

Academy of READING[®] Efficacy Study
(Randomized Control Study)

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 School Specialty
Literacy and Intervention

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ACADEMY OF READING® EFFICACY STUDY SUMMARY

Academy of READING® is an online intervention program that can be used with increasing levels of intensity by a wide range of struggling readers in Tier II and Tier III for instruction, assessment, and progress monitoring.

Academy of READING® is based on original neuroscience research into how the brain functions while reading and proven instructional strategies for best practices of computer-based learning. Online screening and progress monitoring tools enable assessment of reading progress up to the 10th grade.

The program follows fundamental learning principles such as building automaticity in foundational skills, mastery learning, and behavioural motivation. The program is comprised of phonemic awareness, phonics, fluency, and comprehension instruction, assessment, and progress monitoring.

Academy of READING® provides students with individualized instruction. Automated placement tests provide a snapshot of each student’s reading abilities, relative to grade level. Using test data the program identifies goals and creates an Individual Training Plan, allowing each student to work on skill gaps at his or her own pace.

School Specialty Literacy and Intervention believes strongly that its products must demonstrate proven effectiveness in increasing student learning. As such, it conducted an effectiveness study of its Academy of READING® program.

DESIGN AND METHODS

This study was conducted by Edina Torlaković, Senior Research Scientist at School Specialty Literacy and Intervention. The goal of the study was to measure the effectiveness of the Academy of READING® program for students in Special Education. The findings are based on a sample of 34 facilitators and 77 Special Education students involved in a randomized controlled trial of the Academy of READING® as a pull-out intervention. Students were randomly assigned to a treatment or control group. Five schools from Whitehall City Schools, near Columbus, Ohio participated in the study.

The researcher selected the following assessments for data collection: the Gates-MacGinitie Reading Test (GMRT) and Ohio’s Achievement Assessments (OAA) as norm-referenced assessments; System to Enhance Education Performance (STEEP) and the Academy of READING® Oral Reading Fluency Benchmark Assessment (ORFBA) as fluency progress-monitoring assessments. Multiple administrations of these standardized assessments (GMRT, STEEP, OAA) and assessments built into the Academy of READING® (Academy of READING® Placement Test and the Academy of READING® ORFBA) were administered. The design and conduct of this study reflect the quality of standards set by the U.S. Department of Education’s “What Works Clearinghouse”.

All Grade 2–11 students were pre-tested with the GMRT in order to identify low achieving students. Students scoring in the bottom 20% of each grade level were identified. Within each grade level, the

students from this bottom 20% who were identified as Special Education students by the school district were randomly assigned to treatment and control groups. The final sample for the study included 77 students in Grades 2–11. A total of 38 (49%) students were randomly assigned to the treatment group and 39 (51%) to the control group.

For the treatment group, teachers followed the requested guidelines for fidelity in the Academy of READING[®]. Students were “pulled-out” to use the program 3 to 5 times a week, for 30 minutes each session, over a period of 5 months (December to April). This resulted in an average of 121 minutes per week per student using the program. Teachers were also not allowed to use any other reading intervention with the treatment group.

Across study sites, reading teachers and facilitators exposed the control students to a variety of reading activities. However, they were not enrolled in any intervention programs. These activities were ‘business-as-usual’ activities and included non-systematic instruction with Scholastic’s *Read About*, an online comprehension program, in addition to activities such as retakes of tests and quizzes, practicing on previously-released state test items, help with homework, and individual reading time with the teacher.

RESULTS

Did students in the treatment group demonstrate significant learning gains in reading?

Special Education students in Grades 2–11 who participated in the Academy of READING[®] program demonstrated a general level of reading achievement improvement of almost one Grade Level Equivalent (GLE) on GMRT during the study period of five months, a significant learning gain. Their comprehension and vocabulary skills improved significantly (all $p < .01$). Students in the treatment group also achieved significant gains of almost one full grade level on the Academy of READING[®] Placement Test, a significant improvement ($p < .01$).

To examine whether the Academy of READING[®] program had an effect on students’ reading improvement, analysis of students’ oral reading fluency was conducted using the STEEP measure. Students participating in the program improved over the course of the study in oral reading fluency by 21.68 words correct per minute (WCPM). The gains on the STEEP were statistically significant ($p < .01$).

Students using the Academy of READING[®] were also examined on Oral Reading Fluency Benchmark Assessment (ORFBA) and the results were analyzed to determine if their reading improved. The students who used the Academy of READING[®] did show improved oral reading fluency by 16 WCPM on average over the course of the study. These gains on the Academy of READING[®] ORFBA were statistically significant ($p < .01$).

In addition, students using the Academy of READING[®] improved on the Academy of READING[®] Placement Test almost one full grade equivalent and on The Ohio Achievement Assessments (OAA). Gains on both tests were statistically significant ($p < .05$).

How does the reading performance of treatment students compare to students in the control group?

Study findings suggest that the gains experienced by Academy of READING[®] participants in general reading improvement, as shown by oral reading fluency and vocabulary, were greater than those experienced by the control group. In addition, gains in reading comprehension of the treatment students were higher (marginally significant) than those in the control group.

Results revealed that the treatment group scored higher, on average, than the control group by the end of the year on all GMRT subtests. The average gains of the treatment group were higher than the gains of the control group on GLE for Total Score, Comprehension, and Vocabulary. These gains were marginally significant on the Comprehension subtest.

Based on the findings, the treatment students scored higher than the control students by the end of the study when assessed with the Academy of READING[®] ORFBA. The average gains of the treatment group were 9 WCPM greater than the gains of the control group; this was statistically significant.

Students also achieved significantly greater gains (all $p < .05$) than students in the control group on the Academy of READING[®] Placement Test and OAA state tests. Although, students in the treatment group achieved significant gains on the STEEP these gains were not significantly greater than students in the control group.

How do Academy of READING[®] tests correlate with other standardized tests of reading ability?

The Academy of READING[®] Placement Test was correlated to other norm-referenced assessments, STEEP and GMRT. Students' Academy of READING[®] ORFBA pre-test scores were correlated with STEEP pre-test scores ($r = .81, p < .01$) and GMRT Total GLE pre-test scores ($r = .57, p < .01$). Academy of READING[®] post-test scores were also correlated with STEEP post-test scores ($r = .72, p < .01$) and GMRT Total GLE post-test scores ($r = .34, p < .05$). This suggests that the Academy of READING[®] Placement Test and ORFBA are reliable measure of students' oral reading fluency.

CONCLUSION

The results of this study indicate that the Academy of READING[®] program is effective in providing a comprehensive intervention to struggling readers in Special Education. This study revealed that during the first five months of implementation, students using the program demonstrated statistically significant growth of one grade level when used by teachers who were highly trained in using Academy of READING[®]. Results show that the program is successful in significantly improving students' reading skills.

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1. INTRODUCTION

The goal of this study was to evaluate the efficacy of the Academy of READING[®] program with Special Education students struggling with reading at the elementary, middle, and high school levels. These students were also identified as Tier II or Tier III students in the Response to Intervention implementation since they were in the 20th percentile. The study was conducted during the 2010/2011 school year at Whitehall City Schools in Ohio. This report presents the evaluation design and methods, a description of the Academy of READING[®] program, an assessment of program implementation, student performance results, and a discussion of findings.

2. RESEARCH DESIGN

The purpose of this study was to evaluate the effectiveness of the Academy of READING[®] program in helping Special Education students attain critical reading skills. The evaluation study employed a Randomized Controlled Trial (RCT) design with random assignment of students to treatment and control groups. Students within each grade level and classroom level were randomly selected to participate in a pullout intervention employing either the Academy of READING[®] program or the materials teachers typically used with non-proficient students (i.e., ‘business-as-usual’ instruction).

The study addressed the following over-arching evaluation questions:

3. Do students in the treatment group demonstrate significant learning gains in reading during the study period?
4. How does the reading performance of students in the treatment groups compare to that of students in the control group?

2.1 METHODOLOGICAL APPROACH

Whitehall City Schools is a suburban school district in Ohio with three elementary schools, one middle school, and one high school. All students in Grades 2–11 were pre-tested with the Gates MacGinitie Reading Test (GMRT) in order to identify low-achieving students. Students within each school were grouped based on grade level. Students in the bottom 20% of each grade level were identified. Within each grade level, the students from this bottom 20% who were also identified as Special Education by the school district were randomly assigned to either a treatment or control group. This ensured randomization of students at the school and grade level.

2.2 MEETING RESEARCH & EVALUATION STANDARDS

The current study met the quality standards for research set out by the U.S. Department of Education ‘What Works Clearinghouse’ (WWC; 2006). The study also adhered to the Program Evaluation Standards described by the Joint Committee on Standards for Educational Evaluation (1994). This ensured that the study had construct, internal, and external validity. Furthermore, conclusions were based on sound statistical analyses and principles. The WWC Study Review Standards contain nine overarching standards that were considered in the design, implementation, and analyses of the current study. The following section briefly describes the steps that were taken to ensure the nine standards were met.

(Listed in Bold on the Right)

WWC Standards

1. **Randomization:** At the school and grade level all students were randomly assigned to either the control or treatment group.
2. **Baseline Equivalence:** Prior to the start of the study students in the treatment and control groups performed similarly on student outcome measures.
3. **Overall Attrition:** A site with a mobility rate of less than 20% was selected. This contributed to a low attrition rate of approximately 10% due to students dropping out of the study or a lack of complete data.
4. **Differential Attrition:** The attrition rates were essentially the same for the treatment (11%) and control (10%) groups. A chi-square analysis confirmed that the attrition rate did not significantly differ based on whether they were assigned to the treatment or control group.
5. **Intervention Contamination:** After careful consideration, it was determined that the current study was free of any events or other threats to validity. Thus, conclusions concerning the effects of the Academy of READING[®] program can be made confidently.
6. **Mismatch between Unit of Assignment and Unit of Analysis:** Recall that randomization occurred at the student level. Statistical analyses were conducted to account for student, class, and school influences on students’ outcomes.
7. **Variation in People and Outcomes:** Students included in the study had a variety of backgrounds. To account for this, demographic information and multiple measurements were used to assess all students’ performance.
8. **Analysis of Interventions’ Effects on Different Subgroups Outcomes:** In analyses of the outcome variables subgroups of students (gender, ethnicity, free/reduced lunch, and English language proficiency) were considered in the analyses.
9. **Statistical Reporting:** All primary results and statistical analyses concerning the current study are reported.

3. METHOD

The study evaluated the efficacy of the Academy of READING[®] program in helping Special Education struggling readers attain critical reading skills. The program was implemented as a pull-out intervention with groups of 10-20 students. This section describes different study components, including measures, procedures, settings and participants.

3.1 MEASURES

A combination of qualitative and quantitative methods was included in the study design in order to allow for a full understanding of the impact of Academy of READING[®] on students' reading abilities. This section describes these measures.

Student Measures

Various measures were employed to assess changes in students' reading skills. The researcher selected the Gates-MacGinitie Reading Test (GMRT) as a norm-referenced assessment. The System to Enhance Education Performance (STEEP) and Academy of READING[®] Oral Reading Fluency Benchmark Assessment (ORFBA) were employed as a fluency progress-monitoring assessment. The Ohio Achievement Assessments (OAA) was also available to the researcher as a norm-referenced assessment and for that reason it was considered. The same was also true for results of the Academy of READING[®] Placement Test. The test-retest coefficients for all measures are summarized in Appendix A.

Gates MacGinitie Reading Test

The GMRT is a norm-referenced, group-administered reading test that was chosen for this study because it can be administered to students from Kindergarten through Grade 12. It is widely used and well-recognized in the field, and its assessment areas (word decoding, word knowledge, vocabulary, and comprehension) parallel with the instructional focus of Academy of READING[®].

There are two versions of the paper-and-pencil test of equal length and difficulty. By administering different versions of the test in the fall and the spring, students' performance changes during the year can be determined.

STEEP

The System to Enhance Educational Performance (STEEP) is a comprehensive package of research-based benchmark and progress monitoring assessments available for many standard curriculum areas for grades K-12. The assessment of interest to this study was the Oral Reading Fluency assessment. This is an evaluation used to determine students' reading fluency levels.

The assessment consists of a one-minute timed reading of grade appropriate material. The number of words read correctly (i.e., the total number of words read, minus errors and omissions) is the oral reading fluency rate.

Ohio Achievement Assessments (OAA)

The Ohio Achievement Assessments are annual state tests, administered to students in the Ohio school system in grades 3-8. They assess skills in mathematics, reading, writing, science, and social studies. The format is a mixture of multiple-choice, short-answer, and essay questions. Results of this assessment were included in analyses for this study to examine effects of training in Academy of READING[®] upon performance on the Ohio state-standardized reading assessment.

Academy or READING Placement Test

The Academy of READING[®] Placement Test is an assessment of reading ability. It is a CLOZE paragraph test, in which students are presented with a paragraph of text with certain words removed and a list of potential words with which to fill each blank. From this list, students must try to select the correct word: the one which makes most sense in the context of the surrounding sentences. This test was administered in the fall and in the spring, in order to determine changes in the students reading abilities over the course of the school year.

Academy of READING[®] Response to Intervention ORFBA

The Academy of READING[®] ORFBA is used for assessment of Oral Reading Fluency. It is a complete package of research-based universal screening and progress monitoring assessments available for grades 1-12. The test consists of one-minute readings of grade appropriate passages. The oral reading fluency rate is based on words read correctly per minutes. In this study, it was used to provide a second assessment of Oral Reading Fluency, along with STEEP. The format of the test is the same as the STEEP.

3.2 PROCEDURES

This section describes procedures followed for various study aspects including site selection, data collection, training, implementation, test administration, and scoring.

Site Selection

Specific site selection criteria were set up in order to guarantee a student population and settings that are typical of Academy of READING[®] users. These are:

1. Implementation of Academy of READING[®] in Grades 2–11
2. Application of the RTI approach

3. Teachers' completion of implementation training
4. Schools' commitment to implement intervention with fidelity: student training in Academy of READING[®] 3–5 times a week for daily sessions of 30 minutes
5. Ethnic and economic diversity,
6. Teacher comfort with random assignment of students to groups, and
7. No other primary reading intervention or research studies occurring.

Data Collection Timeframe

Table 1 represents the timeframe of training and data collection activities. The study orientation was done within the first month of school. Following the orientation, the student measures were administered to all Grade 2–11 students. After random assignment of students into study groups was completed, the product training occurred. Product training was led by a certified Academy of READING[®] and RTI trainer who is also a curriculum specialist. After the training, implementation of Academy of READING[®] began.

Initial teacher training for the Academy of READING[®] started in November of 2010, and classroom support visits began three weeks after this initial training on the Academy of READING[®]. These classroom-support visits included observations, discussions with reading teachers, modeling of intervention strategies, and additional training for staff. The trainer visited the school district on a monthly basis to provide guidance throughout the implementation.

Table 1: Timeline of Data Collection Activities

Task and Activity	August	September	October	November	December	January	February	March	April	May
Study orientation		√								
Administration of student measures		√	√		√	√			√	√
Assignment of students into study groups			√							
Teacher training begins				√						
Student training begins					√	√				
Follow up training and observations/interviews					√	√	√	√	√	√
End study										√

Test Administration and Scoring

Teachers were presented with an overview of tests, including instruction for administration, make-up testing, accommodating students with Individualized Education Program plans, and assessment return.

- Completed machine-scored answer sheets for the GMRT were sent by district administrators to Nelson Scoring Services.
- STEEP contains automated assessment. It was administered by teachers with students on an individual basis.
- Academy of READING[®] Placement Test is administered online and scoring is automated.
- Academy of READING[®] ORFBA scoring was done by trained teachers, district administrators, reading specialists, and a research assistant.

Implementation Fidelity

In order to ensure that the Academy of READING[®] program was implemented with fidelity, various implementation-monitoring procedures were used. These included regular checks of the Academy of READING[®] database created with the product's automated online data collection, implementation guidelines, regular training, and site visits.

Academy of READING[®] Database and Automated Online Data Collection

The Academy of READING[®] is an on-line intervention tool. The implementation fidelity is characterized by the extent to which students use the program. An automatic Academy of READING[®] data collection database measures various aspects of implementation. These are time in program, time in focused training, number of skills mastered, percentage of program completed, etc. All these fidelity measures are saved every time a student logs in and their total is updated with the completion of every task by a student.

Implementation Guidelines

The Academy of READING[®] program is highly structured, and the Instructor's Resource Guide provides a clear plan for program implementation. Accordingly, teachers followed the guidelines, having the students use the program three to five times a week for 30 minutes each session. Teachers were also not allowed to use any other intervention material with the treatment groups.

Training and Site Visits

School Specialty Literacy and Intervention curriculum specialists designed the implementation model for the Academy of READING[®]. This model is used by the Professional Development

team and it is based on thousands of implementations with Tier II, Tier III, English Language Learners, and Special Education students. It integrates comprehensive professional development and ongoing support to meet the needs of diverse populations and close the achievement gap for struggling students.

A certified Academy of READING[®] and RTI implementation specialist was chosen to provide the site with training and support consistent with typical Academy of READING[®] services to schools.

Phase 1—Plan: School leaders determined the capacity for program fidelity while study implementation goals were established. At the end of this phase, teachers and district administrators (referred to as facilitators from now on) discussed the Implementation Planning Guide.

Phase 2—Deploy: Professional development specialists equipped teachers with product knowledge and tools to implement the interventions effectively. Students received hands-on guidance, and teachers learned to monitor and manage student training. At the end of this phase, teachers:

- Understood the theory and benefits of the programs
- Assessed students' reading proficiency
- Monitored and managed student learning effectively

Trainers from Professional Development started the program with students to model best practices and ensure that teachers were engaged with the implementation. At the end of this phase, teachers:

- articulated the benefits of the programs to students
- created excitement for student learning in the programs
- started student training and interpret Placement Test results

Phase 3—Coach: Ongoing classroom coaching and implementation support helped teachers analyze data and apply appropriate intervention strategies for each student. This ensured ongoing program fidelity with on-site classroom coaching and supplemental materials. During these classroom visits, teachers were coached on:

- Monitoring student progress
- Analyzing and assessing data
- Intervention strategies
- Classroom strategies

Mid-Year Review: This ensured ongoing program fidelity with a mid-year review of interim report cards. With these reports, facilitators became aware of:

- Program usage and fidelity
- Student time-on-task and levels mastered
- Suggested ways to improve implementation

Phase 4—Evaluate: The Accelerated Learning Model team met with administrators to review year-end results and plan for the next school year.

A Comprehensive Year-end Report helped teachers and administrators understand year-end results and use data to make Year 2 Planning decisions. At the end of this implementation period, participants received recommendations for Year 2 implementation and a comprehensive year-end district level report. This report helped teachers and administrators gain insight into:

- Comparative views of participating schools relative to key fidelity metrics
- Student gains on program assessments
- Correlation between time-on-task and gains

The implementation specialist also had the opportunity to monitor the teachers' fidelity of implementation through regular site visits that involved classroom/lab observations. This provided a qualitative measure of implementation fidelity.

It was explicitly stated in written and verbal form that under no circumstances should reading teachers use any components of Academy of READING[®] with the control group. The teachers indicated that they understood the importance of preventing contamination between treatment and control groups.

3.3 SETTINGS

The sample for the study represents five schools: three elementary schools, one middle school, and one high school from the Whitehall City Schools district in Whitehall, Ohio. A total of 77 students (38 treatment and 39 control) and 34 facilitators participated in the study. See Table 2 for District Characteristics.

Table 2: District Characteristics

Geographic Location and City Description	Suburb, small
Total student enrolment	2802 (based on August 2010 data)
Percent qualifying as low income (free/reduced lunch)	82.57%
Ethnic breakdown	
Asian	1%
Black	30%
Hispanic	14%
American Indian/Alaskan Native	0.2%
Multiracial	8%
White	45%
Past performance on state wide assessments	Below average

3.4 PARTICIPANTS

The final student sample for the study included 77 students in Grades 2–11. The student sample size consisted of 38 and 39 students assigned to the treatment and control groups, respectively. Table 3 shows the distribution of students in the treatment and control groups by grade.

In addition to the district-level site coordinator (assistant superintendent), each school identified a school-level coordinator. The district level coordinator was the primary contact for study-related issues. Responsibilities included ensuring that materials were distributed, assessments and program were being implemented correctly, and site visits were scheduled, among other responsibilities

Table 3: Distribution of Students by Grade and Group Assignment

Grade	Treatment	Control
2	2	2
3	1	2
4	3	4
5	4	3
6	5	5
7	4	5
8	6	4
9	8	7
10	2	2
11	3	5
Total	38	39

Teacher Participants and Facilitators

A sample of teachers and reading specialists contributed to the study by participating in an observation and informal interviews. Study participants, also called facilitators, consisted of 34 teachers and reading specialists.

Of the 34 teachers and reading specialists, 12 hold a Bachelor’s degree, 21 hold a Master’s degree, and 1 holds a Doctorate degree. The facilitators have been teaching for a range of 2 to 40 years. They have been teaching at their current schools for a range of 1 to 32 years.

Student Participants

The final sample for the study included 77 students in Grades 2–11. The student sample size consisted of 38 (49%) treatment and 39 (51%) control students. This section presents a description of the students’ demographics and analysis to determine group equivalence. This includes chi-square analyses to examine if any of the demographics were associated with assignment to the treatment or control condition to examine whether there were any pre-existing differences between the treatment and control groups.

Demographics

Table 4 presents demographic information for students in the treatment and control conditions.

Table 4: Student Demographics by Group

Characteristics	Treatment Students (n=38)		Control Students (n=39)		Total Students (n=77)		Chi-Square Results	
	Percent	N	Percent	N	Percent	N	Value	Sig.
Grade Level								
Second	50	2	50	2	5	4		
Third	33	1	67	2	4	3		
Fourth	43	3	57	4	9	7		
Fifth	57	4	43	3	9	7		
Sixth	50	5	50	5	13	10		
Seventh	44	4	56	5	12	9		
Eight	60	6	40	4	13	10		
Ninth	53	8	47	7	19	15		
Tenth	50	2	50	2	5	4		
Eleventh	38	3	63	5	10	8	$\chi^2=1.68$	0.99
Gender								
Female	46	12	54	14	34	26		
Male	51	26	49	25	66	51	$\chi^2=0.16$	0.69
Ethnicity								
African-American	44	11	56	14	32	25		
Hispanic	67	6	33	3	12	9		
Mixed	63	5	38	3	10	8		
White	46	16	54	19	45	35	$\chi^2=2.11$	0.55
Free/Reduced Lunch (FRL)								
FRL	53	31	48	28	77	59		
non-FRL	39	7	61	11	23	18	$\chi^2=1.03$	0.31
Limited English Proficiency (LEP)								
LEP	83	5	17	1	8	6		
non-LEP	47	33	54	38	92	71	$\chi^2=3.01$	0.08
Special Education								
IEP	49	38	51	39	100	77	N/A	
Immigrant								
Non-immigrant	49	38	51	39	100	77	N/A	

Group Equivalence

The comparability between the characteristics of students in treatment and control groups is critical in ensuring the validity of the study's findings. The equivalence of students in treatment and control groups was determined by examining differences in student demographic characteristics and attrition.

Student Characteristics

As shown in Table 4 above, chi-square analysis demonstrated that male and female students in Grades 2–11 were equally likely to be in the treatment and control groups. This was also the case for students of various ethnicities, as well as students with Limited English Proficiency (LEP) and those qualifying for free or reduced-price lunch. Another variable in which the groups match is immigrant status.

Student Outcomes

Although student improvement was demonstrated through the use of gain scores throughout this study the treatment and control group should be equivalent on all outcome measures at the outset of the study. Table 5 displays treatment and control students pre-test scores on all outcomes for the current study. Overall, students in both groups were equivalent on all outcomes at pre-test.

Table 5: Pre-Test Academic Performance Measures by Group

Measure	Treatment			Control			<i>t</i>	df	p-value
	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>			
GMRT Total	38	3.67	1.27	39	3.91	1.50	0.77	75	0.44
GMRT Vocabulary	36	3.63	1.34	37	3.89	1.44	0.80	71	0.43
GMRT Comprehension	38	3.71	1.32	39	3.92	1.60	0.64	75	0.53
STEEP	35	76.51	31.11	35	69.40	42.06	-0.81	68	0.43
OAA Raw	19	127.89	61.79	18	175.56	110.20	1.63	35	0.11
OAA Scaled	19	370.05	19.04	18	384.00	24.42	1.94	35	0.06
AoR ORFBA	37	65.65	35.73	32	60.25	46.86	-.54	67	0.60
AoR Placement Test	38	3.34	1.89	30	2.13	1.89	-2.62	66	0.01

Note. Several high school students were not pre-tested with the Academy of READING[®] Placement Test. Therefore, the treatment groups mean GLE for this test are artificially inflated. As primary analyses were conducted on gain scores this does not affect conclusions made in this report.

Attrition

Analysis was conducted to examine the overall sample attrition (the number of participants that did not complete the study for any reason). As indicated earlier, the initial study sample comprised of 44 Academy of READING[®] participants and 43 control participants, for a total sample of 87 participants. Ten students were omitted from the final sample due to incomplete data. The final sample for analysis was comprised of 38 participants in the Academy of READING[®] and 39 control participants for a total of 77 final study participants. The overall

attrition rate was 11% for the treatment sample and 10% for the control. Chi-square analyses revealed no significant differences in overall attrition rates by condition.

4. PROGRAM DESCRIPTION

Academy of READING® is an intensive intervention tool that can be used with increasing levels of intensity by a wide range of struggling readers for instruction, assessment, and progress monitoring. Academy of READING® is based on neuroscience and reading research that identifies how the brain functions while reading and the five essential components of reading. The program follows fundamental learning principles, such as building automaticity in foundation skills, mastery learning, and behavioural motivation. Academy of READING® focuses on phonemic awareness, phonics, vocabulary, fluency, and comprehension.

Academy of READING® provides systematic instruction that goes from simpler to more complex tasks. Every student's program is self-paced and personalized based on assessment results. The program uses interactive instructional modes to develop skills in all four domains of literacy for a complete, interactive reading comprehension program that supports a Comprehensive Literacy Plan.

Foundation reading skills are broken down into small, manageable chunks and trained to automaticity, including phonemic and grapho-phonemic awareness, phonics, fluent and accurate decoding, and important comprehension skills.

Automated placement tests provide a snapshot of each student's reading abilities, relative to grade level. Using test data the program identifies goals and creates an Individual Training Plan, allowing each student to work on skill gaps at his or her own pace.

Academy of READING® applies research-based motivational elements and strategies within the program to capture and keep the interest of struggling readers.

5. PROGRAM IMPLEMENTATION

5.1 ACADEMY OF READING® IMPLEMENTATION

As described in Section 3.2, teachers received implementation guidelines before the beginning of the study that asked them to use the program for a minimum of 30 minutes three to five times a week.

The implementation fidelity is characterized by the extent to which students used the program (Table 6). An automatic Academy of READING[®] data collection database measured these aspects of implementation. In addition, a School Specialty Literacy and Intervention curriculum specialist had the opportunity to monitor the teachers' fidelity of implementation through regular site visits that involved classroom observations and prepared regular reports. This provided a qualitative measure of implementation fidelity.

This section presents implementation findings and it continues with a description of the comparison programs the teachers used with their control groups.

Table 6: Academy of READING[®] Fidelity Measures by Group

Group	N	Time in Program (hr)	Focused Training (hr)	Time / Week (min)	Program Completed (%)	Skills Mastered
Treatment	38	23.2	10.7	121.4	35.7	21.5
Control	30	1.03	0.0	0.0	0.0	0.0

Note: 30 control group students were pre-tested and post-tested in Academy of READING[®] placement test and for that reason time in program for this group is 1.03 hours on average. However, focused training time is 0.0 hr, meaning that these students did not spend any time training in the program.

5.2 COMPARISON PROGRAMS

Across study sites, reading facilitators exposed control students to a variety of “business-as-usual” reading activities. These included non-systematic use of *Read About* (an on-line comprehension program from Scholastic), re-takes of tests and quizzes, practicing on previously released state test items, help with home work, and individual reading time with a teacher.

The Special Education teachers at Whitehall City Schools do not have a specific curriculum. They follow the Ohio Department of Education’s state standards, and make modifications when needed.

6. STUDENT PERFORMANCE RESULTS

In order to address the study questions pertaining to student performance appropriately, various analyses were conducted, including descriptive, inferential, and multi-level analyses. This section begins with a presentation of student performance among treatment students only, and concludes with the results of comparisons between treatment and control students.

6.1 ACADEMY OF READING[®]'S IMPACT ON LEARNING

This section presents the learning gains of Special Education students who participated in the Academy of READING[®] program in the 2010/2011 school year. Results are presented for student performance on the GMRT reading test, STEEP assessment, Academy of READING[®] Placement Test, Academy of READING[®] ORFBA, and OAA. Results are broken down by subtest where appropriate.

Question 1

Do students in the treatment group demonstrate significant learning gains in reading during the study period?

As indicated previously, a randomized control trial was conducted in five schools across Whitehall City Schools District in Grades 2–11. Intervention teachers in these schools followed explicit implementation guidelines to ensure program fidelity. To address whether students who participated in the Academy of READING[®] program demonstrated significant learning gains in reading from the beginning of the study to the end of the study, gains on various subscales of the GMRT were calculated. Specifically, descriptive analyses were conducted on the Grade Level Equivalent (GLE) scores and Raw scores on the Total test, Comprehension, and Vocabulary parts of the GMRT, as well as on the Lexile Measure. STEEP oral reading fluency gains were calculated, measured in words correct per minute (WCPM). In addition, gains on the Academy of READING[®] Placement Test, Academy of READING[®] ORFBA, and the OAA were considered.

Descriptive Analysis

GMRT Gains for Treatment Students

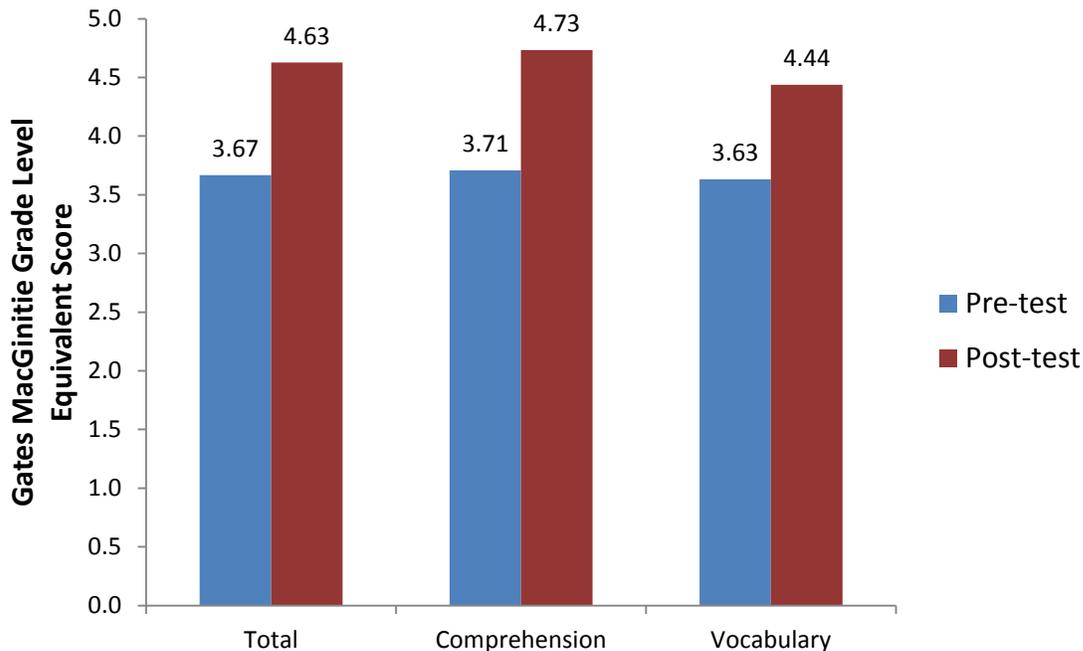
To examine whether the Academy of READING[®] program had an effect on students' reading improvement, descriptive analyses were conducted. As shown in Table 7, students participating in the Academy of READING[®] program improved in reading on average by .96 grade levels in reading during the study, 1.03 grade levels on comprehension, and .80 grade levels on vocabulary (see Figure 1 for pre-test/post-test GLE scores). In addition, students' Lexile scores improved 92.08 points during the study. All the gains on the GMRT were significant (all $p < .01$).

Table 7: Mean GMRT Gains for Treatment Students

Outcome Measure	Gains (Mean)	Standard Error	t-value	Approx. df	p-value
GLE Total Score	.96	.13	6.86	37	0.00*
GLE Comprehension	1.02	.16	6.07	37	0.00*
GLE Vocabulary	.80	.19	4.07	35	0.00*
Raw Total	7.23	1.09	6.61	37	0.00*
Raw Comprehension	3.89	.70	5.51	37	0.00*
Raw Vocabulary	3.11	.87	3.53	35	0.00*
Lexile Measure	92.08	16.53	5.56	35	0.00*

* Significant at the 0.01 level

Figure 1: Treatment Students' Gates MacGinitie Pre-Test and Post-Test GLE Scores



STEEP Gains for Treatment Students

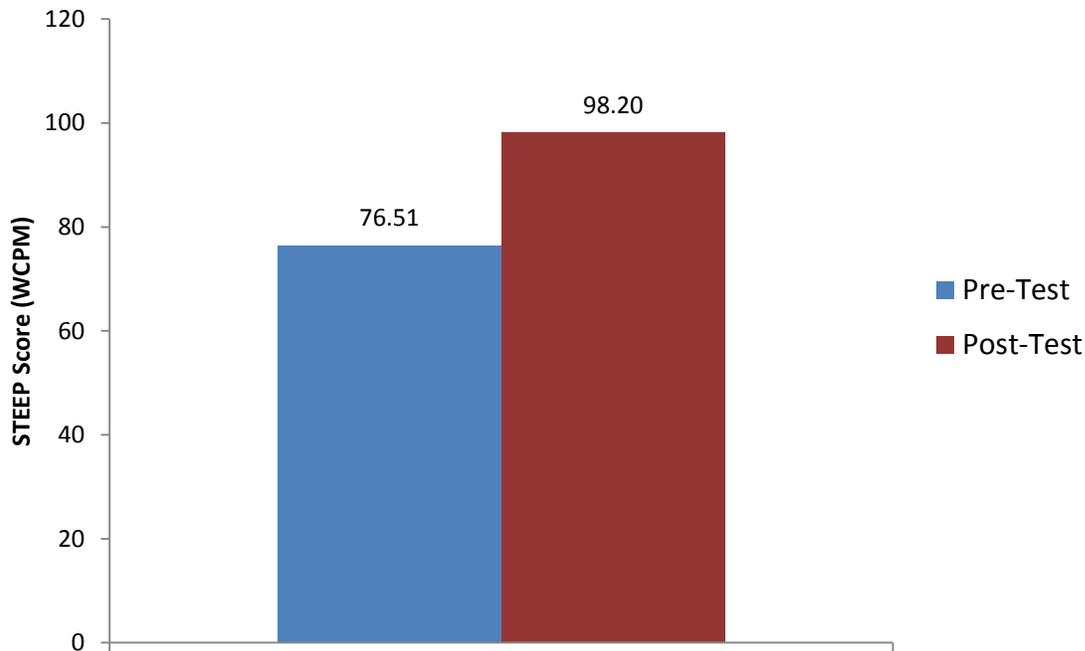
To examine whether the Academy of READING[®] program had an effect on students' reading improvement, descriptive analysis of students' oral reading fluency was conducted. As displayed in Table 8, students participating in the Academy of READING[®] program improved in oral reading fluency by 21.68 WCPM on average during the study (see Figure 2 for pre-test/post-test WCPM scores). The gains on the STEEP ORF test were significant ($p < .01$).

Table 8: Mean STEEP Gains for Treatment Students

Outcome Measure	Gains (Mean)	Standard Error	t-value	Approx. df	p-value
STEER Gains (WCPM)	21.68	2.28	9.49	34	0.00*

* Significant at the 0.01 level

Figure 2: Treatment Students' STEEP Pre-Test and Post-Test WCPM Scores



Academy of READING[®] ORFBA

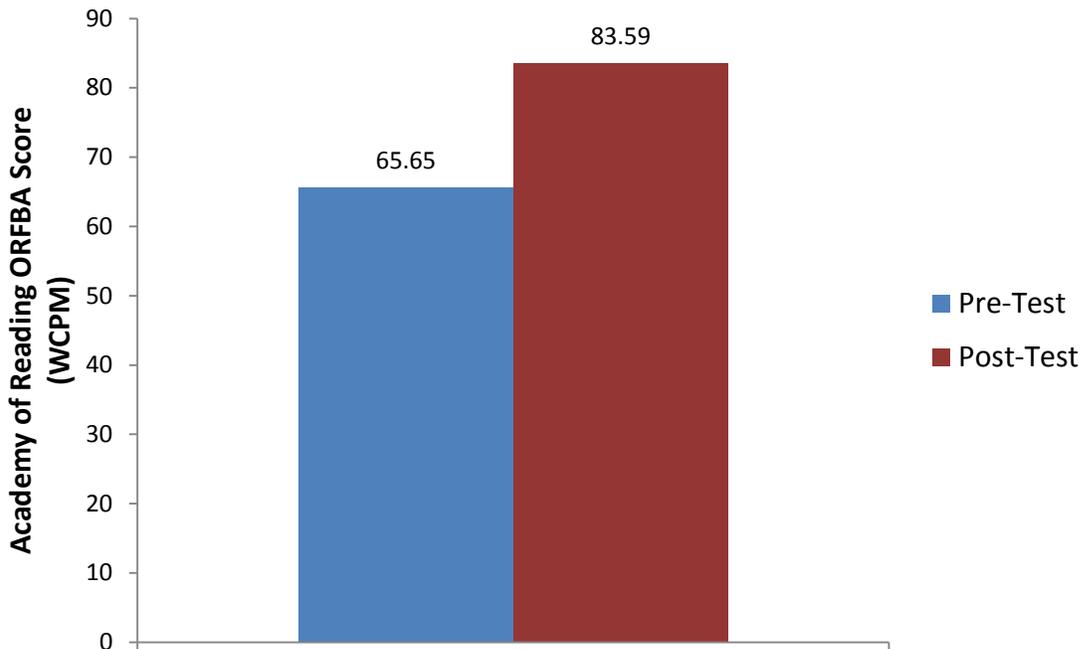
Students' reading improvement was also examined on the Academy of READING[®] ORFBA, and a comparative analysis of students' oral reading fluency was conducted. Table 9 shows how students participating in the Academy of READING[®] program improved in oral reading fluency by 18 WCPM on average during the study (see Figure 3 for pre-test/post-test WCPM scores). The gains on the Academy of READING[®] ORFBA test were significant ($p < .01$).

Table 9: Mean Academy of READING[®] ORFBA Gains for Treatment Students

Outcome Measure	Gains (Mean)	Standard Error	t-value	Approx. df	p-value
AoR ORFBA (WCPM)	18.00	2.86	-6.29	36	0.00*

* Significant at the 0.01 level

Figure 3: Treatment Students' Academy of READING® ORFBA Pre-Test and Post-Test WCPM Scores



Students' Academy of READING® ORFBA pre-test scores were significantly correlated with the STEEP pre-test scores ($r = .807, p < .01$). Furthermore, Academy of READING® ORFBA post-test scores were significantly correlated with the STEEP post-test scores ($r = .720, p < .01$).

Also, students' Academy of READING® ORFBA pre-test scores were significantly correlated with GMRT Total GLE pre-test scores ($r = .568, p < .01$). In addition, Academy of READING® ORFBA post-test scores were significantly correlated with GMRT Total GLE post-test scores ($r = .339, p < .05$). These results suggest that the Academy of READING® ORFBA is a reliable measure of students' oral reading fluency.

Academy of READING® Placement Test

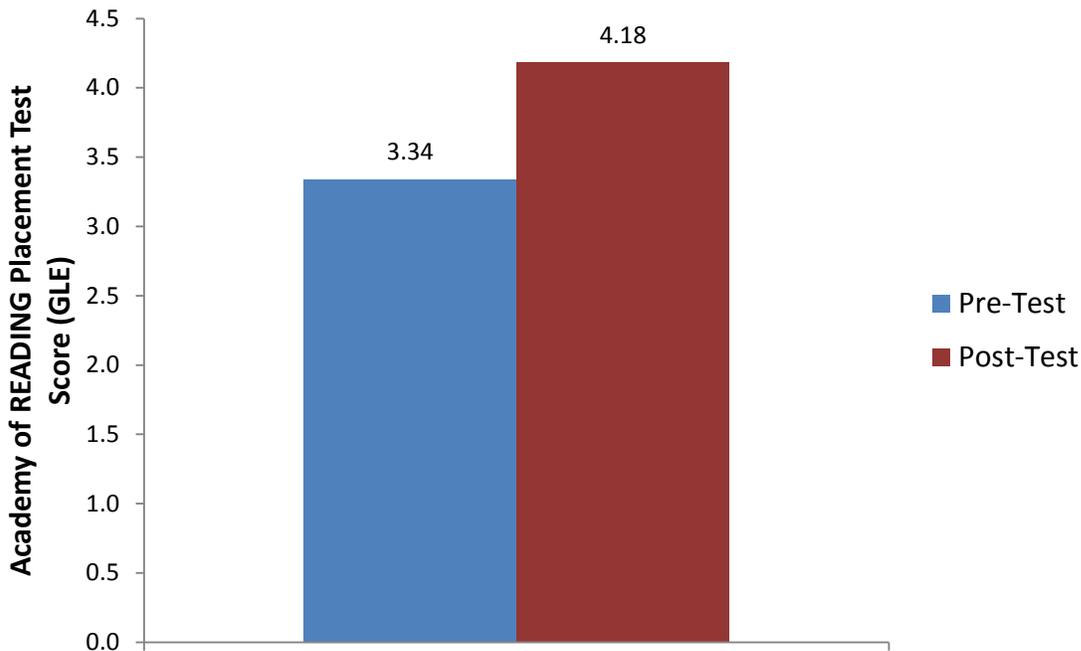
Students using the Academy of READING® also made statistically significant gains (Table 10) on the Academy of READING® Placement Test of .91 grade level equivalent ($p < .01$) (see Figure 4 for pre-test/post-test GLE scores).

Table 10: Mean Academy of READING® Test Gains for Treatment Students

Outcome Measure	Gains (Mean)	Standard Error	t-value	Approx. df	p-value
AoR Placement (GLE)	.91	.24	3.73	32	0.00*

* Significant at the 0.01 level

Figure 4: Treatment Students' Academy of READING[®] Placement Pre-Test and Post-Test GLE Scores



Academy of READING[®] Placement Test pre-test GLE scores were significantly correlated with GMRT Total GLE pre-test scores ($r = .589, p < .01$). Furthermore, Academy of READING[®] Placement Test GLE post-test scores were significantly correlated with GMRT Total GLE post-test scores ($r = .666, p < .01$).

This suggests that the Academy of READING[®] Placement Test is a reliable measure of students' reading proficiency.

Relationship of Past School Performance on Student Gains

Analysis of students' improvement on their state-wide assessment was conducted to examine the relationship between past performance on state-wide assessments and learning gains of students who participated in the Academy of READING[®] program.

Ohio Achievement Assessments Gains

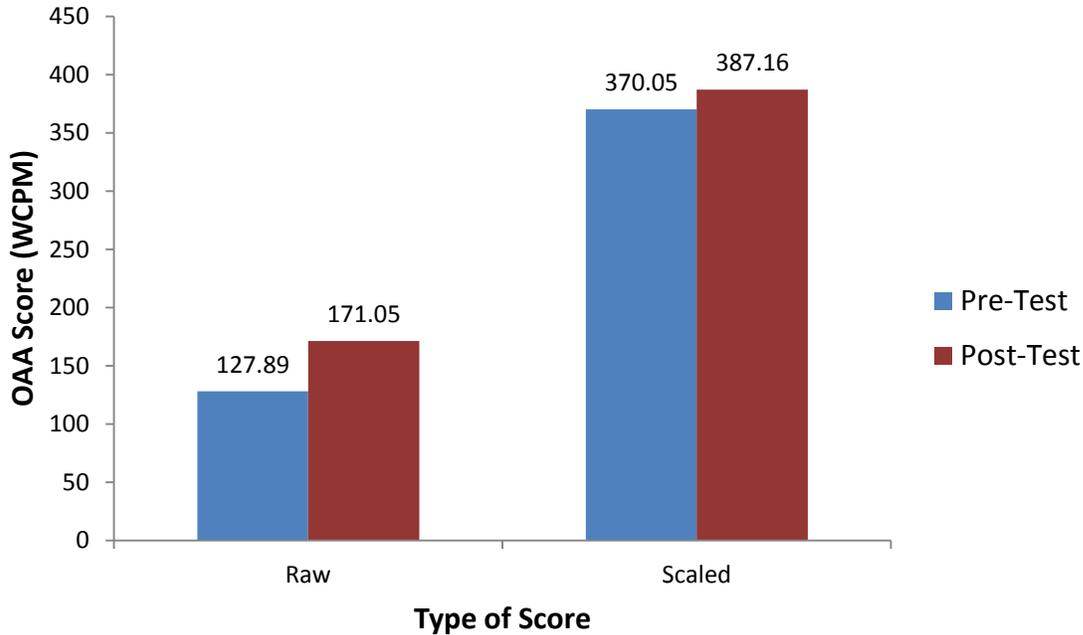
The Ohio Achievement Assessments (OAA) scores for both the 2009/2010 and the 2010/2011 school years were available for 19 (50%) students from the treatment group (note: this test is administered in the Ohio school system in grades 3-8). As displayed in Table 11, students participating in the Academy of READING[®] program improved in OAA raw scores by 43.15 points (see Figure 5 for pre-test/post-test WCPM scores). The gains on the OAA test were significant ($p < .05$).

Table 11: OAA Gains for Treatment Students

Outcome Measure	Gains (Mean)	Standard Error	t-value	Approx. df	p-value
OAA Raw	43.15	17.67	2.44	18	0.02*
OAA Scaled	17.10	5.56	3.07	18	0.00**

* Significant at the 0.05 level, ** Significant at the 0.01 level

Figure 5: Treatment Students' Raw and Scaled OAA Pre-Test and Post-Test Scores



6.2 STUDENT LEARNING COMPARISON

This section of the report presents analyses to examine differences between the performance of treatment and control students on the GMRT, STEEP, and Academy of READING[®] ORFBA assessments. The purpose is to determine whether participating in the Academy of READING[®] resulted in significantly higher performance on the GMRT, STEEP, and Academy of READING[®] ORFBA than ‘business-as-usual’ classroom instruction.

Question 2

How does the reading performance of students in treatment groups compare to that of students in control groups?

Descriptive Comparisons

Students' pre-test and post-test scores on all outcomes are summarized by group in Appendix B.

GMRT

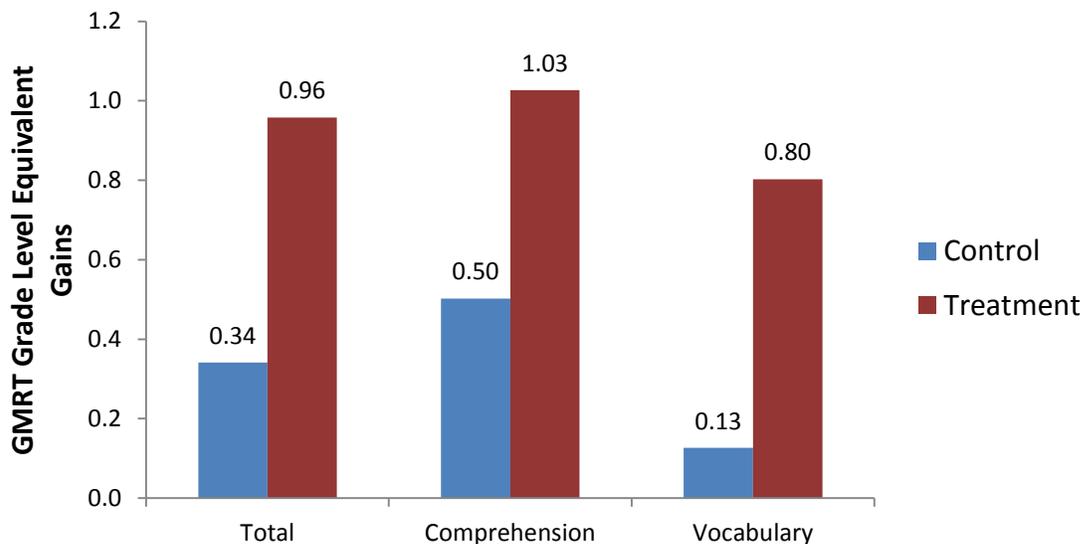
As presented in Table 12 and Figure 6, results reveal that treatment students scored higher, on average, than control students by the end of the study on all GMRT subtests. The average gains of the treatment group are significantly higher than the gains of the control group on GLE total score, GLE vocabulary, raw total, raw vocabulary, and Lexile measure. The difference between average gains of the treatment group and the control group was marginally significant on the GMRT Comprehension subtest (see Table 12 for p values).

Table 12: GMRT Scores by Condition and Subtest

Outcome Measure	Treatment Group Gains (Mean)	Control Group Gains (Mean)	Mean Square	F	Approx. df	p-value
GLE Total Score	.96	.34	7.32	10.43	1	0.00**
GLE Comprehension	1.02	.50	5.28	3.83	1	0.05 [†]
GLE Vocabulary	.80	.12	8.33	7.90	1	0.00**
Raw Total	7.23	1.9	543.45	11.89	1	0.00**
Raw Comprehension	3.89	1.6	97.75	3.97	1	0.05 [†]
Raw Vocabulary	3.11	.40	133.58	6.16	1	0.01*
Lexile Measure	92.08	39.18	51050.09	4.62	1	0.03*

[†] Marginally significant, * Significant at the 0.05 level, ** Significant at the 0.01 level

Figure 6: Students' GLE Gains on GMRT Subtests by Group



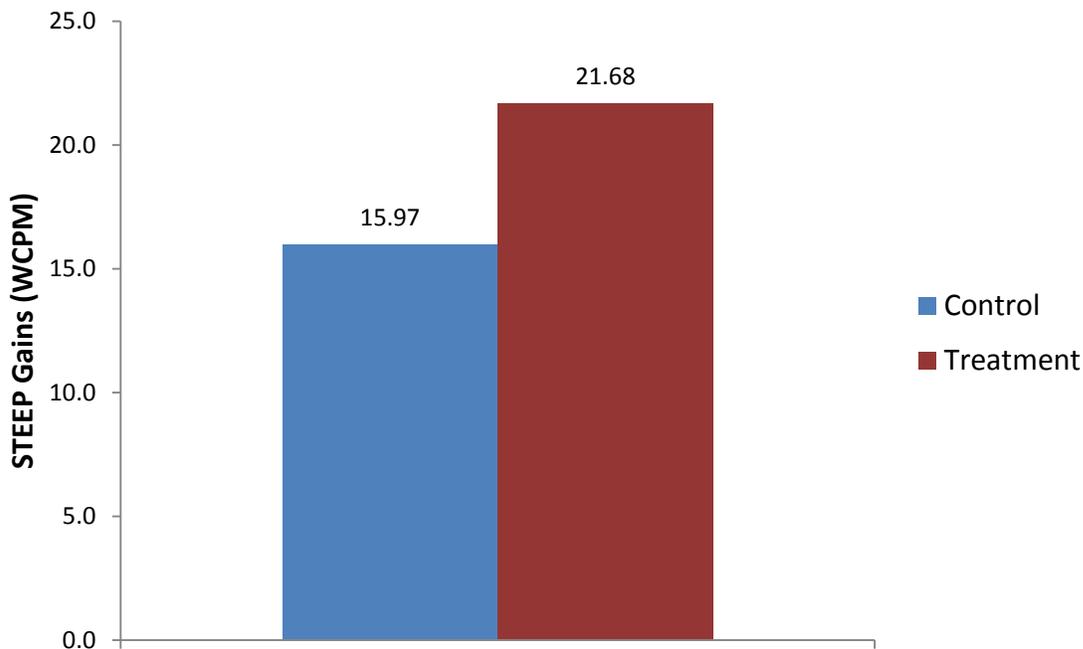
STEEP

Findings indicate that treatment students performed, on average, about 6 words greater in oral reading fluency than the control students by the end of the study on the STEEP. This slight difference in performance was not statistically significant (see Table 13 and Figure 7).

Table 13: STEEP Gains by Group

Outcome Measure	Treatment Group Gains (Mean)	Control Group Gains (Mean)	Mean Square	F	Approx. df	p-value
STEER Gains (WCPM)	21.68	15.97	1070.77	1.15	1	0.28

Figure 7: Students' STEEP Gains by Group



Academy of READING[®] ORFBA

The results displayed in Table 14 reveal that treatment students scored higher, on average, than control students by the end of the year on the Academy of READING[®] ORFBA. The average gains of the treatment group were 8 WCPM higher than the gains of the control group, which is statistically significant, ($p < .05$).

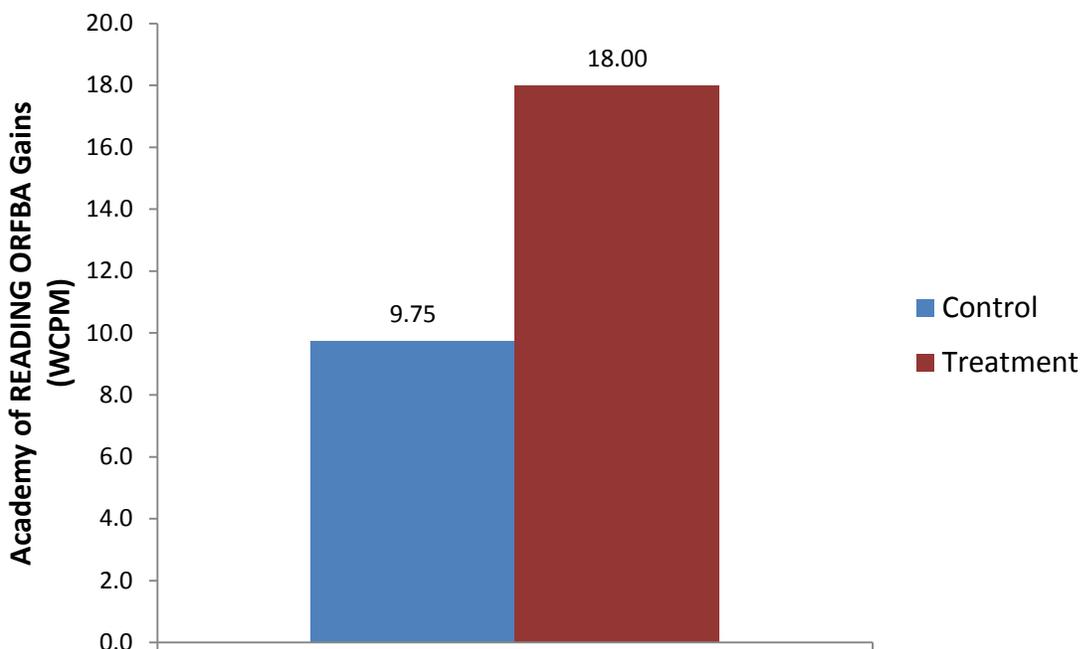
Table 14: Academy of READING[®] ORFBA Gains by Group

Outcome Measure	Treatment	Control	Mean	F	Approx. p-value
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	Group Gains (Mean)	Group Gains (Mean)	Square		df	
AoR ORFBA (WCPM)	18.00	9.75	1167.91	4.06	1	0.04*

* Significant at the 0.05 level

Figure 8: Students' Academy of READING[®] ORFBA Gains by Group



Academy of READING[®] Placement Test

The Academy of READING[®] Placement Test scores were compared but caution is warranted in their interpretation. Only 21 control students (54%) were post-tested with the Academy of READING[®] Placement Test.¹ As shown in Table 15 students in the treatment group achieved greater gains than students in the control group. This difference was statistically significant. Figure 9 summarizes the gains for this group.

Table 15: Academy of READING[®] Placement Gains by Group

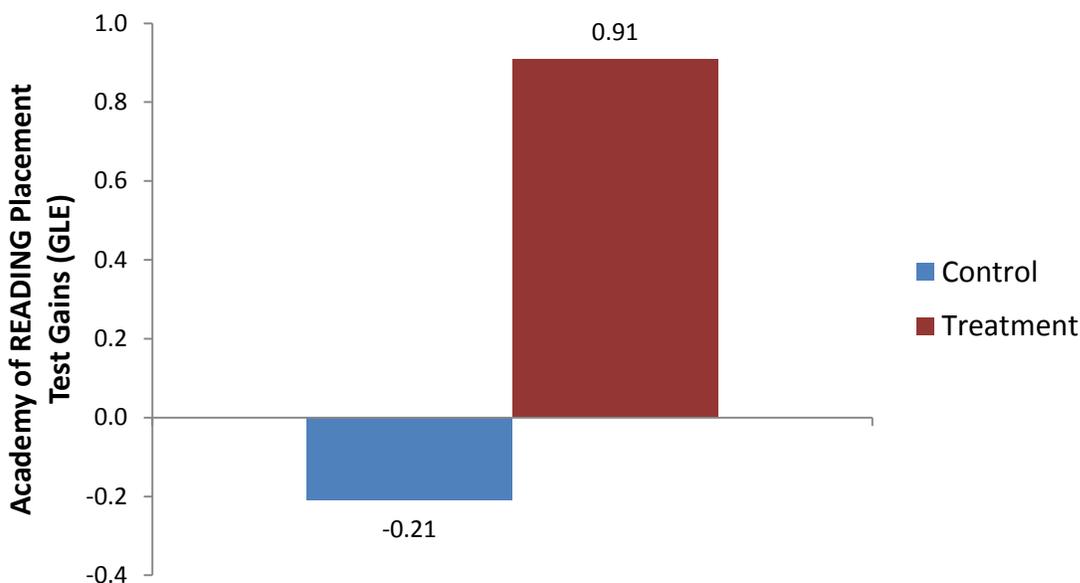
Outcome Measure	Treatment Group Gains	Control Group Gains	Mean	F	Approx. p-value
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¹ Two students in the control group were identified as extreme outliers. Their data was omitted from this analysis.

	(Mean)	(Mean)	Square		df	
AoR Placement Test (GLE)	0.91	-0.21	1.88	8.05	1	0.007*

* Significant at the 0.01 level.

Figure 9: Students' Academy of READING[®] Placement Test Gains by Group



Ohio Achievement Assessments (OAA)

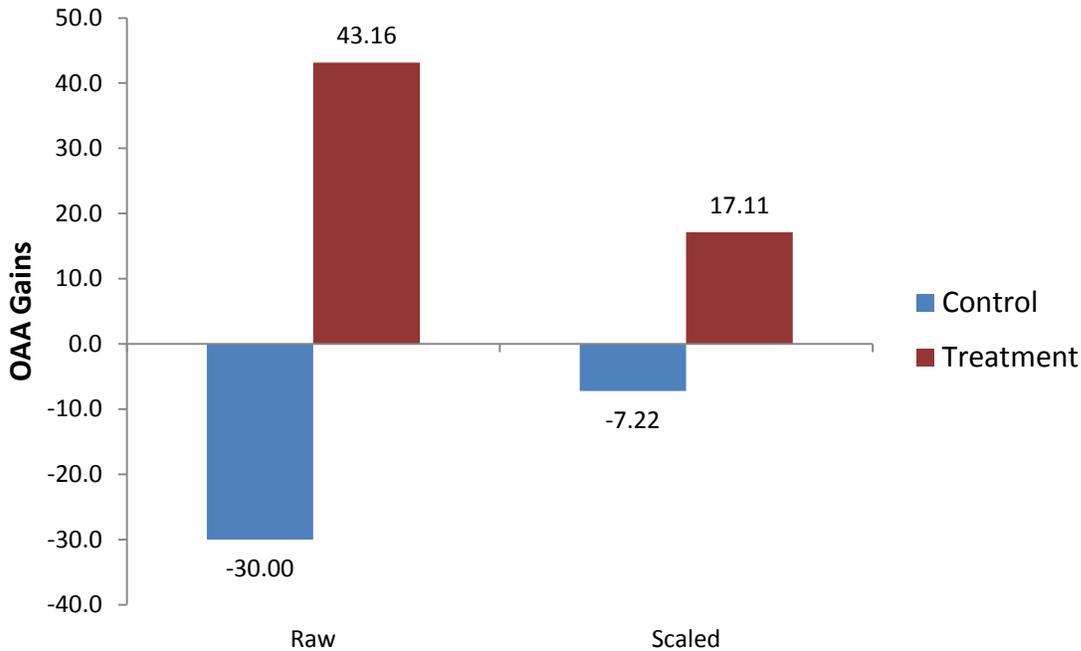
OAA scores were available for only 18 control (46%) and 19 (50%) treatment group students. However, even with this number of students there was no significant difference in OAA scores at pre-test (see Table 5). As shown in Table 16 and Figure 10 in terms of both Scaled and Raw scores students in the treatment group achieved greater gains than students in the control group. These differences were statistically significant.

Table 16: OAA Gains by Group

Outcome Measure	Treatment Group Gains (Mean)	Control Group Gains (Mean)	Mean Square	F	Approx. df	p-value
OAA Scaled Score	17.11	-7.22	610.83	8.96	1	0.05*
OAA Raw Score	43.16	-30.00	7103.16	6.97	1	0.01*

* Significant at the 0.05 level

Figure 10: Students' OAA Gains by Group

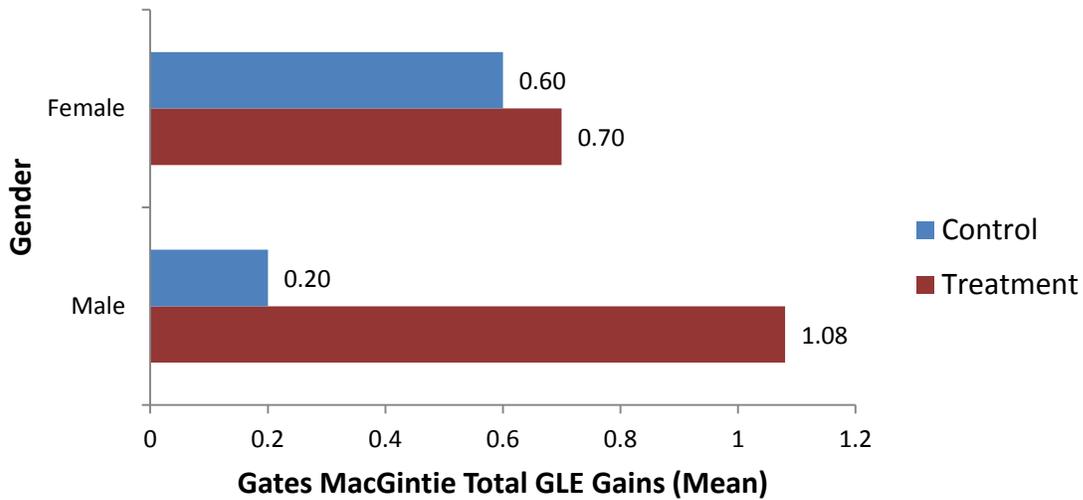


Effects of Academy of READING[®] on Students' Reading Gains by Various Student Characteristics

Factorial Analysis of Variance (ANOVA) was used to examine the effects of the Academy of READING[®] versus comparison programs on GMRT gains by various student characteristics, including gender, ethnicity, free and reduced lunch status, and LEP status. If the effect of the Academy of READING[®] differed based on one of these factors, this would be indicated by a significant interaction. Given the smaller samples for these subgroup analyses, caution is warranted in generalizing these results.

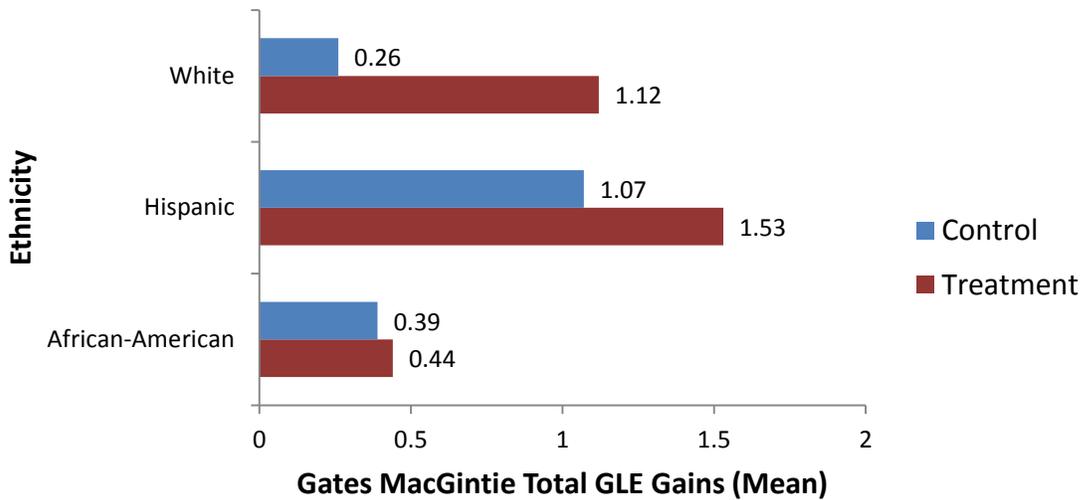
Gender had a marginally significant ($F(1, 73) = 3.82, p = .06$) effect on the efficacy of the Academy of READING[®] program. Male students who trained in the Academy of READING[®] made substantially greater gains than male students in the control group. In contrast, female students trained in the Academy of READING[®] made greater gains than female students in the control group but this difference was not as pronounced.

Figure 11: Students' Reading Gains by Gender



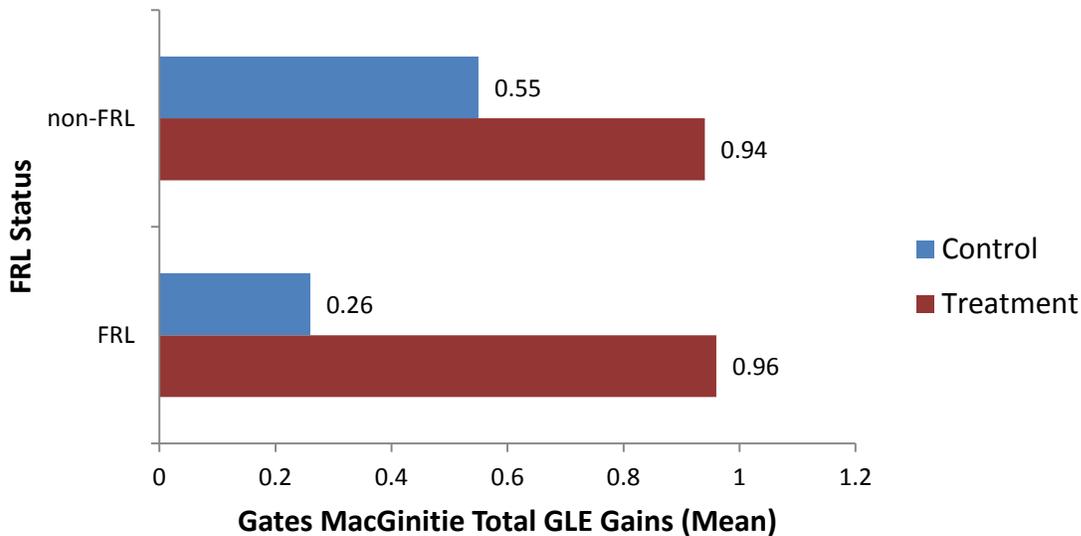
All ethnic groups exposed to the Academy of READING[®] program demonstrated greater gains on the GMRT than those in the control group. The interaction effect was not significant, $F(2, 63) = 1.85, p = .17$.

Figure 12: Students' Reading Gains by Ethnicity



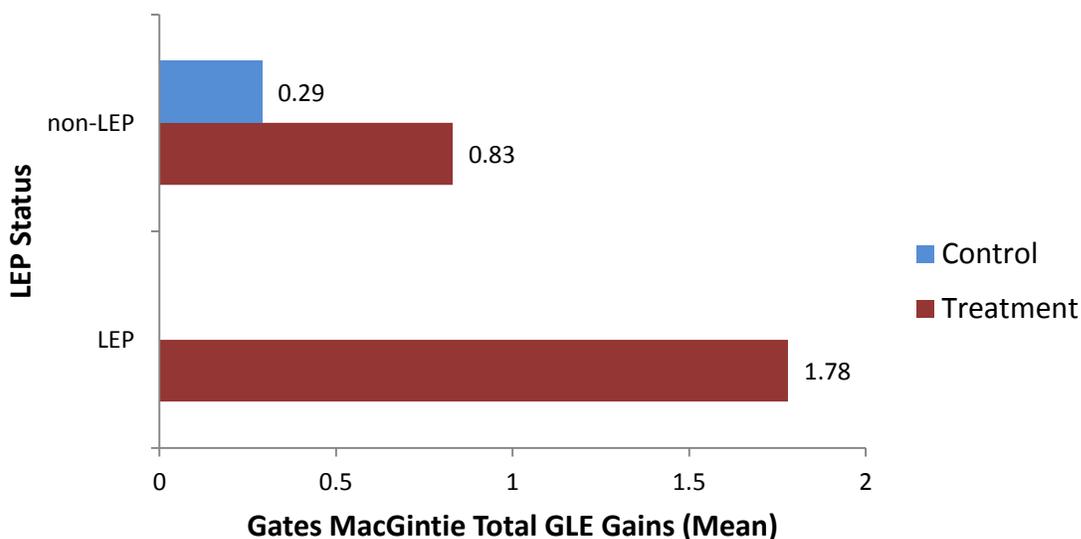
Students' free/reduced lunch status had no effect on the efficacy of the Academy of READING[®] program, $F(1, 65) = 0.33, p = .57$.

Figure 13: Students' GMRT Reading Gains by FRL



It was not possible to evaluate the impact of the Academy of READING[®] based on students LEP status. Only one student in the control group had limited English proficiency. This made statistical analysis of their data unreliable and that datapoint is not displayed in Figure 15. A one-way ANOVA did reveal that overall LEP students achieved significantly greater gains than non-LEP students, $F(1, 75) = 14.47, p < .01$.

Figure 14: Students' GMRT Reading Gains by LEP



6.3 LIMITATIONS OF STUDY

There are limitations for this evaluation study that readers should take into account when interpreting the study's results. The sample size had sufficient power to detect main effects of the program by condition. However, the power to detect effects among subgroups decreased as student-level characteristics divided the data into smaller subsamples. For this reason, caution is warranted in generalizing study results to these subpopulations.

7. CONCLUSION

This study of the Academy of READING[®] program was conducted to measure the effectiveness of the program on Special Education students who are struggling readers. Five schools across Whitehall City school district in Ohio participated in the study. The findings in the report represent a sample of 77 students in Grades 2–11 who were involved in the randomized controlled trial of the Academy of READING[®] as a pull-out intervention. Students were randomly assigned to treatment or control groups for the 2010/2011 school year.

The students who participated in the Academy of READING[®] program, compared to students in the control group, demonstrated significant learning gains during the study period. Students' improvement in general level of reading achievement, overall reading abilities, comprehension and vocabulary, as well as their fluency gains were significant by the end of the study. These results indicate that participating in the Academy of READING[®] program for the duration of this study was associated with large gains in overall reading ability, fluency, vocabulary, and comprehension.

Study findings suggest that the gains experienced by the Academy of READING[®] program participants, overall, were significantly higher of those experienced by children in the control group receiving 'business-as-usual' classroom instruction.

In sum, the results of this study indicate that the Academy of READING[®] program is useful to teachers in providing a comprehensive intervention to Special Education struggling readers found in Tier II and Tier III placements. Teachers and students adapt easily to the program structure, pace, and routine. Results indicate that the program is successful in significantly improving children's general level of reading skills as well as in the specific areas of fluency, vocabulary and comprehension.

Appendix A

Test-Retest Coefficients for Measures Used in the Current Study

Measure	Test-Retest Coefficient
GMRT Total	0.89**
GMRT Vocabulary	0.77**
GMRT Comprehension	0.83**
STEEP	0.94**
Academy of READING [®] Placement Test	0.77**
Academy of READING [®] ORFBA	0.92**
OAA Scaled	0.21
OAA Raw	0.33*

* $p < .05$, ** $p < .001$

Appendix B

Pre-Test and Post-Test Scores for All Measures by Group

Measure	Treatment						Control					
	Pre-Test			Post-Test			Pre-Test			Post-Test		
	<i>n</i>	Mean	SD	<i>n</i>	Mean	SD	<i>n</i>	Mean	SD	<i>n</i>	Mean	SD
GMRT Total	38	3.67	1.27	38	4.63	1.86	39	3.91	1.50	39	4.25	1.89
GMRT Vocabulary	36	3.63	1.34	36	4.44	1.75	37	3.89	1.44	37	4.02	1.59
GMRT Comprehension	38	3.71	1.32	38	4.73	1.98	39	3.92	1.60	39	4.42	2.20
STEEP	35	76.51	31.11	35	98.20	31.22	35	69.40	42.06	35	85.37	41.84
AoR Placement Test	33	3.27	1.97	33	4.18	2.08	19	1.68	1.86	19	1.47	1.87
AoR ORFBA	37	65.65	35.73	37	83.59	37.78	32	60.25	46.86	32	70.00	49.27
OAA Scaled	19	370.05	19.04	19	387.16	19.19	18	384.00	24.42	18	376.78	21.42
OAA Raw	19	127.89	61.79	19	171.05	54.96	18	175.56	110.20	18	145.56	65.91