

Getting Back on Track

Who Needs to Recover Algebra Credit After Ninth Grade?

RESEARCH BRIEF 3



April 2016

AUTHORS OF THIS RESEARCH BRIEF are Jordan Rickles (American Institutes for Research [AIR]), Jessica Heppen (AIR), Suzanne Taylor (AIR), Elaine Allensworth (The University of Chicago Consortium on School Research [Consortium]), Valerie Michelman (Consortium), Nicholas Sorensen (AIR), Kirk Walters (AIR), and Peggy Clements (AIR).

THE BACK ON TRACK STUDY is an investigation about credit recovery in Algebra I for students who fail the course in ninth grade. Students who fail Algebra I are required to recover the credit during high school to earn a diploma, and online credit recovery courses have become a popular strategy in schools in districts around the country. The *Back on Track Study* examines the impact of an online credit recovery Algebra I course compared with a standard face-to-face version of the course; both courses were offered the summer after ninth graders failed Algebra I. The study was funded by the U.S. Department of Education's Institute of Education Sciences, and it was conducted by American Institutes for Research and the University of Chicago Consortium on School Research, in partnership with Chicago Public Schools (CPS). This study is a randomized controlled trial that was designed to address two types of questions:

- 1. What is the impact of online versus face-to-face Algebra I courses for credit recovery?**
- 2. What is the long-term effect of offering expanded credit recovery options early in high school?**

The study took place in 17 CPS high schools that offered both online and face-to-face Algebra I credit recovery courses in summer 2011 and summer 2012. A total of 1,224 ninth graders participated in the study by enrolling in a second-semester Algebra I course for credit recovery during the summer after failing the class. Students were randomly assigned to take the online or face-to-face course.

This research brief is one in a series for the *Back on Track Study* that presents the findings regarding the relative impact of online versus face-to-face Algebra I credit recovery on students' academic outcomes, aspects of implementation of the credit recovery courses, and the effects over time of expanding credit recovery options for at-risk students.

RESEARCH BRIEFS IN THIS SERIES

Getting Back on Track: Comparing the Effects of Online and Face-to-Face Credit Recovery in Algebra I

This brief compares educational outcomes through the second year of high school for students who took online credit recovery versus face-to-face credit recovery in 17 CPS high schools.

Getting Back on Track: The Role of In-Person Instructional Support for Students Taking Online Credit Recovery

This brief describes the role of in-class mentors who supervised students taking the online course and examines whether students benefited from additional instructional support from their in-class mentors.

Getting Back on Track: Who Needs to Recover Algebra Credit After Ninth Grade?

This brief describes the characteristics of students who failed Algebra I in ninth grade across CPS high schools to better understand the population of students who are served by credit recovery courses.

Please visit www.air.org/CreditRecovery to access all of the research briefs and for more information about the *Back on Track Study*.

The Back on Track Study was supported by Grant R305A110149 from the Institute of Education Sciences, U.S. Department of Education to American Institutes for Research. The opinions expressed are those of the authors and do not represent the views of the Institute or the U.S. Department of Education.

Algebra I is an important gateway course for higher-level mathematics and science, and it is required for graduation in many school districts across the country. Yet many students struggle to successfully complete introductory algebra (i.e., Algebra I). Pass rates are consistently low in many places, particularly in urban school districts.^{i,ii} Research has shown that students who fail core courses in their first year of high school are significantly less likely to graduate on time than students who passⁱⁱⁱ—and this pattern is particularly striking when students fail Algebra I. To get back on track for high school success and graduation, students must retake Algebra I to recover the credit. Understanding how schools can best support credit recovery starts with a better understanding of the students in need of credit recovery.

The *Back on Track Study*, conducted by American Institutes for Research and the University of Chicago Consortium on School Research, is an ongoing study designed to examine whether students who took an online Algebra I credit recovery course over the summer had different educational outcomes than students who took a face-to-face Algebra I credit recovery course. The study is also investigating whether early credit recovery helps at-risk students who fail Algebra I in Grade 9 get back on track for high school graduation.

This brief examines the characteristics of students in Chicago Public Schools (CPS) who failed Algebra I during their first year of high school to better understand the types of students in need of Algebra I credit recovery and to inform strategies to support success. Specifically, this brief describes how students who need to recover Algebra I credit compare with students who passed Algebra I in ninth grade based on the following:

- Demographic characteristics
- Academic mathematics and reading proficiency when they started ninth grade
- Signs of disengagement from school in ninth grade (absence rates and suspensions)
- Need for credit recovery in other subjects, in addition to Algebra I, after ninth grade

Who Needs to Recover Algebra Credit After Ninth Grade? KEY FINDINGS

- Students who failed Algebra I in ninth grade were demographically similar to students who passed Algebra I in many ways, including the degree to which they were English learners or had identified disabilities. One notable difference was that students who needed to recover Algebra I credit were more likely to be male than students who passed.
- Students who failed Algebra I in ninth grade were more likely to enter high school with preexisting mathematics and reading deficits than students who passed Algebra I (57% compared with 35% were in the bottom two quintiles for mathematics achievement). However, many students who failed Algebra I entered high school with average or higher mathematics achievement (in the top three quintiles).
- Students who failed Algebra I in ninth grade were more likely to exhibit school disengagement warning signs during ninth grade, including higher absenteeism and higher suspension rates than students who passed Algebra I.
- Students who failed Algebra I in ninth grade were more likely to have failed multiple courses during ninth grade than students who passed Algebra I; half the students who failed Algebra I failed more than four semesters of their ninth-grade academic courses.

About the Study

Typically, CPS students who fail one or both semesters of Algebra I enroll in the next mathematics course in the sequence (Geometry or Algebra II) in their second year of high school, but to earn a diploma they must eventually recover the Algebra I credit during high school. One option is for students to attend summer school. However, the rate of recovery the summer after failing the course is typically low. For example, during the year before the study started (2009–10), only 13% of CPS freshmen who failed their spring semester of Algebra I recovered the course credit over the summer. This study was conducted in partnership with the district to investigate whether offering online credit recovery was more effective at promoting credit recovery than traditional face-to-face summer classes, the summer after failing Algebra I in Grade 9, and to examine the effects over time of offering expanded credit recovery options early in high school.

In this brief, we describe the students who failed Algebra I in ninth grade to better understand the population of students who are served by credit recovery courses. The results presented in this brief draw on CPS student administrative records for 36,423 students who were first-time ninth graders at a regular CPS high school (96 schools) during the 2010–11 or 2011–12 school year and who were enrolled in an Algebra I course in both the fall and spring semesters of their freshman year. For the analyses, we compared the 7,584 students who failed at least one semester of Algebra I (21%) with the 28,839 students who passed both semesters of Algebra I (79%).¹

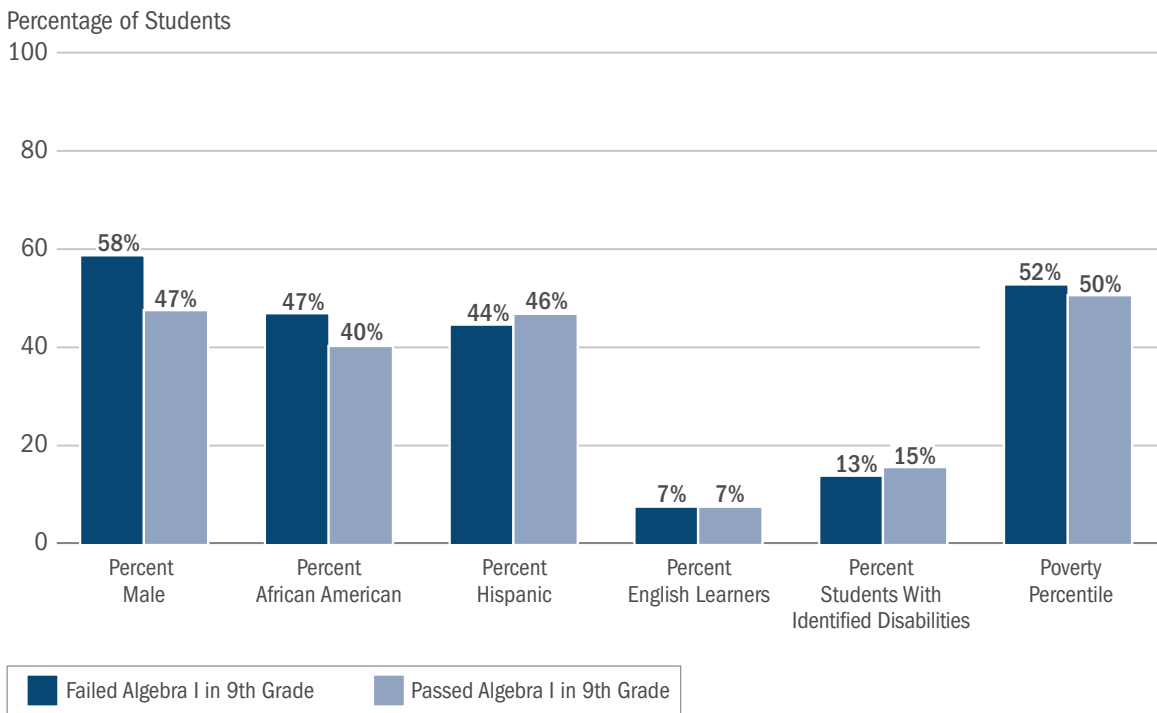
¹ Approximately 90% of CPS students took Algebra I during their first year of high school. CPS Algebra I completion rates increased during the past decade. In 2001–02, about 69% of first-time ninth graders passed Algebra I. In 2011–12, 78% passed this course.

Study Findings

Students who needed Algebra I credit recovery were demographically similar to students who passed Algebra I in ninth grade in many ways

In general, students who failed Algebra I in ninth grade had similar demographic characteristics as students who passed Algebra I in ninth grade (see Figure 1). Students who failed Algebra did not come from communities with higher rates of poverty than students who passed, on average. They also were about as likely to be English learners, or to have identified disabilities. Two notable differences are that students who failed were more likely to be male (58% vs. 47%) and more likely to be African American (47% vs. 40%) than students who passed.

Figure 1. Student Demographic and Socioeconomic Characteristics, by Algebra I Failure

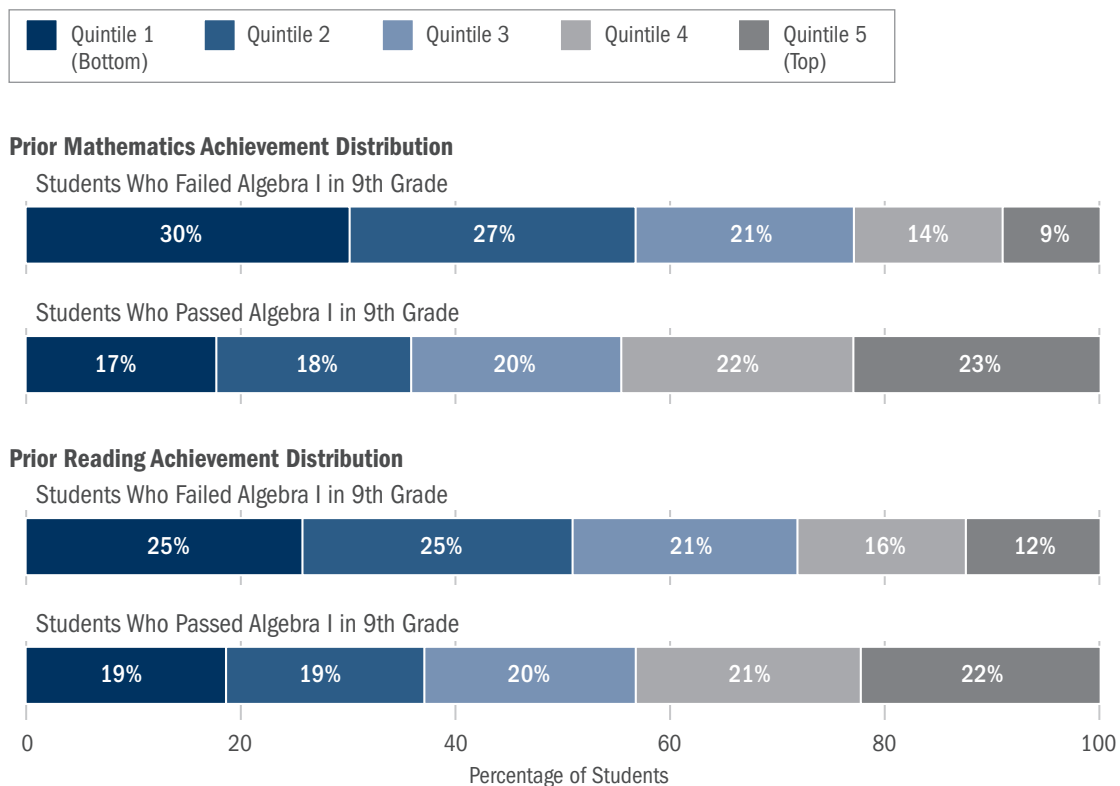


Note. The sample size was between 33,498 and 36,423 students depending on the measure. Poverty Percentile = student percentile ranking based on the student's neighborhood poverty concentration measure, compared with other students in their ninth grade cohort.

About half of students who needed Algebra I credit recovery entered ninth grade with math and reading deficits

Students who failed Algebra I in ninth grade were more likely to have entered high school with academic deficits than students who passed Algebra I in ninth grade (see Figure 2). Based on composite measures of middle school math and reading achievement test scores, a higher percentage of students who failed Algebra I than students who passed entered high school with math achievement in the bottom fifth of the district distribution (30% vs. 17%). On average, students who failed Algebra I entered ninth grade at the 39th percentile in math and students who passed Algebra I entered at the 53rd percentile. Students who failed Algebra I were also more likely to have entered ninth grade with a deficit in prior reading achievement: 25% of students who failed were in the bottom quintile of reading achievement compared with 19% of students who passed Algebra I. However, some students who failed Algebra I entered ninth grade with relatively high math and reading achievement (for example, 23% were in one of the top two mathematics quintiles), which suggests passing Algebra I was only moderately related to incoming achievement and entering high school with above average achievement does not guarantee successful completion of Algebra I.

Figure 2. Student Mathematics and Reading Test Performance in Middle School, by Algebra I Failure

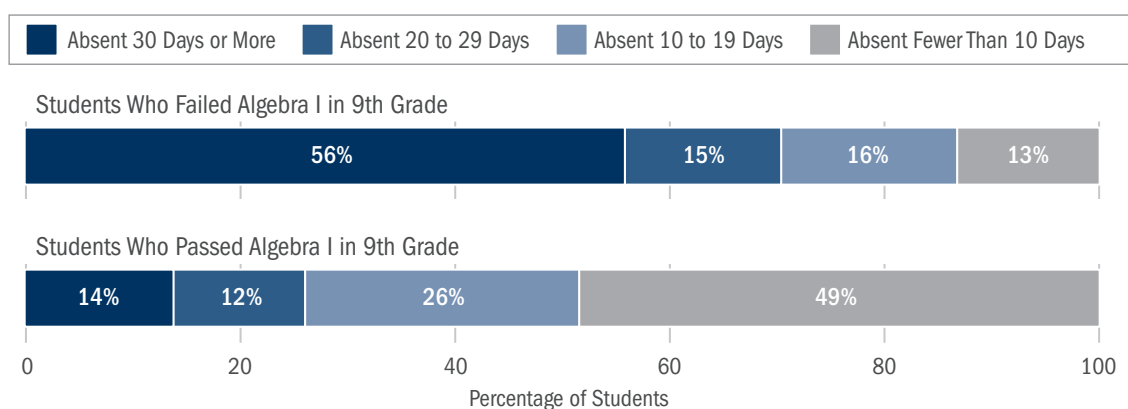


Note. The sample size was 36,423 students (34,176 students for prior reading achievement data). Prior mathematics and reading achievement percentile ranking is based on a composite of middle school achievement test scores.

Most students who needed Algebra I credit recovery exhibited signs of disengagement from school during ninth grade

Many more students who failed Algebra I than students who passed Algebra I exhibited signs of school disengagement during their ninth-grade year (see Figure 3). More than half (56%) of the students who failed Algebra I missed 30 or more days of school during their ninth-grade year, whereas less than one fifth (14%) of students who passed Algebra I missed that many days of school. On average, students who failed Algebra I were absent for 41 days of the year, and students who passed were absent for 15 days of the year. Students who failed Algebra I were also more than twice as likely to be suspended during the year as students who passed Algebra I (46% vs. 16%; not shown in figure).

Figure 3. Student Attendance During the Ninth-Grade Year, by Algebra I Failure

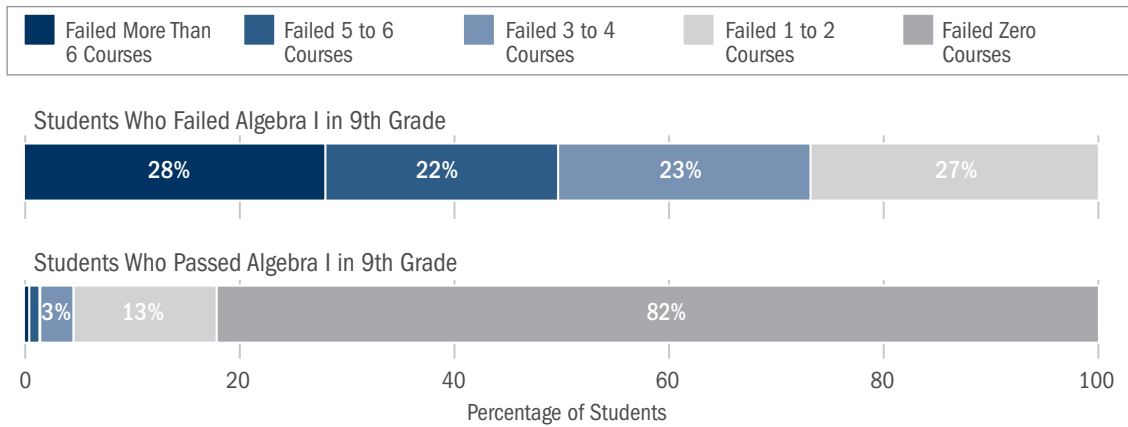


Note. The sample size was 36,423 students. Absence data are for the student's ninth-grade year.

Most students who needed Algebra I credit recovery failed multiple courses during ninth grade

For most students who needed to recover Algebra I credit after ninth grade, algebra was not the only subject of concern. About three of every four students who failed an Algebra I semester credit also failed three or more semesters of their core courses (see Figure 4), and 28% of students failed more than six semesters of their ninth-grade core academic courses (out of an average of 14 semester courses). By contrast, less than 5% of students who passed Algebra I failed three or more core academic courses. The average number of core academic semester courses failed was five for students who failed Algebra I and less than one for students who passed Algebra I. As a result, by the end of their ninth-grade year, few students who needed Algebra I credit recovery (13%) were considered on track to graduate from high school within four years, whereas almost all (91%) of the students who passed Algebra I were considered on track for graduation.

Figure 4. Student Semester Course Failure During the Ninth-Grade Year, by Algebra I Failure



Note. The sample size was 36,423 students. The percentage of failed semester courses is among core academic courses taken in the ninth-grade year.

Summary and Implications for Education Practice

Most students who needed Algebra I credit recovery after their ninth-grade year faced multiple academic challenges, on average, compared with students who passed Algebra I:

- Over half of students who failed Algebra I entered high school with greater preexisting math and reading deficits than is typical.
- Students who failed Algebra I exhibited much greater school disengagement warning signs during ninth grade in terms of attendance and discipline issues; over half were absent more than 30 days, or six weeks of school.
- Students who failed Algebra I were likely to have failed multiple courses during ninth grade; over half of students who failed algebra failed more than 4 semesters of a core course.

For most of the students who fail Algebra I, getting back on the track toward graduation requires more than just recovering the Algebra I credit they failed to receive in ninth grade. Students who fail algebra need substantial support to address the issues that interfere with their school attendance and help them recover credit in multiple subjects. As a result, interventions designed to get students back on track for graduation after failing algebra could likely be more successful if they address broader issues of student academic deficits and engagement in addition to specific shortcomings in algebra content knowledge.

End Notes

- i. Ham, S., & Walker, E. (1999). Getting to the right algebra: The Equity 2000 initiative in Milwaukee Public Schools. New York, NY: MDRC. Retrieved from <http://eric.ed.gov/?id=ED441896>
- ii. Helfand, D. (2006, January 30). A formula for failure in L.A. schools. Los Angeles Times. Retrieved from <http://www.latimes.com/local/la-me-dropout30jan30-story.html>
- iii. Allensworth, E., & Easton, J. Q. (2007). What matters for staying on-track and graduating in Chicago Public High Schools: A close look at course grades, failures and attendance in the freshman year. Chicago, IL: Consortium on Chicago School Research.



1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000

www.air.org

UCHICAGO Consortium

THE UNIVERSITY
OF CHICAGO
CONSORTIUM ON
SCHOOL RESEARCH

1313 East 60th Street
Chicago, Illinois 60637
773.702.3364

consortium.uchicago.edu