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## **Comparison of SAS<sup>®</sup> EVAAS<sup>®</sup> Results and WCPSS Effectiveness Index Results**

### **BACKGROUND**

#### **WCPSS Effectiveness Index**

For several years, WCPSS has computed residual scores for all state End-of-Grade (EOG) and End-of-Course (EOC) tests taken by WCPSS students. These residuals give a measure of how students performed compared to other WCPSS students, adjusting for a number of factors, including prior EOG/EOC test performance, special programs status (i.e., academically gifted status, disability status, and free or reduced-price lunch status), and the overall poverty level of the school as measured by the percentage of students in the school eligible for free or reduced-price lunch (FRL).

These residual scores are produced using regression analysis with the current year's test scores as the dependent variable and prior test performance plus these other factors as the independent variables. The residual score for a student is the difference between the student's actual score and her/his predicted score, which is based on how WCPSS students performed in general plus some adjustments based on the student's status on those independent variables.

In each subject, the student residuals are averaged across all students in the school, and a standardized z-score (termed an "Effectiveness Index") is found for each school by subject. If the z-score is greater than 1, then the school knows that its students scored significantly better than other schools in the district that year, considering their past performance and other factors. Similarly, if the effectiveness index is less than -1, then this indicates that students in that school as a whole did not do as well as most other schools in the district. Values between -1 and +1 are within one standard deviation of the district average, and are associated with more "typical" or average performance. These analyses are calculated every year, so that they represent measurement against a relative and changing standard from year to year.

The Effectiveness Index thus gives each school an estimate of subjects and grade levels in which their students outperformed or under-performed other students districtwide, after considering students' incoming achievement levels and program characteristics. This analysis produces a rank-ordering of schools such that some number will always be above the 1.0 threshold on each test every year, and a similar number will fall below -1.0, with the majority falling in-between. This procedure therefore results in a relative (rather than absolute) measure of performance for each WCPSS school on each test, analogous to a class rank assigned to a graduating high school student.

Average residual scores by teacher are also produced by this analysis. Interpretation guidelines are provided for teachers that are similar to those for schools; they allow teachers to see whether they fall among the top, bottom, or middle/average group of teachers in terms of their students' performance. Examining average residual scores gives teachers an idea of how well their students performed relative to other WCPSS students that year, and provides them with an estimate of where they rank among their colleagues who taught the same subject or grade that year.

## EVAAS<sup>®</sup>

EVAAS<sup>®</sup> (see <http://www.sas.com/govedu/edu/services/effectiveness.html>) is an analytic approach with some of the same goals of the WCPSS Effectiveness Index approach. It has been deployed in several school districts and states over the past several years. It began in Tennessee in the 1990s through the work of Dr. William Sanders and colleagues (Sanders, Saxton and Horn, 1997), and is currently under the auspices of the SAS<sup>®</sup> Corporation. EVAAS<sup>®</sup> attempts to estimate the effectiveness of schools, teachers, and even districts in raising student test scores by analyzing longitudinal databases that contain multiple measures of student performance across years. This online database has recently been made available to all NC schools free of charge through the NC Department of Public Instruction (<http://ncdpi.sas.com>).

Like the WCPSS Effectiveness Index analyses, EVAAS<sup>®</sup> produces estimates of the extent to which students score better (or more poorly) than would otherwise be expected on achievement test outcomes. This specific analysis is labeled a "School Value Added Report". It differs from the WCPSS Effectiveness Index approach in terms of statistical methodology in several ways (Sanders, Saxton, and Horn, 1997). Those differences include:

- The WCPSS Effectiveness Index analyses use what is called "ordinary least squares" regression equations, whereas EVAAS<sup>®</sup> uses mixed-model regression equations.
- The WCPSS Effectiveness Index analyses make adjustments to students' predicted scores based on program characteristics, whereas EVAAS<sup>®</sup> uses only prior test scores to predict future performance.
- The WCPSS Effectiveness Index compares performance internally within WCPSS, whereas EVAAS<sup>®</sup> (as implemented in North Carolina) uses statewide results as the benchmark for performance.
- The WCPSS Effectiveness Index uses between one and four prior test scores to predict future student performance (depending on the subject and grade level being analyzed), whereas EVAAS<sup>®</sup> (as implemented in North Carolina) uses all available data for each student between grade 3 and grade 12 to predict future student performance.
- EVAAS<sup>®</sup> includes in its models adjustments for students with missing or partially missing historical data, as well as "shrinkage" estimates which provide for more conservative estimates of teacher and school effectiveness than would otherwise be obtained. The WCPSS Effectiveness Index analyses do not incorporate any statistical adjustments for such factors.

## PURPOSE OF STUDY

Since the EVAAS<sup>®</sup> system is now available to all NC schools, and because these two systems are attempting to answer some of the same questions about school effectiveness, the WCPSS Evaluation and Research Department conducted a small-scale study of the results of the two systems. Specifically, this study sought to explore:

- Whether EVAAS<sup>®</sup> results from the *School Value Added Report* were correlated with WCPSS Effectiveness Index results, and
- Whether EVAAS<sup>®</sup> *School Value Added Report* results and WCPSS Effectiveness Index results would identify the same schools as higher and lower-performing.

## Data Sources

For this study, school-level effectiveness estimates from both systems for the 2007-08 school year were analyzed along with the percentage of FRL students in the school to address the questions of interest. All ten high school End-of-Course Tests were examined, as were two selected End-of-Grade tests – Grade 4 Math and Grade 7 Math<sup>1</sup>. All of the raw achievement data used in these analyses are listed in Appendix A.

## RESULTS

### Correlations

Results indicated a high degree of correlation between WCPSS Effectiveness Indices and EVAAS<sup>®</sup> Estimates, with all correlations estimated at .63 or above, with the exception of Civics & Economics (Table 1). Six of the 12 correlations between WCPSS Effectiveness Indices and EVAAS<sup>®</sup> Estimates are above .90. These results imply that there is a high degree of correspondence between the two measures (e.g., schools that scored higher on EVAAS<sup>®</sup> also tended to score higher on the WCPSS Effectiveness Index).

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<sup>1</sup> At the time these analyses were conducted, EOG Reading scores form 2007-08 were not available.

Table 1: Correlations between School-Level WCPSS Effectiveness Indices, EVAAS<sup>®</sup> School Value Added Estimates, and Percentage of Students in the School Eligible for Free or Reduced Price Lunch (FRL), 2007-08 School Year.

Test	WCPSS- EVAAS <sup>®</sup>	WCPSS- FRL	EVAAS <sup>®</sup> - FRL
Grade 4 Math (n=96)	0.97*	0.03	0.05
Grade 7 Math (n=25)	0.77*	0.02	-0.57*
Algebra I (n=24)	0.63*	0.03	-0.74*
Algebra II (n=23)	0.83*	0.03	-0.40*
Biology (n=21)	0.90*	-0.36	-0.64*
Chemistry (n=20)	0.97*	-0.01	-0.02
Civics & Econ. (n=20)	0.36	0.14	-0.64*
English I (n=23)	0.95*	-0.28	-0.46*
Geometry (n=23)	0.99*	-0.29	-0.38
Physical Science (n=20)	0.79*	0.00	-0.54*
Physics (n=14)	0.92*	-0.05	-0.40
US History (n=23)	0.81*	-0.18	-0.40*
<b>All Tests Combined (n=332)</b>	<b>0.79*</b>	<b>-0.05</b>	<b>-0.30*</b>

NOTE: Correlations with an asterisk (\*) imply that there is evidence of a relationship between the two variables. Sample sizes for correlations are indicated in parentheses after each test name. Algebra I data are from high schools only.

Correlations between the percentage of FRL students in the school and WCPSS Effectiveness Indices were all non-significant, indicating no evidence of a relationship between effectiveness and school poverty, which is not unexpected since school poverty is already factored into those effectiveness calculations. EVAAS<sup>®</sup> scores, however, were in many cases significantly negatively correlated with school poverty, implying that schools with higher percentages of FRL students received lower EVAAS<sup>®</sup> scores than schools with smaller percentages of FRL students (Table 1).

### Classification of Schools

The second set of analyses focused on the classifications given to schools by each of the two effectiveness methodologies. In addition to the numeric estimates of effectiveness that schools receive from these two systems, each of the two also results in a classification for each school based on those estimates.

WCPSS Effectiveness Index interpretation guidelines are as follows:

*If the index is above +1.0, the school's residual average is among the top schools in the system serving that grade level. If the index is below -1.0, the school's residual average is among the bottom school averages. Indices between +1.0 and -1.0 are considered typical performance compared to other WCPSS schools.*

In the EVAAS<sup>®</sup> system, a similar three-level distinction is made, in which the numeric result for each school is given a color code as follows:

***Above (Green)<sup>2</sup>***: students in the school made significantly more progress in this subject than students in the average school in the state.

***NDD (Yellow)***: the progress of students in the school was Not Detectably Different from the progress of students in the average school in the state.

***Below (Light Red)***: students in the school made significantly less progress in this subject than students in the average school in the state.

Therefore, while the WCPSS Effectiveness Indices essentially rank-order WCPSS schools' performance relative to each other, the EVAAS<sup>®</sup> system examines school performance relative to statewide performance. Since the majority of WCPSS schools have historically out-performed statewide norms overall on these tests, it was assumed that there would be some differences in which schools were classified as higher or lower-performing between the two systems – specifically, that when the two systems disagreed, that EVAAS<sup>®</sup> would provide a more favorable rating to WCPSS schools.

*Table 2: Classification Results for WCPSS Effectiveness Index and EVAAS<sup>®</sup> School Value Added Reports.*

	% Schools Agree	% EVAAS <sup>®</sup> > WCPSS	% WCPSS > EVAAS <sup>®</sup>
Grade 4 Math	81.3%	12.5%	6.3%
Grade 7 Math	64.0%	8.0%	28.0%
Algebra I	29.2%	54.2%	16.7%
Algebra II	34.8%	52.2%	13.0%
Biology	42.9%	47.6%	9.5%
Chemistry	50.0%	50.0%	0.0%
Civics & Econ.	30.0%	65.0%	5.0%
English I	65.2%	34.8%	0.0%
Geometry	82.6%	8.7%	8.7%
Physical Science	60.0%	20.0%	20.0%
Physics	57.1%	42.9%	0.0%
US History	52.2%	13.0%	34.8%
<b>All Tests Combined</b>	<b>60.2%</b>	<b>28.6%</b>	<b>11.1%</b>

NOTES: Sample sizes are the same as listed in Table 1. Percentages do not add up to exactly 100% due to rounding.

Based on the results presented in Table 2, three patterns are evident across the tests examined:

- Tests where the two systems had relatively high overall agreement on the classification of schools (Grade 4 Math, Geometry, Physical Science);

<sup>2</sup> These descriptions were taken from the online EVAAS<sup>®</sup> help database ([https://ncdpi.sas.com/evaas/help/NC/EVAAS\\_help\\_NVS\\_va\\_school.html](https://ncdpi.sas.com/evaas/help/NC/EVAAS_help_NVS_va_school.html)) on March 6, 2009.

- Tests where EVAAS<sup>®</sup> was generally *more* favorable – that is, where EVAAS<sup>®</sup> was more likely to classify a school into a higher performance category (Algebra I, Algebra II, Biology, Chemistry, Civics & Economics, English I, Physics); and
- Tests where EVAAS<sup>®</sup> was generally *less* favorable in its classification of schools (Grade 7 Math, US History).

Overall, it would appear that the majority of the time on the majority of tests, the two systems were in agreement. Across all tests, there were 95 instances (28.6% of the total comparisons made) where EVAAS<sup>®</sup> Estimates designated schools as outperforming the statewide norms for schools that had WCPSS Effectiveness Indices in the average range. There were 37 additional instances (11.1% of all comparisons) where EVAAS<sup>®</sup> Estimates designated schools as under-performing the state as a whole when those schools' WCPSS Effectiveness Indices would have deemed them to be performing in the average range.

In cases where the EVAAS<sup>®</sup> estimates diverged from those of the WCPSS Effectiveness Index, the EVAAS<sup>®</sup> estimates were typically more favorable to schools – e.g., classifying a school into a higher performance category than the WCPSS results would otherwise assert. Since EVAAS<sup>®</sup> is benchmarking schools against the entire state (rather than just WCPSS schools), this overall result is not surprising.

In addition to this “agree/disagree” analysis between the two systems, it is also instructive to examine those disagreements in terms of where the disagreements tend to occur along the performance continuum. In order to address this, additional analysis about the locations of the disagreements between the classification groups was conducted. Across the twelve tests examined in this study, the vast majority of the disagreements between WCPSS Effectiveness Indices and EVAAS<sup>®</sup> Estimates were in cases where EVAAS<sup>®</sup> designated a school as an outlier (i.e., higher or lower-performing) that WCPSS would have determined to be “average” (Table 3). Therefore, it would appear that EVAAS<sup>®</sup> was more likely to give a school a more extreme classification than the WCPSS Effectiveness Indices.

*Table 3: Nature of Classification Disagreements between EVAAS<sup>®</sup> School Value-Added reports and WCPSS Effectiveness Index, 2007-08 School Year.*

WCPSS	EVAAS <sup>®</sup>	n	% of Total Comparisons
Low	Average	3	0.9%
Low	High	1	0.3%
Average	Low	31	9.3%
Average	High	91	27.4%
High	Low	0	----
High	Average	6	1.8%
<b>No disagreement</b>		<b>200</b>	<b>60.2%</b>

NOTE: Results based only on the 12 tests listed in Table 1 (332 total school comparisons). Percentages do not add up to exactly 100% due to rounding.

As noted previously, one of the main differences between the two systems under study is that the WCPSS Effectiveness Indices model makes adjustments to results based on other non-achievement

factors including school poverty. Therefore, it was of interest to determine whether the discrepancies between the two systems might be related to school poverty level.

The results of this analysis indicated that situations where EVAAS<sup>®</sup> was more favorable to schools in terms of their achievement classification tended to occur most often (78% of the time) in lower-poverty schools – that is, schools where the percentage of students eligible for free or reduced-price lunch was less than 30% (Table 4). Conversely, situations where WCPSS Effectiveness Indices were more favorable to schools tended to occur most often (68% of the time) in schools where the percentage of students eligible for free or reduced-price lunch was 30% or higher.

*Table 4: Classification Disagreements between EVAAS<sup>®</sup> School Value-Added reports and WCPSS Effectiveness Index by School Poverty Level, 2007-08 School Year.*

Nature of Classification Disagreement	Total # Instances	# Instances Where School $\geq$ 30% FRL
EVAAS <sup>®</sup> more favorable	95	21 (22%)
No Disagreement	200	94 (47%)
WCPSS more favorable	37	25 (68%)

NOTE: “FRL” = Free or Reduced-Price Lunch.

## SUMMARY

In summary, the correlations between WCPSS Effectiveness Indices and the estimates from the EVAAS<sup>®</sup> School Value Added Report appear to be very high in most cases, with Civics and Economics being the major exception. Analysis of classification decisions between the two systems also show a high degree of correspondence, with most of the identified discrepancies being cases where EVAAS<sup>®</sup> slotted WCPSS schools into a higher performance category than did WCPSS Effectiveness Indices. The nature of these disagreements was not unanticipated, as the EVAAS<sup>®</sup> system uses a statewide benchmark rather than a WCPSS-specific benchmark. There was also evidence that the classification disagreements were related to the poverty level of the school, such that EVAAS<sup>®</sup> looked more favorably upon schools with lower percentages of students eligible for free or reduced-price lunch (FRL), and less favorably upon those with higher FRL percentages as compared to WCPSS Effectiveness Indices. This again was not entirely unanticipated, since the WCPSS Effectiveness Indices incorporate poverty measures into the calculations, whereas EVAAS<sup>®</sup> does not.

It appears that the EVAAS<sup>®</sup> School Value Added analysis is very similar to WCPSS Effectiveness Indices in both intent and result, some procedural and technical distinctions notwithstanding. The differences in observed results (in the cases where they exist) appear to be linked to both the choice of benchmark and the decision to use (or not use) predictor variables other than prior achievement in the model.

It was also of interest to note that nearly all EVAAS<sup>®</sup>-WCPSS classification discrepancies involved situations where EVAAS<sup>®</sup> was also more likely to classify a WCPSS school into the high or low category than was the WCPSS Effectiveness Index model (see Table 3). This may be due in part to

the fact that the WCPSS model scales schools relative to each other, such that the proportion of schools in the high and low categories is restricted by design – schools that fall more than 1 standard deviation away from the overall average are classified as high or low, regardless of how wide or narrow the band of performance might be. This method will result in approximately 16% of schools being classified into the high category and 16% into the low category for any test in any given year, thereby forcing the “average” group to encompass about two-thirds of the schools in any analysis. Since EVAAS<sup>®</sup> school value added results for WCPSS schools are being scaled relative to the entire state, this restriction is not in play within the Local Education Agency (LEA), and so the number of WCPSS schools in those high and low groups can vary to a greater degree.

The choice of reference group between these two models is particularly consequential, in that decisions as to which schools are low, average or high in terms of performance depends in some cases on which model is used to make the determination. Depending on the intended purpose of the measurement – to motivate overall school improvement, to celebrate high performers, to identify schools for assistance, to prioritize school improvement goals, etc. – the choice of benchmark may be important, as the cost of potential “false positives” or “false negatives” may depend upon the data user’s perspective.

It must be noted that the comparison reported here focused on one type of analysis available from the EVAAS<sup>®</sup> system – the School Value Added Report – which happens to parallel the WCPSS Effectiveness Index model. It should be noted that the EVAAS<sup>®</sup> system contains many types of reports that go beyond what is measured and reported in the WCPSS Effectiveness Index. This analysis made no attempts to catalog or evaluate those, or to compare them to any other reporting systems.

## REFERENCES

Sanders, W. L., Saxton, A. M., & Horn, S. P. (1997). The Tennessee value-added assessment system, a quantitative, outcomes-based approach to educational measurement. In Jason Millman (Ed.). *Grading teachers, grading schools, Is student achievement a valid evaluation measure?* (pp. 137-162). Thousand Oaks, CA Corwin Press. Retrieved from <http://www.sas.com/govedu/edu/sanderssaxtonhorn.pdf> on March 6, 2009.

APPENDIX A

WCPSS-EVAAS<sup>®</sup> Comparisons by School and Test, 2007-08 School Year

The tables in Appendix A show the classification results for each school on each test in both models. Schools highlighted in green indicate that the model labeled them as higher-performing; schools highlighted in yellow are typical, or indistinguishable from “average”; and schools highlighted in red are labeled as lower-performing. In a few cases, EVAAS<sup>®</sup> estimates were not available for some schools and some tests.

4<sup>th</sup> Grade Math Results by School (in ascending order by WCPSS Effectiveness Index rating)

WCPSS	EVAAS <sup>®</sup>	WCPSS	EVAAS <sup>®</sup>	WCPSS	EVAAS <sup>®</sup>
-2.51	-3.4	-0.43	-0.5	0.35	0.5
-2.37	-3.2	-0.43	-0.7	0.37	0.8
-2.28	-2.9	-0.42	-0.3	0.44	1.5
-2.10	-2.4	-0.41	-0.7	0.50	1.5
-1.42	-2.0	-0.39	-0.4	0.50	0.7
-1.35	-1.4	-0.38	-0.1	0.51	0.6
-1.32	-1.9	-0.37	-0.1	0.58	1.4
-1.29	-1.3	-0.33	0.6	0.69	1.7
-1.15	-1.4	-0.24	0.4	0.73	1.4
-1.13	-1.6	-0.20	-0.9	0.75	1.0
-1.04	-1.1	-0.18	-0.1	0.78	1.1
-0.97	-1.0	-0.18	0.2	0.92	1.3
-0.95	-1.1	-0.15	-0.1	0.94	1.7
-0.90	-1.1	-0.13	-0.2	0.95	1.4
-0.87	-1.3	-0.13	0.5	0.99	1.2
-0.86	-0.4	-0.12	-0.1	1.03	2.1
-0.83	-1.1	-0.07	0	1.04	2.1
-0.83	-0.5	-0.06	0.4	1.14	2.0
-0.81	-1	-0.04	0.5	1.21	2.6
-0.80	-0.6	0.02	0.6	1.23	1.0
-0.78	-0.8	0.04	0	1.26	2.1
-0.78	-0.7	0.08	1.1	1.27	2.0
-0.77	-0.8	0.09	0.3	1.37	1.5
-0.71	-0.6	0.18	-0.3	1.41	2.2
-0.69	-0.1	0.20	0.3	1.42	1.8
-0.65	-0.5	0.20	0.6	1.61	2.7
-0.61	-0.2	0.22	0.6	1.68	2.7
-0.60	-0.3	0.25	0.9	1.72	2.4
-0.59	-0.6	0.26	0.5	1.73	1.8
-0.51	-0.3	0.28	0.7	1.83	2.3
-0.51	-0.2	0.29	0.8	2.33	3.1
-0.49	0	0.32	0.8	2.36	2.9

7<sup>th</sup> Grade Math Results by School (in ascending order by WCPSS Effectiveness Index rating)

WCPSS	EVAAS <sup>®</sup>
-1.99	-2.0
-1.85	-2.8
-1.26	-1.0
-1.26	-1.5
-1.00	0.1
-0.90	-1.4
-0.50	
-0.43	-1.5
-0.34	-1.2
-0.27	-0.4
-0.27	1.2
-0.15	
-0.11	-0.8
-0.03	0.2
-0.01	-0.6
0.03	0.1
0.04	-0.6
0.05	0.1
0.07	-1.2
0.41	
0.56	1.1
0.82	-0.4
1.01	-0.1
1.05	0.7
1.16	1.7
1.27	1.2
1.94	1.1
1.96	0.6

End-of-Course Test Results by School (in ascending order by WCPSS Effectiveness Index rating)

## Algebra I

WCPSS	EVAAS <sup>®</sup>
-1.95	-1.7
-1.61	-3.9
-1.60	-1.7
-1.41	-2.7
-0.77	-1.3
-0.62	2.0
-0.37	-0.9
-0.28	-2.1
-0.25	3.0
-0.16	2.4
-0.05	1.5
0.05	1.3
0.13	0.9
0.14	0.0
0.27	3.3
0.34	2.3
0.42	2.4
0.55	3.8
0.64	2.5
0.78	3.0
0.82	2.3
1.30	4.0
1.56	4.1
2.07	-1.7

## Algebra II

WCPSS	EVAAS <sup>®</sup>
-2.89	-5
-1.46	-1.2
-1.12	-1.7
-1.07	-1.0
-0.90	-0.9
-0.79	-1.7
-0.19	-1.3
-0.16	2.5
-0.12	1.0
0.04	2.3
0.19	1.4
0.27	1.5
0.34	0.6
0.35	1.2
0.36	1.6
0.62	1.1
0.64	1.5
0.66	1.3
0.74	1.2
0.77	3.4
0.99	0.3
1.21	1.7
1.53	1.6

## Biology

WCPSS	EVAAS <sup>®</sup>
-2.41	-2.8
-1.71	-2.2
-1.04	
-0.92	-0.9
-0.79	0.0
-0.59	-3.4
-0.61	-0.3
-0.51	0.2
-0.25	0.7
-0.17	0.6
0.16	0.3
0.37	1.4
0.41	1.8
0.51	1.5
0.63	1.3
0.64	1.2
0.67	1.5
0.70	2.2
0.89	2.0
1.09	1.7
1.26	2.4
1.65	3.7

Chemistry

WCPSS	EVAAS <sup>®</sup>
-2.59	-5.2
-1.36	-2.5
-1.34	-2.3
-0.90	-0.2
-0.63	0.3
-0.36	-1.0
-0.34	1.0
-0.24	0.1
-0.08	0.6
0.16	1.6
0.47	2.0
0.49	2.2
0.54	1.3
0.54	3.3
0.63	1.8
0.67	2.1
0.72	2.7
0.76	2.9
1.27	3.6
1.58	4.1

Civics & Economics

WCPSS	EVAAS <sup>®</sup>
-1.93	1.0
-1.63	-0.2
-1.12	0.3
-0.78	-0.1
-0.70	0.6
-0.54	0.2
-0.36	1.6
-0.31	0.7
-0.16	0.6
-0.15	1.0
-0.02	1.4
0.01	0.7
0.18	1.3
0.32	0.7
0.51	1.1
1.12	1.7
1.18	2.0
1.24	2.1
1.26	-1.7
1.87	2.1

English I

WCPSS	EVAAS <sup>®</sup>
-3.13	-1.9
-1.29	-1.1
-0.79	-0.7
-0.75	0.1
-0.70	-0.1
-0.50	-0.2
-0.45	-0.3
-0.23	0.2
-0.13	0.3
-0.07	0.0
-0.07	0.1
0.00	0.4
0.14	0.4
0.31	0.9
0.35	0.5
0.36	0.5
0.49	0.7
0.63	0.9
0.68	0.4
0.92	0.6
1.24	1.1
1.48	1.4
1.52	1.6

Geometry

WCPSS	EVAAS <sup>®</sup>
-2.03	-3.8
-1.84	-4.0
-1.22	-2.8
-1.18	-2.2
-0.60	-0.8
-0.44	-0.7
-0.37	-0.2
-0.31	-0.3
-0.23	-0.5
-0.18	-0.4
-0.14	-0.1
0.01	0.4
0.09	0.5
0.19	0.4
0.24	0.4
0.31	0.7
0.36	0.4
0.36	0.3
0.96	2.3
1.07	1.5
1.52	3.4
1.60	3.4
1.82	3.5

Physical Science

WCPSS	EVAAS <sup>®</sup>
-1.79	-3.8
-1.33	-1.2
-1.29	-1.3
-1.07	-1.7
-0.79	-2.1
-0.50	-0.4
-0.49	0.3
-0.37	-4.1
-0.24	-2.4
-0.07	1.2
0.20	1.2
0.24	1.3
0.24	0.8
0.24	0.8
0.25	0.0
0.43	0.8
0.80	1.8
1.01	0.7
1.22	1.2
1.75	2.0
1.81	2.9

Physics

WCPSS	EVAAS <sup>®</sup>
-1.60	-4.1
-1.21	-0.6
-0.59	1.0
-0.52	0.2
-0.51	0.4
-0.46	-0.1
-0.43	1.6
-0.31	0.8
-0.24	2.5
0.74	3.2
0.95	3.9
0.98	4.7
1.51	4.3
1.69	4.1

US History

WCPSS	EVAAS <sup>®</sup>
-1.95	-2.2
-1.78	-2.3
-1.32	-0.6
-1.16	-4.1
-0.86	-1.9
-0.53	-0.9
-0.43	-2.2
-0.37	-0.7
-0.29	-1.0
-0.24	-0.8
-0.13	-1.4
-0.06	0.0
0.11	-1.4
0.19	-1.3
0.43	0.0
0.50	0.5
0.55	0.8
0.86	1.8
0.88	0.9
0.96	-0.5
1.43	1.3
1.63	1.2
1.58	1.0