Maryland School Assessment (MSA)
Science

Grades 5 and 8

Technical Report
2008 Operational Test

October, 2008

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Introduction

The Maryland School Assessment (MSA) tests are measures of students' knowledge relative to the Maryland Voluntary State Curriculum. The MSA Science test was added to established assessments in reading and mathematics to form part of the MSA program. Administered annually in the spring, the MSA program was established to meet the requirements of the No Child Left Behind Act (NCLB) of 2001. In 2006, Pearson was contracted by Maryland State Department of Education (MSDE) to develop, administer and maintain the MSA Science test. This report provides technical details of work accomplished during the 2007-2008 test administration cycle.

Purpose

The purpose of this MSA Technical Manual is to provide objective information regarding technical aspects of the 2008 MSA Science operational test. This volume is intended to be one source of information to Maryland K-12 educational stakeholders (including testing coordinators, educators, parents and other interested citizens) about the development, implementation, scoring and technical attributes of the MSA Science. Other sources of information regarding the MSA Science test, provided in paper or online format, include the MSA Science administration manual, implementation material and training materials.

The information provided here fulfills professional and scientific guidelines (AERA, APA, NCME, 1999) for field test technical reports of large scale educational assessments and is intended for use by qualified users within schools who use the MSA Science and interpret the results. Specifically, information was selected for inclusion in this report based on NCLB requirements and the following *Standards for Educational and Psychological Testing*:

- Standards 6.1 – 6.15 Supporting Documentation for Tests
- Standards 10.1—10.12 Testing Individuals with Disabilities
- Standards13.1—13.19 Educational Testing and Assessment

This manual provides information about the MSA Science test regarding:

1. Content of the tests;
2. Test form design;
3. Identification of ineffective items;
4. Reliability of the tests;
5. Difficulty of the test questions;
6. Equating of test forms;
7. Detection of item bias;
8. Scoring and reporting the results of the tests;

Each of these facets in the MSA Science test development and use cycle is critical to validity of test scores and interpretation of results. This technical manual covers all of these topics for the 2007-2008 testing year.

Test Overview
In 2002, the Maryland State Department of Education adopted the testing program known as the Maryland School Assessment (MSA). The first two subjects to be established under this new testing program were Reading and Mathematics. The Science test was added and the first field administration was conducted in the spring of 2007, followed by the first operational test in 2008. The MSA Science test is currently targeted at grade 5 and grade 8 students to assess achievement in Science.

Purpose and Use
By assessing student achievement against the Science academic standards, the MSA Science test serves two important uses. First, it provides information about what students learned in school to parents, teachers, and educators to inform the improvement of individualized instructional programs, classroom education and school performance. Second, the MSA Science test provides an accountability tool to measures performance levels of students, schools and districts against the Science academic standards.

Test Content, Specifications and Design
The MSA Science test was designed to align to the Voluntary State Curriculum (VSC) that specifies curricular indicators and objectives that contributed directly to measuring content standards. According to MSDE's website, the VSC defines what students should know and be able to do and "is the document that aligns the Maryland Content Standards and the Maryland Assessment Program". The VSC is formatted so that it delineates the content standards, which are broad, measurable statements about what students should know and be able to do. Next, the VSC has indicator statements that provide the next level of specificity and begin to narrow the focus for teachers. Finally, the objectives provide teachers with very clear information about what specific learning should occur. The VSC is widely disseminated to Maryland educational stakeholders, to include teachers, central office staff, students, parents and other stakeholders.

In order to ensure that MSDE is in accordance with the federal law that requires states to align their tests to their content standards, the VSC serves as the guiding document for test development and design. Developing the items for testing was a collaborative effort between MSDE, educators and Pearson. Teachers, administrators and content specialists were recruited from all over Maryland for different test development committees. These committees reviewed items developed for MSA Science test.

The basic test specifications were established by MSDE and provided to Pearson to guide the test administration. Since the inception of the Science test, there have been two test administrations-a census field test in 2007 and an operational test in 2008. Both administrations were conducted under the same testing conditions. Accordingly, the field test was designed so that it would meet the requirements of the operational administration test blueprint. The major difference is that there would be fewer scored items on the operational form, but the same number of overall items. For the 2008 operational test, two base forms (i.e., two forms of scored operational items) were used. Each form had a total of 77 items on the grade 5 form and 75 items on the grade 8 form. Grade 5 tests had 66 core (operational) items and 11 field test items for grade 5. The grade 8 test had 64 core items with 11 field test items. For both grade tests, only core items contributed

to student scores. The two base forms share a set of 20 common items. These common items are discrete (i.e., non-passage based) selected response (SR) items.

There are two MSA Science test blueprints available, one for grade 5 and one for grade 8 and there are six standards assessed across each grade with 66 items in the grade 5 test and 64 items in the grade 8 test, as presented in Table 1 and 2.

Table 1. Grade 5 MSA Science Standards Assessed

Standard	
1.0	Skills and Processes
2.0	Earth/Space Science
3.0	Life Science
4.0	Chemistry
5.0	Physics
6.0	Environmental
	Total Number of items: 66
	Total number of points:72

Table 2. Grade 8 MSA Science Standards Assessed

Standard	
1.0	Skills and Processes
2.0	Earth/Space Science
3.0	Life Science
4.0	Chemistry
5.0	Physics
6.0	Environmental
	Total Number of items: 64
	Total number of points: 72

MSA Science 2008 Field test Design

Field test forms were composed of selected response (SR) items and brief constructed response (BCR). Items were either stand-alone (not linked to other items), linked to a lab set stimulus (e.g., technical graph or figure), or linked to a technical passage stimulus. Each field test form included 20 stand-alone SR items that were common across all 10 forms. Each lab set and its linked SR items appeared on two separate field test forms with the same SR items appeared on each form. The 10 field test item sets were combined with the core items. Field test item sets 1-5 were embedded in Base Form A and 6-10 in Base Form B. In other words, operational forms 1 through 5 share the same core items and are differentiated by a unique field test item set within each form.

MSDE and Pearson worked together to finalize the structure of the 2008 field test forms. At each grade, 10 field test forms were produced. The intent of the test build process was to have each form be parallel in terms of number of SR items, BCR items and stimulus materials. In addition, the field test forms were designed to be equivalent to the operational base forms plus embedded field test in terms of total numbers of SR and BCR items. All 10 forms per grade had the same number of SR and BCR items. In addition, a goal of item selection was to balance, to the extent possible, coverage of the standards across the 10 field test forms per grade. On a per form basis, initial item selections were performed by Pearson and then shared with MSDE for review and

approval. Since Form 1 at each grade was the Braille/large print form, items were selected for Form 1 on the basis of feedback provided by the low-vision panel in October.

The 2008 forms (and all subsequent operational assessments) would be spiraled at the student-level. Spiraling at the student-level supports the assumption that examinee groups responding to each test form are randomly equivalent; an assumption that will further strengthen the link across forms.

Item Development and Review

A primary key to the reliability, validity and utilization of any large-scale test is a rigorous psychometric analysis. Field testing is a necessary step for assessing quality of the items and once the items are placed in the operational test, accurate calibration, equating and scaling should be the most critical process to ensure the reliability and validity of the test scores. Best practices for the MSA Science operational testing were guided by the *Standards for Educational and Psychological Testing* (APA, AERA, & NCME, 1999). Based on these decisions, the following information describes the operational testing of MSA in spring 2008.

Item Development

MSDE and Pearson worked together to define the development targets in support of the 2008 field test. Overall, development was structured to spread the items across the six standards specified within the Maryland Voluntary State Curriculum (VSC) and across the topics, indicators, objectives and assessment limits within each standard. Targets were developed at both grades 5 and 8; item development began once the development targets were finalized. The target number of SR items developed in 2007 for the 2008 administration was 190 items for each grade: 174 SR and 16 BCR items.

During 2006 published technical passages were selected and reviewed by Pearson content staff, MSDE content experts, and three separate Maryland content and bias committees to be approved for item development. An item writer training was held in early January 2007. Current or former non-Maryland Science educators were recruited to write items and lab stimulus on behalf of the program. During the training, writers were introduced to a number of topics by both MSDE and Pearson staff. Topics for training included:

- an introduction to the Maryland VSC
- the concept of assessment limits
- the types of items on the MSA Science test
- elements of universal design in assessment
- how to develop items aligned to standards
- identifying potential bias/sensitivity issues within the materials written, and
- guidelines for writing SR and BCR items.

Following training, writers were given an opportunity to begin drafting items, which were then reviewed by Pearson content staff.

Once Pearson received items from writers, each item underwent an extensive internal review by Pearson content specialists for total item quality, including but not limited to:

- accurate Science content
- appropriate and engaging context
- effectiveness as a measurement of assessment limits within VSC
- age and grade-level appropriate language and vocabulary
- adherence to established MSDE style guidelines

Additionally, Pearson content specialists reviewed all items within each grade for the full range of difficulty and cognitive levels. Items then go through an iterative development process between content specialist and copy editors, universal design specialists, and research librarians. In addition, all art and graphical supports for the items were produced. Finally, all BCR items were reviewed by Pearson Performance Scoring Center staff for scorability. Once Pearson completed the internal development, items were released to MSDE for review via Pearson's Item Tracker system. In May of 2007, Pearson and MSDE content experts met to review and discuss each new item and collaborate on revisions. Once revisions were made and reviewed again through the internal Pearson development team, the items were prepared for another series of content and bias reviews in Maryland.

Review panels of Maryland residents were convened in July 2007. Three different panels were convened to review items for each grade. Content review was conducted at each grade by Maryland educators within the appropriate grade range to further confirm content accuracy and grade-level appropriate vocabulary and language, and to identify and discuss potential improvements to the item stem or distractors. A separate bias/sensitivity panel at each grade was convened to examine the items for any possible socio-economic, geographical, cultural or gender biases. Finally, another committee of educators reviewed item text and graphics with particular focus on possible issues for blind or visually impaired students. Before reviewing materials, MSDE and Pearson provided an overview to the panelists on the purpose of each panel, the VSCs, and the criteria by which they were asked to evaluate the items. Since the evaluation criteria were different, the content panelists and bias/sensitivity panelists were trained separately.

Content panelists were asked to evaluate the materials on the basis of the following criteria:

- alignment to the VSCs
- clarity and grade-appropriateness of text and graphic supports
- accuracy of the underlying Science content

Bias/sensitivity panelists were asked to evaluate the materials as an additional check on whether the materials:

- reflected favoritism towards a gender or ethnic group
- were free of potentially offensive or inappropriate language
- discriminated in any way against individuals who have special needs
- contained any underlying assumptions not shared across ethnic, racial, and gender groups, socioeconomic levels, and geographic areas
- contained language and/or dialect that is not commonly used across the state or has different connotations in different parts of the state
- had graphic supports that were appropriate and accessible for all students

In addition to the panels reviewing the items to be field tested in spring 2008, separate bias and content panels were convened for both grade 5 and grade 8 to read and evaluate the technical passages that were proposed to be used on the spring 2009 embedded field test. On the basis of input from these groups, MSDE and Pearson selected the passages for which items would be developed for the 2009 field test.

Following the panels, MSDE and Pearson met to reconcile the comments from the various groups. Each item and stimulus was reviewed along with the comments from the bias, content

and low-vision panels. From this, a final decision was made by MSDE with respect to all edits and the disposition of the item.

Calibration and Equating

MSA Science Linking, Calibration and Equating

The MSA Science operational test was calibrated using data obtained from the 2008 operational test. A concurrent calibration design was used to calibrate all core items in two base forms in a single calibration.

Dichotomously scored SR items were calibrated using the three-parameter logistic (3-PL) IRT model (Lord & Novick, 1968) and polytomously scored BCR items used the Generalized Partial Credit model (GPC; Muraki, 1992). The MSA Science assessments were calibrated using a concurrent calibration design. All concurrent calibrations were performed with students who tested without accommodations. All 3-PL/GPC model items were calibrated using MULTILOG 7.0 (Thissen, Chen, & Bock, 2003), which can estimate parameters simultaneously for dichotomous and polytomous items via marginal maximum likelihood procedures. Due to the 20 items in common between the two base forms simultaneous calibration of the items automatically placed their parameter estimates on the same underlying measurement scale.

Analysis of Operational Test Data

Using the data collected from the 2008 operational test, Pearson computed Classical Test Theory statistics and performed a concurrent calibration of the incomplete data matrix. All analyses resulting from the operational test were then screened and flagged for undesirable psychometric properties. Flagged items were presented to MSDE and Pearson content specialists for review to ensure that items were keyed properly. No miss-keyed items were identified on either of the MSA Science tests.

Some of the results from the analyses included the following Classical Test Theory statistics:

- **P-Value:** proportion of students who answered the item correctly. An item's p-value shows how difficult the item was for the students who took the test.

- **Mean of BCR item:** This is a measure of the difficulty of the BCR items, in Classical Test Theory and is indicated by the average raw score for a BCR item across all students from the rubric ratings. MSA Science rubrics range from 1 to 3, with a 0 score indicating no response. As a result, the average item score for all MSA Science BCR items falls between 0 and 3.

- **Point-Biserial Correlation (Pt Bis):** describes the relationship between a student's performance on the item (correct or incorrect) and the student's performance on the subject area test form as a whole (number of correct items on the test form).

- **Item Option Point-Biserial:** provide information about the relationship of a particular response option and overall performance on the test. An expected pattern of item option biserials is that incorrect item options should have lower values (typically negative) than the correct item option.

- **Frequency Distribution of Item Options by Group:** These data provide information about how the lower third, middle third and upper third responded to items by response

option. These distributions allow for comparisons among the different performance levels.

- **Mean Score by Response Option:** These data indicate the overall raw test score of students by response option.

- **Differential Item Functioning (DIF)**: The information will assist in examining differential item performance across the African American, Asian, White, and Hispanic groups and across the male and female groups. The Mantel-Haenszel Delta is a statistical approach to indicate possible differential item performance and was used here. The Mantel-Haenszel Delta statistic indicates a differential likelihood of similarly performing students from different ethnic or gender groups answering the item correctly.

The following IRT analyses were also completed:

- **Item Parameter Estimates.** Discrimination, difficulty, and guessing parameters for each SR item were computed based on the 3-Parameter Logistic IRT Model. The item characteristic curve for each item was plotted. Discrimination and difficulty parameters were computed for each BCR item using the Generalized Partial Credit model.
- **Standard Error Estimate.** The standard error of item parameter estimates was computed for each item parameter estimate.
- **Item Fit Estimate.** The extent to which the IRT model conforms to the data was estimated item by item.

The following criteria were used to designate items as potentially unsuitable:

- P-value < 0.25 or >.90
- Point-biserial < 0.15
- Point-biserial for distracter > 0.05
- DIF at B or C level
- IRT a parameter < 0.30
- IRT b parameter < -4.0 or >+4.0
- IRT c parameter > 0.30

Testing Population

Maryland Students in grade 5 and 8 took the Science operational test as part of the MSA program. Mode of testing (paper versus online administration) was determined by each school. The number of students per form, including demographic breakdowns and accommodations for grade 5 and grade 8 appear in Tables 3 and 4, respectively.

Table 3. Demographic characteristics of grade 5 and grade 8 sample for overall, online, and paper

	Grade			
	5		8	
	N	%	N	%
Mode of Administration				
Online	25728	42	21886	35
Paper	35033	58	41585	65
Form				
1	6627	10.91	6096	9.60
2	5882	9.68	6180	9.74
3	7466	12.29	6189	9.75
4	5925	9.75	6018	9.48
5	5842	9.61	6099	9.61
6	5902	9.71	7294	11.49
7	5813	9.57	6168	9.72
8	5693	9.37	6223	9.80
9	5796	9.54	7108	11.20
10	5815	9.57	6096	9.60
Gender				
Female	29518	48.58	30858	48.62
Male	31226	51.39	32573	51.32
Ethnicity				
Unknown	21	.03	38	.06
Native	224	.37	255	.40
Asian	3605	5.93	3429	5.40
African American	22763	37.46	24540	38.66
White	28522	46.94	30055	47.35
Hispanic	5626	9.26	5154	8.12
All	**60761**	**100**	**63471**	**100**

* Differences in values reflect missing data

Distribution of Students Across Forms

Forms were spiraled at the student level. Forms were spiraled within mode of administration so that there would be an even distribution of forms.

Table 4. Distribution of forms by grade

		Form									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Grade 5	Online	3919	3290	4850	3362	3277	3333	3246	3216	3252	3288
	Paper	2708	2592	2616	2563	2565	2569	2567	2477	2544	2527
	Overall	6627	5882	7466	5925	5842	5902	5813	5693	5796	5815
Grade 8	Online	3931	4007	4048	3831	3949	4791	4009	4097	4973	3949
	Paper	2165	2173	2141	2187	2150	2503	2159	2126	2135	2147
	Overall	6096	6180	6189	6018	6099	7294	6168	6223	7108	6096

Analysis

Following the processing of answer documents, student demographic and item response data were transmitted to Pearson's psychometric services division. Pearson psychometric staff had primary responsibility for analyzing MSA Science data to ensure accuracy and validity of scoring. Most of the psychometric work was carried out using SAS Version 9.1 and MULTILOG 7.0, commercially available statistical analysis software. Traditional item analysis and data file QC analyses were conducted with SAS programs. Item response theory (IRT) analyses were conducted with the MUTLTILOG program (Thissen, Chen, & Bock, 2003). MULTILOG allows for estimation of IRT item parameters for dichotomously or polytomous scored items. It has been thoroughly tested and is currently utilized by several high-stakes testing programs administered by Pearson.

All technical support and analyses were carried out in accordance with both the *Standards* (AERA, APA, & NCME, 1999) and the Pearson Quality Assurance Program. Pearson staff verified the MSA Science data and analysis process at several steps in the procedure. This included verification of the SAS and MULTILOG programs prior to use on actual field data through review by a second member of the psychometric services staff and by using simulated data sets. Additionally, the output from the traditional and IRT item analysis programs were verified for out of range values and for consistent results across programs.

Pearson conducted extensive statistical analyses on all field items. These analyses showed which items were at an appropriate difficulty level for the testing population and screened for differential item functioning (DIF) for subgroups in the student population. The analysis of the test data is broken down into several components: 1) classical item analyses; 2) DIF analyses; 3) reliability analyses; and 4) calibration of items for bank values to be used in test construction. In the following sections, the analysis procedures for each component are described in detail. Tables summarizing the analyses are provided at the end of the chapter.

Classical Item Analyses

The following classical item statistics that were calculated:

- P-value of SR items
- Mean of BCR
- BCR Standard Deviation
- Point-Biserial Correlation
- Item Option Point-Biserial
- Frequency Distribution of Item Options by Group
- Mean Score by Response Option

The classical statistics for the 2008 MSA operational and field test items are reported in Appendix A.

Differential Item Functioning (DIF) Analyses

One of the goals of the MSA Science test development is to assemble a set of items that provides a measure of a student's ability that is as fair and accurate as possible for all subgroups within the population. Differential item functioning (DIF) analysis refers to procedures that assess whether items are differentially difficult for different groups of examinees. DIF procedures

typically control for overall between-group differences on a criterion, usually total test scores. Between-group performance on each item is then compared within sets of examinees having the same total test scores. If the item is differentially more difficult for an identifiable subgroup when conditioned on ability, the item may be measuring something different from the intended construct. However, it is important to recognize that DIF-flagged items might be related to actual differences in relevant knowledge or skills or statistical Type 1 error. As a result, DIF statistics are used to identify potential sources of item bias. Subsequent review by content experts and bias committees are required to determine the source and meaning of performance differences. In the MSA Science DIF analyses, DIF statistics were estimated for all major subgroups of students with sufficient sample size: Black, Hispanic and Female[1]. Items with statistically significant differences in performance were flagged so that items could be carefully examined for possible biased or unfair content that was undetected in earlier fairness and bias content review meetings held prior to form construction.

Pearson used the Mantel-Haenszel (MH) chi-square approach to detect DIF in SR items. Pearson calculated the Mantel-Haenszel *delta* statistic (MH D-DIF, Holland & Thayer 1988) to measure the degree and magnitude of DIF. The student group of interest is the *focal* group, and the group to which performance on the item is being compared is the *reference* group. The referent groups for this DIF analysis were White for ethnicity and male for gender. The focal groups were females and minority ethnicity groups.

Items were separated into one of three categories on the basis of DIF statistics (Holland & Thayer 1988; Dorans & Holland 1993): negligible DIF (category A), intermediate DIF (category B), and large DIF (category C). The items in category C, which exhibit significant DIF, are of primary concern.

Positive values of *delta* indicate that the item is easier for the *focal* group, suggesting that the item favors the *focal* group. A negative value of *delta* indicates that the item is more difficult for the *focal* group. The item classifications are based on the Mantel-Haenszel chi-square and the MH delta (Δ) value as follows:

- The item is classified as C category if the absolute value of the MH delta value (i.e., |Δ|) is significantly greater than 1 and also greater than or equal to 1.5.
- The item is classified as B category if the MH delta value (Δ) is significantly different from 0 and either the absolute value of the MH delta (|Δ|) is less than 1.5 or the absolute value of the MH delta (|Δ|) is not significantly different from 1.
- The item is classified as A category if the delta value (Δ) is not significantly different from 0 or the absolute value of delta (|Δ|) is less than or equal to 1.

The effect size of the standardized mean difference (SMD) was used to flag DIF for the BCR items. The SMD reflects the size of the differences in performance on CR items between student groups matched on the total score. The following equation defines SMD:

$$SMD = \sum_k w_{Fk} m_{Fk} - \sum_k w_{Rk} m_{Rk}$$

where $w_{Fk} = n_{Fk+}/n_{F++}$ is the proportion of focal group members who are at the kth stratification variable, $m_{Rk} = (1/n_{Rk+})R_k$ is the mean item score for the focal group in the kth stratum, and

[1] DIF analysis on the Asian students was not conducted due to small sample size.

$m_{Rk} = (1/n_{Rk})R_k$ is the analogous value for the reference group. In words, the SMD is the difference between the unweighted item mean of the focal group and the weighted item mean of the reference group. The weights applied to the reference group are applied so that the weighted number of reference group students is the same as in the focal group (within the same ability group). The SMD is divided by the total group item standard deviation to get a measure of the effect size for the SMD using the following equation:

$$\text{Effect Size} = \frac{SMD}{SD}$$

The SMD effect size allows each item to be placed into one of three categories: negligible DIF (AA), moderate DIF (BB), or large DIF (CC). The following rules are applied for the classification. Only categories BB and CC were flagged in the results.

- The item is classified as CC category if the probability is <.05 and if |Effect Size| is >.25.
- The item is classified as BB category if the probability is < .05 and if .17<|Effect Size|≤.25.
- The item is classified as AA category if the probability is >.05 or |Effect Size| is ≤ .17.

The data in Table 5 summarize the number of field-test items in DIF categories for the grade 5 and 8 items and the full results of the DIF analyses appear in Appendix B. Items with a statistical indication of DIF were reviewed for bias by subject matter experts during data review.

Table 5. DIF flag incidence across all MSA Science field-test items

	Grade 5 (221 items total)		Grade 8 (220 items total)	
	DIF Level		DIF Level	
Group indicating DIF for FT Item	**B**	**C**	**B**	**C**
Black	0	0	2	0
Hispanic	1	0	2	1
Female	1	0	7	3
Total	2	0	11	4
Group indicating DIF for OP Item	**B**	**C**	**B**	**C**
Black	4	0	0	2
Hispanic	1	0	1	0
Female	3	0	4	0
Total	8	0	5	2

Test Score Reliability

The reliability of a test provides an estimate of the extent to which an assessment will yield the same results across subsequent administrations, provided the two administrations do not differ on relevant variables. Reliability coefficients are usually forms of correlation coefficients and must be interpreted within the context and design of the assessment and of the reliability study. The forms of reliability below measure different dimensions of reliability and thus any or all might be used in assessing the reliability of MSA Science.

The estimates of reliability reported in this report are internal consistency measures, which are derived from analysis of the consistency of the performance of individuals on items within a test (internal consistency reliability). Therefore, they apply only to the test form being analyzed. They do not take into account form-to-form variation due to equating limitations or lack of parallelism, nor are they responsive to day-to-day variation due, for example, to state of health or testing environment.

This is the formula for the most common index of reliability, namely, Cronbach's coefficient *alpha* (α; Cronbach, 1951). In this formula, the s_i^2's denote the variances for the k individual items; s_{sum}^2 denotes the variance for the sum of all items.

$$\alpha = (k/(k-1)) * [1- \Sigma(s^2_i)/s^2_{sum}]$$

Because of the mixed item types on the MSA Science test (i.e., MC and BCR), a stratified alpha (Feldt & Brennan, 1989) was computed. A stratified alpha is based on a weighted average of Cronbach's alpha for each item set. These results are in Table 6.

Table 6 Reliability estimate by form

Form	Grade 5	Grade 8
Base Form A	.91	.94
Base Form B	.91	.93

The coefficient alpha estimates for all forms meet conventional guidelines and legal benchmarks for applied test reliability (i.e., $\alpha > .85$).

IRT Analysis

Pearson estimated IRT parameters for all MSA Science items to establish the underlying theta scale. These parameter estimates will serve to calibrate students who tested without accommodations and test items onto the same underlying scale. The 3-PL model SR items and the GPC model for BCR items were selected because of the mixed format (i.e., multiple-choice and constructed response or polytomous items) of the test.

Dichotomous Item Response Theory Model

For the SR items, or dichotomously scored items, calibration was done using Birnbaum's 3-PL item response theory (IRT) model (Lord & Novick, 1968). The formulation of the 3-PL model is presented below:

$$P_i(\theta) = c_i + (1 - c_i)\frac{1}{1 + e^{-Da_i(\theta - b_i)}} \qquad (1)$$

where θ (theta) is the student proficiency parameter, a_i is the item discrimination parameter, b_i is the item difficulty parameter, c_i is the lower asymptote parameter and D is a scaling constant. The scaling constant is traditionally 1.7. With multiple-choice items it is assumed that, due to guessing, examinees with minimal proficiency have a probability greater than zero of responding correctly to an item. This probability is represented in the 3-PL model by the c_i parameter.

Polytomous Item Response Theory Model

For the BCR items, or polytomously scored items, calibration was done using the GPC model (Muraki, 1992). For an item j with m_j possible scores (0, 1, . . . , m_j−1), the GPC model gives the probability of response r as a function of latent variable θ as

$$\Pr(X_j = r \mid \theta) = \frac{e^{z_{jr}}}{1 + \sum_{k=0}^{m_j - 1} e^{z_{jk}}}, \quad (2)$$

where

$$z_{ji} = \sum_{k=0}^{i} a_j(\theta - b_j + c_k), \quad (3)$$

X_j is a random variable representing a response to item j and a_j, b_j and c_k, k = 0, 1, 2, ... , m_j−1 are item parameters.

Calibration of the mixed test format (3PL/GPC model) was conducted using MULTILOG 7.0 (Thissen, Chen, & Bock, 2003) and included only the students in the population who:

- Tested without accommodations,
- attempted at least one item on the test,
- attempted at least one BCR item, and
- the student's score was not invalidated.

MULTILOG estimates parameters simultaneously for dichotomous and polytomous items via marginal maximum likelihood procedures.

Item Calibration and Equating

The purpose of item calibration and equating is to create a common scale (theta) for expressing the item parameter estimates across versions of a test. The theta distribution is commonly scaled to have the mean set to 0 and the standard deviation set to 1. This scale is not often used for reporting because of interpretation issues arising from a scale with values typically ranging from -4.0 to +4.0. Therefore, following calibration and equating, the scale was transformed to a reporting scale which can be meaningfully interpreted by students, teachers and other stakeholders.

The following IRT analyses were completed for all items and are reported in Appendix A.

- The *a* parameter estimation for both SR and BCR items.
- The *b* parameter estimation for both SR and BCR items.
- The *c* parameter estimation for SR items only.
- Category step values (*d*) for BCR items only.
- The mean total-test theta estimate for all students earning a given score point for each category for BCR items only.

The item parameter estimates for the 2008 core items were equated to the base scale (established during the calibration of the 2007 census field test) using the 2007 item parameters from the

census field test. Since the entire set of 2008 core items were field tested in 2007, two item parameter sets for the core items were available - one from the 2007 field test calibration and another from the 2008 calibration. A publicly available equating program, STUIRT (Kim & Kolen, 2004), was used to calculate equating constants using the Stocking and Lord Procedure. In order to place the 2008 field test items on the base scale the 2008 operational items were calibrated concurrently with the field test items. These new operational parameters were then used, along with the equated 2008 operational parameters, to calculate equating constants with the Stocking and Lord Procedure using STUIRT. The equating constants are listed in Table 7.

Table 7. Equating constants for operational and field test

	Grade 5		**Grade 8**	
	Slope	**Intercept**	**Slope**	**Intercept**
Operational (08 OP items -> 07 FT items)	1.015867	0.216272	1.08793	0.208599
Field Test (08 FT items -> 08 OP items)	1.006532	0.215406	1.065945	0.205523

The equating constants were applied to the 2008 item parameters so that all items in the MSA Science pool can be put onto the same theta metric. The complete IRT estimates for students in grade 5 and 8 who met the criteria for inclusion in the equating sample are in Appendix A.

Data Review of the Field Test Items

Background

Data review represents a critical step in the test development cycle. The 2008 MSA Science field test data review procedure was different from that of the 2007 field test. Instead of formal data review meeting, Pearson Psychometric team provided the list of flagged items for the criteria based on the following criteria:

For SRs:

1. Omit rate > 5%
2. 0.10 > p value < 0.90
3. Point biserial < 0.10
4. Non-responses to any one of the distractors
5. DIF flag with C

For BCRs:

1. Omit rate > 20%
2. Non-response to any of the rubric score point
3. p value <= 0.10 or >= 0.90
4. Item total correlation < 0.10
5. DIF indicator with CC

The flagged items were reviewed by Pearson Content team and MSDE content experts. The final decision about the suppression of the flagged items was made in collaboration between MSDE and Pearson.

Results of Data Review

A total of 19 items in grade 5 and 12 items in grade 8 were inspected during data review as a result of the item not meeting the statistical flagging criteria for the classical item analyses and DIF. Three of the 19 total flagged were rejected from the grade 5 pool and one of the 12 flagged items for grade 8 was rejected.

Test Analysis, Operational Scaling and Scoring

Test Analysis

IRT item parameter estimates were used to generate test characteristic curves (TCCs), test information functions (TIFs), and conditional standard errors of measure (CSEM). These indices were computed for each of the base forms, form-to-form linking items, and entire item pool. Figure 1 shows the overlaid TCC plots for Form A, B, linking item set and the entire item pool for grade 5. The TCC and TIF values were divided by the total number of score points for each form so that the curves can be plotted on the same scale. Figure 2 displays test information curves for Form A, B, linking item set and the entire item pool. Figure 3 illustrates the conditional standard error of measurements for the four tests.

Figure 1. Test Characteristic Curve of the Grade 5 Science Test

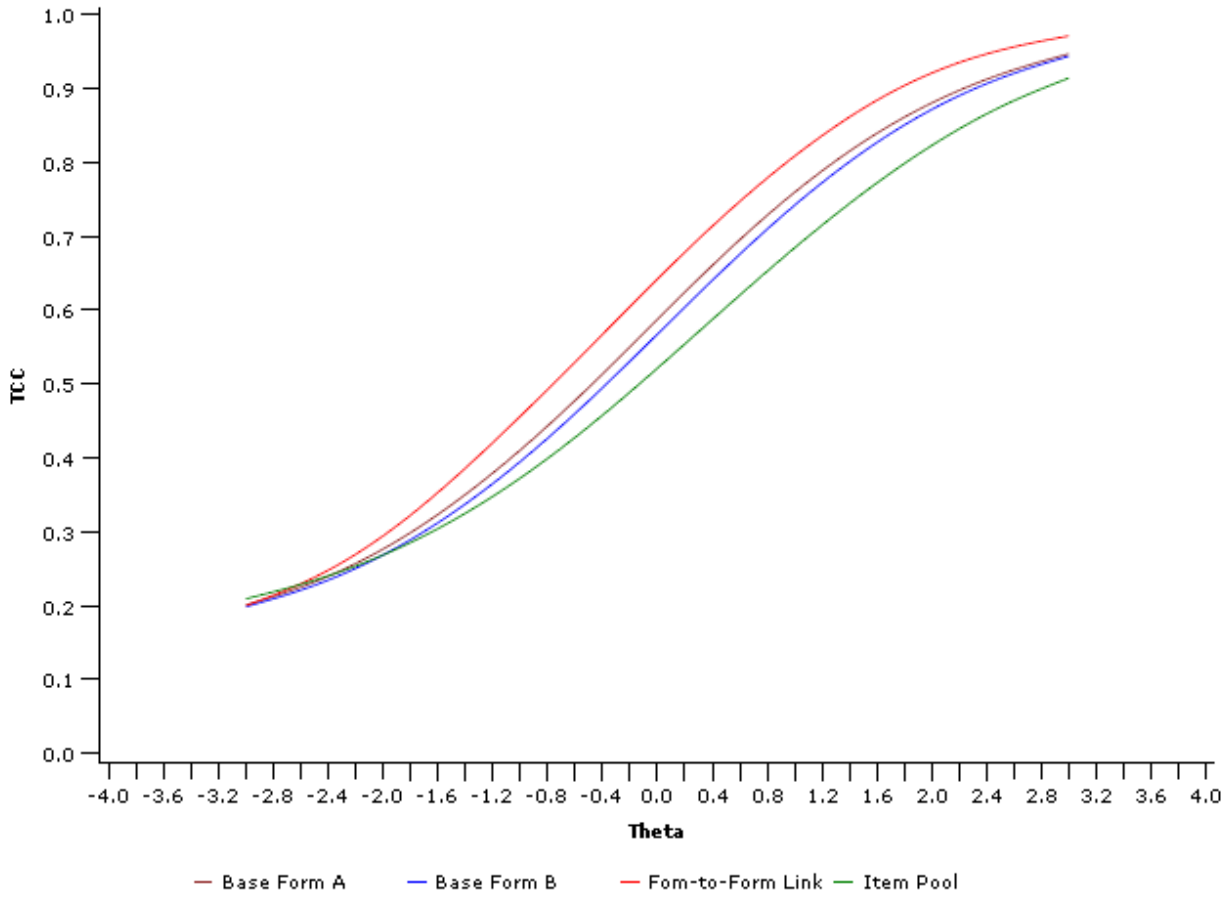


Figure 2. Test Information Function of the Grade 5 Science Test

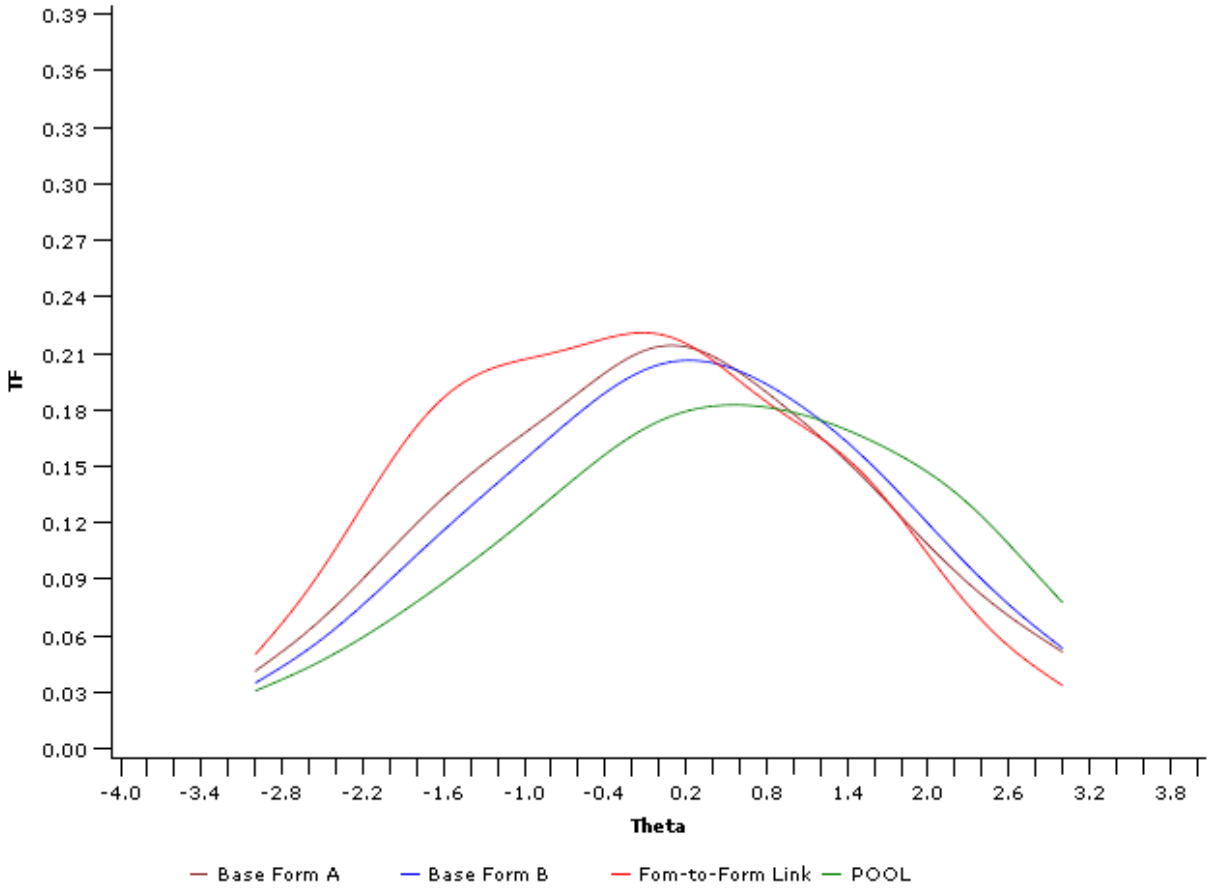
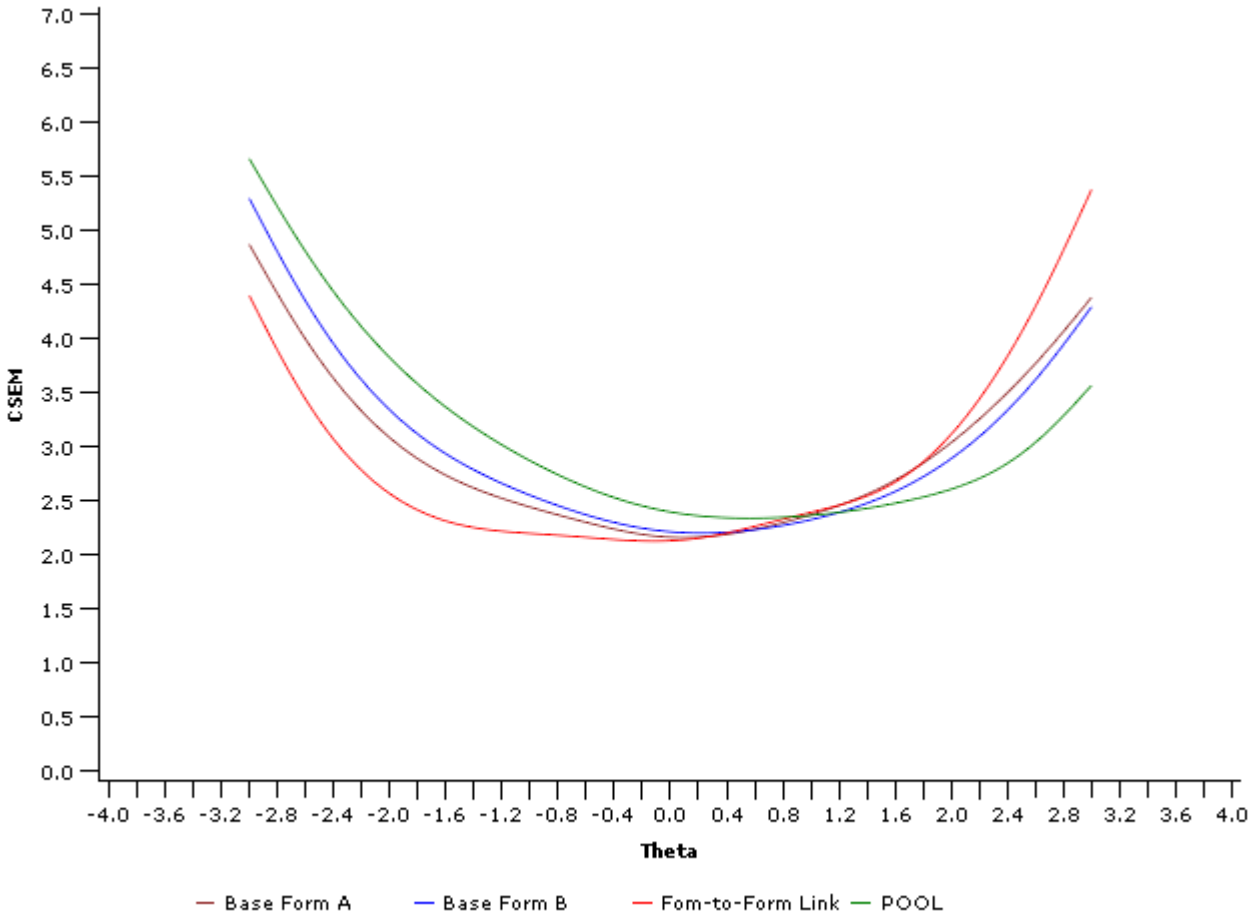


Figure 3. Conditional Standard Error of Measurement for the Grade 5 Science Test



Similar to grade 5, IRT item parameter estimates were used to generate characteristic curves (TCCs), test information functions (TIFs), and conditional standard errors of measure (CSEM) were computed for each of the base form, form-to-form linking items and entire item pool for grade 8. Figure 4 shows the overlaid TCC plots for Form A, B, linking item set and the entire item pool. The TCC and TIF values were divided by the total number of score points for each form so that the curves can be plotted on the same scale. Figure 5 displays test information curves for Form A, B, linking item set and the entire item pool. Figure 6 illustrates the conditional standard error of measurements for the four tests.

Figure 4. Test Characteristic Curve of the Grade 8 Science Test

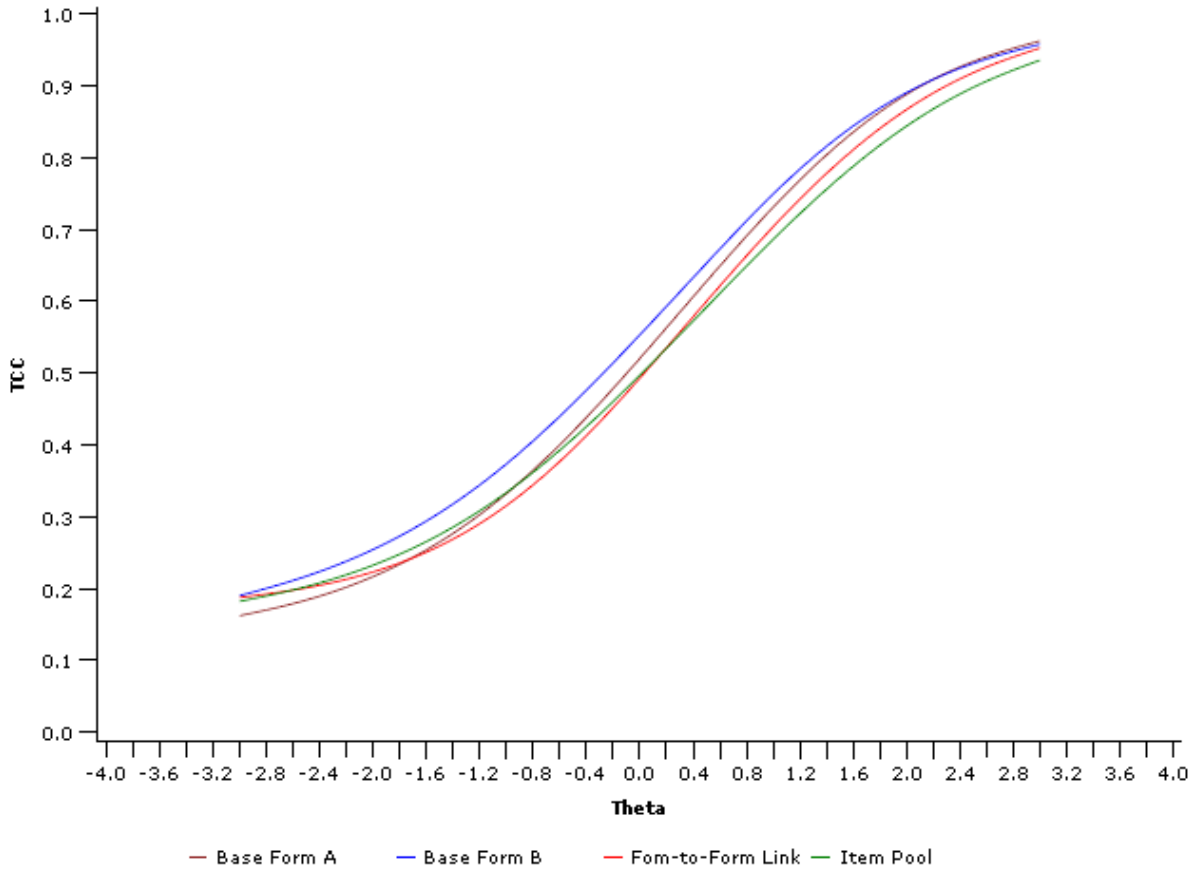


Figure 5. Test Information Function of the Grade 8 Science Test

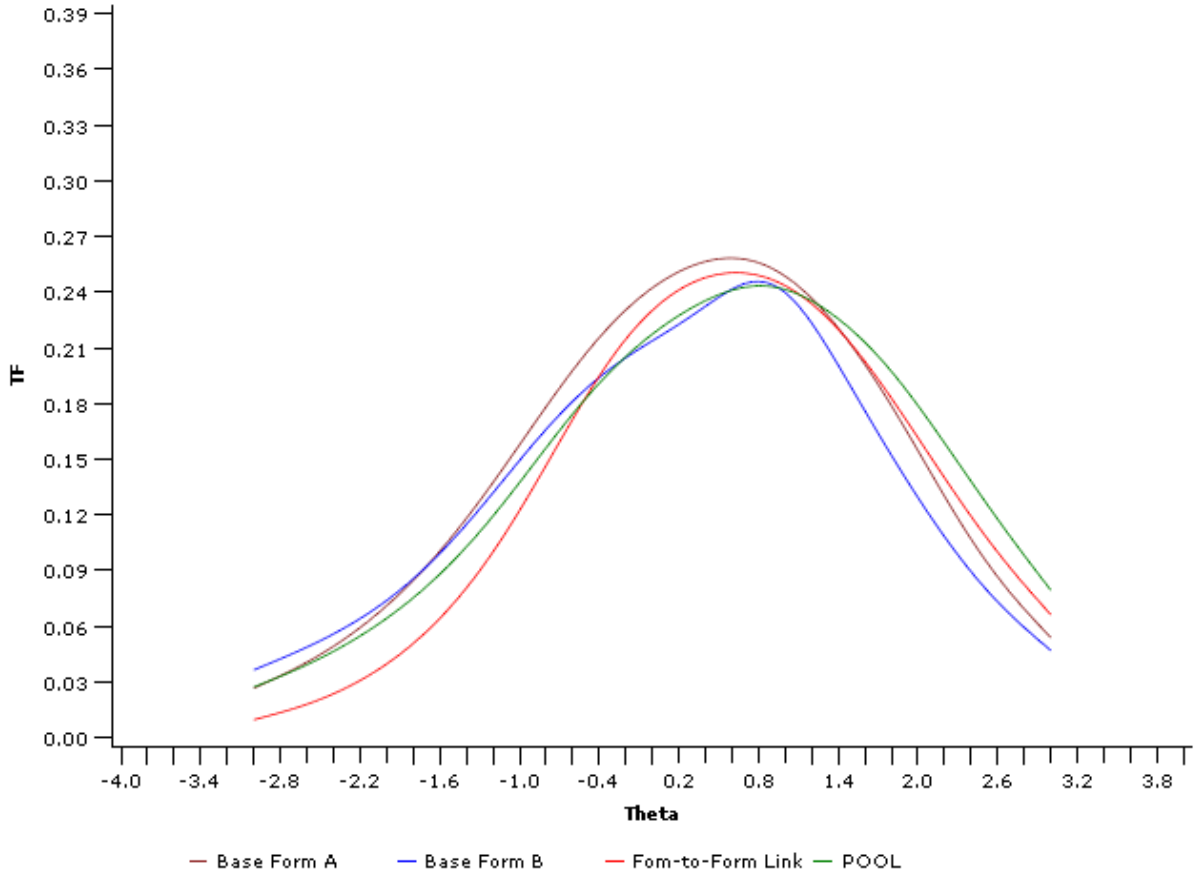
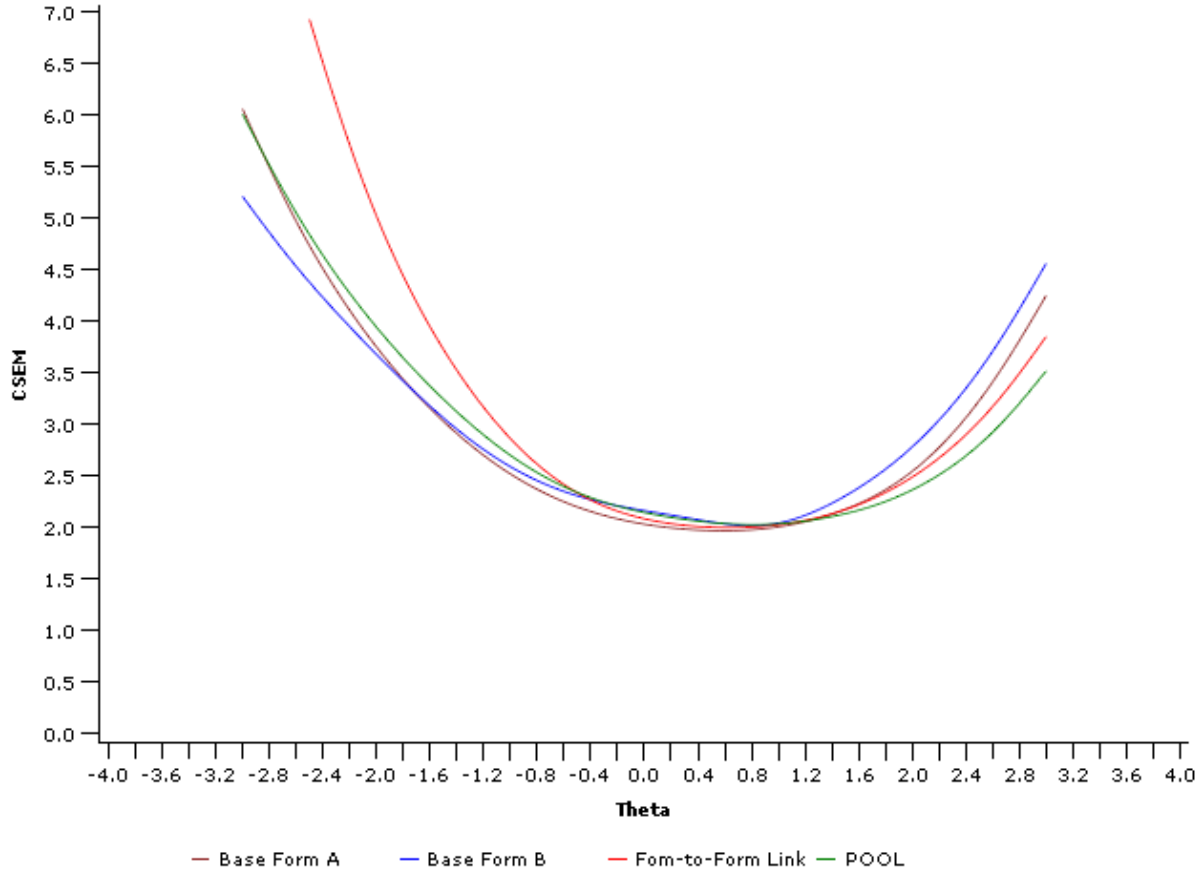


Figure 6. Conditional Standard Error of Measurement for Grade 8 Science Test



Defining Scale Ranges

In order to facilitate the use and interpretation of the results of the 2008 MSA Science operational administration, scale scores were created through the application of scaling constants developed following the 2007 test administration. Scale scores were computed using the following simple linear transformation equation:

$$SS = M1(\theta) + M2$$

where, M1 is a multiplicative term, M2 is an additive term, and θ is an IRT based measure of student ability. These scaling constants (M1 and M2) were developed to meet MSDE requirements that the mean and standard deviation (sd) be set at mean = 400 and sd = 40 on the scale score, while maintaining the LOSS at 240 and the HOSS at 650 as closely as possible for grades 5 and 8. The LOSS and HOSS set the minimum and maximum values that are possible on the MSA Science test. These scaling constants as well as the LOSS and HOSS for each grade appear in Table 8.

Table 8. Target LOSS, HOSS, and scaling constants for grades 5 and 8.

Grade	LOSS	HOSS	M1	M2
5	240	650	42.3077	400.1688
8	240	650	42.617	398.9311

In Maryland Science Assessment, student scale score was derived by item pattern scoring method based on maximum likelihood estimation. While maximum likelihood estimates were available for students with extreme scores other than zero or perfect, occasionally these estimates have very large conditional SEM (CSEM), and differences between these extreme values have little meaning. The ability estimates based on a relative small number of items as is the case for subscales tend to be unstable which can lead to a large CSEM. The CSEM for the extreme ability estimate therefore was truncated in consideration of the current MSA Science scale score range. The range helped us to maintain the student scores within the reasonable range while allowing us to have an understanding that a scale score of 240 is the lowest possible score a student can get on the test. As such, the range of CSEM should be maintained within a reasonable range.

Pearson proposed that a maximum SEM be set to be 160. The maximum SEM value is proposed based on multiple considerations.

- ***Relative magnitude of SEM to the scale score range.***
  Given the current scale score ranges from 240 to 650 which includes 410 points and the SEM is recommended not to exceed 40% of the scale score range. The SEM is an index to represent the measurement precision and the range in which the true student ability exists. A large SEM can lead to an interpretation that a student true ability can be either top or bottom of the scale. By curtailing the SEM to a reasonable value, we can provide a better estimate on where the student's true ability exists.
- ***Existing practice on other Maryland assessments***.
  According to the 2004 Maryland High School Assessment Technical Report, the SEM for LOSS and HOSS is set in consideration of the minimum SEM for the scale score. An internal and preliminary analysis on the Maryland Science SEM indicates that the minimum SEM for the scale score might be approximately 10 or 11 for grades 5 and 8.

Based on aforementioned considerations, the maximum CSEM was set to be 160. Upon the state approval of the recommendation, the truncation rule was implemented to report CSEM both for the overall score and the subscale scores.

ISE Pattern Scoring

In the spring 2008 administration of the MSA Science tests for grade 5 and 8, Pearson used an internally developed software program called IRT Score Estimation (ISE) program (Chien, Hsu, & Shin, 2007). The program has been extensively tested and compared to commercially available software programs (e.g., MULTILOG, PARSCALE; Tong, Um, Turhan, Parker, Shin, Chien, & Hsu, 2007). The report concluded that with normal cases the ISE program was able to replicate MULTILOG and PARSCALE theta estimates. However, "in problem cases, such as monotonically decreasing likelihood functions, in which MULTILOG and PARSCALE both produced theta estimates, ISE was able to produce the estimates that yielded the largest likelihood function, in alignment with the definition of the maximum likelihood algorithm" (p. 9). In addition, "with problem cases in which MULTILOG and PARSCALE failed to produce theta estimates, ISE was able to produce an estimate that yielded the largest likelihood from the likelihood function of a given response pattern" (p. 9). With regard to the CSEMs, ISE produced similar results to MULTILOG. More information about the ISE program can be found in the user manual, technical manual and evaluation report and are available upon request.

The 2008 operational scores were estimated by the pattern scoring approach. The 2008 operational item parameters were first equated to the base theta scale established in 2007. The

equated item parameters were then used to estimate student ability (theta) using Pearson's ISE program. The theta estimates were transformed onto the MSA Science operational scale using the transformation constants described above.

Student Performance

Score Interpretation

To help provide appropriate interpretation of the 2008 MSA Science operational test scores, two types of scores were created: scale scores and performance levels and descriptions.

Scale Scores

As explained in the proceeding section, the 2008 MSA Science yielded scale scores that ranged between 240 and 650. As a result of calibration, equating and scaling the scale scores yielded from the 2 base forms have the same meaning within the same grade; however, the scale scores are not comparable across grade levels. It should be noted that those scale scores have only simple meaning that higher scale scores represent higher performance on the MSA Science test. Thus, performance levels and descriptions can give a specific interpretation other than a simple interpretation because they were developed to bring meaning to the scale scores.

Performance Levels and Descriptions

Performance levels and descriptions provide specific information about students' performance levels and help interpret the 2008 MSA Science scale scores. They describe what students at a particular level generally know and are able to do and can be applicable to all students within a grade level.

Performance standards for MSA Science were established in 2007. Details of the standard-setting process and outcomes are provided in MSA Science standard-setting technical report (Pearson, 2007). The State Board reviewed the performance standards recommended by the standard-setting committee and made a modification in the recommendation. The performance standards approved by the State Board are listed in Table 9. Students whose scale scores are lower than the Proficient cut score are classified as "Basic." The highest performance group whose scale score is equal or higher than Advanced cut score belongs to the "Advanced" group. The middle group is called "Proficient"

Table 9. Scale score cut scores for grades 5 and 8 MSA Science.

Grade	Proficient Cut score	Advanced Cut score
5	391	467
8	387	478

Tables 10 reports percentages of grade 5 students in three performance groups and the descriptive statistics for the selected subgroups (gender and ethnicity). The analysis was conducted for all students in grades 5 as well as by administration mode.

Table 10. Grade 5 performance level percentages and descriptive statistics

	Overall						Online Administration						Paper Administration					
	Performance Levels			Mean	SD	N	Performance Levels			Mean	SD	N	Performance Levels			Mean	SD	N
	B	P	A				B	P	A				B	P	A			
Subgroup																		
All Students																		
All	36	56	9	405	45.7	60770	32	58	10	411	44.4	35017	42	52	7	398	46.5	25753
Gender																		
Female	37	56	7	404	44.3	29503	33	59	8	408	43.1	17007	42	52	6	398	45	12496
Male	35	55	10	407	47	31214	30	58	12	413	45.5	18008	41	51	7	399	47.8	13206
Ethnicity																		
Asian	20	64	16	424	44.4	3604	20	64	17	425	42.9	1994	21	65	14	422	46.2	1610
Black	54	44	2	385	41.4	22748	53	45	2	388	40.2	10666	56	43	2	383	42.4	12082
Hispanic	52	46	2	386	43.8	5625	48	48	4	391	44.5	2106	54	44	2	384	43.1	3519
Native American	36	58	7	403	46.2	224	34	59	7	406	43.1	149	39	55	7	397	51.6	75
White	20	66	14	423	41.2	28512	20	66	14	423	40.9	20098	21	66	13	422	41.6	8414
Note: Performance Levels, B=Basic, P=Proficient, A=Advanced																		

Tables 11 reports percentages of grade 8 students in three performance groups and the descriptive statistics for the selected subgroups (gender and ethnicity). The analysis was conducted for all students in grades 5 as well as by administration mode.

Table 11. Grade 8 performance level percentages and simple statistics

	Overall						Online Administration						Paper Administration					
	Performance Levels			Mean	SD	N	Performance Levels			Mean	SD	N	Performance Levels			Mean	SD	N
	B	P	A				B	P	A				B	P	A			
Subgroup																		
All Students																		
All	39	58	4	397	51.7	63573	37	60	4	400	49.2	41583	43	54	4	392	55.6	21990
Gender																		
Female	39	58	3	397	48.8	30856	37	60	3	399	46.6	20377	42	55	3	392	52.6	10479
Male	39	57	5	398	54.1	32571	36	59	5	401	51.6	21200	43	52	4	391	58.1	11371
Ethnicity																		
Asian	18	71	11	427	46.6	3429	18	72	10	426	45.2	2079	18	70	12	428	48.6	1350
Black	61	38	0	370	47.4	24538	58	41	1	375	45	15477	66	33	0	362	50.3	9061
Hispanic	56	43	1	376	50	5154	55	44	1	379	48.4	2931	57	42	1	372	51.8	2223
Native American	39	57	4	397	51.2	255	38	60	2	399	45.1	184	42	51	7	392	64.5	71
White	20	74	7	420	42.6	30053	20	74	6	420	42.1	20905	20	74	7	420	43.8	9148
Note: Performance Levels, B=Basic, P=Proficient, A=Advanced																		

Validity

Pearson subscribes rigorously to the Standards for Educational and Psychological Testing (AERA, APA, & NCME, 1999). The standards define validity as

> … the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests. Validity is, therefore, the most fundamental consideration in developing and evaluating tests. The process of validation involves accumulating evidence to provide a sound scientific basis for the proposed score interpretations.

Validity can be established through the collection of evidence to demonstrate the alignment of item content with the curriculum, compliance to the test specifications, test fairness, and valid uses and interpretations of test scores. This section describes various analyses to evaluate the validity and reliability evidence for the 2008 MSA Science test.

Content-related Validity

All MSA Science items were explicitly developed to measure the specific knowledge and skills described in the Voluntary State Curriculum (VSC). In addition, the alignment of the items to the standards was reviewed and verified independently by multiple content reviewers and Maryland educators. The MSA Science core items were handed over to Pearson after the extensive reviews by the Mississippi educators and external reviewers.

Construct-related Validity

Construct validity refers to what test scores mean and what kinds of inferences they support. Construct validity is the central concept underlying the MSA Science test validation process. Evidence for construct validity is comprehensive and integrates evidence from both content- and criterion-related validity.

Construct-related validity evidence (internal consistency validity evidence) can come from many sources. The American Psychological Association provides the following list of possible sources (AERA, APA & NCME, 1999):

- high inter-correlations among assessment items or tasks attest that the items are measuring the same trait, such as a content objective, sub-domain or construct;
- substantial relationships between the assessment results and other measures of the same defined construct;
- little or no relationship between the assessment results and other measures which are clearly not of the defined construct;
- substantial relationships between different methods of measurement regarding the same defined construct;
- relationships to non-assessment measures of the same defined construct.

The collection of construct-related evidence is a continuous process, and at present substantial evidence is available representing internal structure (the first of the five bullets above). This section describes four sources of internal structure-based construct validity evidence for the MSA Science test: item-total/point-biserial correlations, inter-correlation among standards/subscales, unidimensionality, and DIF analysis.

Item-total Correlation

Item-total correlations provide another measure of the congruence between the way an item functions and our expectations. Typically students with high ability (i.e., those who perform well on the MSA Science overall) answer items correctly, and students with low ability (i.e., those who perform poorly on the MSA Science overall) answer items incorrectly. If these expectations are met, the point-biserial (i.e., item-total) correlation between the item and the total test score will be high and positive, indicating that the item is a good discriminator between high ability and low ability students. A correlation value above 0.20 is considered acceptable; values closer to 1.00 indicate greater discrimination. A test comprised of maximally discriminating items will maximize internal consistency reliability.

Assuming that the total test score represents the extent to which a student possesses the construct being measured by the test, high point-biserial correlations indicate that the tasks on the test require this construct to be answered correctly. Table 12 reports the mean, minimum, and maximum point-biserial correlation values for the MSA Science tests. The adjusted point-biserial removes the item score from the total score so that the index can be an unbiased estimate of the item with the test. As can be observed from this table, the average adjusted point-biserial ranged from 0.24 to 0.39 across the MSA Science tests for grades 5 and 8. Overall MSA Science core items in general seem to perform well in terms of differentiating students with high ability from low-performing students and measuring a common underlying construct. A portion of the field test items were somewhat less effective, which is to be expected.

Table 12. Summary of adjusted point-biserial

Subject	Grade	Status	Adjusted Point-biserial		
			Mean	Minimum	Maximum
SC	5	OP	0.36	0.10	0.56
SC	5	FT	0.29	-0.09	0.62
SC	8	OP	0.40	0.19	0.68
SC	8	FT	0.35	0.00	0.69

Inter-correlation among Standards

There are six standards within the VSC frameworks for MSA Science. Content judgment was made when classifying items into each of the standards, and the MSA Science subscales each represent one of these standards. To assess the extent to which items aligned with the standards are assessing the same underlying construct, a correlation matrix was computed among the total scores of competencies.

Table 13 reports the correlations among the six standards/subscales. The correlation ranged from 0.54 to 0.77 with majority of correlation around 0.65. The subscales are highly intercorrelated, indicating that a single overarching construct of Science is being measured.

Table 13. Correlation among MSA Science content standards

Grade 5 Form A		**Str1**	**Str2**	**Str3**	**Str4**	**Str5**	**Str6**
	Str1	1.0000					
	Str2	0.6180	1.0000				
	Str3	0.6960	0.6141	1.0000			
	Str4	0.6477	0.5880	0.6323	1.0000		
	Str5	0.6831	0.5985	0.6616	0.6299	1.0000	
	Str6	0.6580	0.5816	0.6512	0.6166	0.6261	1.0000
Grade 5 Form B		**Str1**	**Str2**	**Str3**	**Str4**	**Str5**	**Str6**
	Str1	1.0000					
	Str2	0.6138	1.0000				
	Str3	0.6615	0.6145	1.0000			
	Str4	0.6253	0.6042	0.6021	1.0000		
	Str5	0.6044	0.5791	0.5788	0.5846	1.0000	
	Str6	0.6773	0.6161	0.6688	0.6117	0.5825	1.0000
Grade 8 Form A		**Str1**	**Str2**	**Str3**	**Str4**	**Str5**	**Str6**
	Str1	1.0000					
	Str2	0.6896	1.0000				
	Str3	0.6769	0.7325	1.0000			
	Str4	0.6790	0.7231	0.7105	1.0000		
	Str5	0.5487	0.5897	0.5842	0.5969	1.0000	
	Str6	0.6723	0.6956	0.6921	0.6965	0.5775	1.0000
Grade 8 Form B		**Str1**	**Str2**	**Str3**	**Str4**	**Str5**	**Str6**
	Str1	1.0000					
	Str2	0.6510	1.0000				
	Str3	0.7138	0.6359	1.0000			
	Str4	0.6983	0.6099	0.6783	1.0000		
	Str5	0.6538	0.6141	0.6350	0.6160	1.0000	
	Str6	0.7657	0.6593	0.7164	0.6878	0.6597	1.0000

*Str: Standard

Unidimensionality

In addition to the processes and procedures Pearson employs during item and test form development to promote construct validity, a confirmatory factor analysis is also conducted to examine the construct validity of the 2008 MSA Science tests.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted to further examine the relationship between the subscales. CFA used SAS Proc Calis and the maximum likelihood estimation (MLE; Anderson & Gerbing, 1988) procedure. The model hypothesized that the subscale scores belong to a single latent trait. Model fit was tested through indices including adjusted goodness of fit (AGFI), and Root Mean Squared Error of Approximation (RMSEA). Values of the AGFI statistic which indicate good fit are higher than 0.90 (Tabachnick & Fidell, 2001). The RMSEA is a function of the estimated discrepancy between the population covariance matrix and the model-implied covariance matrix, with a value of less than or equal to .05 indicating close fit and a value between .05 and .08 indicating a "reasonable error of approximation" (Browne & Cudeck, 1993, p. 144). Hu and Bentler (1999) propose an RMSEA $\leq$ .06 as the guideline for close fit. Table 14 summarizes fit indicators estimated from the confirmatory factor analysis for the 2008 MSA Science tests. The confirmatory factor analysis results provide additional

evidence to support the validity of the MSA Science tests. For both grades, the lowest AGFI was 0.9809, and the highest RMSEA was 0.0518. The AGFI and RMSEA indicators supported the model fit.

Table 14. Fit indicators for confirmatory factor analysis on MSA Science

Grade/Form	AGFI	RMSEA
Grade 5 Form A	0.9974	0.0182
Grade 5 Form B	0.9849	0.0452
Grade 8 Form A	0.9845	0.0472
Grade 8 Form B	0.9809	0.0518

*AGFI: Adjusted Goodness of Fit; RMSEA: Root Mean Squared Error of Approximation

Validity Evidence for Scores from Accommodated Testing

Accommodations are offered to students with disabilities that preclude them from being fairly assessed by the tests as they are written (e.g., visually impaired students). In order to examine whether or not these accommodations are effective (i.e., result in valid test scores) the CFA conducted to examine the relationship between subscales was repeated using only students testing with accommodations and then again using only students testing without accommodations. The results of this analysis showed good model fit based on the data from both student populations (see Tables 15). This suggests that offering accommodations to disabled students preserves the internal structure of the test. One can infer from these results that the accommodations offered for the MSA Science tests are effective and produce scores that are as valid as those of students who are not in need of accommodation.

Table 15. Fit indicators for accommodations/non-accommodations based CFA

	Accommodations		No Accommodations	
Grade/Form	AGFI	RMSEA	AGFI	RMSEA
Grade 5 Form A	0.9968	0.0162	0.9937	0.0293
Grade 5 Form B	0.9935	0.0241	0.9869	0.0419
Grade 8 Form A	0.9915	0.0294	0.9910	0.0350
Grade 8 Form B	0.9967	0.0150	0.9891	0.0388

*AGFI: Adjusted Goodness of Fit; RMSEA: Root Mean Squared Error of Approximation

Validity Evidence for Different Populations

The primary evidence for the validity of the MSA Science lies in the content and construct being measured. The evidence of validity is sought from a statistical analysis to detect differential item functioning that could favor a particular sub-group over and beyond the difference in ability.

Since the test assesses the statewide content standards, which are required to be taught to all students, the test should not be more or less valid for use with one subpopulation of students relative to another. Great care has been taken to ensure that the MSA Science items are fair for students of various backgrounds. During the item development and review processes, efforts were made to avoid or detect possible bias toward or against any subpopulations in Maryland. Besides these content-based efforts that are put forth in the test development process, data-driven statistical procedures are also employed to identify items that behave differently for different populations. Statistical indices of Differential Item Functioning (DIF) are only a quantitative marker; bias is a qualitative condition that can only be determined by an examination of the content of the item. The MSA Science test development process approaches bias detection and

elimination from both viewpoints, at multiple steps in the process, and by multiple levels of reviews.

The DIF analysis was carried out on the data collected from the 2008 MSA Science administration. DIF statistics are used to identify items on which members of a focal group have different probability of getting the items correct from members of a reference group after members of both groups have been matched by the students' ability level on the test. In the DIF analyses, the total raw score on the operational items is used as the ability-matching variable. Details of the DIF analysis are provided in the DIF analysis section and the number of items displaying a significant level of DIF is summarized in Table 5. Because of the multi-layered approach to reducing or eliminating systematic bias, empirically the majority of items on the MSA Science operational tests exhibit no DIF or weak DIF, and the impact of DIF on the 2008 MSA Science scores can be considered negligible.

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Appendix A
Item Statistics

Table A.1. Grade 5 item statistics

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
50005	OP	0.81	0.47	1.0493	-0.7825	0.21029	.	.	.
50012_02	OP	0.58	0.45	0.87276	0.2596	0.19335	.	.	.
50012_03	OP	0.46	0.43	1.10344	0.83314	0.21295	.	.	.
50012_05	OP	0.65	0.47	0.81829	-0.18923	0.13582	.	.	.
50015	OP	0.6	0.27	0.36416	-0.44646	0.02566	.	.	.
50016	OP	0.67	0.52	1.33823	-0.01384	0.25025	.	.	.
50020_01	OP	0.83	0.47	1.02274	-0.9857	0.09304	.	.	.
50020_05	OP	0.58	0.48	0.83898	0.18845	0.12202	.	.	.
50020_06	OP	0.47	0.57	0.56553	0.11114	0	2.25959	-0.42442	-1.83517
50026	OP	0.78	0.34	0.58001	-0.773	0.27999	.	.	.
50028	OP	0.65	0.44	0.74583	-0.13189	0.14728	.	.	.
50034	OP	0.88	0.29	0.53285	-2.35157	0.02721	.	.	.
50035_03	OP	0.88	0.26	0.46228	-2.53967	0.03047	.	.	.
50035_04	OP	0.84	0.48	1.12072	-1.08142	0.09073	.	.	.
50035_05	OP	0.42	0.36	0.78503	1.16218	0.19832	.	.	.
50041	OP	0.55	0.37	0.50605	-0.05393	0.04168	.	.	.
50051	OP	0.8	0.35	0.55312	-1.56651	0.01447	.	.	.
50052	OP	0.79	0.36	0.58464	-1.16602	0.09863	.	.	.
50055	OP	0.46	0.49	0.5121	-0.09924	0	3.06567	-0.20995	-2.85572
50058	OP	0.73	0.44	0.7401	-0.85144	0.04108	.	.	.
50059	OP	0.91	0.41	1.08866	-1.70065	0.01971	.	.	.
50061	OP	0.72	0.49	1.0863	-0.22326	0.23365	.	.	.
50062	OP	0.34	0.29	0.69659	1.70182	0.17525	.	.	.
50063_01	OP	0.62	0.45	0.88455	0.21277	0.2102	.	.	.
50063_02	OP	0.3	0.26	1.05468	1.79716	0.1939	.	.	.
50063_03	OP	0.52	0.41	0.66963	0.52367	0.1329	.	.	.
50071	OP	0.5	0.29	1.39226	1.39249	0.36772	.	.	.
50077_01	OP	0.48	0.45	0.93279	0.70199	0.15823	.	.	.
50077_06	OP	0.45	0.25	0.53001	1.61809	0.26362	.	.	.
50083	OP	0.62	0.52	1.11184	0.07487	0.18591	.	.	.
50086	OP	0.55	0.36	0.7129	0.72566	0.25697	.	.	.
50091_01	OP	0.64	0.31	0.55061	0.3202	0.29135	.	.	.
50091_06	OP	0.69	0.42	0.71196	-0.26286	0.17707	.	.	.
50094	OP	0.55	0.32	0.41881	0.24869	0.10256	.	.	.
50105_01	OP	0.63	0.37	0.52822	-0.11328	0.1273	.	.	.
50105_04	OP	0.71	0.42	0.73201	-0.33397	0.19211	.	.	.
50105_05	OP	0.75	0.46	0.90539	-0.43204	0.20617	.	.	.
50123	OP	0.57	0.47	0.86399	0.23596	0.15916	.	.	.
50125	OP	0.84	0.37	0.63249	-1.64134	0.02891	.	.	.
50170_01	OP	0.58	0.34	0.49828	0.27506	0.17763	.	.	.
50170_03	OP	0.79	0.35	0.70991	-0.43551	0.40164	.	.	.
50170_05	OP	0.24	0.18	0.83766	2.46734	0.17198	.	.	.
50180_03	OP	0.6	0.19	0.23736	0.31654	0.21485	.	.	.
50180_05	OP	0.58	0.33	0.64535	0.70072	0.31749	.	.	.
50180_06	OP	0.47	0.35	0.78847	1.05031	0.24144	.	.	.
50183	OP	0.91	0.34	0.78587	-1.99478	0.02551	.	.	.
50192	OP	0.7	0.52	1.11691	-0.20435	0.16868	.	.	.
50194	OP	0.62	0.46	0.91262	0.07422	0.19811	.	.	.
50210_04	OP	0.31	0.2	0.39845	2.62817	0.15742	.	.	.
50210_05	OP	0.86	0.33	0.59826	-1.85445	0.03803	.	.	.
50210_06	OP	0.4	0.33	0.63556	1.32044	0.16178	.	.	.

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
50227	OP	0.67	0.42	0.63634	-0.65931	0.01171	.	.	.
50229	OP	0.51	0.37	0.49331	0.17773	0.05163	.	.	.
50232	OP	0.31	0.29	0.68779	1.77563	0.15669	.	.	.
50238	OP	0.58	0.3	0.94183	1.20241	0.42192	.	.	.
50240_01	OP	0.3	0.14	0.81402	2.75722	0.25115	.	.	.
50240_06	OP	0.65	0.51	1.01153	-0.08052	0.16724	.	.	.
50240_08	OP	0.36	0.56	0.5433	-0.83738	0	2.04483	0.2836	-2.32843
50290	OP	0.56	0.49	1.04534	0.29684	0.19283	.	.	.
50302_01	OP	0.42	0.3	0.77314	1.4574	0.25927	.	.	.
50302_02	OP	0.65	0.48	0.78444	-0.29387	0.08645	.	.	.
50302_04	OP	0.66	0.48	0.85226	-0.18917	0.15225	.	.	.
50311	OP	0.88	0.42	1.0452	-1.54634	0.0351	.	.	.
50329	OP	0.76	0.53	1.17279	-0.57544	0.13681	.	.	.
50335	OP	0.69	0.54	1.54827	-0.03882	0.26951	.	.	.
50345	OP	0.65	0.46	0.94397	0.12964	0.23493	.	.	.
50355	OP	0.53	0.6	0.61675	0.32084	0	1.92175	0.30178	-2.22353
50400_05	OP	0.58	0.36	0.44657	-0.275	0.01476	.	.	.
50400_06	OP	0.56	0.42	0.64321	0.16376	0.10362	.	.	.
50413	OP	0.56	0.42	0.69985	0.72656	0.19089	.	.	.
50415	OP	0.43	0.31	0.69265	1.30269	0.22173	.	.	.
50431	OP	0.61	0.37	0.67496	0.31888	0.26836	.	.	.
50434_01	OP	0.48	0.15	0.70256	2.39888	0.41297	.	.	.
50434_02	OP	0.49	0.37	0.47828	0.34571	0.01621	.	.	.
50434_04	OP	0.73	0.41	0.66117	-0.62127	0.12135	.	.	.
50442	OP	0.42	0.39	0.86526	1.09719	0.1774	.	.	.
50464	OP	0.55	0.33	0.87858	0.98766	0.35061	.	.	.
50472	OP	0.48	0.49	1.11238	0.66296	0.15348	.	.	.
50476	OP	0.67	0.43	0.67062	-0.35398	0.09991	.	.	.
50500_02	OP	0.44	0.26	0.41408	1.40275	0.16598	.	.	.
50500_03	OP	0.7	0.48	1.04459	-0.10568	0.2312	.	.	.
50500_04	OP	0.85	0.41	0.82756	-1.32756	0.05974	.	.	.
50502_01	OP	0.65	0.45	0.83262	-0.0652	0.19616	.	.	.
50502_04	OP	0.92	0.4	1.09118	-1.72347	0.02576	.	.	.
50502_05	OP	0.55	0.4	0.52752	0.04158	0.03732	.	.	.
50532	OP	0.5	0.15	0.22769	2.50256	0.29116	.	.	.
55001_01	OP	0.81	0.44	0.79434	-1.10619	0.03613	.	.	.
55001_04	OP	0.38	0.18	1.08311	2.07217	0.31014	.	.	.
55001_06	OP	0.42	0.32	1.10116	1.37916	0.27189	.	.	.
55006_01	OP	0.54	0.42	0.6822	0.33444	0.13548	.	.	.
55006_02	OP	0.72	0.46	0.82238	-0.56272	0.12633	.	.	.
55006_03	OP	0.75	0.45	0.90635	-0.48785	0.24711	.	.	.
55010_03	OP	0.67	0.44	0.69203	-0.45	0.07557	.	.	.
55010_05	OP	0.28	0.16	0.74144	2.64102	0.2199	.	.	.
55053_02	OP	0.51	0.46	1.24793	0.71025	0.23037	.	.	.
55053_03	OP	0.41	0.21	0.76557	1.97327	0.31108	.	.	.
55053_05	OP	0.44	0.3	0.52516	1.24838	0.17726	.	.	.
55060_02	OP	0.42	0.32	0.9879	1.3522	0.26169	.	.	.
55060_06	OP	0.5	0.34	0.69513	0.92394	0.25323	.	.	.
55060_08	OP	0.36	0.6	0.65561	-0.61994	0	1.93236	-0.13679	-1.79557
55072_02	OP	0.57	0.44	0.82288	0.34373	0.17504	.	.	.
55072_05	OP	0.81	0.47	1.04802	-0.72743	0.19458	.	.	.
55072_08	OP	0.45	0.6	0.69485	-0.40349	0	2.05231	0.60198	-2.65429
55149	OP	0.62	0.43	0.78175	0.10291	0.2003	.	.	.

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
55174	OP	0.45	0.41	0.91788	0.91581	0.18258	.	.	.
55198	OP	0.49	0.44	1.11169	0.73867	0.2282	.	.	.
55207	OP	0.87	0.39	0.81962	-1.54557	0.12632	.	.	.
55208	OP	0.44	0.4	0.94257	0.92162	0.20766	.	.	.
55234	OP	0.88	0.41	0.97016	-1.47537	0.06687	.	.	.
55235	OP	0.82	0.45	0.90758	-1.19025	0.02918	.	.	.
55236	OP	0.57	0.32	0.46009	0.39423	0.17457	.	.	.
50132_02	FT	0.34	0.2	0.83506	2.06945	0.26273	.	.	.
50132_03	FT	0.32	0.16	1.05873	2.24787	0.26938	.	.	.
50132_05	FT	0.33	0.36	1.02174	1.33437	0.16706	.	.	.
50132_06	FT	0.29	0.14	1.09647	2.49349	0.2561	.	.	.
50132_08	FT	0.08	0.6	0.78642	-1.37995	0	1.20995	0.07287	-1.28281
50133_01	FT	0.25	0.14	1.34948	2.30133	0.20389	.	.	.
50133_04	FT	0.4	0.37	0.73102	1.1251	0.13626	.	.	.
50133_05	FT	0.48	0.08	0.06688	4.55596	0.15616	.	.	.
50133_06	FT	0.78	0.52	1.35728	-0.45374	0.21435	.	.	.
50133_08	FT	0.09	0.61	0.75519	-1.2839	0	1.21433	-0.17017	-1.04416
50313	FT	0.23	0.19	0.80374	2.43275	0.15487	.	.	.
50436	FT	0.5	0.29	0.41106	0.70312	0.16348	.	.	.
50439	FT	0.65	0.4	0.68568	-0.00837	0.19798	.	.	.
50486_01	FT	0.53	0.42	0.79492	0.55024	0.16387	.	.	.
50486_02	FT	0.57	0.51	1.18146	0.38892	0.17784	.	.	.
50486_03	FT	0.61	0.35	0.61013	0.32099	0.23837	.	.	.
50486_05	FT	0.37	0.3	1.09375	1.55498	0.23498	.	.	.
50486_06	FT	0.85	0.41	0.83686	-1.3454	0.06569	.	.	.
50510_01	FT	0.61	0.42	0.64741	-0.02294	0.12276	.	.	.
50510_02	FT	0.72	0.47	0.8903	-0.46403	0.19662	.	.	.
50510_03	FT	0.4	0.22	0.25085	1.50283	0.06066	.	.	.
50510_05	FT	0.56	0.46	0.97903	0.44946	0.21403	.	.	.
50516_01	FT	0.72	0.4	0.60218	-0.98493	0.04109	.	.	.
50516_04	FT	0.29	0.21	0.543	2.40743	0.18087	.	.	.
50516_05	FT	0.37	0.34	0.81785	1.39887	0.17746	.	.	.
50516_06	FT	0.2	0.13	0.71552	3.0003	0.15528	.	.	.
50540_01	FT	0.31	0.09	0.17188	7.20364	0.21674	.	.	.
50540_02	FT	0.24	0	-0.08975	-13.1166	0.14448	.	.	.
50540_04	FT	0.45	0.45	0.82632	0.70402	0.11619	.	.	.
50540_06	FT	0.45	0.28	0.47858	1.27563	0.20339	.	.	.
50548_01	FT	0.6	0.37	0.48634	-0.34249	0.0585	.	.	.
50548_04	FT	0.7	0.28	0.40878	-0.57489	0.20022	.	.	.
50548_05	FT	0.51	0.31	0.41421	0.46105	0.0879	.	.	.
50548_06	FT	0.5	0.33	0.45356	0.46408	0.10343	.	.	.
50549	FT	0.69	0.42	0.62059	-0.6811	0.09471	.	.	.
50550	FT	0.74	0.49	1.09385	-0.3085	0.24491	.	.	.
50553_01	FT	0.8	0.45	1.0551	-0.50723	0.27752	.	.	.
50553_04	FT	0.41	0.31	0.82271	1.4847	0.2394	.	.	.
50553_05	FT	0.52	0.36	1.24325	1.03716	0.33356	.	.	.
50553_06	FT	0.69	0.31	0.43066	-0.72749	0.09572	.	.	.
50554	FT	0.55	0.53	1.30808	0.43271	0.17408	.	.	.
50556	FT	0.52	0.31	0.45467	0.57865	0.17404	.	.	.
50557	FT	0.21	0.18	1.3638	2.15624	0.16114	.	.	.
50558_01	FT	0.43	0.43	1.04311	0.94256	0.1758	.	.	.
50558_02	FT	0.36	0.34	0.65616	1.40379	0.12951	.	.	.
50558_03	FT	0.66	0.21	0.24914	-1.07641	0.08075	.	.	.

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
50558_04	FT	0.37	0	-0.26511	-5.51707	0.31437	.	.	.
50562	FT	0.47	0.38	1.39057	1.07633	0.29335	.	.	.
50563	FT	0.32	0.23	0.52677	2.2084	0.17136	.	.	.
50564_01	FT	0.51	0.42	0.85756	0.65355	0.19698	.	.	.
50564_03	FT	0.28	0.25	1.0384	1.88628	0.18584	.	.	.
50564_04	FT	0.72	0.52	1.27439	-0.2106	0.23065	.	.	.
50564_05	FT	0.57	0.25	0.59187	1.25255	0.38248	.	.	.
50566	FT	0.71	0.45	0.8553	-0.42721	0.22494	.	.	.
50571	FT	0.17	0.42	0.44605	-0.7046	0	3.07629	-0.39362	-2.68267
50573_01	FT	0.69	0.32	0.62376	0.23101	0.37195	.	.	.
50573_02	FT	0.58	0.34	0.46906	0.01092	0.13528	.	.	.
50573_03	FT	0.22	0.12	1.16157	2.47719	0.18948	.	.	.
50573_06	FT	0.85	0.37	0.7055	-1.38479	0.13015	.	.	.
50574	FT	0.47	0.32	0.52205	0.92491	0.15102	.	.	.
50577	FT	0.17	0.45	0.55707	-0.52496	0	3.26738	-0.56597	-2.70142
50578	FT	0.77	0.44	0.75938	-0.92431	0.07896	.	.	.
50581	FT	0.5	0.53	1.06313	0.43957	0.0908	.	.	.
50583	FT	0.38	0.4	0.84701	1.13742	0.13421	.	.	.
50584	FT	0.11	0.54	0.77979	-1.58281	0	2.32649	-0.48367	-1.84282
50585	FT	0.14	0.66	0.83198	-0.84306	0	1.45992	0.07083	-1.53075
50586_01	FT	0.68	0.23	0.25911	-1.53999	0.05768	.	.	.
50586_02	FT	0.4	0.4	1.12871	1.03925	0.20214	.	.	.
50586_04	FT	0.26	0.01	-0.27575	-6.80372	0.23143	.	.	.
50586_05	FT	0.31	0.29	0.67598	1.79961	0.14668	.	.	.
50587_01	FT	0.43	0.18	1.17936	1.98689	0.37383	.	.	.
50587_04	FT	0.23	0.23	0.74955	2.24217	0.13013	.	.	.
50587_05	FT	0.4	0.24	0.58309	1.91855	0.24997	.	.	.
50587_06	FT	0.35	0.29	0.94046	1.67971	0.22227	.	.	.
50588_01	FT	0.78	0.29	0.44276	-1.45055	0.05871	.	.	.
50588_02	FT	0.41	0.33	0.53505	1.16514	0.11379	.	.	.
50588_03	FT	0.47	0.46	1.07678	0.78139	0.171	.	.	.
50588_05	FT	0.55	0.33	1.0123	1.01457	0.35167	.	.	.
50590_01	FT	0.66	0.4	0.68779	-0.07294	0.1989	.	.	.
50590_02	FT	0.44	0.5	1.11622	0.72979	0.12719	.	.	.
50590_04	FT	0.32	0.37	1.01751	1.40177	0.14141	.	.	.
50590_05	FT	0.47	0.19	0.99071	1.98475	0.40518	.	.	.
50591_01	FT	0.58	0.3	0.58156	0.79037	0.30259	.	.	.
50591_03	FT	0.71	0.48	1.15629	-0.04128	0.27216	.	.	.
50591_04	FT	0.59	0.46	0.84524	0.19245	0.13911	.	.	.
50591_05	FT	0.52	0.21	0.2577	0.90807	0.15581	.	.	.
50592_02	FT	0.56	0.42	0.69269	0.29278	0.13516	.	.	.
50592_03	FT	0.65	0.42	0.763	0.05293	0.2026	.	.	.
50592_04	FT	0.5	0.22	0.26474	1.08338	0.13957	.	.	.
50592_05	FT	0.69	0.46	0.96005	-0.06218	0.2387	.	.	.
50593_02	FT	0.38	0.15	0.19928	3.24311	0.14209	.	.	.
50593_04	FT	0.31	-0.05	-0.14112	-4.77807	0.09811	.	.	.
50593_05	FT	0.41	0.13	0.14227	2.98076	0.09635	.	.	.
50593_06	FT	0.34	0.19	0.30404	2.54727	0.12079	.	.	.
50598	FT	0.16	0.39	0.44128	-1.468	0	3.71893	-0.0126	-3.70633
50600	FT	0.75	0.46	0.8809	-0.51495	0.17332	.	.	.
55080_01	FT	0.5	0.41	0.6575	0.46894	0.13232	.	.	.
55080_02	FT	0.8	0.45	0.89447	-0.89934	0.11904	.	.	.
55080_03	FT	0.49	0.48	1.23959	0.62358	0.2129	.	.	.

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
55080_05	FT	0.5	0.3	0.38202	0.51962	0.06501	.	.	.
55080_07	FT	0.12	0.61	0.83192	-1.37089	0	2.14163	0.19153	-2.33316
55080_08	FT	0.09	0.48	0.52965	-1.44633	0	2.2601	-0.38267	-1.87742
55081_01	FT	0.29	0.3	0.94939	1.69496	0.15971	.	.	.
55081_02	FT	0.78	0.42	0.72803	-1.02439	0.05784	.	.	.
55081_03	FT	0.34	0.19	0.35999	2.62221	0.16528	.	.	.
55081_05	FT	0.21	0.07	2.05141	2.45593	0.19655	.	.	.
55081_06	FT	0.39	0.21	0.63577	2.10701	0.27849	.	.	.

Note: OP = Operational item; FT = Field Test item

Table A.2. Grade 8 item statistics

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
80013	OP	0.47	0.31	0.43573	0.90156	0.13224	.	.	.
80019	OP	0.35	0.59	0.53206	-0.70219	0	1.59169	0.02896	-1.62065
80024	OP	0.77	0.44	0.9486	-0.3113	0.34185	.	.	.
80027	OP	0.37	0.27	1.01107	1.72092	0.26282	.	.	.
80030	OP	0.44	0.68	0.80192	-0.13716	0	1.80004	-0.09667	-1.70337
80032	OP	0.38	0.33	0.67614	1.55099	0.16942	.	.	.
80048	OP	0.38	0.22	0.85024	1.97904	0.27066	.	.	.
80052	OP	0.42	0.38	1.22997	1.21809	0.26215	.	.	.
80061	OP	0.64	0.48	0.82864	-0.10389	0.1193	.	.	.
80064	OP	0.41	0.72	0.83508	-0.31053	0	1.37059	0.10923	-1.47982
80071	OP	0.55	0.45	0.80407	0.51293	0.19017	.	.	.
80074	OP	0.56	0.35	0.48139	0.29145	0.14702	.	.	.
80080	OP	0.71	0.25	0.75021	0.94526	0.56307	.	.	.
80081	OP	0.69	0.45	0.69285	-0.42578	0.11463	.	.	.
80083	OP	0.29	0.32	0.73804	1.79459	0.13293	.	.	.
80092	OP	0.62	0.42	0.67578	0.05209	0.18706	.	.	.
80107	OP	0.76	0.54	1.08807	-0.66364	0.10498	.	.	.
80112	OP	0.6	0.45	0.67688	0.01776	0.1147	.	.	.
80122	OP	0.39	0.23	1.59631	1.74991	0.31621	.	.	.
80130	OP	0.59	0.43	0.56847	-0.14819	0.06204	.	.	.
80131	OP	0.58	0.46	1.23445	0.60816	0.30276	.	.	.
80196	OP	0.67	0.43	0.84808	0.13133	0.28987	.	.	.
80229	OP	0.56	0.43	0.70518	0.53751	0.18189	.	.	.
80257	OP	0.72	0.51	0.81906	-0.76519	0.01827	.	.	.
80279	OP	0.4	0.47	0.97409	0.99594	0.12806	.	.	.
80280	OP	0.73	0.53	0.89818	-0.69153	0.01288	.	.	.
80284	OP	0.64	0.45	0.89828	0.24232	0.26743	.	.	.
80311	OP	0.46	0.4	0.96748	1.00211	0.22678	.	.	.
80313	OP	0.59	0.54	0.89343	0.0492	0.08637	.	.	.
80319	OP	0.35	0.42	1.05786	1.22457	0.14818	.	.	.
80321	OP	0.55	0.38	0.6679	0.59339	0.2368	.	.	.
80324	OP	0.37	0.44	1.13056	1.18719	0.15659	.	.	.
80325	OP	0.75	0.42	0.65875	-0.89152	0.1303	.	.	.
80330	OP	0.75	0.49	0.86796	-0.76	0.06978	.	.	.
80336	OP	0.67	0.48	0.77777	-0.26439	0.15648	.	.	.
80337	OP	0.67	0.4	0.56311	-0.53266	0.08763	.	.	.
80411	OP	0.51	0.51	1.10819	0.61053	0.17472	.	.	.
80446	OP	0.76	0.48	0.95987	-0.56142	0.2242	.	.	.
80460	OP	0.72	0.42	0.78669	-0.20041	0.30838	.	.	.
80495	OP	0.61	0.39	0.48362	-0.31867	0.02108	.	.	.
80501	OP	0.65	0.49	0.81796	-0.05979	0.17072	.	.	.
80545	OP	0.36	0.65	0.82094	-0.60204	0	2.09076	-0.18846	-1.9023
80550	OP	0.58	0.44	0.65916	0.14185	0.12233	.	.	.
80552	OP	0.57	0.48	0.83621	0.32706	0.15673	.	.	.
80558	OP	0.81	0.51	1.04962	-0.94908	0.07479	.	.	.
80559	OP	0.7	0.38	0.49644	-1.00736	0.0109	.	.	.
80579	OP	0.7	0.54	1.17803	-0.25099	0.17543	.	.	.
85197	OP	0.73	0.48	0.83871	-0.57559	0.14348	.	.	.
85201	OP	0.77	0.45	0.70368	-1.0127	0.03407	.	.	.
80028_01	OP	0.43	0.26	0.36642	1.44953	0.14909	.	.	.
80028_02	OP	0.8	0.37	0.54301	-1.56138	0.02313	.	.	.

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
80042_03	OP	0.56	0.4	0.49491	-0.03161	0.02598	.	.	.
80042_04	OP	0.57	0.39	0.58734	0.33409	0.17845	.	.	.
80042_06	OP	0.5	0.47	0.88393	0.6351	0.16324	.	.	.
80063_01	OP	0.58	0.35	0.60568	0.61058	0.26648	.	.	.
80063_03	OP	0.31	0.23	0.81504	2.167	0.21655	.	.	.
80063_05	OP	0.5	0.38	0.77593	0.96352	0.24158	.	.	.
80091_02	OP	0.54	0.45	0.57071	0.02822	0.01248	.	.	.
80091_03	OP	0.51	0.43	1.26337	0.85873	0.28092	.	.	.
80120_01	OP	0.4	0.29	1.42197	1.52686	0.29571	.	.	.
80120_05	OP	0.67	0.4	0.60423	-0.26132	0.18778	.	.	.
80156_01	OP	0.52	0.45	1.02112	0.75028	0.24428	.	.	.
80156_03	OP	0.79	0.47	0.88416	-0.8378	0.14188	.	.	.
80156_08	OP	0.45	0.63	0.7359	0.06721	0	2.34354	-0.6632	-1.68034
80180_01	OP	0.51	0.33	0.66017	1.06274	0.27023	.	.	.
80180_03	OP	0.52	0.38	0.77471	0.89645	0.2554	.	.	.
80190_03	OP	0.68	0.28	0.33547	-1.02531	0.04792	.	.	.
80190_06	OP	0.73	0.49	0.76677	-0.75526	0.01884	.	.	.
80210_01	OP	0.57	0.37	0.89797	0.81814	0.33916	.	.	.
80210_05	OP	0.63	0.42	0.58406	-0.28833	0.09421	.	.	.
80210_06	OP	0.66	0.28	0.48134	0.46524	0.38763	.	.	.
80220_01	OP	0.62	0.48	0.92037	0.16955	0.2087	.	.	.
80220_04	OP	0.6	0.46	0.65262	-0.06127	0.07033	.	.	.
80220_05	OP	0.51	0.46	0.82239	0.58605	0.1614	.	.	.
80236_01	OP	0.55	0.46	0.67848	0.2601	0.09855	.	.	.
80236_04	OP	0.41	0.51	1.3131	0.94583	0.14685	.	.	.
80236_08	OP	0.41	0.66	0.76328	-0.32164	0	1.82722	-0.20406	-1.62317
80248_03	OP	0.67	0.49	0.79061	-0.34883	0.08822	.	.	.
80248_05	OP	0.44	0.33	0.65761	1.2981	0.21448	.	.	.
80248_06	OP	0.67	0.46	0.7449	-0.24168	0.14634	.	.	.
80278_02	OP	0.82	0.47	0.99304	-0.96421	0.19326	.	.	.
80278_03	OP	0.7	0.45	0.85669	-0.17276	0.27405	.	.	.
80278_04	OP	0.59	0.52	1.02772	0.20059	0.18278	.	.	.
80288_02	OP	0.38	0.3	0.73214	1.62292	0.21663	.	.	.
80288_03	OP	0.56	0.39	0.48585	-0.02677	0.04272	.	.	.
80288_04	OP	0.75	0.43	0.64124	-1.05788	0.02057	.	.	.
80298_03	OP	0.47	0.36	1.11515	1.22577	0.29326	.	.	.
80298_04	OP	0.59	0.38	0.46985	-0.16023	0.04597	.	.	.
80298_05	OP	0.69	0.45	0.66356	-0.50147	0.08819	.	.	.
80422_02	OP	0.55	0.51	1.41024	0.52248	0.25205	.	.	.
80422_03	OP	0.49	0.47	2.21446	0.84702	0.27948	.	.	.
80422_04	OP	0.58	0.44	0.66164	0.14619	0.13615	.	.	.
80475_01	OP	0.49	0.4	0.66937	0.75907	0.17113	.	.	.
80475_02	OP	0.6	0.46	0.67588	-0.02117	0.09514	.	.	.
80475_04	OP	0.64	0.53	0.99451	-0.0151	0.14957	.	.	.
80484_01	OP	0.78	0.44	0.70435	-1.09365	0.02777	.	.	.
80484_02	OP	0.6	0.42	0.54748	-0.18873	0.04035	.	.	.
80484_03	OP	0.65	0.55	1.10993	-0.0814	0.14924	.	.	.
85002_02	OP	0.68	0.34	0.41524	-0.94071	0.02472	.	.	.
85002_05	OP	0.44	0.35	0.3998	0.65544	0.01328	.	.	.
85002_06	OP	0.54	0.37	0.43721	-0.00183	0.02484	.	.	.
85007_01	OP	0.55	0.3	0.31921	-0.14484	0.01788	.	.	.
85007_05	OP	0.66	0.43	0.71213	-0.1138	0.22186	.	.	.
85007_06	OP	0.45	0.35	0.45714	0.82509	0.09202	.	.	.

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
85059_02	OP	0.52	0.47	1.10219	0.63513	0.22272	.	.	.
85059_03	OP	0.57	0.49	0.9356	0.28021	0.1846	.	.	.
85059_07	OP	0.36	0.64	0.82293	-0.62538	0	2.17724	-0.17116	-2.00608
85061_02	OP	0.81	0.47	0.9514	-0.97301	0.16641	.	.	.
85061_03	OP	0.78	0.53	1.11649	-0.74671	0.12856	.	.	.
85061_07	OP	0.43	0.68	0.84416	-0.16194	0	1.85538	0.02043	-1.87582
80250	FT	0.64	0.57	1.16381	-0.04927	0.13267	.	.	.
80299	FT	0.56	0.48	0.87471	0.26392	0.19078	.	.	.
80300	FT	0.35	0.43	0.95173	1.20762	0.11692	.	.	.
80307	FT	0.37	0.33	1.07506	1.49555	0.22455	.	.	.
80342	FT	0.27	0.27	1.02381	1.94294	0.16839	.	.	.
80344	FT	0.73	0.58	1.45937	-0.34247	0.15858	.	.	.
80505	FT	0.15	0.58	0.56892	-0.35321	0	1.33643	0.38879	-1.72522
80600	FT	0.6	0.52	0.8393	0.01547	0.10233	.	.	.
80601	FT	0.13	0.69	0.91096	-0.83776	0	1.28014	0.16547	-1.4456
80603	FT	0.45	0.28	0.33618	1.08319	0.09344	.	.	.
80605	FT	0.34	0.38	0.70306	1.35932	0.11015	.	.	.
80614	FT	0.76	0.46	0.76145	-0.84744	0.08483	.	.	.
80617	FT	0.15	0.72	0.86367	-0.53713	0	1.07619	-0.11612	-0.96006
80619	FT	0.79	0.5	1.09225	-0.84824	0.19057	.	.	.
80620	FT	0.43	0.34	1.08749	1.2471	0.28066	.	.	.
80622	FT	0.21	0.27	1.21613	1.9691	0.12116	.	.	.
80626	FT	0.15	0.55	0.46148	-0.8011	0	1.15102	0.57749	-1.7285
80634	FT	0.08	0.6	0.78865	-1.26646	0	0.93497	-0.56814	-0.36683
80644	FT	0.45	0.43	1.403	1.05643	0.23781	.	.	.
80648	FT	0.68	0.52	1.10757	-0.04845	0.20902	.	.	.
80467_01	FT	0.82	0.48	1.02441	-1.00479	0.11995	.	.	.
80467_02	FT	0.58	0.51	0.78774	0.04087	0.06048	.	.	.
80467_03	FT	0.47	0.38	0.78537	1.00839	0.22459	.	.	.
80467_04	FT	0.54	0.34	0.71682	0.97603	0.30061	.	.	.
80507_02	FT	0.57	0.45	1.08047	0.64064	0.28586	.	.	.
80507_03	FT	0.3	0.13	1.12944	2.58551	0.26369	.	.	.
80507_04	FT	0.64	0.47	0.89644	0.17008	0.24086	.	.	.
80507_05	FT	0.65	0.35	0.43282	-0.55453	0.05539	.	.	.
80528_01	FT	0.44	0.41	0.89158	1.05645	0.19966	.	.	.
80528_02	FT	0.25	0.19	0.80738	2.44098	0.17933	.	.	.
80528_04	FT	0.57	0.34	0.93322	1.03086	0.37299	.	.	.
80528_05	FT	0.7	0.41	0.86092	0.09688	0.34753	.	.	.
80533_01	FT	0.56	0.36	1.24632	0.99172	0.39129	.	.	.
80533_02	FT	0.44	0.32	0.65806	1.25839	0.24155	.	.	.
80533_03	FT	0.47	0.37	1.10648	1.0743	0.29539	.	.	.
80533_04	FT	0.54	0.32	0.40208	0.25972	0.09627	.	.	.
80533_06	FT	0.45	0.44	1.07003	0.91907	0.19573	.	.	.
80533_08	FT	0.08	0.63	0.84393	-1.14739	0	1.10644	-0.26768	-0.83876
80534_01	FT	0.51	0.48	1.63164	0.80309	0.26866	.	.	.
80534_02	FT	0.67	0.53	1.09038	-0.05714	0.20177	.	.	.
80534_03	FT	0.63	0.52	1.08373	0.15412	0.21871	.	.	.
80534_04	FT	0.34	0.04	0.01345	66.70641	0.19528	.	.	.
80534_05	FT	0.24	0.22	0.92636	2.27487	0.16437	.	.	.
80534_08	FT	0.07	0.56	0.65595	-1.57252	0	0.8687	0.08143	-0.95013
80535_01	FT	0.43	0.22	0.5791	1.9918	0.29573	.	.	.
80535_02	FT	0.65	0.38	0.74687	0.2112	0.34764	.	.	.
80535_03	FT	0.36	0.27	0.70023	1.85115	0.2137	.	.	.

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
80535_05	FT	0.15	0.03	2.04887	2.5276	0.13783	.	.	.
80535_06	FT	0.42	0.36	0.87979	1.19118	0.2298	.	.	.
80535_08	FT	0.12	0.66	0.77998	-0.79981	0	1.18372	-0.37723	-0.80649
80595_01	FT	0.3	0.12	2.00078	2.46274	0.28182	.	.	.
80595_03	FT	0.6	0.49	0.88283	0.06691	0.18979	.	.	.
80595_05	FT	0.5	0.41	0.74697	0.74396	0.18571	.	.	.
80595_06	FT	0.69	0.5	0.86901	-0.40953	0.17253	.	.	.
80597_01	FT	0.28	0.3	0.90038	1.76934	0.15894	.	.	.
80597_02	FT	0.42	0.3	0.85078	1.51727	0.27427	.	.	.
80597_03	FT	0.4	0.23	0.45903	1.92443	0.22992	.	.	.
80597_05	FT	0.44	0.26	0.87797	1.67842	0.32088	.	.	.
80615_01	FT	0.57	0.6	1.17783	0.11327	0.08484	.	.	.
80615_02	FT	0.58	0.37	0.87705	0.79461	0.35037	.	.	.
80615_04	FT	0.47	0.3	0.36077	0.68187	0.06935	.	.	.
80615_06	FT	0.3	0.21	0.30685	2.63427	0.08823	.	.	.
80623_02	FT	0.52	0.4	0.87739	0.70125	0.26661	.	.	.
80623_04	FT	0.44	0.33	0.4679	0.95481	0.12656	.	.	.
80623_06	FT	0.23	0.02	-0.1219	-20.7086	0.21734	.	.	.
80631_01	FT	0.43	0.2	0.21099	1.39679	0.05053	.	.	.
80631_02	FT	0.53	0.45	1.04745	0.71932	0.24174	.	.	.
80631_04	FT	0.53	0.25	0.48659	1.32987	0.30828	.	.	.
80631_06	FT	0.65	0.43	0.67497	-0.08678	0.16985	.	.	.
80639_01	FT	0.43	0.4	0.74929	0.92428	0.17016	.	.	.
80639_02	FT	0.72	0.48	0.74431	-0.70076	0.03245	.	.	.
80639_04	FT	0.26	0.14	0.5293	3.25093	0.19591	.	.	.
80639_05	FT	0.62	0.47	0.78911	-0.0343	0.18578	.	.	.
80647_01	FT	0.32	0.17	1.01174	2.27816	0.26065	.	.	.
80647_02	FT	0.77	0.41	0.65898	-1.11641	0.12806	.	.	.
80647_05	FT	0.67	0.46	0.78174	-0.14899	0.16616	.	.	.
80647_06	FT	0.56	0.35	0.46065	0.0869	0.13287	.	.	.
80655_01	FT	0.5	0.42	0.95932	0.90626	0.24699	.	.	.
80655_02	FT	0.43	0.33	1.36431	1.41207	0.30019	.	.	.
80655_04	FT	0.57	0.42	0.97832	0.6333	0.28599	.	.	.
80655_05	FT	0.48	0.31	0.5106	1.09089	0.20084	.	.	.
80663_01	FT	0.59	0.32	0.37416	-0.2301	0.07511	.	.	.
80663_03	FT	0.82	0.41	0.73971	-1.29927	0.0892	.	.	.
80663_04	FT	0.76	0.43	0.84201	-0.39056	0.3194	.	.	.
80663_06	FT	0.55	0.44	0.93783	0.58579	0.24373	.	.	.
80665_01	FT	0.71	0.47	1.12756	0.00844	0.3235	.	.	.
80665_02	FT	0.38	0.24	1.05974	1.74307	0.28974	.	.	.
80665_04	FT	0.28	0.24	1.04519	2.03771	0.19293	.	.	.
80665_05	FT	0.53	0.5	0.78762	0.15649	0.09898	.	.	.
80666_01	FT	0.34	0.24	1.50895	1.76547	0.26281	.	.	.
80666_03	FT	0.38	0.25	0.41078	1.84246	0.15273	.	.	.
80666_04	FT	0.65	0.41	0.77263	0.2322	0.29201	.	.	.
80666_06	FT	0.64	0.36	0.71994	0.48885	0.34758	.	.	.
80667_01	FT	0.53	0.29	0.54429	1.04008	0.28552	.	.	.
80667_02	FT	0.24	0.21	0.67668	2.55522	0.15794	.	.	.
80667_04	FT	0.65	0.24	0.26175	-1.06484	0.06214	.	.	.
80667_05	FT	0.39	0.44	1.08078	1.09937	0.16263	.	.	.
85078_01	FT	0.53	0.38	0.71866	0.70492	0.23619	.	.	.
85078_02	FT	0.52	0.42	1.02949	0.82104	0.27458	.	.	.
85078_03	FT	0.51	0.31	0.36866	0.47312	0.08485	.	.	.

UIN	Status	Pvalue	Ptbis	A	B	C	d1	d2	d3
85078_04	FT	0.57	0.32	0.36323	-0.18652	0.03953	.	.	.
85078_05	FT	0.33	0.21	0.48614	2.4169	0.19836	.	.	.
85078_07	FT	0.12	0.66	0.77029	-0.95646	0	1.0943	0.18766	-1.28196
85080_01	FT	0.8	0.53	1.23584	-0.72982	0.1403	.	.	.
85080_03	FT	0.3	0.38	0.89541	1.51043	0.11642	.	.	.
85080_04	FT	0.3	0.1	1.78354	2.30781	0.26903	.	.	.
85080_05	FT	0.73	0.3	0.39194	-1.33238	0.04448	.	.	.
85080_06	FT	0.32	0.19	0.40147	2.73787	0.17551	.	.	.
85080_07	FT	0.12	0.65	0.83547	-0.84309	0	1.38718	-0.39576	-0.99141

Note: OP = Operational item; FT = Field Test item

Appendix B
DIF Analysis

Table B.1 Grade 5 DIF results

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
50005	OP	0.07	0.0085			0.23	0.0158			0.35	0.0177		
50015	OP	0.69	0.06			0.56	0.0542			0.29	0.0272		
50016	OP	-0.08	-0.0017			0.12	0.0114			0.3	0.0205		
50026	OP	0.62	0.035			0.37	0.0288			-0.44	-0.0283		
50028	OP	-0.83	-0.0715			-0.47	-0.036			0.02	0.0014		
50034	OP	-0.29	-0.013			-0.27	-0.0152			-0.73	-0.0284		
50041	OP	-0.41	-0.0389			-0.36	-0.0318			-0.2	-0.0173		
50051	OP	-0.32	-0.019			-0.5	-0.0352			-0.31	-0.0175		
50052	OP	-0.87	-0.0601			-1.06	-0.0751	B	W	-0.4	-0.0253		
50055	OP	N/A	-0.0292			N/A	-0.0236			N/A	0.0419		
50058	OP	0.16	0.0113			0.44	0.0302			0.04	0.0029		
50059	OP	-0.19	-0.0048			-0.26	-0.0088			0.02	0.0005		
50061	OP	-0.45	-0.0344			0.3	0.0223			-0.27	-0.0183		
50062	OP	0.16	0.0187			-0.55	-0.0417			0	0.0007		
50071	OP	0.15	0.0141			-0.44	-0.0384			-0.24	-0.0234		
50083	OP	-0.04	-0.0057			-0.34	-0.028			-0.23	-0.0182		
50086	OP	-0.72	-0.0611			-0.35	-0.0302			-0.56	-0.0514		
50094	OP	-0.58	-0.0551			-0.94	-0.0893			-0.1	-0.0105		
50123	OP	-0.3	-0.0291			0.06	0.0036			-0.03	-0.0022		
50125	OP	-0.22	-0.0123			0.33	0.021			-0.4	-0.0196		
50183	OP	-0.78	-0.0247			-0.53	-0.017			0.53	0.016		
50192	OP	-0.32	-0.0238			-0.3	-0.023			0.3	0.0195		
50194	OP	0.1	0.0069			0.34	0.0336			-0.32	-0.0251		
50227	OP	0.63	0.0479			0.11	0.0058			0.06	0.0053		
50229	OP	0.14	0.0129			0.15	0.0132			0.27	0.0256		
50232	OP	0	-0.0048			0.15	0.0111			-0.37	-0.031		
50238	OP	0.45	0.0515			0.1	0.0067			-0.36	-0.0339		
50290	OP	0.33	0.0233			0.28	0.0227			-0.21	-0.0166		
50311	OP	-0.28	-0.0105			-0.17	-0.0065			0.35	0.0108		
50329	OP	-0.13	-0.0068			-0.1	-0.006			0.16	0.009		
50335	OP	0.25	0.0179			-0.57	-0.0428			0.06	0.0034		
50345	OP	-0.65	-0.0542			-0.18	-0.0141			-0.43	-0.0331		
50355	OP	N/A	-0.0029			N/A	-0.0206			N/A	0.0555		
50413	OP	-0.31	-0.028			-0.45	-0.0405			-0.09	-0.0076		
50415	OP	-0.07	-0.0052			-0.1	-0.0084			0.26	0.0228		
50431	OP	-0.25	-0.0204			-0.3	-0.0257			-0.59	-0.0519		
50442	OP	0.19	0.0117			0.28	0.0227			0.01	0.0013		
50464	OP	0.48	0.0518			-0.06	-0.0095			-0.55	-0.0515		
50472	OP	0.58	0.0445			0.23	0.0198			-0.16	-0.0126		
50476	OP	-0.76	-0.0655			-0.73	-0.06			0.27	0.0219		
50532	OP	0.39	0.0373			0.25	0.0289			0.09	0.0087		
55149	OP	-0.5	-0.0383			-0.27	-0.0223			-0.64	-0.0535		
55174	OP	-0.39	-0.0317			-0.28	-0.0242			-0.06	-0.0045		
55198	OP	-0.4	-0.0296			-0.07	-0.0009			-0.56	-0.0468		
55207	OP	-0.24	-0.0099			-0.72	-0.037			-0.06	-0.002		
55208	OP	-0.11	-0.0032			0.05	0.0038			0.25	0.0212		
55234	OP	-0.44	-0.0187			-0.27	-0.0101			0.55	0.0191		
55235	OP	-0.74	-0.0439			-0.4	-0.0231			0.65	0.0314		

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
55236	OP	0.43	0.0349			-0.06	-0.0031			0.13	0.0121		
50012_02	OP	-0.48	-0.0443			-0.2	-0.0205			-0.01	-0.0009		
50012_03	OP	-0.01	-0.0036			-0.03	-0.0063			-0.13	-0.0115		
50012_05	OP	-0.39	-0.0245			-0.11	-0.0066			-0.23	-0.018		
50020_01	OP	0.32	0.0208			0.38	0.0233			0.65	0.0296		
50020_05	OP	0.19	0.0122			-0.53	-0.0434			0.05	0.0045		
50020_06	OP	N/A	0.0558			N/A	0.0516			N/A	0.0865		
50035_03	OP	0.09	0.0086			-0.31	-0.0133			-0.56	-0.0234		
50035_04	OP	-0.57	-0.0344			-0.33	-0.0219			-0.18	-0.0074		
50035_05	OP	-0.13	-0.0146			-0.24	-0.0221			0.04	0.0032		
50063_01	OP	-0.48	-0.0398			0.11	0.0121			-0.51	-0.0421		
50063_02	OP	-0.81	-0.0501			-0.55	-0.0376			-0.17	-0.014		
50063_03	OP	-0.25	-0.0299			-0.39	-0.0377			-0.07	-0.0051		
50077_01	OP	0.14	0.0155			0.46	0.0444			0.56	0.0474		
50077_06	OP	0.5	0.0432			-0.07	-0.007			0.09	0.009		
50091_01	OP	0.64	0.0673			0.2	0.0221			0.18	0.0157		
50091_06	OP	0.25	0.0191			0.89	0.0687			-0.39	-0.0298		
50105_01	OP	0.33	0.0252			0.25	0.021			-0.04	-0.0043		
50105_04	OP	0.22	0.0207			0.32	0.0287			0.26	0.0191		
50105_05	OP	-0.55	-0.0398			-0.22	-0.0143			-0.47	-0.0294		
50170_01	OP	0.1	-0.0036			0.27	0.0188			-0.33	-0.0311		
50170_03	OP	0.24	0.0226			0.7	0.0586			-0.63	-0.0402		
50170_05	OP	0.04	-0.0035			-0.27	-0.0179			0.01	-0.0004		
50180_03	OP	0.22	0.0237			0.37	0.0384			-0.34	-0.0335		
50180_05	OP	-0.42	-0.0358			-0.08	-0.0057			-0.46	-0.0418		
50180_06	OP	0.26	0.0222			0.82	0.0812			-0.25	-0.0238		
50210_04	OP	0.09	0.0104			-0.31	-0.0246			-0.23	-0.0202		
50210_05	OP	-0.57	-0.026			0.04	0.0054			0.35	0.0154		
50210_06	OP	0.14	0.0037			-0.65	-0.0574			-0.36	-0.0331		
50240_01	OP	-0.13	-0.0043			0.2	0.021			0.11	0.0083		
50240_06	OP	0.01	-0.0023			-0.18	-0.0199			0.04	0.0042		
50240_08	OP	N/A	0.0491			N/A	-0.0236			N/A	0.058		
50302_01	OP	0.14	0.0225			0.02	0.0057			0.24	0.0225		
50302_02	OP	-0.22	-0.0177			-0.02	-0.0029			0.38	0.0283		
50302_04	OP	-0.57	-0.0477			-0.13	-0.0131			-0.54	-0.0398		
50400_05	OP	0.05	-0.0004			-0.19	-0.0203			0.09	0.0082		
50400_06	OP	-0.29	-0.0162			-0.07	-0.0059			-0.32	-0.0276		
50434_01	OP	-0.3	-0.0176			0.1	0.0158			0.28	0.0295		
50434_02	OP	-0.2	-0.0192			-0.39	-0.0354			0.16	0.0143		
50434_04	OP	0.82	0.0668			0.44	0.0372			-0.12	-0.0083		
50500_02	OP	0.31	0.0242			0.23	0.0224			0.69	0.0679		
50500_03	OP	-0.25	-0.0181			0.24	0.0196			0.46	0.0325		
50500_04	OP	0.12	0.001			0	-0.0018			0.07	0.0035		
50502_01	OP	0.39	0.0345			0.09	0.0085			0.4	0.0306		
50502_04	OP	-0.47	-0.0124			0.16	0.0035			-0.44	-0.0113		
50502_05	OP	-0.05	0			0.32	0.0308			0.05	0.0055		
55001_01	OP	-0.24	-0.0157			0.12	0.012			0.45	0.023		
55001_04	OP	0.67	0.0586			0.6	0.0564			0.17	0.0153		
55001_06	OP	-0.21	-0.0024			-0.11	-0.0066			-0.34	-0.0303		
55006_01	OP	0.52	0.044			0.11	0.0126			-0.07	-0.0058		

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
55006_02	OP	-0.59	-0.0441			-0.38	-0.028			0.07	0.0042		
55006_03	OP	0.35	0.0161			0.5	0.0379			-0.14	-0.0094		
55010_03	OP	-0.22	-0.0169			0.13	0.0133			-0.05	-0.0031		
55010_05	OP	-0.08	-0.0012			0.13	0.0159			0.09	0.0075		
55053_02	OP	-0.36	-0.0238			-0.31	-0.028			-0.3	-0.0243		
55053_03	OP	-0.19	-0.0121			0.13	0.0157			-0.34	-0.0326		
55053_05	OP	-0.03	0.001			0.15	0.015			0.12	0.0115		
55060_02	OP	0.14	0.0129			0.39	0.0347			0.27	0.0235		
55060_06	OP	0.47	0.0396			0.43	0.0413			0.2	0.0184		
55060_08	OP	N/A	0.0649			N/A	0.0055			N/A	0.1344	BB	F
55072_02	OP	0.33	0.0227			0.03	-0.0018			-0.19	-0.0169		
55072_05	OP	0.12	0.0071			0.81	0.0495			-0.01	-0.0008		
55072_08	OP	N/A	0.0417			N/A	0.1002			N/A	0.1147		
50313	FT	-0.5	-0.0213			-0.2	-0.0172			-0.34	-0.0235		
50436	FT	-0.06	-0.0178			-0.2	-0.0198			0.32	0.0332		
50439	FT	-0.33	-0.0219			-0.13	-0.0054			0.17	0.0144		
50549	FT	-0.8	-0.0695			-0.78	-0.0665			-0.2	-0.0159		
50550	FT	-1.07	-0.0751	B	W	-0.44	-0.0277			-0.04	-0.0016		
50554	FT	0.56	0.0368			0.08	0.0029			0.4	0.0283		
50556	FT	0.03	-0.0078			-0.04	-0.012			0.13	0.0135		
50557	FT	-0.6	-0.0188			0.39	0.0271			-0.93	-0.0598		
50562	FT	0.05	0.0229			0.1	0.0169			-0.53	-0.0463		
50563	FT	-0.1	-0.0007			0.55	0.0507			-0.1	-0.007		
50566	FT	0.38	0.0282			0.44	0.0361			0.51	0.0375		
50569	FT	0.56	0.0538			0.7	0.0541			0.03	0.0031		
50571	FT	N/A	0.0141			N/A	0.0057			N/A	0.0447		
50574	FT	-0.51	-0.0596			-0.72	-0.0709			-0.33	-0.0313		
50577	FT	N/A	-0.002			N/A	-0.0135			N/A	0.0519		
50578	FT	0.41	0.0401			-0.08	-0.0053			0.31	0.0192		
50581	FT	-1.06	-0.0821	B	W	-0.43	-0.038			-1.47	-0.1124	B	M
50583	FT	-0.99	-0.0681			-0.68	-0.0466			-1.45	-0.1214	B	M
50584	FT	N/A	0.0078			N/A	-0.0466			N/A	0.0278		
50585	FT	N/A	-0.0012			N/A	0.0365			N/A	0.0579		
50598	FT	N/A	0.0405			N/A	0.0106			N/A	0.0171		
50600	FT	0.07	-0.0026			-0.04	0.0041			-0.22	-0.0128		
50132_02	FT	0.48	0.042			0.31	0.0267			0.05	0.0068		
50132_03	FT	-0.05	0.0214			-0.11	-0.0059			-0.05	-0.0053		
50132_05	FT	-0.45	-0.0251			0.03	0.0029			-0.6	-0.0452		
50132_06	FT	-0.28	-0.0006			-0.01	0.0094			0.44	0.0348		
50132_07	FT	N/A	0.0102			N/A	0.0029			N/A	0.0874		
50132_08	FT	N/A	0.0267			N/A	0.0123			N/A	0.0771		
50133_01	FT	0.04	0.0159			0.7	0.057			0.34	0.0229		
50133_02	FT	0.5	0.0245			-0.07	0.0031			-0.07	-0.0026		
50133_04	FT	-0.33	-0.017			0	-0.0064			-1.21	-0.1023	B	M
50133_05	FT	0	-0.0088			0.69	0.0747			-0.14	-0.0152		
50133_06	FT	-0.03	-0.0044			1	0.0621	B	H	-0.1	-0.007		
50133_08	FT	N/A	-0.0077			N/A	0.004			N/A	0.0047		
50486_01	FT	0.09	0.0175			0.38	0.0352			0.66	0.058		
50486_02	FT	-0.52	-0.0336			0.47	0.0431			-0.52	-0.039		
50486_03	FT	0.16	0.0166			0	0.0127			-0.71	-0.06		

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
50486_05	FT	0.04	0.0071			-0.11	-0.0143			-0.14	-0.012		
50486_06	FT	0.11	0.0109			0.05	-0.0005			-0.56	-0.023		
50510_01	FT	-0.71	-0.0478			-0.54	-0.0371			0.14	0.0121		
50510_02	FT	-1.03	-0.0651	B	W	-0.99	-0.0749			0.03	0.002		
50510_03	FT	0.04	0.0054			-0.29	-0.0252			0.05	0.0039		
50510_05	FT	-0.64	-0.0517			-0.66	-0.0488			-0.54	-0.0446		
50516_01	FT	-0.11	-0.0146			-0.47	-0.0377			0.6	0.0431		
50516_04	FT	0.15	0.0121			-0.07	-0.0049			-0.31	-0.026		
50516_05	FT	-0.09	-0.0028			-0.21	-0.0123			-0.32	-0.0271		
50516_06	FT	0.07	0.0131			-0.53	-0.021			0.01	0.0023		
50540_01	FT	-0.3	-0.0252			0.43	0.0422			0.23	0.023		
50540_02	FT	0.04	-0.0072			0.37	0.0183			0.32	0.0243		
50540_04	FT	-0.56	-0.0522			-0.49	-0.0433			-0.64	-0.0518		
50540_06	FT	-0.07	-0.0088			-0.33	-0.0318			-0.36	-0.033		
50548_01	FT	0.05	0.0036			0.15	0.0099			0.24	0.0223		
50548_04	FT	-0.21	-0.004			0.81	0.0739			0.53	0.0463		
50548_05	FT	-0.34	-0.0248			0.24	0.0128			-0.07	-0.0061		
50548_06	FT	0.41	0.0412			0.47	0.0514			0.49	0.0462		
50553_01	FT	0.01	0.0121			0.33	0.0277			0.19	0.0133		
50553_04	FT	-0.38	-0.0309			-0.18	-0.0125			-0.18	-0.0155		
50553_05	FT	-0.29	-0.0245			0.18	0.0261			-0.69	-0.0617		
50553_06	FT	0.32	0.0388			-0.14	-0.0087			-0.82	-0.0644		
50558_01	FT	-0.35	-0.0281			-0.17	-0.0133			-0.63	-0.054		
50558_02	FT	-0.76	-0.0379			-0.28	-0.0141			-0.65	-0.055		
50558_03	FT	0.38	0.0223			-0.14	-0.0097			-0.16	-0.0159		
50558_04	FT	0.38	0.0262			-0.45	-0.0442			-0.66	-0.0625		
50564_01	FT	0	-0.0104			0.04	0.0045			0.44	0.0385		
50564_03	FT	-0.32	-0.0221			0.03	0.0033			-0.02	-0.0014		
50564_04	FT	-0.25	-0.0291			-0.14	-0.0165			0.11	0.0076		
50564_05	FT	0.51	0.0513			0.07	0.0191			-0.05	-0.0047		
50573_01	FT	-0.52	-0.0531			-0.02	0.0048			-0.39	-0.0332		
50573_02	FT	-0.56	-0.0453			-0.39	-0.0356			0.32	0.0325		
50573_03	FT	-0.21	-0.008			-0.05	0.0061			-0.12	-0.0073		
50573_06	FT	0.06	0.0149			0.55	0.0468			0.36	0.019		
50586_01	FT	0.2	0.0238			-0.04	-0.0065			0.26	0.0218		
50586_02	FT	-0.07	-0.002			0.4	0.0344			0.33	0.0267		
50586_04	FT	0.15	0			-0.1	-0.0089			-0.07	-0.0044		
50586_05	FT	-0.11	-0.0144			0.4	0.0298			0.6	0.049		
50587_01	FT	-0.23	-0.0254			0.07	0.0079			-0.05	-0.0028		
50587_04	FT	-0.56	-0.0378			-0.33	-0.0234			-0.1	-0.0071		
50587_05	FT	0.12	-0.0018			0.67	0.0597			0.04	0.007		
50587_06	FT	-0.28	-0.0299			0.42	0.0303			-0.13	-0.0098		
50588_01	FT	0.44	0.0298			0.92	0.0715			0.41	0.0285		
50588_02	FT	0.05	0.0211			0.3	0.0288			0.02	0.0009		
50588_03	FT	0.23	0.024			0.16	0.0182			0.06	0.0037		
50588_05	FT	0.32	0.0435			0.35	0.0292			-0.43	-0.042		
50590_01	FT	-0.16	-0.0207			-0.6	-0.0643			-0.35	-0.0283		
50590_02	FT	-0.08	-0.0065			0.34	0.0332			0.11	0.01		
50590_04	FT	-0.21	-0.0035			-0.02	0.0019			0.09	0.0062		
50590_05	FT	0.48	0.0565			0.42	0.0413			0.43	0.0445		

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
50591_01	FT	0.35	0.0394			0.5	0.0614			0.19	0.0198		
50591_03	FT	-0.18	-0.0059			-0.34	-0.0237			-0.55	-0.0371		
50591_04	FT	0.01	0.0195			0.3	0.0341			-0.12	-0.0078		
50591_05	FT	0.49	0.0357			0.34	0.0298			0.57	0.0586		
50592_02	FT	0.14	0.0025			0.19	0.0119			0.56	0.0494		
50592_03	FT	0.38	0.0339			0.11	0			0.5	0.0393		
50592_04	FT	1.22	0.128	B	B	0.57	0.0627			0.3	0.0317		
50592_05	FT	-0.03	0.0002			0.15	0.0152			0.02	-0.0005		
50593_02	FT	0.43	0.0492			0.24	0.0305			0.4	0.0361		
50593_04	FT	0.06	0.0048			0.37	0.0259			-0.11	-0.0122		
50593_05	FT	0.24	0.0409			0.43	0.0449			0.58	0.0603		
50593_06	FT	0.76	0.0565			-0.14	-0.0101			0.05	0.0045		
55080_01	FT	0.01	0.0027			0.18	0.0243			0.44	0.0397		
55080_02	FT	-0.01	-0.0054			-0.36	-0.0237			-0.43	-0.0207		
55080_03	FT	0.43	0.0352			0.18	0.0034			-0.39	-0.0321		
55080_05	FT	0.07	0.0155			-0.43	-0.0337			0	0.002		
55080_07	FT	N/A	-0.0094			N/A	0.0161			N/A	0.085		
55080_08	FT	N/A	0.0125			N/A	-0.0167			N/A	0.0881		
55081_01	FT	-0.63	-0.0307			-0.45	-0.028			-0.63	-0.0503		
55081_02	FT	0.23	0.0294			-0.16	-0.0066			-0.59	-0.0348		
55081_03	FT	0.33	0.0238			-0.07	-0.0115			0.1	0.0062		
55081_05	FT	0.28	0.0185			0.17	0.0119			0.34	0.0258		
55081_06	FT	0.51	0.0537			-0.24	-0.0174			0.21	0.0207		

Table B.2 Grade 8 DIF results

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
80013	OP	-0.14	-0.0138			-0.38	-0.0348			-0.7	-0.0678		
80019	OP	N/A	-0.0164			N/A	-0.0192			N/A	0.1626	BB	F
80024	OP	-0.1	-0.0126			-0.37	-0.0282			-0.58	-0.0369		
80027	OP	-0.07	-0.0022			0.25	0.023			-0.24	-0.0213		
80030	OP	N/A	-0.0832			N/A	-0.0363			N/A	0.0968		
80032	OP	0.29	0.0168			-0.33	-0.0267			-0.24	-0.0213		
80048	OP	-0.15	0.0047			-0.24	-0.0135			-0.27	-0.0252		
80052	OP	-0.17	-0.012			-0.1	-0.0092			-0.82	-0.0714		
80061	OP	-0.06	-0.007			0.03	0.0011			1.08	0.0824	B	F
80064	OP	N/A	-0.191	B	W	N/A	-0.0467			N/A	-0.015		
80071	OP	-0.73	-0.0589			-0.41	-0.0389			0.26	0.0231		
80074	OP	0.26	0.0266			0.14	0.0154			-0.38	-0.0359		
80080	OP	0.71	0.0668			0.29	0.0309			-0.64	-0.0542		
80081	OP	0.24	0.0145			0.19	0.0166			-0.16	-0.0117		
80083	OP	-0.25	-0.0226			0.47	0.0362			-0.82	-0.0645		
80092	OP	0.27	0.0155			-0.39	-0.0359			-0.33	-0.029		
80107	OP	-1.35	-0.0978	B	W	-1.62	-0.1064	C	W	-1.3	-0.0684	B	M
80112	OP	0.33	0.0229			0.45	0.0339			-0.02	-0.0017		
80122	OP	0.09	0.0173			0.41	0.0381			-0.38	-0.035		
80130	OP	-0.58	-0.0524			-0.4	-0.0386			0.01	0.0013		
80131	OP	0.23	0.0178			0.07	0.0045			-0.63	-0.053		
80196	OP	-0.09	-0.001			-0.15	-0.0088			-0.1	-0.0078		
80229	OP	0.01	-0.0003			-0.64	-0.0555			-0.37	-0.0329		
80257	OP	0.06	0.0033			-0.29	-0.0197			0.14	0.0088		
80279	OP	-0.56	-0.0327			-0.01	0.0007			-0.75	-0.0598		
80280	OP	0.17	0.0058			0.76	0.0479			-0.1	-0.0056		
80284	OP	0.53	0.0487			0.96	0.083			0.03	0.0027		
80311	OP	0.15	0.0088			0.49	0.0389			-0.09	-0.0081		
80313	OP	-0.12	-0.0112			-0.51	-0.0404			0.04	0.0028		
80319	OP	-0.21	-0.019			-0.3	-0.0231			-0.4	-0.0322		
80321	OP	-0.46	-0.0397			-0.77	-0.0744			-0.37	-0.0335		
80324	OP	-0.2	-0.0141			-0.19	-0.0137			-0.49	-0.0372		
80325	OP	0.12	0.0177			0.15	0.0108			-0.18	-0.0125		
80330	OP	-0.01	0.001			0.12	0.0117			-0.33	-0.0192		
80336	OP	-0.9	-0.0641			0.11	0.0085			-1.14	-0.0843	B	M
80337	OP	0.38	0.0415			0.12	0.017			0.77	0.0614		
80411	OP	0.44	0.036			0.23	0.0221			0.08	0.0071		
80446	OP	0.32	0.0223			0.38	0.0306			0.68	0.0414		
80460	OP	-0.06	0.0057			-0.02	0.0011			-0.01	-0.0007		
80495	OP	0.23	0.0235			0.26	0.0217			0.58	0.0543		
80501	OP	-0.26	-0.0172			-0.18	-0.0137			-0.51	-0.0402		
80545	OP	N/A	-0.0957			N/A	-0.1269	B	W	N/A	0.1902	CC	F
80550	OP	0	-0.0015			-0.23	-0.0225			0.06	0.0055		
80552	OP	0.41	0.0303			-0.01	-0.0002			-0.03	-0.0029		
80558	OP	-0.56	-0.0427			-0.39	-0.0234			-0.07	-0.0027		
80559	OP	0.71	0.0589			0.47	0.0349			0.7	0.0536		
80579	OP	0.15	0.0108			-0.05	-0.0038			0.38	0.0243		
85197	OP	0.29	0.0203			0.25	0.0165			0.03	0.0022		
85201	OP	0.08	0.0069			0.04	0.0025			0.23	0.0146		

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
80028_01	OP	0.05	0.0118			0.52	0.0516			-0.68	-0.0658		
80028_02	OP	0.02	0.0047			0.11	0.0097			-0.38	-0.0226		
80042_03	OP	0.63	0.0491			-0.47	-0.0426			0.37	0.0334		
80042_04	OP	0.07	0.0081			0.11	0.0116			0.38	0.0352		
80042_06	OP	0.3	0.023			0.11	0.0138			0.24	0.0198		
80063_01	OP	0	-0.0098			0.48	0.045			-1.08	-0.0999	B	M
80063_03	OP	0.02	0.0016			0.15	0.0156			-0.42	-0.0357		
80063_05	OP	0	0.0048			-0.42	-0.0329			-0.63	-0.0586		
80091_02	OP	0.16	0			0.22	0.0284			0.31	0.0264		
80091_03	OP	0.61	0.0477			0.23	0.0216			0.33	0.0281		
80120_01	OP	0.22	0.0226			-0.07	-0.0075			-0.07	-0.006		
80120_05	OP	-0.17	-0.0145			0	-0.0008			0.23	0.0184		
80156_01	OP	-0.5	-0.0333			-0.21	-0.0191			-1.16	-0.1002	B	M
80156_03	OP	-0.22	-0.0205			0.39	0.0255			0.46	0.0253		
80156_08	OP	N/A	-0.0494			N/A	-0.0935			N/A	0.1107		
80180_01	OP	0.09	0.0112			0.34	0.0337			0.16	0.0156		
80180_03	OP	0.04	0.0122			0.43	0.0436			-0.14	-0.0125		
80190_03	OP	0.04	0.009			0.43	0.0365			0.13	0.011		
80190_06	OP	-0.02	-0.0012			-0.8	-0.0613			-0.1	-0.0063		
80210_01	OP	-0.84	-0.0752			-0.77	-0.0712			-1.22	-0.1098	B	M
80210_05	OP	-0.08	-0.0018			0.14	0.0118			0.01	0.0026		
80210_06	OP	0.36	0.0408			0.18	0.028			-0.81	-0.0725		
80220_01	OP	-0.35	-0.0268			-0.44	-0.0357			-0.18	-0.0143		
80220_04	OP	-0.62	-0.0492			-0.38	-0.0335			0.02	0.0021		
80220_05	OP	-0.39	-0.0297			-0.26	-0.0216			-0.34	-0.0295		
80236_01	OP	0.05	0.0009			-0.21	-0.022			-0.1	-0.0079		
80236_04	OP	0.48	0.034			0.41	0.0287			-0.21	-0.0145		
80236_08	OP	N/A	0.0228			N/A	0.061			N/A	0.2771	CC	F
80248_03	OP	0.14	0.0135			-0.12	-0.0072			0.06	0.0046		
80248_05	OP	0.2	0.0241			0.2	0.0224			0.12	0.0115		
80248_06	OP	0.06	0.0106			0.22	0.0203			0.11	0.0078		
80278_02	OP	-0.54	-0.0246			-0.52	-0.0302			-0.68	-0.0329		
80278_03	OP	0.1	0.019			0.42	0.0364			-0.61	-0.0447		
80278_04	OP	-0.68	-0.0515			-0.35	-0.0302			-0.99	-0.0761		
80288_02	OP	-0.15	-0.013			-1.11	-0.0834	B	W	-0.35	-0.0316		
80288_03	OP	0.05	0.0081			-0.34	-0.0276			-0.16	-0.0149		
80288_04	OP	0.41	0.0251			-0.42	-0.0345			-0.12	-0.0084		
80298_03	OP	0.63	0.0551			0.64	0.0552			-0.3	-0.0265		
80298_04	OP	0.26	0.0236			0.04	0.005			-0.31	-0.0265		
80298_05	OP	0.46	0.041			0.38	0.03			0.25	0.0183		
80422_02	OP	0.26	0.0195			0.47	0.0404			0.41	0.0335		
80422_03	OP	0.25	0.0281			0.29	0.0303			0.59	0.0472		
80422_04	OP	-0.23	-0.0197			-0.23	-0.0116			0.22	0.0195		
80475_01	OP	-0.07	-0.0067			-0.19	-0.0167			0.06	0.006		
80475_02	OP	0.21	0.0064			0.17	0.015			0.21	0.0175		
80475_04	OP	0.37	0.033			0.22	0.0173			0.56	0.0412		
80484_01	OP	0.56	0.0424			0.23	0.0185			0.66	0.0394		
80484_02	OP	-0.28	-0.0149			0.23	0.0256			0.47	0.0398		
80484_03	OP	0.06	0.0072			-0.3	-0.0222			0.14	0.0097		
85002_02	OP	0.45	0.0377			0.34	0.0282			-0.04	-0.0024		

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
85002_05	OP	-0.17	-0.0158			-0.15	-0.0181			-0.38	-0.0356		
85002_06	OP	0.28	0.029			0.11	0.0113			0.21	0.021		
85007_01	OP	0.33	0.0316			0.55	0.0541			0.2	0.0196		
85007_05	OP	-0.28	-0.0241			-0.03	0.0034			-0.21	-0.0161		
85007_06	OP	0.16	0.015			-0.08	-0.0069			0.08	0.0081		
85059_02	OP	-0.01	-0.0093			0.19	0.0138			0.54	0.0446		
85059_03	OP	-0.11	-0.0137			-0.02	-0.0058			0.7	0.0562		
85059_07	OP	N/A	-0.0756			N/A	-0.062			N/A	0.2044	CC	F
85061_02	OP	0.32	0.0133			-0.23	-0.0248			-0.13	-0.0064		
85061_03	OP	-0.19	-0.0233			-0.26	-0.0266			-0.29	-0.0148		
85061_07	OP	N/A	-0.0656			N/A	-0.006			N/A	0.1018		
80250	FT	-0.88	-0.0663			-0.6	-0.0433			0.02	0.0021		
80299	FT	-0.26	-0.0332			-0.41	-0.0365			-0.8	-0.0677		
80300	FT	0.14	0.0072			0.29	0.018			-0.07	-0.0048		
80307	FT	-0.03	0.0273			0.28	0.0371			-0.32	-0.0282		
80342	FT	-0.2	0.0044			-0.05	0.0076			0.53	0.0418		
80344	FT	-1.67	-0.1149	C	W	-0.96	-0.0598			-0.78	-0.0431		
80505	FT	N/A	0.0596			N/A	0.0471			N/A	0.1269		
80600	FT	-0.58	-0.0713			-0.07	-0.0074			-0.57	-0.0436		
80601	FT	N/A	-0.0327			N/A	0.0348			N/A	0.0374		
80603	FT	0.04	-0.0003			0.25	0.0186			0.52	0.0525		
80605	FT	0.11	0.0195			0.52	0.039			-0.49	-0.0376		
80614	FT	0.35	0.019			-0.02	-0.0004			0.32	0.0192		
80617	FT	N/A	0.007			N/A	0.1023			N/A	0.0569		
80619	FT	0.27	0.0046			0.09	-0.0035			0.73	0.0379		
80620	FT	-0.18	-0.0181			-0.15	-0.0166			-0.85	-0.0801		
80622	FT	-0.14	-0.0053			0.18	0.0055			0.21	0.0133		
80626	FT	N/A	-0.0068			N/A	0.065			N/A	0.0564		
80634	FT	N/A	-0.0253			N/A	0.0302			N/A	0.0265		
80644	FT	0.14	0.0369			0.4	0.0397			0.19	0.0166		
80648	FT	0.4	0.0302			-0.19	-0.0085			0.25	0.0198		
80467_01	FT	0.01	0.0015			-0.02	-0.0007			0.1	0.0052		
80467_02	FT	-0.57	-0.0619			-0.6	-0.054			-0.75	-0.0608		
80467_03	FT	0.18	0.0124			0.22	0.0267			-0.67	-0.0631		
80467_04	FT	0.01	0.0134			-0.09	-0.0082			-0.03	-0.0025		
80507_02	FT	0.43	0.0297			0.3	0.0183			-0.69	-0.0612		
80507_03	FT	0.81	0.0554			0.39	0.0295			-0.04	-0.0025		
80507_04	FT	-0.22	-0.0061			-0.05	-0.0036			-0.59	-0.0455		
80507_05	FT	0.92	0.0674			0.82	0.0726			0.73	0.0614		
80528_01	FT	-0.32	-0.0319			-0.51	-0.0563			-0.09	-0.0077		
80528_02	FT	-0.03	0.005			0.04	0.0131			-0.26	-0.0203		
80528_04	FT	-0.3	-0.0172			-0.68	-0.0676			0.56	0.055		
80528_05	FT	0.45	0.0375			-0.04	0.0113			-0.59	-0.0442		
80533_01	FT	-0.11	-0.0101			-0.17	-0.0224			-0.19	-0.0169		
80533_02	FT	0.93	0.0821			0.88	0.079			0.22	0.0215		
80533_03	FT	0.1	0.0106			0.36	0.0362			0.69	0.0633		
80533_04	FT	0.26	0.0238			0	0.0004			-1.11	-0.1061	B	M
80533_06	FT	0.16	0.0083			0.34	0.0272			0.2	0.0167		
80533_08	FT	N/A	0.0179			N/A	0.0307			N/A	0.0423		
80534_01	FT	-0.24	0.0094			-0.43	-0.0252			-0.35	-0.0295		

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
80534_02	FT	0.06	0.0004			-0.43	-0.0439			-0.64	-0.0446		
80534_03	FT	-0.28	-0.0238			-0.07	-0.0042			-0.04	0.0005		
80534_04	FT	-0.12	-0.0029			0.22	0.0157			-0.23	-0.0194		
80534_05	FT	-0.28	-0.0069			-0.21	-0.0101			0.3	0.02		
80534_08	FT	N/A	-0.0151			N/A	-0.0163			N/A	0.039		
80535_01	FT	-0.01	-0.0159			-0.07	-0.0064			0.07	0.0094		
80535_02	FT	0.13	0.0122			0.13	0.0082			0.07	0.0084		
80535_03	FT	0.1	0.0102			0.09	0.0104			-0.73	-0.0654		
80535_05	FT	-0.17	-0.019			0.18	-0.0023			-0.41	-0.0213		
80535_06	FT	-0.25	-0.0347			0.07	0.004			0.03	0.0025		
80535_08	FT	N/A	0.0072			N/A	0.0636			N/A	0.0817		
80595_01	FT	0.23	0.033			-0.52	-0.0343			-0.4	-0.0334		
80595_03	FT	-0.3	-0.0242			0.2	0.0087			-0.88	-0.072		
80595_05	FT	0.74	0.0597			0.33	0.0252			-0.12	-0.0114		
80595_06	FT	-0.01	-0.0103			-0.06	-0.0106			-0.44	-0.0291		
80597_01	FT	-0.21	-0.0087			-0.27	0.0009			-0.81	-0.0623		
80597_02	FT	0.1	-0.0053			0.81	0.0755			-0.75	-0.0722		
80597_03	FT	-0.31	-0.0268			-0.31	-0.0307			-0.27	-0.0259		
80597_05	FT	0.45	0.0486			0.63	0.0668			-0.42	-0.0431		
80615_01	FT	-0.53	-0.0349			-0.06	-0.0061			0.21	0.0139		
80615_02	FT	0.02	-0.0019			-0.46	-0.0431			0.15	0.0136		
80615_04	FT	1.5	0.1526	C	B	0.98	0.0862			-0.04	-0.0029		
80615_06	FT	-0.15	-0.0017			-0.26	-0.0139			-0.09	-0.0047		
80623_02	FT	0.14	0.0094			0.35	0.0256			0.13	0.0122		
80623_03	FT	0.7	0.0718			0.31	0.0445			0.19	0.0169		
80623_04	FT	0.35	0.0193			0.17	0.0109			-0.05	-0.0063		
80623_06	FT	0.13	0.0117			0.35	0.0246			0.14	0.0118		
80631_01	FT	0.24	0.0314			0.49	0.0562			0.16	0.0161		
80631_02	FT	-0.07	-0.0032			0.29	0.0226			0.43	0.0386		
80631_04	FT	0.73	0.0739			0.89	0.0774			0.3	0.0298		
80631_06	FT	0.63	0.054			0.55	0.0455			0.44	0.0353		
80639_01	FT	0.35	0.0253			0.51	0.0426			-0.07	-0.0072		
80639_02	FT	0.3	0.0298			-0.01	0.006			0.95	0.0666		
80639_04	FT	-0.12	-0.0102			0.39	0.023			0.02	0.0005		
80639_05	FT	0.04	0.0075			0.01	0.0055			0.06	0.0079		
80647_01	FT	0.43	0.045			0.24	0.0166			0.19	0.017		
80647_02	FT	0.61	0.0535			0.07	0.0003			0.3	0.0178		
80647_05	FT	0.33	0.0224			-0.41	-0.0404			0.17	0.011		
80647_06	FT	0.19	0.0199			0.39	0.0484			0.3	0.0307		
80655_01	FT	-0.38	-0.028			0.14	0.0217			-0.54	-0.0478		
80655_02	FT	0.21	0.0259			0.36	0.0337			-0.11	-0.008		
80655_04	FT	-0.15	-0.0028			-0.07	-0.0069			0.15	0.013		
80655_05	FT	0.87	0.0766			0.73	0.0807			0.44	0.0431		
80663_01	FT	0.13	0.0132			0.24	0.0239			-0.34	-0.0314		
80663_03	FT	0.78	0.0528			1	0.057	B	H	0.38	0.0202		
80663_04	FT	0.3	0.017			0.38	0.0161			-1.04	-0.064	B	M
80663_06	FT	0	-0.0004			-0.11	-0.0043			-0.75	-0.0653		
80665_01	FT	-0.12	0.0012			0.58	0.0551			-1.09	-0.073	B	M
80665_02	FT	0.44	0.035			-0.01	-0.0098			0.1	0.0115		
80665_04	FT	-0.33	-0.0367			-0.74	-0.0539			0.07	0.0055		

		Black/White				Hispanic/White				Male/Female			
UIN	**Status**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**	**Delta**	**SMD**	**Sig**	**Favor**
80665_05	FT	-0.52	-0.0445			-0.42	-0.0269			-0.31	-0.0258		
80666_01	FT	0.08	0.0271			0.62	0.0553			-0.4	-0.0339		
80666_03	FT	0.55	0.0458			0.68	0.0653			0.02	0.0037		
80666_04	FT	0.51	0.0564			0.51	0.05			0.37	0.0333		
80666_06	FT	0.2	0.0394			0.44	0.0505			-0.15	-0.0135		
80667_01	FT	-0.19	-0.0229			-0.15	-0.0141			0.12	0.0097		
80667_02	FT	0.05	0.0039			0.21	0.0089			0.3	0.0261		
80667_04	FT	-0.08	-0.0064			-0.38	-0.0276			-0.16	-0.011		
80667_05	FT	0.2	0.0143			-0.06	-0.0033			0.34	0.0283		
85078_01	FT	0.17	0.0131			0.12	0.0021			-0.2	-0.0176		
85078_02	FT	0.09	0.0218			0.32	0.0463			0.21	0.0191		
85078_03	FT	0.13	0.0022			-0.02	-0.0131			-0.03	-0.0005		
85078_04	FT	-0.42	-0.0317			-0.37	-0.0307			0.19	0.0177		
85078_05	FT	0.35	0.028			0.66	0.0482			0.07	0.0061		
85078_07	FT	N/A	0.0122			N/A	0.0162			N/A	0.1037		
85080_01	FT	0.27	0.0124			0.44	0.0237			1.26	0.0607	B	F
85080_03	FT	-0.22	-0.0202			-0.79	-0.0547			0.1	0.0072		
85080_04	FT	0.67	0.0716			0.6	0.0546			-0.12	-0.0084		
85080_05	FT	0.54	0.0422			0.62	0.0665			0.22	0.0187		
85080_06	FT	-0.11	-0.0032			-0.06	-0.0044			-0.11	-0.0078		
85080_07	FT	N/A	-0.0183			N/A	-0.0199			N/A	0.0024		