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Thank you for your request to our REL Reference Desk regarding **successful experience of Algebra I in predicting a successful experience in university mathematics**. Ask REL Southwest is part of a collaborative Ask-A-REL reference desk service provided by the 10 regional educational laboratories (REL). This service functions, by design, much in the same way as a technical reference library, providing references, referrals, and brief responses in the form of citations for research-based education questions.

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QUESTION

Does having a successful experience in Algebra I predict a successful experience in university mathematics?

Barnett, M. D., Sonnert, G., & Sadler, P. M. (2014, October). Productive and ineffective efforts: how student effort in high school mathematics relates to college calculus success. *International Journal of Mathematical Education in Science & Technology*, 45(7), 996-1020. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: Relativizing the popular belief that student effort is the key to success, this article finds that effort in the most advanced mathematics course in US high schools is not consistently associated with college calculus performance. We distinguish two types of student effort: productive and ineffective efforts. Whereas the former carries the commonly expected benefits, the latter is associated with negative consequences. Time spent reading the course text in US high schools was negatively related to college calculus performance. Daily study time, however, was found to be either a productive or an ineffective effort, depending on the level of high school mathematics course and the student's performance in it.

Corbishley, J. B., & Truxaw, M. P. (2010, February). Mathematical readiness of entering college freshmen: An exploration of perceptions of mathematics faculty. *School Science and Mathematics*, 110(2), 71-85. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: The National Council of Teachers of Mathematics has set ambitious goals for the teaching and learning of mathematics that include preparing students for both the workplace and higher education. While this suggests that it is

important for students to develop strong mathematical competencies by the end of high school, there is evidence to indicate that overall this is not the case. Both national and international studies corroborate the concern that, on the whole, US 12th grade students do not demonstrate mathematical proficiency, suggesting that students making the transition from high school to college mathematics may not be ready for its rigors. In order to investigate mathematical readiness of entering college students, this study surveyed mathematics faculty. Specifically, faculty members were asked their perceptions of average entering students' readiness related to relevant mathematical skills and concepts, and the importance of the same skills and concepts as foundations for college mathematics. Results demonstrated that the faculty perceived that average freshman students are generally not mathematically prepared; further, the skills and concepts rated as highly important--namely, algebraic skills and reasoning and generalization--were among those rated the lowest in terms of student competencies.

Danielle, M. N., Amanuel, T. R., & Dupuis, B. H. (2013, March). The impact of institutional factors on the relationship between high school mathematics curricula and college mathematics course-taking and achievement. *Educational Research Quarterly*, 36(3), 22-46. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: Meta-analytic methods were used to examine the moderating effect of institutional factors on the relationship between high school mathematics curricula and college mathematics course-taking and achievement from a sample of 32 colleges. The findings suggest that the impact of curriculum on college mathematics outcomes is not generally moderated by institutional characteristics such as selectivity and educational profile, providing evidence that the relationships between curriculum and college mathematics outcomes generalize to a range of colleges. The results inform college policies and practices for advising students on mathematics course-taking including enrollment in developmental courses, and high school mathematics curriculum selection.

Dupuis, D. N., Medhanie, A., & Harwell, M. (2012, May). A multi-institutional study of the relationship between high school mathematics achievement and performance in introductory college statistics. *Statistics Education Research Journal*, 11(1), 4-20. Retrieved from [http://iase-web.org/documents/SERJ/SERJ11\(1\)_Dupuis.pdf](http://iase-web.org/documents/SERJ/SERJ11(1)_Dupuis.pdf)

From the ERIC abstract: In this study we examined the effects of prior mathematics achievement and completion of a commercially developed, National Science Foundation-funded, or University of Chicago School Mathematics Project high school mathematics curriculum on achievement in students' first college statistics course. Specifically, we examined the relationship between students' high school mathematics achievement and high school mathematics curriculum on the difficulty level of students' first college statistics course, and on the grade earned in that course. In general, students with greater prior mathematics achievement took more difficult statistics courses and earned higher grades in those courses. The high school mathematics curriculum a student completed was unrelated to statistics grades and course-taking.

Finkelstein, N., Fong, A., Tiffany-Morales, J., Shields, P., & Huang, M. (2012). *College bound in middle school & high school? How math course sequences matter*. Sacramento, CA: Center for the Future of Teaching and Learning at WestEd. Retrieved from <http://files.eric.ed.gov/fulltext/ED538053.pdf>

From the ERIC abstract: As California competes for jobs in an increasingly competitive global economy, the state faces a looming shortage of highly educated workers (PPIC, 2012). For a variety of reasons, the need for individuals with degrees in science, technology, engineering, and mathematics (STEM) is of particular concern. Nowhere is this more true than in the discipline of mathematics where understanding develops cumulatively, requiring that students master progressively more complex building-block concepts and skills in order to be successful in each next-higher-level course. Prior research confirms that success in high-level mathematics in high school is predictive of postsecondary success and careers in STEM fields. This study digs deeper into this middle- and high-school connection as it applies to STEM, in order to better understand the degree to which California students stay on the trajectory for STEM-related attendance eligibility at California's public universities and, if students veer off the trajectory, to better understand when and why.

Fuller, E., Deshler, J. M., & Kuhn, B. (2014). Tracking the success of pre-college algebra workshop students in subsequent college mathematics classes. *PRIMUS*, 24(1), 46-60. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: In 2007 the Department of Mathematics at West Virginia University began developing a placement process designed to identify at-risk students entering mathematics courses at the College Algebra and Calculus levels. Major changes in our placement testing process and the resulting interventions for at-risk students were put in place in Fall of 2008. At the lowest level of this placement process we seek to intervene with students who traditionally perform very poorly in university-level classes by offering a self-paced remediation course. The current work will outline the basics of this remedial program and present data confirming the efficacy of the intervention.

Garland, M., LaTurner, J., Herrera, A. W., Ware, A., Jonas, D., & Dougherty, C. (2011). *High school predictors of college readiness: Determinants of developmental course enrollment and second-year postsecondary persistence in Virginia*. Richmond, VA: Virginia Department of Education. Retrieved from <http://files.eric.ed.gov/fulltext/ED539120.pdf>

From the ERIC abstract: In 2007, the Virginia Board of Education directed the Virginia Department of Education (VDOE) to study academic indicators that are associated with high school students' successful preparation for college and careers. VDOE then embarked on a multi-year effort to identify available data sources and conduct research on high school indicators that are associated with enrollment and success in credit-

bearing courses in college. VDOE's initial studies linked high school indicators with students' enrollment in four-year colleges and universities across the country that was acquired from the National Student Clearinghouse. This report is the first in a two-part series connecting high school program and outcomes data to course enrollment, grades, and persistence in Virginia's two- and four-year institutions of higher education (IHE). This first report addresses the following questions: (1) How did students who enroll in Virginia two- and four-year colleges differ from those with no record of enrollment in a Virginia college?; (2) To what extent were better prepared students less likely to enroll in developmental courses?; (3) To what extent did better high school academic preparation close income and ethnic gaps in student enrollment in developmental courses?; (4) To what extent were better prepared students more likely to persist into their second year in the Virginia higher education institution in which they enrolled in the first year?; and (5) To what extent did better high school preparation close income and ethnic gaps in second-year persistence? Following a brief description of the high school and higher education data files used in the analysis, the remaining sections of this report address each of these five questions. Throughout the report, the authors present both descriptive statistics that compare higher education outcomes for different groups of students, and results from statistical analyses that estimate the incremental association between a given high school variable and higher education outcomes after controlling for other variables.

Hall, A. L. (2013, September). Program implementation and student outcomes at four Western North Carolina early college high schools: A study synopsis. *Community College Journal of Research & Practice*, 37(9), 677-690. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the Academic Search Elite abstract: This study examined student retention, achievement and perceptions, and implementation of four western North Carolina early colleges. Findings included a 92.6% retention rate. The majority of students were proficient in English I and Algebra I. Over 90% of students rated their early college positively. Students rated high school instructor expectations and relationships more positively than college instructors. Findings included a significant inverse relationship between college grade-point average and median number of college courses taken. Future practice recommendations include addressing student perception differences between high school and college faculty. College faculty may benefit from professional development prior to teaching early college students.

Harwell, M., Post, T. R., & Cutler, A. (2009). The preparation of students from National Science Foundation-funded and commercially developed high school mathematics curricula for their first university mathematics course. *American Educational Research Journal*, 46(1), 203-231. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: The selection of K-12 mathematics curricula has become a

polarizing issue for schools, teachers, parents, and other educators and has raised important questions about the long-term influence of these curricula. This study examined the impact of participation in either a National Science Foundation-funded or commercially developed mathematics curriculum on the difficulty level of the first university mathematics course a student enrolled in and the grade earned in that course. The results provide evidence that National Science Foundation-funded curricula do not prepare students to initially enroll in more difficult university mathematics courses as well as commercially developed curricula, but once enrolled students earn similar grades. These findings have important implications for high school mathematics curriculum selection and for future research in this area.

Harwell, M. R., Post, T. R., Medhanie, A., Dupuis, D. N., & LeBeau, B. (2013, November). A multi-institutional study of high school mathematics curricula and college mathematics achievement and course taking. *Journal for Research in Mathematics Education*, 44(5), 742-774. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the Academic Search Elite abstract: This study examined the relationship between high school mathematics curricula and student achievement and course-taking patterns over 4 years of college course taking for a sample of over 10,000 students from 32 postsecondary 4-year institutions. Three types of curricula were studied: National Science Foundation (NSF) funded curricula, the University of Chicago School Mathematics Project curriculum, and commercially developed curricula. The major result was that high school mathematics curricula were unrelated to college mathematics achievement or students' course-taking patterns for students who began college with precalculus (college algebra) or a more difficult course. However, students of the NSF-funded curricula were statistically more likely to begin their college mathematics at the developmental level. Implications of these results for research and practice are discussed.

Jonas, D., Dougherty, C., Herrera, A. W., LaTurner, J., Garland, M., & Ware, A. (2012). *High school predictors of college readiness: Determinants of high school graduates' enrollment and successful completion of first-year mathematics and English college courses in Virginia*. Richmond, VA: Virginia Department of Education. Retrieved from <http://files.eric.ed.gov/fulltext/ED539122.pdf>

From the ERIC abstract: In 2007, the Virginia Board of Education directed the Virginia Department of Education (VDOE) to study academic indicators that are associated with high school students' successful preparation for college and careers. VDOE then embarked on a multi-year effort to identify available data sources and conduct research on high school indicators that are associated with enrollment and success in credit-bearing courses in college. VDOE's initial studies, using data from the National Student Clearinghouse, focused on high school academic preparation indicators that predict whether a student will enroll in a four-year college in Virginia or elsewhere in the US. The research conducted as part of this project assessed the association between high

school academic indicators and student success upon enrollment in a two- or four-year institution of higher education (IHE) in Virginia. Success in higher education was defined by three indicators: (1) enrolling directly into credit-bearing English and mathematics courses in the student's first year of college; (2) earning a grade of C or better in the student's first credit-bearing course in English or mathematics; and (3) persistence into the second year of college at the same institution. An earlier report described the association between high school academic indicators--particularly Virginia's end-of-course reading and Algebra I state Standards of Learning (SOL) scores and type of diploma earned--and the probability that students would enroll in credit-bearing English or mathematics courses and would persist into the second year at the same institution. This report addresses the remaining higher education success indicator: whether students earned a C or better in their first credit-bearing course in English or mathematics. In this study, students who enrolled in developmental English or mathematics courses or who earned a grade lower than C in their first credit-bearing course were counted as not successful in their first year of college. This report, the second in a two-part series, addresses the following two research questions: (1) To what extent were better prepared students more likely to enroll directly into credit-bearing English or mathematics courses and earn a grade of C or better?; and (2) To what extent did better high school academic preparation close gaps in students' likelihood of enrolling directly into credit-bearing courses and earning a grade of C or better?

Kingston, N. M., & Anderson, G. (2013, Fall). Using state assessments for predicting student success in dual-enrollment college classes. *Educational Measurement: Issues and Practice*, 32(3), 3-10. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: Scores on state standards-based assessments are readily available and may be an appropriate alternative to traditional placement tests for assigning or accepting students into particular courses. Many community colleges do not require test scores for admissions purposes but do require some kind of placement scores for first-year English and math courses. In this study, we examine the efficacy of using the reading and math portions of the Kansas State Assessment (KSA) for predicting the success of high school students taking College Algebra and College English I at a Kansas community college. Results showed that in this sample KSA scores predicted as well or better than more traditional placement tests and with no extra cost to the institution.

Kowski, L. E. (2013). Does high school performance predict college math placement? *Community College Journal of Research and Practice*, 37(7), 514-527. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: Predicting student success has long been a question of interest for postsecondary admission counselors throughout the United States. Past

research has examined the validity of several methods designed for predicting undergraduate success. High school record, standardized test scores, extracurricular activities, and combinations of all three have historically been successful predictors. This paper comprises a literature review of past research devoted to predicting community college success. Various state high school graduation requirements were examined as well as the issues surrounding high school mathematics proficiency and its lack of connection to college readiness. Significant variables found to influence the probability of remedial mathematics for community college freshmen were overall high school performance determined by the nonweighted high school grade point average (GPA), taking a math class beyond the state-required sequence, and the socioeconomic status of the high school.

LaManque, A. (2009, Spring). Evaluating a non-randomized trial: A case study of a pilot to increase pre-collegiate math course success rates. *Journal of Applied Research in the Community College*, 16(2), 76-82. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: This article presents a case study of a two-year pilot to increase pre-collegiate math course success rates at a large community college. The EnableMath pilot involved the use of computerized software that allowed students to practice math problems in a lab during class time. Additional components of the program included the administration of the College Student Inventory (CSI) motivational assessment and in-class counseling support. EnableMath students achieved a course success rate of 15 to 20 percentage points higher than other students in the same math courses. End-of-class survey data as well as enrollment data suggest strong student demand for EnableMath courses. However, for students moving from Pre-Algebra to Elementary Algebra and Intermediate Algebra to college-level (to a lesser degree) courses, success rates for EnableMath students lagged behind other students. EnableMath students moving from Elementary Algebra to Intermediate Algebra achieved similar rates of success as their peers. The article discusses the difficulties in evaluating a non-randomized trial and suggests that the math department focus on improving the transition in pilot sections from Pre-Algebra to Elementary Algebra.

Lassila, K. E., Rule, L. C., Lee, C., Driggs, R. J., Fulton, G., Skarda, M., & Torres, J. (2009, January-December). Enhancing Iowa high school students' transition to college. *Journal of the Iowa Academy of Science*, 116(1-4), 9-13. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the Academic Search Elite abstract: We present our studies of the transitions of Iowa science students from high school to post-secondary colleges. Our report summarizes information and impressions from dealing with thousands of new students arriving at our six colleges, along with meetings and discussions with high school science teachers to add their viewpoints into our considerations. Feedback from

community college, four year college, and high school science teachers highlighted the following five study issues and needs for improving student transitions from high school to college science: 1) Better math preparation is needed; 2) More work with inquiry-based learning rather than with facts and memorization is needed in both secondary and post-secondary courses; 3) Students must become aware of career choices earlier; 4) Misconceptions by teachers at both levels must be minimized; and 5) High school and college science educators must improve intercommunication.

Long, M. C., Iatarola, P., & Conger, D. (2009, Winter). Explaining gaps in readiness for college-level math: The role of high school courses. *Education Finance and Policy*, 4(1), 1-33. Retrieved from <http://www.mitpressjournals.org/doi/pdf/10.1162/edfp.2009.4.1.1>

From the ERIC abstract: Despite increased requirements for high school graduation, almost one-third of the nation's college freshmen are unprepared for college-level math. The need for remediation is particularly high among students who are low income, Hispanic, and black. Female students are also less likely than males to be ready for college-level math. This article estimates how much of these gaps are determined by the courses that students take while in high school. Using data on students in Florida public postsecondary institutions, we find that differences among college-going students in the highest math course taken explain 28-35 percent of black, Hispanic, and poverty gaps in readiness and over three-quarters of the Asian advantage. Courses fail to explain gender gaps in readiness. Low-income, black, and Asian students also receive lower returns to math courses, suggesting differential educational quality. This analysis is valuable to policy makers and educators seeking to reduce disparities in college readiness.

Norman, K. W., Medhanie, A. G., Harwell, M. R., Anderson, E., & Post, T. R. (2011, July). High school mathematics curricula, university mathematics placement recommendations, and student university mathematics performance. *Primus: Problems, Resources & Issues in Mathematics Undergraduate Studies*, 21(5), 434-455. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: Recent 'math wars' have drawn attention to how well various high school mathematics curricula prepare students for college-level mathematics. The purpose of this study was to investigate the relationship between the high school mathematics curricula and students' post-secondary mathematics placement recommendation, specifically how students responded to the mathematics placement recommendations and the students' performance in the first college mathematics class. The results showed no relationship between students' participation in a particular high school mathematics curriculum and mathematics placement recommendation, or between student high school mathematics curriculum and students' responses to a university mathematics placement recommendation. However, students who took a more/less difficult class than what was recommended achieved significantly lower/higher grades than those who followed the recommendation. The findings have

implications for high school mathematics curricula selection, post-secondary student placement, and future research in this area.

Post, T. R., Medhanie, A., Harwell, M., Norman, K. W., Dupuis, D. N., Muchlinski, T., Monson, D. (2010, May). The impact of prior mathematics achievement on the relationship between high school mathematics curricula and postsecondary mathematics performance, course-taking and persistence. *Journal for Research in Mathematics Education*, 41(3), 274-308. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: This retrospective study examined the impact of prior mathematics achievement on the relationship between high school mathematics curricula and student postsecondary mathematics performance. The sample (N = 4,144 from 266 high schools) was partitioned into 3 strata by ACT mathematics scores. Students completing 3 or more years of a commercially developed curriculum, the University of Chicago School Mathematics Project curriculum, or National Science Foundation-funded curriculum comprised the sample. Of interest were comparisons of the difficulty level and grade in their initial and subsequent college mathematics courses, and the number of mathematics courses completed over 8 semesters of college work. In general, high school curriculum was not differentially related to the pattern of mathematics grades that students earned over time or to the difficulty levels of the students' mathematics course-taking patterns. There also was no relationship between high school curricula and the number of college mathematics courses completed.

Pyzdrowski, L. J., Sun, Y., & Curtis, R. (2013, June). Readiness and attitudes as indicators for success in college calculus. *International Journal of Science and Mathematics Education*, 11(3), 529-554. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: This study examined student indicators for success in entry-level college calculus. An attitude toward mathematics inventory, course performance, readiness assessment, and student interviews were used to determine characteristics and behaviors of students who succeeded in the course. In addition to student indicators, difficult topics and suggestions for improvement in the course structure were identified. While the focus of this study was on student indicators, the analyses of instructor interviews were included in order to compare their views with those of the students. The quantitative analyses showed that high school grade point average and the Calculus Readiness Assessment had positive significant correlations with course performance. The strongest positive significant correlation, however, was between attitude (Attitudes Toward Mathematics Inventory overall and confidence subscale) and course performance.

Wilder, S. (2013, Spring). Algebra: The key to student success, or just another hurdle? *Ohio Journal of School Mathematics*, issue 67, 48-56. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: The strong emphasis on algebra has led to nationwide school reforms, and it is an integral part of major high school curricula changes that have taken place in recent years. In this article we try to determine if there is a basis for the underlying belief that algebra equips students with the skills necessary to succeed in college. Based on the existing literature, it follows that college algebra may be an indicator of student success in college, but there is no evidence that this subject contributes to that success. There is no evidence of the context or structure of algebra aiding students in developing or even improving any of their cognitive skills, but only their content knowledge. While it is not impossible that this could be the case in a particular situation if the mathematics curricula were constructed with this in mind, no such studies were found in the literature.

Zelkowski, J. (2010). Secondary mathematics: Four credits, block schedules, continuous enrollment? What maximizes college readiness. *Mathematics Educator*, 20(1), 8-21. Retrieved from http://tme.coe.uga.edu/wp-content/uploads/2012/08/v20n1.Zelkowski_p.8-21.pdf

From the ERIC abstract: This paper posits the position that if higher education and secondary schools wish to increase students' college readiness, specifically in mathematics and critical thinking skills, continuous enrollment in secondary mathematics is one avenue worth exploring as opposed to increasing mathematics graduation requirements only in terms of Carnegie credits. NAEP-HSTS 2005 and NELS:88 data indicate, respectively, non-continuous enrollment in secondary mathematics results in lower mathematics achievement and decreases the odds of completing a bachelor's degree. Nationally, schools following 4x4 block schedules (90-minute classes that meet daily for only one semester) were found to have mathematics achievement scores two thirds of one grade-level lower than schools following a 50-minute year-long mathematics courses. Typical college-bound students who do not take mathematics all four years of high school likely diminish their odds of bachelor degree completion by about 20%.

Zelkowski, J. (2011, Spring). Defining the intensity of high school mathematics: distinguishing the difference between college-ready and college-eligible students. *American Secondary Education*, 39(2), 27-54. *Although we typically limit our referrals to publicly available resources, based upon the abstract, we determined that this resource may be of interest to you. It may be found through university or public library systems.*

From the ERIC abstract: This study was conducted to discover and examine school-level characteristics that can affect change in high school graduates from being college-eligible to college-ready. Using the National Educational Longitudinal Study (NELS:88),

the article describes and interprets the results. Findings indicate school personnel (principals, teachers, counselors, and educators) can contribute greatly to preparing college-ready high school graduates. The research suggests that behavior management needs less focus while academic rigor needs more. Teachers need to be supporting and less negative about their students and press for achievement. Course offerings of calculus and number of mathematics credits needed for graduation are much less important than students remaining continuously enrolled in mathematics courses all the way through their senior year. Senior year mathematics homework completed out of school was extremely valuable in producing a college-ready high school graduate.

METHODS

Search of Databases and Websites

- [Institute of Education Sciences \(IES\) website](http://www.ies.ed.gov) (<http://www.ies.ed.gov>)
- [ERIC database](http://www.eric.ed.gov) (www.eric.ed.gov)
- EBSCO's Academic Search Elite database
- [Google Scholar](http://scholar.google.com) (scholar.google.com)

Keywords and Search Strings Used in the Searches

(Algebra I) AND (college mathematics OR secondary school mathematics OR mathematics skills OR mathematics achievement OR college readiness OR college attendance) AND (high school students OR college students).

Criteria for Inclusion

REL Southwest selected resources that provide research on the successful experience in Algebra I in predicting a successful experience in university mathematics. Because few resources found focus exclusively on Algebra I, additional resources that deal with the high school mathematics curriculum in general are included. When REL Southwest staff reviewed resources, we considered – among other things – three factors:

1. **Date of Publication:** The most current information (primarily published from 2009 to the present) is included.
2. **Source and Funder of the Report/Brief/Article:** Priority was given to publications written in relevant, peer-reviewed journals or reports or produced by well-known research organizations.
3. **Methodology:** Sources include literature reviews and conference presentations.

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