Effects of a Mathematics Read Aloud Accommodation for Students with High and Low Reading Skill

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Special Education Accountability

- IDEA 1997 made it a requirement that students with disabilities be included in statewide assessments (IDEA, 1997)
  - IDEA also required that students with disabilities be given whatever accommodation necessary so that he/she can participate in the state assessment (IDEA, 1997)

- Statewide assessments are designed to be a tool for evaluating special education (McDonnell, McLaughlin & Morrison, 1997)
  - When students with disabilities are excluded from statewide assessments or not given appropriate accommodations the capability to make special education accountable is compromised (Thompson, Blount & Thurlow, 2002).
Why Accountability is Important

- Results of statewide assessment guide school policy (Elliott, Thurlow & Ysseldyke, 1996), as well as significantly influence curriculum (Langefeld, Thurlow & Scott, 1996)
  - More recently retention and promotion decisions (High School Exit Exam; Below Basic, etc.) have also been based on statewide assessments (Langefeld, Thurlow & Scott, 1996)
- Accountability for special education was intended to provide schools and districts with vital information that could be used in reform efforts (McDonnell, McLaughlin & Morrison, 1997)
Previous Methods of Evaluating Special Education

- The Individualized Education Plan (IEP) was the most common tool for measuring progress for students with disabilities (Ysseldyke, Thurlow & Geened, 1994)
  - IEP’s are too individualized for school-level accountability decisions
  - IEP’s are not always comprised of the best benchmarks or measurement tools - making them somewhat invalid measures of student progress
Actual Participation

- It is estimated that up to 85% of students with disabilities are capable of participating in statewide assessments, with or without an accommodation (Elliott, Kratochwill & McKeveitt, 2001)
  - The National Assessment of Educational Progress (NAEP) reported that students with disabilities are only participating 45-75% of the time (Fuchs & Fuchs, 2001; Vanderwood, McGrew & Ysseldyke, 1998)
  - Often when students with disabilities are assessed his/her scores are not reported with the general education scores (Fuchs et al., 2000)
What are Accommodations?

- Any change in the standardized assessment procedure (Elliott et al., 2002). Includes:
  - Change in response format
  - Timing
  - Setting or environment

- They fall into three general categories
  - Alterations in standardized test administration not designed to change the construct - change in location or small group administration
  - More significant alterations that may interfere with the construct - extra time and oral presentation
  - Accommodations that are likely to result in a change in construct - using a calculator on a math computation task (Bielinski et al., 2001)
Why?

- Students with disabilities are hard to uniformly assess (Elliott, McKeivitt & Kettler, 2002)
  - Which accommodations to use for which students (e.g., heterogeneity of LD students)
  - How accommodated scores should be reported (Fuchs et al., 2000a)
Problems with Accommodations

- Construct Validity - the accommodation must not alter the intended construct
  - Accommodations that address the students disability, not the construct being measure, help prevent against test scores that are measuring something different than the student’s skill in a particular domain (Elliott, Kratochwill & McKeveitt, 2001)
- In order for test scores to be compared to each other, the construct validity of a test must be preserved across all testing administrations
Current Methods of Assigning Accommodations

- Descriptive - based on policy (state guidelines) and general logic, not evidence
- Comparative - relies on multiple sources of data.
  - Essentially databases are examined to see how students with disabilities are affected by accommodations. Relies on post hoc data, preventing a causal relationship from being identified (correlational)
- Experimental - relies on systematic manipulation of variables
  - Data-based decision making
    (Elliott et al., 2002; Fuchs et al., 2000a)
More on Accommodation Assignment

- Currently, the IEP team assigns accommodations
  - Teachers generally participate in accommodations decisions and have been shown to be poor judges of determining who should receive which accommodations (Fuchs et al., 2000b)
    - They typically assign them more often than is necessary and assign more accommodations that the student needs (Helwig & Tindal, 2003)
  - McKevitt and Elliott (2003) found that when teachers determined who should receive an accommodation the differential boost was not observed
Choosing an Accommodation - Differential Boost

- There is evidence for validity when parallel administrations of the standard and non-standard (accommodated) administrations of the test are delivered to both disabled and non-disabled students results in a significant interaction between students groups (Fuchs & Fuchs, 2001)
  - This is most commonly referred to as a differential boost, but should be interpreted with caution as the student(s) with disabilities may not have been able to perform the task even in the presence of an accommodation (McKevitt & Elliott, 2003), which would lead to spurious test results (Pomplum & Omar, 2000)
Example of a Differential Boost

- In the accommodated condition the student with a disability should exhibit an increase in scores above those of his/her non-disabled peers - often the non-disabled students will show a decrease in performance in the presence of an accommodation (often citing that it is distracting) (Fuchs et al., 2000a; Fuchs et al., 2000b)

- Leveling the playing field
Read Aloud Accommodation

- Thurlow and Bolt (2001) found that a read aloud accommodation given for a mathematics assessment resulted in a differential boost - suggesting validity of the accommodation
  - This same effect is not observed when a real aloud accommodation is used on a reading assessment
Mathematics Read Aloud Accommodation

- One of the 12 most commonly prescribed accommodations (Thurlow & Bolt, 2001)

- When the read aloud accommodation is used on a mathematics assessment, research consistently shows the construct validity to remain unaltered (Bielinski et al., 2001)
  - This is true when students only have a reading disability (Elliott et al., 2001)
  - Research suggests that a disability is determined with performance is below the 25th percentile on a standardized assessment (Fuchs et al., 2004)
Math Read Aloud Accommodations Research

- Elliott and colleagues (2001) found that when students with disabilities received an individualized accommodation they performed about the same as students without a disability not receiving an accommodation.
- Gilbertson Schulte and colleagues (2001) did not find the differential boost.
  - They used accommodation packages that did not experimentally manipulate the accommodation variable independent of one another (used more time, read aloud, etc.)
Meloy, Deville and Frisbe (2002) found that LD and non-LD students both showed increases in scores with the read aloud accommodation (no differential boost)

- Did not use repeated measures - the participants either received the accommodation or the standard administration

Johnson (2000) also failed to show a differential boost

- Did not use repeated measures
Helwig and Tindal (2003) did not find a differential boost.

They used repeated measures, but the standard administration condition was not timed, while the read aloud condition was.

Research suggests more time results in higher scores for all students (Elliott & Marquart, 2004; Fuchs et al., 2000b).
Rules of Thumb for Conducting Accommodation Research

- Repeated measures design with parallel forms of the assessment tool
  - This implies the use of a measure with good test-retest reliability
- Inclusion of both disabled and non-disabled populations

(Fuchs et al., 2000a; Fuchs et al., 2000b; Gilbertson Schulte, et al., 2001; Pomplum & Omar, 2000)
Missing in the Research

- A synthesis of the literature by Thurlow and Bolt (2001) showed that the majority of studies found a differential boost when a mathematics accommodation was used; however, none of the current studies conducted assessment to see if the student had the skills to actually perform the mathematics task (e.g., could the student do basic computation tasks which are absent of language)
Research Questions

- Can reading performance be used to accurately determine which groups of students will show the differential boost on a read aloud accommodation?
- Is there a difference in the validity of an accommodation, as denoted by a significant interaction, between students above and below the 25th percentile on mathematics skill?
Methods - Participants

- 180 4th (N=97) and 5th (N=83) students from an urban elementary school in southern California
- 94% received all instruction in the general education classroom with the remainder receiving RSP
- 67% Hispanic, 11.5% Caucasian, 11% African American, 2.2% Filipino, 2.2% Vietnamese, 1.1% Korean and 0.5% Chinese
- 43.4% were male and 53.3% were female
- 46.2% classified as ELL, with 3.3% considered FEP
Methods - Comprehension Measure

- **MAZE Curriculum-Based Measure (M-CBM)**
  - 4th and 5th grade probes were obtained from AimsWEB (Shinn & Shinn, 2002)
  - Used to assess comprehension
  - Test-retest reliability for a 1 month spread is .83 (Shinn, Deno & Espin, 2000)
  - Correlation between .66 and .76 with both the Gates-MacGinitie Reading and the Metropolitan Achievement Test (Jenkins & Jewell, 1990)
  - Standardized administration protocols were used.
Maze-CBM

Jason and Max picked next Friday to carry out their special mission. Friday was a week away. They agreed, had, branches so many things to accomplish. In plan, order, at to reach their final goal, the next, branches, boys made a plan for each day (to, of, each) the week. They had to work (hard, creek, big) every day to finish each task. (Pile, Could, Had) they do it all?

On Monday, (creek, big, they) agreed to meet and put plan (near, wood, A) into action. Plan A was to (gather, work, day) as many fallen branches as they could, on, had carry. They hauled the wood from (near, a, the) edge of the cornfield and stacked (agree, it, they) in a big pile at the (plan, edge, hauled) of the forest.

On Tuesday, the (rocks, by, boys) met near the lazy creek and (put, climb, wood) plan B into motion. They dug (up, near, the) rocks the size of footballs from (and, night, the) creek’s bottom. By dusk, they had (rode, arranged, to) the rocks in a neat circle (a, next, up) to the pile of branches they (their, found, had) hauled the night before.

On Wednesday, (plan, the, work) C was to climb into the (attic, umbrellas, they) above Jason’s garage. They searched around (Max, in, with) flashlights and both found backpacks. They (spoke, under, wore) their packs as they rode their (without, bikes, garage) to the edge of the forest (to, end, for) complete the day’s work.

On Thursday (they, it, work) rained. They had to drop the (up, plan, forest) for the day. Still, Jason and (went, backpack, Max) met at the end of their (bikes, driveways, on) under umbrellas. They quietly spoke. They (rained, decided, tent) their mission would work without plan (a, fire, was).

When the sun went down on (only, Friday, evening), they met at the edge of (the, out, and) forest. There sat their tent. They’d (stacked, tasks, set) it up on Wednesday evening. The (circle, special, wood) was ready to go into their (campfire, many, night) ring. Their next step was to (big, build, climb) a warm fire.

The mission to (camp, step, the) out was complete. The only tasks (Max, now, next) were to sit back and enjoy (a, the, ring) fruits of their labor.

- The students worked for 3 minutes and completed as much as possible
- The number of correct answers was divided by the total attempted to yield percentage correct
- Percentage correct was used for analysis
Methods - Reading Measure

- Reading Curriculum-Based Measure (R-CBM)
  - 4th and 5th grade probes were obtained from AimsWEB (Shinn & Shinn, 2002)
  - Used to assess reading fluency
  - Alternate forms reliability of .85 for 4th grade and .88 for 5th grade (Howe & Shinn, 2002)
  - Standardized administration protocols were used
R-CBM

- Had the student read each probe for 1 minute
- Total words read minus the errors was used to calculate words read
- The median words read of the 3 passages was used for analysis

Jason and Max picked next Friday to carry out their special mission. Friday was a week away. They had so many things to accomplish. In order to reach their final goal, the boys made a plan for each day of the week. They had to work hard every day to finish each task. Could they do it all?

On Monday, they agreed to meet and put plan A into action. Plan A was to gather as many fallen branches as they could carry. They hauled the wood from the edge of the cornfield and stacked it in a big pile at the edge of the forest.

On Tuesday, the boys met near the lazy creek and put plan B into motion. They dug up rocks the size of footballs from the creek’s bottom. By dusk, they had arranged the rocks in a neat circle next to the pile of branches they had hauled the night before.

On Wednesday, plan C was to climb into the attic above Jason’s garage. They searched around with flashlights and both found backpacks. They wore their packs as they rode their bikes to the edge of the forest to complete the day’s work.

On Thursday it rained. They had to drop the plan for the day. Still, Jason and Max met at the end of their driveways under umbrellas. They quietly spoke. They decided their mission would work without plan D.

When the sun went down on Friday, they met at the edge of the forest. There sat their tent. They’d set it up on Wednesday evening. The wood was ready to go into their campfire ring. Their next step was to build a warm fire.

The mission to camp out was complete. The only tasks now were to sit back and enjoy the fruits of their labor.
Basic Mathematics Computation

- 4th and 5th grade probes from the Monitoring Basic Skills Progress (2nd Ed.) were used (Fuchs, Hamlett & Fuchs, 1990)
- Used to assess computation - basic math facts, no reading involved
  - Multiplication, division of whole numbers, fractions and decimals
- Internal consistency for 4th and 5th grades is .97
- Correlated to California Tests of Basic Skills (CTBS) scores at .74 for 4th grade and .67 for 5th grade (Fuchs, Hamlett & Fuchs, 1990)
Students were instructed to complete as many problems as possible in 5 minutes (skipping any he/she did not know)

The total number correct divided by number attempted was used to calculate a percentage correct

Percentage correct was used for analysis
Methods - Applied Math Measure

- Basic Mathematics Concepts and Applications
  - 4th and 5th grade probes from the Monitoring Basic Skills Progress (2nd Ed) were used (Fuchs, Hamlett & Fuchs, 1990)
  - Each of the tests represents year-long grade-level mathematics concepts and application curriculum
    - Probes can contain number concepts, names of numbers and vocabulary, measurement, charts and graphs, grid reading, geometry, fractions, decimals and word problems (Fuchs et al., 1990)
  - Internal consistency for 4th and 5th grades is .97
  - Correlated to CTBS subtest at .75 for 4th grade and .81 for 5th grade (Fuchs, Hamlett & Fuchs, 1990)
Students were instructed to complete as many problems as possible in 5 minutes (skipping any that he/she did not know)

The total number correct divided by number attempted was used to calculate percentage correct

Percentage correct was used for analysis
4 University of California, Riverside School Psychology students collected data
- There were 2 researchers per class (each researcher took turns reading directions and administering the test, while the other monitored students and collected protocols)
- The read-aloud accommodation condition was counterbalance in an effort to control for order effects
## Assessment Administration

<table>
<thead>
<tr>
<th>Grade Class</th>
<th>Whole Class Administration</th>
<th>Individually Administered</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4th Grade Class 1</strong></td>
<td>Math with accommodation (5 minutes)</td>
<td>Computation (5 minutes)</td>
</tr>
<tr>
<td><strong>4th Grade Class 2</strong></td>
<td>Math without accommodation (5 minutes)</td>
<td>Computation (5 minutes)</td>
</tr>
<tr>
<td><strong>4th Grade Class 3</strong></td>
<td>Math with accommodation (5 minutes)</td>
<td>Computation (5 minutes)</td>
</tr>
<tr>
<td><strong>5th Grade Class 1</strong></td>
<td>Math with accommodation (5 minutes)</td>
<td>Computation (5 minutes)</td>
</tr>
<tr>
<td><strong>5th Grade Class 2</strong></td>
<td>Math without accommodation (5 minutes)</td>
<td>Computation (5 minutes)</td>
</tr>
<tr>
<td><strong>5th Grade Class 3</strong></td>
<td>Math with accommodation (5 minutes)</td>
<td>Computation (5 minutes)</td>
</tr>
</tbody>
</table>
Read-Aloud Accommodation

- Each student was given an applied mathematics protocol and instructed not to begin writing, but to follow along (one researcher in monitored students)
- The other researcher read each question aloud to the students. After the entire test had been read, students were instructed to begin
Statistical Analysis

- Repeated measures design
  - Accommodation vs. Non-Accommodation condition

- M-CBM and R-CBM task
  - Grouped by lower 25th and upper 75th percentile
    - Based on winter norms provided by AIMSweb, students were divided into high (>25th percentile) and low (<25th percentile) groups for R-CBM (median words read correctly) and Maze-CBM (correct responses)

- Computation task
  - Used in the second analysis to identify students with an expected mathematics disability (lower 25th percentile)
Statistical Analysis

- Mixed factorial ANOVA
- Within Subject
  - Accommodation condition (Level 1: read aloud accommodation; Level 2: no accommodation)
- Between Subject
  - M-CBM (Level 1: below the 25th percentile; Level 2: above the 25th percentile)
  - R-CBM (Level 1: below the 25th percentile; Level 2: above the 25th percentile)
Answering the Research Questions

- The first repeated measures ANOVA included all students and grouped based on M-CBM and R-CBM levels
  - Can reading performance be used to accurately determine which groups of students will show the differential boost on a read aloud accommodation?

- The second repeated measures ANOVA only included those students above the 25th percentile on the computation task, and grouped based on M-CBM and R-CBM levels
  - Is there a difference in the validity of an accommodation, as denoted by a significant interaction, between students above and below the 25th percentile on mathematics skill?
## Results - Research Question 1

Table 1

*Means and Standard Deviations of Scores for High and Low Reading Achievement Groups*

<table>
<thead>
<tr>
<th>Task</th>
<th>All Students</th>
<th>Applied Mathematics Score When Grouped by M-CBM Score</th>
<th>Applied Mathematics Score When Grouped by R-CBM Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>Low N=92 M SD</td>
<td>High N=87 M SD</td>
</tr>
<tr>
<td>M-CBM</td>
<td>12.49</td>
<td>48.45</td>
<td>59.20</td>
</tr>
<tr>
<td>R-CBM</td>
<td>107.57</td>
<td>24.40</td>
<td>20.58</td>
</tr>
<tr>
<td>Applied Math with Accommodation</td>
<td>53.62</td>
<td>45.58</td>
<td>52.69</td>
</tr>
<tr>
<td>Applied Math without Accommodation</td>
<td>52.87</td>
<td>21.22</td>
<td>18.68</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task</th>
<th>M</th>
<th>Low N=87 M SD</th>
<th>High N=87 M SD</th>
<th>Low N=64 M SD</th>
<th>High N=113 M SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-CBM</td>
<td>12.49</td>
<td>48.45</td>
<td>59.20</td>
<td>45.64</td>
<td>57.93</td>
</tr>
<tr>
<td>R-CBM</td>
<td>107.57</td>
<td>24.40</td>
<td>20.58</td>
<td>24.96</td>
<td>20.98</td>
</tr>
<tr>
<td>Applied Math with Accommodation</td>
<td>53.62</td>
<td>45.58</td>
<td>52.69</td>
<td>41.76</td>
<td>59.31</td>
</tr>
<tr>
<td>Applied Math without Accommodation</td>
<td>52.87</td>
<td>21.22</td>
<td>18.68</td>
<td>21.80</td>
<td>19.91</td>
</tr>
</tbody>
</table>
### Results - Research Question 1

Table 2

*Analysis of the Accommodation Condition Using all Participants*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>R²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between-Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-CBM</td>
<td>1</td>
<td>5807.15</td>
<td>9.231*</td>
<td>0.051</td>
<td>0.003</td>
</tr>
<tr>
<td>R-CBM</td>
<td>1</td>
<td>1318.55</td>
<td>2.096</td>
<td>0.012</td>
<td>0.149</td>
</tr>
<tr>
<td>M-CBM * R-CBM</td>
<td>1</td>
<td>610.97</td>
<td>0.971</td>
<td>0.006</td>
<td>0.326</td>
</tr>
<tr>
<td>Error</td>
<td>173</td>
<td>629.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within-Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accommodation</td>
<td>1</td>
<td>62.15</td>
<td>0.232</td>
<td>0.001</td>
<td>0.631</td>
</tr>
<tr>
<td>Accommodation * M-CBM</td>
<td>1</td>
<td>1005.76</td>
<td>3.753</td>
<td>0.021</td>
<td>0.054</td>
</tr>
<tr>
<td>Accommodation * R-CBM</td>
<td>1</td>
<td>48.74</td>
<td>0.182</td>
<td>0.001</td>
<td>0.670</td>
</tr>
<tr>
<td>Accommodation * M-CBM * R-CBM</td>
<td>1</td>
<td>222.39</td>
<td>0.830</td>
<td>0.005</td>
<td>0.364</td>
</tr>
<tr>
<td>Error</td>
<td>173</td>
<td>268.02</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *p < .001
Results - Research Question 1

- When differentiated based on M-CBM score, both low and high groups exhibited increased performance on the applied mathematics assessment in the read aloud condition; however, the scores of the high R-CBM group showed a decrease in performance for the applied mathematics assessment when given a read aloud accommodation.

- The significant between-subject main effect shows that the number of correct responses given by the low M-CBM group were significantly lower than the high M-CBM group.
## Results - Research Question 2

Table 3
*Means and Standard Deviations of Applied Mathematics Scores for Students Above the 25th Percentile on the Computation Task*

<table>
<thead>
<tr>
<th>Task</th>
<th>Applied Mathematics Score When Grouped by M-CBM Score</th>
<th>Applied Mathematics Score When Grouped by R-CBM Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low N=60</td>
<td>High N=74</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Applied Math with Accommodation</td>
<td>53.50</td>
<td>23.43</td>
</tr>
<tr>
<td>Applied Math without Accommodation</td>
<td>47.60</td>
<td>20.50</td>
</tr>
</tbody>
</table>
Results - Research Question 2

Table 4

Analysis of the Accommodation Condition Using Participants Scoring Above the 25th Percentile on the Computation Task

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>R²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between-Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-CBM</td>
<td>1</td>
<td>3474.75</td>
<td>6.966**</td>
<td>0.051</td>
<td>0.009</td>
</tr>
<tr>
<td>R-CBM</td>
<td>1</td>
<td>1248.34</td>
<td>2.503</td>
<td>0.019</td>
<td>0.116</td>
</tr>
<tr>
<td>M-CBM * R-CBM</td>
<td>1</td>
<td>76.05</td>
<td>0.152</td>
<td>0.001</td>
<td>0.697</td>
</tr>
<tr>
<td>Error</td>
<td>130</td>
<td>498.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within-Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accommodation</td>
<td>1</td>
<td>4.371</td>
<td>0.016</td>
<td>0.000</td>
<td>0.900</td>
</tr>
<tr>
<td>Accommodation * M-CBM</td>
<td>1</td>
<td>1077.77</td>
<td>3.929*</td>
<td>0.029</td>
<td>0.050</td>
</tr>
<tr>
<td>Accommodation * R-CBM</td>
<td>1</td>
<td>3.89</td>
<td>0.014</td>
<td>0.000</td>
<td>0.905</td>
</tr>
<tr>
<td>Accommodation * M-CBM * R-CBM</td>
<td>1</td>
<td>477.73</td>
<td>1.742</td>
<td>0.013</td>
<td>0.189</td>
</tr>
<tr>
<td>Error</td>
<td>130</td>
<td>268.02</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .001
Differential Boost

Differential Boost
Results - Research Question 2

- When the low computation students were removed from the analysis the high R-CBM and M-CBM students performed better on the applied mathematics assessment with no read aloud accommodation.
- As suggested by Calhoon and colleagues (2000), students who are suspected of a mathematics disability (<25th percentile) will not benefit from a read aloud accommodation.
- The comprehension task helped identify students who would benefit from the accommodation, while the fluency task did not.
Comprehension vs. Fluency

- Large English language learner population
- Comprehension of the text may be necessary for students to complete an applied assessment
  - By 4th grade comprehension tends to become more important than fluency (automaticity)
- Assessed at grade level, not instructional level
Future Implications

- Examine the read aloud accommodation without English language learners
- Assess students at instructional level, not grade level
- Examine the correlations between the CBM measures and statewide testing scores
- Not use hard cut-off scores for students (25th percentile)
- The interaction accounted for 29% of the variance in performance…this suggests there are other variables of interest