AN INVESTIGATION INTO THE EFFECT THAT FINAL EXAM EXEMPTIONS IN SEVENTH AND EIGHTH GRADE SCIENCE COURSES HAVE ON STUDENTS' NINTH GRADE EARTH SCIENCE REGENTS' SCORES

THESIS

Submitted to the Graduate Committee of the
Department of Education and Human Development
State University of New York
College at Brockport
in Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Education

Suzanne Cavanaugh
State University of New York
College at Brockport
Brockport, New York

March, 1998

SUBMITTED BY:

Suzanne Cavanaugh 3/2/98

Candidate Date

APPROVED BY:

Stephen Balzac 3/3/98

Thesis Advisor Date

Marie Beer 3/3/98

Second Faculty Reader Date

Patricia E. Baker 3/3/98

Director of Graduate Studies Date

ABSTRACT

Virtually no research has ever been conducted examining the effect that exemptions from cumulative final examinations during the middle school years have on a students's New York State Regents examination scores. The purpose of this study was to determine if there was a statistically significant difference in students' earth science regents scores when they were given cumulative final exams during seventh and eighth grade as compared to those that were exempt from taking cumulative final exams during these years.

The subjects in this study were 48 students attending a rural school in Central New York State over a three year period. Twenty-seven students who maintained a 90 or above average in science class during both seventh and eighth grade were exempt from taking cumulative final exams both years. Twenty-one students who maintained an 80-89.9 average in science class during seventh and eighth grade were required to take a cumulative final exam both years. All 48 students took the earth science regents .

The results of the regents scores were compared using analysis of covariance. The results indicated that the 90 or above average students still scored significantly higher on the earth science regents even though they had not taken cumulative final exams during seventh and eighth grade.

TABLE OF CONTENTS

Chapter 1 **Page**

Introduction.....1

Chapter 2

Review of Related Literature.....4

Test-Wiseness.....4

Test Anxiety.....8

Effects of Repeated Practice on Examination Scores.....11

Summary.....12

Chapter 3

Methods.....14

Introduction.....14

Subjects.....14

Procedure.....15

Chapter 4

Results.....17

Chapter 5

Conclusions.....21

References..... 25

List of Tables

Table 1. Mean, Standard Deviation and Sum of Squares for the exempt and control groups.....17

Table 2. ANCOVA Calculations.....19

Table 3. Calculated F value.....20

CHAPTER 1

INTRODUCTION

Some middle schools in New York State practice final examination exemptions for seventh and eighth grade students that maintain a 90 or above average throughout the school year. People who argue in favor of this policy believe that a student given this incentive will work harder and learn more during the school year. Proponents in favor of this exemption plan also believe that a cumulative final tests what the top students already know and is not a meaningful assessment for this group of students.

Many other teachers argue against this issue. Science teachers in particular feel strongly that although exemptions do offer an incentive during the middle school years, in the long run this policy has a negative effect on the top students. When these students are faced with high school regents exams and, in particular, the earth science regents exam, their lack of cumulative test taking skills result in lower than expected scores on their regents examinations.

Also, in light of the new requirements of the New York State Board of Regents which will require all students that want a diploma to pass New York State Regents Exams beginning with the graduating class of 2003, is it appropriate to reward any middle school students with final exam exemptions of any kind ? In the long run are we harming these students? If so then we need to reevaluate this policy.

The focus of this study examines if science students who have been exempt from taking cumulative final exams in seventh and eighth grade score statistically lower on the earth science regents exam than students who were not exempt from taking cumulative final

-maintained a 90 or above average in seventh grade life science and were exempt from the cumulative final examination.

-maintained a 90 or above average in eighth grade physical science and were exempt from the cumulative final examination.

-completed the New York State earth science regents course, then upon completion of the course took the earth science regents examination.

The control group was randomly selected from a group of students which met the following criteria:

-maintained an 80-89.9 average in seventh grade life science and took the cumulative final examination.

-maintained an 80-89.9 average in eighth grade physical science and took the cumulative final examination.

-completed the New York State earth science regents course, then upon completion of the course took the earth science regents examination.

The statistical test of analysis of covariance or ANCOVA was chosen for this study. This particular statistical test was chosen because it attempts to even out the obvious grade point difference between the experimental and the control groups by using an adjusted criterion from which to measure any variation. With this test one can be reasonably certain that any significant variation in the earth science regents scores between the two groups is not because of their grade point differences but because of the effect that the independent variable, the lack of practice in taking cumulative final exams, had on their earth science regents scores.

If statistical analysis shows a significant drop in the earth science regents scores of the experimental group as compared to the control group, then this will support the hypothesis that a lack of practice in taking cumulative final exams does have a negative effect on a student's earth science regents score.

If there appears to be little variation in a student's overall average and the earth science regents scores between the experimental and control groups, then this will fail to support the hypothesis, and lend support to the claim that final exam exemptions have little or no effect on these top students..

CHAPTER 2

REVIEW OF RELATED LITERATURE

Little research has been conducted specifically on the effects that exemptions from cumulative final exams during middle school years have on high achieving students and how this effects test scores on cumulative finals during high school.

Exams of all types such as final exams, national achievement exams, and college entrance exams to mention only a few, play a crucial role in how a student is perceived and what opportunities are afforded that student. Because exam scores are so crucial to academic achievement and success in our society, extensive research has been conducted on various aspects of test taking abilities or the lack thereof. Researchers have spent the last several decades studying why some students appear to consistently score high on all types of tests while other seemingly bright students consistently score much lower. These variations are seemingly unrelated to content knowledge and random guess.
Several factors appear to be a possible cause for these variations in test taking abilities.

TEST-WISENESS

According to Millman, Bishop, and Ebel (1965) test-wiseness is defined as:

> a subject's capacity to utilize the characteristics and formats of the tests and or the test taking situation to receive high scores. Test-wiseness is independent of the examinee's knowledge of the subject matter for which the items supposedly measure. Test-wiseness excludes factors of mental attitude (such as anxiety and confidence) and motivational state of the examinee. It is also restricted to the actual taking of the test not the preparation for the test. p.711

In light of this definition, test-wiseness is a test taking strategy that could and should be taught to all students in order to enhance all test scores. Since Millman et al. (1965)

formulated this idea, much research has been conducted on what actual components make up test-wiseness skills and if indeed learning these strategies actually improve overall test scores.

There appears to be some evidence that high achieving students could orally verbalize many of the principles of test-wiseness. In an attempt to outline precisely what principles make up test-wiseness a study was conducted on two hundred forty high achieving suburban high school students. (Millman et al. 1965) The students were instructed to pretend that a new student from a different part of the country had moved to their area and was scoring very low on tests. Their job was to write down tips that helped them score well on tests. From this survey these researchers formulated an outline of test-wiseness principles. The outline is divided into two main categories: elements which are independent of the test construction or purpose and those elements that are dependent.

The outline is as follows:

An Outline of Test-Wiseness Principles

I. Elements independent of test constructor or test purpose.

A. Time-using strategy
   1. Begin to work as rapidly as possible with reasonable assurance of accuracy.
   2. Set up a schedule for progress through the test.
   3. Omit or guess at items (see I.C. and II.B) which resist quick response.
   4. Mark omitted items, or items which could use further consideration, to assure easy relocation.
   5. Use time remaining after completion of the test to reconsider answers.

B. Error-avoidance strategy.
   1. Pay careful attention to directions, determining clearly the nature of the task and the intended basis for response.
   2. Pay careful attention to the items, determining clearly the nature of the the question.
   3. Ask examiner for clarification when necessary, if it is permitted.
   4. Check all answers.

C. Guessing strategy.
   1. Always guess if right answers only are scored.
   2. Always guess if the correction for guessing is less severe than a "correction for guessing" formula that gives an expected score of zero for random responding.
   3. Always guess even if the usual correction or a more severe penalty for guessing is employed, whenever elimination of options provides sufficient chance of profiting.

D. Deductive reasoning strategy.
   1. Eliminate options which are known to be incorrect and choose from among the remaining options.
   2. Choose neither or both of two options which imply the correctness of each other.
   3. Choose neither or one (but not both) of two statements, one of which, if correct, would imply the incorrectness of the other.
   4. Restrict choice to those options which encompass all of two or more given statements known to be correct.
   5. Utilize relevant content information in other test items and options.

II. Elements dependent upon the test constructor or purpose.

A. Intent consideration strategy.

   1. Interpret and answer question in view of previous idiosyncratic emphases of the test constructor or in view of the test purpose.
   2. Answer items as the test constructor intended.
   3. Adopt the level of sophistication that is expected.
   4. Consider the relevance of specific detail.

B. Cue using strategy.
   1. Recognize and make use of any consistent idiosyncrasies of the test constructor which distinguish the correct answer from incorrect options.
      a. Correct responses are longer (shorter) than the incorrect options.
      b. Correct responses are qualified more carefully, or represent a higher degree of generalization.
      c. More false (true) statements are included.
      d. Correct responses are placed in certain physical positions among the options (such as in the middle).
      e. Correct responses are placed in certain logical positions among an ordered set of options (such as the middle of the sequence).
      f. Correct responses include (do not include) similar statements, or make (do not make) it one of a pair of diametrically opposite statements.

g. Correct responses are composed (are not composed) of familiar or stereotyped phraseology.
h. Correct responses are grammatically inconsistent with the stem.

2. Consider the relevancy of specific detail when answering a given item.
3. Recognize and make use of specific determiners.
4. Recognize and make use of resemblance between the options and an aspect of the stem.

In light of this research it became apparent that while some students intuitively pick up these test-wiseness strategies, others do not seem to grasp these skills without being given specific instructions. Researchers and educators came to realize that these test-wiseness skills were strategies that needed to be taught to students. Several guides have been published in order to teach these basic strategies to all students: Caswell and Olsen, 1981; Phillips, 1983; and Antes, 1989.

Sharrat (1992) developed a test readiness curriculum that was designed to teach test-wiseness skills to a general population of students. He used this test readiness curriculum to conduct his research. He found that students instructed according to his test readiness curriculum had a significant test score gain over students that were not given this instruction. Also, a study done by Gentry (1993) found a significant positive correlation between test-wiseness skills and higher grade point average in college students. Once again supporting the idea that this skill needs to be taught as part of the curriculum to all students in order to improve test scores in the entire student population.

Although some test-wiseness studies have been conducted on the general population, more research has been focused on the teaching of test-wiseness strategies to special populations such as minority groups, members of culturally different groups, and special education students. The research by Putnam (1992), Whinnery and Fuchs (1993), and Johns and Vanleinburg (1992) indicates that special education teachers need to teach students with mild disabilities effective test-taking strategies and skills to enable them to cope in a general education classroom. Whinnery and Fuchs (1993) examined the effect of

teaching these skills using various study guides or curriculum based measurement test-taking strategy training. Students' scores on a post-treatment computation test were higher than students without the strategy training.

At the University of Texas, Bernstein (1991) conducted a project to increase the pool of future minority teachers. These teachers were academically knowledgeable secondary students but they seemed to lack the skills for coping with minimum competency testing. These students were given "The Effective Test Performance Study Guide" to help prepare for standardized testing. The results indicated that the guide contributed to test score improvement.

In summary, the research does show that students lacking test-wiseness skills can learn these skills and improve their test scores on all types of test. It appears that high-achieving students already intuitively have knowledge of these test-wiseness strategies. Studies on the test score improvement of this population of students is lacking. It seems that educators have assumed that these students already have internalized test-wise strategies.

TEST ANXIETY

Factors other than test-wiseness strategies have an apparent effect on test grades. Birenhaum and Nasser (1994) studied students who seemed to be quite adept at using test-wiseness skills yet they still scored poorly on exams. Many students in test taking situations experience test anxiety. According to Macmillan's School Dictionary (1974) anxiety is a feeling of fearful uneasiness or worry about what may happen. Morris, Davis, and Hutchings (1981) separated test-anxiety into two major components, worry and emotionality. Worry refers to the cognitive elements of anxiety such as negative expectations and potential consequences. Emotionality refers to one's perception of the

anxiety experience such as nervousness and tension. These two anxiety components are aroused and maintained by different situational conditions.

In order to determine if a student is suffering from test anxiety, Morris et al. (1981) developed a worry-emotionality pre-examination questionnaire. This questionnaire was used to help determine not only if test anxiety existed and which students suffered from test anxiety, but knowing whether anxiety was caused by worry or emotionality helped the sufferers better understand and try to cope with what brought on this test anxiety. What follows is a sample of the questionnaire most often given.

Pre-Examination Questionnaire

Directions: To the left of each of the following statements, indicate your feelings, attitudes, or thoughts as they are right now in relation to this course examination. Use the following numerical scale:

1. The statement does not describe my present condition.
2. The condition is barely noticeable.
3. The condition is moderate.
4. The condition is strong.
5. The condition is very strong; the statement describes my present condition very well.

___I feel my heart beating fast. (Emotionality)
___I feel regretful. (Worry)
___I am so tense that my stomach is upset. (Emotionality)
___I am afraid that I should have studied more for this test. (Worry)
___I have an uneasy, upset feeling. (Emotionality)
___I feel that others will be disappointed in me. (Worry)
___I am nervous. (Emotionality)

___I feel I may not do as well on this test as I could. (Worry)
___I feel panicky. (Emotionality)
___I do not feel very confident about my performance on this test. (Worry)

Studies by Berliner and Casanova (1988) and Strauss and Clark (1989) showed that individuals with high test anxiety tended to consistently perform less well on examinations.

Researchers have not only broken anxiety down into worry-emotionality components, but have also come up with different types of test-anxious students: those who lack test-taking skills, those who lack study skills (Birenbaum and Nasser, 1994) and those who have long-term memory problems (O'Brien, 1991).

One study points to the possibility that students in general are more anxious about science tests. Everson, et al (1993) found that physical science exams elicited the highest levels of test anxiety. These high levels of test anxiety appear to have a profound relationship to low performance in science courses.

Because there are many types of test anxious students, several strategies to reduce test anxiety have been studied. It appears that there are some techniques that reduce test anxiety and help most test-anxious students no matter what type of anxiety. Suggested methods of reducing test anxiety are as simple as chewing a stick of gum. Wilmore (1995) found that students who were allowed to chew a stick of gum during a test received higher scores than students who were not allowed to chew gum.

An instructional method that reduces test anxiety is the outcome based curriculum. Students who are instructed using this method are tested and retested on any material that they initially scored below eighty on. This method of retesting reduces anxiety in test takers. In one study Davidson et al. (1984) showed that a test-retest policy reduced test anxiety in approximately sixty percent of students. In combination with a test-retest strategy, another study by Banger (1983) showed that combining a retest policy with increased information about probable question types and examination format greatly reduced test-anxiety which in turn correlated with higher test scores.

One researcher, Ross (1994) studied 52 college students that participated in a one credit class for the reduction of test anxiety. This program used a variety of study skills and behavioral strategies to improve test scores. The participants of this course demonstrated slightly higher grade averages and a significant positive change in their attitude towards school in general.

There are several different reasons for students to exhibit test-anxiety. Guitmann (1987) studied the test-anxiety level of adolescent children of divorced parents. Results indicated that children of divorced parents had significantly higher anxiety scores on the worry-emotionality scale than did children of intact families. This may be one reason why children of divorced parents have lower academic achievement Langham-Johnson (1981) investigated the correlation between levels of test-anxiety and socioeconomic status among college sophomores and juniors. This study found a statistically significant correlation between the two factors once again eluding to a possible reason why students from lower socioeconomic backgrounds tend to have a lower academic achievement.

In summary, it appears that high test anxiety for whatever reason tends to have a direct correlation with lower test scores. The question still remains whether or not high test scorers simply lack test anxiety or if their test-wiseness skills make them successful even if test anxiety does exist. There appears to have been little or no research on this relationship so one cannot come to any certain conclusions.

EFFECTS OF REPEATED PRACTICE ON EXAMINATION SCORES

Does research go along with the old saying "practice makes perfect" or do new findings refute this myth? This section will examine whether of not students benefit from repeated practice in test taking. As it stands, research appears to be split down the middle on this topic.

Many teachers use weekly quizzes as a means to not only frequently evaluate students but also to encourage students to study the material on a regular basis. This seems like a sound practice, one that could only enhance learning, and therefore give rise to higher examination scores. Duty (1982) conducted a study in order to support what he had already observed, that weekly quizzes did indeed stimulate learning. In his study, he found that his organic chemistry students scored 7.6 percent higher on the final exam after being

given weekly quizzes throughout the semester. Freilich (1989) did a similar study using chemistry students and found that final exam scores were the same for students who took the weekly quizzes as the students who did not take the weekly quizzes. This study did show that while final exam results were uniform in the experimental and the control groups, further investigation showed that the first three exams (the final being the fourth) the no quiz group, the control, scored lower than the experimental group. The conclusion drawn in this study was that the control group must have intensely studied for the final exam. The experimental group maintained a higher day-to-day involvement during the course than the control group.

The question of test familiarity comes up often in relationship to standardized testing. .Several courses have been set up to coach students on how to pass standardized tests such as the Scholastic Aptitude Test (SAT), the California Achievement Test (CAT), the Proficiency Examination Program (PEP) and the American College Testing (ACT). The primary focus of these coaching courses involves practicing previous examinations. Do these courses really work? Sawyer and Welch (1990), Powers (1993), Lanese (1991), and Rainey (1996) examined the effects of coaching on the PEP. SAT, CAT, and the ACT, respectively. All four studies found that the positive effects of practice on test-taking were negligible.

In specific classroom situations, Enright et al. (1992) showed that mainstreamed special education students did benefit from repeated practice. This could also be a reflection of decreased test-anxiety due to practice or an increase in test-wiseness strategy skills learned during repeated practice.

SUMMARY

In light of all the evidence on test-taking it appears that the high achieving students who have maintained a high grade point average throughout the school year most likely

already possess test-wiseness strategies since the evidence suggests that high achieving students can verbalize many of the principles of test-wiseness. Apparently these students have also developed techniques to help them cope with test-anxiety. Studies show that individuals with high test-anxiety tend to consistently perform poorer on tests and vice versa. This leads to the assumption that test anxiety must not be a controlling factor in this group of students. The question of this study seems to come down to whether or not this group of students will score lower on exams if they are not given sufficient practice in test taking. Here it appears the evidence is two sided, making the outcome of this study a difficult one to predict.

CHAPTER 3

METHODS

INTRODUCTION

This chapter describes the subjects used in this study, and an explanation of the criteria necessary for placement into the experimental or the control group. Since this is post-facto research, the procedure is a brief summary of the statistical test used in this study and the rationale for choosing this test over other correlation tests.

SUBJECTS

The 48 subjects in this study were selected from a single rural school district in upstate New York. The subjects were selected from two classes, the 1998 and 1999 graduating class. In the graduating class of 1998 there are 164 students and the graduating class of 1999 consist of 179 students in total..

The experimental group is made up of all the students from these two classes that met a specific set of criteria. Each student had to have maintained a 90 or above average in both the seventh grade life science class and eighth grade physical science class. Maintaining a 90 or above average in these classes entitled these students to be exempt from taking the cumulative written final exam in both seventh and eighth grade science. All of the subjects in the experimental group chose not to take the final exam either of these years. In ninth grade each of the subjects completed the New York State earth science regents course . Upon completion of this course each took the earth science regents exam. A total of 27 students met all of the above criteria.

The control group is made up of all students from the same two classes who met a different set of criteria than the experimental group. Each student had to have maintained an average between 80 and 89.9 in both the seventh grade life science and eighth grade physical science class. Maintaining an average in the 80's required these students to take the cumulative written final exam in both their seventh and eighth grade science courses. In ninth grade each of the subjects completed the New York State earth science course, and took the New York State regents exam upon completion of the course. A total of 21 students met all of the above criteria.

PROCEDURE

For each of the 48 subjects one mean score was determined using the seventh and eighth grade final averages. Since the mean score for the experimental group (averaging 90 or above) and the control group (averaging 80-89.9) were unequivalent from the start, and the basis for placement into separate groups to begin with, the statistical test of analysis of covariance or ANCOVA was chosen in an attempt to create equivalent groups of subjects after the fact. This test attempts to even out any previous differences that were assumed between the groups by using an adjusted criterion from which to measure variation The groups of subjects are thus presumed to be statistically controlled. One can then be reasonably certain that if a significant variation shows up in the adjusted criterion measure the difference is due not to sampling fluctuations, but to a real treatment effect or some other uncontrolled variable.

The seventh and eighth grade final averages were adjusted accordingly, and these adjusted scores were then applied to the usual methods of analysis of variance. Then an F-test was applied to test the significance of the test difference. If the calculated F number is

less than the F number given in the F distribution table then the null hypothesis will fail to be supported. If the F number is greater that the number given in the F distribution curve then the null hypothesis will be rejected. The null hypothesis states that there will be no difference between the regents scores for the experimental (exempt) group and the control (non-exempt) group. One must keep in mind for the purpose of this study that there should be a difference in the outcome of the regents exam scores. The group that maintained a 90 or above average throughout seventh and eighth grade should be expected to score higher on the earth science regents exam than the group of students that maintained an 80-89.9 average in seventh and eighth grade. If this is the case, and the experimental group does score higher on the earth science regents exam this will lend support to the idea that being exempted from the seventh and eighth grade final exam did not affect the earth science regents exam score.

CHAPTER 4

RESULTS

The main question addressed in this research was whether students with a 90 or above average who were exempt from taking cumulative final science exams during seventh and eighth grade scored statistically lower on the ninth grade earth science regents exam than students with an 80-89.9 average who took cumulative final science exams during both seventh and eighth grade.

TABLE 1

Mean, Standard Deviation, and Sum of Squares for the Exempt and Control Groups

	Exempt		Control		EXEMPT	EXEMPT	CONTROL	CONTROL
	X	Y	X	Y	X-MEAN(X)	Y_MEAN(Y)	X-MEAN(X)	Y-MEAN(Y)
	97.00	88.00	86.50	67.00	4.54	5.81	6.60	21.34
	97.00	94.00	82.50	65.00	4.54	70.73	2.04	43.82
	96.50	82.00	85.00	69.00	2.66	12.89	1.14	6.86
	96.50	92.00	83.00	55.00	2.66	41.09	0.86	276.22
	91.50	83.00	87.00	84.00	11.36	6.71	9.42	153.26
	95.50	90.00	85.50	69.00	0.40	19.45	2.46	6.86
	92.00	82.00	82.50	85.00	8.24	12.89	2.04	179.02
	91.00	92.00	81.00	68.00	14.98	41.09	8.58	13.10
	97.50	98.00	87.00	73.00	6.92	154.01	9.42	1.90
	90.50	61.00	84.50	86.00	19.10	604.67	0.32	206.78
	98.00	87.00	83.00	57.00	9.80	1.99	0.86	213.74
	92.50	87.00	80.50	91.00	5.62	1.99	11.76	375.58
	91.00	84.00	84.50	79.00	14.98	2.53	0.32	54.46
	93.50	82.00	80.50	65.00	1.88	12.89	11.76	43.82
	93.00	90.00	83.00	61.00	3.50	19.45	0.86	112.78
	95.00	82.00	84.50	70.00	0.02	12.89	0.32	2.62
	94.50	77.00	88.00	75.00	0.14	73.79	16.56	11.42
	95.00	87.00	80.00	53.00	0.02	1.99	15.44	346.70
	91.00	86.00	82.00	82.00	14.98	0.17	3.72	107.74
	96.50	88.00	86.50	80.00	2.66	5.81	6.60	70.22
	97.00	95.00	85.50	70.00	4.54	88.55	2.46	2.62
	93.50	83.00			1.88	6.71		
	96.00	80.00			1.28	31.25		
	98.00	72.00			9.80	184.69		
	98.00	92.00			9.80	41.09		
	97.00	93.00			4.54	54.91		
	97.00	84.00			4.54	2.53		
MEAN	94.87	85.59	83.93	71.62				
STDEV	2.52	7.63	2.38	10.61				
NUMBER	27.00	27.00	21.00	21.00				
SSW					165.30	1512.52	113.64	2250.95

Table 1 presents descriptive statistics of the mean, standard deviation, and the sum of squares within in both the group of students which was exempt from final exams in seventh and eighth grade (n=27) and the control group which took final exams in both seventh and eighth grade (n=21). The numbers in the X column are the mean scores for each student's seventh and eighth grade final averages. The Y column represents that student's actual score on the earth science regents exam.

One should notice that there is a 10.9 point difference between the mean score of X for the exempt group and the mean score for the control group. This is understandable in light of the fact that the exempt group was chosen from a group of students who maintained a 90 or above average in both seventh and eighth grade science. In contrast, the control group was chosen from a group of students who maintained an 80-89.9 average in both seventh and eighth grade science. Both groups had similar standard deviations from the mean with 2.52 being the standard deviation for the exempt group, and 2.38 for the control group.

As mentioned in the previous chapter, because of this obvious difference in the mean scores between the exempt and control group, the statistical test of analysis of covariance or ANCOVA was chosen in order to statistically create equivalent groups after the fact. It would only stand to reason that the exempt group with a mean score of 94.87 would outscore the control group with a mean score of 83.93 on the earth science regents exam. When looking at Table 1, one can see that the exempt students did indeed have a mean earth science regents score 13.97 points higher than the control group. So what ANCOVA has essentially done is to statistically "handicap", the control group so that the end results on the adjusted criterion actually reflect differences due to the manipulation of the independent variable or other uncontrolled factors, and not sampling fluctuations.

Table 2 is included to show the reader the full extent of the calculations involved in the process of ANCOVA.

TABLE 2

ANCOVA Calculations

EXEMPT			CONTROL		
X2	Y2	XY	X2	Y2	XY
9409	7744	8536	7482.25	4489	5795.5
9409	8836	9118	6806.25	4225	5362.5
9312.25	6724	7913	7225	4761	5865
9312.25	8464	8878	6889	3025	4565
8372.25	6889	7594.5	7569	7056	7308
9120.25	8100	8595	7310.25	4761	5899.5
8464	6724	7544	6806.25	7225	7012.5
8281	8464	8372	6561	4624	5508
9506.25	9604	9555	7569	5329	6351
8190.25	3721	5520.5	7140.25	7396	7267
9604	7569	8526	6889	3249	4731
8556.25	7569	8047.5	6480.25	8281	7325.5
8281	7056	7644	7140.25	6241	6675.5
8742.25	6724	7667	6480.25	4225	5232.5
8649	8100	8370	6889	3721	5063
9025	6724	7790	7140.25	4900	5915
8930.25	5929	7276.5	7744	5625	6600
9025	7569	8265	6400	2809	4240
8281	7396	7826	6724	6724	6724
9312.25	7744	8492	7482.25	6400	6920
9409	9025	9215	7310.25	4900	5985
8742.25	6889	7760.5			
9216	6400	7680			
9604	5184	7056			
9604	8464	9016			
9409	8649	9021			
9409	7056	8148			
1xy=	343667.92	**S'yy=**	6058.66		
2xy=	345772.00	**E'yy=**	3445.10		
3xy=	345474.00	**T'yyR=**	2613.56		
Sxy=	2104.08				
Exy=	298.00				
Txy=	1806.08				

TABLE 3

Calculated F Value

ANALYSIS OF COVARIANCE TABLE				
SOURCE	**SS**	**df**	**MS**	**F**
Total	6058.66	46		
Error	3445.10	45	76.56	
Treatments	2613.56	1	2613.56	**34.14**

Table 3 contains the actual F value of 34.14, with 1 being the degrees of freedom for the numerator and 46 the degrees of freedom for the denominator. The critical value at the .05 level is 4.05. As one can see, 34.14 is way outside of the critical value and therefore indicates that the exempt group, even after statistically correcting for the obvious lower mean scores of the control groups' seventh and eighth grade averages, still scored significantly higher on the earth science regents than the control group.

CHAPTER 5

CONCLUSIONS

This study tested the hypothesis that the top students' lack of practice in taking cumulative final examinations in seventh and eighth grade science class had a negative effect on their ninth grade earth science regents score. The findings of this study indicate that a lack of practice in taking cumulative final science exams in seventh and eighth grade appears to have little effect on the earth science regents scores' of these top students. These findings fail to support the hypothesis. The top students who were exempt from the final exam still scored significantly higher on the earth science regents than the group of students who maintained a 80-89.9 average in seventh and eighth grade and took the cumulative final exam both years.

As mentioned in chapter 2, the outcome of this study was difficult to predict even in light of previous research. There is little or no research specifically on top students in terms of test-wiseness. The current research assumes that this population of students has already internalized test-wise strategies and test score improvements in this group have never been studied. Much of the research has focused on special populations such as minority groups and special education students.

The research on the relationship between test-anxiety and high test scorers is also lacking. There are no clear conclusions on whether or not these top students have high test-anxiety and simply overcome it with their test-wiseness skills or if they simply lack test-anxiety altogether.

The main focus of this study relates directly to the effects of repeated practice on examination scores. Research on this subject is often inconclusive, but in summary most studies have found that the effects of repeated practice are minimal at best. Any benefit of repeated practice could be a reflection of decreased test-anxiety due to the practice, or an increase in test-wiseness strategy skills learned during repeated practice.

This study is in agreement with previous research on several points. First, the findings of previous research support the idea that top students already possess test-wiseness strategies. The research also supports the idea that top students either lack or have learned how to cope with test-anxiety. Research also supports the idea that the positive effects of repeated practice on test-taking are negligible.

This study examines the idea that the top students, even without the practice of taking cumulative final exams in seventh and eighth grade, still scored significantly higher on the ninth grade earth science regents. These students already possessed test-wiseness strategies, had learned how to cope with or overcome test-anxiety, and scored significantly higher on the exam even though they were not given sufficient practice in test-taking.

When examining the results one must keep in mind some of the limitations of this study. This is post-facto research. The independent variable (exemption from the seventh and eighth grade cumulative final science exam) was not manipulated by the researcher. The subjects in this study were assigned to the experimental and control groups after they had or had not taken the final exam in seventh and eighth grade. Post-facto research does not allow for any cause and effect relationship to be established. One can only make predictions.

The findings of this research make it possible to predict that this exemption policy will not have a negative effect on the top students when faced with high school regents exams. The science teachers that strongly argued against this exemption policy should feel more confident that this policy is not detrimental to these students. According to this research these top students still come out on top.

Many questions still remain. It is possible that the subjects in this study that were exempt from the seventh and eighth grade final science exams took several other exams during their middle school years. This would have given these students practice in taking cumulative final exams, although not in science. This factor may have given these students

the practice that they may have needed. It is possible that if this group of students were exempt from all finals in seventh and eighth grade they may not have scored as well on the ninth grade earth science regents.

When examining the results of this study one must keep in mind that this study is focusing on the top students. These students may already posses test-wisensess strategies, have learned how to cope with test-anxiety, and may not be effected by repeated practice. Extending this research to make predictions about other lower ability students may be disastrous. This study predicts that the top students do not appear to be harmed by this exemption policy. To interpret from this study that final exams are not necessary for any students in the middle school is inappropriate. Much more research on this topic is needed.

Some middle schools in New York State are going along with the current trend of alternative assessments such as portfolios or final projects replacing the final exam. Before adopting this policy research needs to be focused on the lower ability students. These students may not posses test-wiseness strategies and may suffer from test-anxiety. For this group of students there may be a strong negative effect if they are not given sufficient practice in test taking. With the new requirements being handed down to us from the New York State Board of Regents it is extremely important that middle school administrators consider this issue before they replace final exams with projects and portfolios. Portfolios and final projects are a wonderful supplement to final exams, but replacement with such assessment tools is not recommended. These lower ability students may suffer greatly when faced with the rigors of New York State regents exams.

One suggestion for further research would be to perform a similar study, only set up the research experimentally. This could be done by taking all the 90 or above students and randomly requiring 50% of the group to take a cumulative final exam and exempt the other 50% from the final. This would allow for a manipulated independent variable which would allow for a cause and effect relationship to be established between the independent

and dependent variable. Other experiments could be carried out in similar fashion only varying the ability level of the students. Instead of only testing the 90 or above students the experiment could be repeated on students with 80 averages, 70 averages, 60 averages. and so on. This type of experimental data would allow for clearer results on each group of students and show how each group is effected by the lack of practice in taking exams. This data would give middle school administrators something to rely on when faced with making decisions on whether of not to rely on alternative assessments, final exams, or a combination of both.

This research has only touched upon one small portion of a much larger topic. It is relatively safe to predict that top students are not adversely affected on their earth science regents when they are exempt from taking final science exams in seventh and eighth grade. This study by no means allows for predictions about other students with lower abilities. Hopefully this study will lead to new research on similar topics before middle schools administrators consider the trends of alternative assessments taking the place of the cumulative final examination.

REFERENCES

Antes, Richard L. (1989). Preparing students for taking tests. Phi Delta Kappa Educational Foundation. Bloomington, IN. (ERIC Documentation Reproduction Service No. ED 314 491)

Barger, George W. (1983). Classroom testing procedures and student anxiety. Improving College and University Teaching. 31. 25-26.

Berliner, D., & Casanova, U. (1988). How do we balance test anxiety and achievement? Instructor, 97. 14-15. (ERIC Documentation Reproduction Service No. EJ 374 309)

Bernstein, Laura. (1991). Improving test-taking skills of secondary students. Teacher Education and Practice. 6. 71-72.

Birenbaum, M. & Nasser, F. (1994). On the relationship between test anxiety and test performance. Measurement and Evaluation in Counseling and Development. 27. 293-301. (ERIC Documentation Reproduction Service No. EJ 487 656)

Caswell, Martha S. & Olsen, June. (1981). A quide to test taking as easy as...1,2,3. Michigan State Board of Education. Lansing. (ERIC Documentation Reproduction Service No. ED 246 103)

Davidson, William B., et al. (1984). A test-retest policy for introductory psychology courses. Teaching of Psycology. 11. 182-184. (ERIC Documentation Reproduction Service No. EJ 307 570)

Duty, Robert C. (1982). Weekly or biweekly quizzes in organic chemistry" Does it make a difference? Journal of Chemical Education. 59. 218-219.

Enright, B., et al. (1992). Helping mainstreamed students develope successful test-taking skills. Diagnostique. 17. 128-136. (ERIC Documentation Reproduction Service No. EJ 452 892)

Everson, Howard, et al. (1993). Test anxiety and the curriculum: The subject matters. (ERIC Documentation Reproduction Service No. ED 366 598)

Frelich, Mark B. (1989). Frequent quizzing, the final exam, and learning: is there correlation? Journal of Chemical Education. 66. 219-223.

Guitmann, J. (1987). Test anxiety and performance of adolescent children of divorced parents. Educational Psychology. 7. 225-226.

Johns, Jerry, & Vanleirsburg, Peggy. (1992). Teaching test-wiseness: Can test sores of special populations be improved? Reading Psychology. 13. 99-103.

Lanese, James F. (1991). Test familiarity: Evidence of "practice effect"? Annual Meeting of the American Educational Research Association. Chicago, Il. (ERIC Documentation Reproduction Service No. ED 334 267)

Langham-Johnson, S. (1981). Anxiety scale as a retest measure in college courses. Annual University of South Carolina Conference on Educational Issues and Research. Columbia, SC.

Macmillan. (1974). School Dictionary. New York: Macmillan Publishing Co. Inc.

Millman, J., Bishop C.H., & Ebel, R. (1965). An analysis of test-wiseness. Educational and Psychological Measurement. 25. 707-726.

Morris, Larry W., Davis, Mark A. & Hutchings, Calvin H. (1981). Cognitive and emotional components of anxiety: Literature review and a revised worry-emotionality scale. Journal of Educational Psychology. 73. 230-239.

O'Brien, Thomas V. (1991). Test anxiety in college students: A review of the recent research and endorsement of a multimodal approach. Community/Junior College Quarterly of Research and Practice. 15. 271-283. (ERIC Documentation Reproduction Service No. EJ 430 294)

Phillips, Art. (1983). Test-taking skills. A SORD project. Jackson Education Service District. Hedford, OR. (ERIC Documentation Reproduction Service No. ED 237 581)

Powers, Donald E. (1993). Coaching for the SAT: A summary of the summeries and an update. Educational Measurement: Issues and Practice. 39. 24-30. (ERIC Documentation Reproduction Service No. ED 385 593)

Putnam, M. Lewis. (1992). The test practices of mainstream secondary classroom teachers. Remedial and Special Education. 13. 11-21.

Rainey, Anthony. (1996). Effects of American College Testing (ACT) coaching courses on American College Testing scores. (Research / technical report). (ERIC Documentation Reproduction Service No. ED 397 069)

Ross, David B. (1994). Group reduction of test anxiety: Does it really work? (Research / technical report). (ERIC Documentation Reproduction Service No. ED 392 120)

Sawyer, R. & Welch, C. (1990). Changes in PEP test scores for students who have been tested more than once. American College Testing Program. Iowa City, Iowa. (ERIC Documentation Reproduction Service No. ED 336 426)

Sharatt. G. (1992). Test readiness instruction for rural students. Rural Educator. 13. 21-23. (ERIC Documentation Reproduction Service No. EJ 443 521)

Strauss, Michael J., & Clark, John H. (1989). Fear and trembling in the examination hour. Journal of College Science Teaching. 18. 233-235.

Whinnery, Keith W., & Fuchs, Lynn S. (1993). Effects of goal and test-taking stratigies on the computation performance of students with learning disabilities. Learning Disabilities Research and Practice. 8. 204-214.

Wilmore, Elaine L. (1995). Test anxiety? Try a stick of gum...(non- classroom material). (ERIC Documentation Reproduction Service No. ED 392 120)