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Analyzing the Reliability of the easyCBM Reading Comprehension Measures: Grade 2

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Abstract

In this technical report, we present the results of a reliability study of the second-grade multiple choice reading comprehension measures available on the easyCBM learning system conducted in the spring of 2011. Analyses include split-half reliability, alternate form reliability, person and item reliability as derived from Rasch analysis, top / bottom reliability, and repeated measures analysis of variance (ANOVA). Results suggest adequate reliability for the second grade multiple choice reading comprehension measures.

Analyzing the Reliability of the easyCBM Reading Comprehension Measures: Grade 2

Curriculum-based measures (CBMs) are standardized assessments with a rich history of use for screening students at risk for difficulty in reading as well as for tracking the progress students make in gaining essential skills over the course of a school year (Alonzo, Ketterlin-Geller, & Tindal, 2006). In recent years, the widespread adoption of Response to Intervention (RTI) as a model for instructional delivery and school-wide improvement efforts has resulted in renewed attention being given to CBMs and a greater emphasis being placed on their technical adequacy for a variety of uses. One concern expressed by practitioners and researchers alike is the degree to which the brief, individually-administered fluency-based probes most frequently identified with CBM are appropriate for use with older students. As students move from elementary to secondary school, there is some evidence to suggest that more complex CBMs, designed to measure more challenging constructs, such as reading comprehension and vocabulary in context may be more appropriate (Yovanoff, Duesbery, Alonzo, & Tindal, 2005). In this technical report, we describe a study of the reliability of the easyCBM second-grade multiple choice reading comprehension measures conducted in 2011.

Methods

In this section, we describe the methods used in conducting a study of the split-half and top-bottom reliability, as well as Rasch analyses of grade 2 multiple-choice reading comprehension (MCRC) measures from the easyCBM® assessment system.

Setting and Participants

The study was conducted in elementary and middle schools from two Pacific Northwest public school districts in the spring of 2011. *District A* was diverse, and comprised of approximately 8,900 students, of which approximately 56% were White, 11% Hispanic, 15%

Asian-Pacific Islander, 11% Multiracial, 7% Black, and 1% American Indian-Alaskan Native students. About 26% of students were eligible for free or reduced-priced meals. Students in District A outperformed their peers in the state on the statewide reading assessment. On average, more than 79% of students in grades 3-8 tested proficient on the statewide reading test, compared to about 67% for the state. In all, 27 teachers (six in grade 2, four in grade 3, five in grade 4, six in grade 5, and six in grade 6) and 715 students participated in the study from District A.

District B was a large and diverse school district, of approximately 14,000 students, with a demographic make-up of approximately 56% White, 15% Hispanic, 11% Asian-Pacific Islander, 11% Multiracial, 6% Black, and 2% American Indian-Alaskan Native students. About 34% of students in the district were eligible for free or reduced-priced meals. In 2010, students from District B slightly outperformed their peers in the state on the statewide reading assessment. On average, a little fewer than 69% of students in grades 3-8 tested proficient on the state reading test, compared to about 67% for the state. Fourth grade showed the largest difference between students scoring proficient for the district and state, 72% compared to 67%, respectively. Six teachers (two in grades 3 and 7, one in grades 4 and 8) and 317 students participated in the study from District B.

Because we wanted to investigate the reliability for the full grade range of easyCBM® MCRC tests, we recruited participants from grades 2-8, with a goal of recruiting six teachers, with a corresponding six classes of students, from each of these seven grades. We successfully recruited six teachers for grades 2-6. Two teachers were recruited for grade 7 (seven total classes of students), and one for grade 8 (three total classes). The average class size across all grades was 27 students. Teachers were recruited at the district level and were compensated $150 for participating in the study. The three participating teachers in grades 7 and 8 were given

additional stipend money because they administered comprehension measures to more than one class of students. All students in attendance on the days the MCRC tests were administered participated in the study.

Multiple-choice Reading Comprehension Measures

The reading comprehension measures on easyCBM® are designed for group administration and are available for grades 2-8. Students first read an original work of narrative fiction and then answer multiple-choice questions (12 questions on the grade 2 test, 20 questions on each of the grade 3-8 tests) based on the story. Multiple-choice questions are designed to assess literal and inferential comprehension on all grade level tests; evaluative comprehension is also assessed on the grade 3-8 tests. Each question is comprised of the question stem and three possible answer choices: the correct answer and two incorrect but plausible distractors. The comprehension measures have a total of 12 points (grade 2) or 20 points (grades 3-8) possible; students earn one point for every question they answer correctly.

We selected the format of the reading comprehension tests based on prior empirical work with local school districts (Alonzo & Tindal, 2004a, 2004b, 2004c). In this work, teachers had expressed their desire for tests that closely resembled the types of readings students regularly encountered in their classes. At the same time, concerns about increasing the reliability, ease of use, and cost-effectiveness of our measures prompted us to use selected response rather than open-ended question types in our comprehension measures. Accordingly, we developed the MCRC tests in a two-step process. First, we wrote the stories that were used as the basis for each test. Then, we wrote the test items associated with each story. We embedded quality control and content review processes in both these steps throughout instrument development.

Two people, selected for their expertise in instrument development and language arts,

were principally involved with overseeing the creation of the MCRC tests. The first person oversaw the creation and revision of the stories and test items earned her Bachelor of Arts degree in Literature from Carleton College in 1990, worked for twelve years as an English teacher in California public schools, was awarded National Board for Professional Teaching Standards certification in Adolescent and Young Adulthood English Language Arts in 2002, and earned her Ph.D. in the area of Learning Assessments/System Performance at the University of Oregon. The second person hired to write the MCRC items earned his Ph.D. in education psychology, measurement, and methodology from the University of Arizona. He has worked in education at the elementary and middle school levels, as well as in higher education and at the state level. He held a position as associate professor in the distance-learning program for Northern Arizona University and served as director of assessment for a large metropolitan school district in Phoenix, Arizona. In addition, he served as state Director of Assessment and Deputy Associate Superintendent for Standards and Assessment at the Arizona Department of Education. He was a test development manager for Harcourt Assessment and has broad experience in assessment and test development.

Grade 2 test development. The two individuals hired to develop the grade 2 measures worked together to create documentation for story-writers to use while creating their stories. This written documentation was provided to increase the comparability of story structure and reduce the likelihood of construct irrelevant variance related to variation in story type affecting student performance on the different forms of the comprehension measures. Story creation specifications provided information about the length of the stories (approximately 700 words), characters, settings, and plots. Stories, which were composed between June 2006 and January 2007, were written by a variety of people who were either elementary and secondary school

teachers or graduate students in the College of Education. In all, 21 stories were written; one did not pass the criteria required for use in the assessment system, leaving 20 to be piloted at the grade 2 level.

The professional item writer we hired created 12 multiple-choice questions, each with 3 possible answer options, for each form of the grade 2 MCRC test. In all, he wrote 240 multiple-choice questions for the grade 2 measures. All questions were written between July and October of 2007. For each of the grade 2 MCRC tests, we wrote seven questions targeting literal comprehension and five questions targeting inferential comprehension, for a total of 12 items on each form of the test. Within each type of comprehension, item-writing specifications called for a range of difficulty such that each form of each test contained some easy, moderate, and difficult items in each of the types of comprehension assessed on that test. Item-writing specifications also guided the ordering of the items on each MCRC form. In all cases, we followed a similar pattern of item ordering, beginning with the easiest literal comprehension item and continuing with items of increasing difficulty, ending with an item designed to be one of the most challenging, pulled from the highest level of comprehension assessed in that grade level (inferential comprehension in grade 2). Once multiple-choice items were written, the stories and item lists were formatted into individual tests (forms), each comprised of a story and 12 multiple-choice test items. Alonzo, Liu and Tindal (2008) provide a detailed description of the development and technical adequacy of the grade 2 MCRC test.

Grade 2 test selection and administration. We selected a subset of MCRC grade 2 forms (roughly 60% of those available through the easyCBM® assessment system) to use in this study. We used forms 8, 9, 10, 11, 12, 13, 14, 15, and 16 in this study. We selected these grade 2 forms because higher form numbers are typically used less in the classroom compared to the

lower-numbered assessment forms (e.g., forms 1-7) on which we have already completed earlier research; thus, we deemed further understanding form and item-level reliability statistics of the selected forms a priority.

Each student participated in the testing on three separate testing occasions in three different sessions, roughly one week apart. Each comprehension measure was group administered by the classroom teacher. In the first session, students completed a comprehension form assigned by class. Roughly one week later, students completed an alternate form of the comprehension measure. On the final testing occasion, students completed a third alternate form. To reduce the possibility of the order of the forms completed adversely affecting testing results, we assigned comprehension forms within a given grade at the class level based on a two-group counterbalanced measure design. For instance, the first of the six participating grade 2 classes completed forms 11, 12, and 13, in that order, over the three testing occasions; the second grade 2 class completed forms 13, 12 and 11 (the opposite order of the first). We used the same counterbalanced measure design for all classes and all grades in the study.

Analysis

We used a variety of approaches to study the reliability of the easyCBM comprehension assessments: repeated measures analysis of variance, split half reliability using the Guttman formula, top/bottom reliability, and Rasch analysis. Each of these analytic approaches is explained in more detail in the following section.

One-way repeated measures analysis of variance. To examine whether there was a significant difference in difficulty across the forms, we conducted one-way repeated measures analysis of variance (ANOVA). Each student completed three test forms in each grade. When there was a statistically significant within-subject effect, the mean differences among the three

forms were further analyzed to investigate where the significant within-subject difference resided.

Split-half reliability. We conducted form and item-level reliability analyses for all grades in this study. To assess overall reliability of the MCRC measure, we examined the internal consistency among items within each selected test form using split-half reliability coefficients calculated from the Guttman formula using SPSS 19 (SPSS Inc., 2010). We used the Guttman formula to calculate split-half reliability coefficients because the Guttman formula does not assume homogeneity of test halves and will not overestimate the full-form reliability (Kerlinger & Lee, 2000). Thus, we felt the Guttman formula provided a more conservative and reasonable estimate of full test form reliability.

Top-bottom reliability. We computed the total score based on the scored item-level data, with unanswered items scored as incorrect (i.e., "0"). The possible total score for grade 2 forms is 12. Because easyCBM® progress monitoring measures were developed to target students who are at-risk for academic failure, items should function differently for students who are at or below the 23rd percentile (i.e., lower percentiles) and those who are at or above the 78th percentile (i.e., higher percentiles). To evaluate the appropriateness of items, item functioning was compared between the two aforementioned groups. The scores corresponding to the 23rd and 78th percentiles were computed for each form. Then, the proportions of correct responses for each item for the two groups were analyzed. Both groups should demonstrate high proportions of correct responses for an easy item that functions appropriately. For a difficult item that is functioning appropriately, the proportion of correct responses for the lower percentile group should be lower than that for the higher percentile group. A higher proportion of correct

responses for the lower percentile group indicates that the item may not be functioning appropriately.

Rasch analyses. Data from the pilot testing of the MCRC measures were analyzed with a one-parameter logistic Rasch analysis using the software Winsteps 3.68.2 (Linacre, 2009). Unlike classical statistics, Rasch analyses consider patterns of responses across individuals, providing information at a level of specificity in results unattainable with approaches based on classical statistics used in the development of most CBMs. In a complex iterative process, a Rasch analysis concurrently estimates the difficulty of individual test items and the ability level of each individual test taker. The results, relevant to the discussion here, include an estimation of the difficulty (referred to as the 'measure') of each item, the standard error of measure associated with each item's estimated difficulty, and the degree to which each item 'fits' the measurement model (referred to as the 'mean square outfit'). In addition, a Rasch analysis can provide information about the average estimated ability of students who selected each of the possible answer choices. All of this information must be considered when evaluating the technical adequacy of the measures, as described below.

Considering item estimated difficulty. Rasch analyses, which examine each item's reliability, provide a more precise treatment of reliability than classical statistics, which examine the issue from a global test level. The most reliable estimation of a test-taker's ability can be gained from tests comprised of items that represent the fullest range of difficulty possible for the population for which the test is intended. Thus, to evaluate the technical adequacy of our MCRC measures, we looked for items representing a range of difficulties. In Rasch analyses, this information is gleaned from examining each item's *measure*. Easy items will have measures represented with negative numbers; difficult items will have measures represented with positive

numbers. A measure of zero indicates an item that a person of average ability would be expected to have a 50% chance of getting correct. Thus, we sought a full range of *measure* on every MCRC test form.

Examining the standard error of measure. Rasch analyses also provide information about the standard error of measure associated with the estimation of each item's measure. Generally, the smaller the standard error of measure, the more reliable the estimation is. We sought small standard errors of measure for all items on our MCRC tests.

Using the mean square outfit to evaluate goodness of fit. An additional piece of information used to evaluate technical adequacy in a Rasch model is the mean square outfit associated with each item. Values in the range of 0.50 to 1.50 are considered *acceptable fit*. Mean square outfits falling outside this acceptable range indicate the need for further evaluation of item functioning. In general, items with a mean square outfit less than 0.50 are considered less worrisome than items with mean square outfits higher than 1.50 because items falling into the former category perform more *consistently* (e.g., every student regardless of ability gets the item correct or incorrect) compared to items in the latter category that function more *inconsistently* (e.g., students who perform poorly on all other items, always get the item correct) (Linacre, 2002). In all cases, distractor analysis provides useful information to further evaluate the technical adequacy of each item.

Analyzing distractor selection information. A distractor analysis provides information on the average estimated ability of test takers who selected a particular distractor on a test. In evaluating the technical adequacy of an assessment instrument, one hopes to see that the correct answer is selected by test-takers with the highest average estimated ability and the remaining distractors are selected by test-takers with lower estimated abilities. In addition, every distractor

in a well-constructed measure will be selected by at least some test-takers. We considered all of these features in evaluating the technical adequacy of the MCRC measures.

Analyzing person and item reliability. Rasch analyses report both the person and item reliability. The person reliability is equivalent to the traditional test reliability. Low values indicate a narrow range of person measures, or a small number of items. Therefore, testing persons with more extreme abilities (high and low) or lengthening the measure would increase the person reliability. Winsteps' item reliability has no traditional equivalent. Low item reliability values indicate a narrow range of item measures or a small sample. A larger sample of persons would increase item reliability. Low item reliability means that the sample size is too small to precisely locate the items on the latent variable (i.e., ability).

Results

Grade 2 MCRC Equivalence by Form

In this section we report findings concerning the equivalence of MCRC forms. We used one-way repeated measures ANOVA to evaluate equivalence of difficulty across the MCRC forms. Because like groups of students took three MCRC forms, each roughly one week apart, we evaluated the difficulty equivalence of each set of the three forms that were taken by the same group of students. Mean differences between forms 11, 12, and 13 as well as forms 14, 15, and 16, were not statistically significant. On the other hand, mean differences across forms 8, 9, and 10 were statistically significant, $F(2, 82) = 4.04$, $p < .05$. Forms 8 and 9 were significantly more difficult than form 10. Tables 1-8 in Appendix A display descriptive statistics and the complete results of repeated measures ANOVA, as well as post-hoc analyses conducted to compare mean differences for the grade 2 MCRC measures used in the study.

Grade 2 MCRC Split-half Reliability

In this section we report overall reliability of the MCRC measure based on internal consistency among items within each selected test form using split-half reliability coefficients calculated with the Guttman formula. Split-half reliability coefficients were computed by comparing the results from the first 6 items of the MCRC measure to the second 6 items for all students in the sample taking each form. Some coefficients were calculated based on less than 12 items (*e.g.*, form 14 in grade 2) if a given item did not have enough variance to calculate reliability. For grade 2 MCRC forms 8 through 16, Guttman split-half reliability coefficients ranged from .56 to .87. Specifically, the split-half coefficient for form 8 was .81 (n = 12 items); the split-half coefficient for form 9 was .87 (n = 12 items); the split-half coefficient for form 10 was .67 (n = 12 items); the split-half coefficient for form 11 was .73 (n = 12 items); the split-half coefficient for form 12 was .72 (n = 12 items); the split-half coefficient for form 13 was .61 (n = 12 items); the split-half coefficient for form 14 was .56 (n = 12 items); the split-half coefficient for form 15 was .78 (n = 12 items); the split-half coefficient for form 16 was .81 (n = 12 items). Tables 1-18 in Appendix B display descriptive statistics and complete results of split-half reliability analyses by form for grade 2 MCRC measures used in this study.

Grade 2 Top-bottom Reliability

In this section we report results from top-bottom reliability analysis used to evaluate the appropriateness of items. The proportion of correct responses of each item for low-performing (at or below the 23rd percentile) and high-performing (at or above the 78th percentile) students was evaluated from this analysis to examine the appropriateness of item functioning. For form 8, the proportion of correct responses ranged from .41 to .93 for the low-performing students, while every student in the high-performing group answered all 12 items correctly. For form 9, the

proportion of correct responses ranged from .29 to .86 for the low-performing students; every student in the high-performing group answered all items correctly. For form 10, the proportion of correct responses ranged from .36 to .91 for the low-performing students. All students in the high-performing group answered 10 out of 12 items accurately, and the proportions of correct responses for the remaining two items were .24 and .95. It is important to note that the proportion of correct responses for item 10 was higher for the low-performing students (.45) than for the high-performing students (.24). For form 11, the proportion of correct responses ranged from .22 to .89 for the low-performing students; every student in the high-performing group answered all items correctly.

For form 12, the proportion of correct responses ranged from .27 to .91 for the low-performing students; every student in the high-performing group answered all items correctly. For form 13, the proportion of correct responses ranged from .25 to .92 for the low-performing students. All students in the high-performing group answered 7 out of 12 items accurately, and the proportion of correct responses for the remaining five items ranged from .71 to .96. For form 14, all students in the low-performing group answered 2 out of 10 items correctly, and the proportion of correct responses for the remaining 10 items ranged from .13 to .88. All students in the high-performing group answered 9 out of 12 items accurately, and the proportion of correct responses for the remaining three items ranged from.77 to .92. For form 15, the proportion of correct responses ranged from .10 to .80 for the low-performing students. All students in the high-performing group answered 7 out of 12 items accurately, and the proportion of correct responses for the remaining five items ranged from .72 to .94. For form 16, the proportion of correct responses ranged from .10 to .80 for the low-performing students. All students in the high-performing group answered 7 out of 12 items accurately, and the proportion

of correct responses for the remaining five items ranged from .80 to .93. Tables 1-10 in Appendix C display mean and percentile scores and the complete top-bottom reliability results for the grade 2 MCRC forms used in this study.

Grade 2 Item-level Rasch Analyses

On the grade 2 MCRC form 8, items #2, #7 and #12 had mean square outfit values that exceeded the model fit selection criteria of 1.5, and five items (#3, #4, #8, #10, and #11) had mean square outfit values below 0.5. Distractor analysis indicated that these items were functioning appropriately. The only exceptions were items #2 and #7 with mean square outfit values of 1.85 and 1.95, respectively, which exceeded the model fit selection criteria of 1.5. Two items (#8 and #10) on grade 2 MCRC form 9 were above the mean square outfit of 1.5, and four (items #1, #2, #7, and #9) were below mean square outfit of 0.5. Distractor analysis indicated the items # 1 and #8 were not functioning appropriately. Both person and item reliability were low (0.40 and 0.39 respectively). Most of the items on grade 2 MCRC form 10 were within the model fit selection criteria of mean square outfit values of 0.5 and 1.5. Items #2, #10, and #12, however, were over-fit, with mean square outfit values of 1.56, 1.85, and 3.48, respectively. Distractor analysis indicated that these items were functioning well, with the exception of item #2. Item #5 was under-fit, with mean square outfit of 0.15. Distractor analysis, however, indicated that this item was functioning appropriately. On grade 2 MCRC form 11, items #3 and #5 were over-fit, with mean square outfit of 2.00 and 2.58, respectively. Distractor analysis, however, indicated that these items were functioning appropriately. Three items (#1, #4, and #8) were under-fit, with mean square outfit of 0.10, 0.24, and 0.28, respectively. Distractor analysis indicated that items #3 and #4 could be problematic. Person reliability was low (0.27) and item reliability was moderate (0.76).

Two items (#6 and #8) on grade 2 MCRC form 12 were over-fit, with mean square outfit of 1.59 and 3.22, respectively. Distractor analysis, however, indicated that these two items were functioning appropriately. Five items (#1, #3, #5, #7, and #9) had mean square outfit values of under 0.5. Distractor analysis indicated that items #1 and #5 were not functioning appropriately. Most of the items on grade 2 MCRC form 13 had mean square outfit values within the acceptable range of 0.5 to 1.5. Three items (#1, #6, and #8) were under-fit with mean square outfit values of 0.39, 0.42, and 0.48, respectively. From the distractor analysis, only item #6 was not functioning appropriately. Almost all items on grade 2 MCRC form 14 had mean square outfit values within the acceptable range of 0.5 to 1.5, with the exception of items #4, #6, and #12. Item #4 was under-fit, with mean square outfit of 0.28. Items #6 and #12 had mean square outfit values above the criteria, 1.66 and 1.93 respectively. Distractor analysis, however, indicated that item #6 might not be functioning appropriately. On grade 2 MCRC form 15, most of the items are within the acceptable mean square outfit range of 0.5 to 1.5. Item #10 was over-fit, with a mean square outfit of 1.91. Items #2 and #9 were under-fit, with mean square outfit of .27 and .43, respectively. Distractor analyses indicated that all items were functioning appropriately. On form 16, item #8 had mean square outfit of 1.65, which is above the acceptable fit criteria of 1.5. Items #1, #2, and #7 were under-fit, with mean square outfit values of 0.23, 0.29, and 0.39, respectively. According to the distractor analysis, all items on this form were functioning appropriately.

Person reliability for all of the test forms ranged from zero to 0.59. The low to moderate person reliability might be due to the small number of items on the test form (12 items). Item reliability was generally higher than person reliability, ranging from 0.39 to 0.94. The low item reliability could be a function of the small samples (*n* ranges 44-52). Tables 1-18 in Appendix D

display the item measure, standard error of measure, mean square outfit, and complete distractor analyses for the nine grade 2 MCRC measures used in this study.

Discussion

Our findings in this study suggest that the grade 2 easyCBM multiple choice reading comprehension measures have acceptable levels of reliability for the two purposes for which they are intended: as one part of a battery of assessments administered in the fall, winter, and spring to screen students at risk for reading difficulty, and as repeated measures over time as used to monitor student progress in developing comprehension skill. Although we would have preferred to have even higher alternate form reliability coefficients, it appears likely that our results are dampened by two factors. First, sample sizes in our study were not as large as we would have liked, due to challenges related to participant recruitment. Second, it appears as though the test forms might have had a ceiling effect, with very little variation in scores for students who were in the top third (reducing the power of the top / bottom reliability analyses). Future research should address both these limitations.

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Appendix A

Table 1

Descriptive Statistics of Grade 2 Measures 8 to 10

	Mean	Std. Deviation	N
Total_8	10.5476	2.21086	42
Total_9	10.7381	2.07258	42
Total_10	9.9524	1.65208	42

Table 2

Tests of Within-Subjects Effects for Grade 2 Measures 8 to 10

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
forms	Sphericity Assumed	14.111	2	7.056	4.040	.021
	Greenhouse-Geisser	14.111	1.856	7.602	4.040	.024
	Huynh-Feldt	14.111	1.941	7.272	4.040	.022
	Lower-bound	14.111	1.000	14.111	4.040	.051
Error(forms)	Sphericity Assumed	143.222	82	1.747		
	Greenhouse-Geisser	143.222	76.105	1.882		
	Huynh-Feldt	143.222	79.563	1.800		
	Lower-bound	143.222	41.000	3.493		

Note. Mauchly's Test of Sphericity: The assumption of sphericity was not violated, Mauchly's W was 0.92, χ^2 (2) = 3.23, $p > .05$.

Table 3

Tests of Wihin-Subjects Contrasts for Grade 2 Measures 8 to 10

Source	forms	Type III Sum of Squares	df	Mean Square	F	Sig.
forms	Level 1 vs. Level 3	14.881	1	14.881	4.916	.032
	Level 2 vs. Level 3	25.929	1	25.929	5.807	.021
Error(forms)	Level 1 vs. Level 3	124.119	41	3.027		
	Level 2 vs. Level 3	183.071	41	4.465		

Table 4

Descriptive Statistics of Grade 2 Measures 11 to 13

	Mean	Std. Deviation	N
Total_11	10.1600	2.04401	50
Total_12	10.2000	2.24063	50
Total_13	9.9800	2.03530	50

Table 5

Tests of Within-Subjects Effects for Grade 2 Measures 11 to 13

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
forms	Sphericity Assumed	1.373	2	.687	.393	.676
	Greenhouse-Geisser	1.373	1.881	.730	.393	.664
	Huynh-Feldt	1.373	1.954	.703	.393	.671
	Lower-bound	1.373	1.000	1.373	.393	.534
Error(forms)	Sphericity Assumed	171.293	98	1.748		
	Greenhouse-Geisser	171.293	92.171	1.858		
	Huynh-Feldt	171.293	95.727	1.789		
	Lower-bound	171.293	49.000	3.496		

Note. Mauchly's Test of Sphericity: The assumption of sphericity was not violated, Mauchly's W was 0.94, $\chi^2(2) = 3.14$, $p > .05$.

Table 6

Descriptive Statistics of Grade 2 Measures 14 to 16

	Mean	Std. Deviation	N
Total_14	9.4200	2.15795	50
Total_15	8.8400	2.76538	50
Total_16	8.9000	2.40959	50

Table 7

Tests of Within-Subjects Effects for Grade 2 Measures 14 to 16

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
form	Sphericity Assumed	10.173	2	5.087	2.061	.133	.040
	Greenhouse-Geisser	10.173	1.888	5.388	2.061	.136	.040
	Huynh-Feldt	10.173	1.961	5.187	2.061	.134	.040
	Lower-bound	10.173	1.000	10.173	2.061	.157	.040
Error(form)	Sphericity Assumed	241.827	98	2.468			
	Greenhouse-Geisser	241.827	92.521	2.614			
	Huynh-Feldt	241.827	96.113	2.516			
	Lower-bound	241.827	49.000	4.935			

Note. Mauchly's Test of Sphericity: The assumption of sphericity was not violated, Mauchly's W was 0.94, $\chi^2(2) = 2.93$, $p > .05$.

Table 8

Tests of Wihin-Subjects Contrasts for Grade 2 Measures 14 to 16

Source	form	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
form	Level 1 vs. Level 3	13.520	1	13.520	3.553	.065	.068
	Level 2 vs. Level 3	.180	1	.180	.031	.862	.001
Error(form)	Level 1 vs. Level 3	186.480	49	3.806			
	Level 2 vs. Level 3	286.820	49	5.853			

Appendix B

Table 1

Grade 2 Split-Half Coefficients for MCRC Form 8 with N = 12 Items

Cronbach's Alpha	Part 1	Value	.675
		N of Items	6[a]
	Part 2	Value	.695
		N of Items	6[b]
	Total N of Items		12
Correlation Between Forms			.691
Spearman-Brown Coefficient	Equal Length		.817
	Unequal Length		.817
Guttman Split-Half Coefficient			.812

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 2

Grade 2 Split-Half Scale Statistics for MCRC Form 8 with N = 12 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	5.15	1.521	1.233	6[a]
Part 2	5.49	1.125	1.061	6[b]
Both Parts	10.64	4.453	2.110	12

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 3

Grade 2 Split-Half Coefficients for MCRC Form 9 with N = 12 Items

Cronbach's Alpha	Part 1	Value	.667
		N of Items	6[a]
	Part 2	Value	.520
		N of Items	6[b]
	Total N of Items		12
Correlation Between Forms			.775
Spearman-Brown Coefficient	Equal Length		.873
	Unequal Length		.873
Guttman Split-Half Coefficient			.872

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 4

Grade 2 Split-Half Scale Statistics for MCRC Form 9 with N = 12 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	5.66	.730	.855	6[a]
Part 2	5.46	.855	.925	6[b]
Both Parts	11.12	2.810	1.676	12

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 5

Grade 2 Split-Half Coefficients for MCRC Form 10 with N = 12 Items

Cronbach's Alpha	Part 1	Value	.432
		N of Items	6[a]
	Part 2	Value	.110
		N of Items	6[b]
	Total N of Items		12
Correlation Between Forms			.503
Spearman-Brown Coefficient	Equal Length		.669
	Unequal Length		.669
Guttman Split-Half Coefficient			.665

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 6

Grade 2 Split-Half Scale Statistics for MCRC Form 10 with N = 12 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	5.31	.951	.975	6[a]
Part 2	4.76	.722	.850	6[b]
Both Parts	10.07	2.507	1.583	12

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 7

Grade 2 Split-Half Coefficients for MCRC Form 11 with N = 12 Items

Cronbach's Alpha	Part 1	Value	.361
		N of Items	6[a]
	Part 2	Value	.642
		N of Items	6[b]
	Total N of Items		12
Correlation Between Forms			.572
Spearman-Brown Coefficient	Equal Length		.728
	Unequal Length		.728
Guttman Split-Half Coefficient			.725

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 8

Grade 2 Split-Half Scale Statistics for MCRC Form 11 with N = 12 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	5.08	1.035	1.017	6[a]
Part 2	5.24	1.314	1.146	6[b]
Both Parts	10.33	3.683	1.919	12

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 9

Grade 2 Split-Half Coefficients for MCRC Form 12 with N = 12 Items

Cronbach's Alpha	Part 1	Value	.769
		N of Items	6[a]
	Part 2	Value	.445
		N of Items	6[b]
	Total N of Items		12
Correlation Between Forms			.564
Spearman-Brown Coefficient	Equal Length		.721
	Unequal Length		.721
Guttman Split-Half Coefficient			.719

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 10

Grade 2 Split-Half Scale Statistics for MCRC Form 12 with N = 12 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	5.42	1.440	1.200	6[a]
Part 2	4.98	1.170	1.082	6[b]
Both Parts	10.40	4.074	2.018	12

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 11

Grade 2 Split-Half Coefficients for MCRC Form 13 with N = 12 Items

Cronbach's Alpha	Part 1	Value	.140
		N of Items	6[a]
	Part 2	Value	.516
		N of Items	6[b]
	Total N of Items		12
Correlation Between Forms			.466
Spearman-Brown Coefficient	Equal Length		.636
	Unequal Length		.636
Guttman Split-Half Coefficient			.607

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 12

Grade 2 Split-Half Scale Statistics for MCRC Form 13 with N = 12 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	5.22	.663	.814	6[a]
Part 2	4.98	1.400	1.183	6[b]
Both Parts	10.20	2.961	1.721	12

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 13

Grade 2 Split-Half Coefficients for MCRC Form 14 with N = 11 Items

Cronbach's Alpha	Part 1	Value	.510
		N of Items	6[a]
	Part 2	Value	.314
		N of Items	5[b]
	Total N of Items		11
Correlation Between Forms			.388
Spearman-Brown Coefficient	Equal Length		.559
	Unequal Length		.560
Guttman Split-Half Coefficient			.559

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr.

Table 14

Grade 2 Split-Half Scale Statistics for MCRC Form 14 with N = 11 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	5.13	1.227	1.108	6[a]
Part 2	3.61	1.221	1.105	5[b]
Both Parts	8.74	3.397	1.843	11

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr.

Table 15

Grade 2 Split-Half Coefficients for MCRC Form 15 with N = 12 Items

Cronbach's Alpha	Part 1	Value	.545
		N of Items	6[a]
	Part 2	Value	.674
		N of Items	6[b]
	Total N of Items		12
Correlation Between Forms			.657
Spearman-Brown Coefficient	Equal Length		.793
	Unequal Length		.793
Guttman Split-Half Coefficient			.780

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 16

Grade 2 Split-Half Scale Statistics for MCRC Form 15 with N = 12 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	4.74	1.716	1.310	6[a]
Part 2	4.28	2.726	1.651	6[b]
Both Parts	9.02	7.282	2.699	12

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 17

Grade 2 Split-Half Coefficients for MCRC Form 16 with N = 12 Items

Cronbach's Alpha	Part 1	Value	.702
		N of Items	6[a]
	Part 2	Value	.274
		N of Items	6[b]
	Total N of Items		12
Correlation Between Forms			.679
Spearman-Brown Coefficient	Equal Length		.809
	Unequal Length		.809
Guttman Split-Half Coefficient			.808

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Table 18

Grade 2 Split-Half Scale Statistics for MCRC Form 16 with N = 12 Items

	Mean	Variance	Std. Deviation	N of Items
Part 1	5.06	1.813	1.346	6[a]
Part 2	3.84	1.647	1.283	6[b]
Both Parts	8.90	5.806	2.410	12

a. The items are: Q1_Corr, Q2_Corr, Q3_Corr, Q4_Corr, Q5_Corr, Q6_Corr.

b. The items are: Q7_Corr, Q8_Corr, Q9_Corr, Q10_Corr, Q11_Corr, Q12_Corr.

Appendix C

Table 1
Grade 2 Mean and the Percentile Scores by Form

Form	Mean (*n*)	23rd Percentile (*n*)	78th Percentile (*n*)
8	10.64 (47)	11 (29)	12 (18)
9	10.80 (44)	10 (7)	12 (25)
10	10.00 (45)	9 (11)	11 (21)
11	10.18 (51)	9 (9)	12 (12)
12	10.22 (51)	9 (11)	12 (15)
13	9.98 (50)	9 (12)	11 (24)
14	9.43 (51)	8 (8)	11 (13)
15	8.84 (50)	6 (10)	11 (18)
16	8.80 (51)	6 (10)	11 (15)

Table 2
Item Statistics for Students for Grade 2 Form 8

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.93	.258	29	1.00	.000	18
Q2_Corr	.41	.501	29	1.00	.000	18
Q3_Corr	.90	.310	29	1.00	.000	18
Q4_Corr	.93	.258	29	1.00	.000	18
Q5_Corr	.66	.484	29	1.00	.000	18
Q6_Corr	.79	.412	29	1.00	.000	18
Q7_Corr	.90	.310	29	1.00	.000	18
Q8_Corr	.90	.310	29	1.00	.000	18
Q9_Corr	.86	.351	29	1.00	.000	18
Q10_Corr	.79	.412	29	1.00	.000	18
Q11_Corr	.90	.310	29	1.00	.000	18
Q12_Corr	.83	.384	29	1.00	.000	18

Table 3
Item Statistics for Students for Grade 2 Form 9

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.86	.378	7	1.00	.000	25
Q2_Corr	.43	.535	7	1.00	.000	25
Q3_Corr	.86	.378	7	1.00	.000	25
Q4_Corr	.71	.488	7	1.00	.000	25
Q5_Corr	.71	.488	7	1.00	.000	25
Q6_Corr	.71	.488	7	1.00	.000	25
Q7_Corr	.57	.535	7	1.00	.000	25
Q8_Corr	.57	.535	7	1.00	.000	25
Q9_Corr	.71	.488	7	1.00	.000	25
Q10_Corr	.71	.488	7	1.00	.000	25
Q11_Corr	.29	.488	7	1.00	.000	25
Q12_Corr	.86	.378	7	1.00	.000	25

Table 4
Item Statistics for Students for Grade 2 Form 10

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.91	.302	11	1.00	.000	21
Q2_Corr	.55	.522	11	1.00	.000	21
Q3_Corr	.82	.405	11	1.00	.000	21
Q4_Corr	.36	.505	11	1.00	.000	21
Q5_Corr	.73	.467	11	1.00	.000	21
Q6_Corr	.64	.505	11	1.00	.000	21
Q7_Corr	.82	.405	11	1.00	.000	21
Q8_Corr	.73	.467	11	1.00	.000	21
Q9_Corr	.55	.522	11	.95	.218	21
Q10_Corr	.45	.522	11	.24	.436	21
Q11_Corr	.82	.405	11	1.00	.000	21
Q12_Corr	.64	.505	11	1.00	.000	21

Table 5
Item Statistics for Students for Grade 2 Form 11

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.67	.500	9	1.00	.000	12
Q2_Corr	.44	.527	9	1.00	.000	12
Q3_Corr	.89	.333	9	1.00	.000	12
Q4_Corr	.78	.441	9	1.00	.000	12
Q5_Corr	.56	.527	9	1.00	.000	12
Q6_Corr	.56	.527	9	1.00	.000	12
Q7_Corr	.67	.500	9	1.00	.000	12
Q8_Corr	.67	.500	9	1.00	.000	12
Q9_Corr	.22	.441	9	1.00	.000	12
Q10_Corr	.78	.441	9	1.00	.000	12
Q11_Corr	.56	.527	9	1.00	.000	12
Q12_Corr	.56	.527	9	1.00	.000	12

Table 6
Item Statistics for Students for Grade 2 Form 12

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.73	.467	11	1.00	.000	15
Q2_Corr	.27	.467	11	1.00	.000	15
Q3_Corr	.64	.505	11	1.00	.000	15
Q4_Corr	.55	.522	11	1.00	.000	15
Q5_Corr	.91	.302	11	1.00	.000	15
Q6_Corr	.73	.467	11	1.00	.000	15
Q7_Corr	.82	.405	11	1.00	.000	15
Q8_Corr	.27	.467	11	1.00	.000	15
Q9_Corr	.45	.522	11	1.00	.000	15
Q10_Corr	.73	.467	11	1.00	.000	15
Q11_Corr	.45	.522	11	1.00	.000	15
Q12_Corr	.73	.467	11	1.00	.000	15

Table 7
Item Statistics for Students for Grade 2 Form 13

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.83	.389	12	1.00	.000	24
Q2_Corr	.75	.452	12	1.00	.000	24
Q3_Corr	.42	.515	12	.71	.464	24
Q4_Corr	.67	.492	12	.96	.204	24
Q5_Corr	.83	.389	12	1.00	.000	24
Q6_Corr	.92	.289	12	1.00	.000	24
Q7_Corr	.58	.515	12	1.00	.000	24
Q8_Corr	.83	.389	12	1.00	.000	24
Q9_Corr	.50	.522	12	.96	.204	24
Q10_Corr	.58	.515	12	1.00	.000	24
Q11_Corr	.75	.452	12	.92	.282	24
Q12_Corr	.25	.452	12	.87	.338	24

Table 8
Item Statistics for Students for Grade 2 Form 14

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.88	.354	8	1.00	.000	13
Q2_Corr	.50	.535	8	1.00	.000	13
Q3_Corr	.13	.354	8	1.00	.000	13
Q4_Corr	.63	.518	8	1.00	.000	13
Q5_Corr	.50	.535	8	1.00	.000	13
Q6_Corr	1.00	.000	8	1.00	.000	13
Q7_Corr	1.00	.000	8	1.00	.000	13
Q8_Corr	.75	.463	8	1.00	.000	13
Q9_Corr	.13	.354	8	.92	.277	13
Q10_Corr	.50	.535	8	1.00	.000	13
Q11_Corr	.13	.354	8	.92	.277	13
Q12_Corr	.50	.535	8	.77	.439	13

Table 9
Item Statistics for Students for Grade 2 Form 15

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.80	.422	10	1.00	.000	18
Q2_Corr	.70	.483	10	1.00	.000	18
Q3_Corr	.10	.316	10	1.00	.000	18
Q4_Corr	.30	.483	10	.94	.236	18
Q5_Corr	.50	.527	10	.94	.236	18
Q6_Corr	.40	.516	10	.89	.323	18
Q7_Corr	.20	.422	10	1.00	.000	18
Q8_Corr	.40	.516	10	1.00	.000	18
Q9_Corr	.40	.516	10	1.00	.000	18
Q10_Corr	.40	.516	10	.72	.461	18
Q11_Corr	.30	.483	10	1.00	.000	18
Q12_Corr	.20	.422	10	.94	.236	18

Table 10
Item Statistics for Students for Grade 2 Form 16

	23rd Percentile or Below			78th Percentile or Above		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Q1_Corr	.80	.422	10	1.00	.000	15
Q2_Corr	.70	.483	10	1.00	.000	15
Q3_Corr	.30	.483	10	1.00	.000	15
Q4_Corr	.20	.422	10	1.00	.000	15
Q5_Corr	.70	.483	10	1.00	.000	15
Q6_Corr	.10	.316	10	1.00	.000	15
Q7_Corr	.30	.483	10	1.00	.000	15
Q8_Corr	.50	.527	10	.80	.414	15
Q9_Corr	.20	.422	10	.80	.414	15
Q10_Corr	.20	.422	10	.80	.414	15
Q11_Corr	.50	.527	10	.93	.258	15
Q12_Corr	.40	.516	10	.93	.258	15

Appendix D

Table 1
Item Statistics, Entry Order, Grade 2, Form 8

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	45	47	-1.30	0.22	0.72
2	30	47	2.89	1.55	1.85
3	44	47	-0.67	-1.10	0.16
4	45	47	-1.30	-0.72	0.11
5	37	47	1.59	-1.64	0.52
6	42	47	0.22	-0.04	0.86
7	44	47	-0.67	1.10	1.95
8	44	47	-0.67	-1.10	0.16
9	43	47	-0.18	0.29	1.03
10	41	47	0.56	-1.84	0.3
11	44	47	-0.67	-1.10	0.16
12	42	47	0.22	2.17	2.71

Table 2
Distractor Analysis, Grade 2, Form 8

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	0	2	4	0.61	0.71
	B	0	0	0	0.00	0.00
	C	1	45	96	3.22	0.22
	Missing	**				
2	A	0	17	36	2.09	0.38
	B	1	30	64	3.69	0.22
	C	0	0	0	0.00	0.00
	Missing	**				
3	A	1	44	94	3.39	0.17
	B	0	2	4	-1.39	0.00
	C	0	1	2	-0.10	0.00
	Missing	**				
4	A	0	1	2	-1.39	0.00
	B	0	1	2	-1.39	0.00
	C	1	45	96	3.31	0.18
	Missing	**				
5	A	0	6	13	0.86	0.55
	B	1	37	79	3.74	0.13
	C	0	4	9	0.71	0.95
	Missing	**				
6	A	0	2	4	2.17	0.85
	B	1	42	89	3.45	0.17
	C	0	3	6	-0.96	0.43
	Missing	**				
7	A	0	0	0	0.00	0.00
	B	0	3	6	1.41	0.90
	C	1	44	94	3.23	0.22
	Missing	**				
8	A	1	44	94	3.39	0.17
	B	0	2	4	-0.74	0.65
	C	0	1	2	-1.39	0.00
	Missing	**				
9	A	0	2	4	-1.39	0.00
	B	0	2	4	1.46	1.56
	C	1	43	91	3.4	0.18
	Missing	**				
10	A	0	1	2	-0.10	0.00
	B	1	41	87	3.57	0.14
	C	0	5	11	-0.05	0.60
	Missing	**				

Table 2
Distractor Analysis, Grade 2, Form 8 (Continued)

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	1	44	94	3.39	0.17
	B	0	1	2	-0.10	0.00
	C	0	2	4	-1.39	0.00
	Missing	**				
12	A	1	42	89	3.17	0.25
	B	0	3	6	2.34	0.34
	C	0	2	4	3.02	0.00
	Missing	**				

Table 3
Item Statistics, Entry Order, Grade 2, Form 9

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	42	44	-1.08	-0.44	0.35
2	39	44	0.30	-1.26	0.44
3	43	44	-1.93	0.12	0.58
4	38	44	0.64	0.64	1.22
5	40	44	-0.08	-0.42	0.65
6	41	44	-0.52	0.08	0.85
7	39	44	0.30	-1.26	0.44
8	42	44	-1.08	1.36	2.53
9	37	44	0.95	-2.04	0.42
10	36	44	1.24	3.14	2.28
11	39	44	0.30	0.39	1.12
12	37	44	0.95	-0.36	0.84

Table 4
Distractor Analysis, Grade 2, Form 9

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	0	0	0	0.00	0.00
	B	1	42	95	3.08	0.19
	C	0	1	2	0.03	0.00
	Missing	**	1	2	-0.37	0.00
2	A	0	1	2	0.43	0.00
	B	0	4	9	0.04	0.45
	C	1	39	89	3.29	0.16
	Missing	**				
3	A	1	43	98	2.99	0.21
	B	0	1	2	0.43	0.00
	C	0	0	0	0.00	0.00
	Missing	**				
4	A	0	2	5	2.70	0.00
	B	0	2	5	-0.38	0.41
	C	1	38	86	3.25	0.18
	Missing	**	2	5	0.43	0.00
5	A	1	40	91	3.20	0.18
	B	0	2	5	0.53	1.33
	C	0	1	2	-0.37	0.00
	Missing	**	1	2	0.43	0.00
6	A	0	1	2	-0.80	0.00
	B	1	41	93	3.11	0.19
	C	0	1	2	1.86	0.00
	Missing	**	1	2	0.43	0.00
7	A	0	2	5	0.46	0.83
	B	1	39	89	3.29	0.16
	C	0	2	5	-0.38	0.41
	Missing	**	1	2	0.43	0.00
8	A	1	42	95	3.00	0.21
	B	0	1	2	2.70	0.00
	C	0	0	0	0.00	0.00
	Missing	**	1	2	0.43	0.00
9	A	0	4	9	0.49	0.49
	B	0	2	5	-0.18	0.61
	C	1	37	84	3.43	0.13
	Missing	**	1	2	0.43	0.00
10	A	1	36	82	3.13	0.23
	B	0	2	5	1.56	1.13
	C	0	5	11	2.53	0.17
	Missing	**	1	2	0.43	0.00

Table 4
Distractor Analysis, Grade 2, Form 9 (Continued)

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	0	2	5	1.16	1.53
	B	0	2	5	0.53	1.33
	C	1	39	89	3.21	0.18
	Missing	**	1	2	0.43	0.00
12	A	0	2	5	1.14	0.72
	B	1	37	84	3.35	0.16
	C	0	5	11	0.57	0.64
	Missing	**				

Table 5
Item Statistics, Entry Order, Grade 2, Form 10

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	0	45	0.00	0.00	1.00
2	6	45	1.26	1.00	1.56
3	42	45	-4.18	-0.16	0.60
4	35	45	-2.63	-0.06	0.91
5	2	45	2.63	-0.73	0.15
6	39	45	-3.34	0.18	0.98
7	0	45	0.00	0.00	1.00
8	0	45	0.00	0.00	1.00
9	12	45	0.20	0.65	1.19
10	10	45	0.50	1.87	1.85
11	1	45	3.40	0.31	0.79
12	3	45	2.16	1.92	3.48

Table 6
Distractor Analysis, Grade 2, Form 10

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	0	2	4	-2.09	0.69
	B	1	0	0	0.00	0.00
	C	0	41	91	-1.01	0.18
	Missing	**	2	4	-0.98	1.80
2	A	1	6	13	0.35	0.69
	B	0	39	87	-1.27	0.15
	C	0	0	0	0.00	0.00
	Missing	**				
3	A	1	42	93	-0.96	0.18
	B	0	1	2	-2.78	0.00
	C	0	2	4	-2.09	0.69
	Missing	**				
4	A	0	3	7	-2.32	0.46
	B	0	7	16	-2.03	0.49
	C	1	35	78	-0.75	0.17
	Missing	**				
5	A	0	3	7	-1.9	0.88
	B	0	40	89	-1.13	0.16
	C	1	2	4	1.69	0
	Missing	**	0	0	0	0
6	A	1	39	87	-0.89	0.18
	B	0	5	11	-1.98	0.53
	C	0	1	2	-2.78	0.00
	Missing	**				
7	A	0	2	4	-1.46	1.32
	B	1	0	0	0.00	0
	C	0	43	96	-1.04	0.18
	Missing	**				
8	A	0	3	7	-1.90	0.88
	B	0	42	93	-0.99	0.18
	C	1	0	0	0.00	0.00
	Missing	**				
9	A	0	32	71	-1.3	0.18
	B	1	12	27	-0.26	0.34
	C	0	1	2	-2.78	0.00
	Missing	**				
10	A	1	10	22	-0.52	0.45
	B	0	14	31	-1.11	0.32
	C	0	20	44	-1.27	0.23
	Missing	**	1	2	-1.40	0.00

Table 6
Distractor Analysis, Grade 2, Form 10 (Continued).

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	0	1	2	0.82	0.00
	B	1	1	2	-0.15	0.00
	C	0	43	96	-1.12	0.18
	Missing	**				
12	A	0	41	91	-1.10	0.18
	B	0	1	2	-0.15	0.00
	C	1	3	7	-0.70	1.08
	Missing	**				

Table 7
Item Statistics, Entry Order, Grade 2, Form 11

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	48	51	-1.12	-0.87	0.28
2	40	51	0.91	1.30	1.39
3	49	51	-1.67	1.34	2.58
4	49	51	-1.67	-0.95	0.10
5	36	51	1.49	3.34	2.00
6	38	51	1.21	1.03	1.26
7	47	51	-0.70	-0.39	0.62
8	46	51	-0.37	-1.71	0.24
9	32	51	2.01	-0.39	0.88
10	46	51	-0.37	-0.48	0.65
11	45	51	-0.09	-0.73	0.61
12	43	51	0.37	-0.23	0.86

Table 8
Distractor Analysis, Grade 2, Form 11

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	0	1	2	-0.91	0.00
	B	1	48	94	2.70	0.17
	C	0	2	4	-0.56	1.45
	Missing	**				
2	A	1	40	78	2.76	0.21
	B	0	1	2	0.42	0.00
	C	0	10	20	1.70	0.46
	Missing	**				
3	A	1	49	96	2.59	0.18
	B	0	1	2	2.92	0.00
	C	0	1	2	-2.01	0.00
	Missing	**				
4	A	0	2	4	-1.46	0.55
	B	0	0	0	0.00	0.00
	C	1	49	96	2.67	0.17
	Missing	**				
5	A	0	8	16	1.55	0.41
	B	0	7	14	2.03	0.41
	C	1	36	71	2.81	0.23
	Missing	**				
6	A	1	38	75	2.82	0.20
	B	0	6	12	2.11	0.28
	C	0	7	14	1.16	0.70
	Missing	**				
7	A	0	2	4	-0.01	0.90
	B	1	47	92	2.72	0.17
	C	0	2	4	0.01	2.01
	Missing	**				
8	A	0	1	2	-0.91	0.00
	B	0	2	4	-0.79	1.22
	C	1	46	90	2.82	0.15
	Missing	**	2	4	0.20	0.22
9	A	0	14	27	2.10	0.16
	B	1	32	63	3.14	0.18
	C	0	3	6	-0.83	0.70
	Missing	**	2	4	0.20	0.22
10	A	1	46	90	2.74	0.17
	B	0	0	0	0.00	0.00
	C	0	3	6	0.47	1.25
	Missing	**	2	4	0.20	0.22

Table 8
Distractor Analysis, Grade 2, Form 11 (Continued)

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	0	2	4	0.25	1.15
	B	1	45	88	2.78	0.18
	C	0	2	4	0.91	0.49
	Missing	**	2	4	0.20	0.22
12	A	0	3	6	-0.06	1.01
	B	0	3	6	1.94	0.59
	C	1	43	84	2.83	0.17
	Missing	**	2	4	0.20	0.22

Table 9
Item Statistics, Entry Order, Grade 2, Form 12

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	48	51	-1.17	-0.37	0.40
2	39	51	1.24	-0.86	0.73
3	46	51	-0.40	-0.87	0.39
4	44	51	0.17	-0.37	0.74
5	50	51	-2.55	-0.13	0.37
6	47	51	-0.75	0.87	1.59
7	48	51	-1.17	-0.87	0.17
8	27	51	3.08	3.24	3.22
9	44	51	0.17	-1.03	0.49
10	43	51	0.42	0.74	1.30
11	40	51	1.05	0.07	0.99
12	45	51	-0.10	-0.31	0.71

Table 10
Distractor Analysis, Grade 2, Form 12

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	1	48	94	3.00	0.22
	B	0	3	6	-0.18	0.54
	C	0	0	0	0.00	0.00
	Missing	**				
2	A	0	10	20	0.91	0.47
	B	0	2	4	0.20	0.68
	C	1	39	76	3.43	0.18
	Missing	**				
3	A	1	46	90	3.14	0.20
	B	0	4	8	-0.14	0.65
	C	0	1	2	-0.48	0.00
	Missing	**				
4	A	0	1	2	-1.46	0.00
	B	0	6	12	0.27	0.60
	C	1	44	86	3.26	0.18
	Missing	**				
5	A	1	50	98	2.87	0.23
	B	0	0	0	0	0
	C	0	1	2	-0.04	0
	Missing	**	0	0	0	0
6	A	0	2	4	1.09	2.03
	B	1	47	92	3.02	0.22
	C	0	2	4	-0.26	0.22
	Missing	**				
7	A	1	48	94	3.05	0.20
	B	0	2	4	-0.97	0.49
	C	0	1	2	-0.94	0.00
	Missing	**				
8	A	0	23	45	2.17	0.28
	B	1	27	53	3.48	0.30
	C	0	1	2	-0.48	0.00
	Missing	**				
9	A	0	3	6	0.75	0.42
	B	0	4	8	-0.25	0.60
	C	1	44	86	3.23	0.20
	Missing	**				
10	A	0	1	2	1.42	0.00
	B	1	43	84	3.11	0.23
	C	0	4	8	1.54	0.76
	Missing	**	3	6	0.69	1.09

Table 10
Distractor Analysis, Grade 2, Form 12 (Continued)

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	1	40	78	3.33	0.20
	B	0	5	10	1.72	0.67
	C	0	4	8	0.38	0.64
	Missing	**	2	4	-0.02	1.44
12	A	0	0	0	0.00	0.00
	B	0	4	8	0.63	0.69
	C	1	45	88	3.13	0.21
	Missing	**	2	4	-0.02	1.44

Table 11
Item Statistics, Entry Order, Grade 2, Form 13

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	47	51	-1.24	-0.45	0.48
2	43	51	-0.03	-0.15	0.87
3	29	51	2.00	1.06	1.26
4	42	51	0.18	0.76	1.27
5	47	51	-1.24	-0.16	0.65
6	47	51	-1.24	-0.62	0.39
7	42	51	0.18	-0.60	0.73
8	47	51	-1.24	-0.56	0.42
9	42	51	0.18	-0.29	0.84
10	42	51	0.18	-0.75	0.68
11	42	51	0.18	0.84	1.31
12	28	51	2.12	-0.03	0.97

Table 12
Distractor Analysis, Grade 2, Form 13

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	0	3	6	-0.22	0.95
	B	0	0	0	0.00	0.00
	C	1	47	92	2.46	0.18
	Missing	**	1	2	-4.1	0.00
2	A	0	3	6	-0.67	0.81
	B	1	43	84	2.55	0.18
	C	0	4	8	1.82	0.16
	Missing	**	1	2	-4.10	0.00
3	A	1	29	57	2.77	0.23
	B	0	16	31	1.68	0.36
	C	0	5	10	1.51	0.48
	Missing	**	1	2	-4.10	0.00
4	A	0	2	4	0.86	0.48
	B	1	42	82	2.50	0.21
	C	0	5	10	1.44	0.55
	Missing	**	2	4	-1.64	2.46
5	A	0	0	0	0.00	0.00
	B	0	2	4	0.22	1.12
	C	1	47	92	2.42	0.19
	Missing	**	2	4	-1.64	2.46
6	A	0	2	4	-0.79	1.16
	B	1	47	92	2.46	0.18
	C	0	0	0	0.00	0.00
	Missing	**	2	4	-1.64	2.46
7	A	1	42	82	2.61	0.18
	B	0	6	12	1.00	0.36
	C	0	1	2	1.34	0.00
	Missing	**	2	4	-3.03	1.08
8	A	0	1	2	1.34	0.00
	B	0	1	2	-0.89	0.00
	C	1	47	92	2.48	0.17
	Missing	**	2	4	-3.03	1.08
9	A	1	42	82	2.62	0.17
	B	0	4	8	0.30	0.46
	C	0	3	6	1.87	0.52
	Missing	**	2	4	-3.03	1.08
10	A	0	6	12	0.87	0.47
	B	1	42	82	2.63	0.17
	C	0	1	2	1.34	0.00
	Missing	**	2	4	-3.03	1.08

Table 12
Distractor Analysis, Grade 2, Form 13 (Continued)

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	1	42	82	2.54	0.18
	B	0	3	6	1.29	1.62
	C	0	4	8	0.57	0.59
	Missing	**	2	4	-1.06	3.04
12	A	0	17	33	1.37	0.32
	B	1	28	55	2.96	0.21
	C	0	3	6	1.62	0.87
	Missing	**	3	6	-0.05	2.03

Table 13
Item Statistics, Entry Order, Grade 2, Form 14

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	43	51	-0.19	0.38	1.10
2	40	51	0.33	0.63	1.17
3	34	51	1.13	-0.82	0.82
4	48	51	-1.59	-0.89	0.28
5	44	51	-0.39	-0.59	0.70
6	48	51	-1.59	1.13	1.93
7	49	51	-2.11	-0.09	0.55
8	45	51	-0.62	-0.55	0.67
9	27	51	1.92	-0.67	0.83
10	40	51	0.33	-0.16	0.92
11	37	51	0.76	-0.35	0.90
12	26	51	2.03	2.22	1.66

Table 14
Distractor Analysis, Grade 2, Form 14

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	1	43	84	2.22	0.20
	B	0	5	10	1.24	0.56
	C	0	2	4	-0.32	1.78
	Missing	**	1	2	0.94	0.00
2	A	0	3	6	1.29	0.18
	B	0	8	16	0.82	0.38
	C	1	40	78	2.29	0.22
	Missing	**				
3	A	0	11	22	0.53	0.44
	B	1	34	67	2.56	0.20
	C	0	6	12	1.50	0.21
	Missing	**				
4	A	0	2	4	-0.47	0.47
	B	1	48	94	2.16	0.19
	C	0	1	2	-0.93	0.00
	Missing	**				
5	A	0	5	10	0.34	0.62
	B	0	2	4	-0.58	1.52
	C	1	44	86	2.31	0.18
	Missing	**				
6	A	1	48	94	2.08	0.19
	B	0	1	2	-2.10	0.00
	C	0	2	4	2.09	0.00
	Missing	**				
7	A	0	0	0	0.00	0.00
	B	1	49	96	2.10	0.19
	C	0	1	2	-2.10	0.00
	Missing	**	1	2	0.94	0.00
8	A	1	45	88	2.24	0.19
	B	0	3	6	0.94	0.00
	C	0	2	4	0.26	1.20
	Missing	**	1	2	-2.10	0.00
9	A	0	15	29	1.16	0.33
	B	1	27	53	2.78	0.22
	C	0	9	18	1.04	0.38
	Missing	**				
10	A	0	5	10	0.93	0.57
	B	0	5	10	0.52	0.86
	C	1	40	78	2.37	0.19
	Missing	**	1	2	0.00	0.00

Table 14
Distractor Analysis, Grade 2, Form 14 (Continued)

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	1	37	73	2.48	0.18
	B	0	3	6	0.18	0.70
	C	0	10	20	0.95	0.49
	Missing	**	1	2	0.00	0.00
12	A	0	22	43	1.57	0.26
	B	0	1	2	1.46	0.00
	C	1	26	51	2.48	0.30
	Missing	**	2	4	0.73	0.73

Table 15
Item Statistics, Entry Order, Grade 2, Form 15

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	45	50	-1.48	-0.01	0.81
2	47	50	-2.15	-0.62	0.27
3	37	50	0.09	-1.22	0.63
4	39	50	-0.23	-0.32	0.84
5	32	50	0.80	1.74	1.46
6	33	50	0.67	1.66	1.45
7	36	50	0.24	-1.41	0.61
8	38	50	-0.06	-0.25	0.88
9	42	50	-0.77	-1.26	0.43
10	25	50	1.71	2.59	1.91
11	35	50	0.39	-1.17	0.69
12	32	50	0.80	-0.65	0.83

Table 16
Distractor Analysis, Grade 2, Form 15

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	0	1	2	-0.81	0.00
	B	0	4	8	-0.09	0.60
	C	1	45	90	1.80	0.23
	Missing	**				
2	A	0	1	2	-1.30	0.00
	B	1	47	94	1.78	0.22
	C	0	2	4	-1.06	0.25
	Missing	**				
3	A	0	7	14	-0.15	0.50
	B	1	37	74	2.21	0.22
	C	0	6	12	-0.1	0.14
	Missing	**				
4	A	1	39	78	2.15	0.20
	B	0	7	14	0.17	0.49
	C	0	3	6	-1.34	0.32
	Missing	**	1	2	-0.81	0.00
5	A	1	32	64	2.07	0.29
	B	0	15	30	0.88	0.34
	C	0	3	6	0.19	0.62
	Missing	**				
6	A	0	5	10	1.04	0.64
	B	0	11	22	0.56	0.45
	C	1	33	66	2.09	0.26
	Missing	**	1	2	-0.37	0.00
7	A	1	36	72	2.29	0.21
	B	0	8	16	-0.13	0.29
	C	0	5	10	-0.16	0.75
	Missing	**	1	2	-0.37	0.00
8	A	0	3	6	-0.19	0.94
	B	1	38	76	2.08	0.24
	C	0	8	16	0.26	0.31
	Missing	**	1	2	-0.37	0.00
9	A	1	42	84	2.03	0.21
	B	0	2	4	-0.94	0.98
	C	0	5	10	-0.59	0.36
	Missing	**	1	2	-0.37	0.00
10	A	0	7	14	0.51	0.48
	B	0	16	32	1.22	0.35
	C	1	25	50	2.24	0.33
	Missing	**	2	4	0.48	0.85

Table 16
Distractor Analysis, Grade 2, Form 15 (Continued)

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	0	8	16	-0.02	0.34
	B	1	35	70	2.28	0.22
	C	0	6	12	0.12	0.57
	Missing	**	1	2	-0.37	0.00
12	A	1	32	64	2.37	0.22
	B	0	13	26	0.47	0.39
	C	0	4	8	-0.41	0.40
	Missing	**	1	2	-0.37	0.00

Table 17
Item Statistics, Entry Order, Grade 2, Form 16

Item Number	Raw Score	Count	Measure	Model Standard Error	Mean Square Outfit
1	47	52	-1.70	-0.93	0.23
2	48	52	-2.06	-0.51	0.29
3	43	52	-0.73	-1.25	0.39
4	42	52	-0.54	-0.96	0.53
5	40	52	-0.20	-1.16	0.55
6	34	52	0.66	-1.86	0.57
7	45	52	-1.16	-0.27	0.69
8	30	52	1.16	0.85	1.19
9	21	52	2.23	0.90	1.27
10	24	52	1.87	1.12	1.30
11	40	52	-0.20	1.01	1.41
12	34	52	0.66	2.14	1.65

Table 18
Distractor Analysis, Grade 2, Form 16

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
1	A	0	2	4	-0.71	0.24
	B	1	48	92	1.78	0.21
	C	0	0	0	0.00	0.00
	Missing	**	2	4	-2.64	1.69
2	A	0	1	2	-0.95	0.00
	B	0	2	4	-1.21	0.26
	C	1	47	90	1.86	0.2
	Missing	**	2	4	-2.64	1.69
3	A	1	42	81	2.02	0.22
	B	0	0	0	0.00	0.00
	C	0	9	17	-0.17	0.19
	Missing	**	1	2	-4.33	0.00
4	A	0	7	13	-0.14	0.31
	B	0	4	8	-0.36	0.64
	C	1	40	77	2.14	0.20
	Missing	**	1	2	-4.33	0.00
5	A	0	2	4	0.92	0.00
	B	1	45	87	1.85	0.22
	C	0	4	8	-0.50	0.43
	Missing	**	1	2	-4.33	0.00
6	A	0	14	27	0.14	0.29
	B	1	34	65	2.40	0.19
	C	0	3	6	-0.17	0.56
	Missing	**	1	2	-4.33	0.00
7	A	1	43	83	2.02	0.20
	B	0	2	4	-0.25	0.23
	C	0	5	10	-0.48	0.21
	Missing	**	2	4	-2.64	1.69
8	A	0	3	6	0.61	0.31
	B	0	13	25	1.13	0.43
	C	1	34	65	1.99	0.25
	Missing	**	2	4	-2.64	1.69
9	A	1	21	40	2.47	0.31
	B	0	15	29	0.95	0.32
	C	0	14	27	1.29	0.38
	Missing	**	2	4	-2.64	1.69
10	A	0	12	23	0.53	0.4
	B	1	30	58	2.30	0.23
	C	0	8	15	1.07	0.47
	Missing	**	2	4	-2.64	1.69

Table 18
Distractor Analysis, Grade 2, Form 16 (Continued)

Entry #	Data Code	Score Value	Count	%	Average Measure	S.E. Mean
11	A	0	8	15	0.92	0.48
	B	1	40	77	1.93	0.23
	C	0	3	6	-0.48	0.27
	Missing	**	1	2	-4.33	0.00
12	A	1	24	46	2.40	0.30
	B	0	22	42	1.14	0.26
	C	0	5	10	0.13	0.52
	Missing	**	1	2	-4.33	0.00