

Responsive Management™



AN ASSESSMENT AND EVALUATION OF THE NATIONAL ARCHERY IN THE SCHOOLS PROGRAM

PHASE III: ANALYSIS OF STUDENT GRADES

**Conducted for the National Archery in the Schools
Program Foundation**

**by Responsive Management
in cooperation with Hilarie Davis, Ed.D.**

2009

**AN ASSESSMENT AND EVALUATION OF THE NATIONAL
ARCHERY IN THE SCHOOLS PROGRAM**

PHASE III: ANALYSIS OF STUDENT GRADES

2009

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EXECUTIVE SUMMARY OF FINDINGS

This evaluation was conducted for the National Archery in the Schools Program Foundation by Responsive Management to measure the effect of the National Archery in the Schools Program (NASP) on:

- 1) Attendance in physical education (P.E.) and school in general
- 2) Student performance in P.E. and other subject areas
- 3) Student self-confidence and performance
- 4) Student, guardian, and family member interest and involvement in archery and other sports

The evaluation was completed in three phases:

Phase I: Instructor observations and perceptions of the effects of the NASP

Phase II: A comparison of students who have participated in the NASP and students who have not taken archery

Phase III: An analysis of student grades to assess student performance as it relates to NASP participation

This report discusses the results of Phase III of the study, an analysis of student grades. One of the hypotheses of the NASP Logic Model, as shown in the Phase II report, is that archery positively affects student attendance and performance in school. To examine this hypothesis, researchers examined 716 students' grades recorded prior to and following their participation in the NASP.

Statisticians entered grades and 120 other variables into an SPSS database for each student. These variables included the numeric grade values, along with categorical values (i.e., numeric grades converted to letter grades) using an "A" through "E" grading scale, and the numeric range associated with the letter grades. Using these variables, researchers analyzed the data.

Difference in the Percentage of Students Receiving Each Grade, Pre-Program to Post-Program

In three of the six academic subjects (reading, English, and math), some subgroups of students make better grades after archery. However, there are subgroups in all these subjects making worse grades. For the remaining subjects (writing, science, and social studies/history), almost all subgroups receive worse grades after the archery course.

Difference in the Mean Grades Among Various Subgroups of Male and Female Students for Each Subject, Pre-Program to Post-Program

The results of this analysis are mixed, with some increases in mean grades and some decreases. However, there are more decreases than increases.

Difference in the Mean Grades in Each Subject, Pre-Program To Post-Program, According To the Length of the Archery Program

This analysis, which looked at the length of the archery program, found mostly decreases in mean grades in the six subjects among the students as a whole and among the subgroups based on the length of the archery course that they took. Indeed, only three increases are found, all among students who had an archery course that was one semester or longer: in reading, writing, and English.

Difference in the Mean Grades in Each Subject, Pre-Program To Post-Program, Crosstabulated by Teacher

The results show that students of one of the teachers have a statistically significant increase in mean grades of more than 1.0 points in reading, writing, and English. However, this is counterbalanced by statistically significant decreases of more than 1.0 points in math, science, and social studies/history among students of that same teacher. There are no other statistically significant changes of more than 1.0 points among students of any of the other three teachers analyzed.

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I. PURPOSE OF THE STUDY

This evaluation was conducted for the National Archery in the Schools Program Foundation by Responsive Management to measure the effect of the National Archery in the Schools Program (NASP) on:

- 1) Attendance in physical education (P.E.) and school in general
- 2) Student performance in P.E. and other subject areas
- 3) Student self-confidence and performance
- 4) Student, guardian, and family member interest and involvement in archery and other sports

The evaluation was completed in three phases:

Phase I: Instructor observations and perceptions of the effects of the NASP

Phase II: A comparison of students who have participated in the NASP and students who have not taken archery

Phase III: An analysis of student grades to assess student performance as it relates to NASP participation

This report discusses the results of Phase III of the study, an analysis of student grades. For this phase, three schools submitted student records for analysis along with their surveys conducted in Phases I and II.

For a complete discussion of the background of the NASP, the logic model associated with it, and the hypotheses that are part of the logic model, please see the Phase II report. The Phase II report also discusses the review of literature, which provides evidence that academic achievement is linked to physical activity.

II. METHODOLOGY

One of the hypotheses of the NASP Logic Model, as shown in the Phase II report, is that archery positively affects student attendance and performance in school. To examine this hypothesis, researchers examined 716 students' grades recorded prior to and following their participation in the NASP. Three schools were included within the database: an elementary school in Ohio, a middle school in Michigan, and a high school in Alabama (the names of the schools are not included to ensure confidentiality). Teachers submitted grades to Responsive Management for the following subjects: reading, writing, English, math, science, and social studies and/or history. All grades are based on each school's grading scale. To compare grades across schools and grade levels, several changes were made to the data including:

- 3rd through 8th grade reading and writing scores were averaged into a composite English score in order to compare it to 9th through 11th graders' scores in English.
- 3rd through 8th grade social studies scores were considered comparable to 9th through 11th grade history scores.
- The middle school in Michigan submitted letter grades. Statisticians assigned the following values to letter grades based on the averages of commonly used grading scales: A = 96.5, A- = 91.0, B+ = 88.0, B = 84.5, B- = 81.0, C+ = 78.0, C = 74.5, C- = 71.0, D+ = 68.0, D = 64.5, D- = 61.0, E = 57.5
- The grading scale for writing for elementary school students ranged from "1" through "4" (note that no student had received a score of "1"). To allow comparisons, these grades for writing were converted as follows: 4 = 96.5, 3 = 84.5, 2 = 74.5.
- Reading grades for students at the elementary school in Ohio were also converted: "+" indicates that the student reads above grade level, which statisticians converted to a score of 96.5; "=" indicates that the student reads on grade level, which statisticians converted to a score of 84.5; and "-" indicates that the student reads below grade level, which statisticians converted to a score of 74.5.
- 3rd graders (note that only this particular elementary school had 3rd graders) were awarded letter grades that ranged from A to Z for reading, with O, P, Q, and R equal to reading on grade level. Students reading on grade level were assigned the score of 84.5. The remaining third graders (16 students) who were not reading on grade level were not assigned a score because teachers did not provide a grading scale for the remaining grades.
- Note that not all students had grades for the "before" and "after" categories within each subject. If a student's pre-archery grade in any subject was missing, his/her final grade was excluded from the study.

Statisticians entered grades and 120 other variables into an SPSS database for each student. These variables included the numeric grade values, with the changes discussed above, along with categorical values (i.e., numeric grades converted to letter grades) using an "A" through "E" grading scale, and the numeric range associated with the letter grades. These three fields (the numeric grade value, the letter grade, and the numeric range associated with that letter grade) were included for each respondent's grades before and after the archery course. Also, statisticians created a variable that examined the differences between the grades recorded before and after the archery course. This variable was then categorized into ranges to demonstrate by

how much the grade changed, if at all. Finally, students were classified as above average, average, or below average based on the mean of all their grades included within the database.

Several different types of analysis were completed for this project. Overall, statisticians completed approximately 1,000 data runs examining the relationships between grades and four different variables: gender, grade level, student overall academic performance, and ethnicity.

III. RESULTS AND DISCUSSION

There are four sets of results for this analysis of grades:

- The first set of results are in graphs and show the difference in the percentage of students as a whole and various subgroups of students receiving each grade, pre-program to post-program, for six subjects (reading, writing, English, math, science, and social studies/history). The calculation was made by taking the percentage of students who received each grade *after* the archery program and subtracting the percentage of students who received each grade *prior to* the archery program.
- The second set of results, which are tabulated, show the mean grades and differences in the means for each subject among various groups of male and female students, pre-program to post-program. There are two tables for each academic subject, one table showing males as a whole and various subgroups of males (e.g., Caucasian elementary school males), and the other showing females as a whole and various subgroups of females.
- The third set of results, also tabulated (in a single table), show mean grades for each of the six subjects and the differences in the means, pre-program to post-program, for students as a whole and then according to the length of the archery program (one semester or longer; shorter than one semester).
- The final set of results, tabulated, show mean grades for each of the six academic subjects and the differences in the means, pre-program to post-program, for students as a whole and then among students who had one of four teachers (the four teachers who were able to cooperate in this part of the analysis). The researchers sought to determine if differences in teachers would affect the results.

Difference in the Percentage of Students Receiving Each Grade, Pre-Program to Post-Program

The graphs that follow show the differences in the percentage of students as a whole and various subgroups of students receiving each grade, pre-program to post-program. For each subject, there are up to 15 graphs showing the changes in grades:

- Among students overall
- Among above average students (i.e., students who generally receive above average grades)
- Among average students
- Among below average students
- Among 3rd, 4th, and 5th graders as a whole
- Among 3rd, 4th, and 5th graders who generally receive above average grades
- Among 3rd, 4th, and 5th graders who generally receive average grades
- Among 3rd, 4th, and 5th graders who generally receive below average grades
- Among 6th, 7th, and 8th graders as a whole
- Among 6th, 7th, and 8th graders who generally receive above average grades
- Among 6th, 7th, and 8th graders who generally receive average grades
- Among 6th, 7th, and 8th graders who generally receive below average grades
- Among 9th, 10th, and 11th graders as a whole
- (The sample was too low for analyses among 9th, 10th, and 11th graders who generally receive above average grades.)
- Among 9th, 10th, and 11th graders who generally receive average grades
- (The sample was too low for analyses among 9th, 10th, and 11th graders who generally receive below average grades.)
- A compilation graph that shows the changes in the mean grades of all the above groups

If the hypothesis in the NASP Logic Model is correct, these graphs would demonstrate a decrease in the number of below-average scores (D+, D, D-, and E) while at the same time demonstrating an increase in the average or above-average grades (A+, A, A-, B+, B, B-, C+, C, and C-).

In reading, there is no marked change in grades post-program compared to pre-program in students overall. Among the various subgroups, some show increases in mean grades, and some show decreases. Only one type of subgroup shows increases across the board: all three above average groups show slight increases in mean grades in reading. Results for reading are shown in Figures 1 through 13.

In writing, students overall and all subgroups but one show decreases in mean grades after taking archery. The lone exception is 3rd through 5th graders who are above average: this group shows a slight increase in their mean grade in writing. Results for writing are shown in Figures 14 through 26.

In English, there are no marked changes in grades. The largest change is 0.8 percentage points, which happens twice: 6th through 8th graders who are below average show a 0.8 percentage point decrease in their mean grade, while 9th through 11th graders as a whole show a 0.8 percentage

point increase in their mean grade. Note that the sample sizes are somewhat small among all 9th through 11th grader groups. Results for English are shown in Figures 27 through 41.

In math, about half the subgroups show an increase in their mean math grades after the archery course, and the other half show a decrease. Fairing the worst are the 3rd through 5th graders as a whole and the subgroups of 3rd through 5th graders, who show decreases in their mean math grades. Results for math are shown in Figures 42 through 56.

In science, students as a whole and all subgroups except for one show decreases in mean grades. The lone exception is the group of 6th through 8th graders who receive average grades in general; this group showed a slight increase in mean grade. Results for science are shown in Figures 57 through 71.

In social studies/history, students as a whole and all subgroups except for one show decreases in mean grades. The lone exception, showing a slight increase in mean grade, is the group of 9th through 11th graders as a whole. Results in social studies/history are shown in Figures 72 through 86.

In summary, in three subjects, some subgroups make better grades after archery: reading, English, and math. However, there are subgroups in all these subjects making worse grades. For the remaining subjects (writing, science, and social studies/history), almost all subgroups receive worse grades after archery. These graphs begin on the following page.

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program.

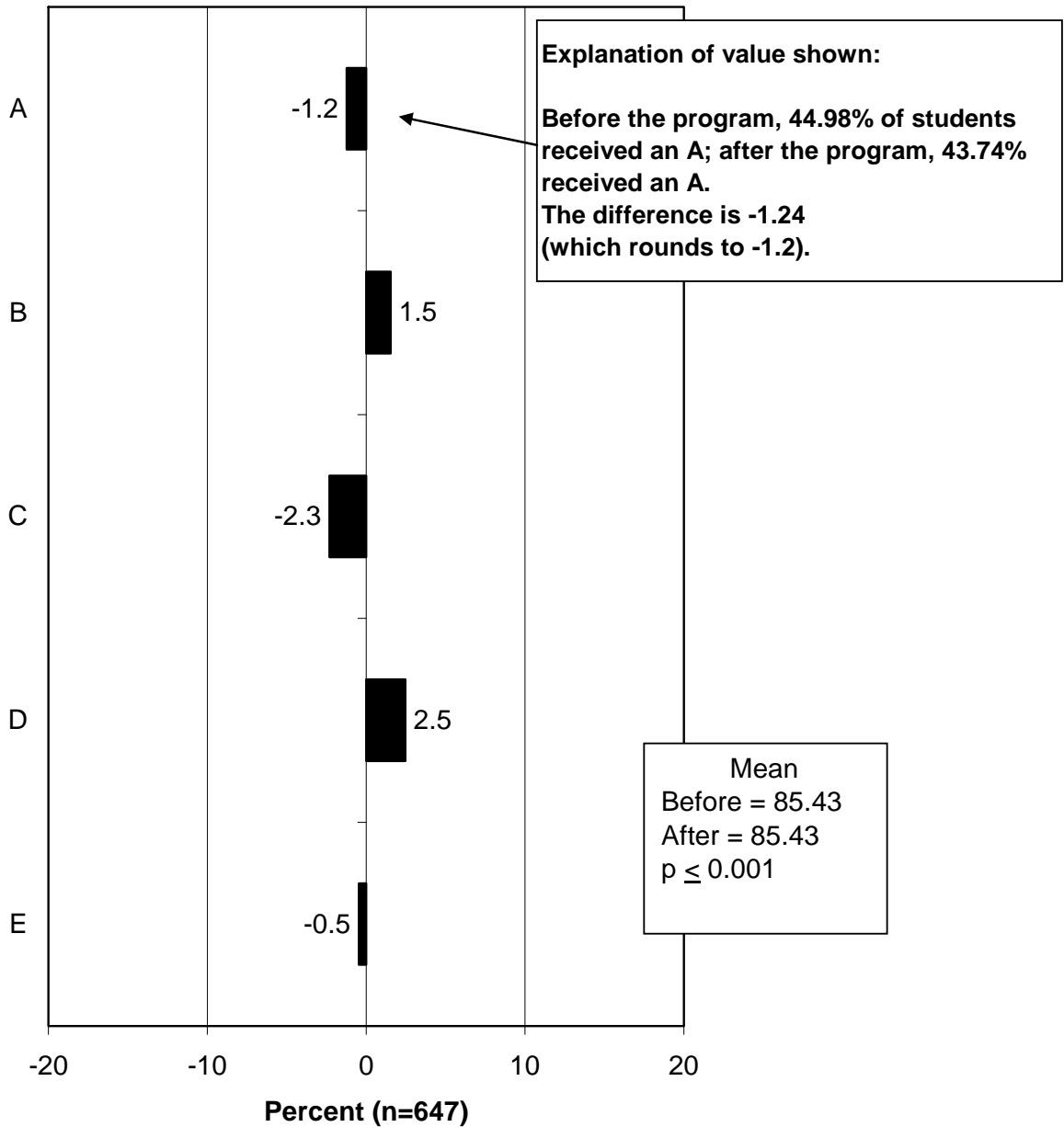


Figure 1. Difference in Percentage Receiving Grades in Reading Overall

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among students who receive above average grades overall).

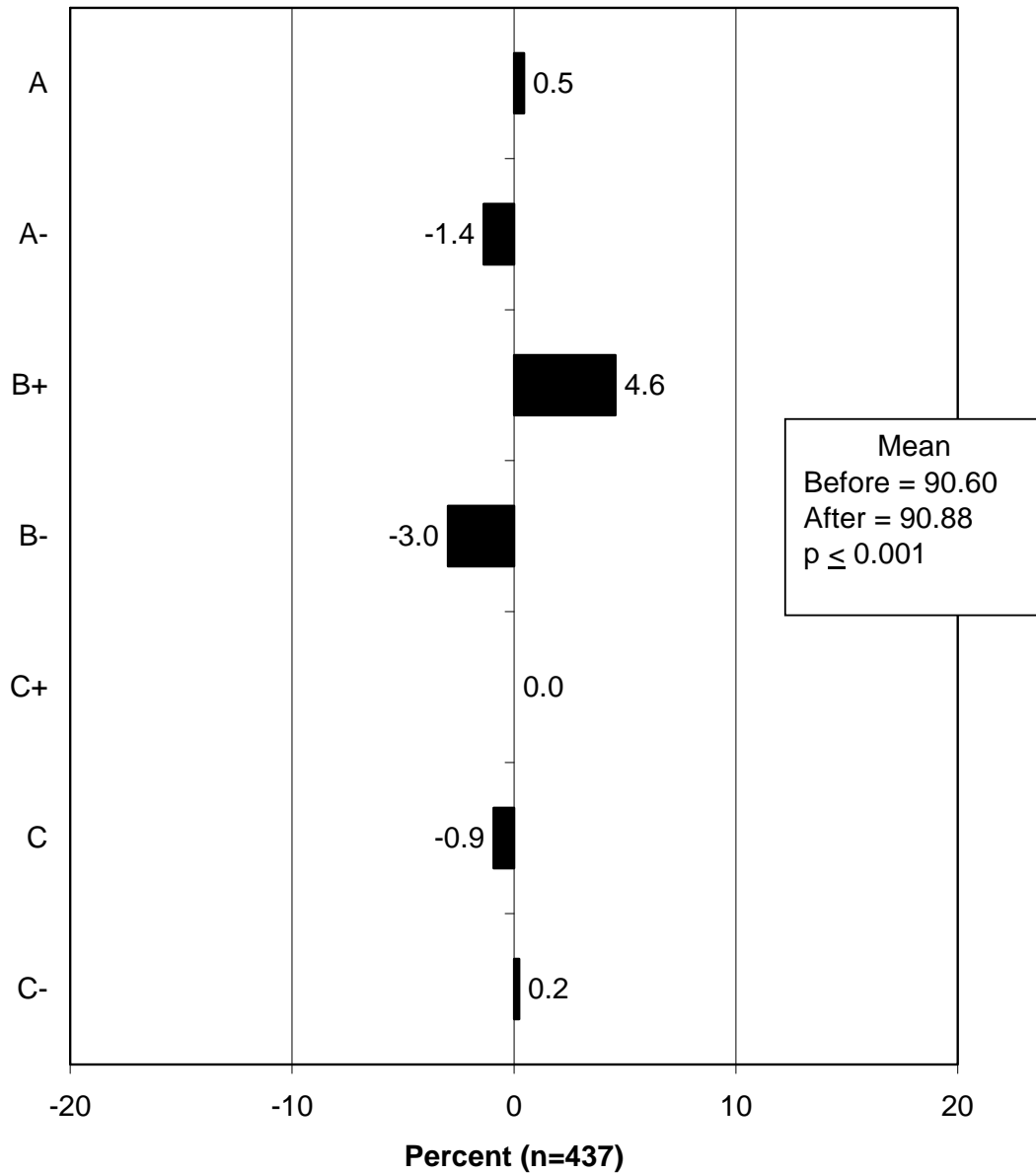


Figure 2. Difference in Percentage Receiving Grades in Reading Among Above Average Students

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among students who receive average grades overall).

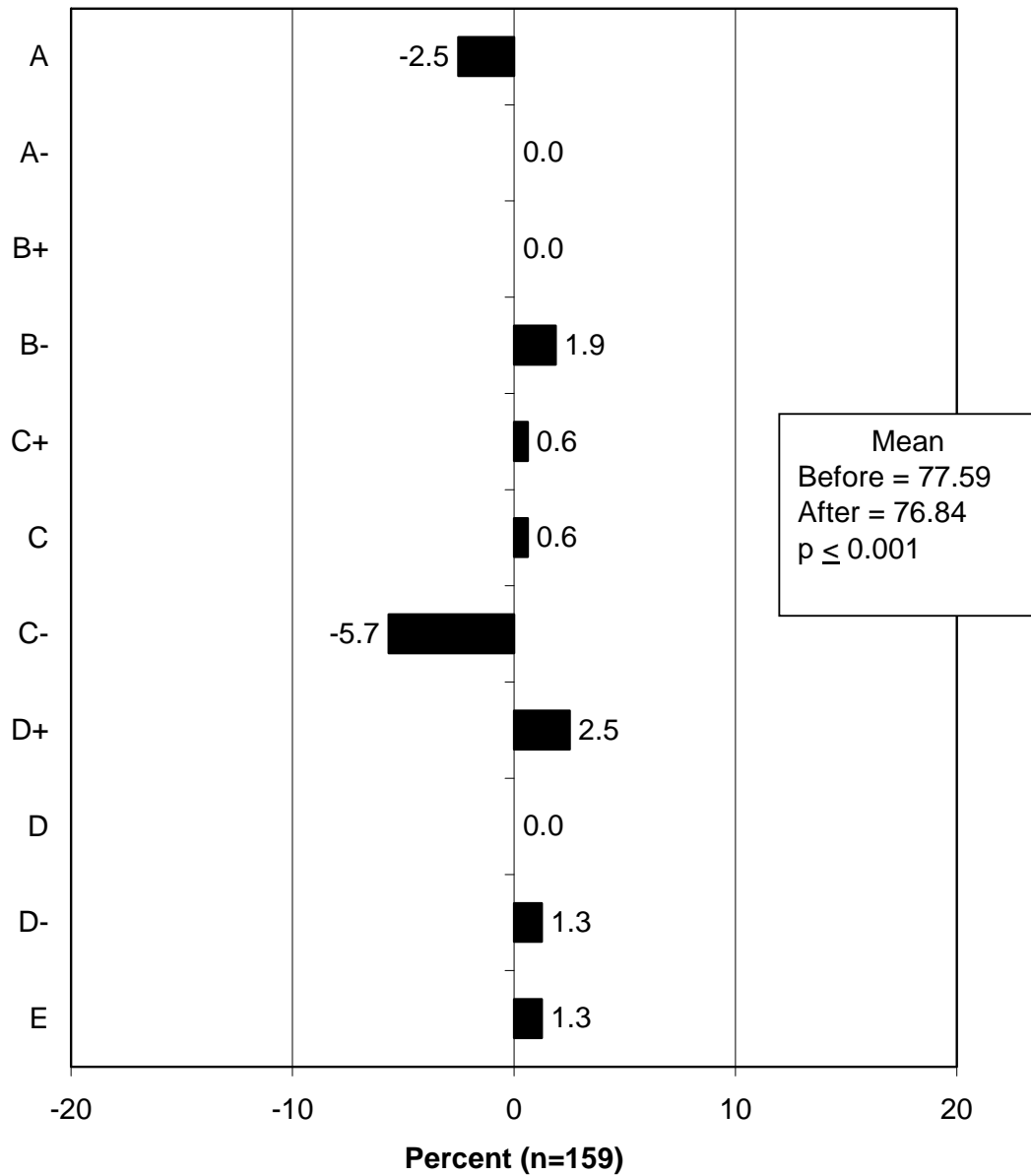


Figure 3. Difference in Percentage Receiving Grades in Reading Among Average Students

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among students who receive below average grades overall).

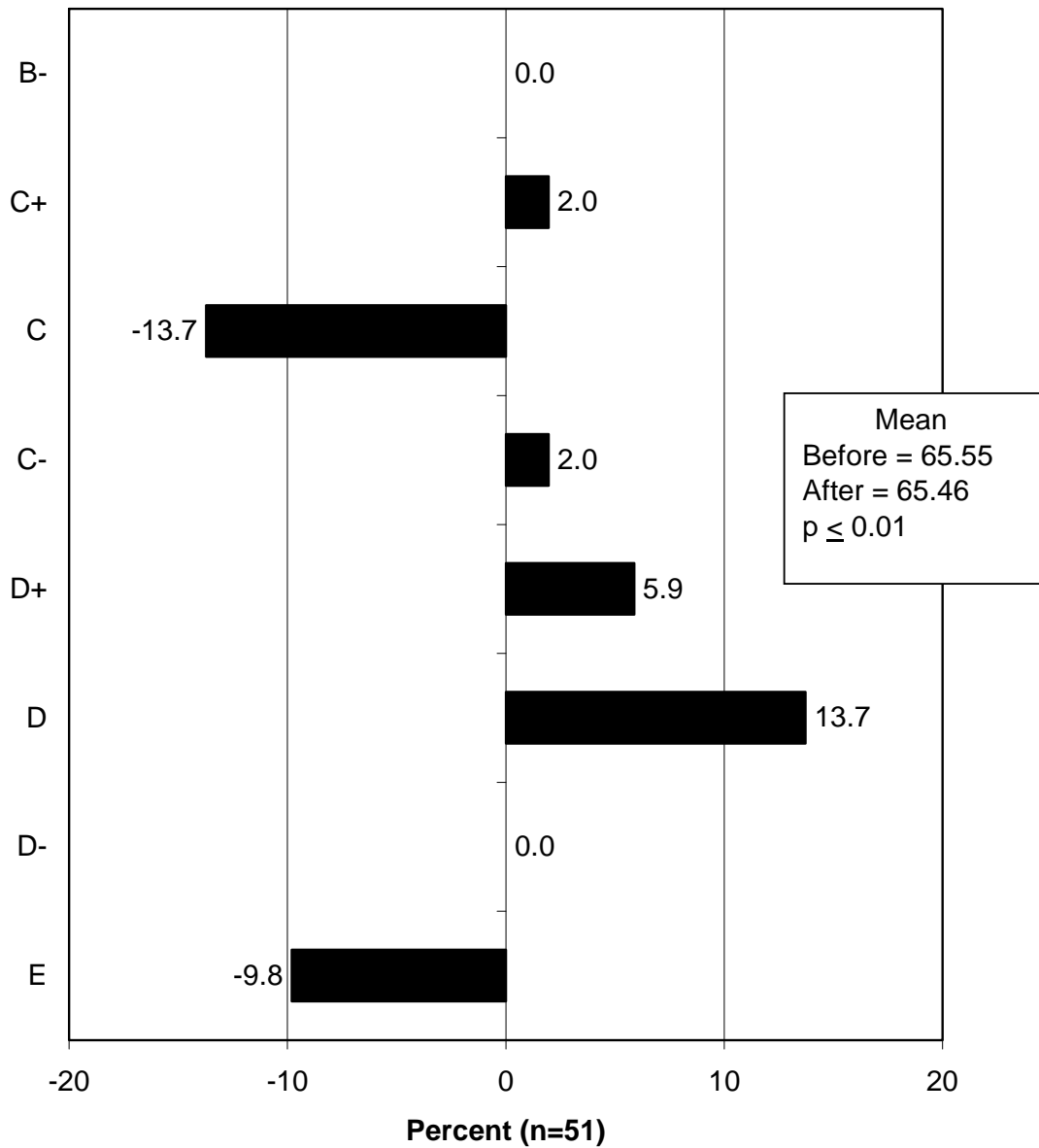


Figure 4. Difference in Percentage Receiving Grades in Reading Among Below Average Students

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among all 3rd, 4th, and 5th grade students).

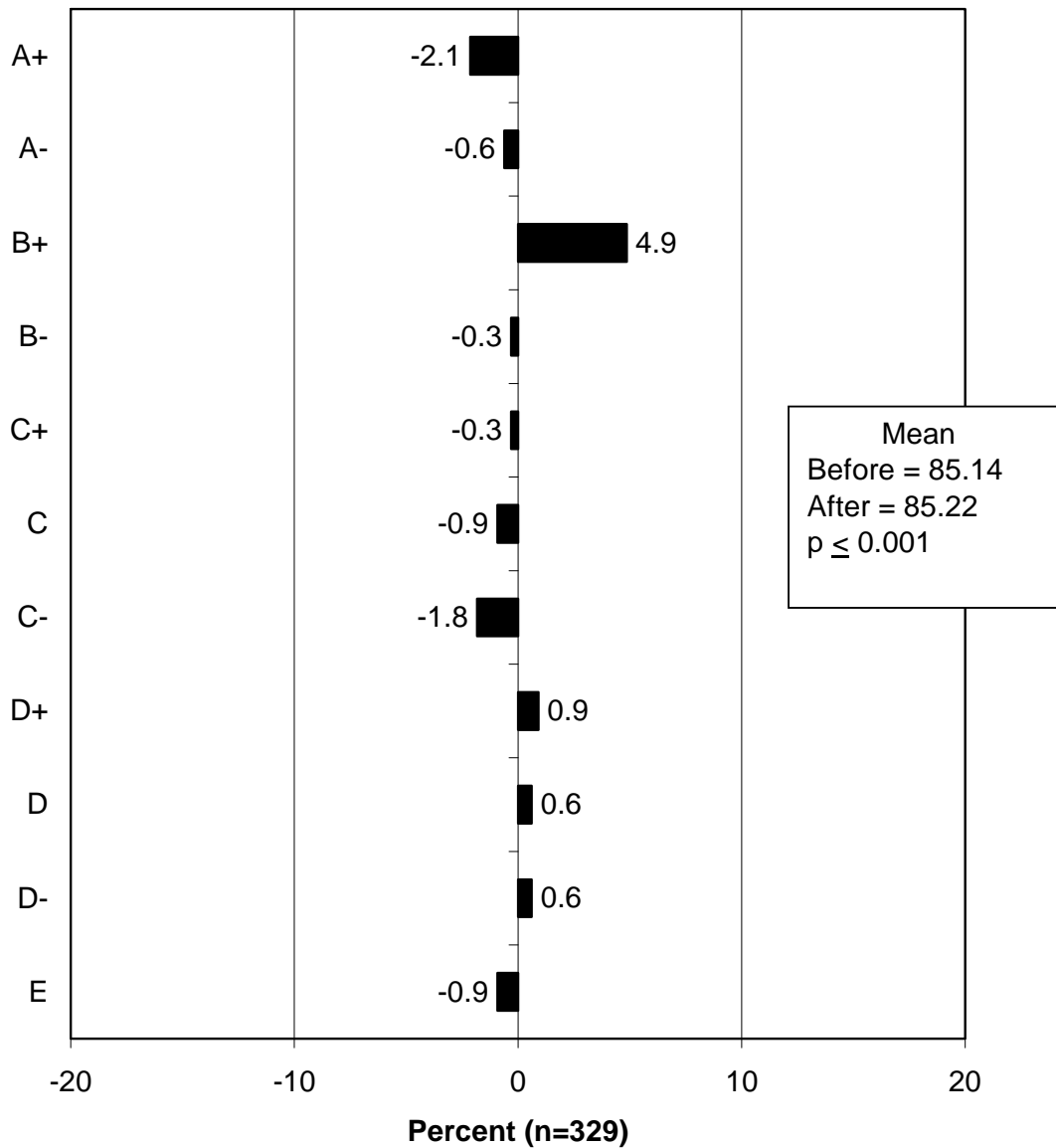


Figure 5. Difference in Percentage Receiving Grades in Reading Among 3rd, 4th, and 5th Graders

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive above average grades overall).

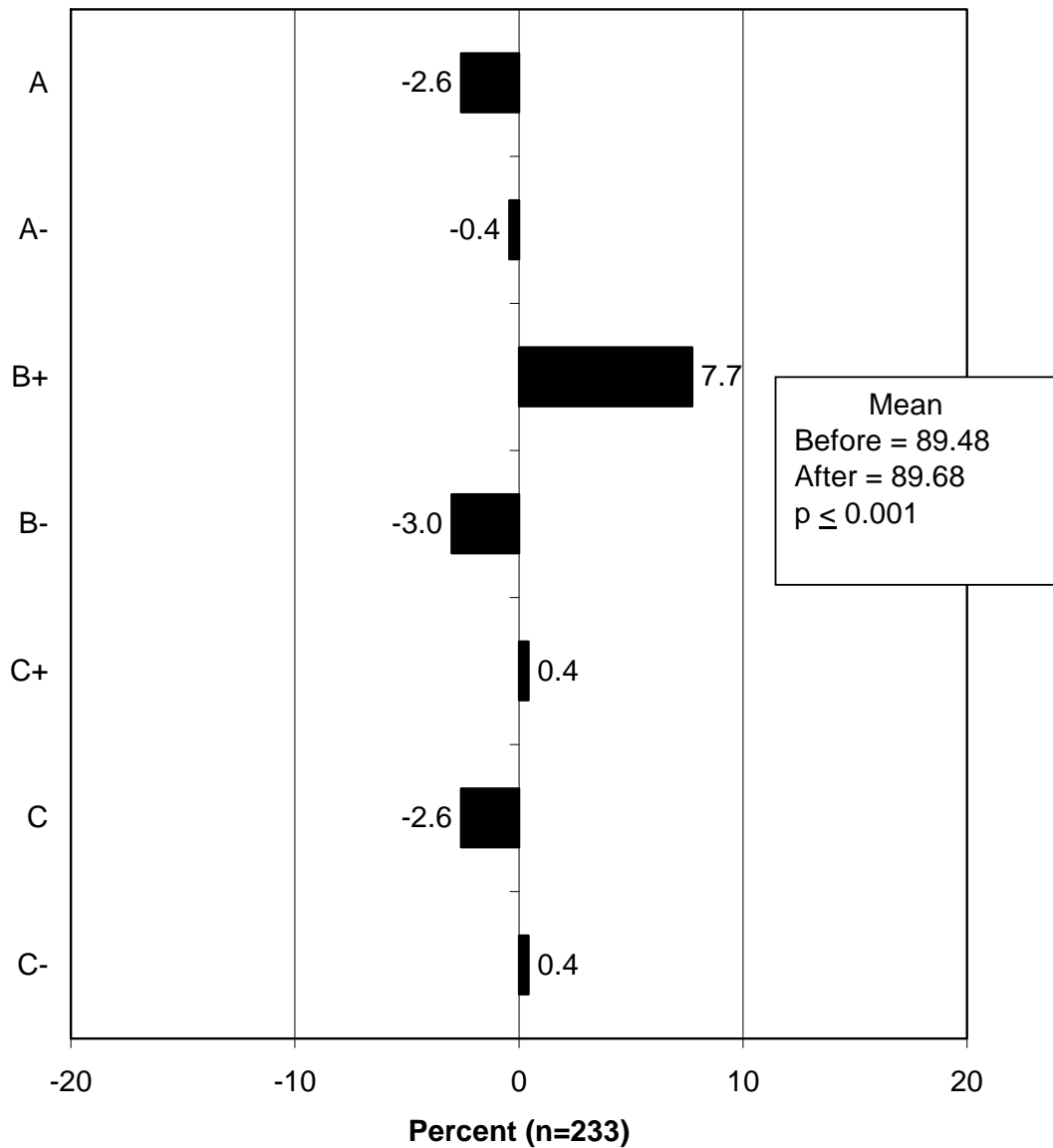


Figure 6. Difference in Percentage Receiving Grades in Reading Among Above Average 3rd, 4th, and 5th Graders

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive average grades overall).

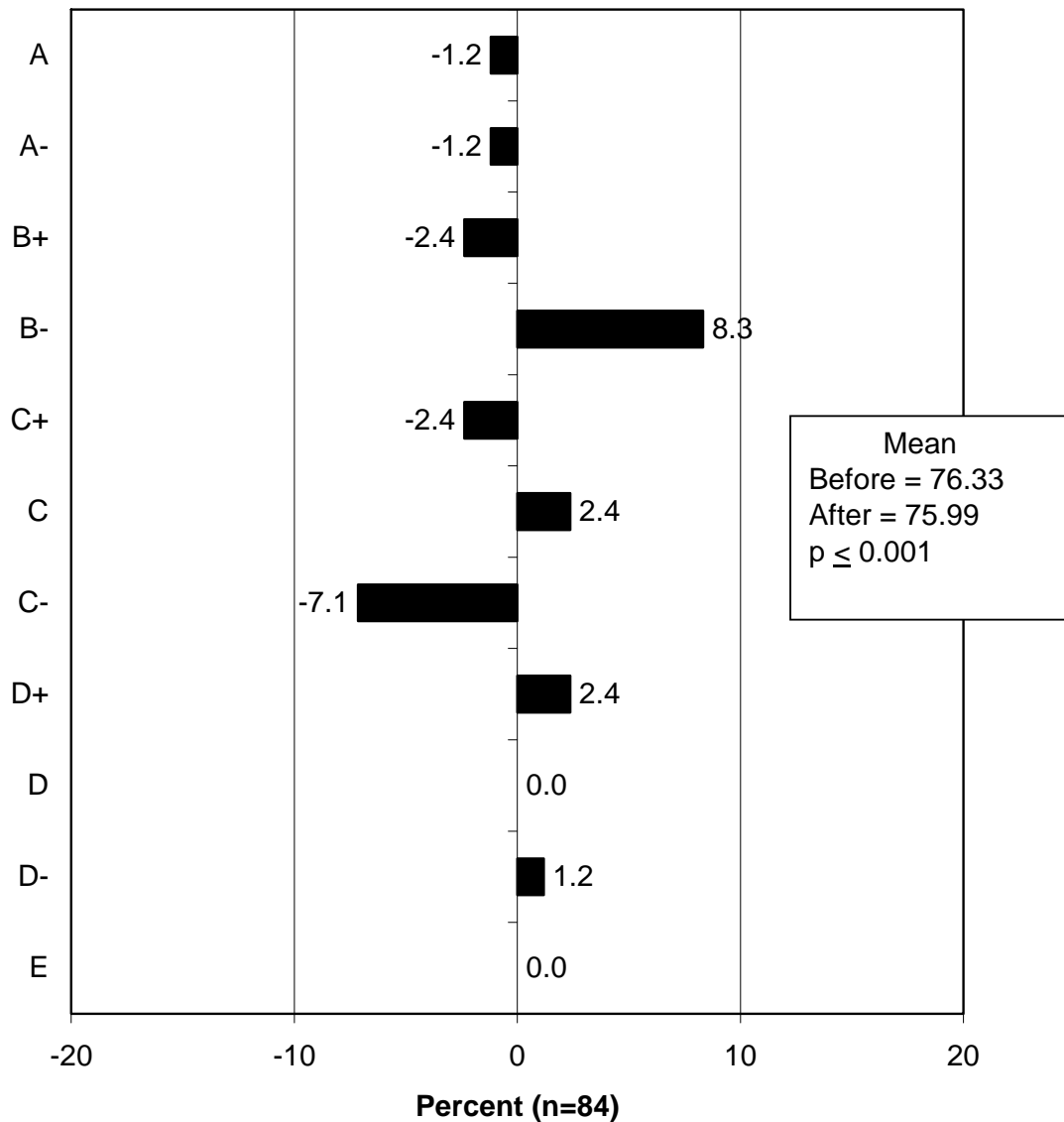


Figure 7. Difference in Percentage Receiving Grades in Reading Among Average 3rd, 4th, and 5th Graders

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive below average grades overall).

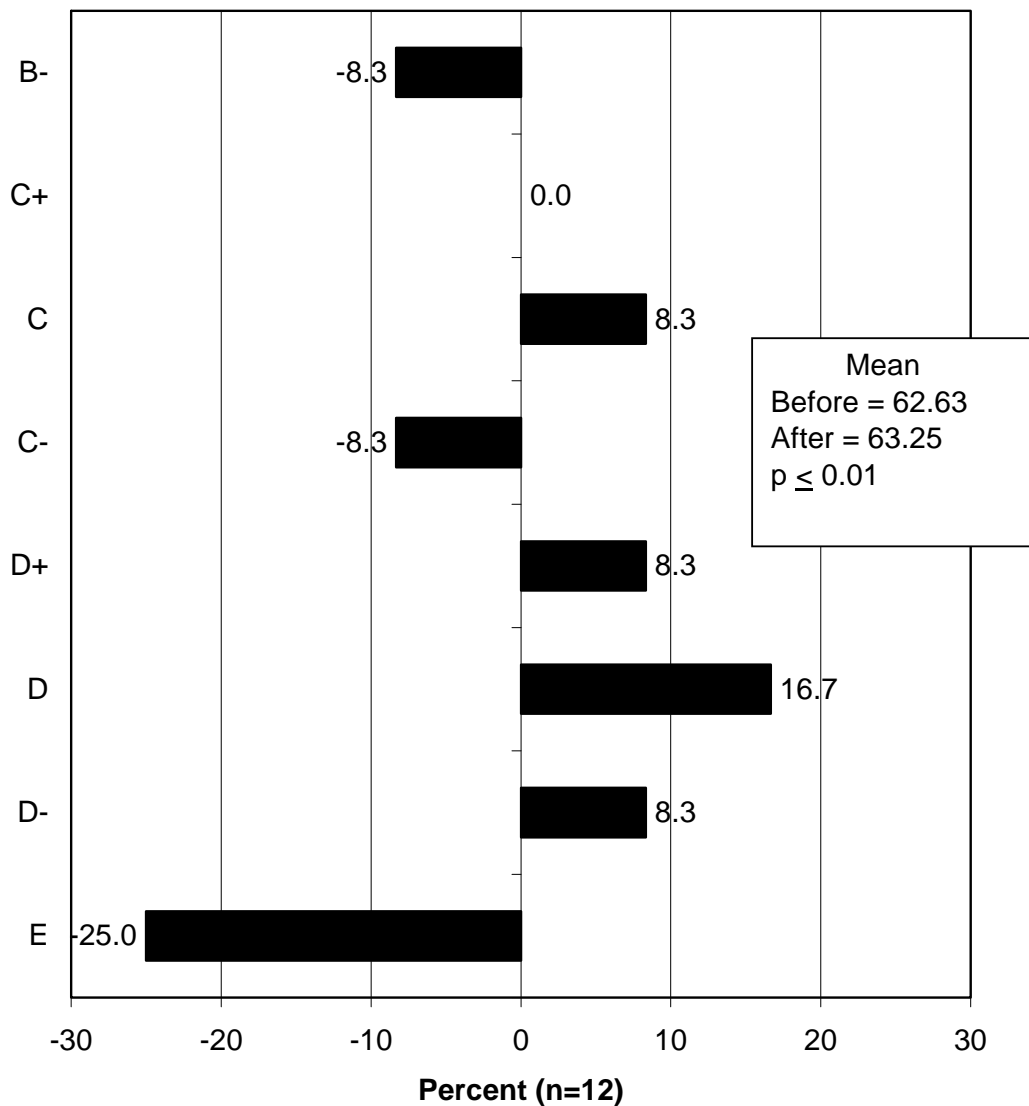


Figure 8. Difference in Percentage Receiving Grades in Reading Among Below Average 3rd, 4th, and 5th Graders

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among all 6th, 7th, and 8th grade students).

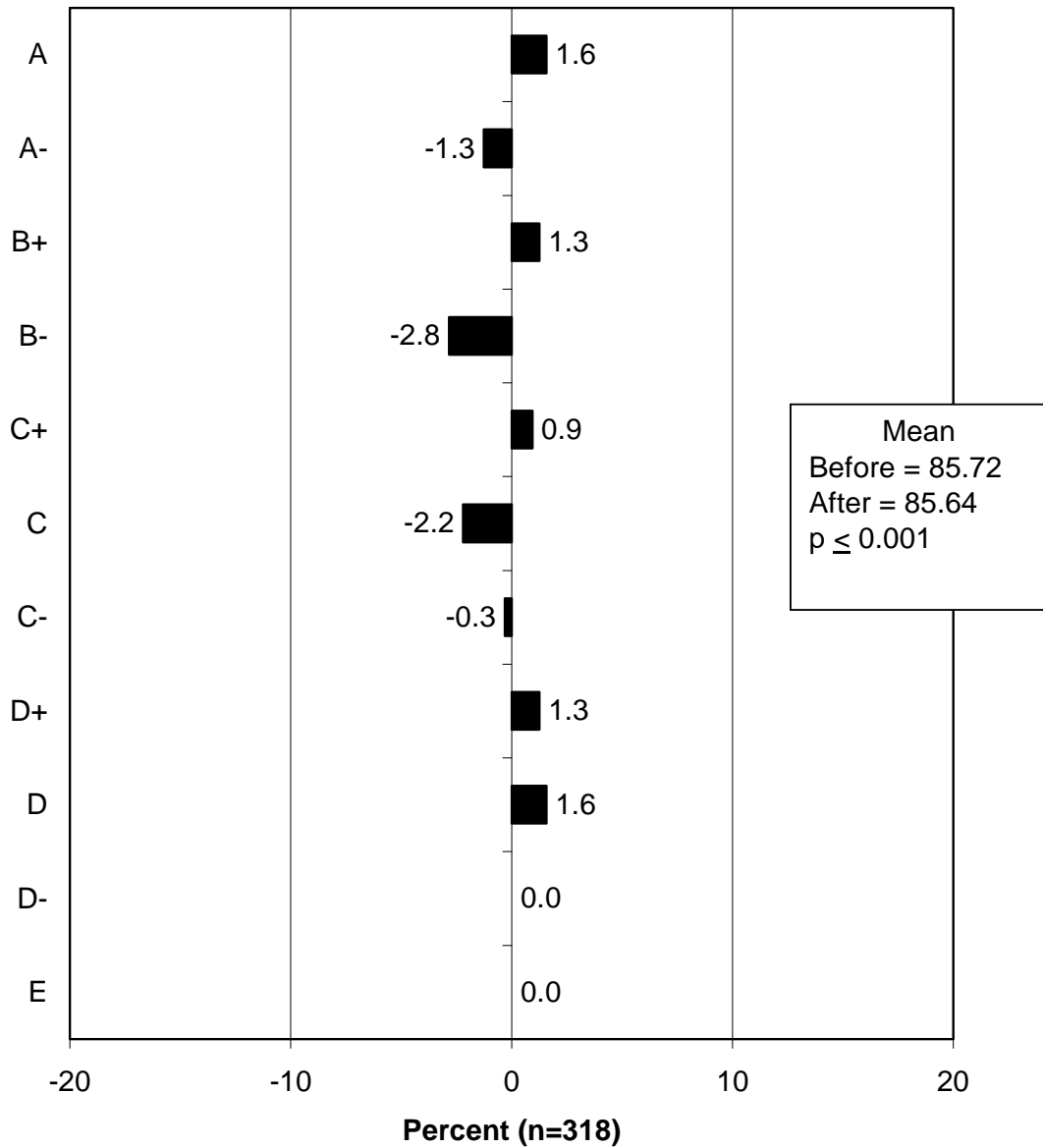


Figure 9. Difference in Percentage Receiving Grades in Reading Among 6th, 7th, and 8th Graders

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among 6th, 7th, and 8th grade students who receive above average grades overall).

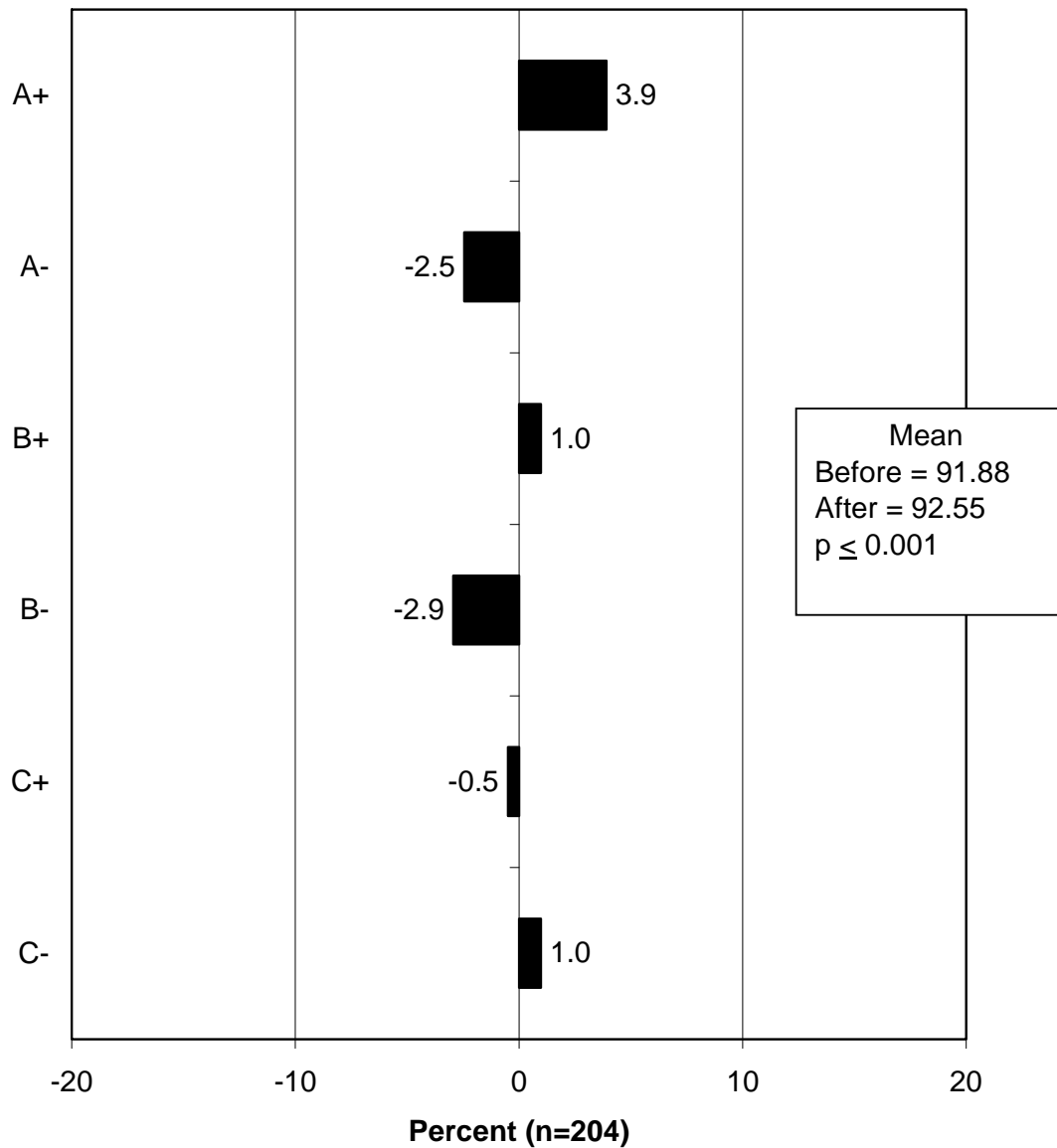


Figure 10. Difference in Percentage Receiving Grades in Reading Among Above Average 6th, 7th, and 8th Graders

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among 6th, 7th, and 8th grade students who receive average grades overall).

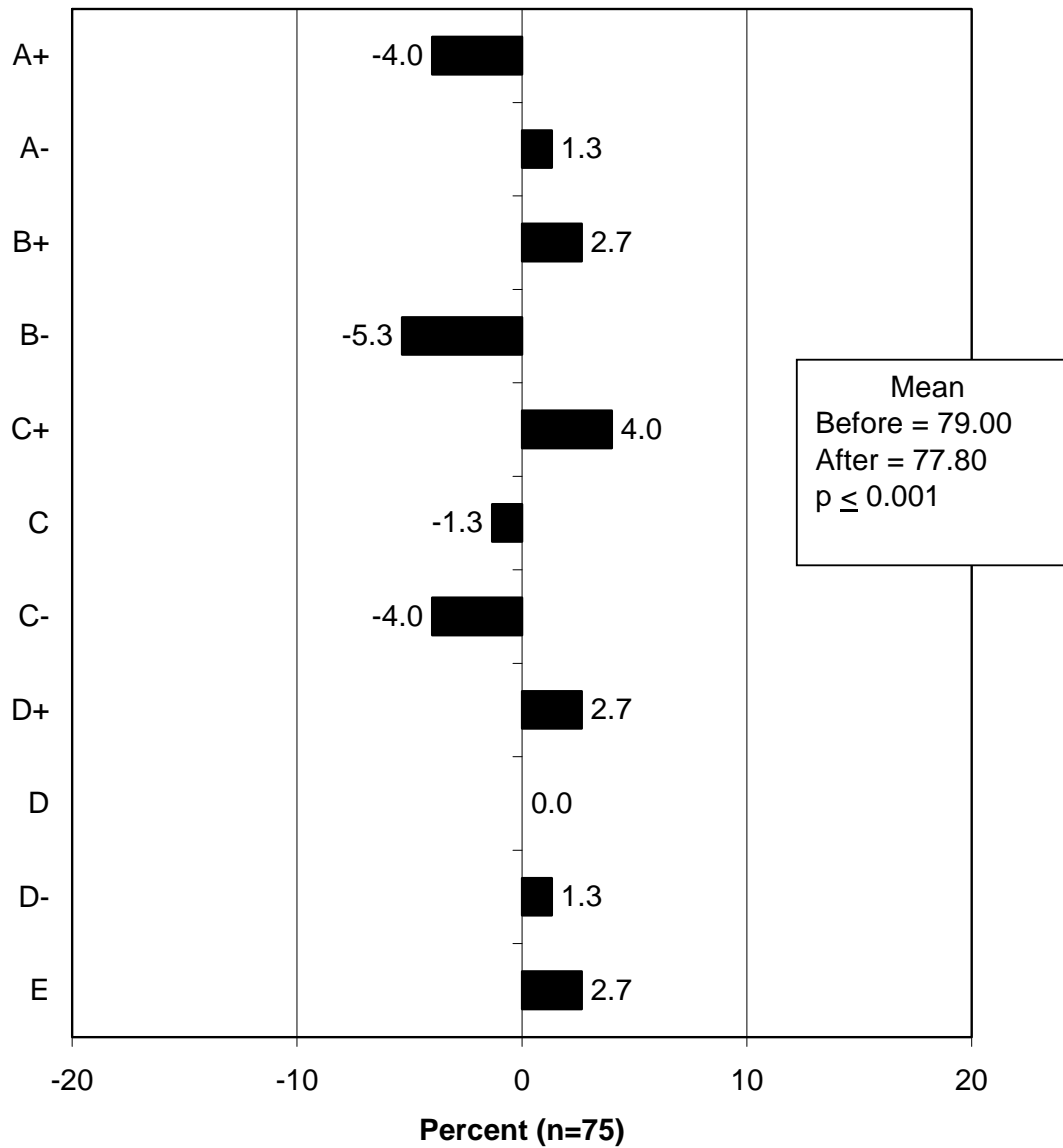


Figure 11. Difference in Percentage Receiving Grades in Reading Among Average 6th, 7th, and 8th Graders

What grades did the student receive in reading before and after the archery program?

Difference in percentage receiving each grade in reading, pre-program to post-program (among 6th, 7th, and 8th grade students who receive below average grades overall).

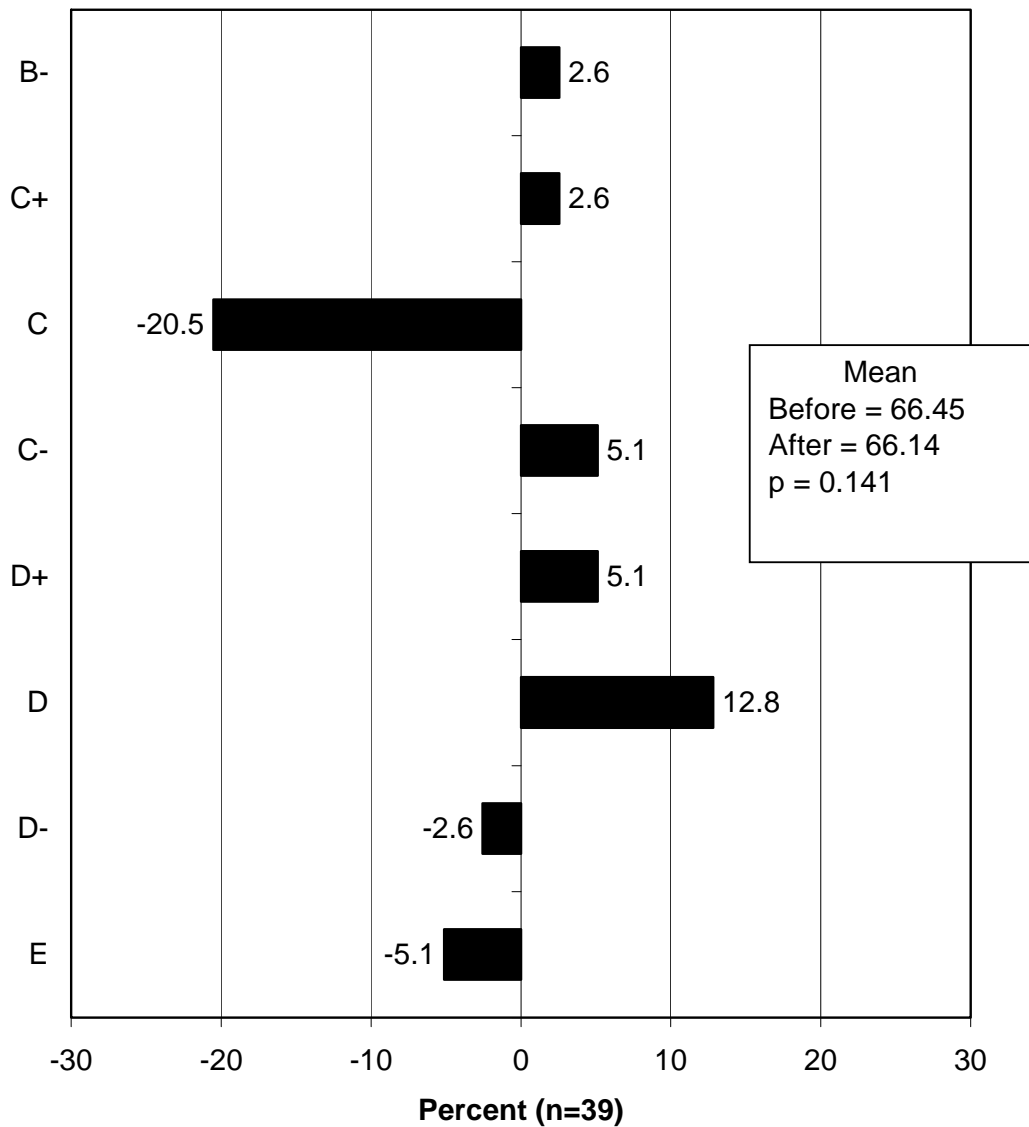


Figure 12. Difference in Percentage Receiving Grades in Reading Among Below Average 6th, 7th, and 8th Graders

Difference between the means of the student's reading grades, pre-program and post-program.

Note that all values are statistically significant ($p \leq 0.01$) except the 6th, 7th, and 8th grade "students with below average grades" category.

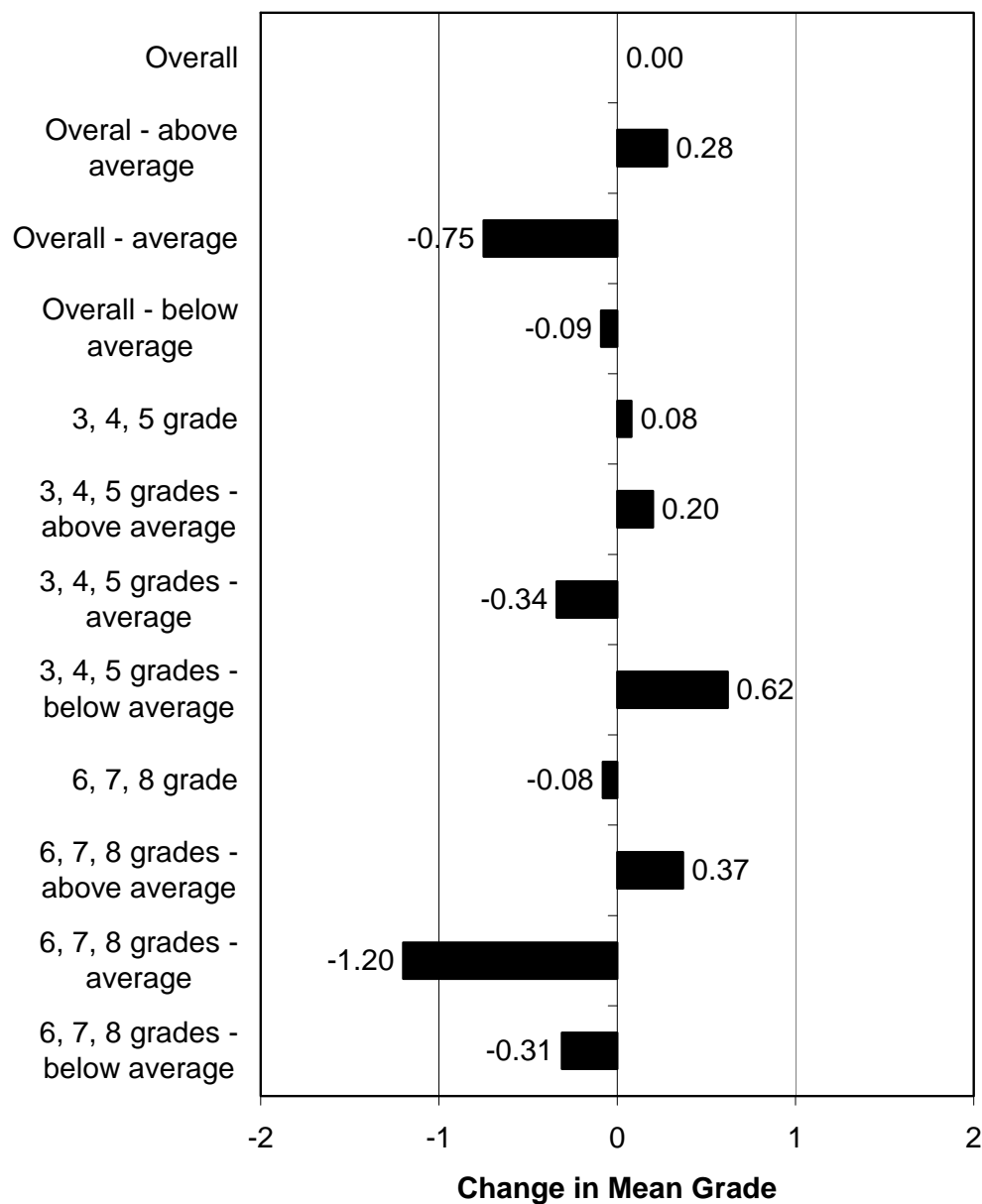


Figure 13. Difference in Mean Grades in Reading—All Groups

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program.

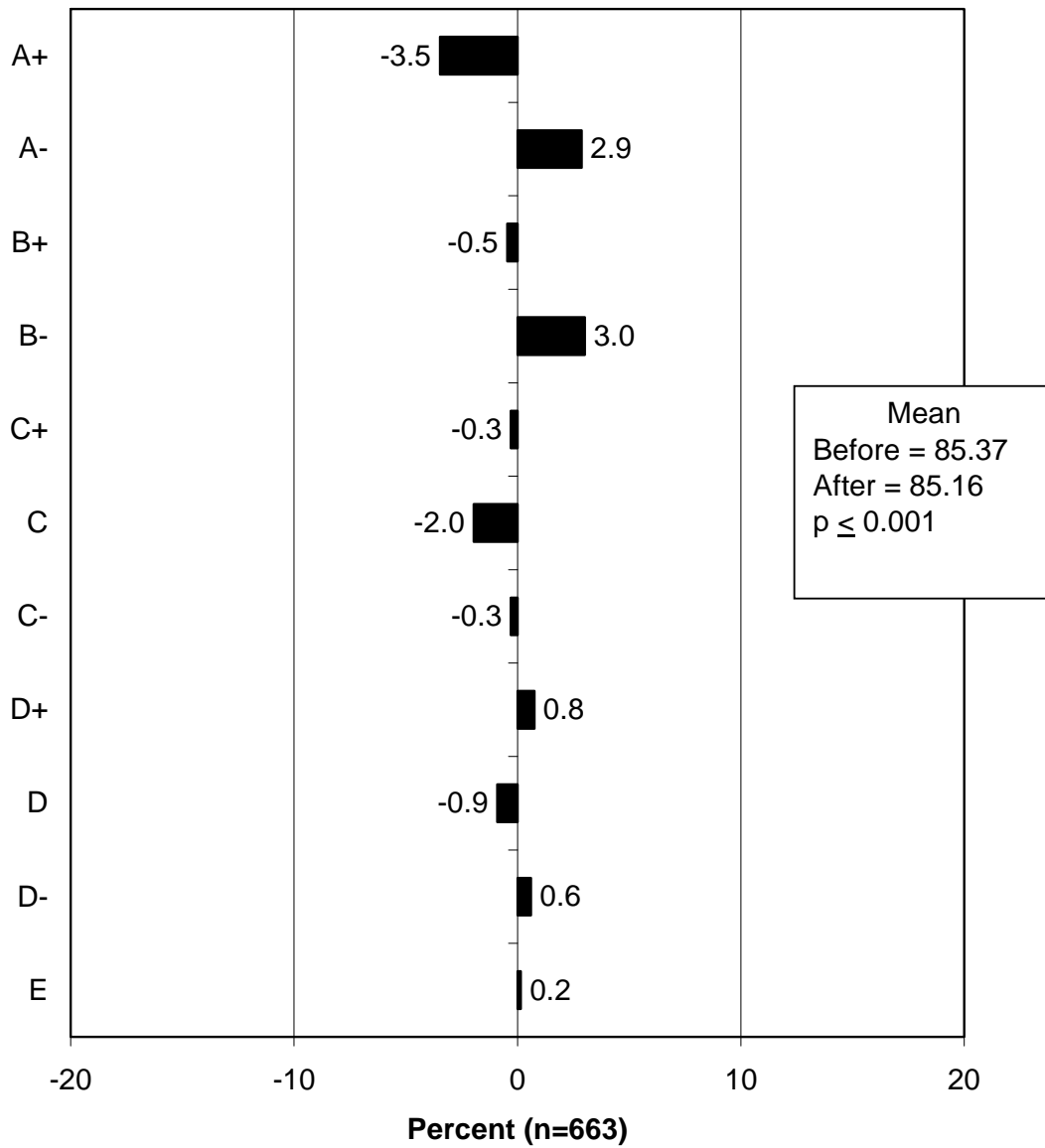


Figure 14. Difference in Percentage Receiving Grades in Writing Overall

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among students who receive above average grades overall).

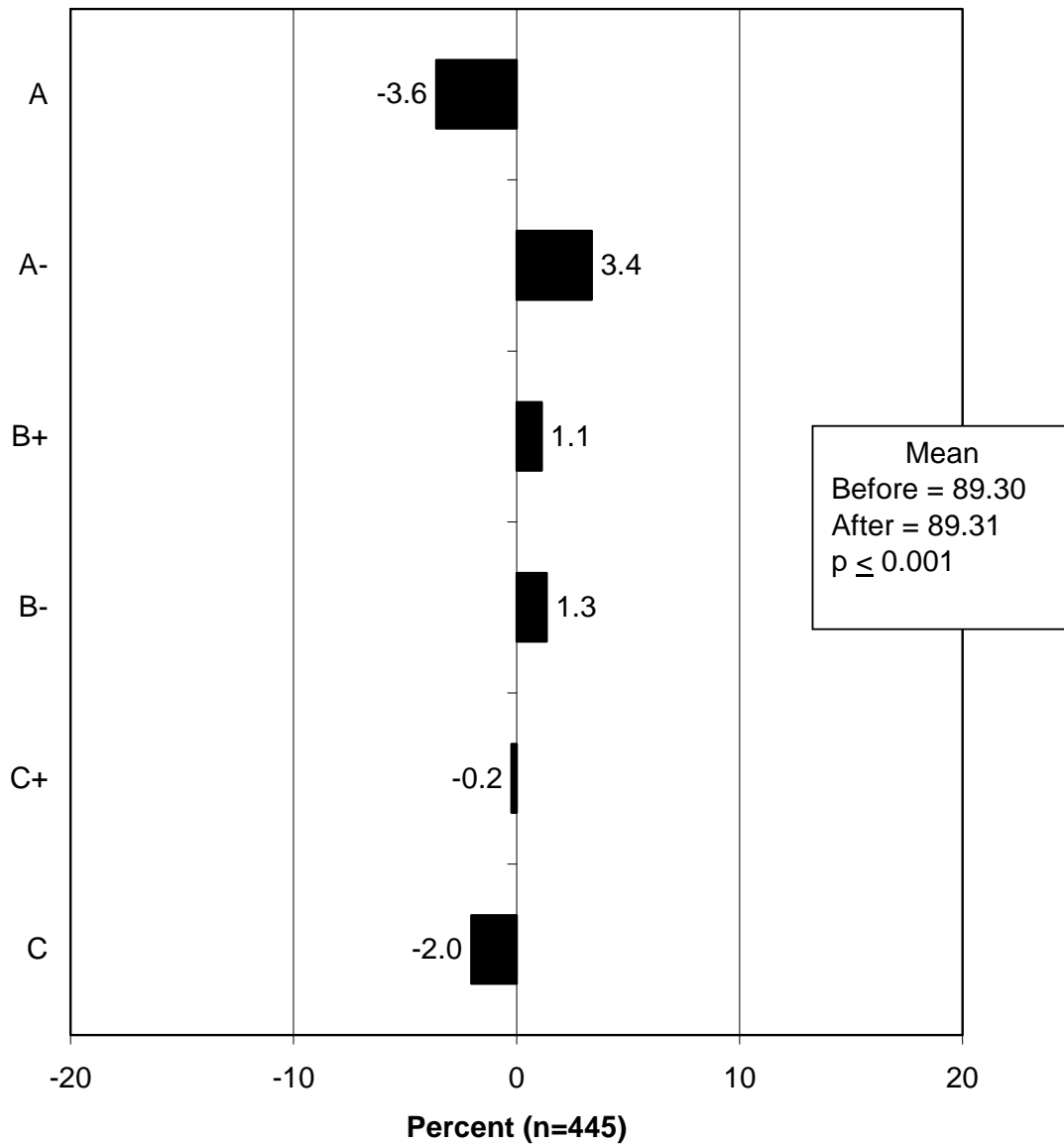


Figure 15. Difference in Percentage Receiving Grades in Writing Among Above Average Students

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among students who receive average grades overall).

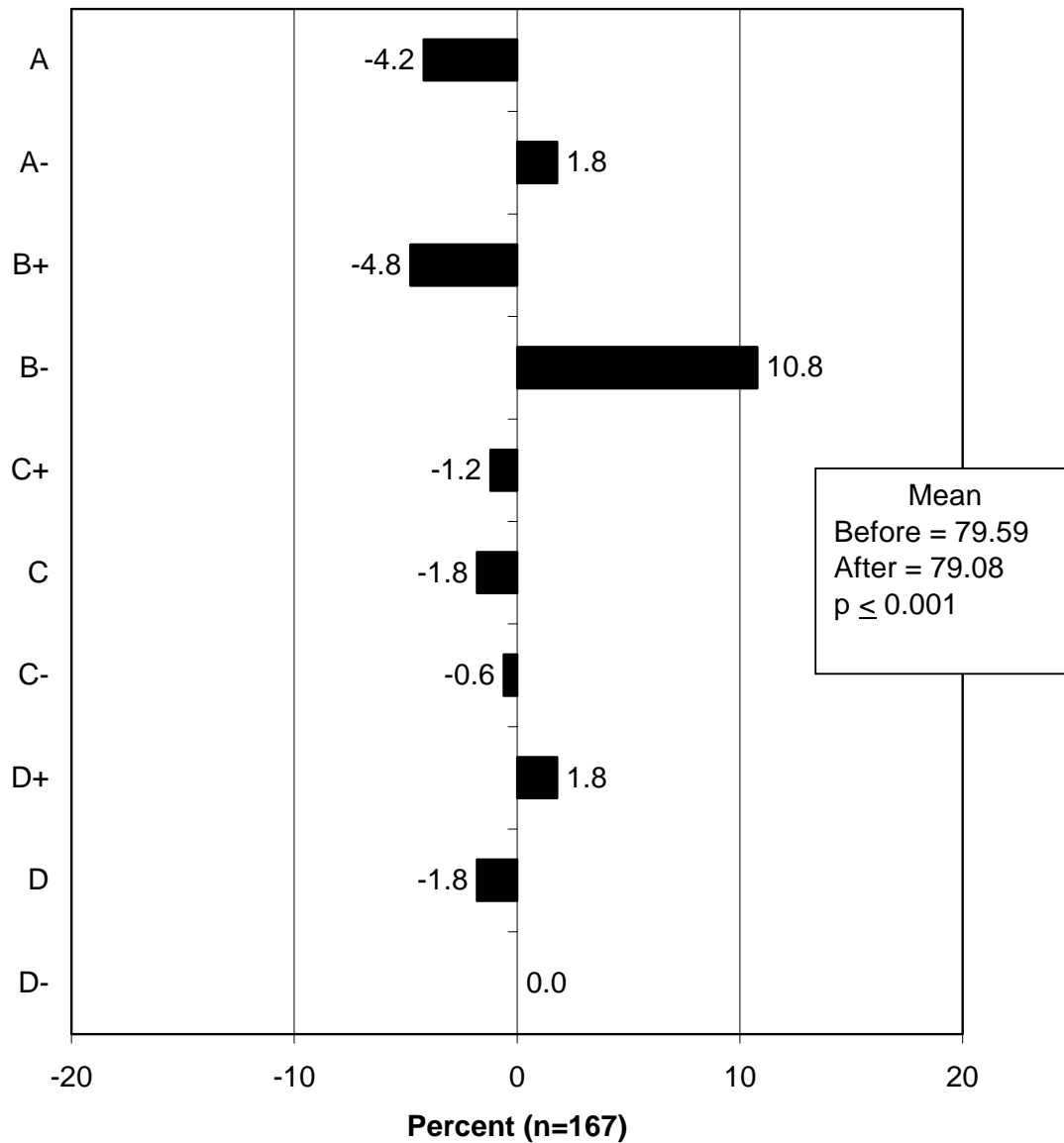


Figure 16. Difference in Percentage Receiving Grades in Writing Among Average Students

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among students who receive below average grades overall).

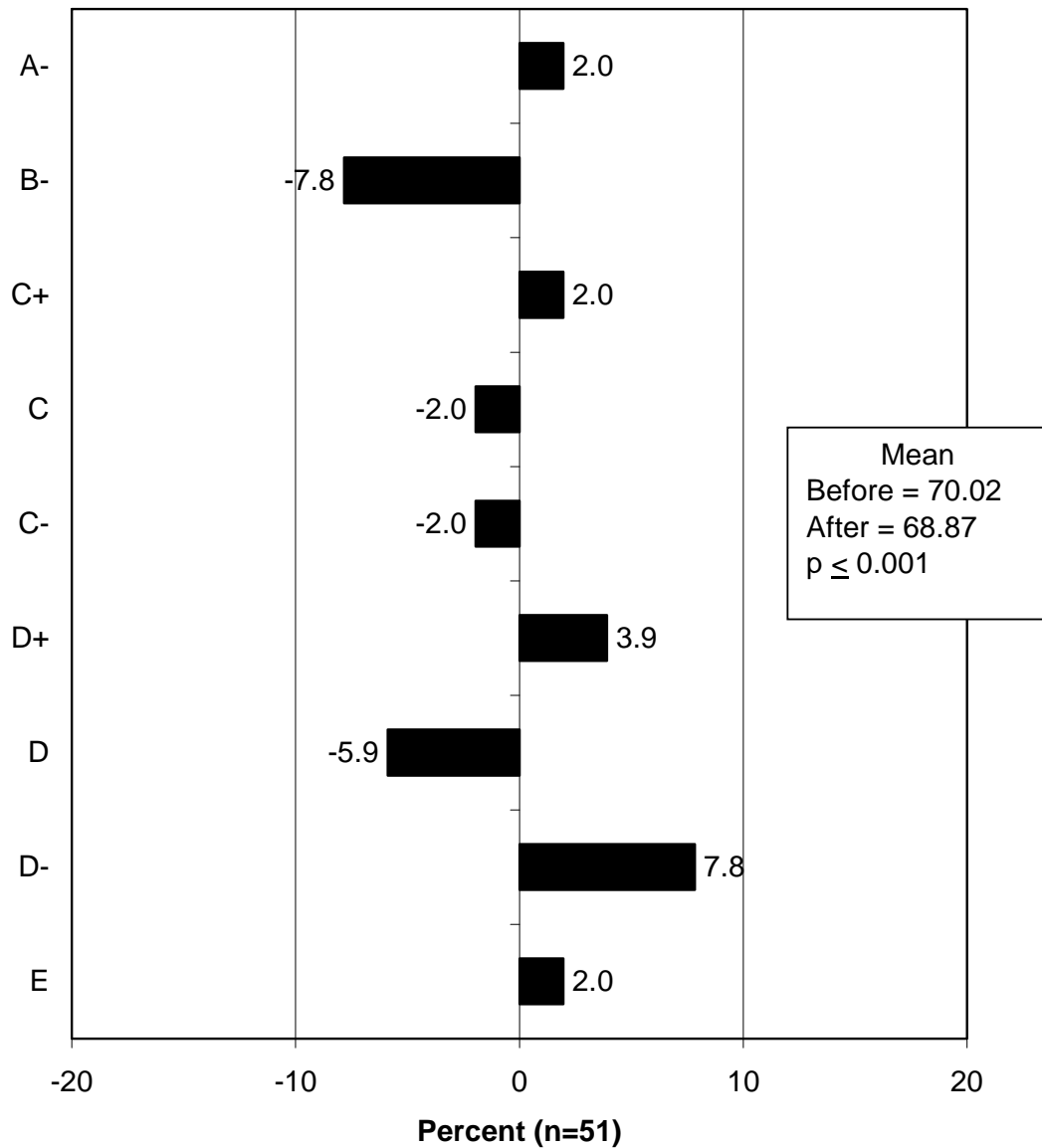


Figure 17. Difference in Percentage Receiving Grades in Writing Among Below Average Students

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among all 3rd, 4th, and 5th grade students).

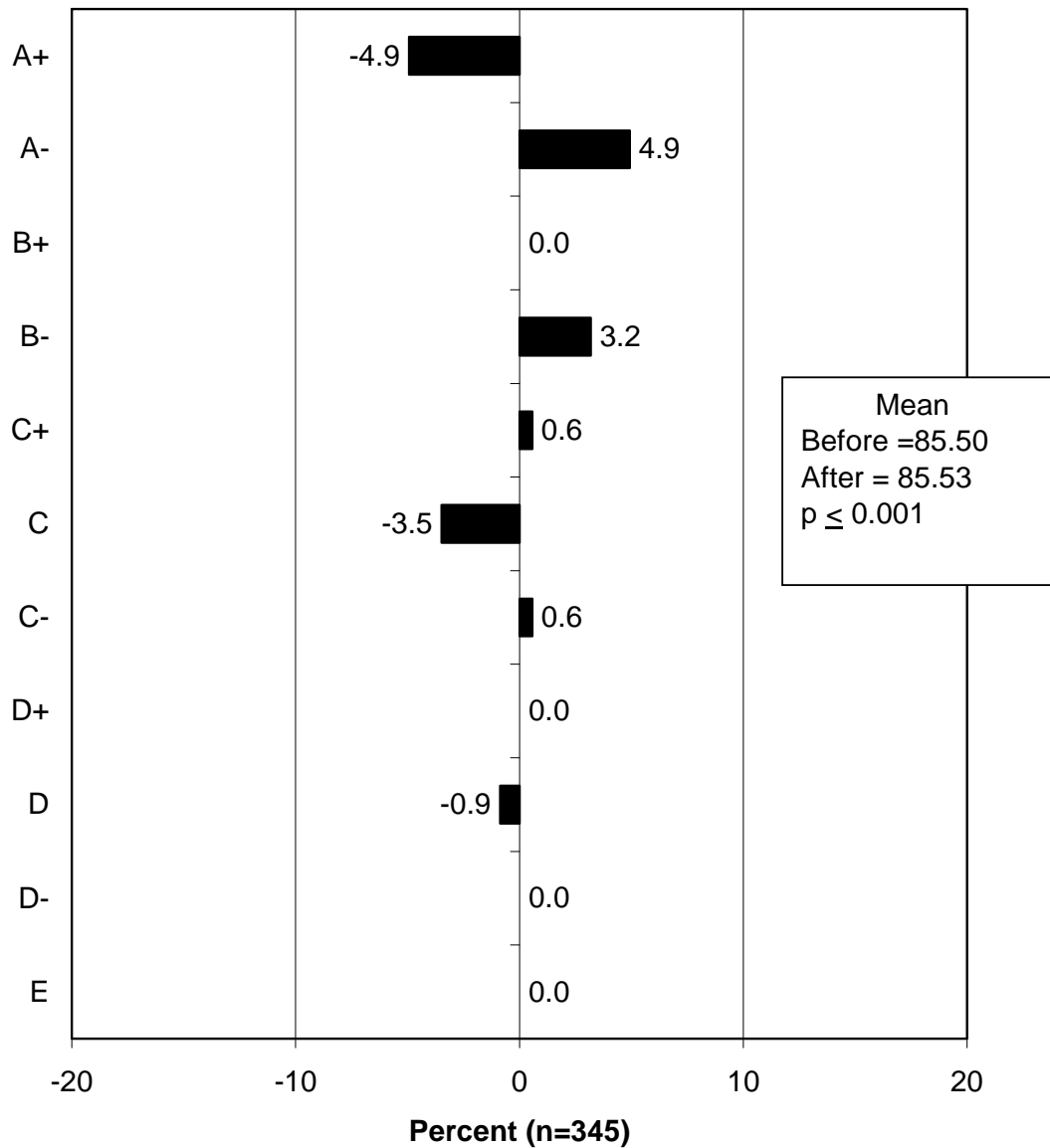


Figure 18. Difference in Percentage Receiving Grades in Writing Among 3rd, 4th, and 5th Graders

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive above average grades overall).

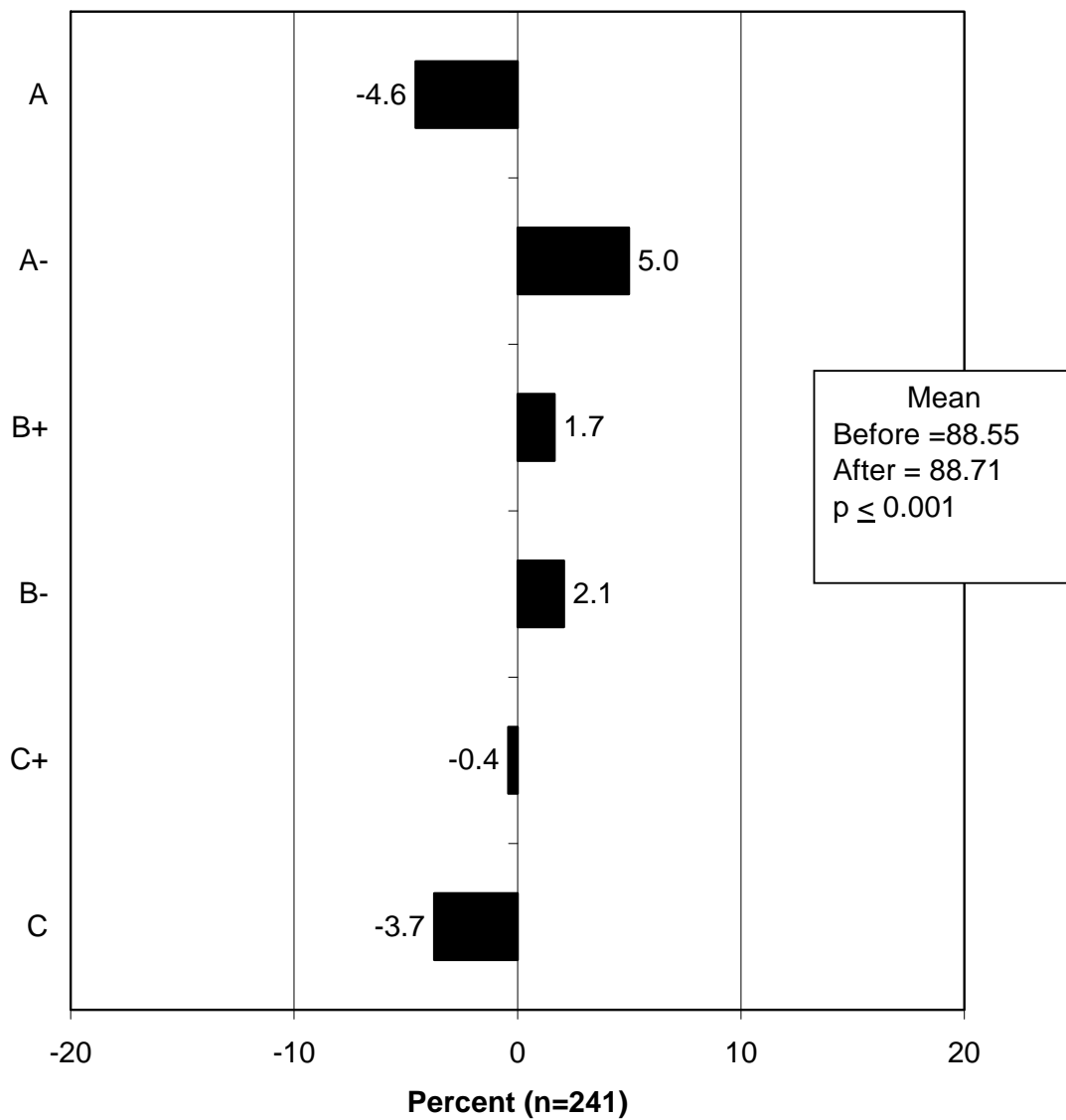


Figure 19. Difference in Percentage Receiving Grades in Writing Among Above Average 3rd, 4th, and 5th Graders

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive average grades overall).

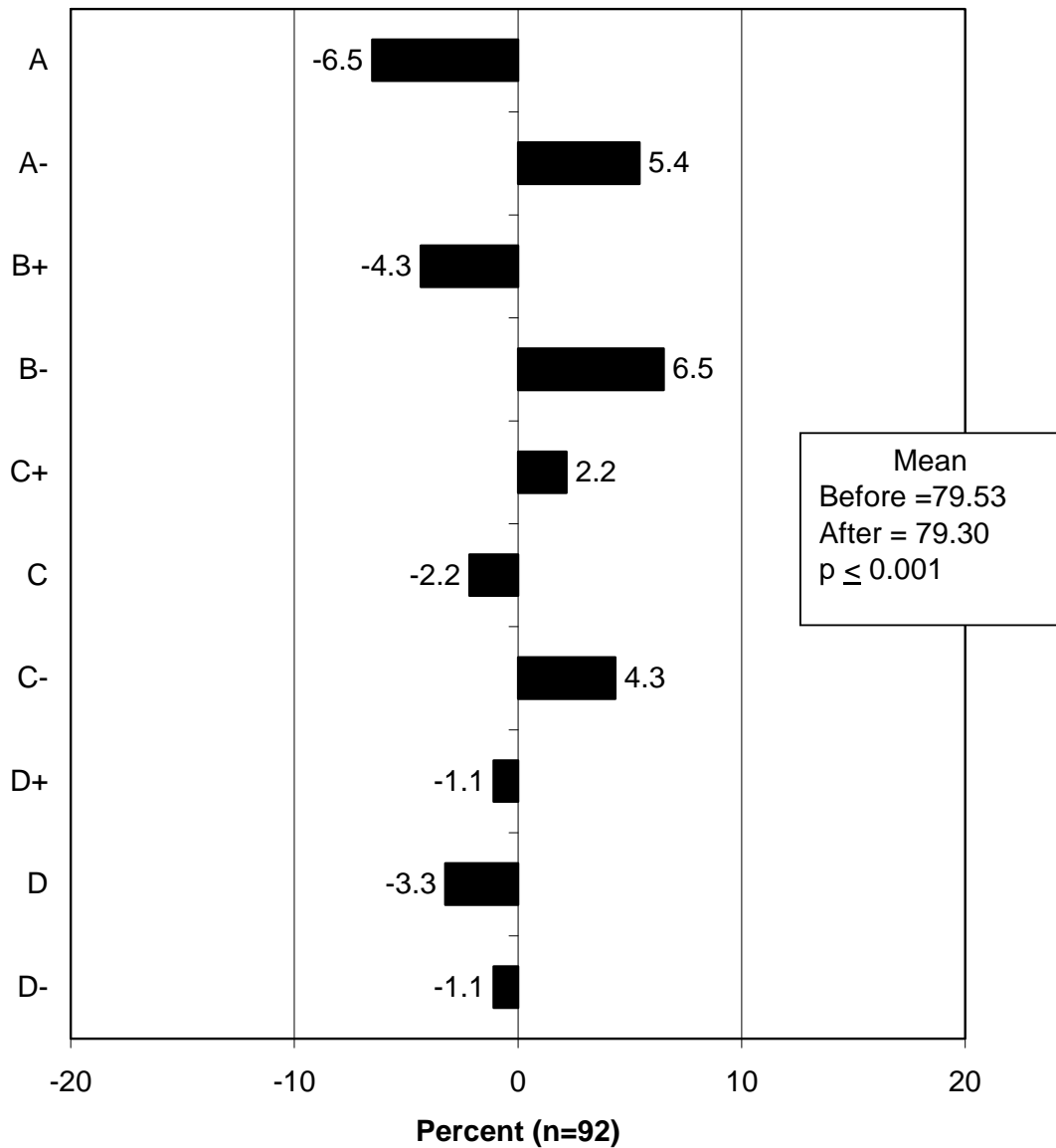


Figure 20. Difference in Percentage Receiving Grades in Writing Among Average 3rd, 4th, and 5th Graders

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive below average grades overall).

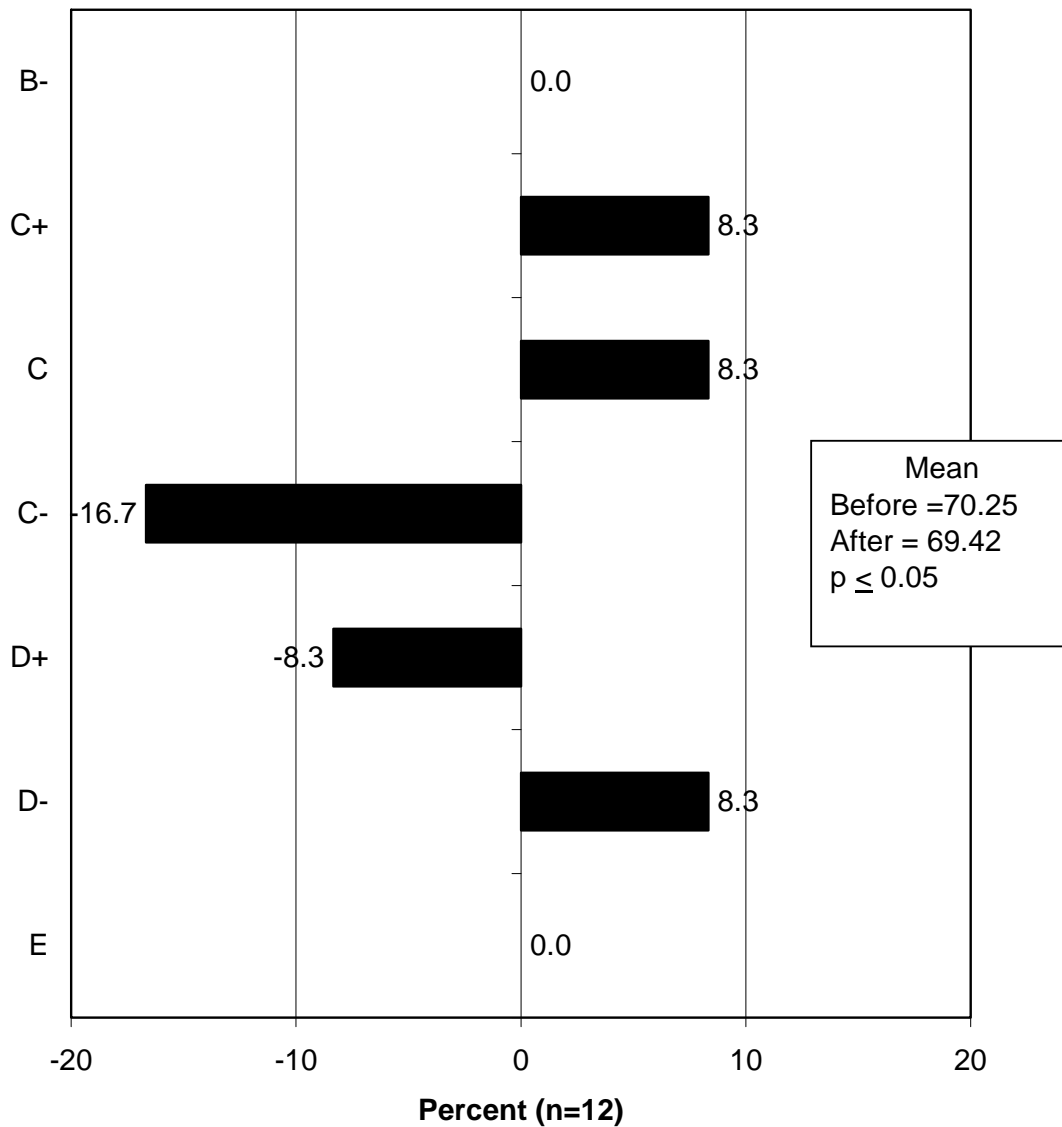


Figure 21. Difference in Percentage Receiving Grades in Writing Among Below Average 3rd, 4th, and 5th Graders

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among all 6th, 7th, and 8th grade students).

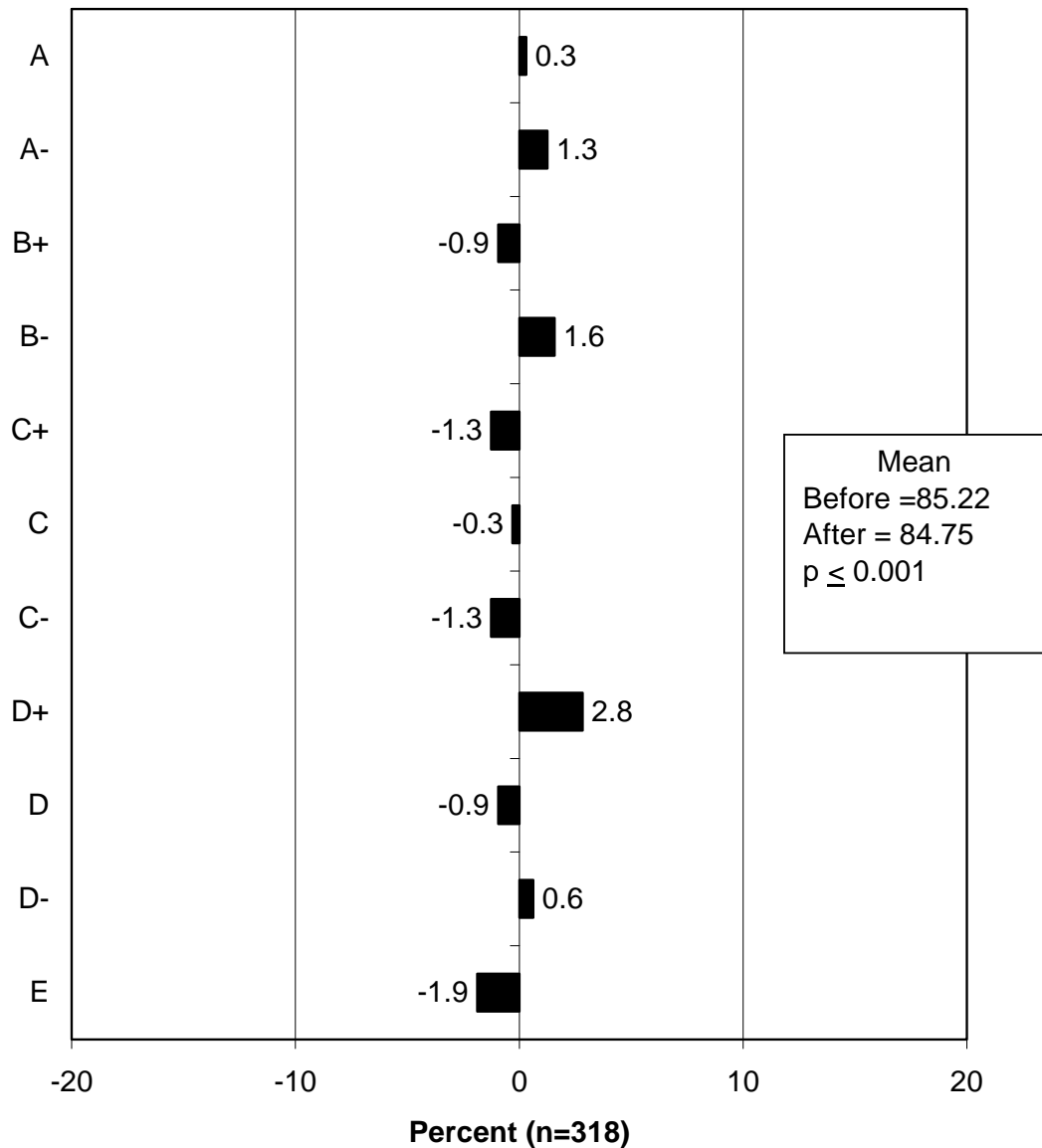


Figure 22. Difference in Percentage Receiving Grades in Writing Among 6th, 7th, and 8th Graders

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among 6th, 7th, and 8th grade students who receive above average grades overall).

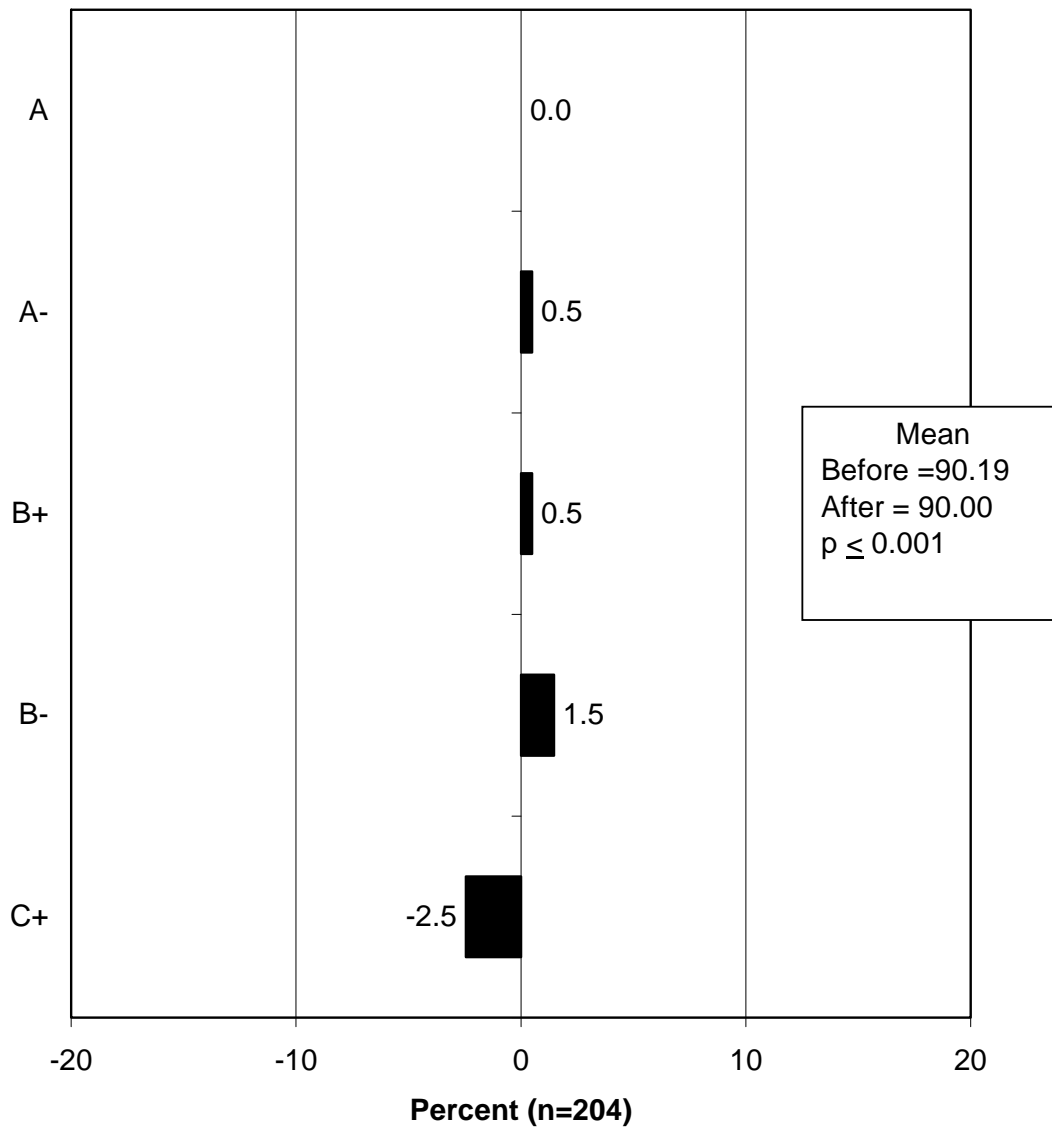


Figure 23. Difference in Percentage Receiving Grades in Writing Among Above Average 6th, 7th, and 8th Graders

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among 6th, 7th, and 8th grade students who receive average grades overall).

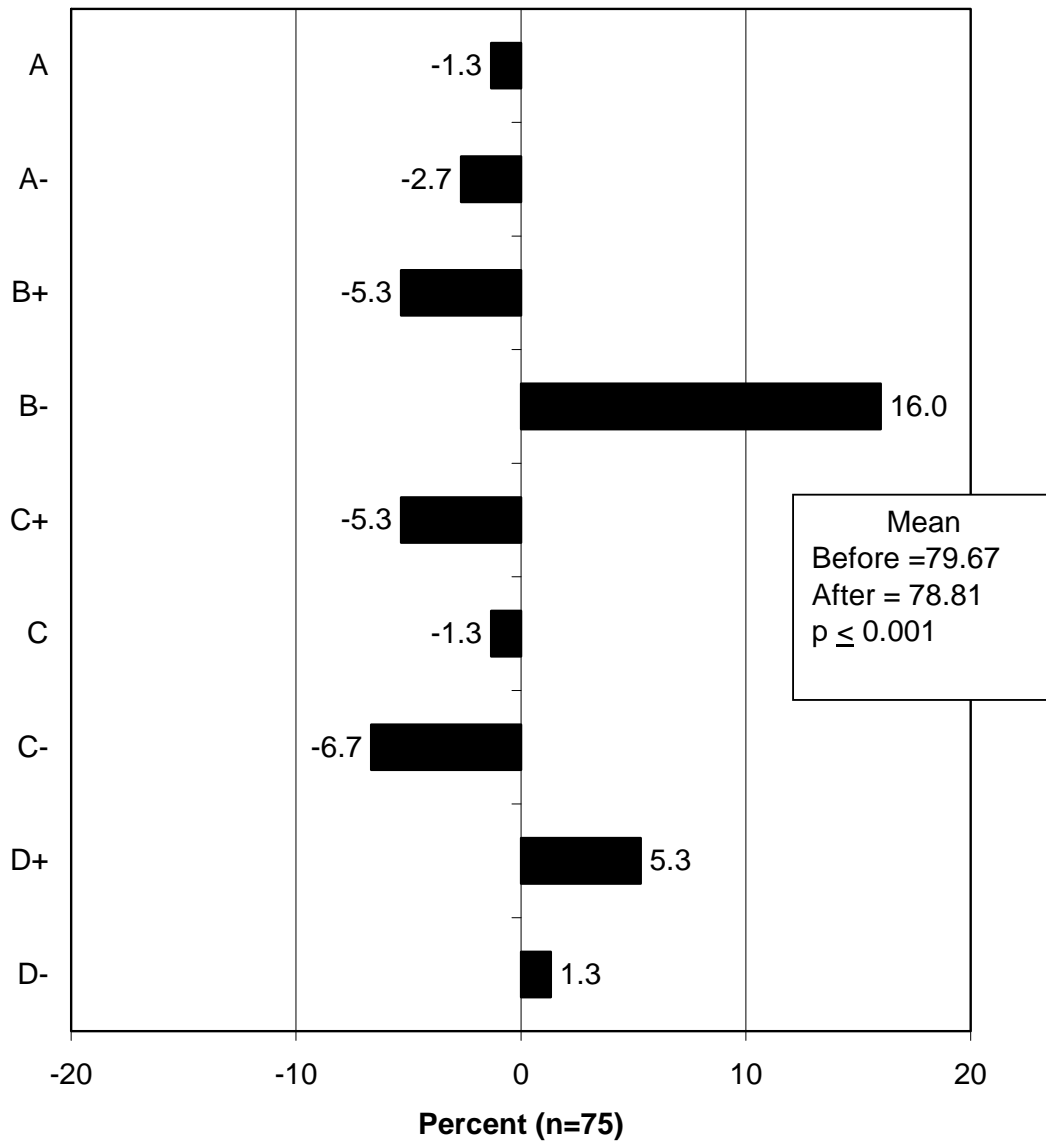


Figure 24. Difference in Percentage Receiving Grades in Writing Among Average 6th, 7th, and 8th Graders

What grades did the student receive in writing before and after the archery program?

Difference in percentage receiving each grade in writing, pre-program to post-program (among 6th, 7th, and 8th grade students who receive below average grades overall).

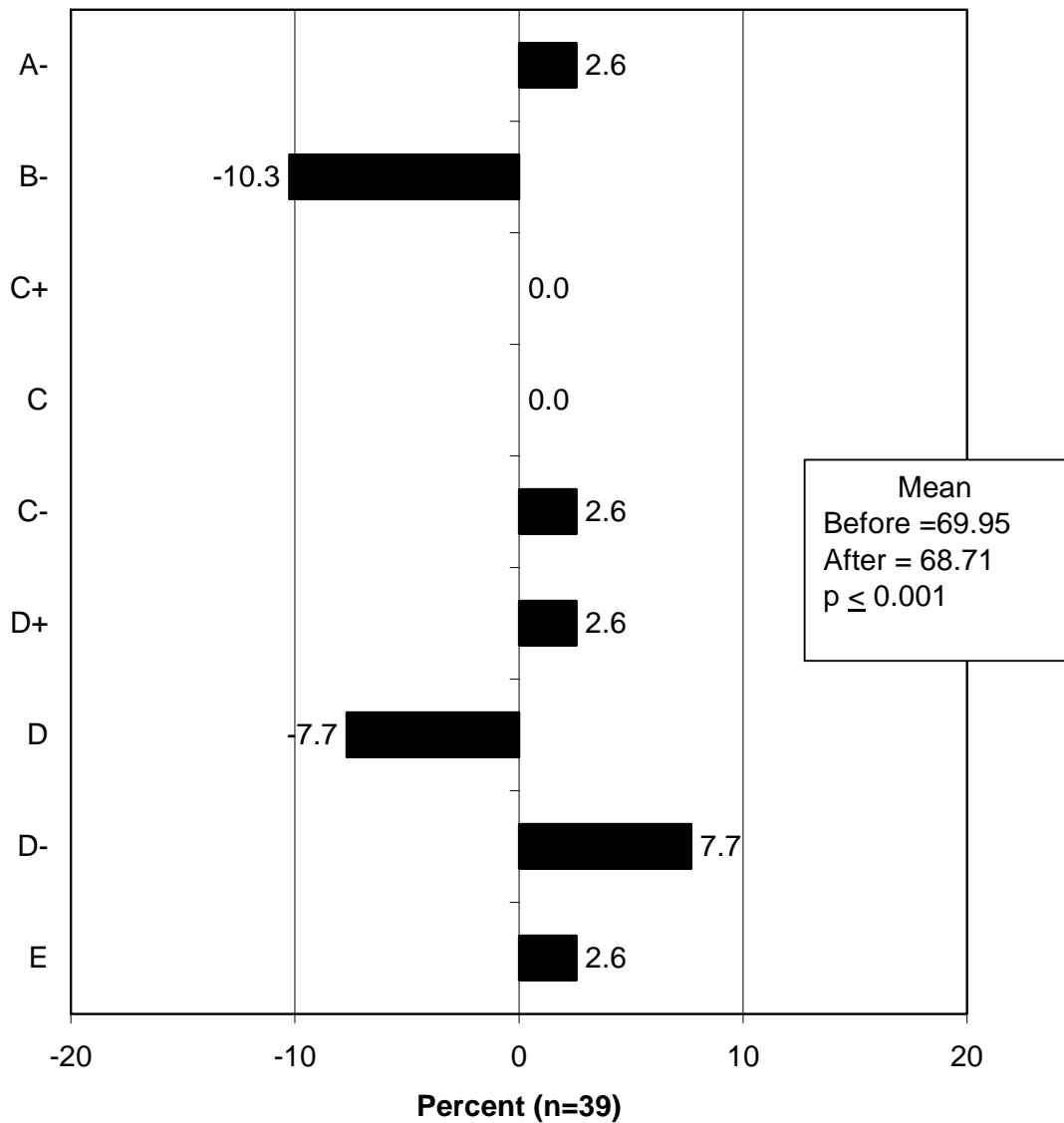


Figure 25. Difference in Percentage Receiving Grades in Writing Among Below Average 6th, 7th, and 8th Graders

Difference between the means of the student's writing grades, pre-program and post-program.

Note that all values are statistically significant ($p \leq 0.05$).

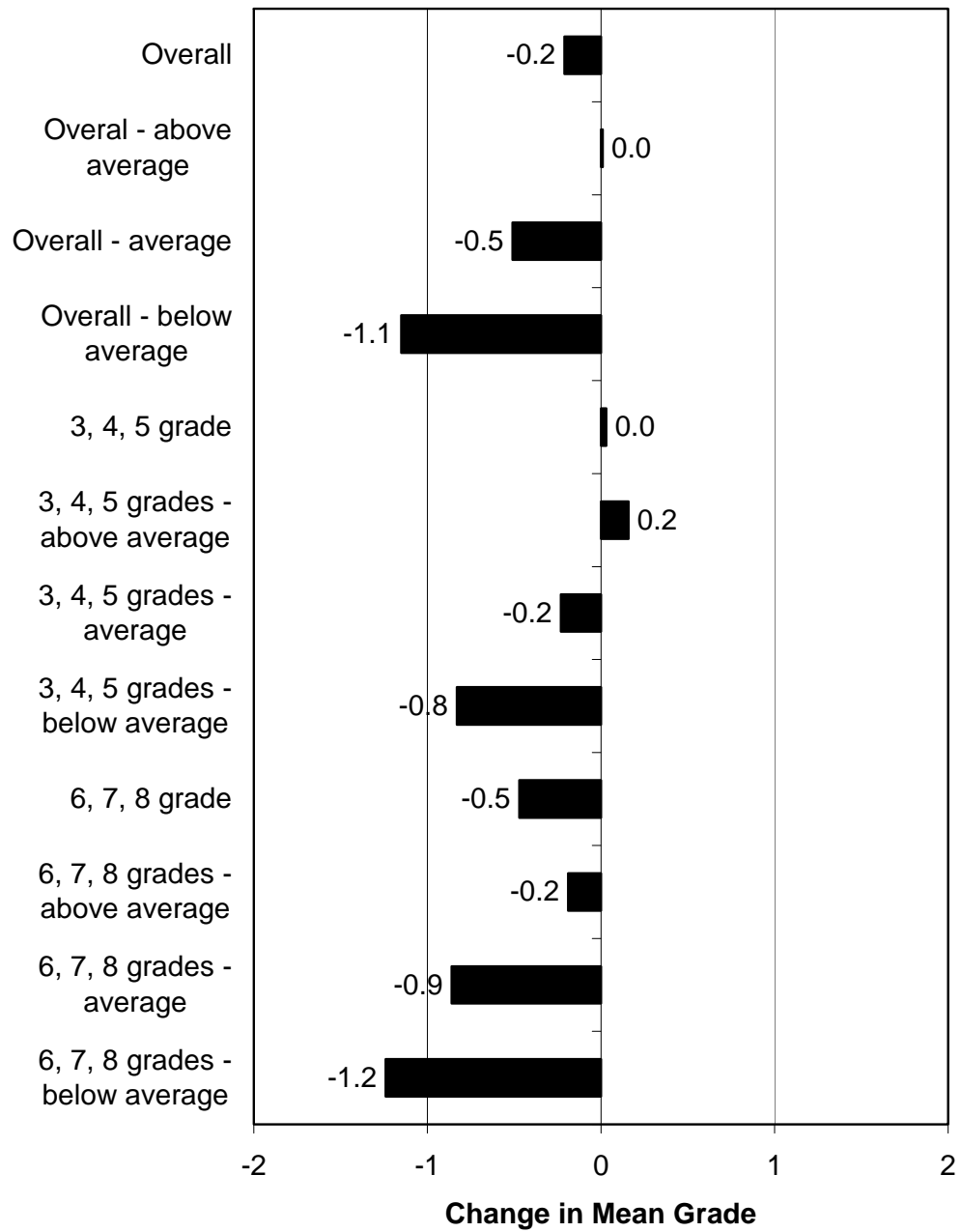


Figure 26. Difference in Mean Grades in Writing—All Groups

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program.

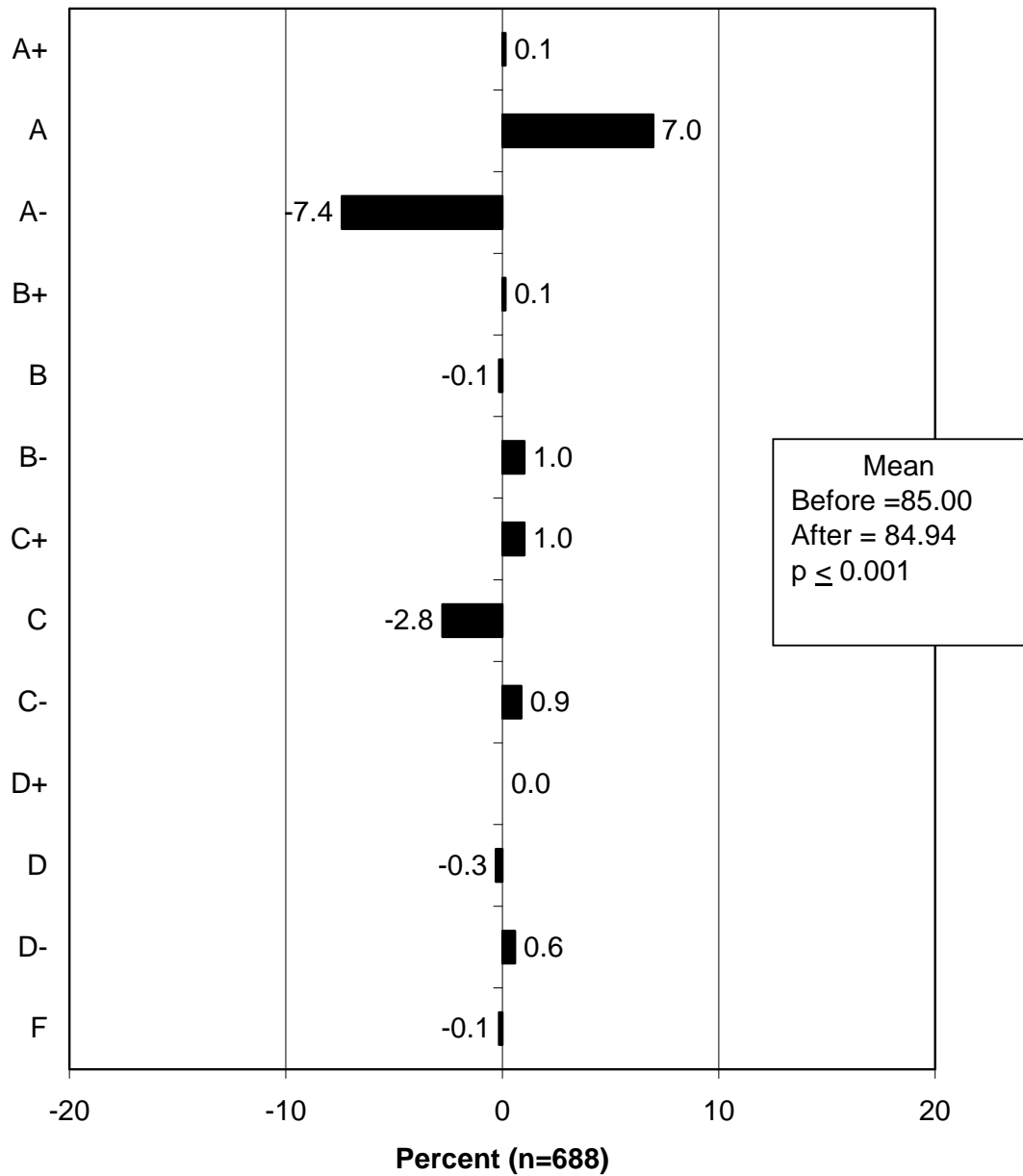


Figure 27. Difference in Percentage Receiving Grades in English Overall

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among students who receive above average grades overall).

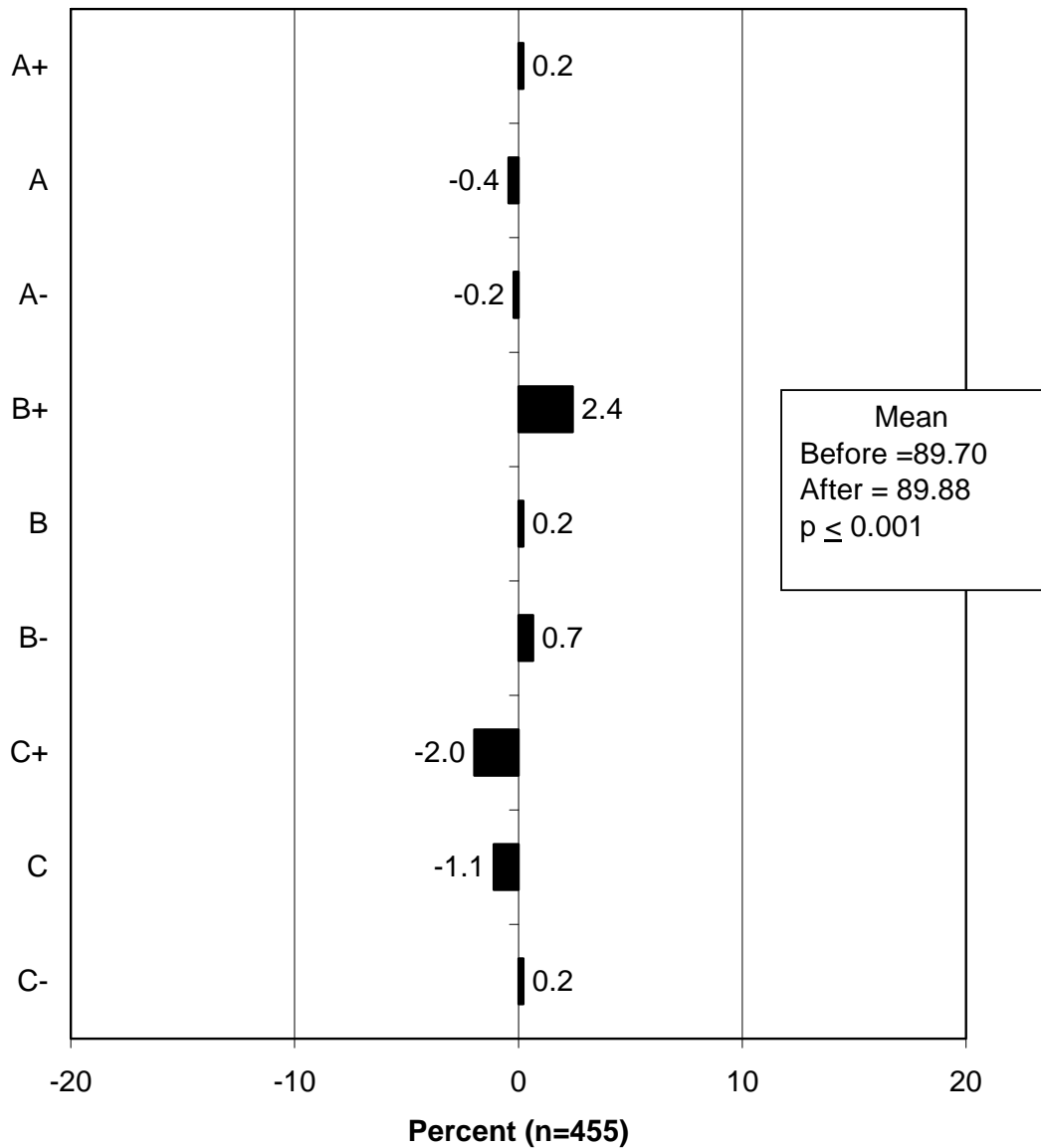


Figure 28. Difference in Percentage Receiving Grades in English Among Above Average Students

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among students who receive average grades overall).

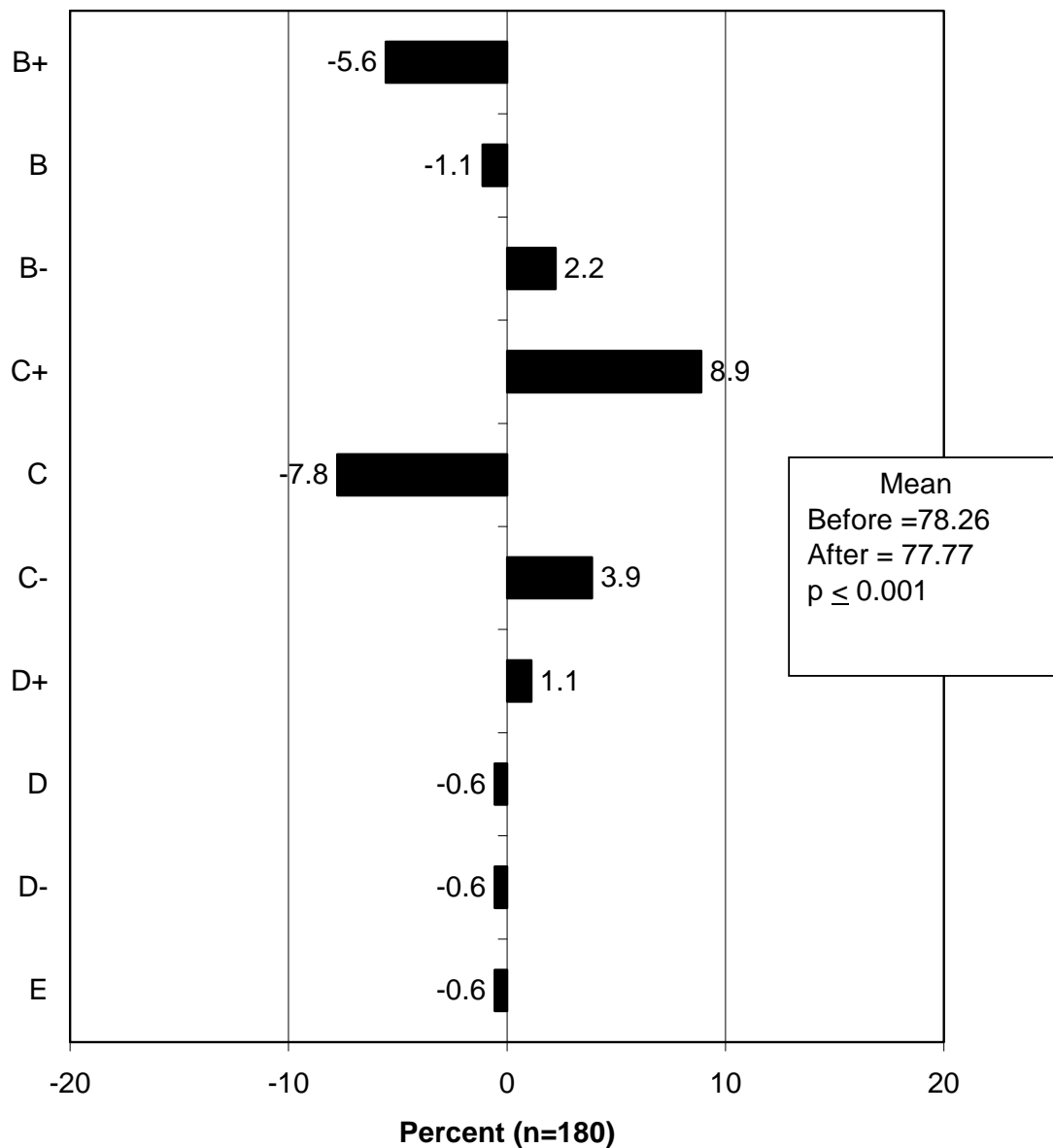


Figure 29. Difference in Percentage Receiving Grades in English Among Average Students

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among students who receive below average grades overall).

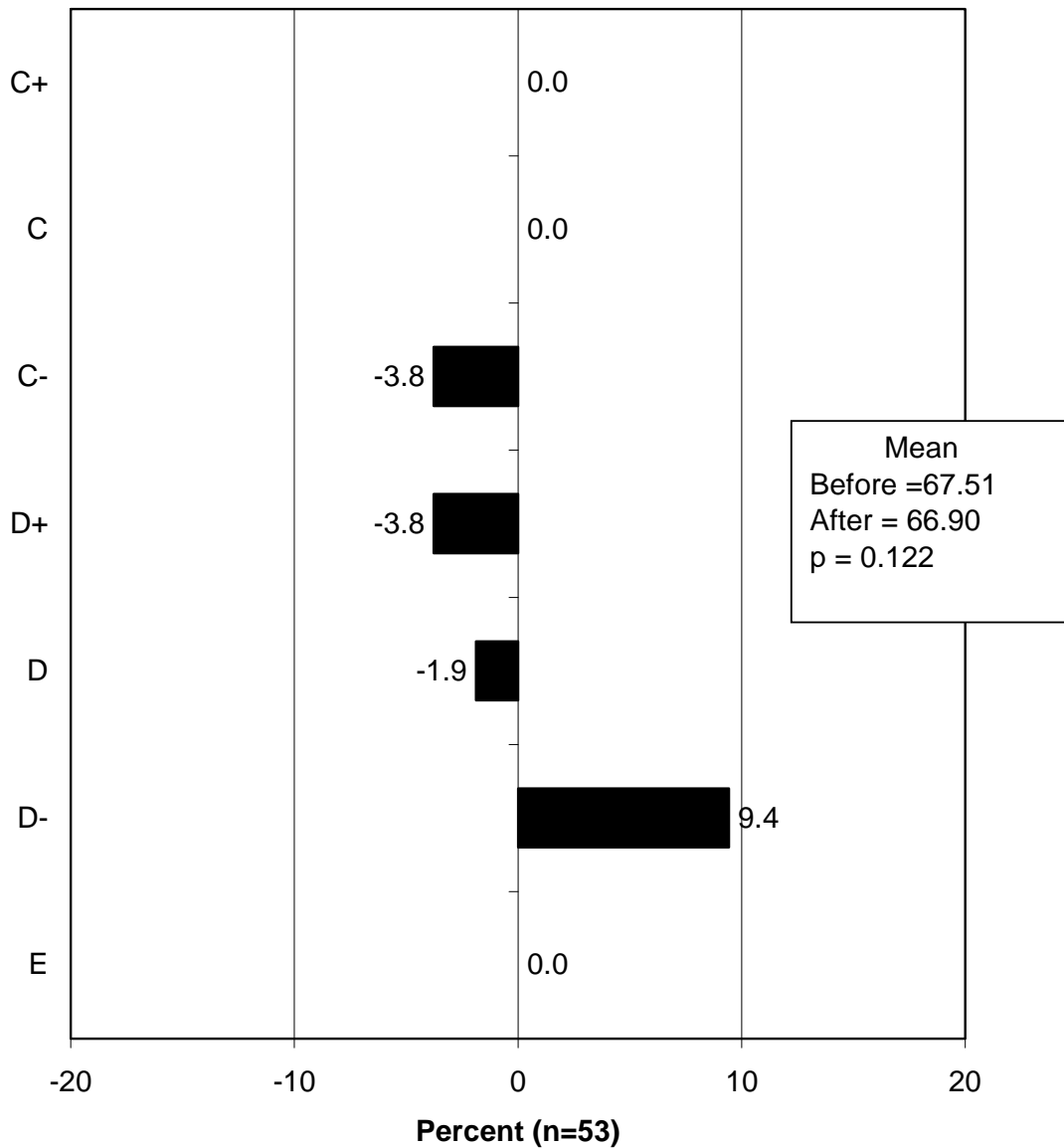


Figure 30. Difference in Percentage Receiving Grades in English Among Below Average Students

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among all 3rd, 4th, and 5th grade students).

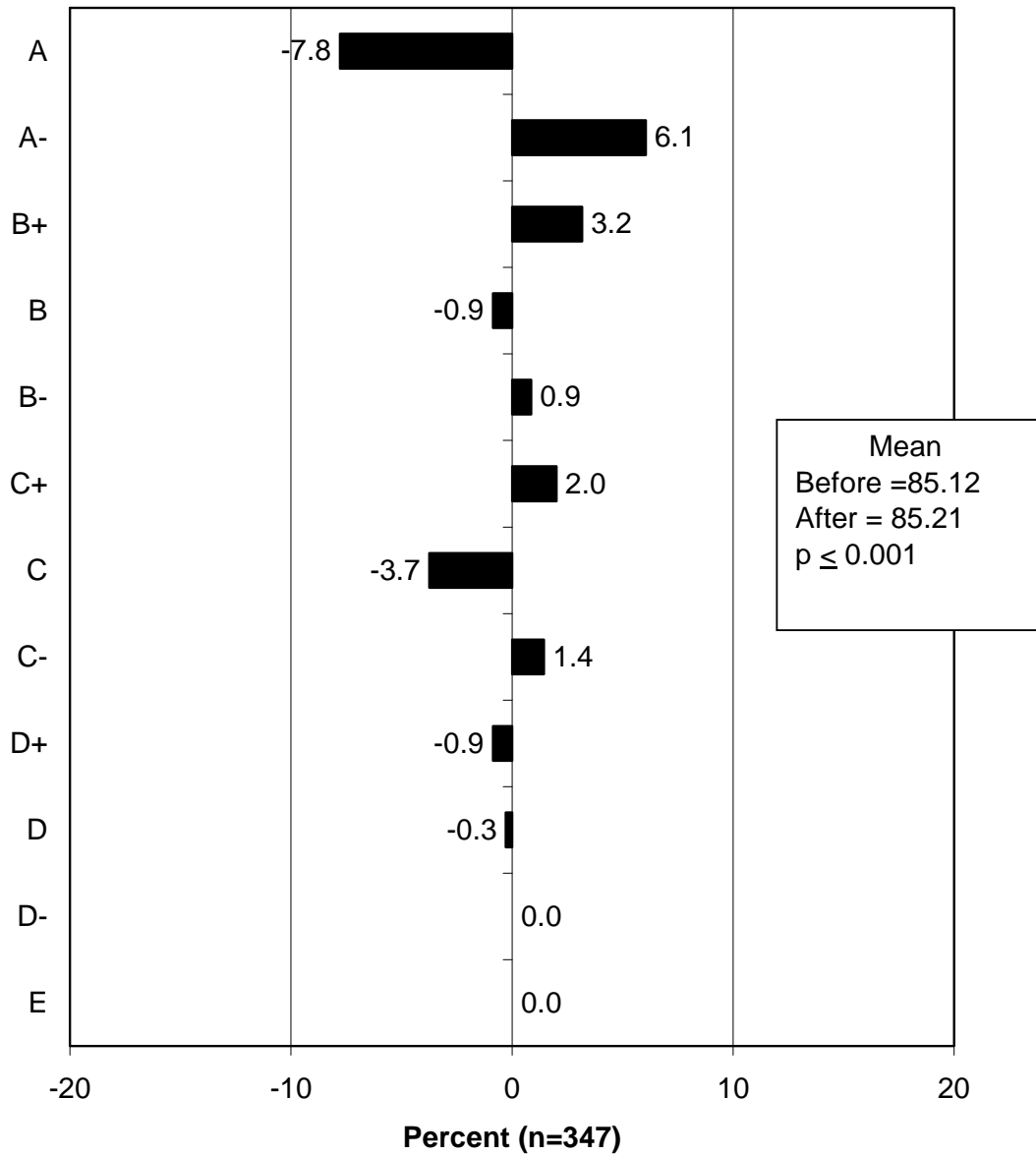


Figure 31. Difference in Percentage Receiving Grades in English Among 3rd, 4th, and 5th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive above average grades overall).

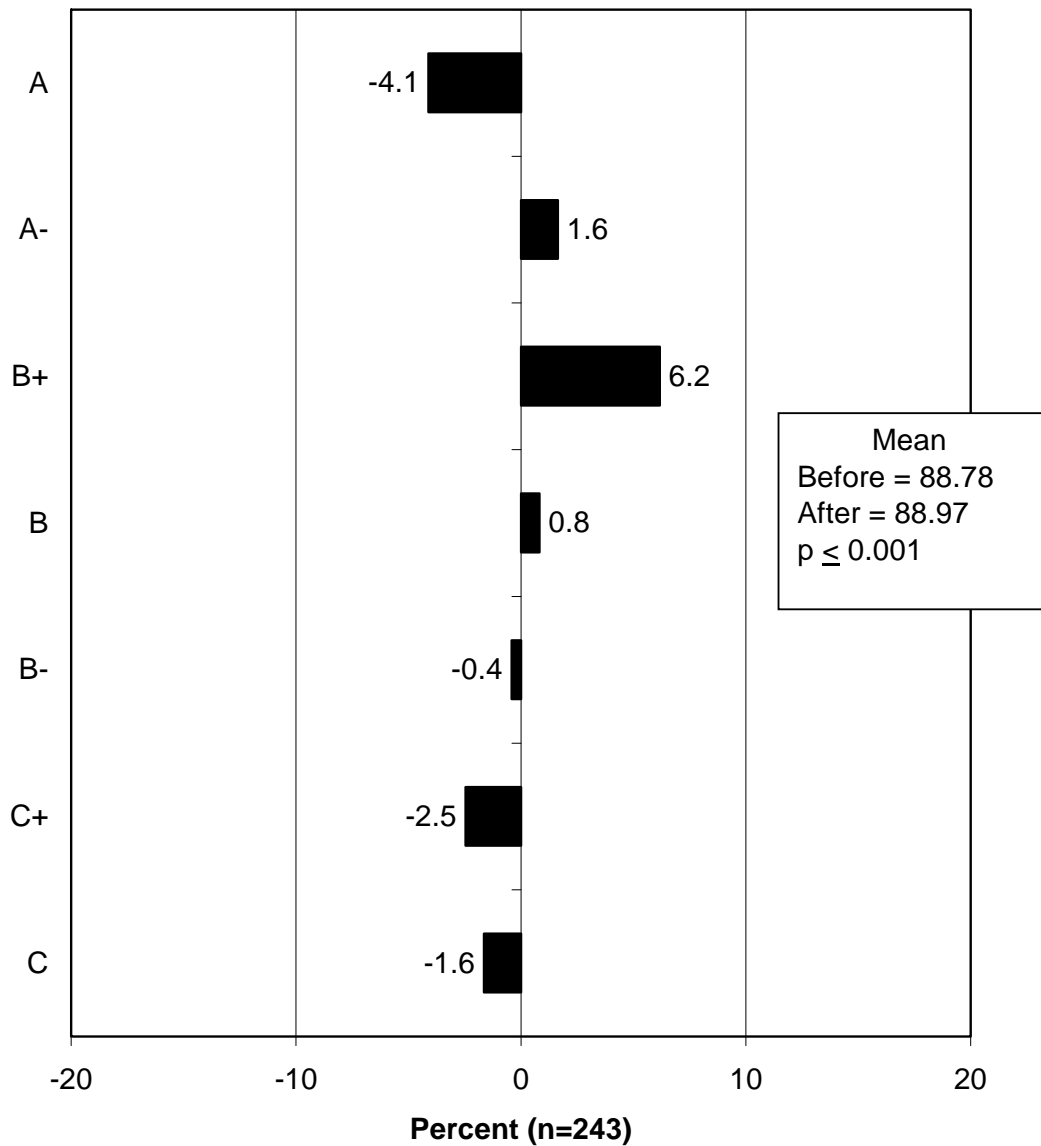


Figure 32. Difference in Percentage Receiving Grades in English Among Above Average 3rd, 4th, and 5th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive average grades overall).

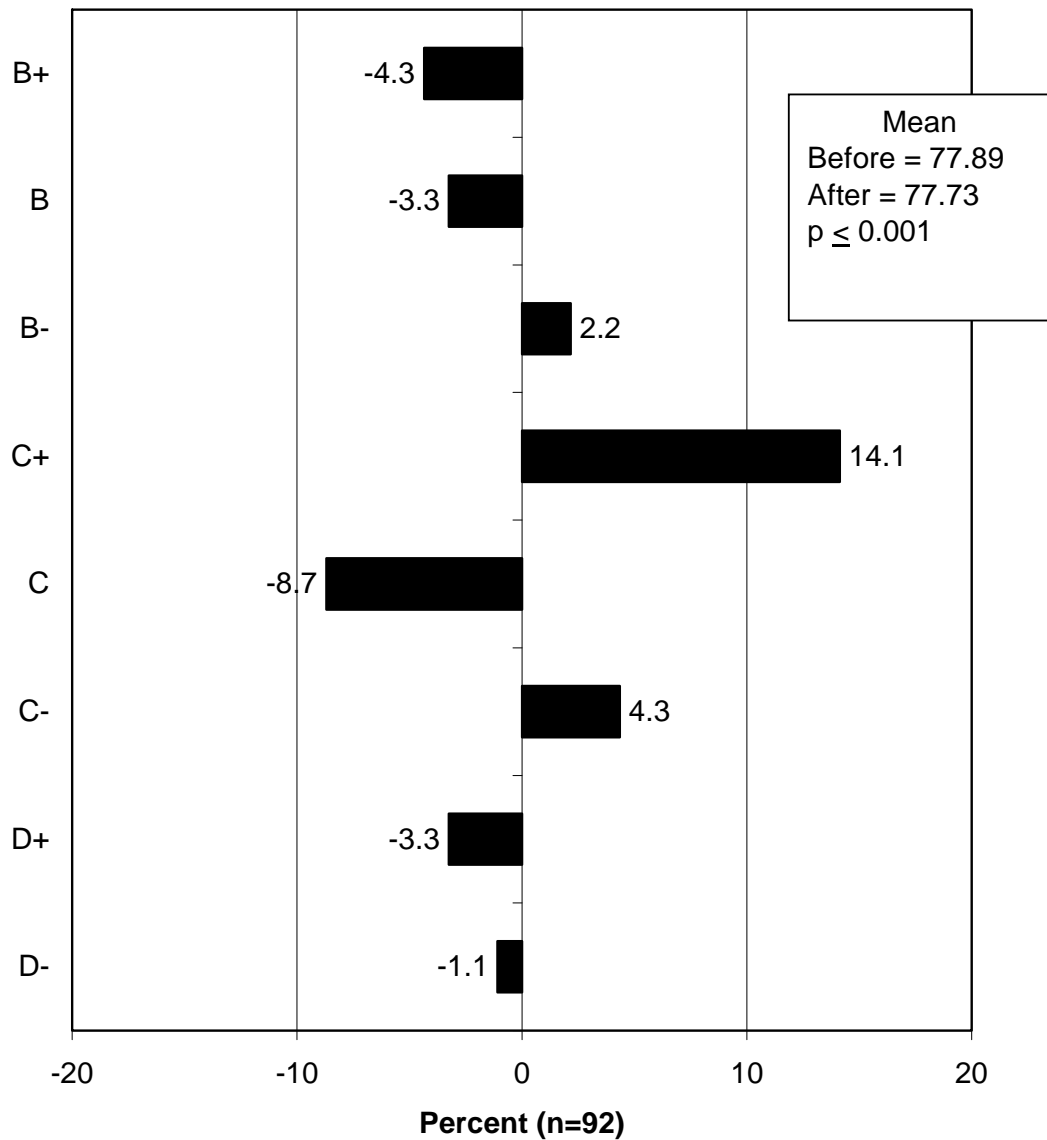


Figure 33. Difference in Percentage Receiving Grades in English Among Average 3rd, 4th, and 5th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive below average grades overall).

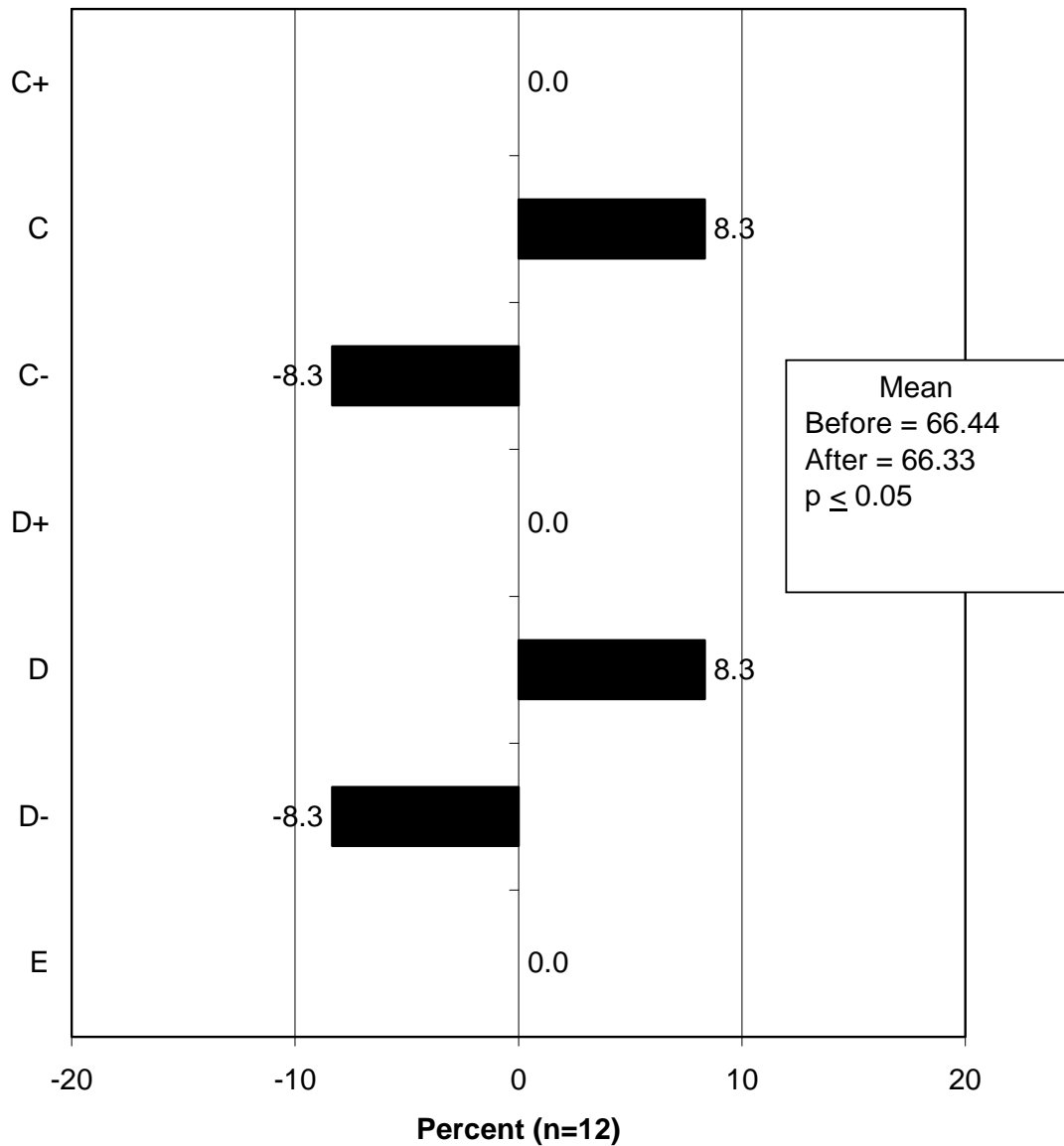


Figure 34. Difference in Percentage Receiving Grades in English Among Below Average 3rd, 4th, and 5th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among all 6th, 7th, and 8th grade students).

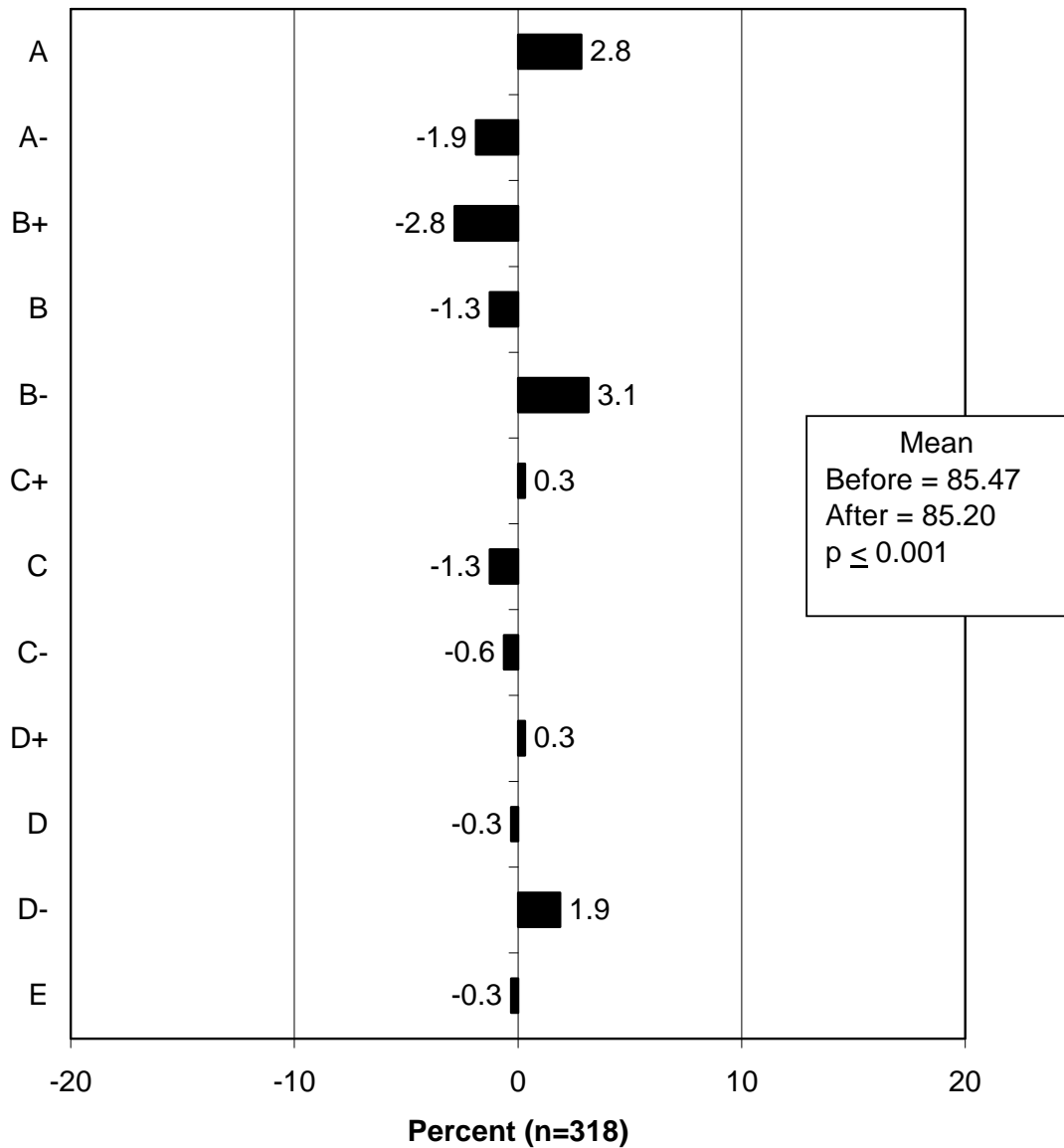


Figure 35. Difference in Percentage Receiving Grades in English Among 6th, 7th, and 8th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among 6th, 7th, and 8th grade students who receive above average grades overall).

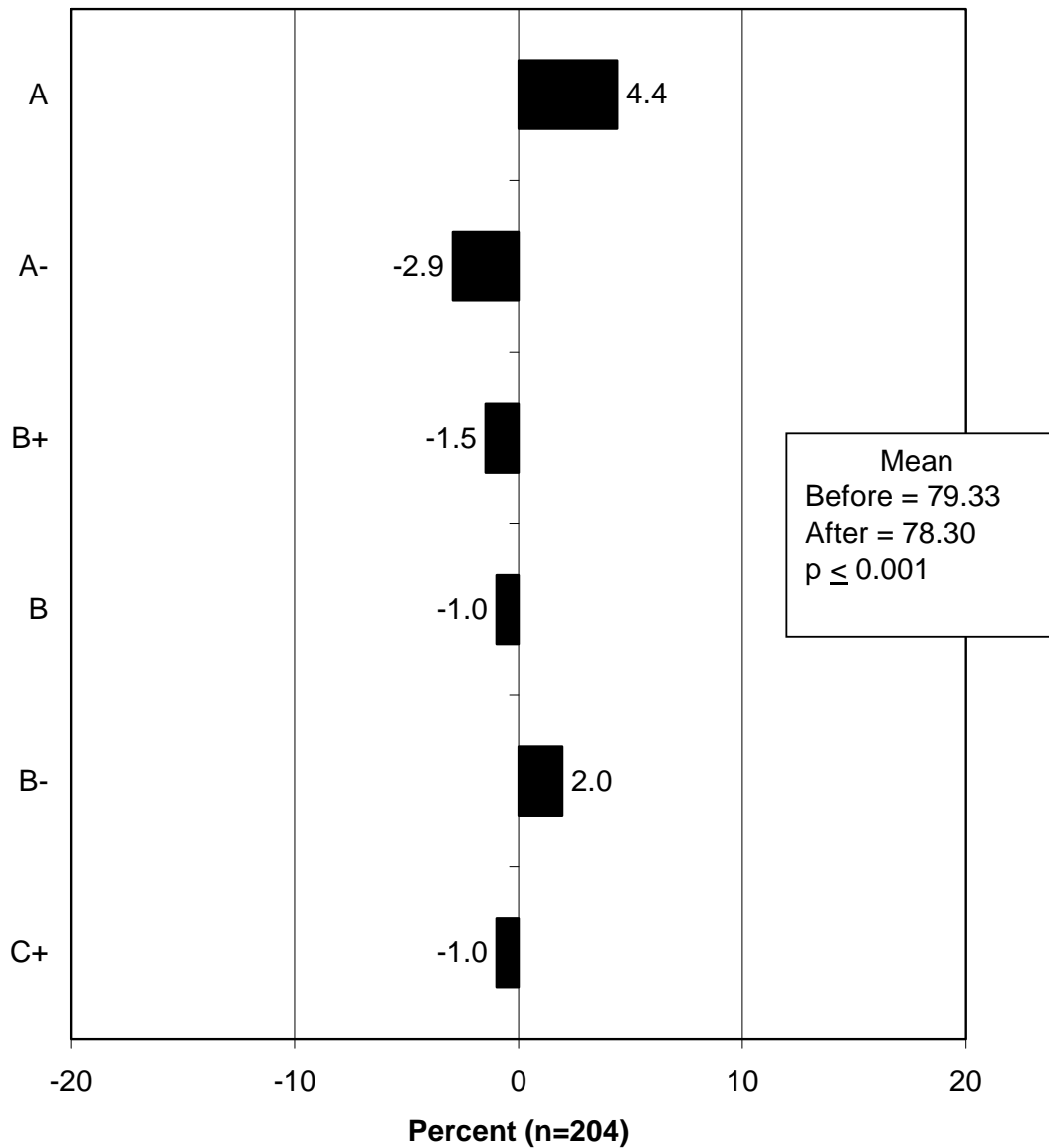


Figure 36. Difference in Percentage Receiving Grades in English Among Above Average 6th, 7th, and 8th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among 6th, 7th, and 8th grade students who receive average grades overall).

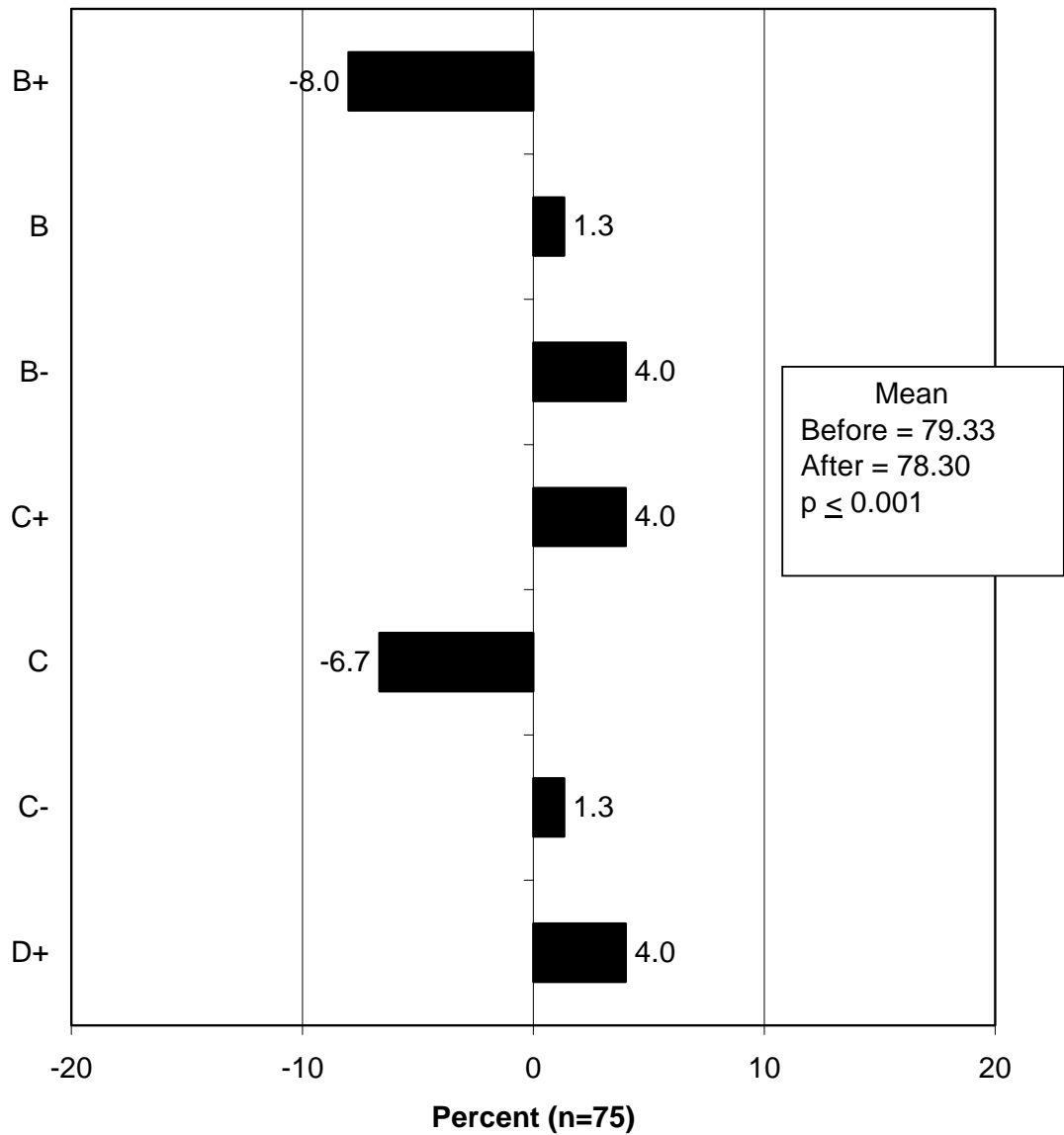


Figure 37. Difference in Percentage Receiving Grades in English Among Average 6th, 7th, and 8th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among 6th, 7th, and 8th grade students who receive below average grades overall).

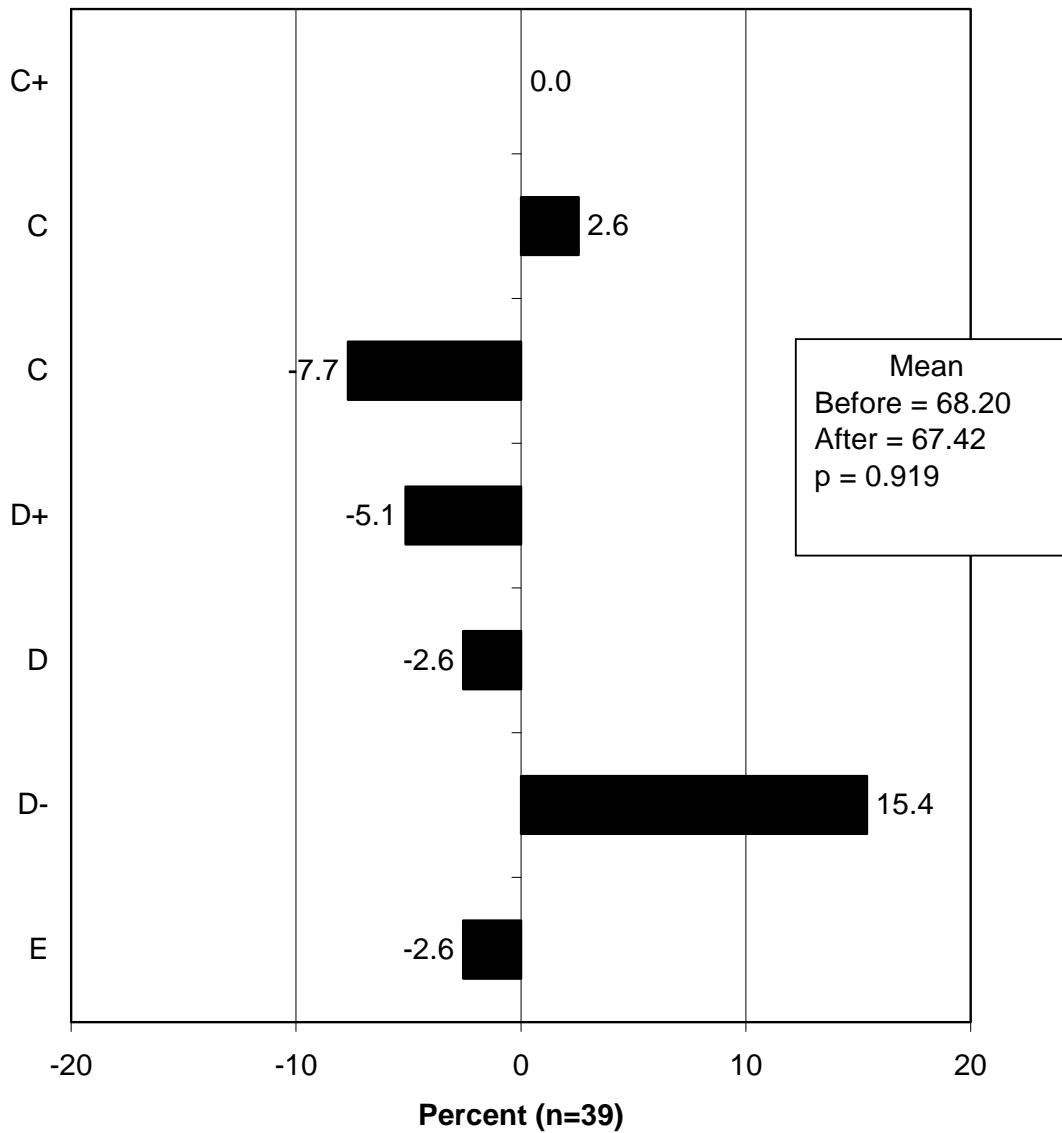


Figure 38. Difference in Percentage Receiving Grades in English Among Below Average 6th, 7th, and 8th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among all 9th, 10th, and 11th grade students).

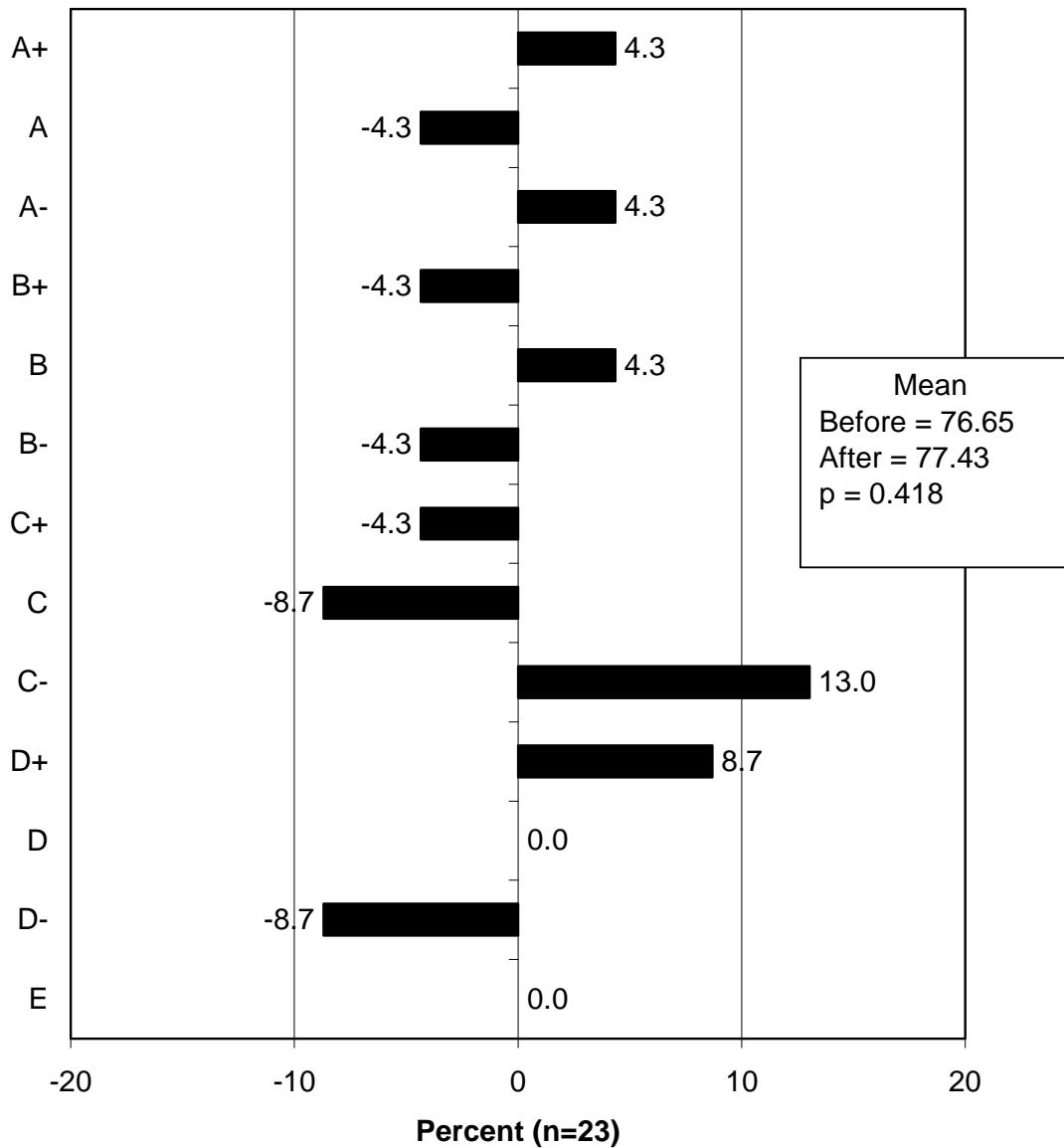


Figure 39. Difference in Percentage Receiving Grades in English Among 9th, 10th, and 11th Graders

What grades did the student receive in English before and after the archery program?

Difference in percentage receiving each grade in English, pre-program to post-program (among 9th, 10th, and 11th grade students who receive average grades overall).

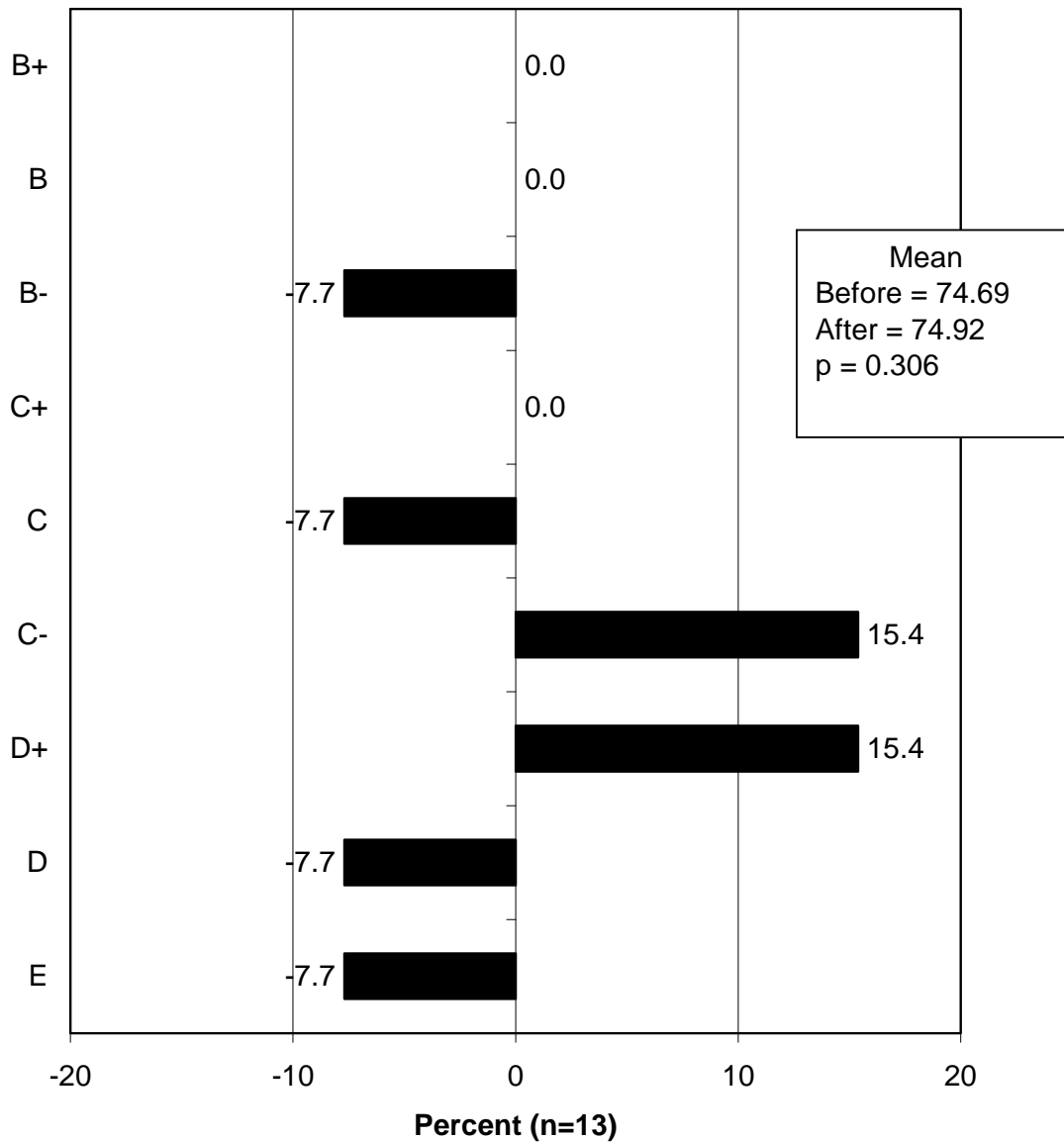


Figure 40. Difference in Percentage Receiving Grades in English Among Average 9th, 10th, and 11th Graders

Difference between the means of the student's English grades, pre-program and post-program.

Note that not all changes are statistically significant; does not show groups with sample sizes of fewer than 10 respondents.

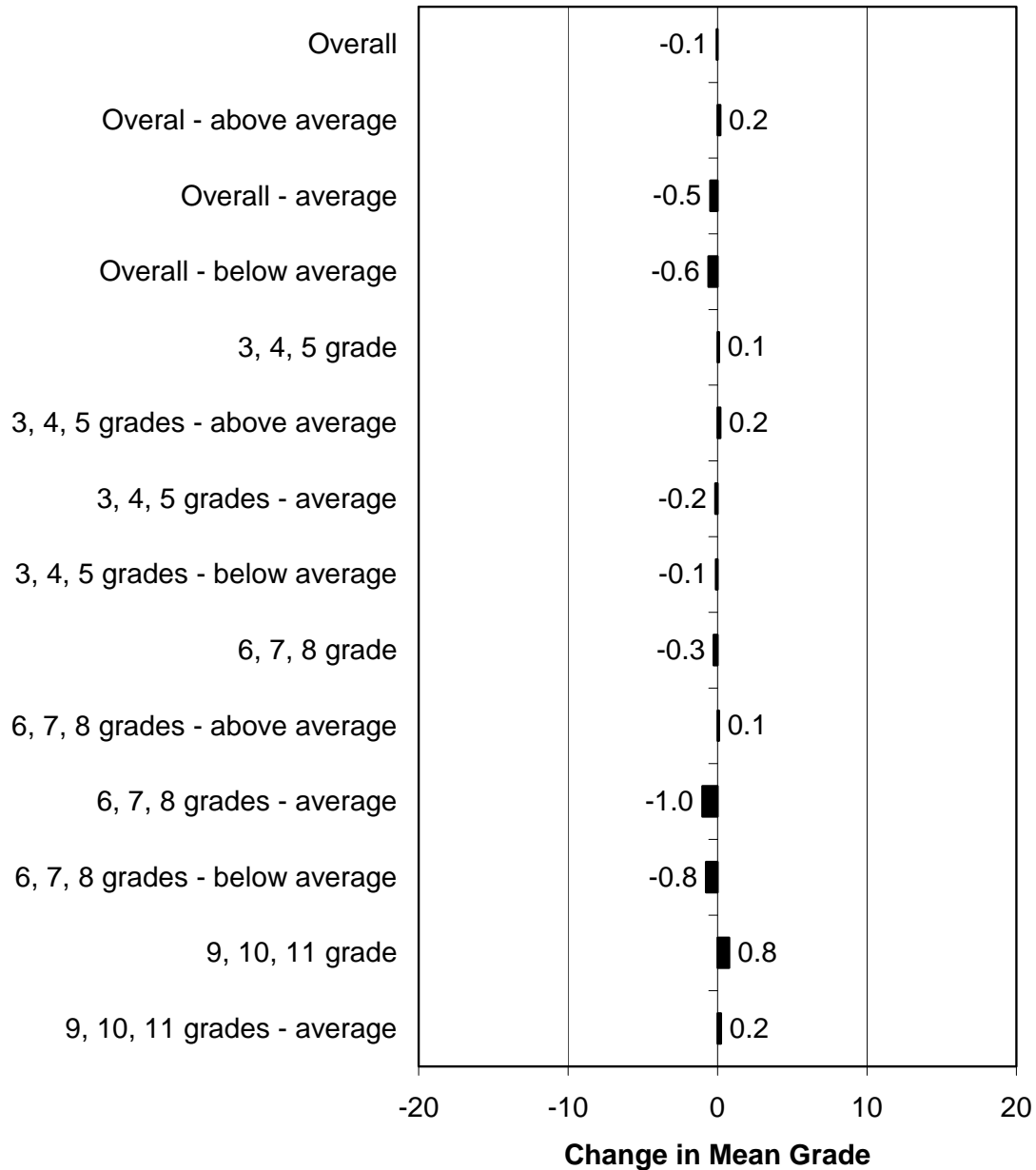


Figure 41. Difference in Mean Grades in English—All Groups

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program.

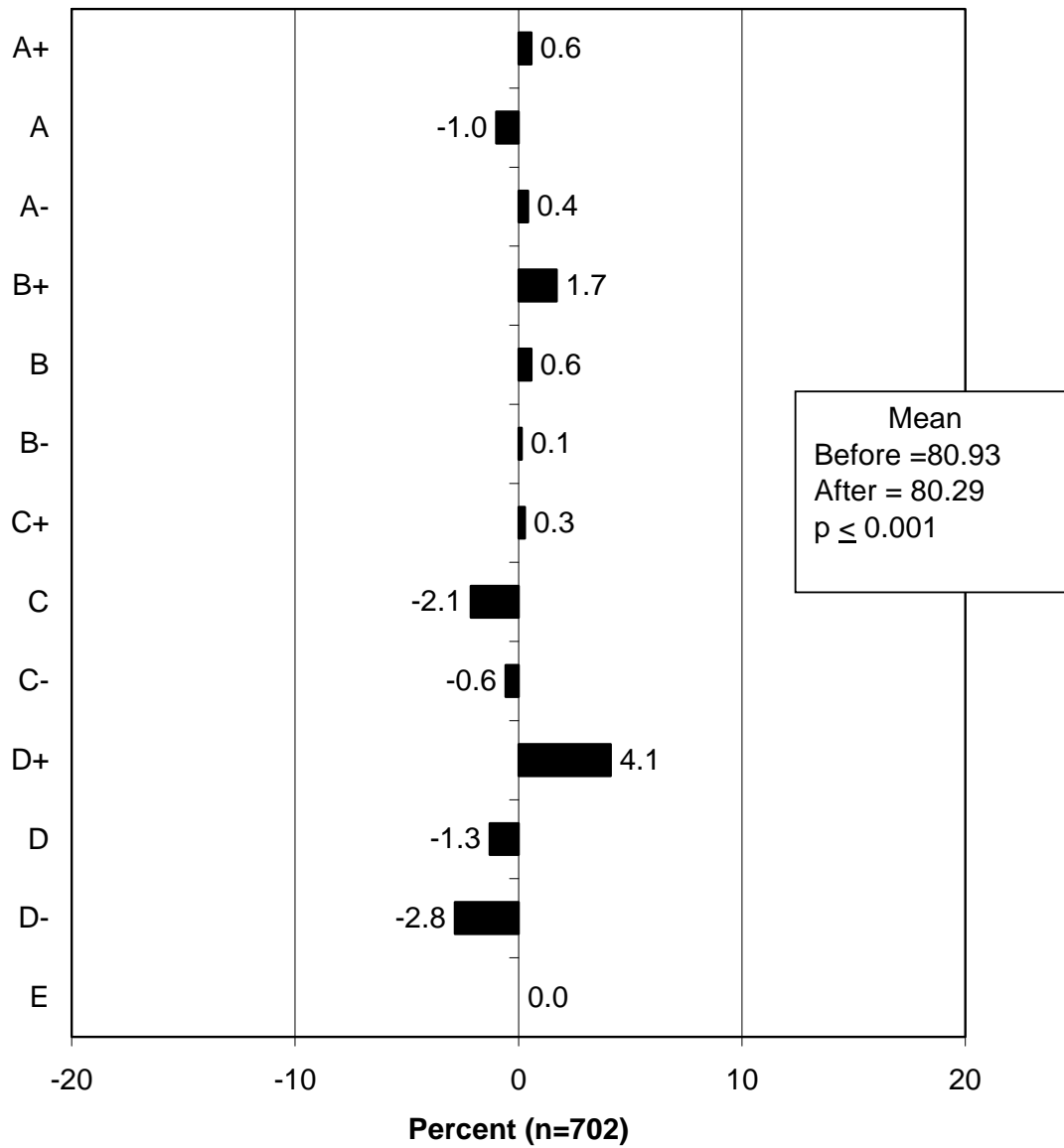


Figure 42. Difference in Percentage Receiving Grades in Math Overall

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among students who receive above average grades overall).

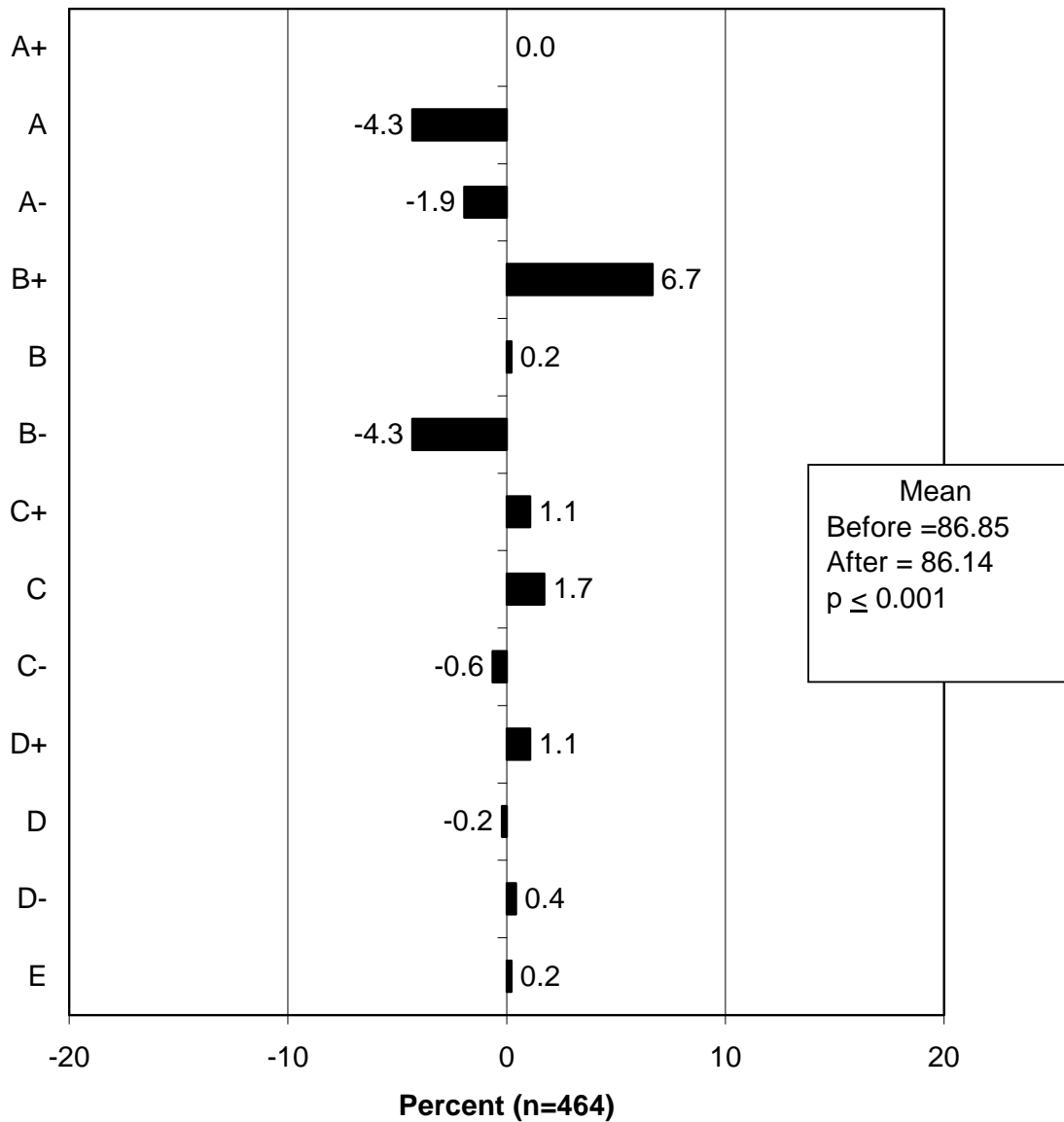


Figure 43. Difference in Percentage Receiving Grades in Math Among Above Average Students

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among students who receive average grades overall).

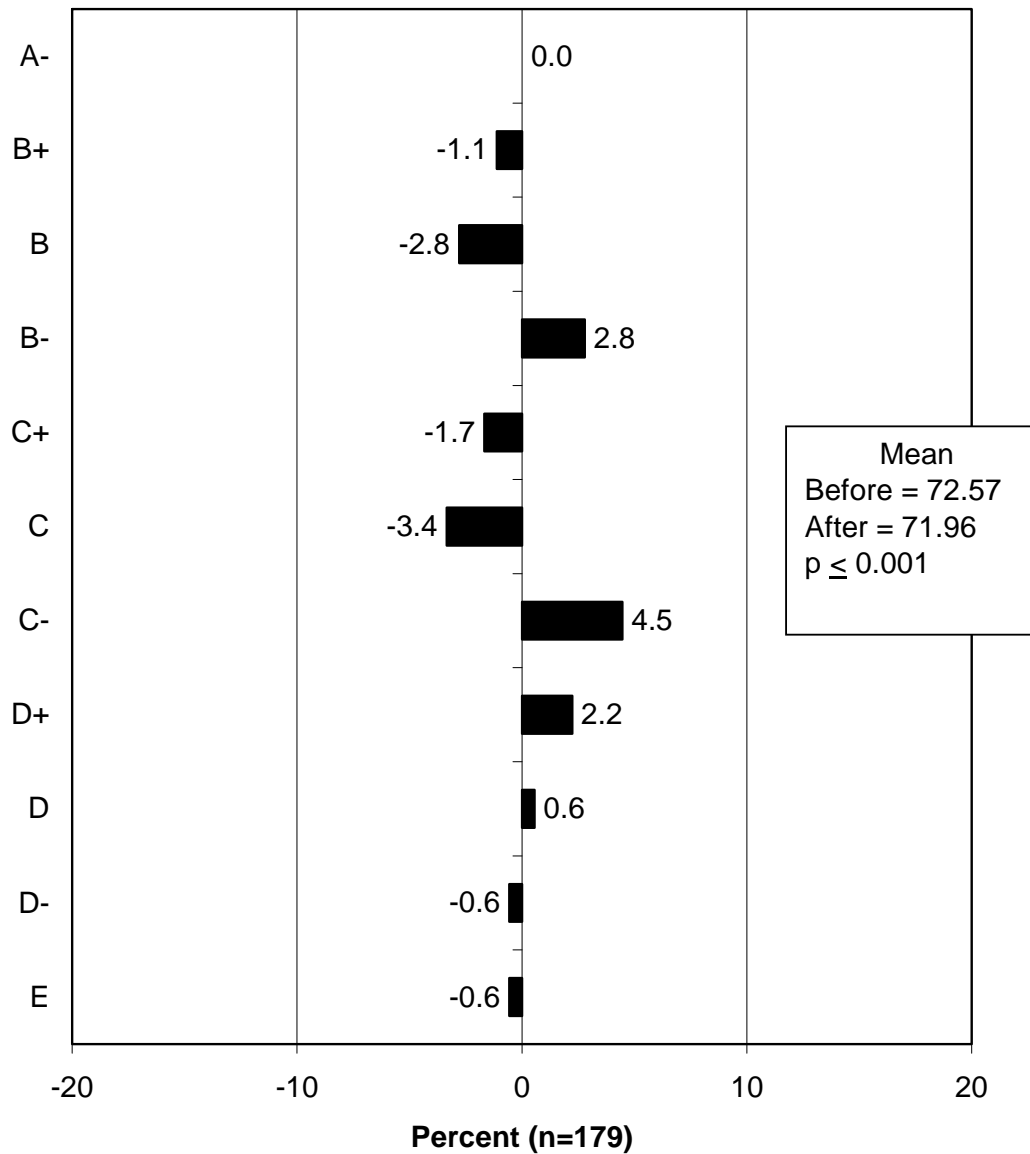


Figure 44. Difference in Percentage Receiving Grades in Math Among Average Students

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among students who receive below average grades overall).

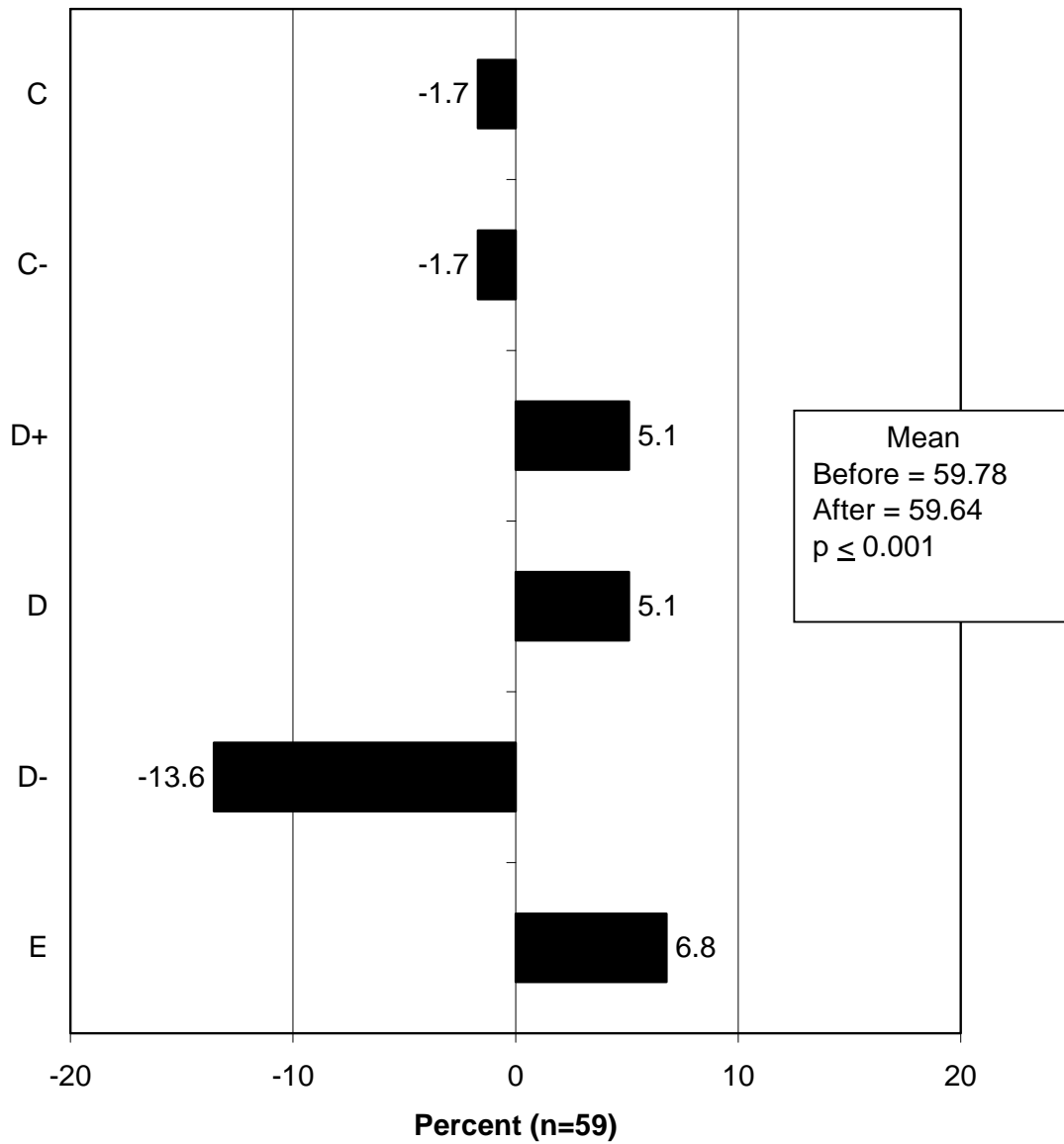


Figure 45. Difference in Percentage Receiving Grades in Math Among Below Average Students

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among all 3rd, 4th, and 5th grade students).

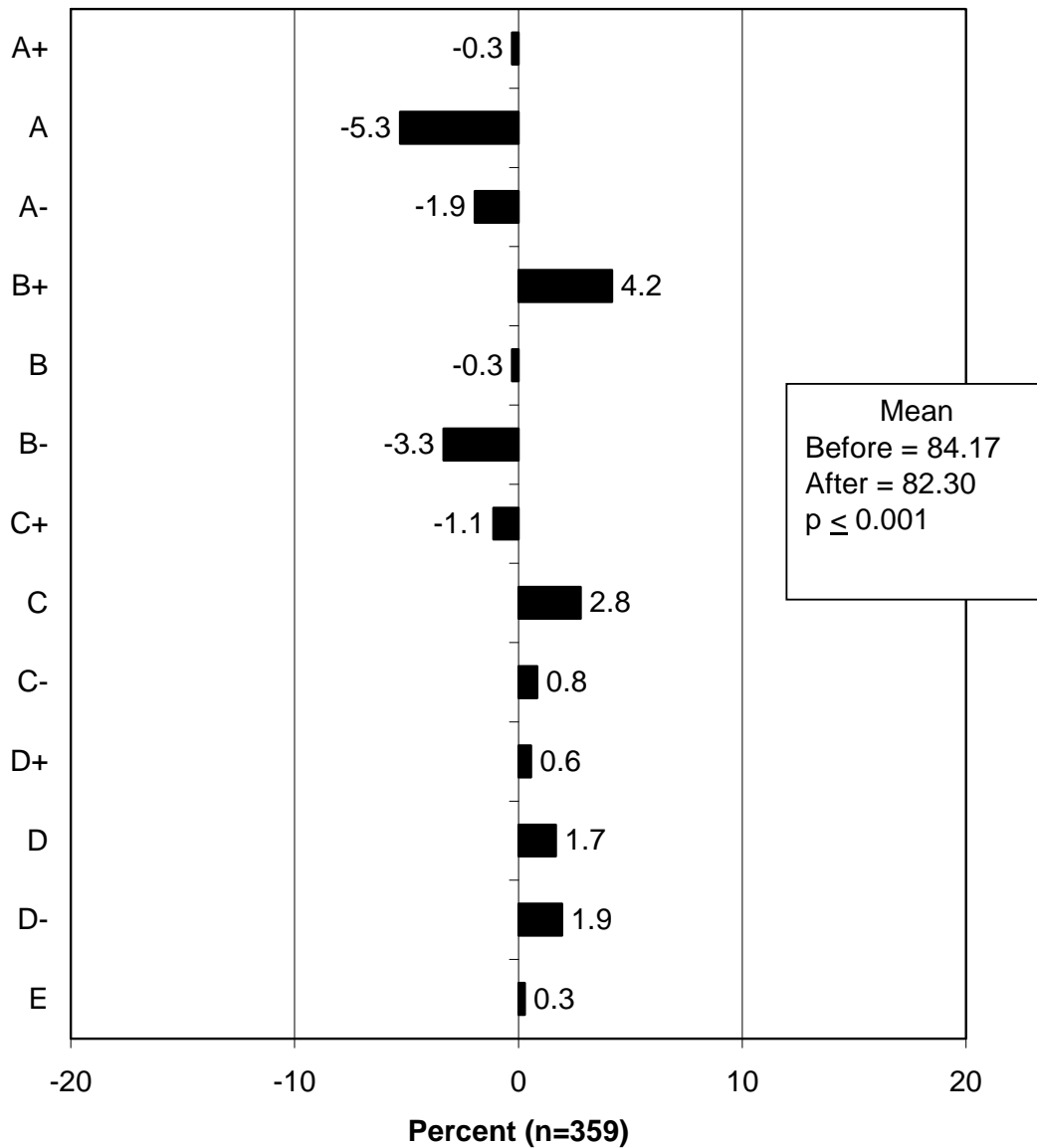


Figure 46. Difference in Percentage Receiving Grades in Math Among 3rd, 4th, and 5th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive above average grades overall).

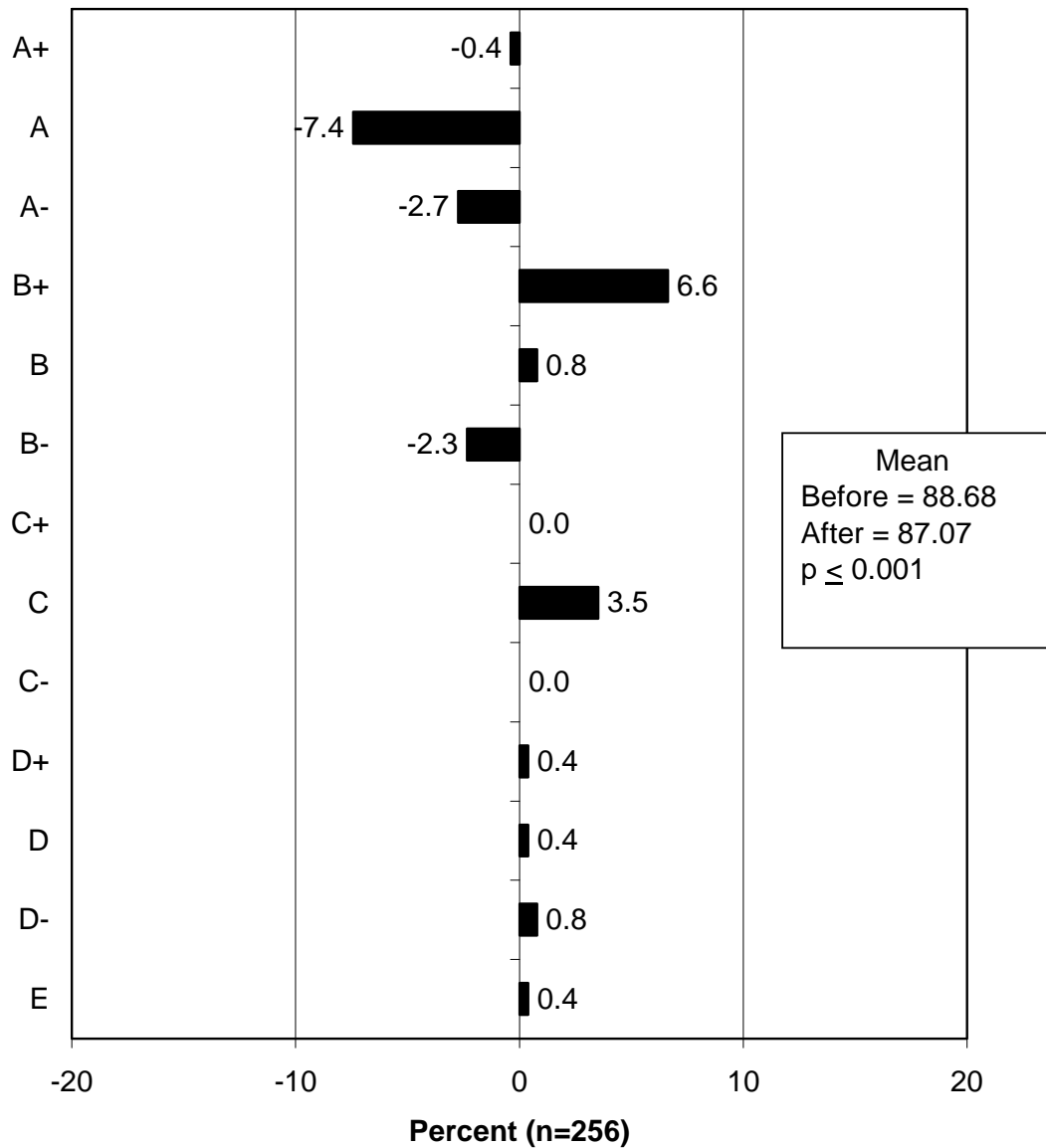


Figure 47. Difference in Percentage Receiving Grades in Math Among Above Average 3rd, 4th, and 5th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive average grades overall).

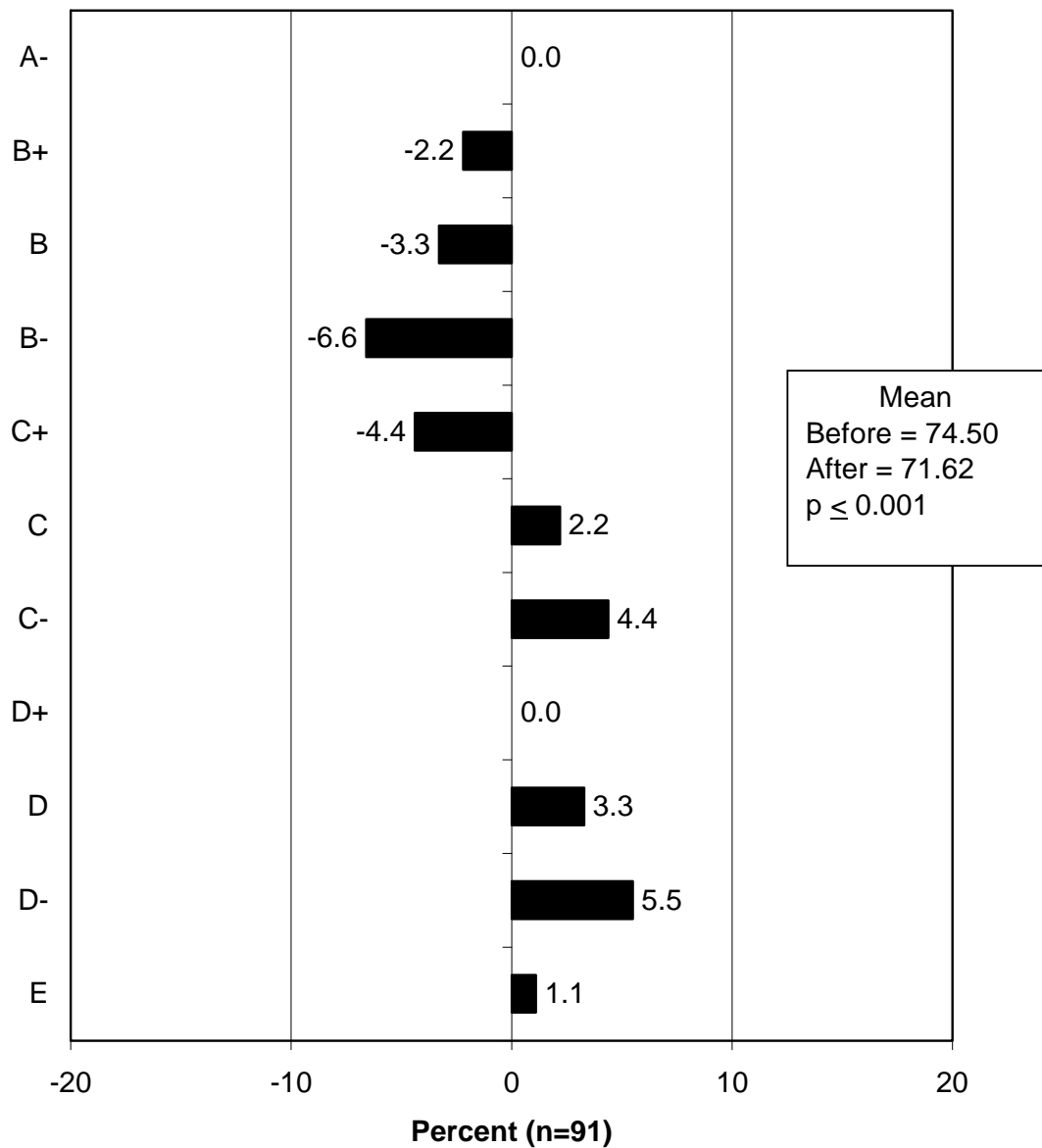


Figure 48. Difference in Percentage Receiving Grades in Math Among Average 3rd, 4th, and 5th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive below average grades overall).

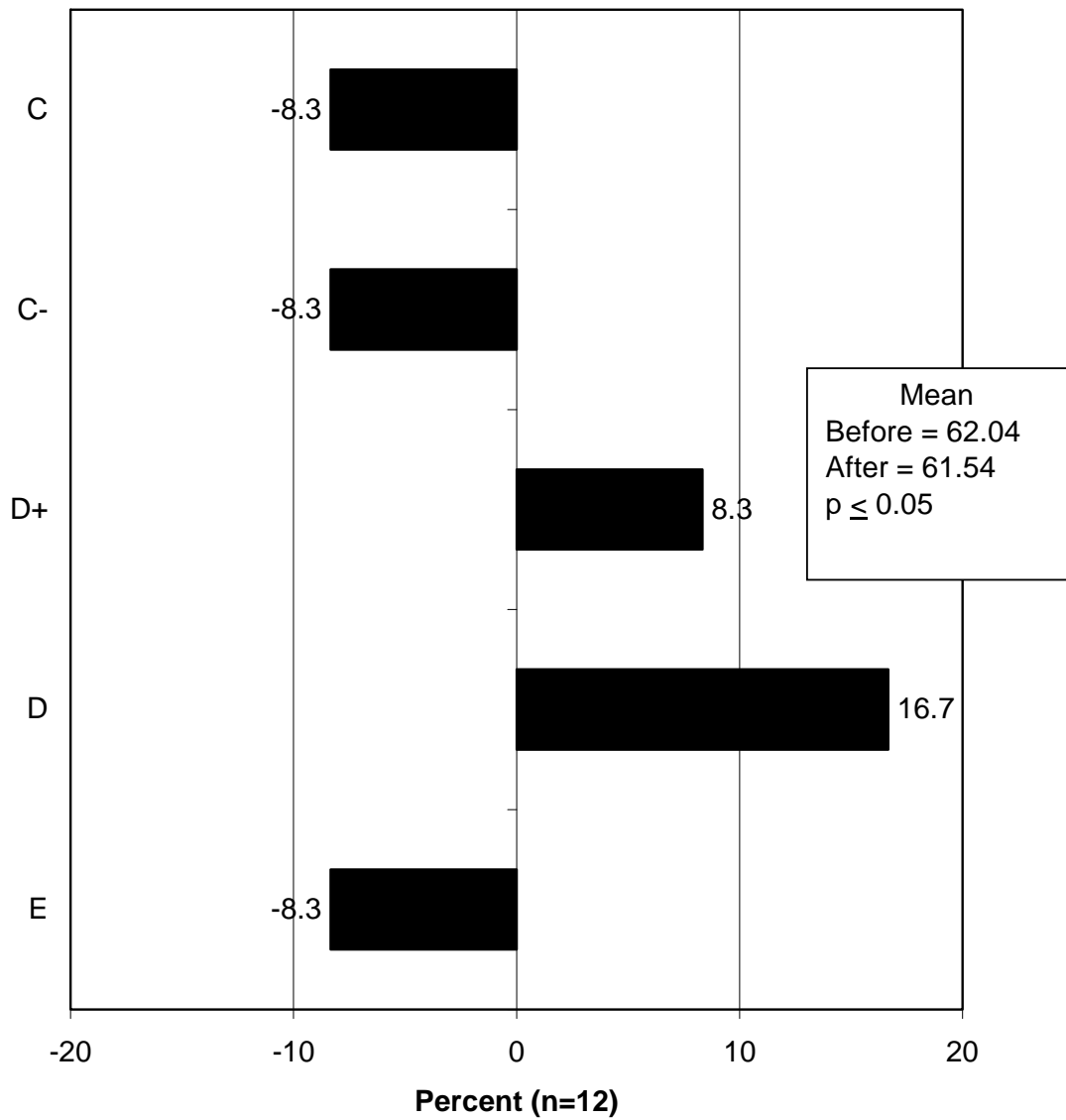


Figure 49. Difference in Percentage Receiving Grades in Math Among Below Average 3rd, 4th, and 5th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among all 6th, 7th, and 8th grade students).

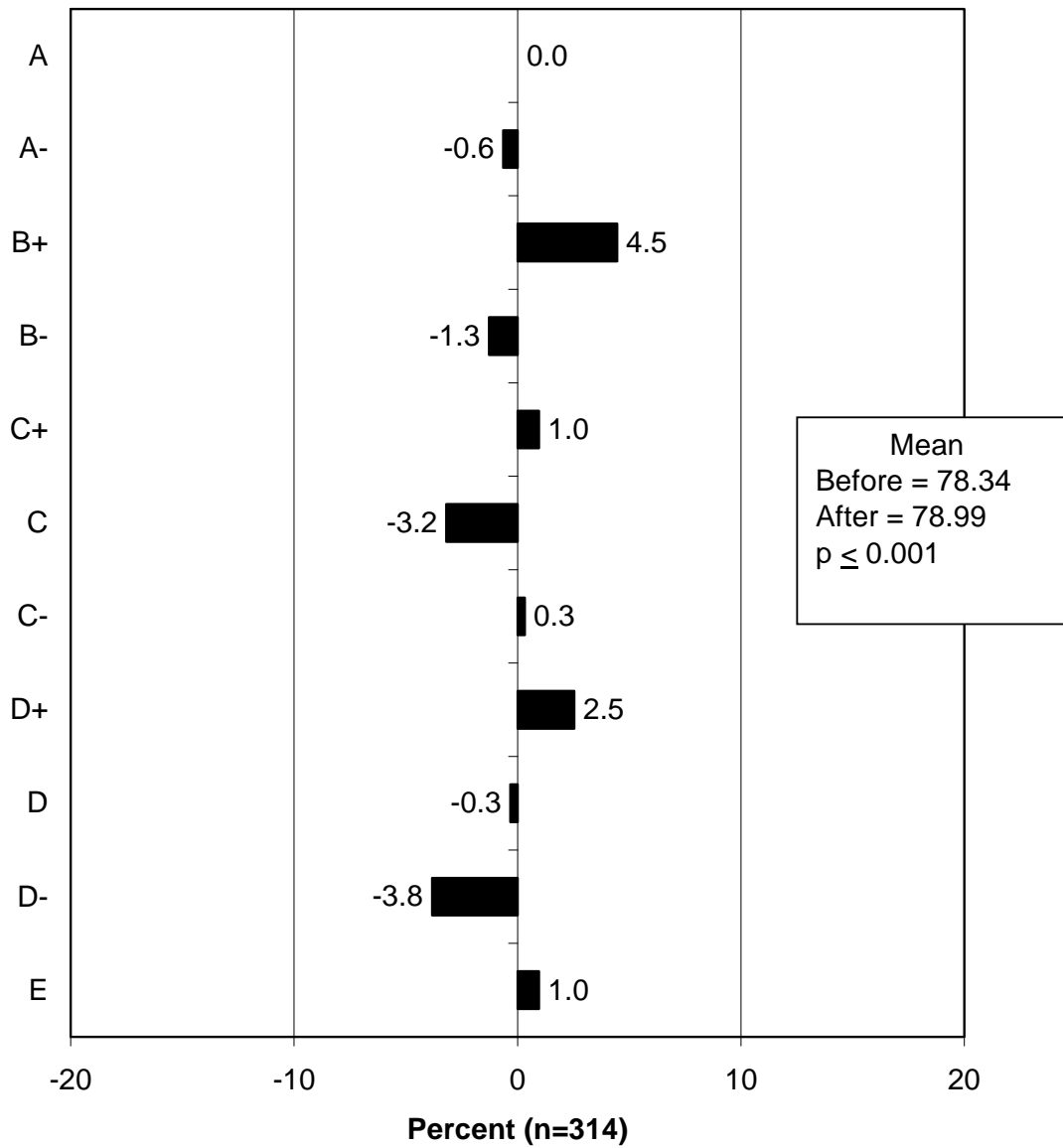


Figure 50. Difference in Percentage Receiving Grades in Math Among 6th, 7th, and 8th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among 6th, 7th, and 8th grade students who receive above average grades overall).

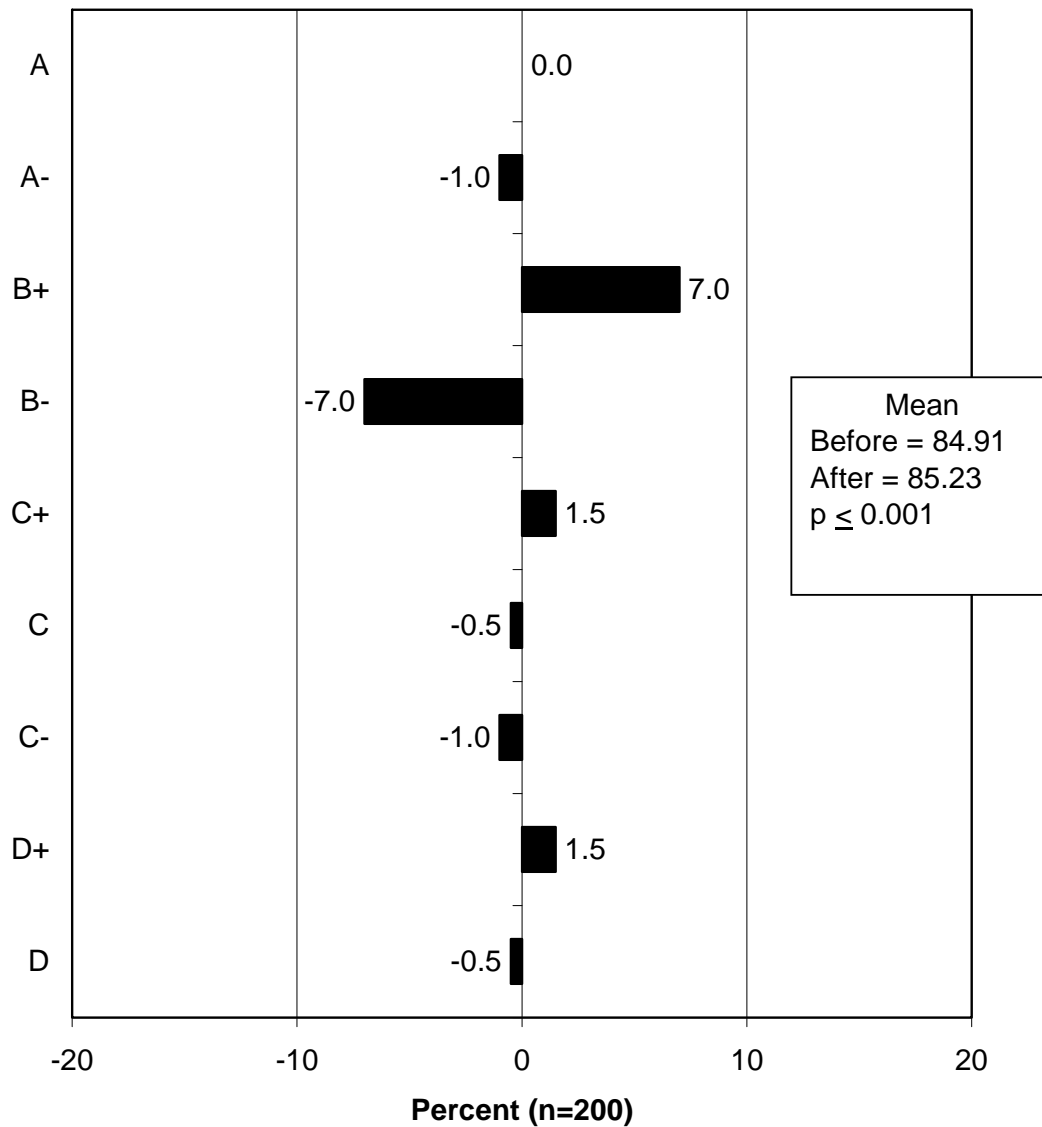


Figure 51. Difference in Percentage Receiving Grades in Math Among Above Average 6th, 7th, and 8th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among 6th, 7th, and 8th grade students who receive average grades overall).

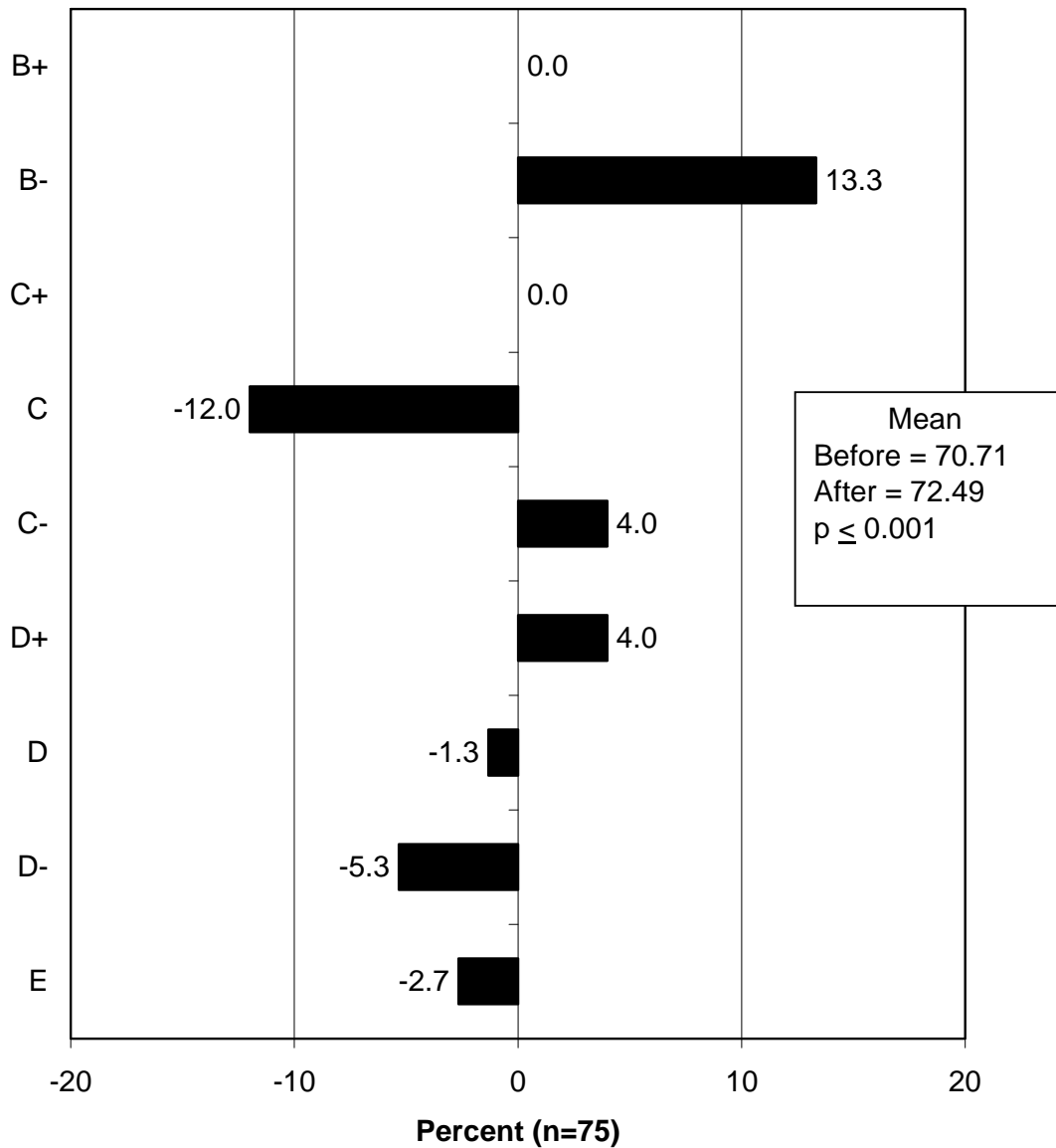


Figure 52. Difference in Percentage Receiving Grades in Math Among Average 6th, 7th, and 8th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among 6th, 7th, and 8th grade students who receive below average grades overall).

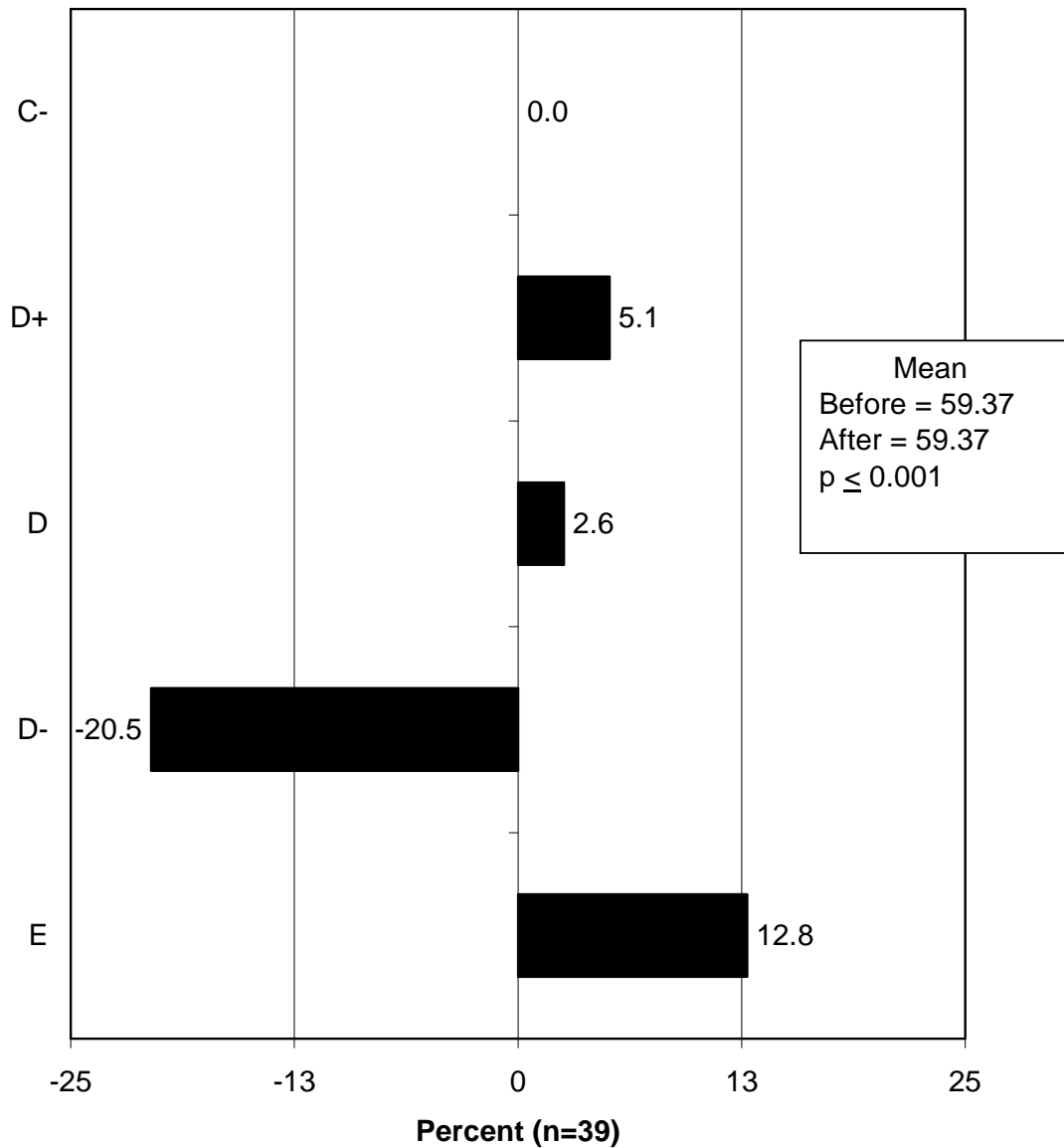


Figure 53. Difference in Percentage Receiving Grades in Math Among Below Average 6th, 7th, and 8th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among all 9th, 10th, and 11th grade students).

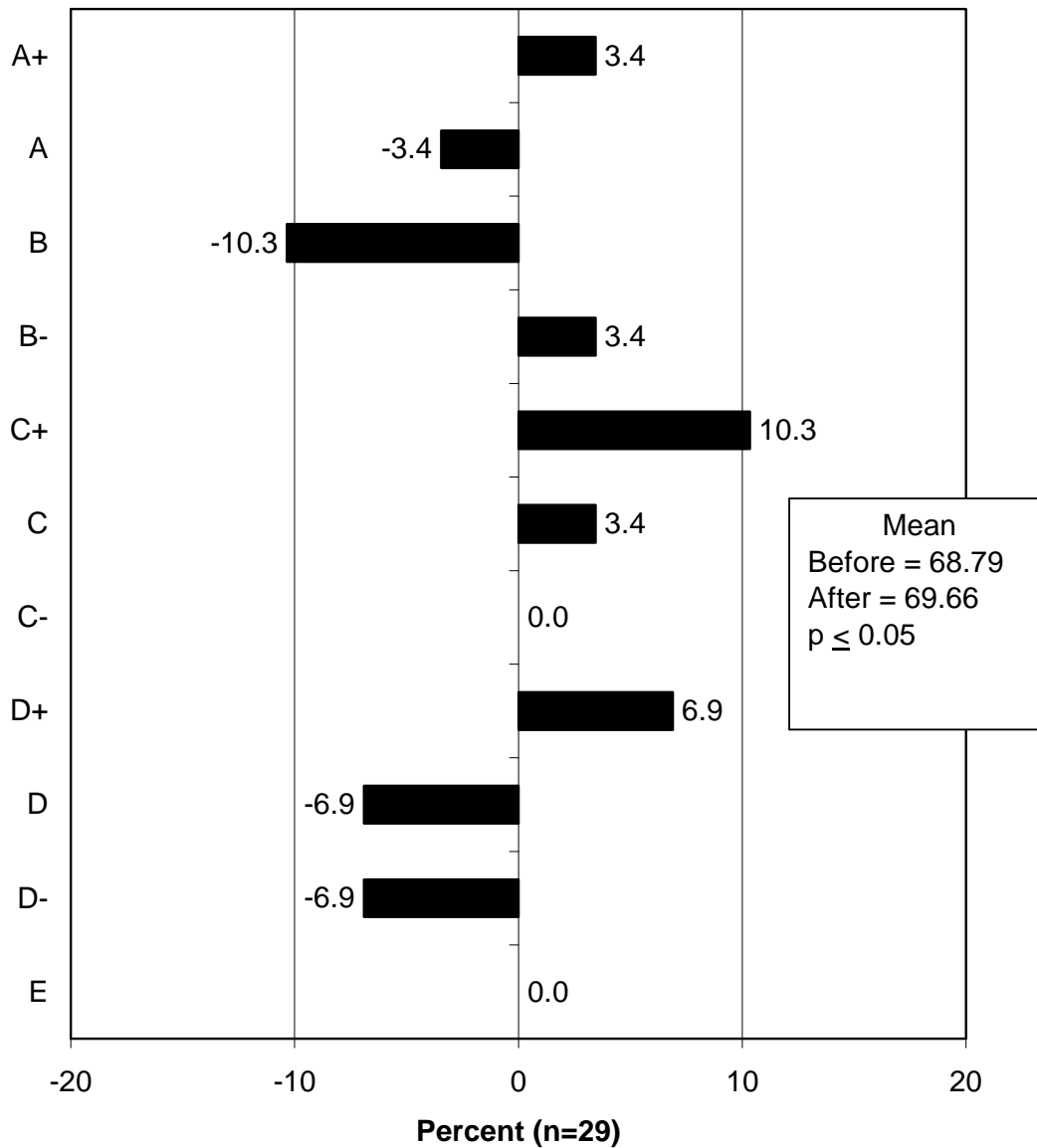


Figure 54. Difference in Percentage Receiving Grades in Math Among 9th, 10th, and 11th Graders

What grades did the student receive in math before and after the archery program?

Difference in percentage receiving each grade in math, pre-program to post-program (among 9th, 10th, and 11th grade students who receive average grades overall).

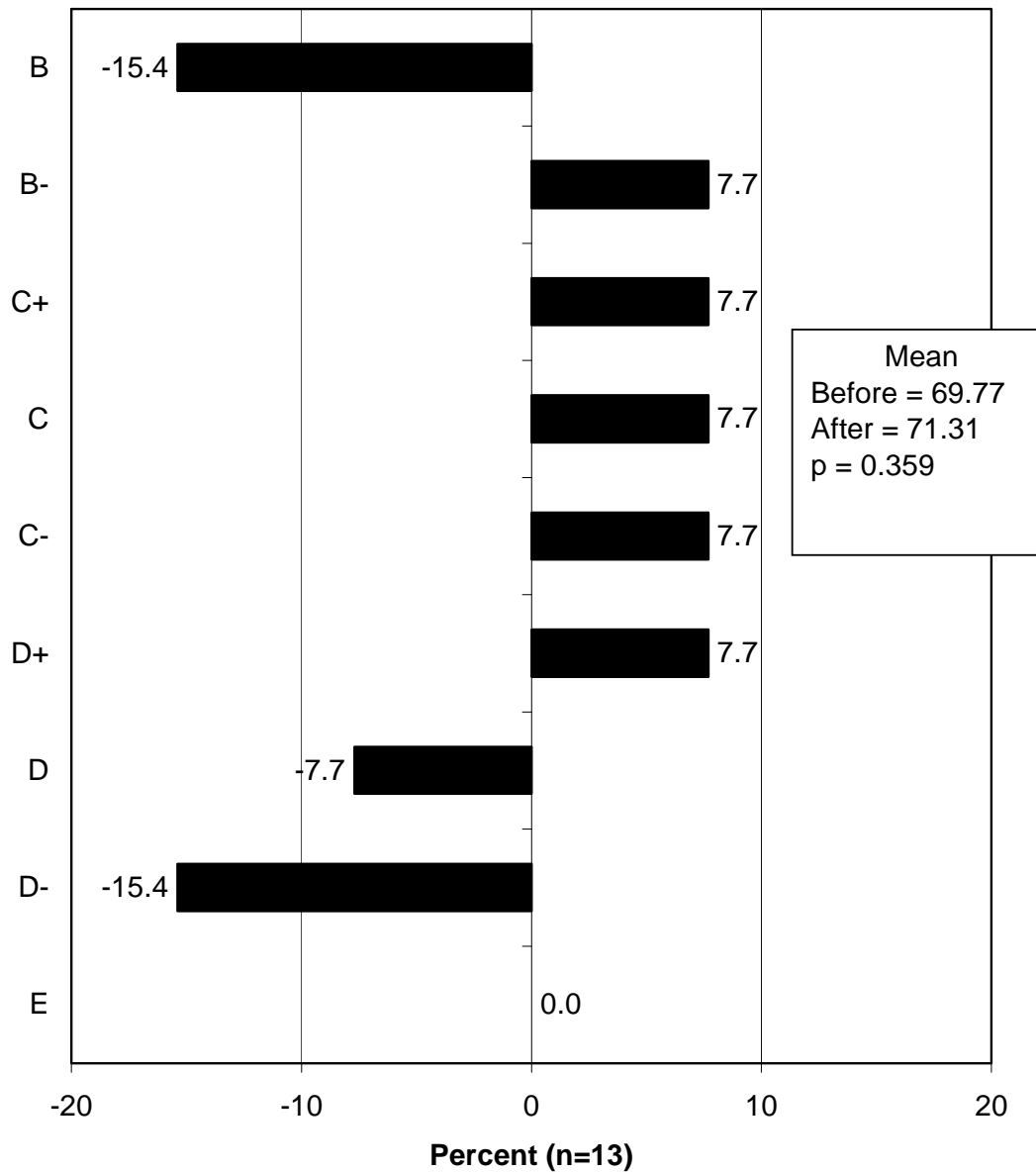


Figure 55. Difference in Percentage Receiving Grades in Math Among Average 9th, 10th, and 11th Graders

Difference between the means of the student's math grades, pre-program and post-program.

Note that not all changes are statistically significant; does not show groups with sample sizes of fewer than 10 respondents.

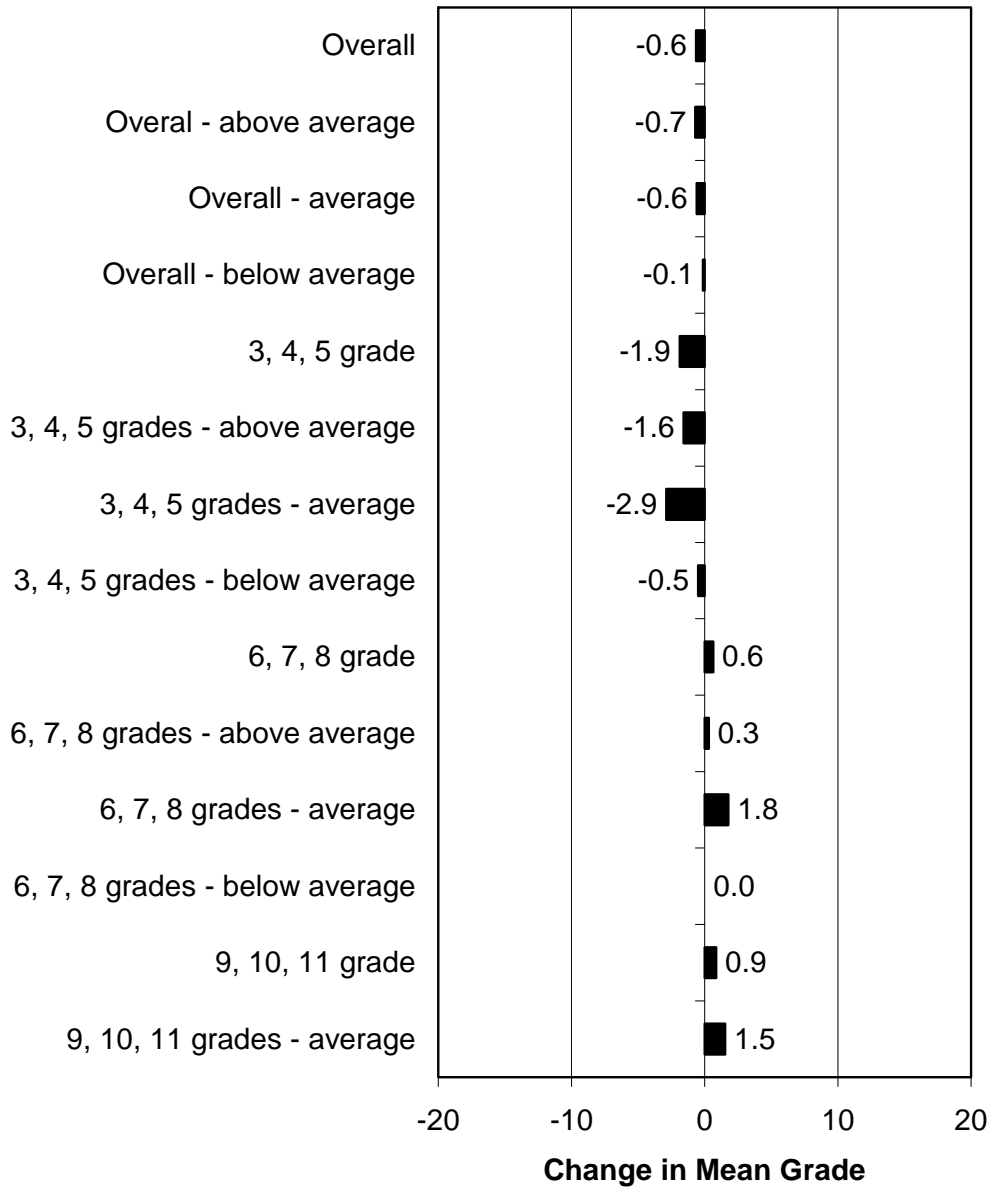


Figure 56. Difference in Mean Grades in Math—All Groups

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program.

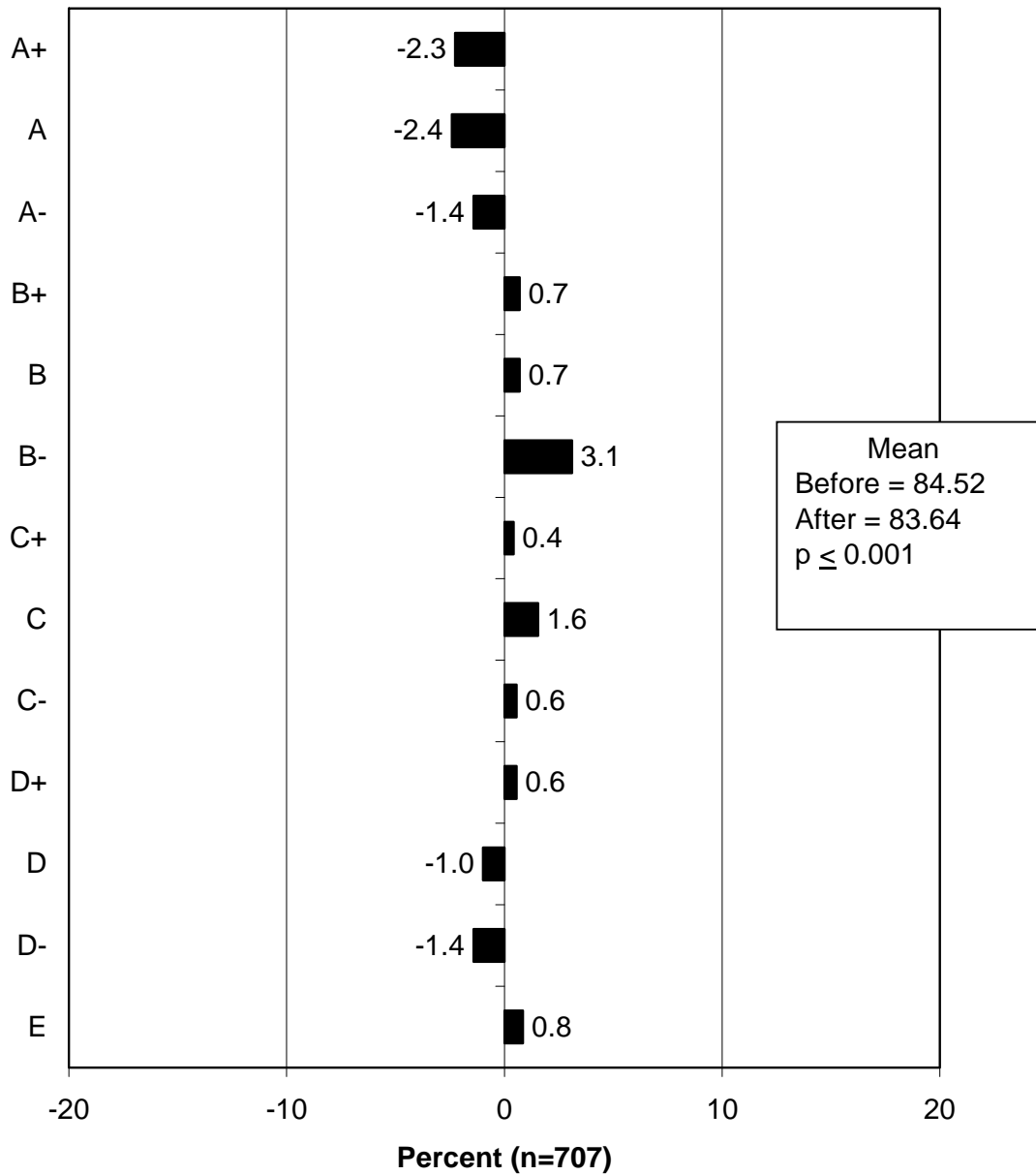


Figure 57. Difference in Percentage Receiving Grades in Science Overall

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among students who receive above average grades overall).

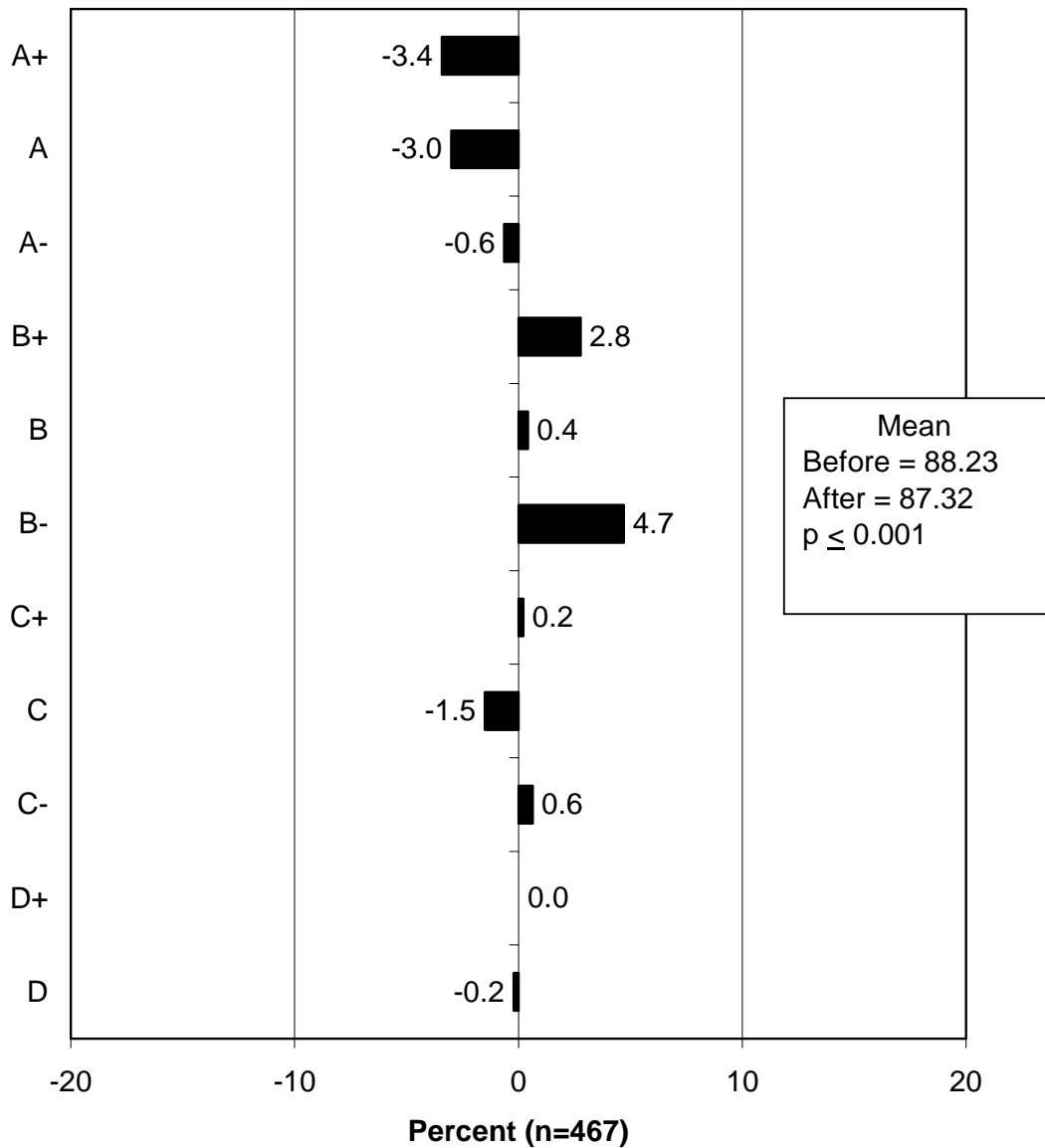


Figure 58. Difference in Percentage Receiving Grades in Science Among Above Average Students

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among students who receive average grades overall).

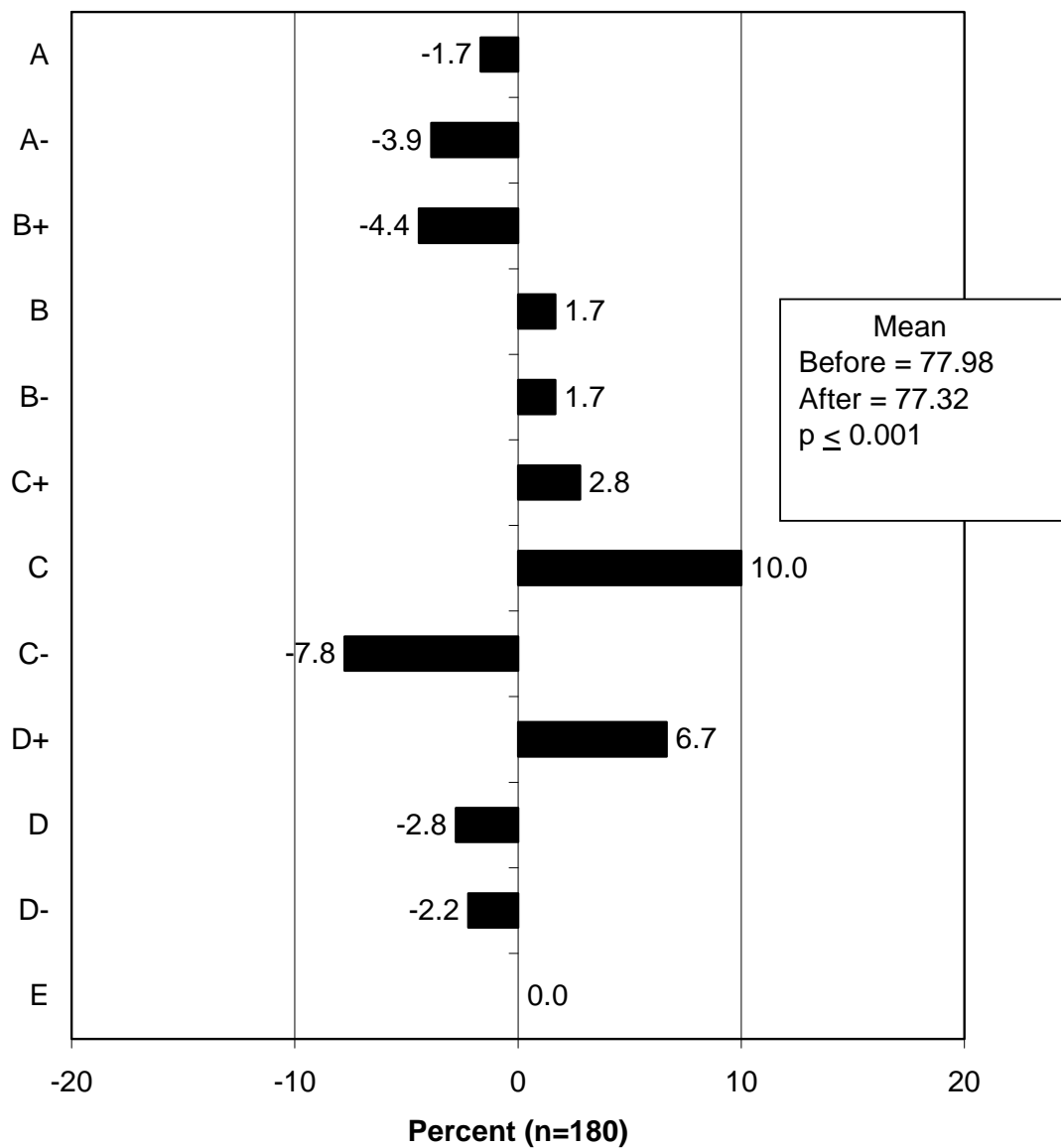


Figure 59. Difference in Percentage Receiving Grades in Science Among Average Students

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among students who receive below average grades overall).

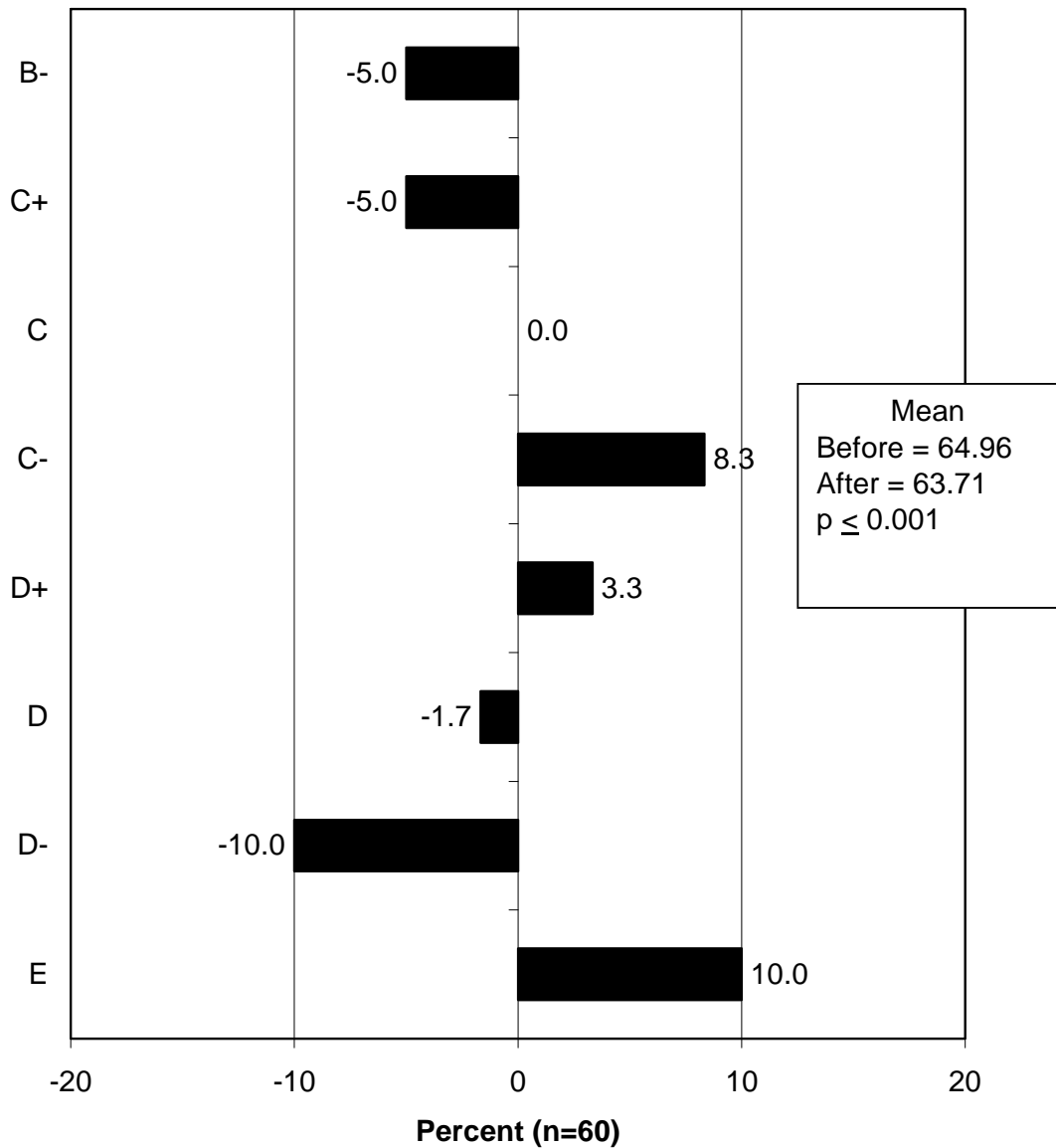


Figure 60. Difference in Percentage Receiving Grades in Science Among Below Average Students

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among all 3rd, 4th, and 5th grade students).

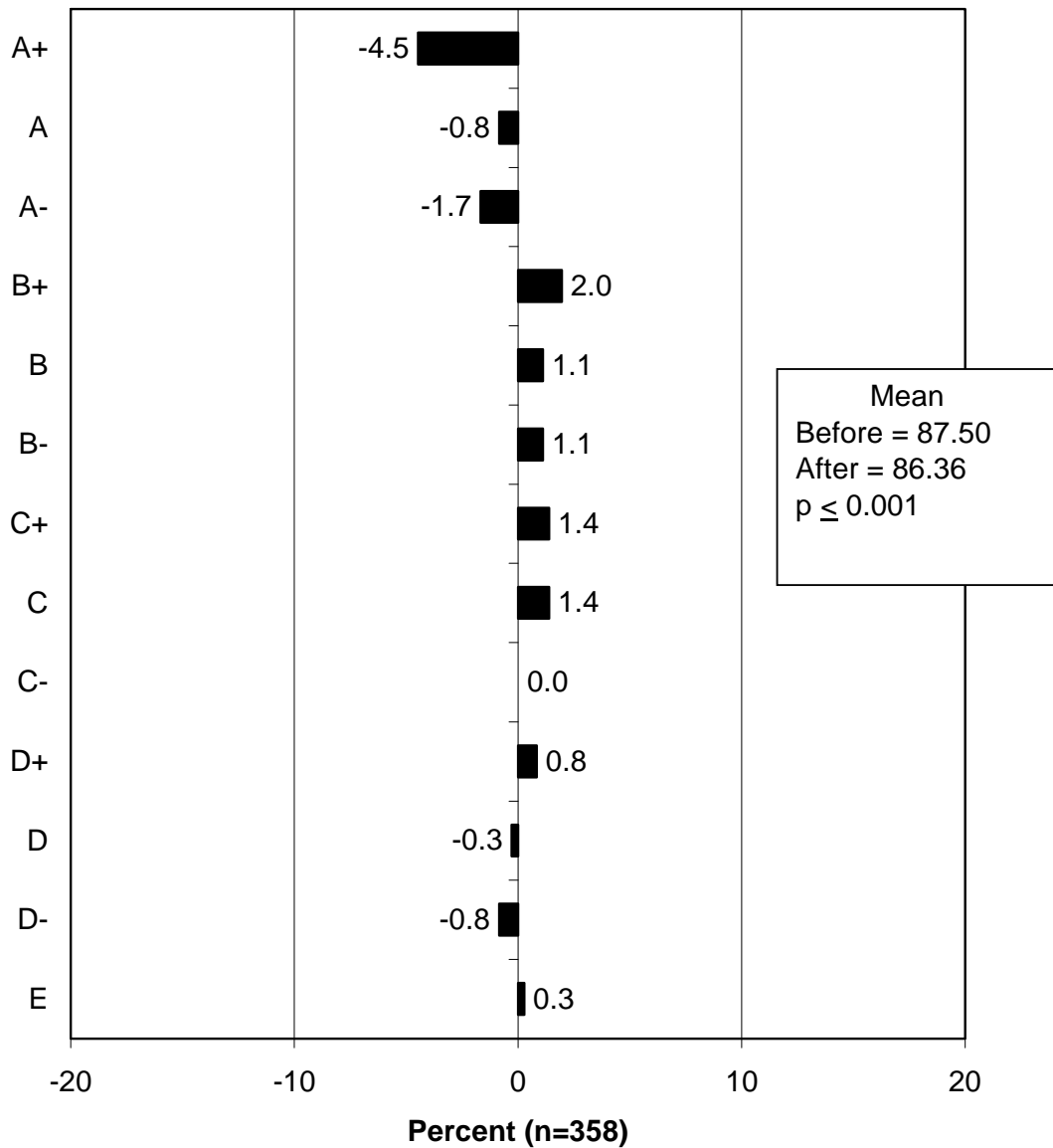


Figure 61. Difference in Percentage Receiving Grades in Science Among 3rd, 4th, and 5th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive above average grades overall).

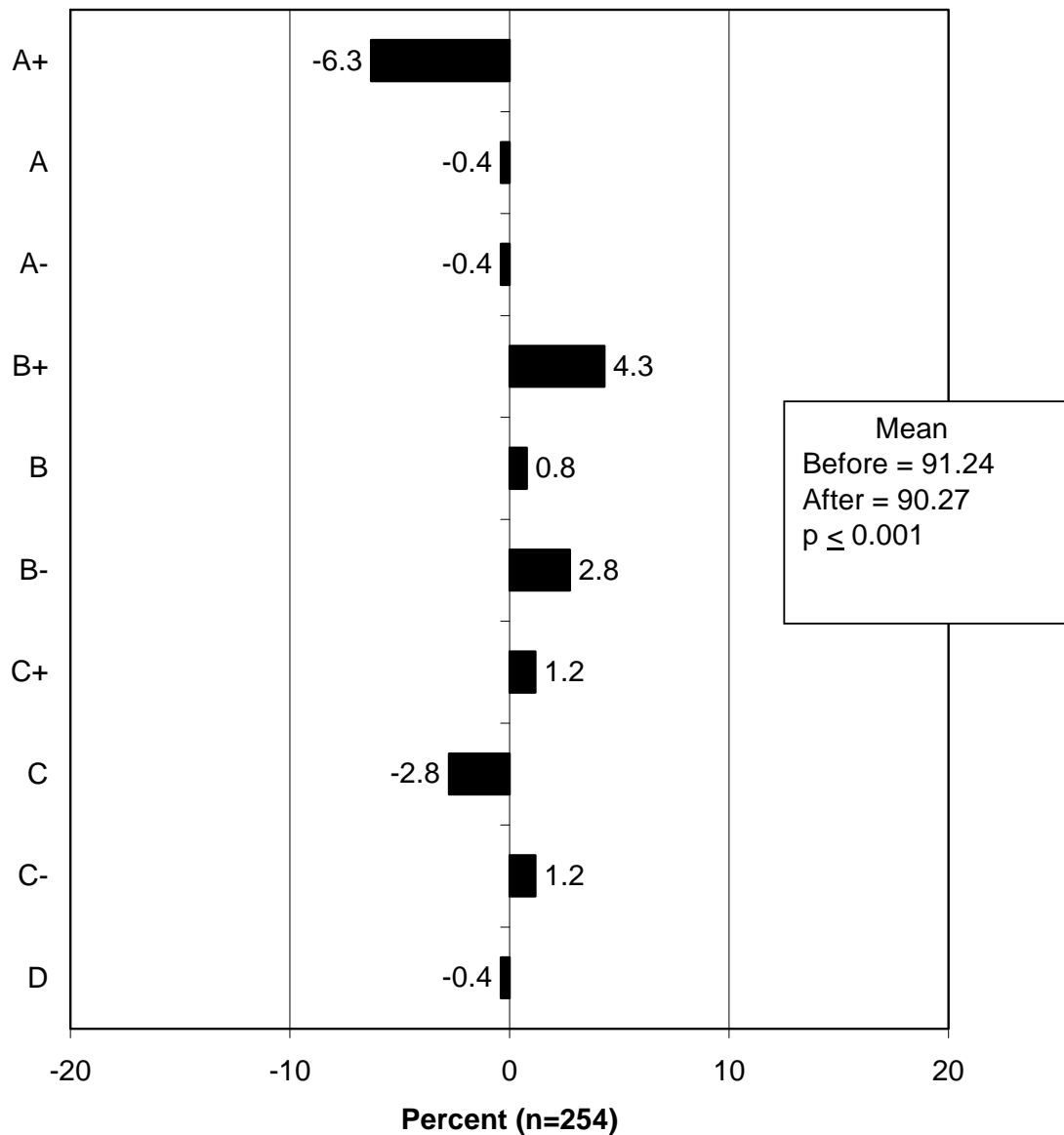


Figure 62. Difference in Percentage Receiving Grades in Science Among Above Average 3rd, 4th, and 5th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive average grades overall).

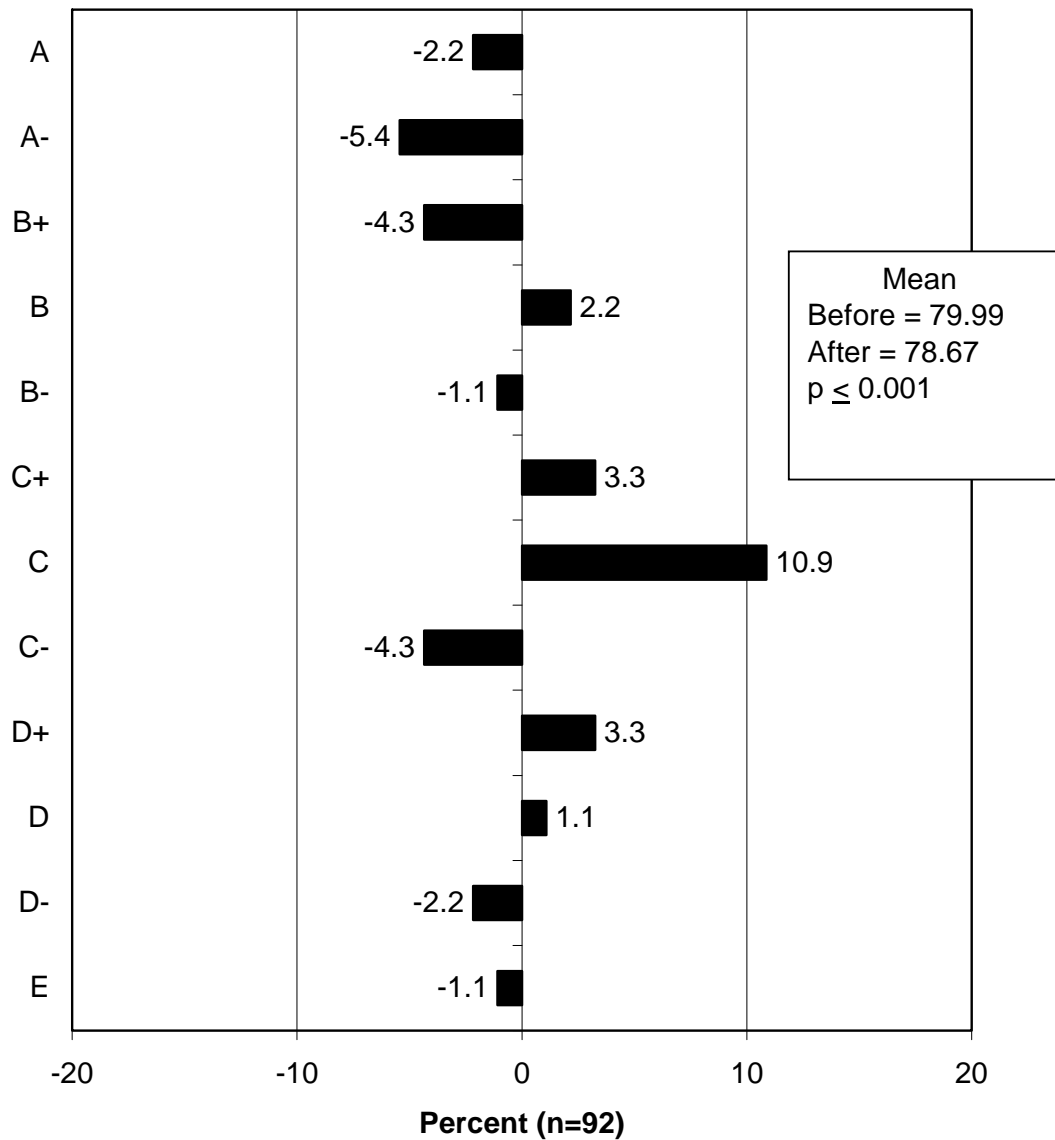


Figure 63. Difference in Percentage Receiving Grades in Science Among Average 3rd, 4th, and 5th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive below average grades overall).

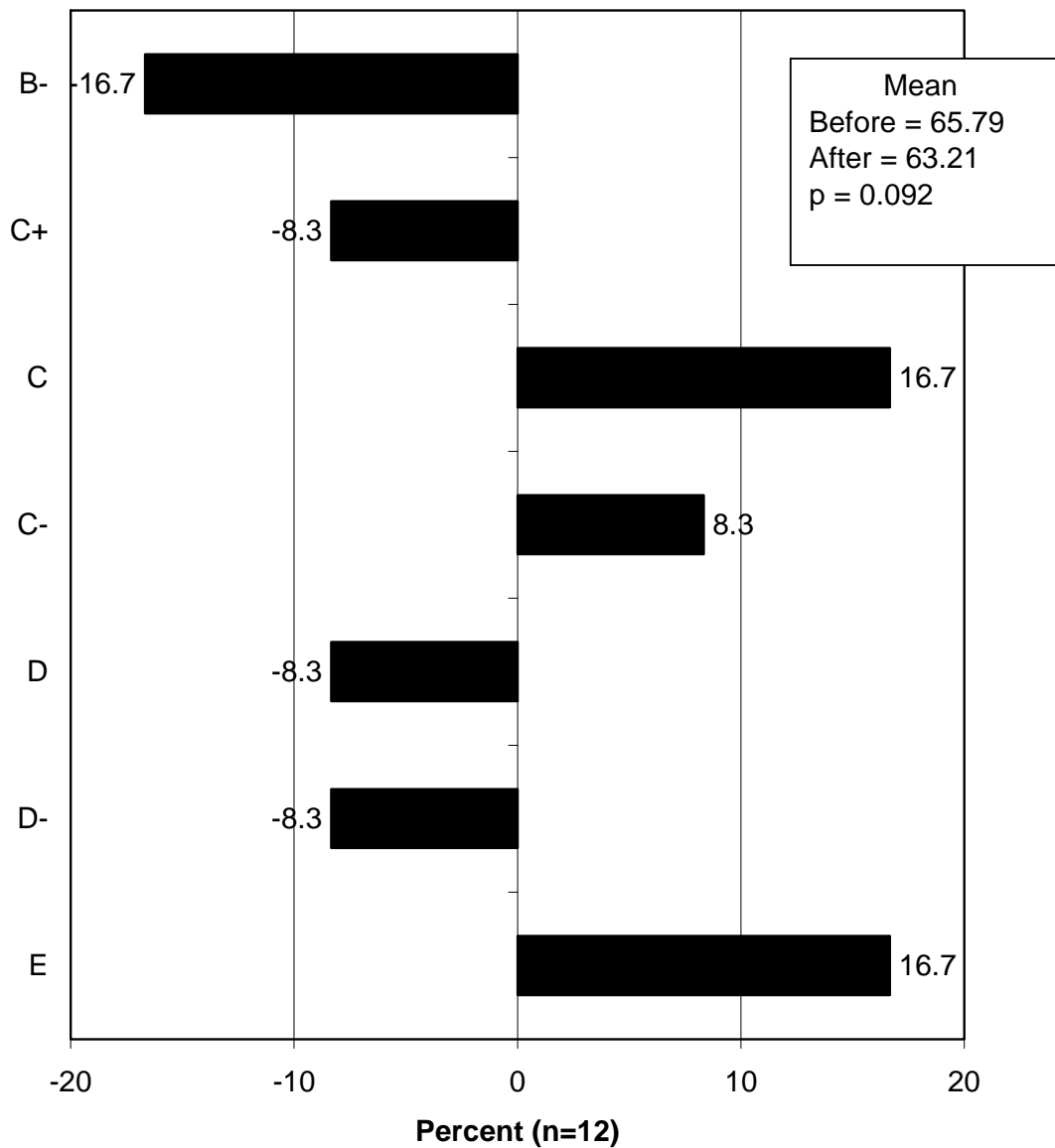


Figure 64. Difference in Percentage Receiving Grades in Science Among Below Average 3rd, 4th, and 5th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among all 6th, 7th, and 8th grade students).

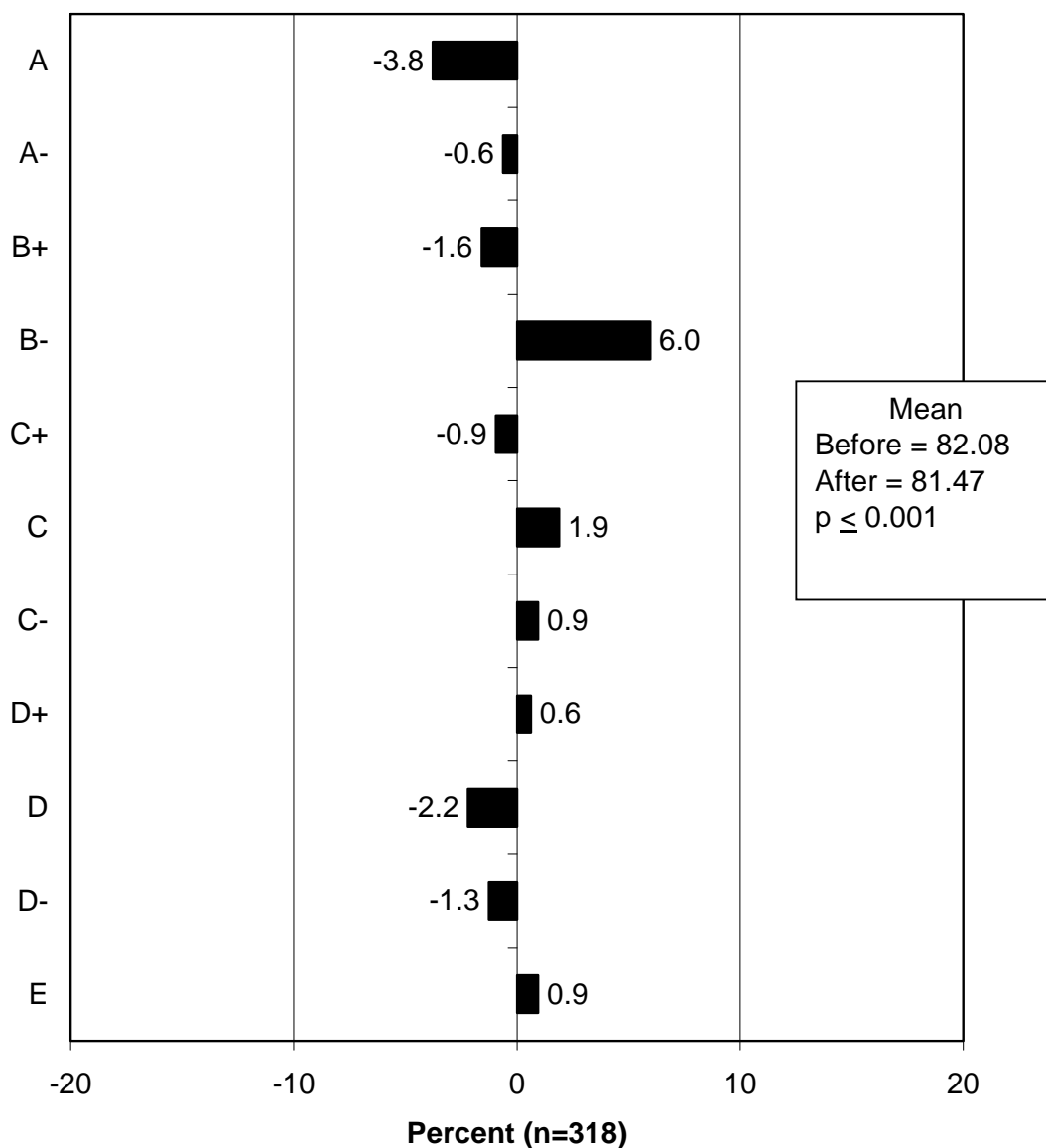


Figure 65. Difference in Percentage Receiving Grades in Science Among 6th, 7th, and 8th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among 6th, 7th, and 8th grade students who receive above average grades overall).

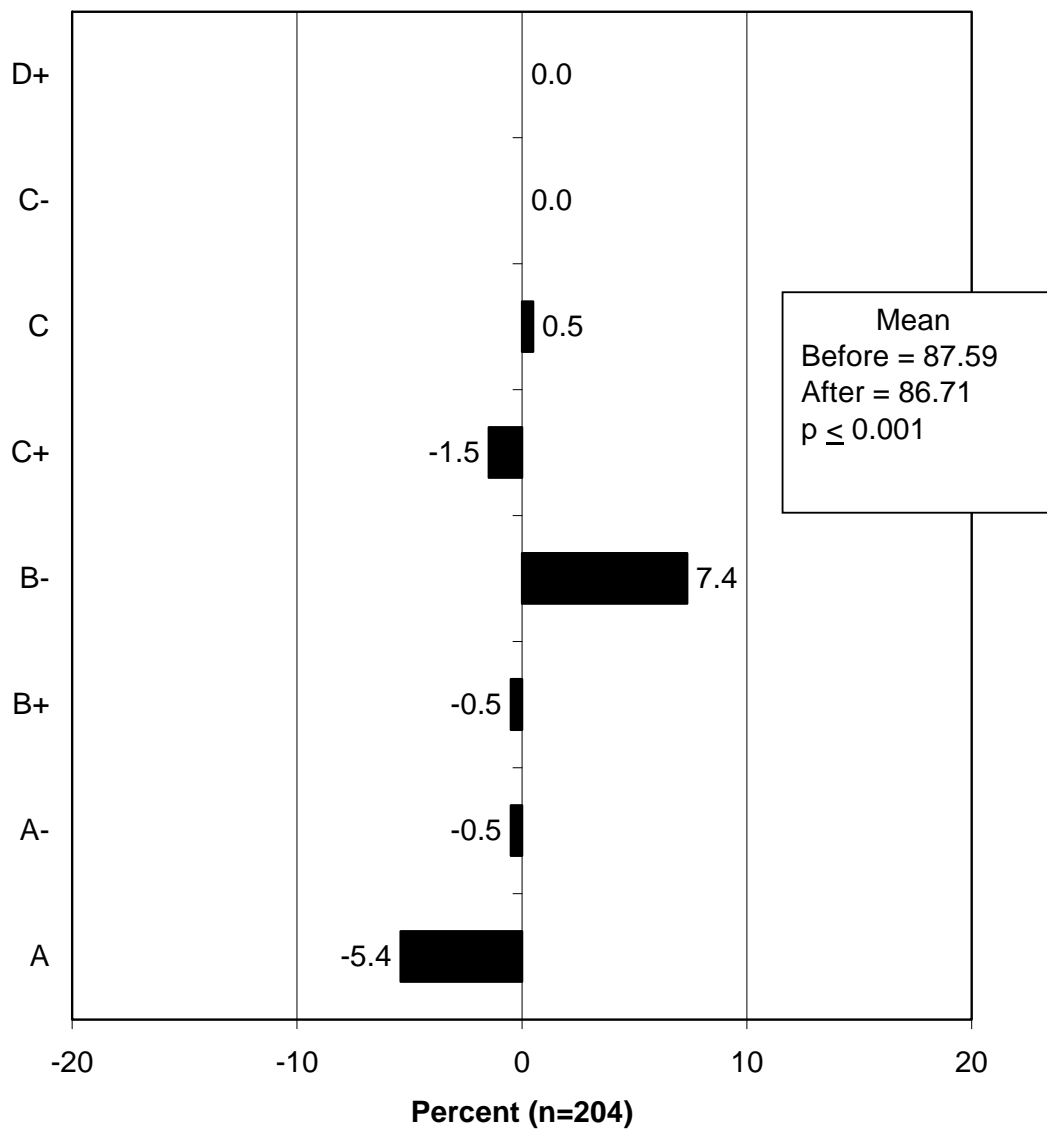


Figure 66. Difference in Percentage Receiving Grades in Science Among Above Average 6th, 7th, and 8th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among 6th, 7th, and 8th grade students who receive average grades overall).

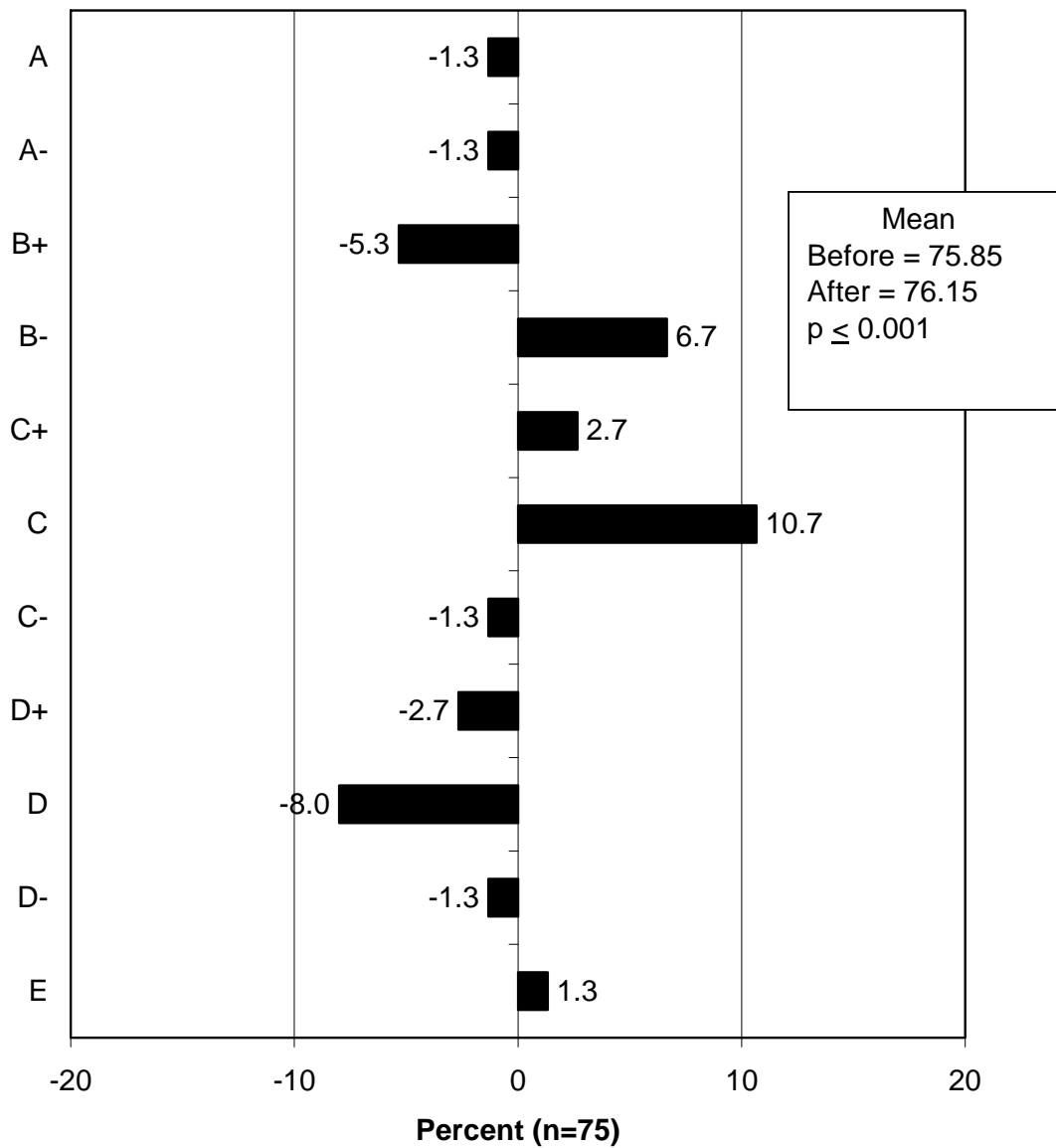


Figure 67. Difference in Percentage Receiving Grades in Science Among Average 6th, 7th, and 8th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among 6th, 7th, and 8th grade students who receive below average grades overall).

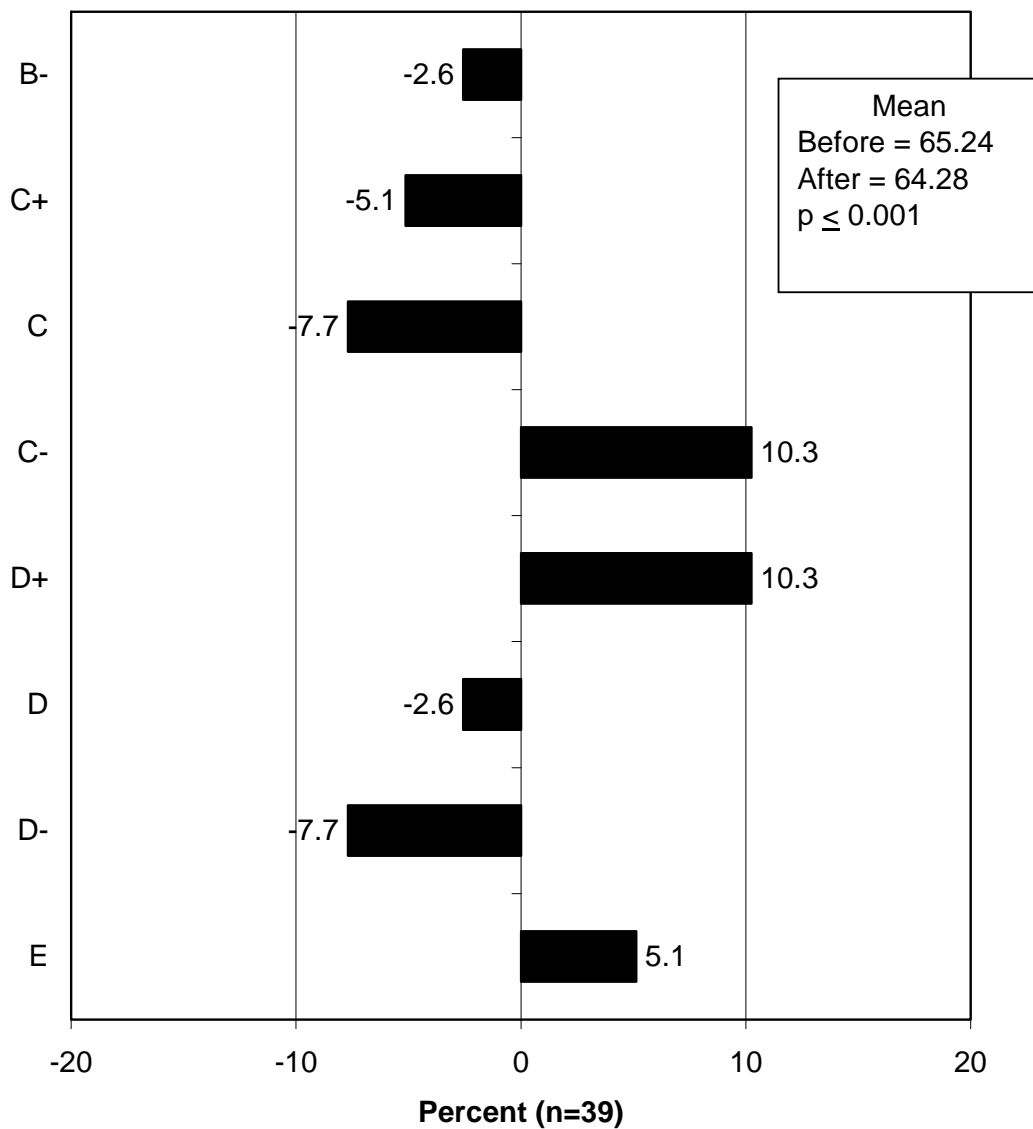


Figure 68. Difference in Percentage Receiving Grades in Science Among Below Average 6th, 7th, and 8th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among all 9th, 10th, and 11th grade students).

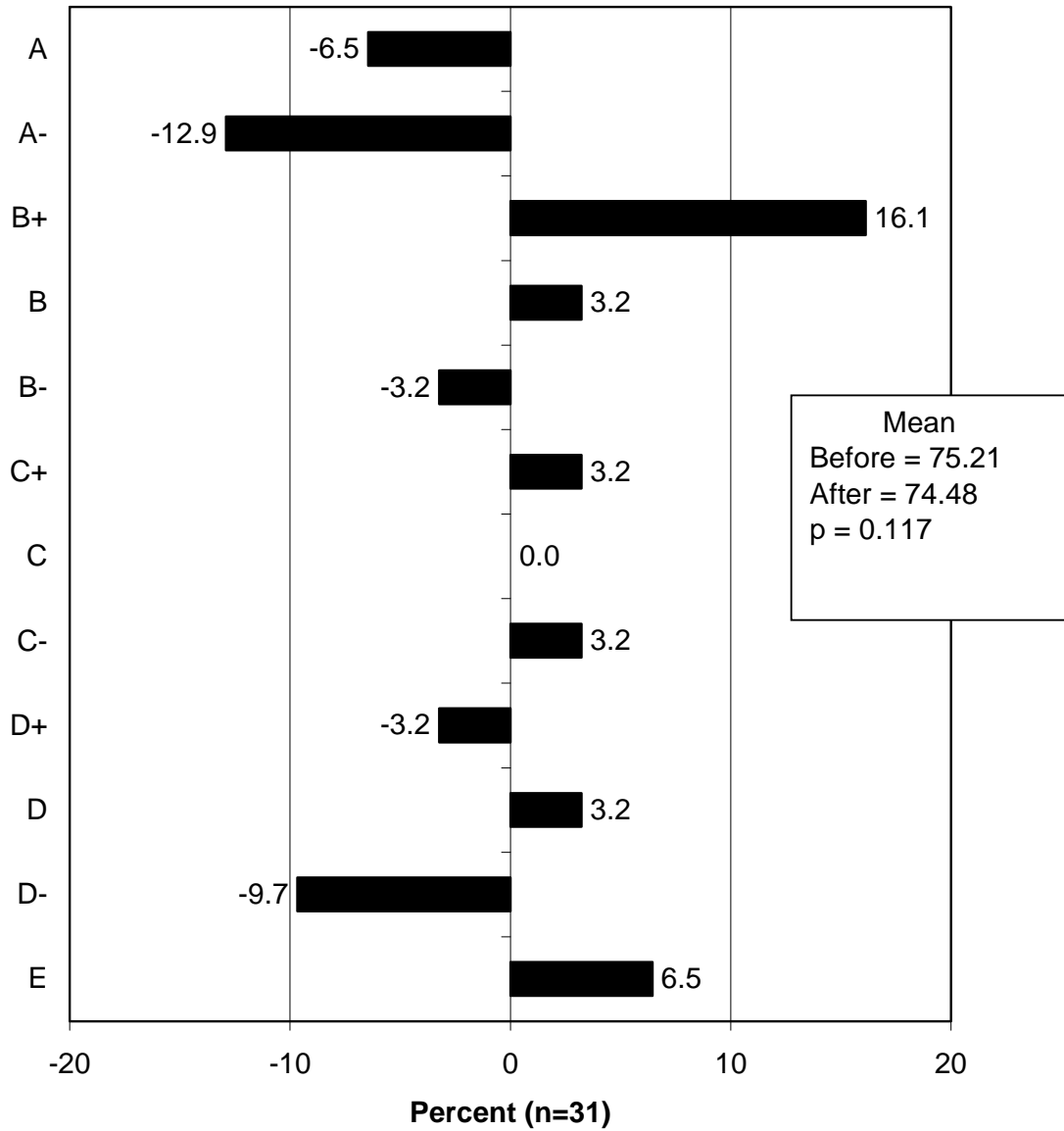


Figure 69. Difference in Percentage Receiving Grades in Science Among 9th, 10th, and 11th Graders

What grades did the student receive in science before and after the archery program?

Difference in percentage receiving each grade in science, pre-program to post-program (among 9th, 10th, and 11th grade students who receive average grades overall).

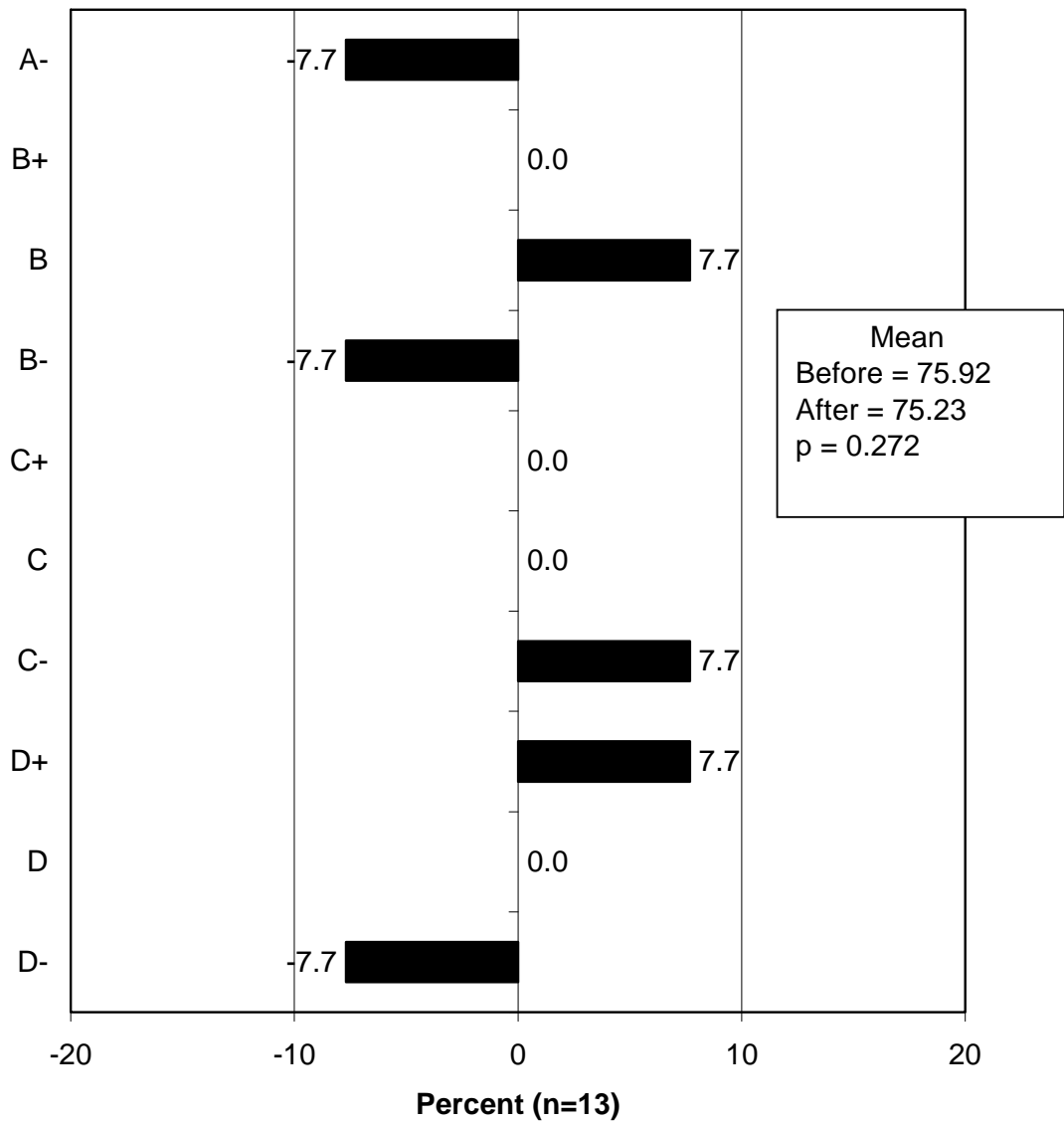


Figure 70. Difference in Percentage Receiving Grades in Science Among Average 9th, 10th, and 11th Graders

Difference between the means of the student's science grades, pre-program and post-program.

Note that not all changes are statistically significant; does not show groups with sample sizes of fewer than 10 respondents.

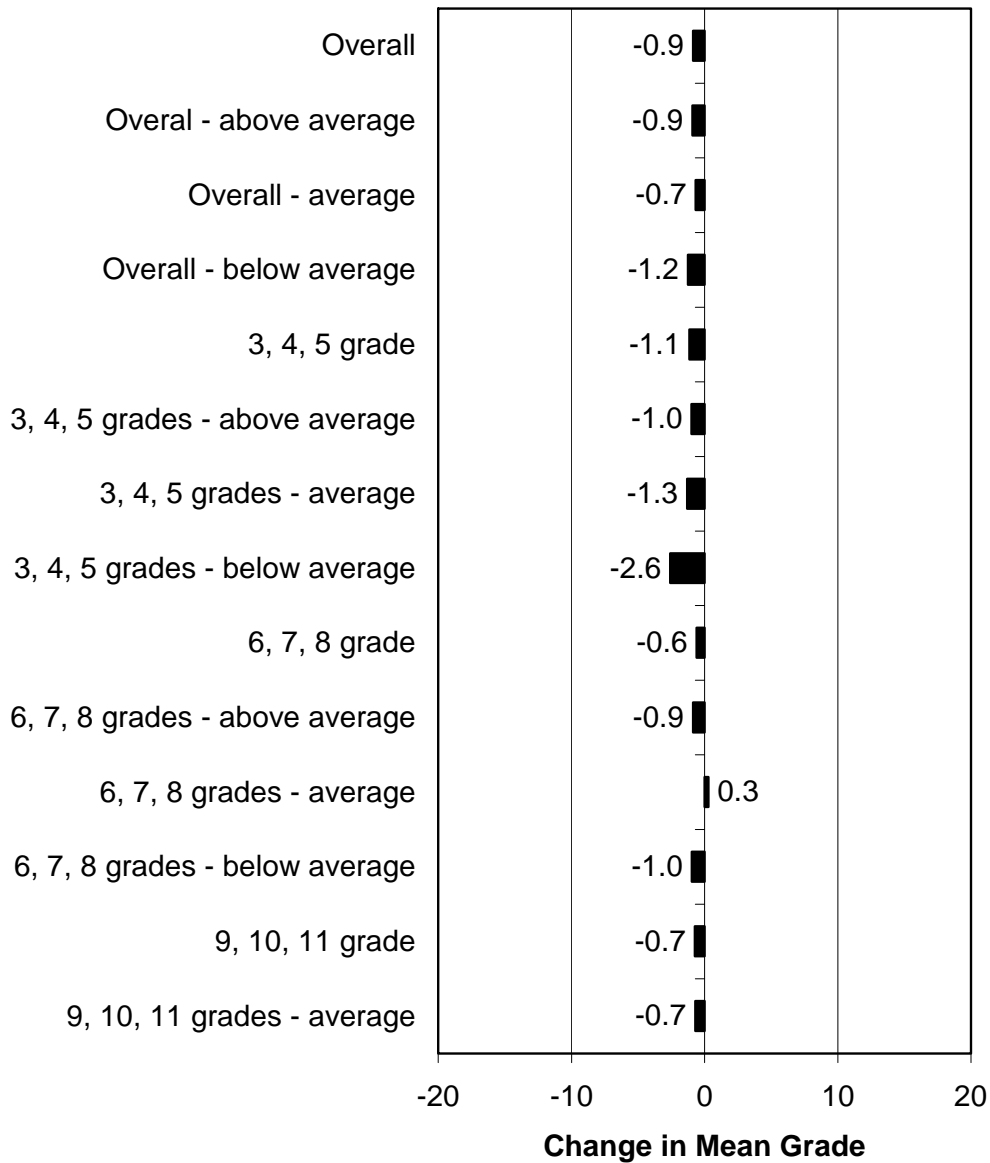


Figure 71. Difference in Mean Grades in Science—All Groups

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program.

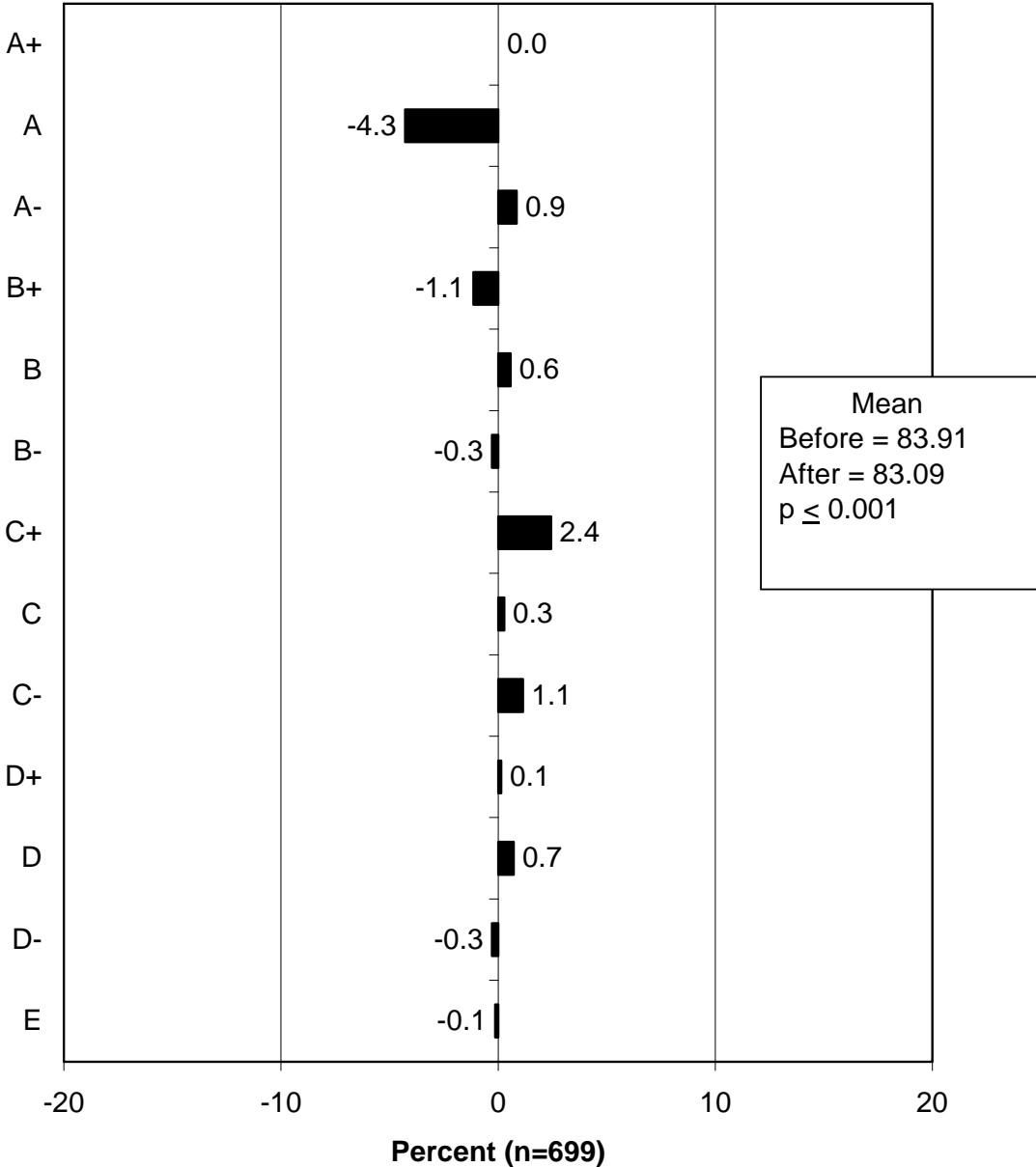


Figure 72. Difference in Percentage Receiving Grades in Social Studies/History Overall

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among students who receive above average grades overall).

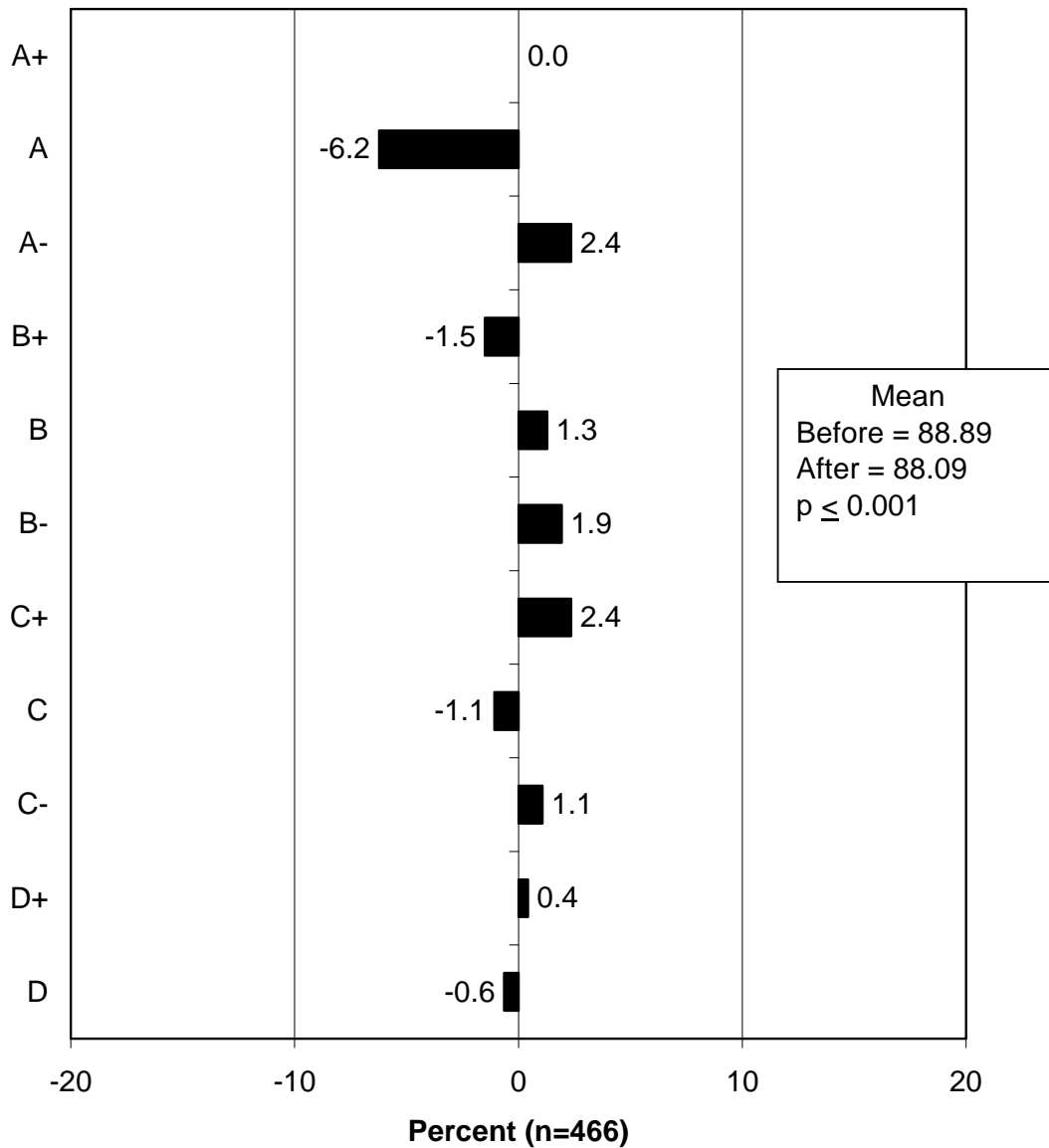


Figure 73. Difference in Percentage Receiving Grades in Social Studies/History Among Above Average Students

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among students who receive average grades overall).

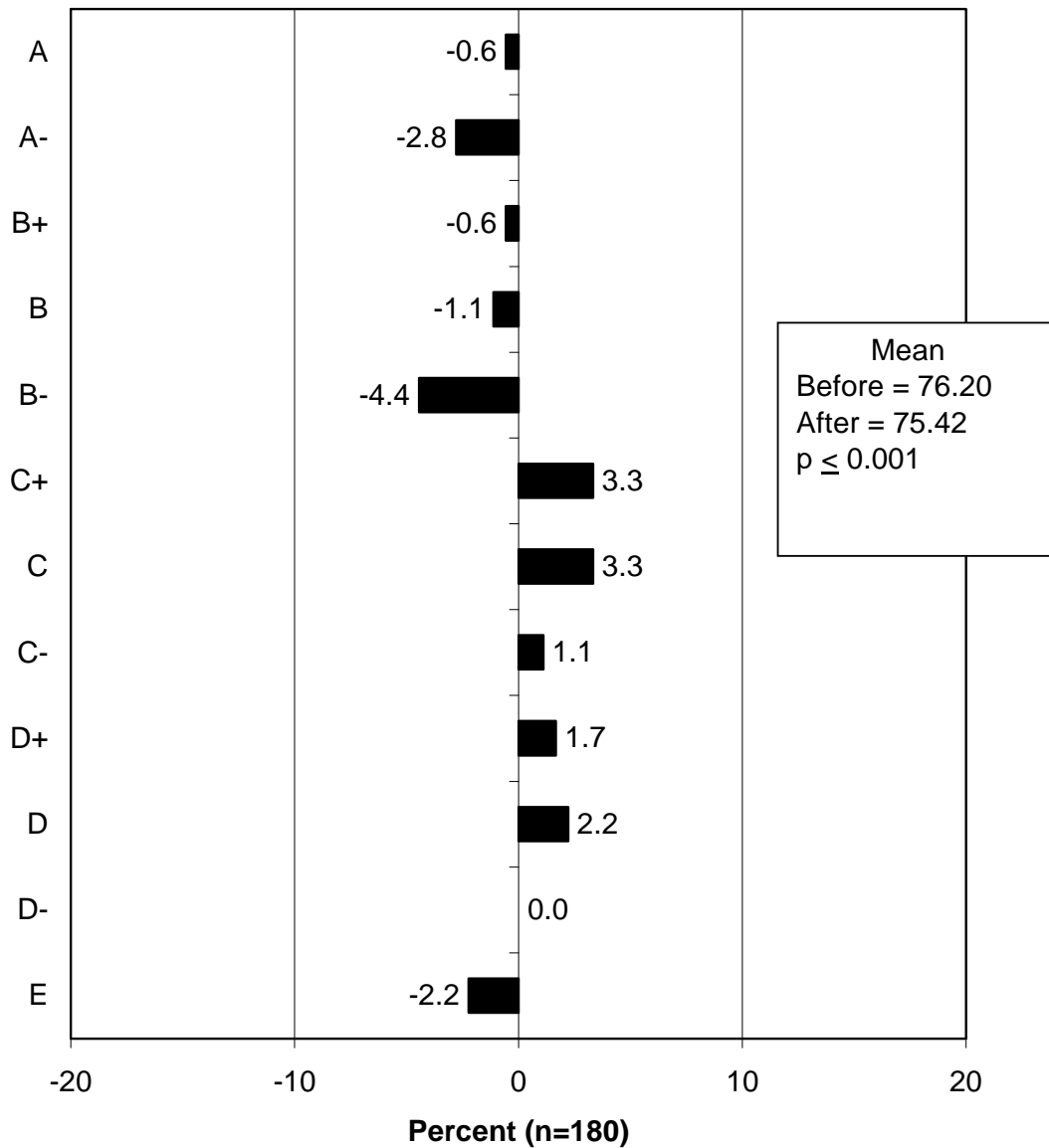


Figure 74. Difference in Percentage Receiving Grades in Social Studies/History Among Average Students

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among students who receive below average grades overall).

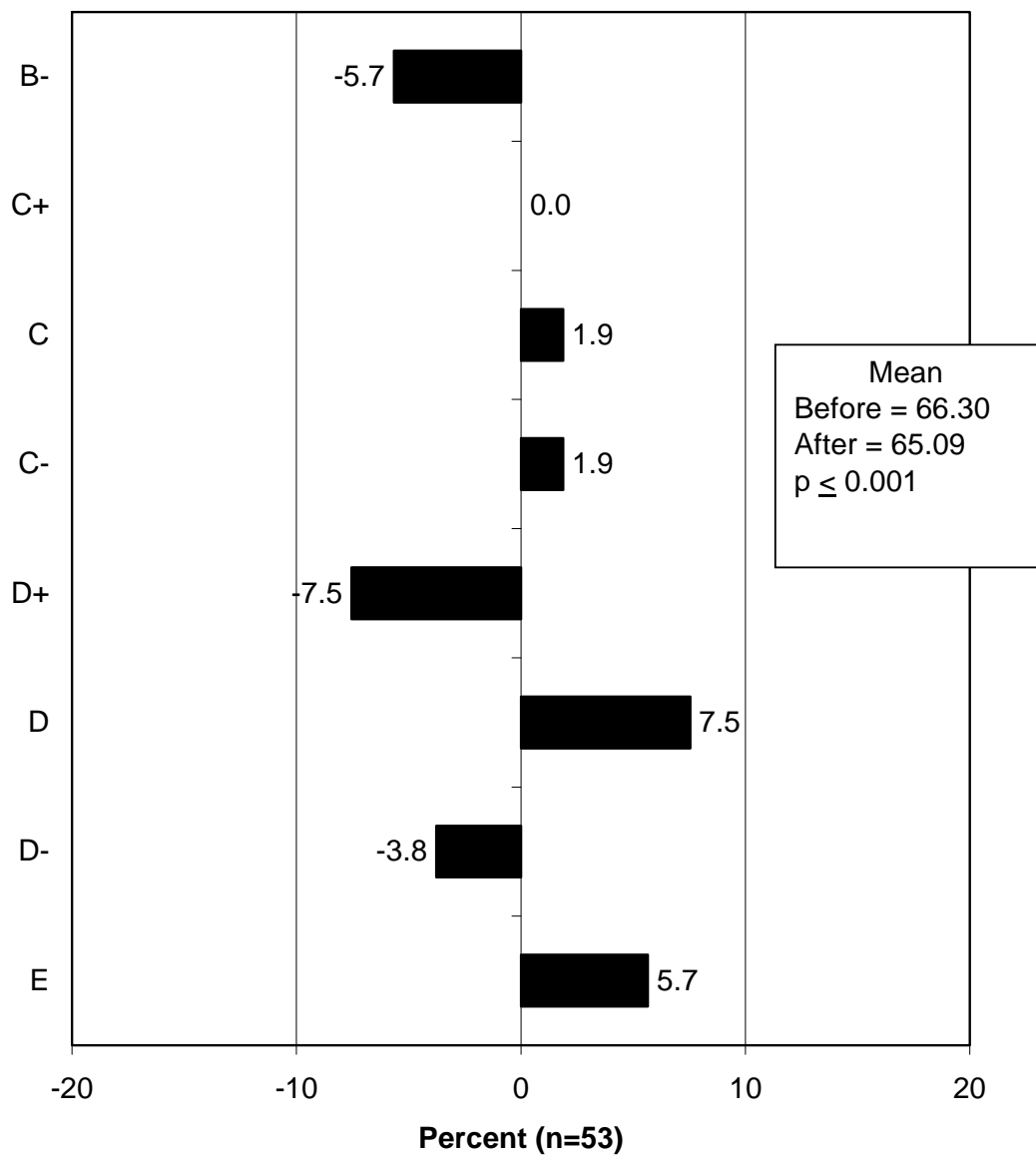


Figure 75. Difference in Percentage Receiving Grades in Social Studies/History Among Below Average Students

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among all 3rd, 4th, and 5th grade students).

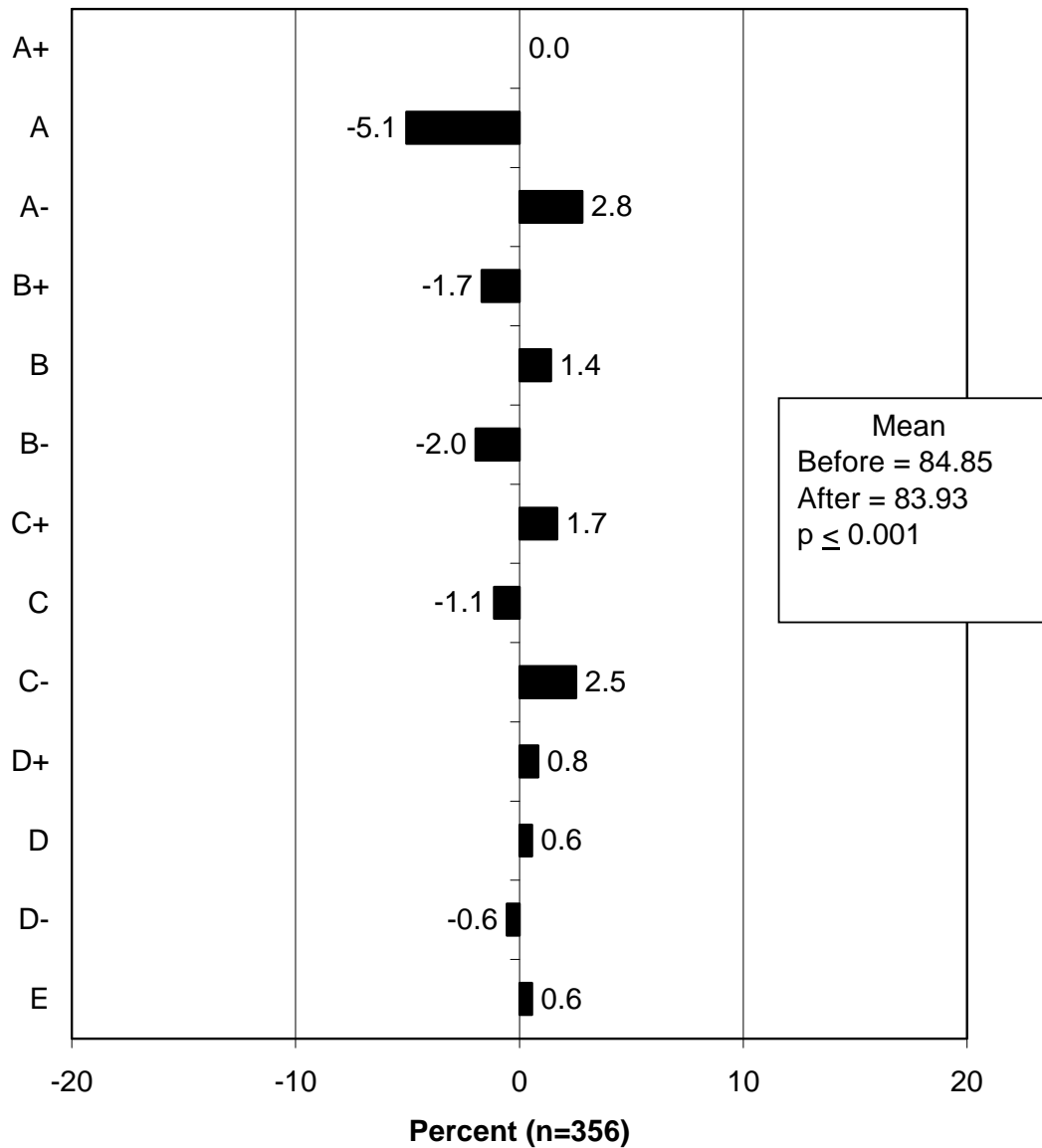


Figure 76. Difference in Percentage Receiving Grades in Social Studies/History Among 3rd, 4th, and 5th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive above average grades overall).

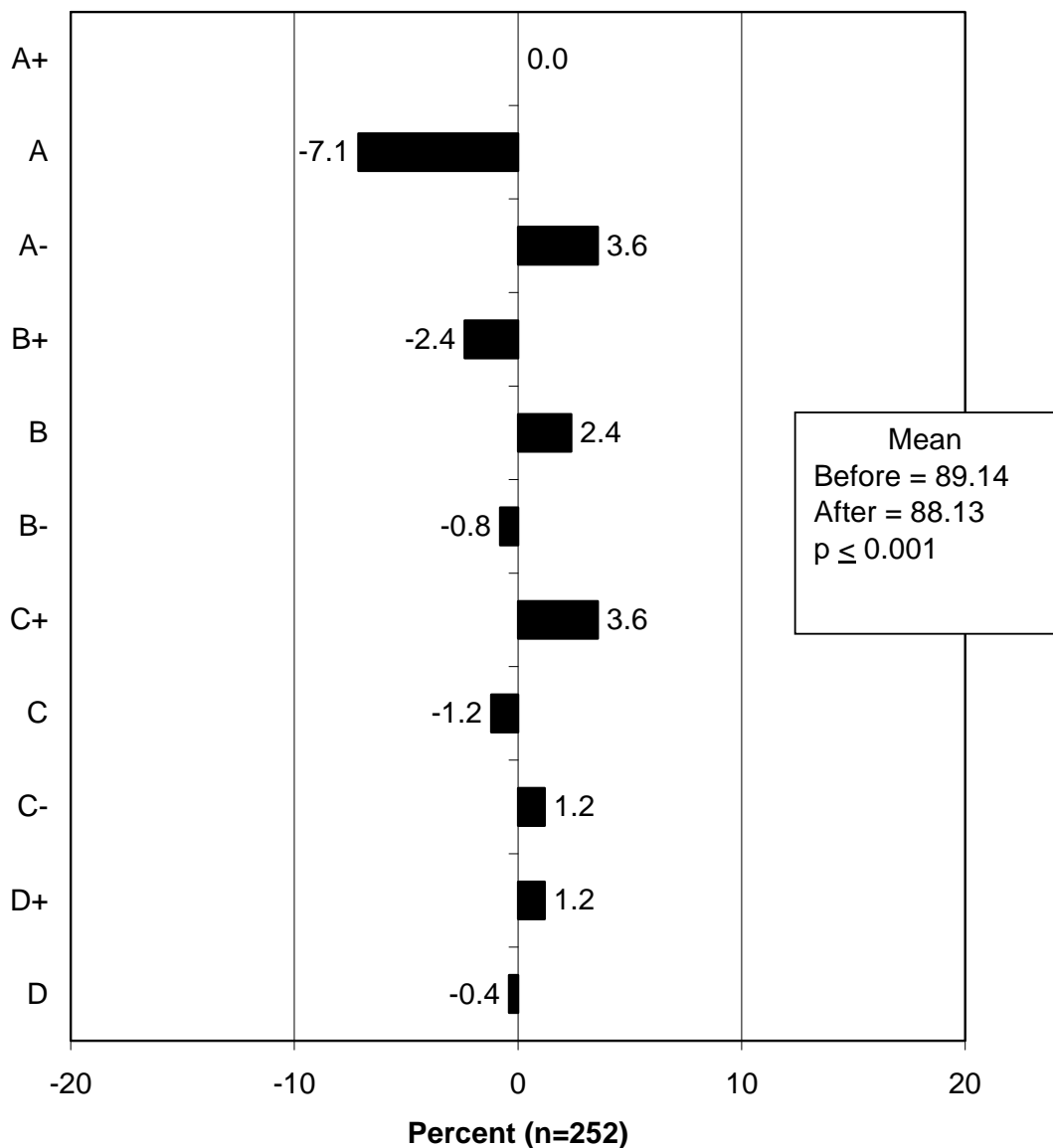


Figure 77. Difference in Percentage Receiving Grades in Social Studies/History Among Above Average 3rd, 4th, and 5th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive average grades overall).

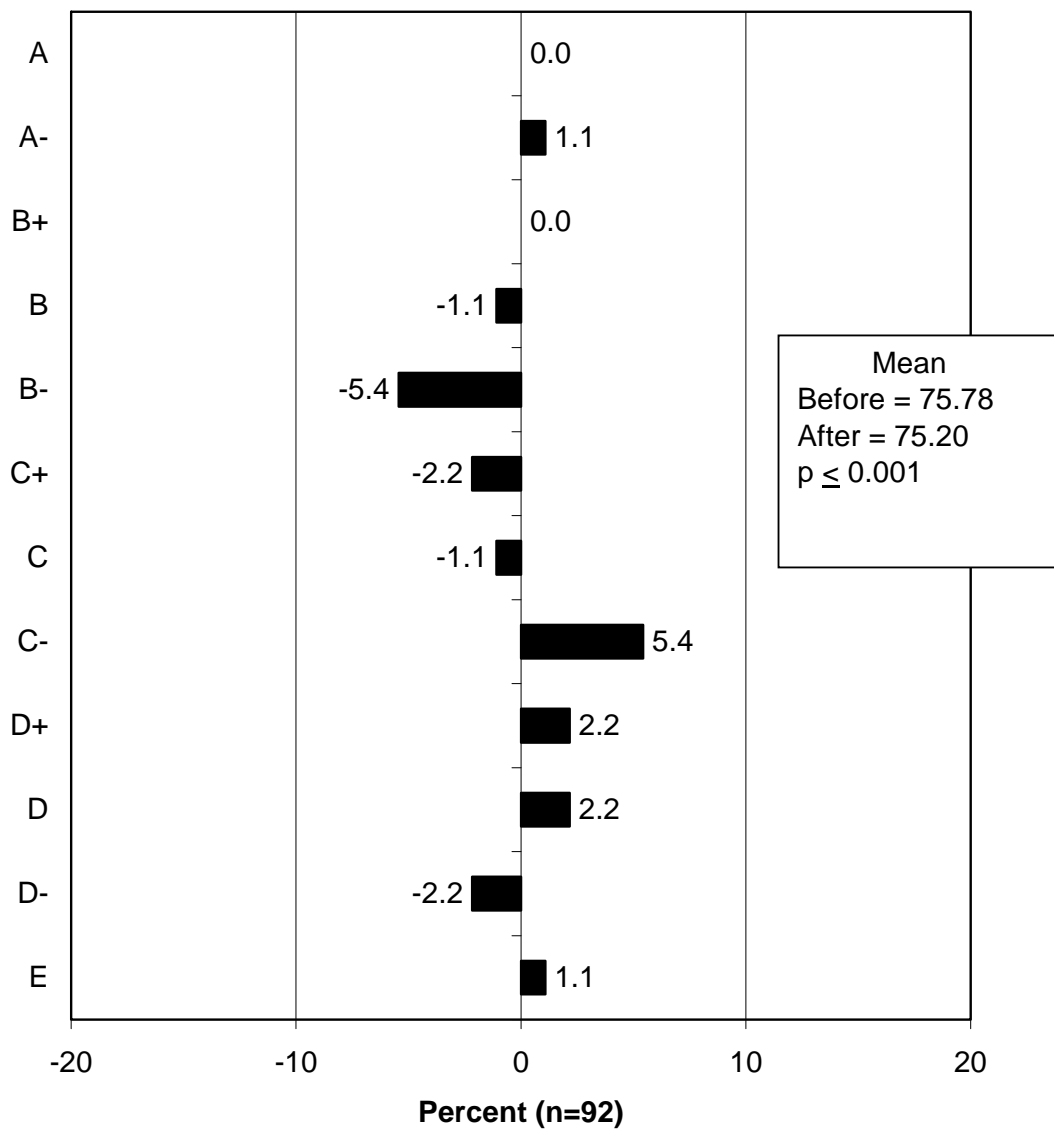


Figure 78. Difference in Percentage Receiving Grades in Social Studies/History Among Average 3rd, 4th, and 5th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among 3rd, 4th, and 5th grade students who receive below average grades overall).

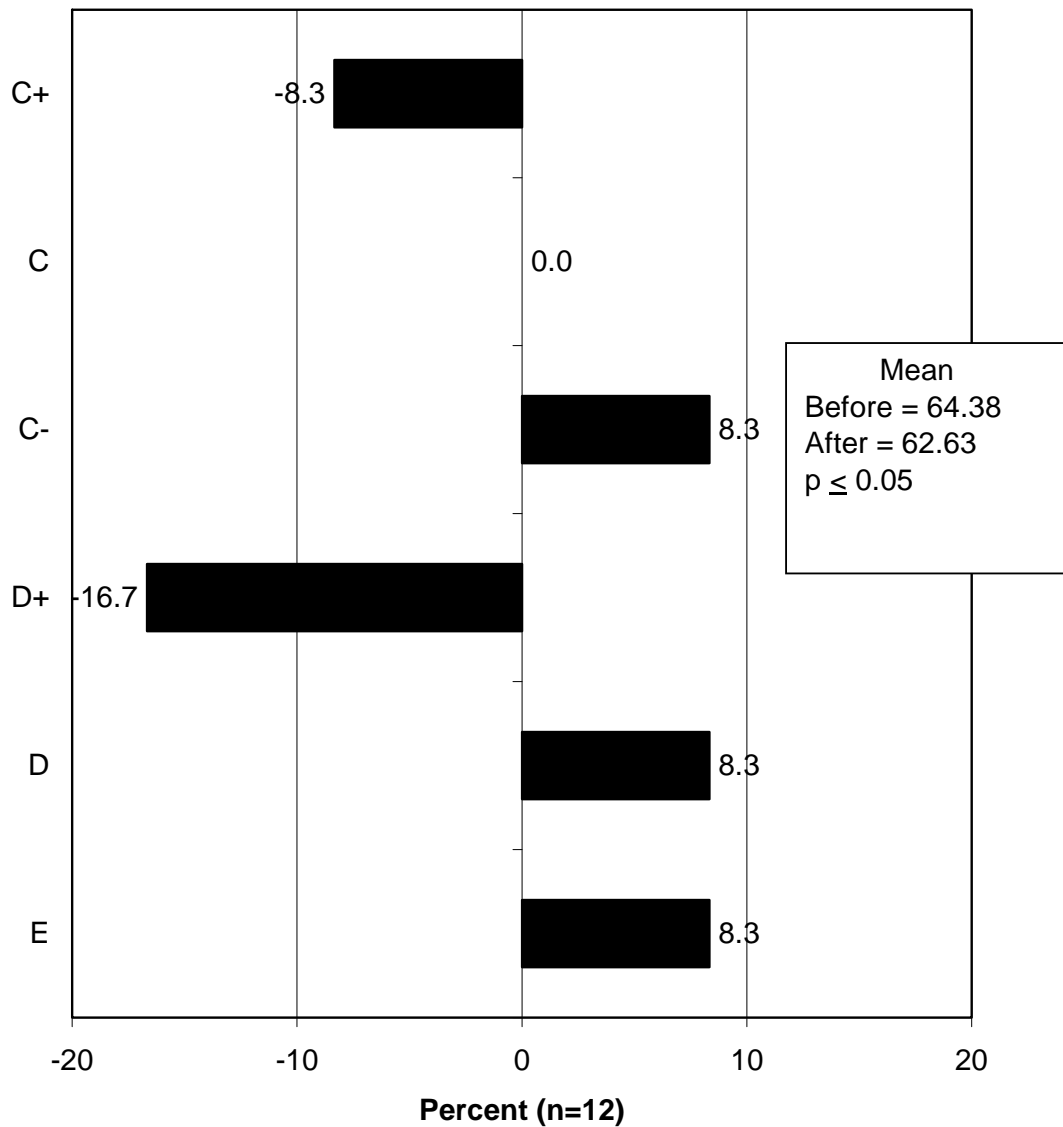


Figure 79. Difference in Percentage Receiving Grades in Social Studies/History Among Below Average 3rd, 4th, and 5th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among all 6th, 7th, and 8th grade students).

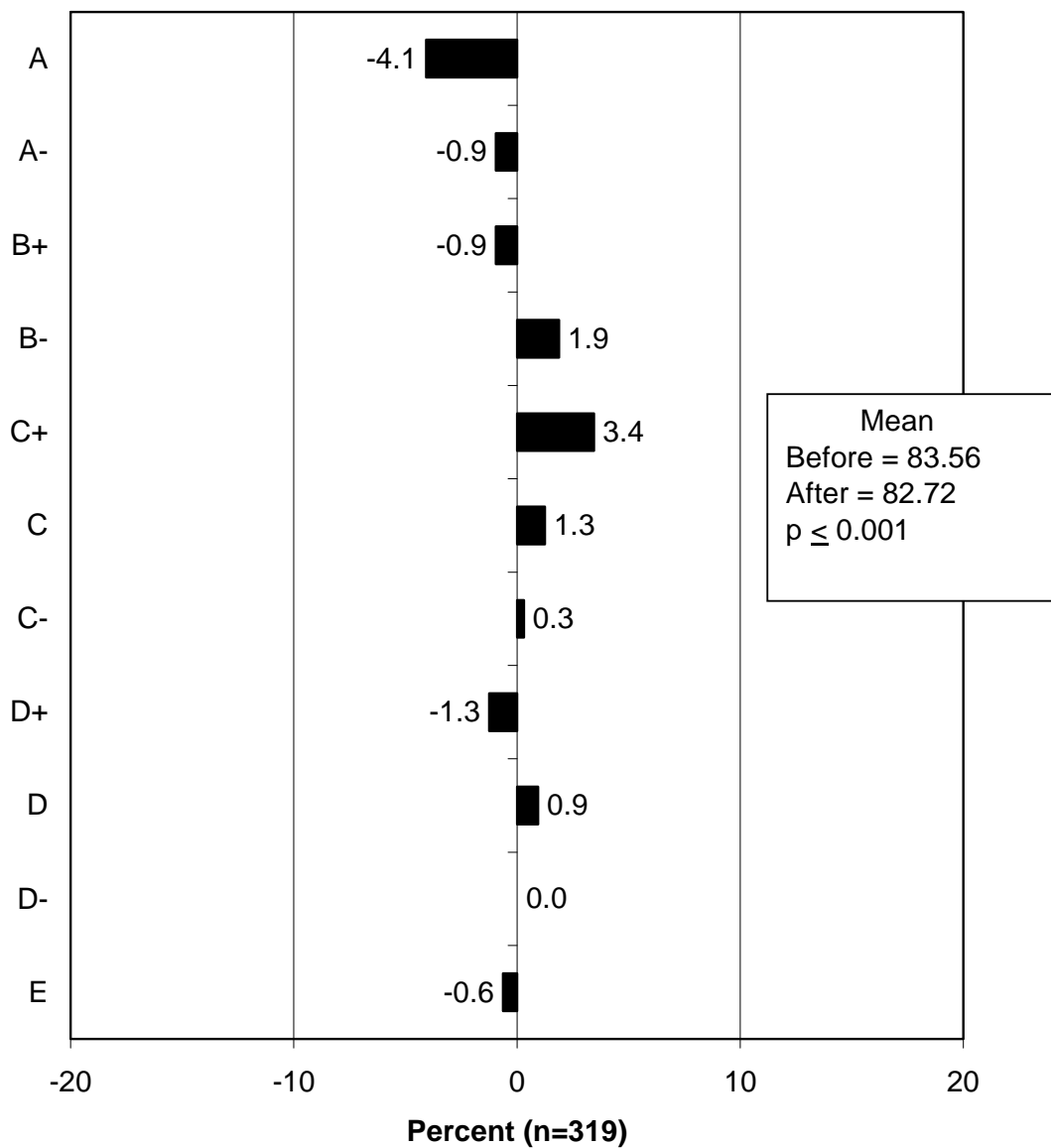


Figure 80. Difference in Percentage Receiving Grades in Social Studies/History Among 6th, 7th, and 8th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among 6th, 7th, and 8th grade students who receive above average grades overall).

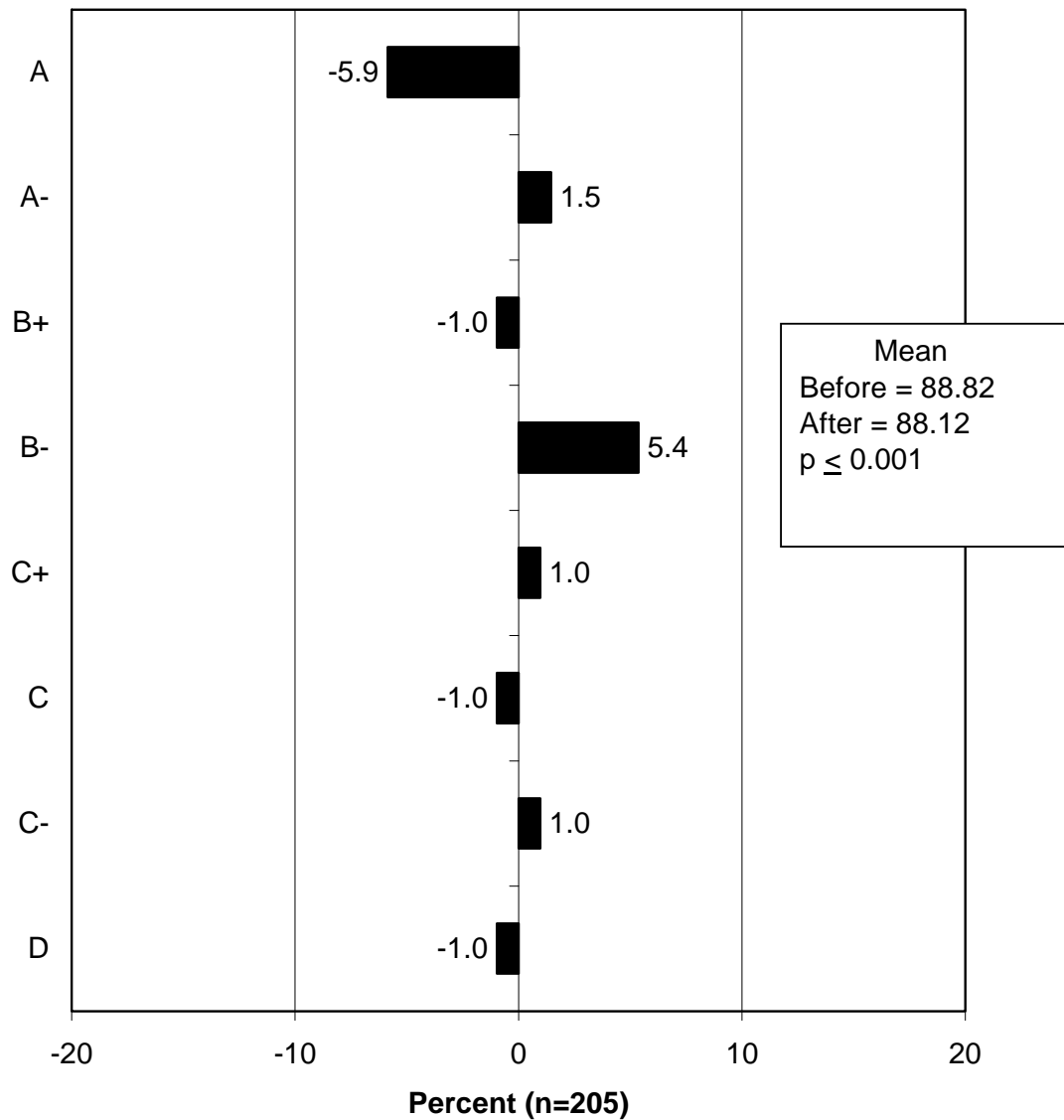


Figure 81. Difference in Percentage Receiving Grades in Social Studies/History Among Above Average 6th, 7th, and 8th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among 6th, 7th, and 8th grade students who receive average grades overall).

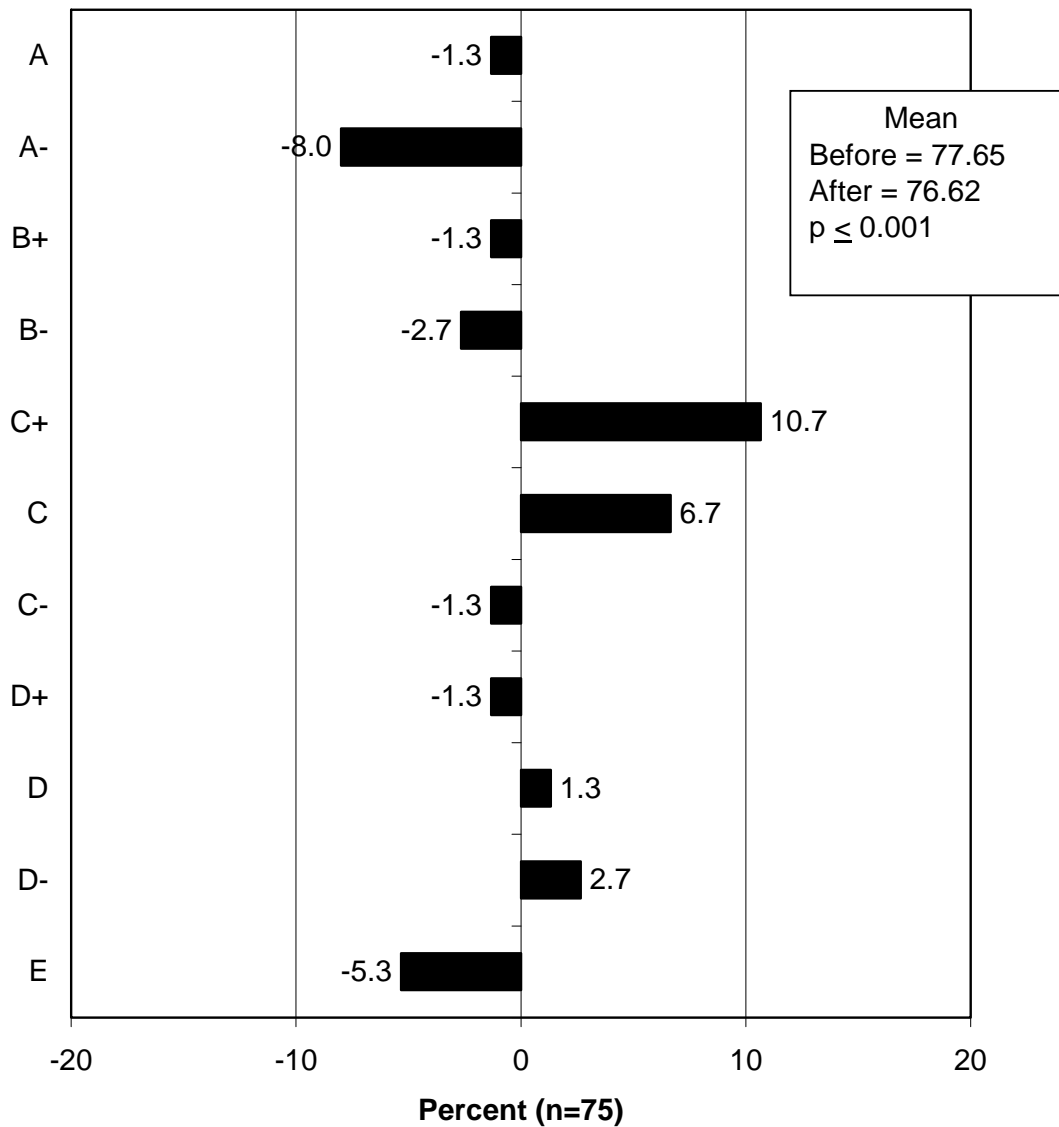


Figure 82. Difference in Percentage Receiving Grades in Social Studies/History Among Average 6th, 7th, and 8th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among 6th, 7th, and 8th grade students who receive below average grades overall).

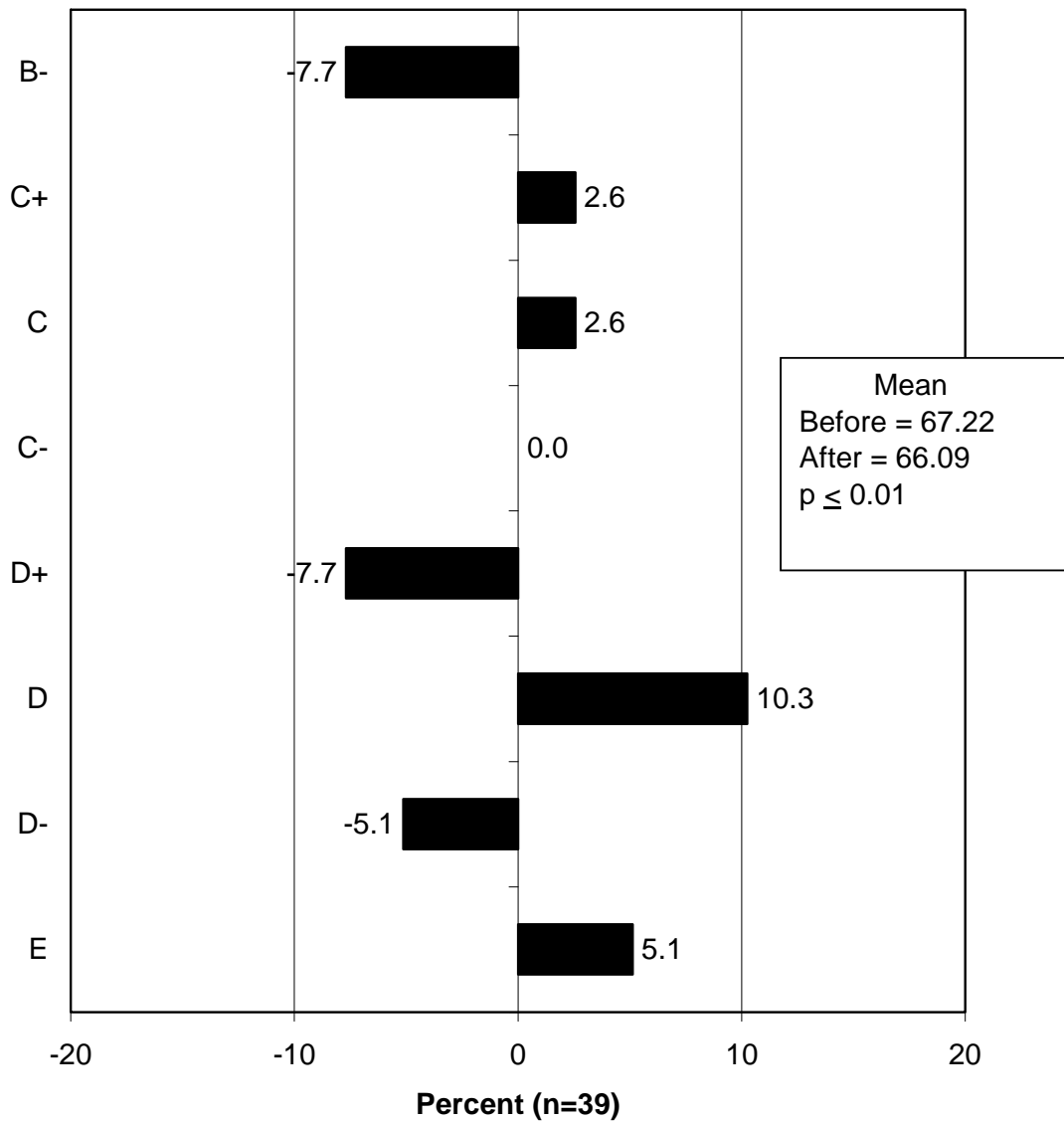


Figure 83. Difference in Percentage Receiving Grades in Social Studies/History Among Below Average 6th, 7th, and 8th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among all 9th, 10th, and 11th grade students).

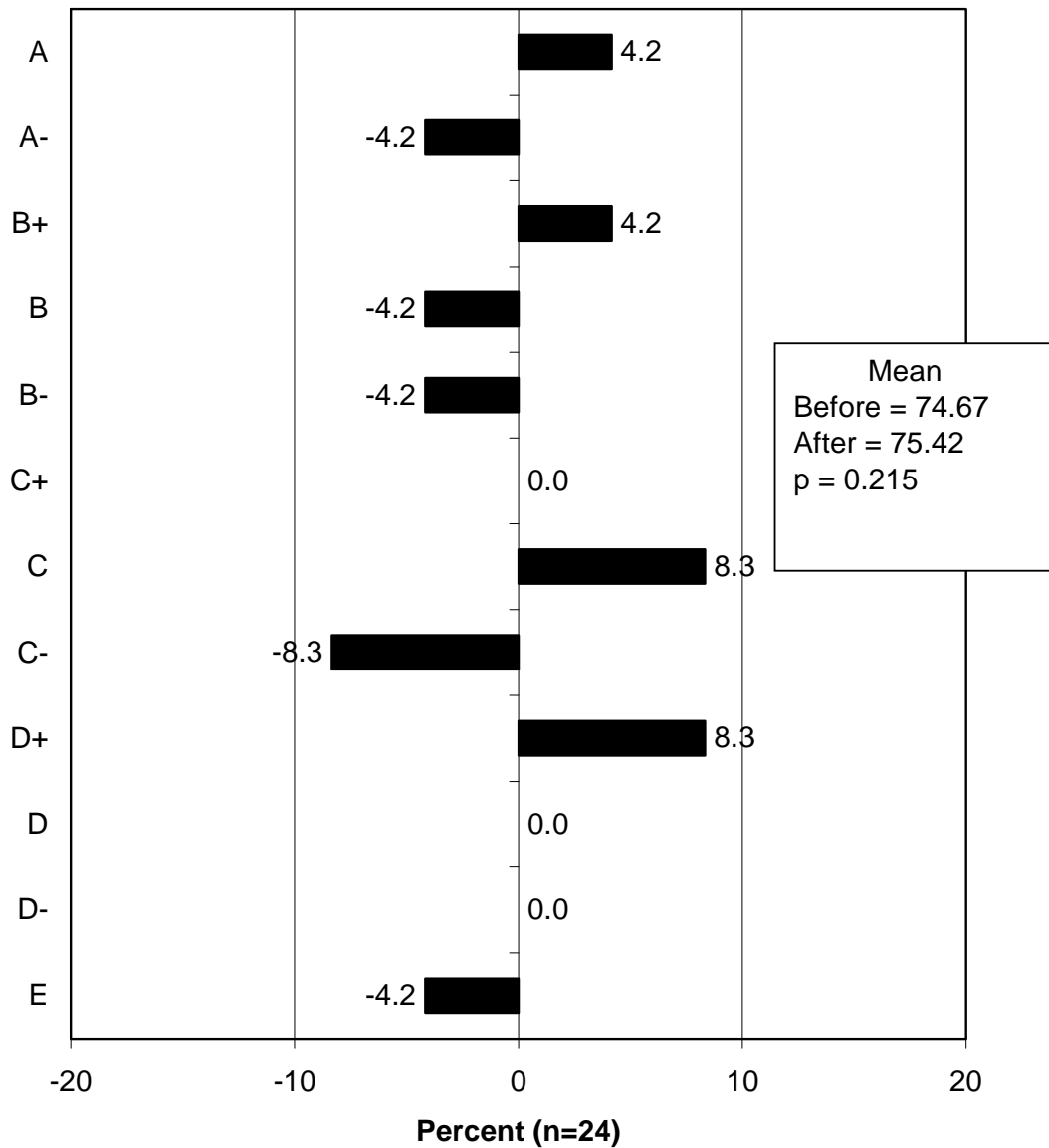


Figure 84. Difference in Percentage Receiving Grades in Social Studies/History Among 9th, 10th, and 11th Graders

What grades did the student receive in social studies or history before and after the archery program?

Difference in percentage receiving each grade in social studies/history, pre-program to post-program (among 9th, 10th, and 11th grade students who receive average grades overall).

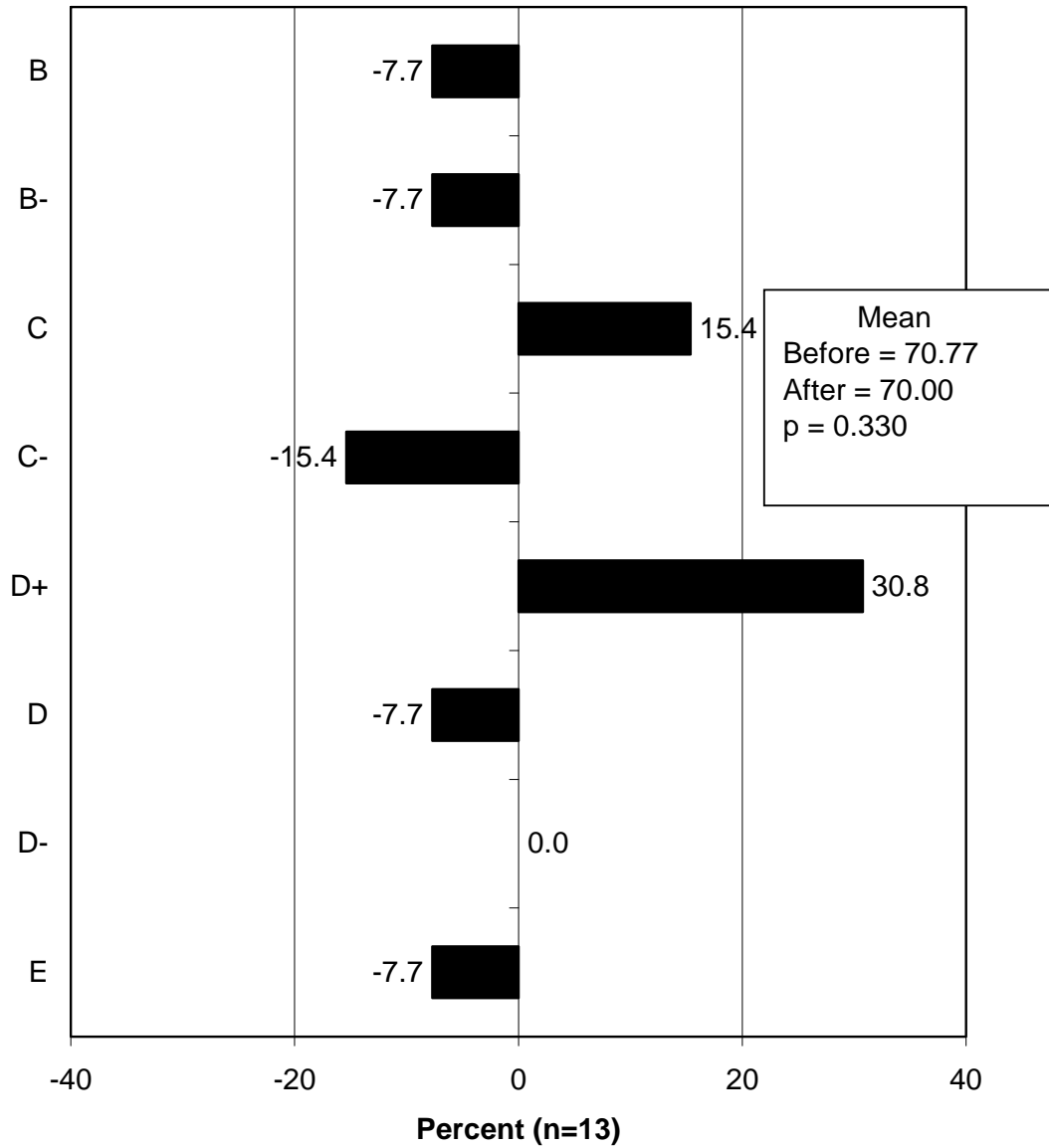


Figure 85. Difference in Percentage Receiving Grades in Social Studies/History Among Average 9th, 10th, and 11th Graders

Difference between the means of the student's social studies/history grades, pre-program and post-program.

Note that not all changes are statistically significant; does not show groups with sample sizes of fewer than 10 respondents.

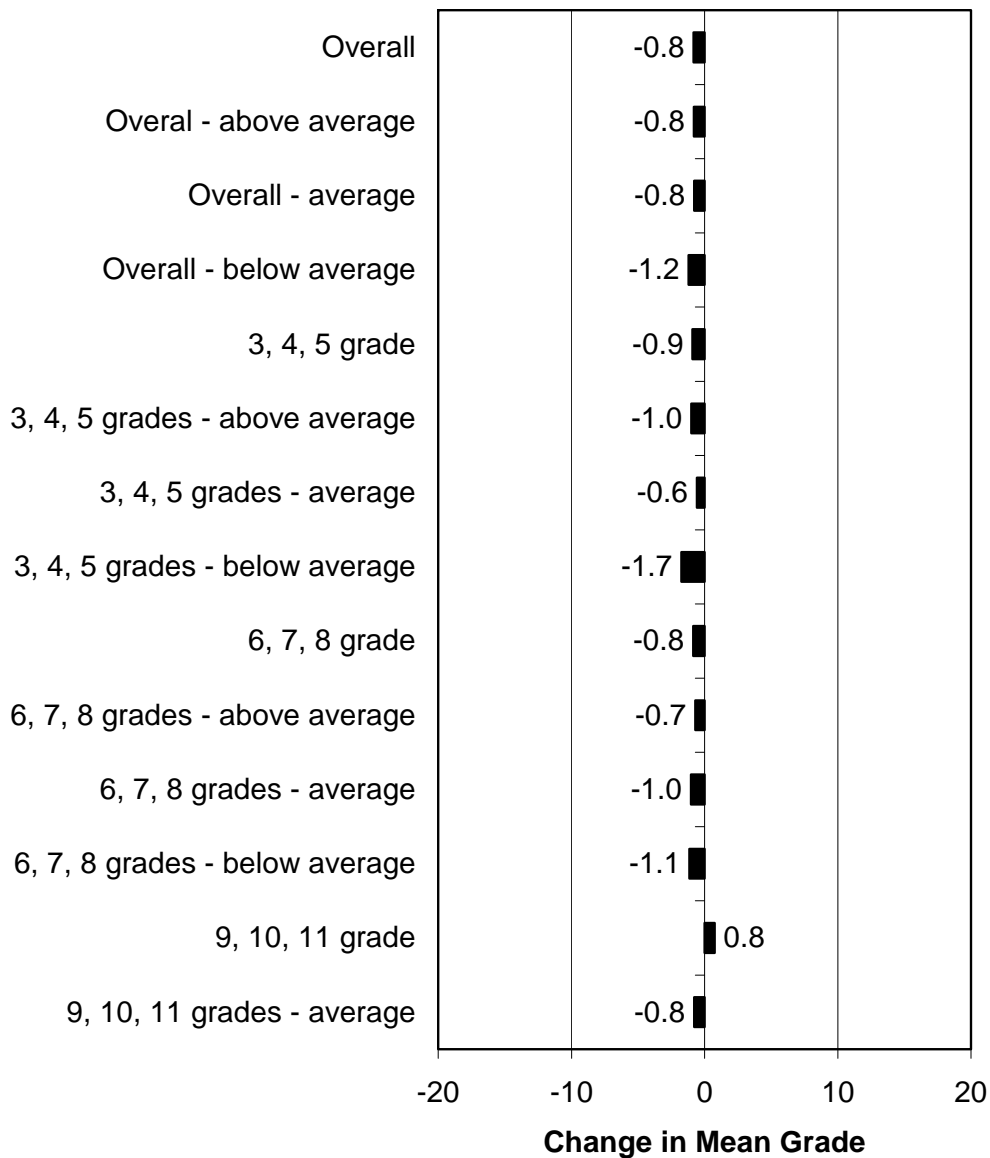


Figure 86. Difference in Mean Grades in Social Studies/History—All Groups

Difference in the Mean Grades Among Various Subgroups of Male and Female Students for Each Subject, Pre-Program to Post-Program

This analysis, similar to the above analysis, showed mixed results. Some subgroups show improvement in grades after archery, while others do not. In the tables that follow, changes in the mean grades of more than 1.0 points that are also statistically significant at the $p \leq 0.001$ level (the statistical significance depends on the size and variance of the sample) are shaded in gray. One overall finding that is immediately apparent is how few subgroups have changes of more than 1.0 points that are statistically significant at the $p \leq 0.001$ level. In short, very few subgroups appear to be markedly affected by the archery program.

In reading, males as a whole show a very slight increase in mean grades, and more than half of the male subgroups show a slight increase in mean grades. None of the male subgroups show a statistically significant change of more than 1.0 points at the $p \leq 0.001$ level. Among females, there is a slight decrease in mean grades in reading overall. The female subgroups are about evenly split between those that show an increase and those that show a decrease in mean grades. Three of the subgroups have a statistically significant decrease of more than 1.0 points at the $p \leq 0.001$ level: average female students, Caucasian average females students, and Caucasian average female elementary school students.

In writing, males as a whole show a slight decrease in mean grades, and most of the male subgroups show a decrease. Two male subgroups have a change of more than 1.0 points that are statistically significant at the $p \leq 0.001$ level: male non-Caucasian elementary school students show an increase; male Caucasian average middle school students show a decrease in mean writing grades. Among females overall, there is a slight decrease in mean writing grades, and most of the female subgroups show a decrease in mean grades. There are no statistically significant (at the $p \leq 0.001$ level) changes of more than 1.0 points among females in writing.

In English, males overall show no marked change in mean grades (actually a 0.02 percentage point increase), although more male subgroups show an increase than a decrease. There are no statistically significant (at the $p \leq 0.001$ level) changes of more than 1.0 points among males in English. Among females overall, there is a slight decrease in grades in English, and most female subgroups show a decrease. There are no statistically significant changes of more than 1.0 points at the $p \leq 0.001$ level among females in English.

In math, males show a decrease in mean grades overall, and male subgroups with decreased grades outnumber male subgroups with increased grades. Six male subgroups have a statistically significant change (at the $p \leq 0.001$ level) in grades in math, all of them decreases: elementary school male students, Caucasian elementary school male students, above average elementary school male students, average elementary school male students, Caucasian above average elementary school male students, and Caucasian average elementary school male students. Among females overall, there is a decrease in math grades after the archery course; however, females subgroups are about evenly divided between those that show an increase and those that show a decrease. Seven female subgroups have a statistically significant (at the $p \leq 0.001$ level) change, all of them decreases: elementary school female students, Caucasian elementary school female students, average female students, above average elementary school female students,

average elementary school female students, Caucasian above average elementary school female students, and Caucasian average elementary school female students.

In science, there is a decrease in mean grades among males overall, and the vast majority of all male subgroups show a decrease in mean grades after the archery course. Five of the male subgroups show a statistically significant decrease in mean grades at the $p \leq 0.001$ level: Caucasian elementary school male students, below average male students, above average middle school male students, Caucasian above average middle school male students, and Caucasian average elementary school male students. There are no male subgroups with a statistically significant (at the $p \leq 0.001$ level) increase in mean grades. Among females, there is a statistically significant (at the $p \leq 0.001$ level) decrease of more than 1.0 points in science grades overall. Furthermore, nearly all female subgroups show a decrease in grades after the archery course, including nine with statistically significant (again, at the $p \leq 0.001$ level) decreases of more than 1.0 points: elementary school female students, Caucasian female students, Caucasian elementary school female students, average female students, below average female students, above average elementary school female students, Caucasian above average elementary school female students, Caucasian average female students, and Caucasian below average female students.

In social studies/history, males show a decrease in mean grades overall. Most of the male subgroups also show a decrease in mean grades in social studies/history. Three of the male subgroups have a statistically significant change at the $p \leq 0.001$ level, all of them decreases: average male students, average elementary school male students, and Caucasian average male students. Results are similar among females, with an overall decrease in mean grades among females overall, and a decrease in most of the female subgroups. Three of the female subgroups have a statistically significant (at the $p \leq 0.001$ level) change, all of them decreases: Caucasian elementary school female students, above average elementary school female students, and Caucasian above average elementary school female students.

In summary, the results of this analysis are mixed, with some increases in mean grades and some decreases. However, there are more decreases than increases. These tables start on the following page.

Table 1. Male Students' Mean Grades in Reading Pre-Program and Post-Program

Students' Mean Grades in Reading Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All male students	83.79	83.95	$p \leq 0.001$	0.16
Elem. school male students	83.93	84.19	$p \leq 0.001$	0.26
Middle school male students	83.64	83.70	$p \leq 0.001$	0.06
All Caucasian male students	83.83	84.06	$p \leq 0.001$	0.23
Caucasian elem. school male students	84.10	84.26	$p \leq 0.001$	0.16
Caucasian middle school male students	83.55	83.87	$p \leq 0.001$	0.32
All non-Caucasian male students	83.37	82.69	$p \leq 0.05$	-0.68
Non-Caucasian elem. school male students	82.53	83.61	$p \leq 0.01$	1.08
Non-Cauc. middle school male students	85.06	80.83	$p = 0.211$	-4.23
Above avg. male students	90.09	90.59	$p \leq 0.001$	0.50
Average male students	76.92	76.39	$p \leq 0.001$	-0.53
Below avg. male students	63.79	63.85	$p \leq 0.01$	0.06
Above avg. elem. school male students	89.06	89.42	$p \leq 0.001$	0.36
Average elem. school male students	75.48	75.53	$p \leq 0.001$	0.05
Below avg. elem. school male students	62.19	62.25	$p \leq 0.05$	0.06
Above avg. middle school male students	91.39	92.08	$p \leq 0.001$	0.69
Average middle school male students	78.39	77.27	$p = 0.067$	-1.13
Below avg. middle school male students	64.35	64.41	$p \leq 0.05$	0.07
Caucasian above avg. male students	90.01	90.60	$p \leq 0.001$	0.59
Cauc. above avg. elem. sch. male students	88.98	89.28	$p \leq 0.001$	0.30
Cauc. above avg. mid. sch. male students	91.27	92.21	$p \leq 0.001$	0.94
Non-Caucasian above avg. male students	90.94	90.50	$p \leq 0.001$	-0.44
Non-Caucasian above avg. elementary school male students	89.77	90.64	$p \leq 0.05$	0.86
Non-Caucasian above avg. middle school male students	93.08	90.25	$p = 0.220$	-2.83
Caucasian avg. male students	77.49	76.73	$p \leq 0.001$	-0.76
Cauc. avg. elem. school male students	76.26	76.00	$p \leq 0.01$	-0.26
Caucasian avg. middle school male students	78.62	77.40	$p = 0.186$	-1.22
Non-Caucasian avg. male students	69.71	72.07	$p = 0.221$	2.36
Non-Caucasian avg. elementary school male students	70.00	72.25	$p = 0.178$	2.25
Non-Caucasian avg. middle school male students	68.00	71.00	constant	3.00
Caucasian below avg. male students	62.88	63.93	$p \leq 0.01$	1.05
Caucasian below avg. elementary school male students	59.93	60.50	$p \leq 0.05$	0.57
Caucasian below avg. middle school male students	63.86	65.07	$p \leq 0.05$	1.21
Non-Caucasian below avg. male students	72.33	63.17	$p = 0.223$	-9.17
Non-Caucasian below avg. elementary school male students	78.00	74.50	constant	-3.50
Non-Caucasian below middle elementary school male students	69.50	57.50	constant	-12.00

Table 2. Female Students' Mean Grades in Reading Pre-Program and Post-Program

Students' Mean Grades in Reading Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All female students	87.12	86.94	$p \leq 0.001$	-0.18
Elem. school female students	86.43	86.31	$p \leq 0.001$	-0.12
Middle school female students	87.81	87.58	$p \leq 0.001$	-0.23
All Caucasian female students	87.10	86.90	$p \leq 0.001$	-0.20
Caucasian elem. school female students	86.46	86.32	$p \leq 0.001$	-0.14
Caucasian middle school female students	87.74	87.47	$p \leq 0.001$	-0.27
All non-Caucasian female students	87.39	87.63	$p = 0.063$	0.24
Non-Cauc. elem. school female students	85.83	86.06	$p = 0.112$	0.23
Non-Cauc. middle school female students	88.80	89.05	$p = 0.128$	0.25
Above avg. female students	91.04	91.13	$p \leq 0.001$	0.09
Average female students	78.59	77.52	$p \leq 0.001$	-1.07
Below avg. female students	68.28	67.95	$p = 0.306$	-0.33
Above avg. elem. school female students	89.88	89.92	$p \leq 0.001$	0.04
Average elem. school female students	77.47	76.60	$p \leq 0.001$	-0.88
Below avg. elem. school female students	63.50	65.25	$p = 0.261$	1.75
Above avg. middle school female students	92.26	92.39	$p \leq 0.001$	0.13
Average middle school female students	80.02	78.70	$p \leq 0.05$	-1.32
Below avg. middle school female students	69.47	68.63	$p = 0.455$	-0.84
Caucasian above avg. female students	91.13	91.20	$p \leq 0.001$	0.07
Caucasian above avg. elementary school female students	89.93	89.99	$p \leq 0.001$	0.06
Caucasian above avg. middle school female students	92.40	92.49	$p \leq 0.001$	0.08
Non-Caucasian above avg. female students	89.73	90.03	$p = 0.083$	0.30
Non-Caucasian above avg. elementary school female students	89.07	88.86	$p = 0.136$	-0.21
Non-Caucasian above avg. middle school female students	90.31	91.06	$p = 0.333$	0.75
Caucasian avg. female students	78.58	77.44	$p \leq 0.001$	-1.14
Caucasian avg. elementary school female students	77.65	76.62	$p \leq 0.001$	-1.03
Caucasian avg. middle school female students	79.81	78.52	$p \leq 0.05$	-1.29
Non-Caucasian avg. female students	78.63	78.63	$p = 0.261$	0.00
Non-Caucasian avg. elementary school female students	74.50	76.25	constant	1.75
Non-Caucasian avg. middle school female students	82.75	81.00	$p = 0.157$	-1.75
Caucasian below avg. female students	68.28	67.95	$p = 0.306$	-0.33
Caucasian below avg. elementary school female students	63.50	65.25	$p = 0.261$	1.75
Caucasian below avg. middle school female students	69.47	68.63	$p = 0.455$	-0.84
Non-Caucasian below avg. female students	No cases	--	--	--
Non-Caucasian below avg. elementary school female students	No cases	--	--	--
Non-Caucasian below middle elementary school female students	No cases	--	--	--

Table 3. Male Students' Mean Grades in Writing Pre-Program and Post-Program

Students' Mean Grades in Writing Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All male students	83.49	83.27	$p \leq 0.001$	-0.22
Elem. school male students	83.46	83.57	$p \leq 0.001$	0.11
Middle school male students	83.53	82.94	$p \leq 0.001$	-0.59
All Caucasian male students	83.63	83.31	$p \leq 0.001$	-0.32
Caucasian elem. school male students	83.69	83.63	$p \leq 0.001$	-0.06
Caucasian middle school male students	83.57	82.97	$p \leq 0.001$	-0.60
All non-Caucasian male students	81.93	82.80	$p \leq 0.001$	0.87
Non-Caucasian elem. school male students	81.42	83.00	$p \leq 0.001$	1.58
Non-Caucasian middle school male students	82.94	82.39	$p = 0.208$	-0.56
Above avg. male students	87.69	87.69	$p \leq 0.001$	0.00
Average male students	79.28	78.57	$p \leq 0.001$	-0.71
Below avg. male students	69.06	68.94	$p \leq 0.01$	-0.13
Above avg. elem. school male students	86.42	86.85	$p \leq 0.001$	0.43
Average elem. school male students	78.88	78.40	$p \leq 0.001$	-0.48
Below avg. elem. school male students	70.19	69.44	$p \leq 0.05$	-0.75
Above avg. middle school male students	89.38	88.80	$p \leq 0.001$	-0.57
Average middle school male students	79.73	78.77	$p \leq 0.001$	-0.97
Below avg. middle school male students	68.67	68.76	$p \leq 0.05$	0.09
Caucasian above avg. male students	87.62	87.57	$p \leq 0.001$	-0.05
Caucasian above avg. elementary school male students	86.39	86.63	$p \leq 0.001$	0.24
Caucasian above avg. middle school male students	89.21	88.78	$p \leq 0.001$	-0.43
Non-Caucasian above avg. male students	88.47	89.06	$p \leq 0.05$	0.59
Non-Caucasian above avg. elementary school male students	86.73	89.00	$p \leq 0.05$	2.27
Non-Caucasian above avg. middle school male students	91.67	89.17	$p = 0.213$	-2.50
Caucasian avg. male students	79.75	78.88	$p \leq 0.001$	-0.87
Caucasian avg. elementary school male students	79.57	78.89	$p \leq 0.001$	-0.68
Caucasian avg. middle school male students	79.92	78.86	$p \leq 0.001$	-1.07
Non-Caucasian avg. male students	73.07	74.50	$p = 0.261$	1.43
Non-Caucasian avg. elementary school male students	73.42	74.50	$p = 0.173$	1.08
Non-Caucasian avg. middle school male students	71.00	74.50	constant	3.50
Caucasian below avg. male students	69.45	69.18	$p \leq 0.01$	-0.27
Caucasian below avg. elementary school male students	70.07	69.64	$p = 0.109$	-0.43
Caucasian below avg. middle school male students	69.24	69.02	$p \leq 0.05$	-0.21
Non-Caucasian below avg. male students	65.50	66.67	$p = 0.199$	1.17
Non-Caucasian below avg. elementary school male students	71.00	68.00	constant	-3.00
Non-Caucasian below middle elementary school male students	62.75	66.00	$p = 0.157$	3.25

Table 4. Female Students' Mean Grades in Writing Pre-Program and Post-Program

Students' Mean Grades in Writing Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All female students	87.32	87.12	$p \leq 0.001$	-0.20
Elem. school female students	87.71	87.65	$p \leq 0.001$	-0.06
Middle school female students	86.92	86.57	$p \leq 0.001$	-0.35
All Caucasian female students	87.53	87.37	$p \leq 0.001$	-0.17
Caucasian elem. school female students	87.85	87.87	$p \leq 0.001$	0.02
Caucasian middle school female students	87.20	86.84	$p \leq 0.001$	-0.37
All non-Caucasian female students	84.24	83.52	$p \leq 0.01$	-0.71
Non-Cauc. elem. school female students	85.68	84.45	$p = 0.067$	-1.23
Non-Cauc. middle school female students	82.65	82.50	$p = 0.127$	-0.15
Above avg. female students	90.70	90.71	$p \leq 0.001$	0.01
Average female students	80.05	79.84	$p \leq 0.001$	-0.22
Below avg. female students	71.50	68.78	$p = 0.081$	-2.72
Above avg. elem. school female students	90.59	90.50	$p \leq 0.001$	-0.09
Average elem. school female students	80.41	80.53	$p \leq 0.001$	0.12
Below avg. elem. school female students	70.38	69.38	$p = 0.213$	-1.00
Above avg. middle school female students	90.82	90.93	$p \leq 0.001$	0.12
Average middle school female students	79.55	78.88	$p = 0.365$	-0.68
Below avg. middle school female students	71.78	68.63	$p = 0.094$	-3.16
Caucasian above avg. female students	91.07	91.12	$p \leq 0.001$	0.05
Caucasian above avg. elementary school female students	90.84	90.86	$p \leq 0.001$	0.03
Caucasian above avg. middle school female students	91.31	91.39	$p \leq 0.001$	0.08
Non-Caucasian above avg. female students	85.91	85.41	$p = 0.162$	-0.50
Non-Caucasian above avg. elementary school female students	87.39	85.89	$p = 0.229$	-1.50
Non-Caucasian above avg. middle school female students	84.25	84.88	$p = 0.299$	0.63
Caucasian avg. female students	80.24	80.11	$p \leq 0.001$	-0.13
Caucasian avg. elementary school female students	80.54	80.66	$p \leq 0.001$	0.12
Caucasian avg. middle school female students	79.81	79.33	$p = 0.229$	-0.48
Non-Caucasian avg. female students	77.13	75.50	$p = 0.238$	-1.63
Non-Caucasian avg. elementary school female students	78.00	78.00	$p = 0.157$	0.00
Non-Caucasian avg. middle school female students	76.25	73.00	$p = 0.157$	-3.25
Caucasian below avg. female students	71.50	68.78	$p = 0.081$	-2.72
Caucasian below avg. elementary school female students	70.38	69.38	$p = 0.213$	-1.00
Caucasian below avg. middle school female students	71.78	68.63	$p = 0.094$	-3.16
Non-Caucasian below avg. female students	No cases	--	--	--
Non-Caucasian below avg. elementary school female students	No cases	--	--	--
Non-Caucasian below middle elementary school female students	No cases	--	--	--

Table 5. Male Students' Mean Grades in English Pre-Program and Post-Program
Students' Mean Grades in English Pre-Program and Post-Program

	Pre-Program	Post-Program	Significance	Change
All male students	83.21	83.22	$p \leq 0.001$	0.02
Elem. school male students	83.48	83.71	$p \leq 0.001$	0.23
Middle school male students	83.58	83.32	$p \leq 0.001$	-0.27
High school male students	77.11	77.50	$p = 0.443$	0.39
All Caucasian male students	83.25	83.26	$p \leq 0.001$	0.01
Caucasian elem. school male students	83.65	83.76	$p \leq 0.001$	0.11
Caucasian middle school male students	83.56	83.42	$p \leq 0.001$	-0.14
Caucasian high school male students	77.11	77.50	$p = 0.443$	0.39
All non-Caucasian male students	82.65	82.74	$p = 0.051$	0.09
Non-Caucasian elem. school male students	81.97	83.31	$p = 0.084$	1.33
Non-Cauc. middle school male students	84.00	81.61	$p = 0.271$	-2.39
Non-Caucasian high school male students	No cases	--	--	--
Above avg. male students	88.61	88.81	$p \leq 0.001$	0.20
Average male students	77.68	77.31	$p \leq 0.001$	-0.37
Below avg. male students	66.26	66.38	$p \leq 0.05$	0.13
Above avg. elem. school male students	87.47	87.85	$p \leq 0.001$	0.38
Average elem. school male students	77.13	77.11	$p \leq 0.001$	-0.02
Below avg. elem. school male students	66.19	65.84	$p = 0.054$	-0.34
Above avg. middle school male students	90.38	90.44	$p \leq 0.001$	0.06
Average middle school male students	79.06	78.02	$p = 0.204$	-1.05
Below avg. middle school male students	66.51	66.59	$p = 0.284$	0.08
Above avg. high school male students	84.67	83.50	$p = 0.242$	-1.17
Average high school male students	74.45	75.27	$p = 0.322$	0.82
Below avg. high school male students	61.00	66.00	constant	5.00
Caucasian above avg. male students	88.51	88.72	$p \leq 0.001$	0.21
Cauc. above avg. elem. school male students	87.39	87.65	$p \leq 0.001$	0.26
Cauc. above avg. mid. school male students	90.24	90.49	$p \leq 0.001$	0.25
Cauc. above avg. high school male students	84.67	83.50	$p = 0.242$	-1.17
Non-Caucasian above avg. male students	89.71	89.78	$p = 0.215$	0.07
Non-Cauc. above avg. elem. school male students	88.25	89.82	$p = 0.062$	1.57
Non-Cauc. above avg. mid. school male students	92.38	89.71	$p = 0.285$	-2.67
Non-Cauc. above avg. high school male students	No cases	--	--	--
Caucasian avg. male students	78.11	77.58	$p \leq 0.001$	-0.52
Caucasian avg. elem. school male students	77.82	77.59	$p \leq 0.001$	-0.23
Caucasian avg. middle school male students	79.27	78.13	$p = 0.448$	-1.14
Caucasian avg. high school male students	74.45	75.27	$p = 0.322$	0.82
Non-Caucasian avg. male students	71.39	73.29	$p = 0.381$	1.89
Non-Cauc. avg. elem. school male students	71.71	73.38	$p = 0.334$	1.67
Non-Cauc. avg. mid. school male students	69.50	72.75	constant	3.25
Non-Cauc. avg. high school male students	No cases	--	--	--
Caucasian below avg. male students	65.98	66.53	$p \leq 0.05$	0.55
Cauc. below avg. elem. school male students	65.00	65.07	$p = 0.121$	0.07
Cauc. below avg. mid. school male students	66.55	67.05	$p = 0.423$	0.50
Cauc. below avg. high school male students	61.00	66.00	constant	5.00
Non-Caucasian below avg. male students	68.92	64.92	$p = 0.199$	-4.00
Non-Cauc. below avg. elem. school male students	74.5	71.25	constant	-3.25
Non-Cauc. below avg. mid. school male students	66.125	61.75	$p = 0.157$	-4.38
Non-Cauc. below avg. high school male students	No cases	--	--	--

Table 6. Female Students' Mean Grades in English Pre-Program and Post-Program
Students' Mean Grades in English Pre-Program and Post-Program

	Pre-Program	Post-Program	Significance	Change
All female students	86.93	86.80	$p \leq 0.001$	-0.14
Elem. school female students	86.88	86.82	$p \leq 0.001$	-0.07
Middle school female students	87.36	87.08	$p \leq 0.001$	-0.29
High school female students	75.00	77.20	$p = 0.220$	2.20
All Caucasian female students	87.04	86.90	$p \leq 0.001$	-0.14
Caucasian elem. school female students	87.01	86.96	$p \leq 0.001$	-0.06
Caucasian middle school female students	87.47	87.16	$p \leq 0.001$	-0.31
Caucasian high school female students	75.00	77.20	$p = 0.220$	2.20
All non-Caucasian female students	85.37	85.29	$p = 0.144$	-0.08
Non-Cauc. elem. school female students	85.05	84.84	$p = 0.166$	-0.20
Non-Cauc. middle school female students	85.73	85.78	$p = 0.267$	0.05
Non-Cauc. high school female students	No cases	--	--	--
Above avg. female students	90.68	90.84	$p \leq 0.001$	0.16
Average female students	79.18	78.50	$p \leq 0.001$	-0.69
Below avg. female students	69.42	67.68	$p = 0.298$	-1.74
Above avg. elem. school female students	90.03	90.04	$p \leq 0.001$	0.01
Average elem. school female students	78.92	78.57	$p \leq 0.001$	-0.35
Below avg. elem. school female students	66.94	67.31	$p = 0.213$	0.38
Above avg. middle school female students	91.54	91.66	$p \leq 0.001$	0.12
Average middle school female students	79.79	78.79	$p = 0.122$	-1.00
Below avg. middle school female students	70.63	68.63	$p = 0.350$	-2.00
Above avg. high school female students	81.50	93.00	$p = 0.157$	11.50
Average high school female students	76.00	73.00	$p = 0.157$	-3.00
Below avg. high school female students	60.00	54.00	constant	-6.00
Caucasian above avg. female students	90.95	91.11	$p \leq 0.001$	0.16
Cauc. above avg. elem. sch. female students	90.27	90.31	$p \leq 0.001$	0.04
Cauc. above avg. mid. sch. female students	91.86	91.94	$p \leq 0.001$	0.08
Cauc. above avg. high sch. female students	81.50	93.00	$p = 0.157$	11.50
Non-Cauc. above avg. female students	87.13	87.22	$p = 0.289$	0.09
Non-Cauc. above avg. elem. sch. female students	87.00	86.56	$p = 0.324$	-0.44
Non-Cauc. above avg. mid. sch. female students	87.28	87.97	$p = 0.275$	0.69
Non-Cauc. above avg. high sch. female students	No cases	--	--	--
Caucasian avg. female students	79.27	78.58	$p \leq 0.001$	-0.68
Cauc. avg. elem. school female students	79.06	78.65	$p \leq 0.001$	-0.41
Cauc. avg. mid. school female students	79.81	78.92	$p = 0.126$	-0.88
Cauc. avg. high school female students	76.00	73.00	$p = 0.157$	-3.00
Non-Caucasian avg. female students	77.875	77.06	$p = 0.287$	-0.81
Non-Cauc. avg. elem. school female students	76.25	77.13	$p = 0.157$	0.88
Non-Cauc. avg. mid. school female students	79.5	77.00	$p = 0.157$	-2.50
Non-Cauc. avg. high school female students	No cases	--	--	--
Caucasian below avg. female students	69.42	67.68	$p = 0.298$	-1.74
Cauc. below avg. elem. sch. female students	66.94	67.31	$p = 0.213$	0.38
Cauc. below avg. mid. sch. female students	70.63	68.63	$p = 0.350$	-2.00
Cauc. below avg. high sch. female students	60.00	54.00	constant	-6.00
Non-Cauc. below avg. female students	No cases	--	--	--
Non-Cauc. below avg. elem. sch. female students	No cases	--	--	--
Non-Cauc. below avg. mid. sch. female students	No cases	--	--	--
Non-Cauc. below avg. high sch. female students	No cases	--	--	--

Table 7. Male Students' Mean Grades in Math Pre-Program and Post-Program

Students' Mean Grades in Math Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All male students	79.84	79.28	$p \leq 0.001$	-0.55
Elem. school male students	83.62	81.88	$p \leq 0.001$	-1.73
Middle school male students	76.87	77.48	$p \leq 0.001$	0.61
High school male students	68.95	70.09	$p = 0.068$	1.14
All Caucasian male students	79.71	79.16	$p \leq 0.001$	-0.56
Caucasian elem. school male students	83.75	81.83	$p \leq 0.001$	-1.92
Caucasian middle school male students	76.73	77.47	$p \leq 0.001$	0.73
Caucasian high school male students	68.95	70.09	$p = 0.068$	1.14
All non-Caucasian male students	81.48	80.96	$p \leq 0.05$	-0.52
Non-Caucasian elem. school male students	82.39	82.39	$p = 0.386$	0.00
Non-Caucasian middle school male students	79.44	77.75	$p = 0.206$	-1.69
Non-Caucasian high school male students	No cases	--	--	--
All female students	82.11	81.38	$p \leq 0.001$	-0.72
Above avg. male students	86.61	85.91	$p \leq 0.001$	-0.70
Average male students	72.96	72.65	$p \leq 0.001$	-0.31
Below avg. male students	59.85	59.40	$p \leq 0.001$	-0.44
Above avg. elem. school male students	88.61	87.08	$p \leq 0.001$	-1.54
Average elem. school male students	74.68	72.46	$p \leq 0.001$	-2.22
Below avg. elem. school male students	63.00	61.38	$p = 0.074$	-1.63
Above avg. middle school male students	84.60	84.98	$p \leq 0.001$	0.38
Average middle school male students	71.39	72.79	$p = 0.328$	1.39
Below avg. middle school male students	59.15	59.02	$p \leq 0.05$	-0.13
Above avg. high school male students	73.33	74.83	$p = 0.244$	1.50
Average high school male students	71.55	73.00	$p = 0.289$	1.45
Below avg. high school male students	58	58	$p \leq 0.05$	0.00
Caucasian above avg. male students	86.43	85.65	$p \leq 0.001$	-0.78
Cauc. above avg. elem. sch. male students	88.50	86.78	$p \leq 0.001$	-1.73
Cauc. above avg. mid. sch. male students	84.45	84.85	$p \leq 0.001$	0.40
Cauc. above avg. high sch. male students	73.33	74.83	$p = 0.244$	1.50
Non-Caucasian above avg. male students	88.91	89.25	$p = 0.059$	0.34
Non-Cauc. above avg. elem. sch. male students	89.73	90.18	$p = 0.288$	0.45
Non-Cauc. above avg. mid. school male students	87.10	87.20	$p = 0.235$	0.10
Non-Cauc. above avg. high sch. male students	No cases	--	--	--
Caucasian avg. male students	72.90777	72.69417	$p \leq 0.001$	-0.21
Caucasian avg. elem. school male students	74.89	72.49	$p \leq 0.001$	-2.40
Caucasian avg. middle school male students	71.25	72.83	$p = 0.269$	1.58
Caucasian avg. high school male students	71.55	73.00	$p = 0.289$	1.45
Non-Caucasian avg. male students	73.79	72.07	$p = 0.397$	-1.71
Non-Cauc. avg. elem. school male students	73.08	72.25	$p = 0.446$	-0.83
Non-Cauc. avg. mid. school male students	78.00	71.00	constant	-7.00
Non-Cauc. avg. high school male students	No cases	--	--	--
Caucasian below avg. male students	59.85	59.58	$p \leq 0.001$	-0.27
Cauc. below avg. elem. school male students	63.79	61.93	$p = 0.122$	-1.86
Cauc. below avg. mid. sch. male students	58.98	59.17	$p \leq 0.05$	0.19
Cauc. below avg. high school male students	58.00	58.00	$p \leq 0.05$	0.00
Non-Caucasian below avg. male students	59.83	57.50	constant	-2.33
Non-Cauc. below avg. elem. sch. male students	57.50	57.50	constant	0.00
Non-Cauc. below avg. mid. sch. male students	61.00	57.50	constant	-3.50
Non-Cauc. below avg. high sch. male students	No cases	--	--	--

Table 8. Female Students' Mean Grades in Math Pre-Program and Post-Program
Students' Mean Grades in Math Pre-Program and Post-Program

	Pre-Program	Post-Program	Significance	Change
All female students	82.11	81.38	$p \leq 0.001$	-0.72
Elem. school female students	84.77	82.75	$p \leq 0.001$	-2.03
Middle school female students	79.80	80.47	$p \leq 0.001$	0.67
High school female students	68.29	68.29	$p = 0.109$	0.00
All Caucasian female students	82.07	81.41	$p \leq 0.001$	-0.66
Caucasian elem. school female students	84.69	82.85	$p \leq 0.001$	-1.84
Caucasian middle school female students	79.88	80.47	$p \leq 0.001$	0.59
Caucasian high school female students	68.29	68.29	$p = 0.109$	0.00
All non-Caucasian female students	82.57	80.93	$p \leq 0.05$	-1.64
Non-Caucasian elem. school female students	85.92	81.29	$p = 0.084$	-4.63
Non-Cauc. middle school female students	78.55	80.50	$p = 0.126$	1.95
Non-Caucasian high school female students	No cases	--	--	--
Above avg. female students	87.05	86.33	$p \leq 0.001$	-0.72
Average female students	71.94	70.86	$p \leq 0.001$	-1.09
Below avg. female students	59.67	60.02	$p \leq 0.001$	0.35
Above avg. elem. school female students	88.69	87.06	$p \leq 0.001$	-1.63
Average elem. school female students	74.26	70.50	$p \leq 0.001$	-3.76
Below avg. elem. school female students	60.13	61.88	$p = 0.135$	1.75
Above avg. middle school female students	85.13	85.45	$p \leq 0.001$	0.32
Average middle school female students	69.57	71.98	$p \leq 0.01$	2.41
Below avg. middle school female students	59.69	59.88	$p = 0.180$	0.19
Above avg. high school female students	90.50	89.50	$p = 0.157$	-1.00
Average high school female students	60.00	62.00	constant	2.00
Below avg. high school female students	59.00	58.33	$p = 0.083$	-0.67
Caucasian above avg. female students	87.16	86.47	$p \leq 0.001$	-0.69
Cauc. above avg. elem. sch. female students	88.73	87.18	$p \leq 0.001$	-1.55
Cauc. above avg. mid. sch. female students	85.33	85.61	$p \leq 0.001$	0.28
Cauc. above avg. high sch. female students	90.50	89.50	$p = 0.157$	-1.00
Non-Caucasian above avg. female students	85.69	84.58	$p = 0.065$	-1.11
Non-Cauc. above avg. elem. sch. female students	88.25	85.65	$p = 0.086$	-2.60
Non-Cauc. above avg. mid. sch. female students	82.50	83.25	$p = 0.192$	0.75
Non-Cauc. above avg. high sch. female students	No cases	--	--	--
Caucasian avg. female students	72.15	71.25	$p \leq 0.001$	-0.91
Cauc. avg. elem. school female students	74.26	71.09	$p \leq 0.001$	-3.16
Cauc. avg. middle school female students	70.10	72.17	$p \leq 0.05$	2.08
Caucasian avg. high school female students	60.00	62.00	constant	2.00
Non-Caucasian avg. female students	68.50	64.50	$p = 0.213$	-4.00
Non-Cauc. avg. elem. school female students	74.25	59.50	$p = 0.157$	-14.75
Non-Cauc. avg. mid. school female students	62.75	69.50	$p = 0.157$	6.75
Non-Cauc. avg. high school female students	No cases	--	--	--
Caucasian below avg. female students	59.67	60.02	$p \leq 0.001$	0.35
Cauc. below avg. elem. sch. female students	60.13	61.88	$p = 0.135$	1.75
Cauc. below avg. mid. sch. female students	59.69	59.88	$p = 0.180$	0.19
Cauc. below avg. high sch. female students	59.00	58.33	$p = 0.083$	-0.67
Non-Caucasian below avg. female students	No cases	--	--	--
Non-Cauc. below avg. elem. sch. female students	No cases	--	--	--
Non-Cauc. below avg. mid. sch. female students	No cases	--	--	--
Non-Cauc. below avg. high sch. female students	No cases	--	--	--

Table 9. Male Students' Mean Grades in Science Pre-Program and Post-Program

Students' Mean Grades in Science Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All male students	83.79	83.06	$p \leq 0.001$	-0.73
Elem. school male students	87.01	86.02	$p \leq 0.001$	-0.99
Middle school male students	81.33	80.84	$p \leq 0.001$	-0.49
High school male students	74.90	74.58	$p = 0.116$	-0.31
All Caucasian male students	83.82	83.05	$p \leq 0.001$	-0.77
Caucasian elem. school male students	87.11	86.03	$p \leq 0.001$	-1.08
Caucasian middle school male students	81.34	80.87	$p \leq 0.001$	-0.48
Caucasian high school male students	75.65	75.33	$p = 0.251$	-0.33
All non-Caucasian male students	83.50	83.18	$p \leq 0.01$	-0.32
Non-Caucasian elem. school male students	86.14	86.00	$p = 0.205$	-0.14
Non-Cauc. middle school male students	81.11	80.39	$p \leq 0.01$	-0.72
Non-Caucasian high school male students	57.50	57.50	constant	0.00
Above avg. male students	89.70	88.74	$p \leq 0.001$	-0.96
Average male students	77.98	77.82	$p \leq 0.001$	-0.16
Below avg. male students	65.95	64.86	$p \leq 0.001$	-1.08
Above avg. elem. school male students	91.23	90.34	$p \leq 0.001$	-0.90
Average elem. school male students	80.08	79.17	$p \leq 0.001$	-0.91
Below avg. elem. school male students	66.50	63.50	$p = 0.287$	-3.00
Above avg. middle school male students	87.76	86.75	$p \leq 0.001$	-1.01
Average middle school male students	76.50	77.12	$p \leq 0.001$	0.62
Below avg. middle school male students	66.59	65.83	$p \leq 0.01$	-0.76
Above avg. high school male students	86.43	85.00	$p = 0.308$	-1.43
Average high school male students	74.18	74.27	$p = 0.279$	0.09
Below avg. high school male students	62.75	63.00	$p = 0.141$	0.25
Caucasian above avg. male students	89.66	88.75	$p \leq 0.001$	-0.91
Cauc. above avg. elem. sch. male students	91.09	90.34	$p \leq 0.001$	-0.75
Cauc. above avg. mid. sch. male students	87.92	86.84	$p \leq 0.001$	-1.09
Cauc. above avg. high sch. male students	86.43	85.00	$p = 0.308$	-1.43
Non-Caucasian above avg. male students	90.21	88.65	$p = 0.080$	-1.56
Non-Cauc. above avg. elem. sch. male students	92.73	90.32	$p = 0.437$	-2.41
Non-Cauc. above avg. mid. sch. male students	85.58	85.58	$p \leq 0.05$	0.00
Non-Cauc. above avg. high sch. male students	No cases	--	--	--
Caucasian avg. male students	78.06	77.63	$p \leq 0.001$	-0.44
Cauc. avg. elementary school male students	80.38	78.85	$p \leq 0.001$	-1.53
Caucasian avg. middle school male students	76.62	77.17	$p \leq 0.001$	0.55
Caucasian avg. high school male students	74.18	74.27	$p = 0.279$	0.09
Non-Caucasian avg. male students	76.71	80.64	$p = 0.301$	3.93
Non-Cauc. avg. elem. school male students	77.67	81.67	$p = 0.263$	4.00
Non-Cauc. avg. middle school male students	71.00	74.50	constant	3.50
Non-Cauc. avg. high school male students	No cases	--	--	--
Caucasian below avg. male students	65.83	64.92	$p \leq 0.001$	-0.91
Cauc. below avg. elem. school male students	66.79	63.36	$p = 0.197$	-3.43
Cauc. below avg. mid. school male students	66.00	65.64	$p \leq 0.05$	-0.36
Cauc. below avg. high school male students	63.80	64.10	$p = 0.259$	0.30
Non-Caucasian below avg. male students	66.88	64.38	$p = 0.092$	-2.50
Non-Cauc. below avg. elem. sch. male students	64.50	64.50	constant	0.00
Non-Cauc. below avg. mid. sch. male students	72.75	67.75	$p = 0.157$	-5.00
Non-Cauc. below avg. high sch. male students	57.50	57.50	constant	0.00

Table 10. Female Students' Mean Grades in Science Pre-Program and Post-Program

Students' Mean Grades in Science Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All female students	85.32	84.27	$p \leq 0.001$	-1.05
Elem. school female students	88.02	86.72	$p \leq 0.001$	-1.30
Middle school female students	82.82	82.09	$p \leq 0.001$	-0.73
High school female students	76.29	74.14	$p = 0.121$	-2.14
All Caucasian female students	85.32	84.27	$p \leq 0.001$	-1.04
Caucasian elem. school female students	88.06	86.69	$p \leq 0.001$	-1.38
Caucasian middle school female students	82.83	82.19	$p \leq 0.001$	-0.64
Caucasian high school female students	76.29	74.14	$p = 0.121$	-2.14
All non-Caucasian female students	85.32	84.18	$p = 0.051$	-1.14
Non-Caucasian elem. school female students	87.50	87.17	$p = 0.095$	-0.33
Non-Caucasian middle school female students	82.70	80.60	$p = 0.246$	-2.10
Non-Caucasian high school female students	No cases	--	--	--
Above avg. female students	89.43	88.54	$p \leq 0.001$	-0.89
Average female students	77.97	76.52	$p \leq 0.001$	-1.45
Below avg. female students	63.37	61.85	$p \leq 0.001$	-1.52
Above avg. elem. school female students	91.24	90.21	$p \leq 0.001$	-1.04
Average elem. school female students	79.88	77.74	$p = 0.273$	-2.14
Below avg. elem. school female students	64.38	62.63	$p = 0.287$	-1.75
Above avg. middle school female students	87.45	86.68	$p \leq 0.001$	-0.78
Average middle school female students	74.77	74.54	$p = 0.253$	-0.23
Below avg. middle school female students	63.31	62.06	$p = 0.064$	-1.25
Above avg. high school female students	88.00	89.50	$p = 0.157$	1.50
Average high school female students	85.50	80.50	$p = 0.157$	-5.00
Below avg. high school female students	62.33	59.67	$p = 0.083$	-2.67
Caucasian above avg. female students	89.62	88.64	$p \leq 0.001$	-0.97
Cauc. above avg. elem. school female students	91.34	90.15	$p \leq 0.001$	-1.19
Cauc. above avg. middle school female students	87.76	86.99	$p \leq 0.001$	-0.78
Cauc. above avg. high school female students	88.00	89.50	$p = 0.157$	1.50
Non-Caucasian above avg. female students	87.03	87.17	$p = 0.075$	0.14
Non-Cauc. above avg. elem. sch. female students	90.05	90.90	$p = 0.099$	0.85
Non-Cauc. above avg. mid. sch. female students	83.25	82.50	$p = 0.438$	-0.75
Non-Cauc. above avg. high sch. female students	No cases	--	--	--
Caucasian avg. female students	77.99	76.88	$p \leq 0.001$	-1.12
Caucasian avg. elem. school female students	80.16	78.24	$p = 0.134$	-1.92
Caucasian avg. middle school female students	74.33	74.65	$p = 0.091$	0.33
Caucasian avg. high school female students	85.50	80.50	$p = 0.157$	-5.00
Non-Caucasian avg. female students	77.63	70.75	$p = 0.238$	-6.88
Non-Cauc. avg. elem. school female students	74.75	68.50	$p = 0.157$	-6.25
Non-Cauc. avg. middle school female students	80.50	73.00	$p = 0.157$	-7.50
Non-Caucasian avg. high school female students	No cases	--	--	--
Caucasian below avg. female students	63.37	61.85	$p \leq 0.001$	-1.52
Cauc. below avg. elem. school female students	64.38	62.63	$p = 0.287$	-1.75
Cauc. below avg. middle school female students	63.31	62.06	$p = 0.064$	-1.25
Cauc. below avg. high school female students	62.33	59.67	$p = 0.083$	-2.67
Non-Caucasian below avg. female students	No cases	--	--	--
Non-Cauc. below avg. elem. sch. female students	No cases	--	--	--
Non-Cauc. below avg. mid. sch. female students	No cases	--	--	--
Non-Cauc. below avg. high sch. female students	No cases	--	--	--

Table 11. Male Students' Mean Grades in Social Studies/History Pre-Program and Post-Program

Students' Mean Grades in Social Studies or History Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All male students	83.30	82.49	$p \leq 0.001$	-0.81
Elem. school male students	84.03	83.11	$p \leq 0.001$	-0.92
Middle school male students	83.30	82.51	$p \leq 0.001$	-0.79
High school male students	76.11	76.26	$p = 0.140$	0.16
All Caucasian male students	83.23	82.41	$p \leq 0.001$	-0.82
Caucasian elem. school male students	83.91	83.04	$p \leq 0.001$	-0.88
Caucasian middle school male students	83.37	82.50	$p \leq 0.001$	-0.87
Caucasian high school male students	76.11	76.26	$p = 0.140$	0.16
All non-Caucasian male students	84.13	83.43	$p \leq 0.001$	-0.70
Non-Caucasian elem. school male students	85.14	83.78	$p = 0.091$	-1.36
Non-Caucasian middle school male students	82.11	82.72	$p = 0.211$	0.61
Non-Caucasian high school male students	No cases	--	--	--
Above avg. male students	88.83	88.15	$p \leq 0.001$	-0.67
Average male students	76.74	75.58	$p \leq 0.001$	-1.16
Below avg. male students	68.02	67.50	$p \leq 0.001$	-0.52
Above avg. elem. school male students	88.71	87.98	$p \leq 0.001$	-0.73
Average elem. school male students	76.00	74.61	$p \leq 0.001$	-1.39
Below avg. elem. school male students	64.81	63.88	$p = 0.067$	-0.94
Above avg. middle school male students	89.38	88.59	$p \leq 0.001$	-0.79
Average middle school male students	78.69	77.74	$p \leq 0.001$	-0.95
Below avg. middle school male students	69.22	68.74	$p \leq 0.05$	-0.48
Above avg. high school male students	84.00	85.71	$p = 0.243$	1.71
Average high school male students	72.00	71.00	$p = 0.320$	-1.00
Below avg. high school male students	66.00	68.00	constant	2.00
Caucasian above avg. male students	88.75	88.09	$p \leq 0.001$	-0.66
Caucasian above avg. elem. school male students	88.48	87.87	$p \leq 0.001$	-0.62
Cauc. above avg. middle school male students	89.51	88.60	$p \leq 0.001$	-0.91
Caucasian above avg. high school male students	84.00	85.71	$p = 0.243$	1.71
Non-Caucasian above avg. male students	89.79	88.91	$p \leq 0.05$	-0.88
Non-Cauc. above avg. elem. school male students	91.00	89.14	$p = 0.053$	-1.86
Non-Cauc. above avg. mid. school male students	87.58	88.50	$p = 0.151$	0.92
Non-Cauc. above avg. high school male students	No cases	--	--	--
Caucasian avg. male students	76.83	75.60	$p \leq 0.001$	-1.24
Caucasian avg. elementary school male students	76.05	74.43	$p \leq 0.01$	-1.63
Caucasian avg. middle school male students	78.78	77.89	$p \leq 0.001$	-0.89
Caucasian avg. high school male students	72.00	71.00	$p = 0.320$	-1.00
Non-Caucasian avg. male students	75.43	75.36	$p = 0.308$	-0.07
Non-Caucasian avg. elem. school male students	75.58	76.08	$p = 0.242$	0.50
Non-Caucasian avg. middle school male students	74.50	71.00	constant	-3.50
Non-Caucasian avg. high school male students	No cases	--	--	--
Caucasian below avg. male students	67.57	67.12	$p \leq 0.001$	-0.45
Caucasian below avg. elem. school male students	62.93	62.86	$p \leq 0.05$	-0.07
Cauc. below avg. middle school male students	69.19	68.50	$p \leq 0.01$	-0.69
Caucasian below avg. high school male students	66.00	68.00	constant	2.00
Non-Caucasian below avg. male students	72.33	71.17	$p = 0.199$	-1.17
Non-Cauc. below avg. elem. sch. male students	78.00	71.00	constant	-7.00
Non-Cauc. below avg. mid. school male students	69.50	71.25	$p = 0.157$	1.75
Non-Cauc. below avg. high school male students	No cases	--	--	--

Table 12. Female Students' Mean Grades in Social Studies/History Pre-Program and Post-Program

Students' Mean Grades in Social Studies or History Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance	Change
All female students	84.57	83.73	$p \leq 0.001$	-0.84
Elem. school female students	85.74	84.82	$p \leq 0.001$	-0.92
Middle school female students	83.81	82.93	$p \leq 0.001$	-0.88
High school female students	69.20	72.20	$p = 0.220$	3.00
All Caucasian female students	84.64	83.76	$p \leq 0.001$	-0.88
Caucasian elem. school female students	85.77	84.76	$p \leq 0.001$	-1.01
Caucasian middle school female students	83.95	83.09	$p \leq 0.001$	-0.86
Caucasian high school female students	69.20	72.20	$p = 0.220$	3.00
All non-Caucasian female students	83.64	83.25	$p \leq 0.01$	-0.39
Non-Caucasian elem. school female students	85.29	85.58	$p = 0.121$	0.29
Non-Caucasian middle school female students	81.65	80.45	$p = 0.158$	-1.20
Non-Caucasian high school female students	No cases	--	--	--
Above avg. female students	88.95	88.04	$p \leq 0.001$	-0.91
Average female students	75.32	75.15	$p \leq 0.001$	-0.17
Below avg. female students	63.69	61.43	$p \leq 0.01$	-2.26
Above avg. elem. school female students	89.56	88.27	$p \leq 0.001$	-1.29
Average elem. school female students	75.47	76.00	$p \leq 0.01$	0.53
Below avg. elem. school female students	63.50	60.13	$p = 0.135$	-3.38
Above avg. middle school female students	88.40	87.75	$p \leq 0.001$	-0.65
Average middle school female students	75.91	74.73	$p \leq 0.05$	-1.18
Below avg. middle school female students	64.34	62.28	$p \leq 0.05$	-2.06
Above avg. high school female students	82.00	89.50	$p = 0.157$	7.50
Average high school female students	64.00	64.50	$p = 0.157$	0.50
Below avg. high school female students	54.00	53.00	constant	-1.00
Caucasian above avg. female students	89.17	88.23	$p \leq 0.001$	-0.94
Cauc. above avg. elem. school female students	89.65	88.33	$p \leq 0.001$	-1.32
Cauc. above avg. middle school female students	88.77	88.09	$p \leq 0.001$	-0.68
Cauc. above avg. high school female students	82.00	89.50	$p = 0.157$	7.50
Non-Caucasian above avg. female students	86.22	85.64	$p \leq 0.01$	-0.58
Non-Cauc. above avg. elem. sch. female students	88.45	87.60	$p = 0.115$	-0.85
Non-Cauc. above avg. mid. sch. female students	83.44	83.19	$p = 0.242$	-0.25
Non-Cauc. above avg. high sch. female students	No cases	--	--	--
Caucasian avg. female students	75.52	75.32	$p \leq 0.001$	-0.21
Caucasian avg. elem. school female students	75.80	76.03	$p \leq 0.05$	0.23
Caucasian avg. middle school female students	76.02	75.13	$p \leq 0.01$	-0.88
Caucasian avg. high school female students	64.00	64.50	$p = 0.157$	0.50
Non-Caucasian avg. female students	72.00	72.50	$p = 0.238$	0.50
Non-Caucasian avg. elem. school female students	69.50	75.50	$p = 0.157$	6.00
Non-Cauc. avg. middle school female students	74.50	69.50	$p = 0.157$	-5.00
Non-Caucasian avg. high school female students	No cases	--	--	--
Caucasian below avg. female students	63.69	61.43	$p \leq 0.05$	-2.26
Cauc. below avg. elem. school female students	63.50	60.13	$p = 0.135$	-3.38
Cauc. below avg. middle school female students	64.34	62.28	$p \leq 0.05$	-2.06
Cauc. below avg. high school female students	54.00	53.00	constant	-1.00
Non-Caucasian below avg. female students	No cases	--	--	--
Non-Cauc. below avg. elem. sch. female students	No cases	--	--	--
Non-Cauc. below avg. mid. sch. female students	No cases	--	--	--
Non-Cauc. below avg. high sch. female students	No cases	--	--	--

Difference in the Mean Grades in Each Subject, Pre-Program To Post-Program, According To the Length of the Archery Program

This analysis, which looked at the length of the archery program, found mostly decreases in mean grades in the six subjects among the students as a whole and among the subgroups based on the length of the archery course that they took. Indeed, only three increases are found, all among students who had an archery course that was one semester or longer: in reading, writing, and English. Again, changes in the mean grade of more than 1.0 points that are also statistically significant at the $p \leq 0.001$ level (the statistical significance depends on the size and variance of the sample) are shaded in gray.

Table 13. Students' Mean Grades Crosstabulated by Length of Course

Students' Mean Grades Pre-Program and Post-Program					
Subject	Length of Course	Pre-Program	Post-Program	Significance ¹	Change
Reading	All students	85.43	85.43	$p \leq 0.001$	0.00
	Less than 1 semester	85.75	85.39	$p \leq 0.001$	-0.36
	1 semester or longer	84.15	85.56	$p \leq 0.001$	1.41
Writing	All students	85.37	85.16	$p \leq 0.001$	-0.21
	Less than 1 semester	86.45	85.75	$p \leq 0.001$	-0.70
	1 semester or longer	81.53	83.03	$p \leq 0.001$	1.50
English	All students	85.00	84.94	$p \leq 0.001$	-0.06
	Less than 1 semester	86.10	85.57	$p \leq 0.001$	-0.53
	1 semester or longer	81.66	83.02	$p \leq 0.001$	1.36
Math	All students	80.93	80.29	$p \leq 0.001$	-0.64
	Less than 1 semester	79.76	79.75	$p \leq 0.001$	-0.01
	1 semester or longer	84.28	81.85	$p \leq 0.001$	-2.43
Science	All students	84.52	83.64	$p \leq 0.001$	-0.88
	Less than 1 semester	82.92	82.15	$p \leq 0.001$	-0.77
	1 semester or longer	89.07	87.88	$p \leq 0.001$	-1.19
Social Studies/History	All students	83.91	83.09	$p \leq 0.001$	-0.82
	Less than 1 semester	83.37	82.66	$p \leq 0.001$	-0.71
	1 semester or longer	85.42	84.27	$p \leq 0.001$	-1.15
Overall Grades	All students	83.99	83.60	$p \leq 0.001$	-0.39
	Less than 1 semester	83.78	83.26	$p \leq 0.001$	-0.52
	1 semester or longer	84.59	84.54	$p \leq 0.001$	-0.05

¹Significance refers to the statistical significance of the analysis and was dependent on the size and variance of the sample; it does not refer to a statistically significant *change*.

Difference in the Mean Grades in Each Subject, Pre-Program To Post-Program, Crosstabulated by Teacher

The final analysis examined students of the four teachers who submitted grades. The four teachers have the characteristics shown below.

Teacher #1 is a male teacher at a middle school in Michigan. He has been teaching NASP for 1 year, which is a required course for every P.E. student. The school also has an after-school club. The NASP course he teaches is 4 to 5 weeks long, and he teaches it to 4th through 8th graders. The school is in a rural area. Anecdotally, he reports that students in the archery club appear to never miss school on days that archery is taught in P.E.

Teacher #2 is a female teacher at an elementary school in Ohio. She has been teaching NASP for 2 years, which is required of certain grade levels in the school. The NASP course is taught for more than 1 semester within the P.E. curriculum. She teaches NASP to 3rd through 5th graders. The school is in a rural area.

Teacher #3 is a male teacher at a high school in Alabama. He was a first-time NASP teacher this past year. The course is elective in this school. It is taught for more than 1 semester within the P.E. curriculum. He teaches 9th through 12th graders (although no 12th graders were included in the analysis). The school is located in a small city/town.

Teacher #4 is a female teacher at a middle school in Michigan. She has been teaching NASP for 1 year. As stated above (see Teacher #1), NASP is a required course for every P.E. student in the school. The school also has an after-school club. The NASP course she teaches is 4 to 5 weeks long, and she teaches it to 4th through 8th graders. The school is in a rural area. She reiterated that students in the archery club appear to never miss school on days that archery is taught in P.E.

The results show that students of Teacher #2 have a statistically significant increase in mean grades of more than 1.0 points in reading, writing, and English. However, this is counterbalanced by statistically significant decreases of more than 1.0 points in math, science, and social studies/history among students of Teacher #2. There are no other statistically significant changes of more than 1.0 points.

Table 14. Students' Mean Grades Overall Crosstabulated by Teacher

Students' Mean Grades Overall Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance ¹	Change
All Students	83.99	83.60	$p \leq 0.001$	-0.39
Teacher #1	82.31	81.81	$p \leq 0.001$	-0.50
Teacher #2	85.46	85.36	$p \leq 0.001$	-0.10
Teacher #3	78.64	78.95	$p = 0.210$	0.31
Teacher #4	85.25	84.72	$p \leq 0.001$	-0.53

¹Significance refers to the statistical significance of the analysis and was dependent on the size and variance of the sample; it does not refer to a statistically significant *change*.

Table 15. Students' Mean Grades in Reading Crosstabulated by Teacher

Students' Mean Grades in Reading Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance ¹	Change
All Students	85.43	85.43	$p \leq 0.001$	0.00
Teacher #1	83.72	83.47	$p \leq 0.001$	-0.25
Teacher #2	84.15	85.56	$p \leq 0.001$	1.41
Teacher #3	n/a	n/a	n/a	n/a
Teacher #4	87.77	87.31	$p \leq 0.001$	-0.46

¹Significance refers to the statistical significance of the analysis and was dependent on the size and variance of the sample; it does not refer to a statistically significant *change*.

Table 16. Students' Mean Grades in Writing Crosstabulated by Teacher

Students' Mean Grades in Writing Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance ¹	Change
All Students	85.37	85.16	$p \leq 0.001$	-0.21
Teacher #1	84.82	83.99	$p \leq 0.001$	-0.82
Teacher #2	81.53	83.03	$p \leq 0.001$	1.50
Teacher #3	n/a	n/a	n/a	n/a
Teacher #4	88.07	87.52	$p \leq 0.001$	-0.55

¹Significance refers to the statistical significance of the analysis and was dependent on the size and variance of the sample; it does not refer to a statistically significant *change*.

Table 17. Students' Mean Grades in English Crosstabulated by Teacher

Students' Mean Grades in English Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance ¹	Change
All Students	85.00	84.94	$p \leq 0.001$	-0.06
Teacher #1	84.27	83.73	$p \leq 0.001$	-0.54
Teacher #2	82.44	83.89	$p \leq 0.001$	1.45
Teacher #3	76.65	77.43	$p = 0.418$	0.78
Teacher #4	87.92	87.41	$p \leq 0.001$	-0.51

¹Significance refers to the statistical significance of the analysis and was dependent on the size and variance of the sample; it does not refer to a statistically significant *change*.

Table 18. Students' Mean Grades in Math Crosstabulated by Teacher

Students' Mean Grades in Math Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance ¹	Change
All Students	80.93	80.29	$p \leq 0.001$	-0.64
Teacher #1	78.35	78.36	$p \leq 0.001$	0.01
Teacher #2	86.09	83.15	$p \leq 0.001$	-2.94
Teacher #3	71.74	72.83	$p = 0.570$	1.09
Teacher #4	81.17	81.14	$p \leq 0.001$	-0.03

¹Significance refers to the statistical significance of the analysis and was dependent on the size and variance of the sample; it does not refer to a statistically significant *change*.

Table 19. Students' Mean Grades in Science Crosstabulated by Teacher

Students' Mean Grades in Science Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance ¹	Change
All Students	84.52	83.64	$p \leq 0.001$	-0.88
Teacher #1	82.33	81.43	$p \leq 0.001$	-0.90
Teacher #2	90.54	89.25	$p \leq 0.001$	-1.29
Teacher #3	79.21	78.71	$p = 0.292$	-0.50
Teacher #4	83.52	82.88	$p \leq 0.001$	-0.64

¹Significance refers to the statistical significance of the analysis and was dependent on the size and variance of the sample; it does not refer to a statistically significant *change*.

Table 20. Students' Mean Grades in Social Studies/History Crosstabulated by Teacher

Students' Mean Grades in Social Studies or History Pre-Program and Post-Program				
	Pre-Program	Post-Program	Significance ¹	Change
All Students	83.91	83.09	$p \leq 0.001$	-0.82
Teacher #1	82.58	82.10	$p \leq 0.001$	-0.48
Teacher #2	87.03	85.59	$p \leq 0.001$	-1.44
Teacher #3	74.67	75.42	$p = 0.215$	0.75
Teacher #4	84.16	83.22	$p \leq 0.001$	-0.94

¹Significance refers to the statistical significance of the analysis and was dependent on the size and variance of the sample; it does not refer to a statistically significant *change*.

ABOUT RESPONSIVE MANAGEMENT

Responsive Management is a nationally recognized public opinion and attitude survey research firm specializing in natural resource and outdoor recreation issues. Its mission is to help natural resource and outdoor recreation agencies and organizations better understand and work with their constituents, customers, and the public.

Utilizing its in-house, full-service, computer-assisted telephone and mail survey center with 45 professional interviewers, Responsive Management has conducted more than 1,000 telephone surveys, mail surveys, personal interviews, and focus groups, as well as numerous marketing and communications plans, need assessments, and program evaluations on natural resource and outdoor recreation issues.

Clients include most of the federal and state natural resource, outdoor recreation, and environmental agencies, and most of the top conservation organizations. Responsive Management also collects attitude and opinion data for many of the nation's top universities, including the University of Southern California, Virginia Tech, Colorado State University, Auburn, Texas Tech, the University of California—Davis, Michigan State University, the University of Florida, North Carolina State University, Penn State, West Virginia University, and others.

Among the wide range of work Responsive Management has completed during the past 20 years are studies on how the general population values natural resources and outdoor recreation, and their opinions on and attitudes toward an array of natural resource-related issues. Responsive Management has conducted dozens of studies of selected groups of outdoor recreationists, including anglers, boaters, hunters, wildlife watchers, birdwatchers, park visitors, historic site visitors, hikers, and campers, as well as selected groups within the general population, such as landowners, farmers, urban and rural residents, women, senior citizens, children, Hispanics, Asians, and African-Americans. Responsive Management has conducted studies on environmental education, endangered species, waterfowl, wetlands, water quality, and the reintroduction of numerous species such as wolves, grizzly bears, the California condor, and the Florida panther.

Responsive Management has conducted research on numerous natural resource ballot initiatives and referenda and helped agencies and organizations find alternative funding and increase their memberships and donations. Responsive Management has conducted major agency and organizational program needs assessments and helped develop more effective programs based upon a solid foundation of fact. Responsive Management has developed websites for natural resource organizations, conducted training workshops on the human dimensions of natural resources, and presented numerous studies each year in presentations and as keynote speakers at major natural resource, outdoor recreation, conservation, and environmental conferences and meetings.

Responsive Management has conducted research on public attitudes toward natural resources and outdoor recreation in almost every state in the United States, as well as in Canada, Australia, the United Kingdom, France, Germany, and Japan. Responsive Management routinely conducts surveys in Spanish and has also conducted surveys and focus groups in Chinese, Korean, Japanese, and Vietnamese.

Responsive Management's research has been featured in most of the nation's major media, including CNN, ESPN, *The Washington Times*, *The New York Times*, *Newsweek*, *The Wall Street Journal*, and on the front pages of *The Washington Post* and *USA Today*.

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