	High	0.165	Low
509	52	0.932	High	0.735	High	0.170	Low
510	53	0.933	High	0.742	High	0.175	Low
512	54	0.935	High	0.754	High	0.187	Low
513	55	0.935	High	0.760	High	0.192	Low
514	56	0.936	High	0.766	High	0.198	Low
516	57	0.938	High	0.778	High	0.210	Low
517	58	0.939	High	0.783	High	0.216	Low
518	59	0.940	High	0.789	High	0.223	Low
520	60	0.942	High	0.800	High	0.235	Low
521	61	0.943	High	0.805	High	0.242	Low
522	62	0.944	High	0.811	High	0.249	Low
524	63	0.946	High	0.821	High	0.262	Low
525	64	0.947	High	0.826	High	0.269	Low
527	65	0.949	High	0.836	High	0.283	Low
528	66	0.950	High	0.840	High	0.291	Low
529	67	0.951	High	0.845	High	0.298	Low
531	68	0.953	High	0.854	High	0.313	Low
532	69	0.954	High	0.858	High	0.320	Low
534	70	0.955	High	0.867	High	0.336	Medium
535	71	0.956	High	0.871	High	0.343	Medium
537	72	0.958	High	0.879	High	0.359	Medium
538	73	0.959	High	0.883	High	0.367	Medium
540	74	0.961	High	0.890	High	0.383	Medium
542	75	0.963	High	0.897	High	0.399	Medium
543	76	0.964	High	0.900	High	0.407	Medium
545	77	0.965	High	0.907	High	0.423	Medium
547	78	0.967	High	0.913	High	0.440	Medium
548	79	0.968	High	0.916	High	0.448	Medium
550	80	0.970	High	0.922	High	0.464	Medium
552	81	0.971	High	0.927	High	0.481	Medium
554	82	0.973	High	0.932	High	0.497	Medium
556	83	0.974	High	0.937	High	0.514	Medium
558	84	0.976	High	0.942	High	0.530	Medium
560	85	0.977	High	0.946	High	0.546	Medium
563	86	0.979	High	0.952	High	0.570	Medium
565	87	0.980	High	0.955	High	0.586	Medium
567	88	0.981	High	0.959	High	0.601	Medium
570	89	0.983	High	0.963	High	0.624	Medium
573	90	0.985	High	0.968	High	0.646	Medium
576	91	0.986	High	0.971	High	0.667	Medium
579	92	0.988	High	0.975	High	0.688	High

ISIP™ AND ACT ASPIRE LINKING STUDY

ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
583	93	0.989	High	0.979	High	0.714	High
587	94	0.991	High	0.982	High	0.739	High
591	95	0.992	High	0.985	High	0.762	High
597	96	0.993	High	0.988	High	0.794	High
603	97	0.995	High	0.991	High	0.823	High
612	98	0.996	High	0.994	High	0.860	High
625	99	0.998	High	0.997	High	0.901	High

Third Grade

Table 7 shows the probability projection for third graders' MOY ISIP Math scores and their projected ACT Aspire Math performance level. Students in third grade who obtained an ISIP Math score of 409 to 624 (1st to 99th percentile ranks) had a high probability of achieving the ACT Aspire performance level 2 (Close) or higher.

Students in third grade who obtained an ISIP Math score of 469 to 503 (15th to 38th percentile ranks) had a medium probability of achieving the ACT Aspire performance level 3 of *Ready* or higher. Students who obtained an ISIP Math score lower than 469 had a low probability, whereas students who obtained an ISIP Math score higher than 503 had a high probability of achieving *Ready* or higher.

Students who obtained an ISIP Math score of 541 to 569 (69th to 86th percentile ranks) had a medium probability of achieving ACT Aspire performance level 4 (*Exceeding*). Students who obtained an ISIP Math score lower than 541 had a low probability, whereas students who obtained an ISIP Math score higher than 569 had a high probability of achieving the *Exceeding* level.

ISIP™ AND ACT ASPIRE LINKING STUDY

Table 7: MOY of Third Grade ISIP Math to Predict ACT Aspire Math

ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
409	1	0.987	High	0.057	Low	<0.001	Low
421	2	0.988	High	0.085	Low	<0.001	Low
429	3	0.989	High	0.111	Low	<0.001	Low
435	4	0.989	High	0.134	Low	0.001	Low
440	5	0.989	High	0.156	Low	0.001	Low
444	6	0.990	High	0.176	Low	0.001	Low
448	7	0.990	High	0.198	Low	0.002	Low
451	8	0.990	High	0.216	Low	0.002	Low
454	9	0.990	High	0.235	Low	0.003	Low
457	10	0.990	High	0.256	Low	0.003	Low
460	11	0.990	High	0.277	Low	0.004	Low
462	12	0.990	High	0.292	Low	0.005	Low
464	13	0.990	High	0.307	Low	0.005	Low
466	14	0.990	High	0.323	Low	0.006	Low
469	15	0.990	High	0.348	Medium	0.008	Low
470	16	0.990	High	0.356	Medium	0.008	Low
472	17	0.990	High	0.374	Medium	0.009	Low
474	18	0.990	High	0.391	Medium	0.011	Low
476	19	0.990	High	0.409	Medium	0.012	Low
478	20	0.990	High	0.427	Medium	0.014	Low
479	21	0.990	High	0.436	Medium	0.015	Low
481	22	0.990	High	0.455	Medium	0.017	Low
482	23	0.990	High	0.464	Medium	0.018	Low
484	24	0.990	High	0.483	Medium	0.021	Low
485	25	0.990	High	0.493	Medium	0.022	Low
487	26	0.991	High	0.512	Medium	0.025	Low
488	27	0.991	High	0.521	Medium	0.026	Low
490	28	0.991	High	0.540	Medium	0.030	Low
491	29	0.991	High	0.550	Medium	0.032	Low
493	30	0.991	High	0.569	Medium	0.036	Low
494	31	0.991	High	0.578	Medium	0.038	Low
495	32	0.991	High	0.588	Medium	0.040	Low
497	33	0.992	High	0.607	Medium	0.045	Low
498	34	0.992	High	0.616	Medium	0.048	Low
499	35	0.992	High	0.625	Medium	0.051	Low
500	36	0.992	High	0.634	Medium	0.054	Low
502	37	0.992	High	0.653	Medium	0.060	Low
503	38	0.992	High	0.662	Medium	0.064	Low
504	39	0.992	High	0.671	High	0.067	Low
505	40	0.992	High	0.680	High	0.071	Low

ISIP™ AND ACT ASPIRE LINKING STUDY

ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
507	41	0.993	High	0.697	High	0.079	Low
508	42	0.993	High	0.706	High	0.083	Low
509	43	0.993	High	0.714	High	0.088	Low
510	44	0.993	High	0.723	High	0.093	Low
511	45	0.993	High	0.731	High	0.098	Low
513	46	0.993	High	0.747	High	0.108	Low
514	47	0.994	High	0.755	High	0.113	Low
515	48	0.994	High	0.763	High	0.119	Low
516	49	0.994	High	0.771	High	0.125	Low
517	50	0.994	High	0.778	High	0.131	Low
518	51	0.994	High	0.786	High	0.138	Low
520	52	0.994	High	0.800	High	0.151	Low
521	53	0.995	High	0.807	High	0.158	Low
522	54	0.995	High	0.814	High	0.165	Low
523	55	0.995	High	0.821	High	0.173	Low
524	56	0.995	High	0.828	High	0.181	Low
526	57	0.995	High	0.840	High	0.197	Low
527	58	0.995	High	0.847	High	0.206	Low
528	59	0.995	High	0.853	High	0.214	Low
529	60	0.996	High	0.858	High	0.223	Low
530	61	0.996	High	0.864	High	0.233	Low
532	62	0.996	High	0.875	High	0.252	Low
533	63	0.996	High	0.880	High	0.261	Low
534	64	0.996	High	0.886	High	0.272	Low
535	65	0.996	High	0.891	High	0.282	Low
537	66	0.997	High	0.900	High	0.303	Low
538	67	0.997	High	0.905	High	0.314	Low
539	68	0.997	High	0.909	High	0.325	Low
541	69	0.997	High	0.917	High	0.347	Medium
542	70	0.997	High	0.921	High	0.359	Medium
543	71	0.997	High	0.925	High	0.371	Medium
545	72	0.997	High	0.932	High	0.394	Medium
546	73	0.998	High	0.936	High	0.406	Medium
547	74	0.998	High	0.939	High	0.418	Medium
549	75	0.998	High	0.945	High	0.443	Medium
550	76	0.998	High	0.948	High	0.455	Medium
552	77	0.998	High	0.953	High	0.479	Medium
553	78	0.998	High	0.956	High	0.491	Medium
555	79	0.998	High	0.961	High	0.516	Medium
557	80	0.999	High	0.965	High	0.540	Medium
558	81	0.999	High	0.967	High	0.552	Medium
560	82	0.999	High	0.971	High	0.576	Medium

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ISIP Score	Percentile	Prob-Close	Close	Prob-Ready	Ready	Prob-Exceeding	Exceeding
562	83	0.999	High	0.974	High	0.599	Medium
564	84	0.999	High	0.977	High	0.622	Medium
566	85	0.999	High	0.980	High	0.644	Medium
568	86	0.999	High	0.982	High	0.666	Medium
570	87	0.999	High	0.985	High	0.687	High
572	88	0.999	High	0.987	High	0.707	High
574	89	0.999	High	0.988	High	0.726	High
577	90	0.999	High	0.990	High	0.754	High
580	91	>0.999	High	0.992	High	0.779	High
583	92	>0.999	High	0.994	High	0.802	High
586	93	>0.999	High	0.995	High	0.824	High
589	94	>0.999	High	0.996	High	0.843	High
593	95	>0.999	High	0.997	High	0.866	High
598	96	>0.999	High	0.998	High	0.891	High
604	97	>0.999	High	0.999	High	0.915	High
612	98	>0.999	High	0.999	High	0.940	High
624	99	>0.999	High	>0.999	High	0.900	High

Classification Accuracy

We conducted a classification accuracy for third grade MOY ISIP Reading scores and ACT Aspire Reading levels and for third grade MOY ISIP Math scores and ACT Aspire Math levels. Classification accuracy analyses are performed to determine ISIP cut points that could help differentiate students who would or would not attain level 3 (*Ready*) or higher on the ACT Aspire.

The Division of Arkansas Elementary & Secondary Education (See ACT Aspire Arkansas 2019 Technical Report) showed that in the 2018-2019 school year, 72% of third grade students in Arkansas met the benchmark in reading (28% in L3: Ready and 44% in L4: Exceed), whereas 62% of third grade students in Arkansas met the benchmark in math (38% in L3: Ready and 24% in L4: Exceed). In this sample, 41% of third grade students met the benchmark in reading (19% in L3: Ready and 22% in L4: Exceed), whereas 63% of third grade students met the

benchmark in math (40% in L3: Ready and 23% in L4: Exceed). The portion of the sample in this study that attained level 3 aligned with the overall passing rate in math but not in reading.

Reading

We used the results from the linking study to determine cut points that would help differentiate between students who were at risk of not meeting the *Ready* level or higher on the ACT Aspire. False positive, sensitivity (students who met the *Ready* level or above), specificity (students who did not meet the *Ready* level or above), positive predictive power, negative predictive power, and the overall rate were computed and compared to determine the best ISIP Reading cut point to identify students who would most likely meet the *Ready* level or higher on the ACT Aspire test in the spring for all students.

In this instance, a true positive indicates students who met or exceeded the cut point on the ISIP and are not at risk since they attained *Ready* or higher on the ACT Aspire. True negatives indicate students that scored below the cut point on the ISIP and did not meet *Ready* status on the ACT Aspire.

We first evaluated cut points for all students. After establishing the appropriate percentile with the best sensitivity and specificity at the 60th percentile, we evaluated that cut point by subgroups (White, Black or African American, Hispanic, Asian and other race/ethnicities, Female, and Male).

Table 8 shows the results from the classification accuracy for all students and by subgroups. For all students, the sensitivity was 0.76, indicating that approximately 76% of students who were classified by ISIP as likely to meet the *Ready* or above category on the ACT Aspire did so. Specificity was 0.82, indicating that 82% of students who were classified as at risk by ISIP did not meet *Ready* or above.

The positive predictive power was 0.75. This indicates that 75% of the students who were classified as likely to pass the ACT did so. The negative predictive power was 0.82, indicating

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that 82% of students who were identified as at risk did not meet *Ready* or above on the ACT Aspire Reading. The overall classification rate was 0.79, indicating that the percentage of students correctly classified on the ISIP Reading with respect to the ACT Aspire Reading was approximately 80%.

Results for the students who are White, Black or African American, Hispanic, and Asian and other race/ethnicities are similar. Sensitivity ranges from 0.66 to 0.78, and specificity ranges from 0.79 to 0.82. Specificity is highest for students who are Hispanic and lowest for students who are Asian or other race/ethnicities. Sensitivity is highest for students who are White or other race/ethnicity, and lowest for students who are Hispanic. Results are almost identical between female and male students. Sensitivity was 0.76 for females and 0.75 for males, and specificity was 0.82 for females and 0.81 for males.

Math

The same methodology is applied to ISIP Math and ACT Aspire Math. There were 4,087 third grade students in total. False positive, sensitivity (true positive rate), specificity (true negative rate), positive predictive power, negative predictive power, and overall rate are conducted and compared for all students and by subgroups (White, Black or African American, Hispanic, Other race/ethnicity, Female, and Male).

Results show that an ISIP Math cut point at the 45th percentile rank was the best differentiator for all students and by subgroups. The classification accuracy analyses with a cut point at the 45th percentile rank on the ISIP Math and the ACT Aspire Math benchmark cut point at the *Ready* level are reported here.

For all students, the sensitivity was 0.83, indicating that approximately 83% of the students whose score met or exceeded the threshold met *Ready* or above standards on the ACT Aspire Math. Specificity was 0.81, indicating that 81% of the students who did not meet the threshold on the ISIP did not meet *Ready* or above standards on the ACT Aspire. The positive

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predictive power or a precision of classification was 0.89. The negative predictive power was 0.72, and the overall classification rate was 0.82, indicating that 82% of students were correctly classified on the ISIP Math with respect to the ACT Aspire Math.

We reviewed these cut points by subgroup. Sensitivity ranged from 0.85 for students who are White, to 0.76 for students who are Black or African American. Specificity ranged from 0.88 for students who are Black or African American to 0.77 for students who are White.

Results are almost identical between female and male students. The sensitivities were 0.83 for female and 0.84 for male students. Specificity was 0.82 for female and 0.79 for male students. The positive predictive powers or a precision of classification were 0.90 for female and 0.88 for male students.

Overall, ISIP Reading and ISIP Math show almost identical classification accuracy results. ISIP Math shows a slightly better Overall rate over ISIP Reading (0.82 vs. 0.79), better sensitivity (0.82 vs. 0.74), and better positive prediction rate (0.89 vs. 0.73). However, ISIP Reading shows a better negative prediction rate over ISIP Math (0.82 vs. 0.73). Both ISIP Reading and ISIP Math show high classification accuracy indices, especially sensitivity, specificity, and the overall rate.

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Table 8: Classification Accuracy Indices

Measure	Group	TP (Pass ISIP/ Pass ACT)	FP (Pass ISIP, Fail ACT)	FN (Fail ISIP, Pass ACT)	TN (Fail ISIP, Fail ACT)	False Negative	False Positive	Sensitivity	Specificity	Positive Predictive	Negative Predictive	Overall Rate
Reading 60th percentile	ALL	1,414 (32.4%)	461 (10.5%)	455 (10.4%)	2,040 (46.7%)	0.18	0.24	0.76	0.82	0.75	0.82	0.79
	WH	1,073 (36.3%)	321 (10.8%)	310 (10.5%)	1,255 (42.4%)	0.20	0.22	0.78	0.80	0.77	0.80	0.79
	BL	79 (21.0%)	47 (12.5%)	36 (9.5%)	215 (57.0%)	0.18	0.31	0.69	0.82	0.63	0.86	0.78
	HI	149 (20.6%)	58 (8.0%)	78 (10.8%)	437 (60.5%)	0.12	0.34	0.66	0.88	0.72	0.85	0.81
	OT	113 (36.2%)	35 (11.2%)	31 (9.9%)	133 (42.6%)	0.21	0.22	0.78	0.79	0.76	0.81	0.79
	F	772 (36.3%)	198 (9.3%)	241 (11.3%)	918 (43.1%)	0.18	0.24	0.76	0.82	0.80	0.79	0.79
	M	642 (28.6%)	263 (11.7%)	214 (9.5%)	1,122 (50.1%)	0.19	0.25	0.75	0.81	0.71	0.84	0.79
Math 45th percentile	ALL	2,211 (53.8%)	278 (6.8%)	450 (11.0%)	1,167 (28.4%)	0.19	0.17	0.83	0.81	0.89	0.72	0.82
	WH	1,641 (58.9%)	196 (7.0%)	292 (10.5%)	657 (23.6%)	0.23	0.15	0.85	0.77	0.89	0.69	0.82
	BL	129 (37.4%)	21 (6.1%)	41 (11.9%)	154 (44.6%)	0.12	0.24	0.76	0.88	0.86	0.79	0.82
	HI	267 (39.4%)	48 (7.1%)	74 (10.9%)	288 (42.5%)	0.14	0.22	0.78	0.86	0.85	0.80	0.82
	OT	163 (58.4%)	13 (4.7%)	35 (12.5%)	68 (24.4%)	0.16	0.18	0.82	0.84	0.93	0.66	0.83
	F	1,061 (53.7%)	122 (6.2%)	225 (11.4%)	566 (28.7%)	0.18	0.17	0.83	0.82	0.90	0.72	0.82
	M	1,139 (53.9%)	156 (7.4%)	217 (10.3%)	601 (28.4%)	0.21	0.16	0.84	0.79	0.88	0.73	0.82

Note: ALL = all students, WH = White students, BL = Black or African American students, HI = Hispanic students
 OT = 2 or more races, Asian, and Native American/Alaskan Native, other race ethnicities
 F = female students, M = male students
 TP = True Positive, FP = False Positive, FN = False Negative, and TN = True Negative

Discussion

This study demonstrates how ISIP scores predict students' performance on the ACT Aspire state assessment tests in reading and math. The main goal of this study is to provide useful information to teachers and administrators to prepare their second and third grade students for the ACT Aspire end-of-year assessments in the spring of third grade. The results show that the EOY ISIP Reading and ISIP Math scores for students in second grade can help predict at-risk students. This gives teachers the entire third grade year to work with at-risk students, especially those who are predicted to have a medium probability of attaining the *Ready* performance level. Similarly, using the MOY ISIP Reading and ISIP Math scores in third grade will help teachers measure student progress and help provide intervention for students at risk.

The ACT Aspire performance level 3 (*Ready*) identifies whether a student has met proficiency on the assessment or not. Results show that a second grader who obtained an ISIP Reading score around the 40th to 75th percentile ranks had a medium probability of attaining *Ready* or higher. Students who obtained an ISIP Reading score lower than the 40th percentile rank had a low probability, whereas students who obtained an ISIP Reading score around the 75th percentile rank or higher had a high probability of attaining the *Ready* level or higher. This result implies that if a second grader is in Tier 1 (above the 40th percentile rank) or in Level 4 (between the 60th and the 80th percentile ranks) or 5 (above the 80th percentile rank) at EOY, then he or she has a high probability of attaining level 3 or higher on the ACT Aspire Reading in the third grade.

Results also show that a third grader who obtained an ISIP Reading score around the 30th to 70th percentile ranks had a medium probability of attaining *Ready* or higher. Similar to second grade students, if a third grader is in Tier 1 (above the 40th percentile rank) or in Level 4

(between the 60th and the 80th percentile ranks) or 5 (above the 80th percentile rank) at MOY of their third grade, then he or she has a high probability of attaining level 3 or higher on the ACT Aspire Reading in the third grade. Classification accuracy with a cut point at the 60th percentile for ISIP Reading shows strong specificity (students predicted to meet the *Close* level or below) at 0.82, and sensitivity (students predicted to meet the *Ready* or above level) at 0.76, which enables teachers to quickly identify students that may need intense intervention before the ACT Aspire is administered in the spring.

In math, students who scored in Tier 1 in the spring of second grade had a high probability of achieving the *Ready* level or higher at the end of third grade. Similarly, students in third grade who scored in Tier 1 at MOY also had a high probability of achieving the *Ready* level. A cut point for math at the 45th percentile shows strong specificity (0.81) and sensitivity (0.83). These results mirror the actual passing rate in Arkansas.

Conclusions and Limitations

The findings from this study give useful information for school administrators, superintendents, teachers, and parents to use ISIP scores and percentile ranks to predict students' performance on the ACT Aspire Reading and ACT Aspire Math end-of-year assessments. Teachers can identify students who are at risk of not meeting *Ready* or above and give them the critical intervention they need to improve their academic skills.

The results confirm a positive relationship between the ISIP and ACT Aspire assessments. While results are promising, it must be understood that complete certainty of passing ACT Aspire Reading and ACT Aspire Math tests is unknown. There are many other factors that may affect students' ACT Aspire Reading and ACT Aspire Math scores besides their reading and math abilities as measured by the ISIP assessments. This research evaluated the ISIP scores from the spring of second grade and the winter of third grade, and we note that students need to continue to grow from these benchmark periods to meet *Ready* or above on the

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ACT Aspire. These cut points will help teachers identify students who may need additional intervention in order to increase the probability that they will be successful on the end-of-year assessment.

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