Nonacademic Interventions for Postsecondary Enrollment and Success with Rural and High-Poverty Populations:

A Systematic Evidence Review

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February 2021

This report was prepared for the Institute of Education Sciences under Contract ED-IES-17-C-0004 by Regional Educational Laboratory Appalachia administered by SRI International. The report has been peer reviewed and approved for publication as a REL technical assistance resource by the U.S. Department of Education's Institute of Education Sciences (IES). The content of the publication does not necessarily reflect the views or policies of IES or the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

Schmidt, R. A., & Park, C. J., (2021). *Nonacademic interventions for postsecondary enrollment and success in rural high-poverty schools: A systematic evidence review.* Arlington, VA: SRI International, Regional Educational Laboratory Appalachia.

This report is available on the Regional Educational Laboratory website at https://ies.ed.gov/ncee/edlabs/regions/appalachia/additional-resources.asp

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Summary

Nonacademic Interventions for Postsecondary Enrollment and Success with Rural and High-Poverty Populations: A Systematic Evidence Review

Student success in postsecondary education depends on academic preparation and on having the nonacademic knowledge, skills, and behaviors to successfully navigate the demands of postsecondary study. While nonacademic competencies are important for all students, rural and high-poverty populations face unique nonacademic challenges, such as access to adequate college counseling and mentoring. They also have lower postsecondary enrollment and completion rates than their nonrural or low-poverty peers (Adelman, 2006; Byun et al., 2012; Hu, 2003). This review sought to identify nonacademic interventions with evidence of positive effects on postsecondary enrollment, academic performance, persistence, and completion, particularly with rural and high-poverty populations. Results identified five interventions with potentially positive effects for all students: Free Application for Federal Student Aid (FAFSA) interventions, the Facilitating Long-term Improvements in Graduation and Higher Education for Tomorrow (FLIGHT) program, college counseling, summer counseling, and summer bridge programs. Of these five interventions, two (FLIGHT and summer counseling) showed positive effects with high-poverty populations. In addition to these five interventions, Upward Bound showed positive effects for rural and high-poverty students, but not for the overall study population. Additionally, the Upward Bound study took place between 1992 and 1994. The program has changed substantially since that time, and thus the findings of the study may not be generalizable to current conditions. These results indicate a need for additional high-quality research with rural and high-poverty populations so that education leaders can select and implement interventions that work in their contexts.

Key findings

- **There is a medium to large extent of evidence for the effect of FAFSA interventions on postsecondary enrollment.** Additionally, there is a small extent of evidence for the effects of FAFSA, FLIGHT, college counseling, summer counseling, and summer bridge programs on at least one metric of postsecondary enrollment or success.
- **Only one study found positive effects for rural populations, and three found positive effects for high-poverty populations.** Upward Bound reported positive effects for students in rural and high-poverty schools, and Upward Bound, summer counseling, and FLIGHT reported positive effects on high-poverty populations. Based on our review of research from key databases, there appears to be a gap in rigorous evidence about nonacademic interventions with rural and high-poverty populations.
- **The information available on the effects of nonacademic interventions on postsecondary enrollment and success appears to have significant gaps.** Our search of the published literature returned only 17 studies (across nine interventions) that used well-designed and well-implemented experimental or quasi-experimental designs, and only eight of these studies (across six interventions) found statistically significant positive effects of nonacademic interventions on postsecondary outcomes.

Background on this Research Review

Success in postsecondary education depends not only on academic preparation but also on successfully navigating the social, cultural, and other implicit demands of postsecondary study. For example, enrolling in college may require students to get immunizations and to complete college entrance exams, financial aid paperwork, and housing forms. Students must be aware of these requirements and have the tools and knowledge necessary to meet them. Likewise, continued enrollment and success in college can depend on students' persistence or grit, their connections to the college community, time management skills, and ability to acclimate to new cultural norms. Finally, successful completion of a degree requires students to take appropriate courses, balance the demands of paid work with course requirements, seek help when necessary, and continue to prioritize a college degree over more immediate career options. Interventions at the high school or even middle and elementary school levels may prepare students to overcome these hurdles by building their nonacademic competencies, thus improving their likelihood of postsecondary enrollment and success.

While nonacademic competencies are important for all students, rural populations and high-poverty populations in particular may benefit from interventions that address them because these populations enroll in and complete college at significantly lower rates than their nonrural or low-poverty peers (Adelman, 2006; Byun et al., 2012; Hu, 2003). Although academic competencies contribute to this gap, rural and high-poverty populations also face unique nonacademic challenges to postsecondary enrollment and success. For example, rural students are less likely to encounter college-educated role models (Castleman & Page, 2014; Hoxby & Avery, 2013) who could help them understand the steps needed to enroll or prepare them for the challenges in persisting in postsecondary education. Likewise, high-poverty students often face inadequate college

counseling at their schools (Plank & Jordan, 2001). Nonacademic interventions could connect rural and high-poverty students with mentors or outside counselors to fill these gaps. Additionally, the American Council on Education has shown that the majority of public college students attend a postsecondary institution within 50 miles of home (Hillman & Weichman, 2016), and rural and high-poverty students are less likely to apply to and enroll in college if few colleges are located nearby (Rouse, 1995; Turley, 2009). Nonacademic interventions could address the challenges of identifying colleges outside students' immediate surroundings and help them overcome barriers to moving and living far from home.

In keeping with this research, education leaders from four partner school districts in eastern Kentucky report that many of their students deemed academically well prepared nonetheless fail to enroll in college or leave college after a year and return home. These stakeholders expressed a need to implement nonacademic interventions to improve postsecondary enrollment and success for their rural high-poverty populations.

When selecting an intervention to implement, stakeholders in Kentucky, as well as those nationwide who work with rural and high-poverty populations, need evidence that the intervention will work in their particular context. As mentioned above, rural and high-poverty populations face unique challenges, and an intervention with evidence in urban or low-poverty areas may not be easily transferrable to a rural or high-poverty area. Recognizing this reality, policymakers and program leaders seek interventions that demonstrate effectiveness in contexts similar to their own, consistent with Every Student Succeeds Act (ESSA) requirements (Institute of Education Sciences, 2019). Thus, a systematic review of the evidence for the effectiveness of nonacademic interventions on rural and high-poverty populations would be valuable to stakeholders working with these populations.

At this time, there is no repository of evidence on which rural, high-poverty stakeholders can draw that identifies the effects of nonacademic interventions on postsecondary outcomes in their locales. While a practice guide on the path to college published by the Institute of Education Sciences highlights key postsecondary enrollment interventions and makes recommendations focused on nonacademic competencies, it does not discuss the promise of such interventions for rural high-poverty populations in particular, nor has it been updated since 2009 (Tierney et al., 2009). Likewise, the What Works Clearinghouse (WWC) website can be searched for a variety of secondary and postsecondary interventions, but it is not searchable or sortable by population, nor can it be narrowed to nonacademic interventions in particular.

This dearth of easily accessible evidence presents a challenge for policymakers and school and district personnel who need to identify interventions that can be implemented in their particular contexts. This evidence review was designed to fill that need. See box 1 for a list of key terms used in this review and box 2 for a description of the methods and sample.

Box 1: Key terms

Intervention. A program, strategy, or activity designed to improve student outcomes. An intervention may address academic competencies, nonacademic competencies, or both. School, district, or external staff (for example, from nonprofit organizations, publishers, or technology companies) actively design and/or implement interventions. This definition excludes whole-school reforms, which usually encompass multiple interventions.

Nonacademic competencies. The knowledge, skills, and behaviors that enable students to navigate the social, cultural, and other implicit demands of postsecondary study. These include competencies that are not explicitly tested or required by postsecondary institutions or courses but are necessary to enrolling, succeeding, persisting in, and completing postsecondary education (for example, time management, a sense of belonging or connectedness, or knowledge of degree requirements). For additional information on the research base for nonacademic competencies, see appendix A.

Nonacademic interventions. Interventions including programmatic supports or activities that address at least one nonacademic competency. A nonacademic intervention may address, for example, knowledge of the postsecondary enrollment and registration process, the challenges of living independently for the first time, adapting to cultural norms of dorm living, or strengthening students' connections to the college community. For inclusion in this review, an intervention must address at least one nonacademic competency.

What Works Clearinghouse. The What Works Clearinghouse (WWC) examines the available research on educational programs, policies, and practices. Trained reviewers examine the research design, methods, and reported outcomes in research studies and provide ratings of the strength of the design and implementation of each study as well as the size of the reported impact. The WWC also systematically searches for studies on programs, policies, and practices and consolidates the evidence to provide ratings of the average impact and the extent of evidence for each intervention.

Methodological terms

Does not meet WWC standards. This study rating indicates that a study does not establish a relationship between the intervention and outcomes.

Improvement index. This index describes the effect of an intervention on outcomes in percentile units. It can be interpreted as the change in percentile rank attributed to the intervention for an average student. An improvement index of +1 indicates that the intervention would move the average student from the 50th to the 51st percentile.

Medium to large extent of evidence. An intervention with a medium to large extent of evidence has evidence from at least two studies, in at least two schools, and with more than 350 students or 14 classrooms.

Meets WWC standards with reservations. This rating indicates that a study has established a relationship between the intervention and outcomes, but that causality is not firmly established. Additional research is needed to confirm that the intervention causes the outcomes. A study may receive this rating if it is a randomized controlled trial that was not well implemented or if it used a strong quasi-experimental design.

Meets WWC standards without reservations. This WWC study rating indicates that a study used rigorous methods that allow the reader to conclude that the intervention caused the outcomes. In this report, studies of nonacademic interventions meeting this criterion indicate that, under the conditions used in the study, the nonacademic intervention caused changes in postsecondary enrollment, academic performance, persistence, or completion.

Mixed effects. Interventions with mixed effects are those where some studies show positive effects and others show negative effects, or where the number of studies with positive or negative effects is outweighed by the number of studies with no effects.

Positive effects. A study with an estimated effect that is positive and statistically significant demonstrates "positive effects." The term applies to findings from a study.

Potentially positive effects. A term the WWC uses to characterize study findings. Interventions with potentially positive effects have at least one study of the intervention that shows statistically significant positive effects, no studies that show statistically significant negative effects, and the number of studies with no effects is smaller than the number of studies with positive effects.

Small extent of evidence. An intervention with a small extent of evidence has evidence from only one study, one school, or fewer than 350 students and 14 classrooms.

Well-designed and well-implemented studies. An experimental study is "well-designed and well-implemented" if it meets WWC standards without reservations, and a quasi-experimental study is "well-designed and well-implemented" if it meets WWC standards with reservations.

Outcomes

Postsecondary academic performance. Student test scores, grades, passing rates, or other course performance indicators in postsecondary education.

Postsecondary completion. Student completion of a degree program or graduation from a degree-granting institution. This includes associate's and bachelor's degrees but does not include workforce training or certification programs that do not award a degree.

Postsecondary education. For the purposes of this report, postsecondary education includes both two-year and four-year degree-granting institutions. It does not include training programs or industry certifications.

Postsecondary enrollment. Student initial enrollment or matriculation at a postsecondary degree-granting institution within one year of graduating from high school.

Postsecondary persistence or retention. Student continued enrollment and credit accrual at a degree-granting institution beyond the first semester of the first year.

Postsecondary enrollment and success. In this report, postsecondary enrollment and success is an umbrella term encompassing postsecondary enrollment, academic performance, persistence, and completion.

Population characteristics

High-poverty populations. This review defines high poverty as interventions wherein more than 50 percent of the students are eligible for free or reduced-price lunch. High-poverty populations are the students who participate in such interventions.

Rural populations. This review uses the NCES definition of rural locales, including all three rural locale designations: Rural – Fringe (locale 41), Rural – Distant (locale 42), and Rural – Remote (locale 43). Rural populations are students living and attending school in rural locales.

Sources: Karp, 2011; NCES, 2019a; 2019b; https://ies.ed.gov/ncee/wwc and https://ies.ed.gov/ncee/wwc/Glossary

This review addressed three primary questions:

1. What is the existing evidence for positive effects of nonacademic interventions on student postsecondary enrollment, academic performance, persistence, and completion for all students from well-designed and well-implemented experimental or quasi-experimental studies?
2. What is the existing evidence for positive effects of nonacademic interventions on student postsecondary outcomes for rural and high-poverty populations?
3. What additional research is needed to address the evidence gap for postsecondary student outcomes with rural and high-poverty populations?

Box 2: Data sources, sample, and methods

This review used a systematic evidence review to address the three primary questions.

Data sources. The review drew on published research in scholarly journals, dissertations, What Works Clearinghouse (WWC) intervention reports, and WWC reviews of individual studies. The first step was a search of ProQuest's Education Database to systematically identify published research in scholarly journals, book chapters, commissioned reports, conference papers, print media, and dissertations. The second step was a search focused on WWC intervention reports and WWC reviews of individual studies to identify additional studies that met inclusion criteria and were not previously identified in the ProQuest search.

Sample. The sample for this review included all studies published between 1998 and 2018 that met the inclusion criteria discussed below. Broadly speaking, a study must have evaluated a nonacademic intervention for students, ages 5 to 19, designed to improve postsecondary enrollment, academic performance, persistence, or completion. The interventions discussed in this review also had to have at least one study that met WWC design standards and showed positive effects of the intervention on postsecondary enrollment, academic performance, persistence, or completion.

Inclusion criteria. To be included in this evidence review, a study must meet two sets of criteria. First, the study must examine nonacademic interventions implemented with the relevant population and examine the outcomes of interest. A study must:

1. Include original research. Reviewers excluded studies summarizing other research, news articles, and promotional material for interventions. When the search returned literature reviews, meta-analyses, and WWC intervention reports, the research team reviewed the sources in these documents and screened them for the inclusion criteria.

2. Test the effects of an intervention or policy. The review excluded studies focused solely on the relationship between nonacademic competencies themselves (such as grit or persistence) and student outcomes or the relationship between demographic background variables (such as socioeconomic status, race, and parental education) and student outcomes. The purpose of this criterion was to ensure that the evidence review was focused on programs and policies that could be implemented by stakeholders in their schools, districts, or states.

3. Include participants who were ages 5 to 19 years at the time of the intervention, excluding any interventions that took place entirely with postsecondary students at postsecondary institutions. This criterion ensured that the evidence review was focused on interventions that could be implemented with students in K–12 public schools or during the summer after high school.

4. Examine an intervention with at least one nonacademic component (see box 1). The review excluded interventions that were purely academically focused.

5. Measure one of the four outcomes of interest: postsecondary enrollment; postsecondary academic performance; postsecondary persistence; or postsecondary completion.

6. Have been published in English between January 1, 1998, and December 20, 2018 (the date the searches were completed). This criterion maximized the likelihood that authors would report all the information needed for a WWC review.[1]

Second, to be included in this review, a study must be well-designed and well-implemented and show positive effects. The study must:

7. Meet WWC standards (with or without reservations). This eliminated studies using qualitative designs and those using less rigorous quantitative methods, such as correlational and descriptive studies.

8. Report statistically significant or substantively important positive effects (see definitions of these terms in box 1).

Methods. The research team searched ProQuest's Education Database and the WWC website for studies to include in the sample. The team searched ProQuest's Education Database using a series of predetermined search terms and created a list of all studies ProQuest returned for each search term. The research team also examined both the "Path to Graduation" and "Postsecondary" topic areas in the intervention reports and reviews of individual studies sections of the WWC website. If the research team found a study in ProQuest's Education Database that the WWC had already reviewed, the team did not re-review the study but instead used the ratings recorded on the WWC website. The team created a list of all studies included in the intervention reports and individual study reviews in these topic areas that included postsecondary outcomes. The studies found either in ProQuest or on the WWC website formed the full sample of studies screened for this review.

For each study in this sample, researchers completed an online screening form, documenting whether the study met the first six inclusion criteria, regarding the focus on nonacademic interventions with the relevant populations and outcomes. Next, for each study that met these inclusion criteria but had not been reviewed by the WWC, the study team carried out a full WWC review, including querying authors when needed. The researchers involved in this step were all WWC certified to review studies using version 3.0 of the WWC standards (the version current at the start of the review process). Studies previously reviewed by the WWC were not reviewed again; rather, this review simply documented the ratings the WWC assigned. Finally, the research team narrowed the list of studies to those that met WWC standards with or without reservations and demonstrated positive effects on one of the outcomes of interest (the final two inclusion criteria, above). This review documents the findings of the studies that met all eight inclusion criteria.

For additional detail on the searching and screening process, including training and reliability monitoring in the screening process, WWC author queries, and the list of search terms and search results, see appendix B. Appendix C reproduces the form researchers used to screen studies for inclusion in this review. Appendix D provides the full list of studies that examined nonacademic interventions with the relevant population and outcomes and were screened for design and effects. Appendix E provides a full description of the interventions with studies that met all the initial inclusion criteria and also used designs that met WWC standards with or without reservations.

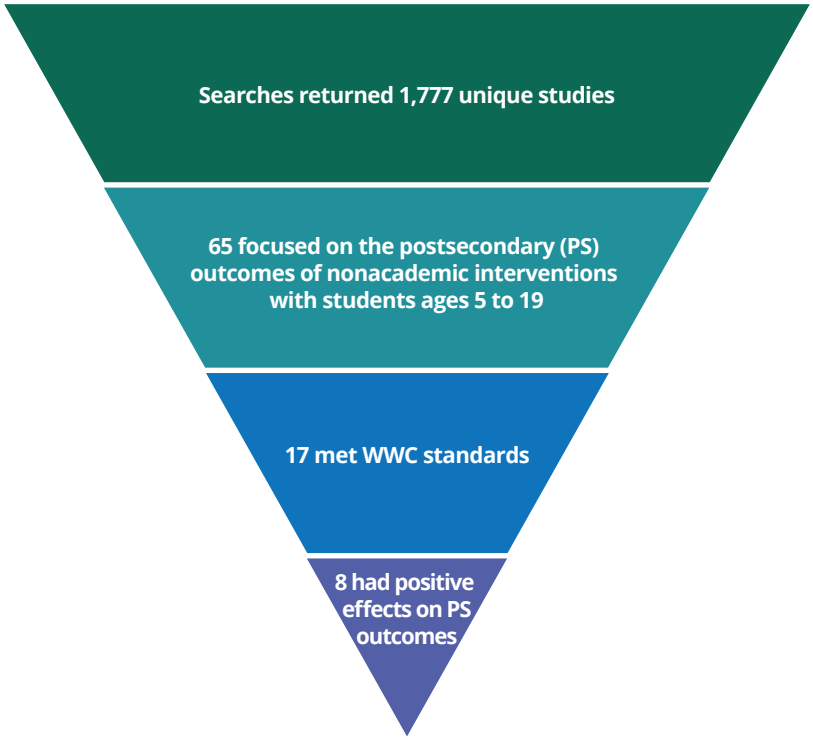
[1] *The WWC was established in 2002, with its standards reflecting a move toward more rigorous study designs and reporting that was already under way in education research. This review extended its search window back to 1998 to capture some of these pre-WWC studies.*

Findings from the Review

The search process yielded 1,777 studies. Of these, 1,712 did not focus on the postsecondary outcomes of nonacademic interventions with students ages 5 to 19.[2] Of the 65 studies that focused on the relevant population and outcomes, 48 did not meet WWC standards (figure 1). A total of eight studies investigating six interventions met all inclusion criteria, including the requirement that the studies meet WWC standards with or without reservations and show statistically significant positive effects. Only one of these six interventions showed positive effects for rural populations (Seftor et al., 2009), and only three showed positive effects specifically for high-poverty populations (Bettinger et al., 2012; Carrell & Sacerdote, 2013; Castleman et al., 2014; Murphy et al., 2010; Page et al., 2018; Philp, 2015; Seftor et al., 2009).

The next section of this review describes each intervention that had effects on postsecondary outcomes for the overall study population. Next, it discusses interventions that had effects specifically for rural and high-poverty populations. For a more detailed description of the interventions, see appendix E.

Figure 1. A search of ProQuest's Education Database and the What Works Clearinghouse (WWC) website returned 1,777 unique studies; only 65 focused on nonacademic interventions with the relevant populations and outcomes, and only eight studies met WWC standards and had positive effects on postsecondary outcomes



PS is postsecondary.
Source: Authors' review of literature identified using ProQuest's Education Database and the WWC website between June and December 2018.

[2] *Interventions taking place in preschool or early elementary school in which students are tracked into postsecondary education are rare. However, we included students as young as 5 to allow for the inclusion of this type of intervention. Interventions that took place entirely with postsecondary students in a postsecondary institution were excluded. See appendix B for additional information.*

This review identified five nonacademic interventions with potentially positive effects on at least one postsecondary outcome for the overall study population.[3]

The eight studies that met all inclusion criteria investigated six interventions.[4] Of these six interventions, five have evidence of positive effects on postsecondary outcomes for the overall study population, based on well-designed and well-implemented studies: support for completing the Free Application for Federal Student Aid (FAFSA), Facilitating Long-Term Improvements in Graduation and Higher Education for Tomorrow (FLIGHT), college counseling, summer counseling, and summer bridge programs (table 1).[5] This section of the review briefly describes each intervention and summarizes the findings on their effects on postsecondary outcomes. For a more detailed description of the interventions, see appendix E.

FAFSA interventions showed positive effects on postsecondary enrollment and persistence

FAFSA interventions provide students and families with information on the importance of completing the FAFSA to obtain college aid, send reminders on key financial aid deadlines, and may assist low-income families in completing the application. These interventions can seek to engage high-poverty populations in particular, but may also be implemented broadly, for all students who have expressed an interest in postsecondary education. FAFSA interventions have the potential to overcome the particular barriers faced by rural and high-poverty populations by giving them information about the college application process to which they might otherwise have no access.

This review identified two studies of FAFSA interventions that met WWC standards (Bettinger et al., 2012, and Page et al., 2018). Both showed positive, statistically significant effects of FAFSA interventions on students' enrollment in postsecondary education. The two studies have an average improvement index of +8, indicating that, on average, FAFSA interventions can move the average student from the 50th to the 58th percentile in the distribution of students enrolling in postsecondary education. With two studies including more than 350 students and more than two schools, the extent of evidence of the effect of FAFSA information interventions on postsecondary enrollment is medium to large (WWC, 2013a, 2019a).

Additionally, one study of a FAFSA intervention that included both information about financial aid and support for completing the FAFSA showed a positive effect of the intervention on student persistence in college for two consecutive years (Bettinger et al., 2012). The improvement index for this outcome was +9, indicating that FAFSA interventions can move the average student from the 50th to the 59th percentile in the distribution of students persisting in college. The extent of evidence for postsecondary persistence is small because only one study that met WWC standards examined this outcome (table 1).

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[3] *Upward Bound demonstrated potentially positive effects for rural and high-poverty students (Seftor et al., 2009), but not for the overall study population (Myers et al., 2004). Thus, this intervention is discussed in the next section.*

[4] *The WWC had already reviewed all eight studies discussed in this review. The search process did return additional studies that had not been reviewed by the WWC, but none met the criteria for inclusion in this review. See appendixes B and D for more information.*

[5] *This review identified no nonacademic interventions implemented with students ages 5 to 19 that had high-quality evidence of effects on students' postsecondary academic performance.*

FLIGHT showed positive effects on postsecondary enrollment

FLIGHT is a school-based program that provides mentoring and other supports to middle and high school students to improve their chances of enrolling and succeeding in college. The program seeks to engage students who qualify for free or reduced-price lunch and are in good academic and disciplinary standing (WWC, 2019b). FLIGHT includes three key nonacademic services: wraparound case management from school staff, including meetings to review and monitor students' academic progress and steps toward college; one-on-one student mentoring from volunteers; and a detailed annual report, provided to parents, teachers, and guidance counselors, of students' grades, attendance, and test scores (Philp, 2015). Results showed that FLIGHT has a positive, statistically significant effect on postsecondary enrollment. While the extent of the evidence is small, stemming from only one study, the average improvement index is +39, suggesting that FLIGHT can move the average student from the 50th to the 89th percentile in the distribution of students enrolling in postsecondary education.

College counseling interventions showed potentially positive effects on postsecondary enrollment[6]

College counseling interventions provide high school seniors with mentoring and assistance with completing college applications. In the college counseling intervention that met inclusion standards for this report, college undergraduates met with high school seniors to help them navigate the steps involved in applying to college, provided feedback on their application essays, and helped them fill out paperwork, including financial aid applications. The intervention also included financial support with application fees and a $100 incentive for completing the application process. The population of interest was students with high grade 10 test scores who had not yet applied to college in their senior year of high school (WWC, 2013b).

One study of a college counseling intervention in New Hampshire (Carrell & Sacerdote, 2013)[7] found positive effects on postsecondary enrollment, with an improvement index of +5, indicating that college counseling can move the average student from the 50th to the 55th percentile in the distribution of students enrolling in postsecondary education. The study also examined postsecondary persistence but found no statistically significant effects on this outcome.

Summer counseling interventions showed mixed effects on postsecondary enrollment and potentially positive effects on postsecondary persistence

Summer counseling broadly refers to programs aimed at ensuring that high school graduates successfully matriculate in college in the fall after high school graduation. Summer counseling supports students during the summer after high school in getting through the steps necessary to matriculate and in overcoming barriers to postsecondary enrollment. The specific services and delivery of summer counseling programs vary but may include text messaging, in-person meetings, and social media

[6] *In the WWC systematic review of college counseling, only one study met WWC standards with or without reservations (WWC, 2013b). This study demonstrated a positive effect on postsecondary enrollment (Carrell & Sacerdote, 2013). The WWC characterized college counseling as having potentially positive effects on postsecondary enrollment.*

[7] *The WWC reviewed a version of this working paper entitled "Late interventions matter too: The case of college coaching New Hampshire." Since this review, Carrell and Sacerdote have updated the paper with a new title ("Why do college going interventions work") and replaced the original copy. Regional Educational Laboratory Appalachia analysts examined both the WWC intervention report and the full study as currently published.*

campaigns to offer "information about tasks required for postsecondary enrollment, as well as assistance in overcoming unanticipated financial, informational, and socioemotional barriers" (WWC, 2018, p. 1).

Results showed mixed effects of summer counseling on postsecondary enrollment (WWC, 2018). One study of summer counseling showed statistically significant positive effects on postsecondary enrollment, resulting in its inclusion in this review (Castleman et al., 2014), and four other studies showed no effects. The average improvement index across all five studies was +5, which corresponds to moving the average student from the 50th to the 55th percentile in the distribution of students enrolling in postsecondary education. However, this average includes effects as low as zero and as high as a +13 improvement index (table 1). Unfortunately, the studies did not examine the effects of various components of summer counseling, and there are too few studies to draw conclusions about why the program may have had an effect in some studies but not in others. Therefore, although positive on average, the evidence for the effect of summer counseling on postsecondary enrollment should be interpreted with caution.

Finally, one study of summer counseling found a statistically significant positive effect of the intervention on student persistence in college into the fall and spring of students' second year (Castleman et al., 2014). The improvement index for this outcome was +6, indicating that a summer counseling intervention can move the average student from the 50th to the 56th percentile in the distribution of students persisting in college through their second year (WWC, 2018). The extent of evidence for this outcome is small because it is based on only one rigorous evaluation (table 1).

Summer bridge interventions showed potentially positive effects on postsecondary completion[8]

Summer bridge programs aim to support students' postsecondary transition by connecting students to social resources that can help them succeed in college. In contrast with summer counseling interventions, these programs are traditionally hosted by postsecondary institutions, introducing admitted students to the resources and requirements of the particular institution. This review identified one study of a summer bridge program, offered to all incoming students at a selective technical university in the southeastern United States (Murphy et al., 2010). In the five-week program, students took a short non-credit-bearing course in calculus, chemistry, computer science, or English composition designed to mimic a college-level course. Upperclassmen served as coaches to support the students. Although largely focused on academic skills, this intervention included a nonacademic component that integrated families by inviting them to family-support sessions and award sessions. The family-support sessions included discussions with students and their families about housing arrangements, food plans, and coed visitation to educate both students and families about common pitfalls in the college experience (Murphy et al., 2010). The Murphy et al. study (2010) demonstrated an effect of the summer bridge program on college completion with an improvement index of +4, which corresponds to moving the average student from the 50th to the 54th percentile in the distribution of students completing college as a result of the summer bridge program. However, with only one study, the extent of evidence for the effect of summer bridge programs on postsecondary completion is small (WWC, 2016a).

[8] *In the WWC systematic review of summer bridge interventions, only one study met WWC standards with or without reservations (WWC, 2016a). This study demonstrated a positive effect on postsecondary completion (Murphy et al., 2010). The WWC characterized summer bridge interventions as having potentially positive effects on postsecondary completion.*

Summary of the evidence for nonacademic interventions on the overall study population

This systematic review identified five interventions with well-designed and well-implemented studies that showed positive effects on students' postsecondary enrollment, persistence, or completion in the overall study population. FAFSA interventions showed the most promise overall, with positive effects on postsecondary enrollment and persistence, while FLIGHT, college counseling, summer counseling, and summer bridge programs showed positive effects on only one outcome each (postsecondary enrollment for FLIGHT and college counseling, persistence for summer counseling, and completion for summer bridge programs). Additionally, the extent of evidence for the effects of FAFSA interventions on postsecondary enrollment is medium to large, reflecting two studies that met WWC standards. The extent of evidence for each of the other findings is small.

Table 1. Summary of the findings on nonacademic interventions for the overall study population, including the effectiveness ratings, average improvement index, and extent of evidence across studies for each intervention, by outcome, 2006–2019

Intervention	Rating across studies	Outcomes		
		Postsecondary enrollment	Postsecondary persistence	Postsecondary completion
FAFSA	Number of studies	2	1	0
	Effectiveness rating [a]	Potentially positive	Potentially positive	na
	Avg improvement index [b]	+8	+9	na
	Extent of evidence [c]	Medium to large	Small	na
FLIGHT	Number of studies	1	0	0
	Effectiveness rating	Potentially positive	na	na
	Avg improvement index	+39	na	na
	Extent of evidence	Small	na	na
College counseling	Number of studies	1	1	0
	Effectiveness rating	Potentially positive	Indeterminate	na
	Avg improvement index	+5	na	na
	Extent of evidence	Small	Small	na
Summer counseling	Number of studies	5	1	0
	Effectiveness rating	Mixed	Potentially positive	na
	Avg improvement index	+5	+6	na
	Extent of evidence	Medium to Large	Small	na
Summer bridge program	Number of studies	0	0	1
	Effectiveness rating	na	na	Potentially positive
	Avg improvement index	na	na	+4
	Extent of evidence	na	na	Small

a. The effectiveness rating summarizes the direction and statistical significance of effects found across studies.

b. The average improvement index averages the effect of an intervention across studies of the same intervention and expresses the average effect in percentile units. For binary outcomes, such as college completion, an improvement index of +1 corresponds to moving the average student from the 50th to the 51st percentile in the distribution of students completing college as a result of the intervention.

c. The extent of evidence reflects the number of studies, schools, and students included in the analyses that contributed to the evidence for an intervention. "Small" indicates that the evidence is based on only one study, one school, or fewer than 350 students. "Medium to large" indicates that the evidence is based on at least two studies, in two schools, and with more than 350 students.

Note: FAFSA is Free Application for Federal Student Aid. FLIGHT is Facilitating Long-Term Improvements in Graduation and Higher Education for Tomorrow. na is not applicable, indicating that no well-designed and well-implemented studies investigated the effect of the intervention on this outcome. No studies investigated the effect of any of these interventions on postsecondary academic performance.

Source: Authors' review of the What Works Clearinghouse intervention reports and single-study reviews.

Upward Bound was the only program that showed a positive impact on postsecondary enrollment in projects taking place in rural locales that served high-poverty populations.

Upward Bound is a federal program that provides high school students from low-income households and first-generation college students with academic and nonacademic supports, such as cultural activities, college tours, and help with FAFSA completion, all with the aim of increasing postsecondary enrollment and completion. A randomized controlled trial of Upward Bound found no overall impact of the program on any of the postsecondary outcomes of interest for this report (Myers et al., 2004). A follow-up study disaggregated results by a series of student-, project-, and school-level variables, including location of the project (rural or urban) (Seftor et al., 2009) and found a positive impact of Upward Bound on students' postsecondary enrollment in projects taking place in rural locales. Additionally, during the time frame of the Upward Bound studies (1992 to 1994), projects were required to enroll at least two-thirds low-income students. Thus, the impact on students in rural locales includes high-poverty students as well (Seftor et al., 2009). However, it should be noted that although the study was published within the eligible time frame for this review, the intervention took place between 1992 and 1994. The program has changed substantially since that time, and thus the findings of the study may not be generalizable to current conditions.

None of the studies with overall impacts discussed above disaggregated the effects of their interventions on postsecondary outcomes for rural populations. The FLIGHT study included three rural counties, but the study did not report the effect of FLIGHT on postsecondary outcomes for the rural populations separately from the urban populations (Philp, 2015).[9]

Evidence suggests summer counseling, FLIGHT, and Upward Bound might be effective with high-poverty populations.

Castleman et al.'s study (2014) of summer counseling examined outcomes for postsecondary enrollment and persistence separately for high-poverty populations in two sites. In one site, Boston, summer counseling showed positive effects for students from high-poverty populations on enrollment and persistence into their sophomore year of college. The improvement index for this effect was +14, which corresponds to high-poverty students moving from the 50th to the 64th percentile in the distribution of students persisting into their sophomore year of college as a result of summer counseling (WWC, 2018). Additionally, the FLIGHT program specifically seeks to engage students who qualify for free or reduced-price lunch, and the one study of FLIGHT that met the WWC design standards found positive results among the participants (Philp, 2015). Likewise, as discussed above, the Upward Bound program included a large proportion of high-poverty students, and thus its impacts on rural students included high-poverty students as well (Seftor et al., 2009).

Although FAFSA interventions showed the most promise overall, their effects on high-poverty populations are untested. Both studies of FAFSA interventions included high-poverty populations in the sample but did not disaggregate results specifically for those populations.

[9] *The author disaggregated high school outcomes but not postsecondary outcomes for rural populations.*

Overall, summer counseling and FLIGHT showed the most promise for K–12 stakeholders with a high proportion of students in poverty, as both have been shown to have potentially positive effects on persistence in postsecondary education, specifically for a subpopulation of high-poverty students, and in studies that took place within the last 10 years. Nonetheless, the extent of evidence for each is small because the number of studies that met design standards is limited.

The information available on the effects of nonacademic interventions on postsecondary enrollment and success, particularly for rural and high-poverty populations, may have significant gaps.

The results of the literature search and screening process indicate large gaps may exist in the research that could help schools, districts, and states select interventions that meet the Every Student Succeeds Act's evidence requirements and are likely to benefit their rural and high-poverty populations. These possible research gaps fall into six main categories. First, although the search returned a large number of studies that examined nonacademic competencies, more than half of these were excluded because they did not focus on an intervention (1,033 studies, 58 percent, table 2). Instead, these studies focused on the nonacademic competencies themselves, naturally occurring or preexisting student characteristics, or family or demographic background variables. Second, 29 percent of the studies identified in the search were excluded because they focused on populations older than 19 or younger than 5. This included one preschool intervention, a large number of college-level interventions (including 36 that took place in the first year of postsecondary education), and interventions designed for adults who were not in school. Third, 11 percent of the studies were excluded because they did not examine postsecondary outcomes. These studies often focused on the effects of nonacademic interventions on students' high school outcomes, such as course grades and high school graduation.

Table 2. Of the 1,777 studies researchers found in their search of ProQuest's Education Database and the What Works Clearinghouse website, nearly two-thirds did not examine a nonacademic competency, and more than half did not examine an intervention

Reason for Exclusion	Number of studies	Percent of studies
Did not examine a nonacademic competency	1,159	65.2
Did not examine an intervention	1,033	58.1
Did not focus on students ages 5 to 19	514	28.9
Did not include the postsecondary outcomes of interest	201	11.3
Total number of studies screened	1,777	100

Note: Categories are not mutually exclusive; a study could be excluded from the review for more than one reason.

Source: Authors' review of the evidence and What Works Clearinghouse intervention reports.

The fourth gap in research was in the quality of the study designs. Of the 65 studies that examined nonacademic interventions with the relevant population and outcomes, only 17 used well-designed and well-implemented experimental or quasi-experimental designs (see figure 1). Fifth, the results of this evidence review show a gap in the disaggregation of research results. Only three studies that met the criteria for inclusion in this review examined effects separately for high-poverty populations and only one examined effects explicitly for rural populations. Additionally, the one study that examined a rural population was implemented between 1992 and 1994, and the program has changed substantively since then (Seftor et al., 2009).

Finally, among the 17 well-designed and well-implemented studies that met the inclusion standards for this review, only eight found statistically significant positive effects for the outcomes of interest. The remaining nine studies found indeterminate effects (eight studies) or did not provide adequate information to calculate effect sizes (one study, Nathan, 2013). In addition to the three studies that found indeterminate effects of summer counseling (discussed above), the studies with indeterminate effects examined developmental summer bridge programs (Barnett et al., 2012), EXCEL[10] (Bergin et al., 2007), and the Quantum Opportunity Program (Rodriguez-Planas, 2010; Schirm et al., 2006). This review found no additional well-designed, well-implemented studies with positive, statistically significant effects of these three programs on the outcomes of interest for the overall study population or for rural or high-poverty populations in particular. Therefore, despite existing randomized controlled trials or quasi-experimental studies of these three interventions, they lack strong evidence of their effect on postsecondary outcomes.

[10] *Despite being spelled in all capital letters, it does not appear that EXCEL is an acronym. In the Bergin et al. (2010) study, the intervention is always referred to only as "EXCEL."*

Implications

Nationwide, 19 percent of U.S. public school students are enrolled in a rural school (Lavalley, 2018), and 24 percent are enrolled in a high-poverty school (NCES, 2019c). These students face challenges that are different from those faced by their nonrural and low-poverty peers. One example is in building the nonacademic competencies necessary for postsecondary enrollment and success. To address these challenges, decisionmakers need evidence for nonacademic interventions designed to increase postsecondary enrollment and success, particularly among rural and high-poverty populations. This review shows that the only intervention with evidence of impact in rural communities serving high-poverty students is Upward Bound as implemented in 1992–1994.

This indicates there are likely gaps in evidence that researchers can address in five ways. First, researchers can carry out more studies on nonacademic competencies and the link between these competencies and postsecondary outcomes. A substantial portion of the research on postsecondary enrollment and success is focused on academic, rather than nonacademic, competencies. The screening process for this review eliminated 65 percent of the studies returned from the searches because they did not address nonacademic competencies. Nonacademic competencies have been linked to postsecondary enrollment and success (Conley, 2007; Duckworth et al., 2007; Kinsantas et al., 2008; McDonough, 1997; Nagaoka et al., 2009), particularly for rural and high-poverty populations (Terenzini et al., 2001), but more research is needed to understand how these competencies promote postsecondary enrollment and success.

Second, in addition to more research on nonacademic competencies, researchers can also carry out more studies on specific interventions designed to improve these competencies. This review found that the research that does exist on nonacademic competencies often focuses on the competencies themselves, rather than on interventions designed to develop these competencies. Investigation into nonacademic competencies is an important first step in designing interventions that aim to improve the nonacademic knowledge, skills, and behaviors that have been shown to affect postsecondary outcomes. This type of research can help the field understand how nonacademic competencies develop and which have the strongest relationship with student outcomes. With this information, intervention designers can create programs that are hypothesized to develop these competencies and thus impact student outcomes. However, decisionmakers rarely design their own programs or interventions from scratch; they need to be able to identify programs and policies that are already designed and within their power to implement. Researchers need to provide evidence on whether specific nonacademic interventions have the hypothesized effects on students. This will enable stakeholders to take action in implementing successful interventions in their schools and districts.

Third, researchers can carry out studies of nonacademic interventions that take place in secondary schools or with students ages 5 to 19. A substantial portion of the research on the effects of nonacademic interventions on postsecondary outcomes took place entirely in postsecondary educational settings. This review excluded more than one-quarter of the studies identified in the initial search because they focused on students older than 19 or younger than 5, or took place entirely with postsecondary students already enrolled in postsecondary institutions (for example, first-year experience courses). Although these

interventions are important to investigate, the studies will not yield information that will help those in the K–12 system effectively prepare high school graduates for success in postsecondary education. Increasing the available evidence about nonacademic interventions currently in place in K–12 schools and their effect on postsecondary outcomes can help fill this gap and potentially benefit the K–12 and higher education systems.

Without additional research, schools and districts are implementing programs with limited evidence of effectiveness. For example, mentoring programs are designed to put prospective college students in touch with adults who know the ins and outs of the college application and enrollment process and have firsthand knowledge of how to succeed in a postsecondary institution. One program with a mentoring component (FLIGHT) showed positive effects on postsecondary enrollment, specifically with a high-poverty population. However, the body of rigorous evidence for mentoring is small, reflecting just this one study. Many other mentoring programs either have not been studied or have not shown effects on postsecondary outcomes. For example, the Quantum Opportunity Program (QOP) provides mentors to students as part of a long-term after-school program. However, WWC reviews of QOP studies showed indeterminate effects of the program on postsecondary persistence (WWC, 2007, 2016b). While two studies met WWC standards with reservations (Rodriguez-Planas, 2010; Schirm et al., 2006), neither showed statistically significant effects on the postsecondary outcomes of interest. Thus, the field needs more research on mentoring interventions to determine whether they are effective for improving students' postsecondary outcomes before they are implemented more broadly.

Fourth, researchers should address the gap in the evidence for rural and high-poverty populations. Decisionmakers are increasingly looking to identify interventions that are most likely to benefit students in their particular context, a practice embedded in the Every Student Succeeds Act. Rural and high-poverty schools and districts have unique strengths and challenges, and the lack of information on how interventions perform in those contexts presents a dilemma for decisionmakers. Without additional research, schools and districts serving rural and high-poverty populations may implement interventions that are not designed for their circumstances and may not achieve intended outcomes. The consequences are wasted resources and inadequately supported students. Researchers can address this gap in two ways: (a) they can carry out more studies specifically focused on rural and high-poverty areas; (b) researchers using large national datasets or multi-site studies could consider rural and high-poverty populations in their sampling and disaggregate their results for high-poverty and rural populations. Many studies reviewed here included high-poverty populations, but only three disaggregated results for these populations.

Fifth, researchers should address the gap in both the quality of the research and in the quality of the reporting of research in this field. Although 65 studies returned by the search of ProQuest's Education Database and the WWC website were focused on the populations, interventions, and outcomes of interest, and used designs appropriate to be included in this review, only 17 met WWC standards with or without reservations (see figure 1). The remaining 48 studies did not meet standards, most commonly (45 of the 48) because the authors failed to demonstrate that the treatment and comparison groups were equivalent before the intervention began. This can happen for two reasons. On the one hand, the study may not have been well implemented, such that the treatment and comparison groups were substantially different, even before the intervention began. In this case, any effects attributed to the treatment may

in fact be due to preexisting differences. Researchers can address this issue through more frequent use of random assignment, greater attention to attrition, and more careful selection of comparison group participants in non-random-assignment studies. Another way a study may fail to demonstrate the equivalence of the treatment and comparison groups at baseline is if it did not report data at baseline. In these cases, the groups may not have been substantially different, but the study authors neglected to provide evidence of that fact. This may lead to underreporting of significant results. Researchers can improve the quality of evidence in the field by ensuring that they report information on the baseline differences between treatment and comparison groups.

Additionally, only three studies that met WWC standards reported results separately for high-poverty populations, and only one disaggregated for rural populations. While the failure to disaggregate for rural students may reflect an inadequate number of research studies being conducted in rural communities, approximately one-third of the studies focused on nonacademic interventions with postsecondary outcomes reported the proportion of students in poverty.[11] This indicates that the researchers had the ability to disaggregate results for students living in poverty, if not the statistical power to detect effects for subgroups.

This insufficient reporting of important aspects of the study design and of the subgroups of students included in the analysis may lead to underreporting of the number of effective interventions for rural and high-poverty populations. As a result, stakeholders may choose not to implement interventions that have the potential for positive effects.

Finally, this review was unable to identify which specific program components led to improved postsecondary outcomes. All six interventions discussed in this review include multiple components, sometimes including academic elements (FLIGHT, Upward Bound, and summer bridge). However, none of the studies examined the separate effect of each intervention component, and none of the interventions had enough studies or enough variation in implementation for this review to attempt to tease apart the effects. Without substantially more research, it is not possible to determine which piece of each intervention is most responsible for the outcomes, or if all the elements work together as a whole. Each school or district has its own set of resources and constraints, and local actors are rarely able to implement interventions exactly as designed. Additional information on the critical components of an intervention and their connection to the desired outcomes can support stakeholders in implementing a program that leverages their existing resources and still has an effect on postsecondary outcomes.

[11] *This includes studies that were ultimately excluded from the review because they did not meet WWC standards or did not have positive effects.*

Limitations

This review is limited by insufficient data reporting in the majority of well-designed studies addressing the populations and outcomes of interest. As discussed above, 45 of the 65 studies that were focused on the populations, interventions, and outcomes of interest, and that used designs appropriate to be included in this review, did not meet WWC standards because they failed to show that the treatment and comparison groups were similar before the intervention began.[12] As a result, the number of interventions with positive effects may be underreported. Additionally, insufficient data reporting prevented the authors of this review from systematically analyzing the similarities and differences in the components of these nonacademic interventions and their effects on students.

This review may also be limited by the approach to searching for and including literature. The research team designed the approach to be systematic and replicable. However, searching only an online database and WWC's website may have excluded studies that did not include the selected keywords or were not housed in ProQuest's Education Database. Additionally, the particular key words and phrases used as search terms may not have uncovered all relevant studies in ProQuest's Education Database. As a result, relevant studies may have been omitted from this review.

Similarly, the review was limited to studies published between 1998 and 2018. This may have eliminated well-designed and well-implemented experimental or quasi-experimental studies published more than 20 years ago or in the time between the completion of the search and the publication of this study. The authors chose to limit the date range to increase the chances of finding studies that reported the full set of data required by WWC and of reaching authors to gather additional information not reported in the studies. Given the challenges of identifying studies that included all the needed data discussed above, it is unlikely that extending the time frame backward would yield much additional evidence.

[12] *The Regional Educational Laboratory Appalachia researchers queried the authors of the studies that ProQuest returned which had not already been reviewed by the WWC (four studies). These queries followed WWC procedures, but no authors were able to provide the information necessary to establish baseline equivalence. Three authors did not reply to multiple attempts, and one author replied but was unable to provide the information.*

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Appendix A: Nonacademic competencies

Research has used a variety of terms for the nonacademic competencies discussed in this report. Likewise, studies vary in how they define what the category includes and excludes. This review draws its definition of nonacademic competencies largely from frameworks for college readiness developed by Barnett (2016) and Conley (2012). In addition to the academic skills necessary for success in postsecondary education, both frameworks emphasize what Barnett calls "noncognitive skills," and what Conley refers to as "key learning skills and techniques." These skills include students' ability to set personal goals, their internal motivation and self-regulation, and their persistence in pursuing long-term goals. These skills have been linked to postsecondary enrollment and success (Duckworth et al., 2007; Kinsantas et al., 2008), and Barnett identifies at least one example of schools working to increase these skills in their students (Barnett, 2016). Additionally, there is evidence that the relationship between these skills and postsecondary outcomes may be particularly strong for students from low-income backgrounds (Terenzini et al., 2001).

Besides key learning skills and techniques, both frameworks also discuss the role of cultural capital or "key transition knowledge and skills" (Conley, 2012). Competencies in this area include an understanding of the norms or expectations of college, understanding the application and financial aid process, and the ability to select a college appropriate for one's interests, skills, and needs. As with noncognitive skills, research shows that cultural capital impacts postsecondary outcomes, especially for traditionally underrepresented students (Conley, 2007; McDonough, 1997; Nagaoka et al., 2009).

In its inclusion criteria, this review defines "nonacademic competencies" as both the key learning skills and techniques and the key transition knowledge and skills outlined by Barnett (2016) and Conley (2012). Thus, studies that examined other factors that are not explicitly academic, such as race, socioeconomic status, and institutional barriers to success, were excluded as not addressing nonacademic competencies.

Appendix B: Methods

At the start of the project, researchers performed a series of searches of ProQuest's Education Database using variations on a set of broad search terms (nonacademic, noncognitive, out-of-school time, social-emotional, rural college access and success, and high-poverty college access and success) and the outcomes of interest (postsecondary enrollment, postsecondary performance, postsecondary persistence, and postsecondary completion), including or excluding quotation marks, Boolean operators, and wildcards[13] to narrow or broaden the search results. The goal of this step was to obtain the broadest possible list of relevant studies, while excluding studies not relevant to the review. At this first stage, the research team ruled out using the outcomes as search terms, as they returned substantially fewer studies than did searches excluding those terms. To ensure that no studies were inadvertently excluded, the team instead added the word "outcome" to many of the searches. The final search terms and search results are in table B1.

Once the search terms were finalized, one principal investigator trained five additional researchers in the searching and screening process. The training covered the process for accessing and searching ProQuest's Education Database, saving the results of searches, completing the screening form, and reviewing the operational definitions for the inclusion criteria (see box 1 in the body of the report). The principal investigator demonstrated screening five studies from the "nonacademic" search term. Following this initial training, each researcher screened the next 10 studies from the "nonacademic" search term. At a follow-up meeting, the team discussed discrepancies in their responses to the screening items and updated a frequently asked questions (FAQ) document with additional information on the screening criteria. Each researcher double-screened a minimum of 10 more studies, continuing until reaching 80 percent agreement with the principal investigator across five screening questions. Once each researcher had reached reliability in the screening process, he or she was assigned a search term or terms and began to screen independently. Screeners completed an online checklist to document the reasons for inclusion or exclusion (see appendix C for a print version of the online screening form). The full set of search terms, as well as the Boolean operators, wildcards, and variations used in each case, are shown in table B1. Many studies appeared in more than one search. For the first four months of screening, this overlap was used to continue to monitor reliability between screeners, and screening pairs met to discuss and resolve discrepancies in their responses to the checklist. After that point, researchers screened all studies only once.

[13] *Boolean operators are words such as "and," "or," and "not" that join search terms. Wildcards are asterisks added to search terms to allow the search engine to complete the word. For example, "skill*" would return studies that include "skill," "skills," or "skilled" in their description.*

Table B1. Search terms and results

Broad search term	Specific search terms used in ProQuest's Education Database	Number of studies returned
Nonacademic	("nonacademic" OR "non-academic") AND ("postsecondary outcome*" OR "post-secondary outcome*" OR "college outcome*") AND intervention*	707
Noncognitive	("noncognitive" OR "non-cognitive") AND ("postsecondary outcome*" OR "post-secondary outcome*" OR "college outcome*")	540
Out-of-school time	("out of school time" OR "out-of-school time") AND ("postsecondary outcome*" OR "post-secondary outcome*" OR "college outcome*")	29
Social-emotional	("social emotional skill*" OR "social-emotional skill*" OR "socio emotional skill*" OR "socio-emotional skill*") AND ("postsecondary outcome*" OR "post-secondary outcome*" OR "college outcome*")	30
Rural college access	rural AND ("college access") AND ("postsecondary outcome*" OR "post-secondary outcome*" OR "college outcome*")	338
Rural college success	rural AND ("college success") AND ("postsecondary outcome*" OR "post-secondary outcome*" OR "college outcome*")	435
High-poverty college access	("high poverty" OR "high-poverty") AND ("college access") AND ("postsecondary outcome*" OR "post-secondary outcome*" OR "college outcome*")	121
High-poverty college success	("high poverty" OR "high-poverty") AND ("college success") AND ("postsecondary outcome*" OR "post-secondary outcome*" OR "college outcome*")	126

Note: Categories are not mutually exclusive. Studies were often returned in more than one search.

Source: Authors' search of ProQuest's Education Database between June and December 2018.

In addition to searching ProQuest's Education Database, the two principal investigators also examined the What Works Clearinghouse (WWC) list of intervention reports and reviews of individual studies in the "Path to Graduation" and "Postsecondary" topic areas. In compiling its intervention reports, the WWC carries out a full literature search for all studies examining a particular intervention. The principal investigators first created a list of all the studies included in each intervention report or study review that reported on postsecondary outcomes. Then, one principal investigator screened these studies using the same inclusion criteria used on the studies found in ProQuest's Education Database.

After this initial screening, the study team compiled the list of studies that met the inclusion criteria, and researchers screened each study for design criteria. Only researchers with advanced degrees in quantitative research methods and design or who were WWC-certified carried out the second-stage screening. At this stage, researchers excluded studies that used qualitative designs; used quantitative descriptive designs (that is, did not perform statistical tests of the differences between groups); used

quantitative designs with no comparison group or regression discontinuity designs;[14] or had already been reviewed by the WWC (for example, those found on the WWC website). Studies that had already been reviewed by the WWC were included in this review if they met the inclusion criteria, but they were not reviewed again using the WWC standards. Studies that had not yet been reviewed by the WWC were subject to a WWC review. At this stage, researchers documented the basic research design and any reasons for exclusion in an online spreadsheet.

Once the list of studies had been narrowed to those that examined nonacademic interventions with the relevant population and outcomes, had designs eligible to be reviewed using WWC standards, and had not already been reviewed by the WWC, the study team carried out a WWC review of each eligible study, including author queries when needed and peer review of the ratings. The researchers involved in this step were all certified WWC reviewers under version 3.0 of the WWC standards.

The study team found a total of six studies in ProQuest's Education Database that met the criteria for inclusion in the report and had not been reviewed by the WWC. For the WWC reviews by Regional Educational Laboratory Appalachia (REL AP), each of these six studies was assigned to two certified reviewers. Each reviewer completed a version 3.0 WWC Study Review Guide provided by the WWC. In this form, reviewers documented the study design (randomized controlled trial, quasi-experimental design, or cluster randomized controlled trial), outcomes, potential confounds, attrition, baseline equivalence, and an overall rating (see box 1 in the body of the report). For studies that met standards with or without reservations, reviewers also noted additional study details, such as the setting, sample sizes, and comparison condition. After both completed the form, a master reviewer compared the two responses. In cases of discrepancy, the two reviewers met with the master reviewer to confer. The master reviewer then completed a master review form documenting the final ratings for the study.

Of the six studies eligible for the REL AP WWC review, four had insufficient information to make an overall rating. For these studies, the research team completed author queries. Researchers contacted the author of each study, outlining the specific information that was missing and necessary to complete the review. Authors had three weeks to respond to a query, but researchers extended this deadline because few authors responded. Researchers continued to reach out to authors for four months to attempt to obtain the information necessary to complete a WWC review. For a variety of reasons, none of the authors was able to supply the necessary information. Three never replied to the queries, and one explained he no longer had access to the original data used for the study. Most of the studies in this category (three of the four) were Ph.D. dissertations, and authors were rarely still at the institution where the study was carried out; most were no longer in education research.

The two studies with sufficient information to complete a WWC review were sent to the WWC, along with the master review form, to be double-coded in an official WWC review. The WWC gave feedback on the master Study Review Guide, and the researchers made adjustments as needed. Of these two studies, one did not meet WWC standards and one met WWC standards without reservations but did not include the

[14] *Regression discontinuity designs were not eligible to meet WWC standards under the version 3.0 standards. Thus, studies using this approach were excluded from this review.*

information necessary to calculate effect sizes. See appendix D for the full list of studies that examined nonacademic interventions with the relevant population and outcomes.

After gathering the full set of interventions that met the screening criteria and completing the WWC reviews, researchers determined that several interventions that met the student-age criterion (for example, first-year experience courses and Linked Learning communities) were nonetheless not relevant for this review. The initial reason for extending the age range in the screening criteria to 19 was to include programs focusing on over-age high school students and those taking place in the summer after high school. However, interventions implemented entirely with postsecondary students already enrolled in postsecondary institutions are impossible for K–12 stakeholders to implement in their schools. Thus, although these studies technically met the initial inclusion criteria, they were excluded from the review.

Finally, using the list of studies that met all inclusion criteria, the principal investigators identified nonacademic interventions that had at least one well-designed and well-implemented study that included the relevant population and found positive effects on at least one outcome of interest.

Appendix C: Screening form

This appendix includes a print version of the online form used in the literature screen.

Reviewer Information

Reviewer name: _____

Date: _____

Search term category (select one):

❍ Nonacademic

❍ Noncognitive

❍ Out-of-school time

❍ Social-emotional

❍ Rural college access

❍ Rural college success

❍ High-poverty college access

❍ High-poverty college success

Study citation: _____

Study type

Is the study any of the following?

	Yes	No	Don't know
Literature review	❍	❍	❍
Meta-analysis	❍	❍	❍
Study summarizing other research	❍	❍	❍
News article	❍	❍	❍
Promotional material for an intervention	❍	❍	❍

Participants

Do the study participants include K–12 students or students approximately ages 5–19 AT THE TIME OF THE INTERVENTION? (interventions that students receive the summer after high school graduation are also included)

Yes	No
❍	❍

Focus

Does the study focus on an INTERVENTION?

Yes	No
❍	❍

Does the study investigate a NONACADEMIC component, activity or factor?

Yes	No
❍	❍

Outcomes

Does the study include any of the following outcomes?

(Select all that apply)

❍ Postsecondary enrollment or matriculation

❍ Postsecondary educational persistence or retention

❍ Postsecondary academic performance

❍ Postsecondary completion or graduation

❍ None of these

Appendix D: Full list of studies that examined nonacademic interventions with the relevant population and outcomes

This appendix lists all studies that met the study's first six inclusion criteria:

1. Included an original research study
2. Tested the effects of an intervention or policy
3. Included participants who were ages 5 to 19 years at the time of the intervention, excluding any interventions that took place entirely with postsecondary students at postsecondary institutions
4. Examined an intervention with at least one nonacademic component
5. Measured one of the four outcomes of interest: postsecondary enrollment; postsecondary persistence; postsecondary academic performance; and postsecondary completion
6. Was published in English between January 1, 1998, and December 20, 2018 (the date the searches were completed)

Table D1 shows only those studies that met the above six criteria and also met What Works Clearinghouse (WWC) standards and showed statistically significant, positive results. Tables D2 through D3 display the studies that met the above inclusion criteria but were excluded from analysis in this report, by the reasons for their exclusion.

Table D1. Studies eligible for inclusion in the report by What Works Clearinghouse (WWC) rating

Full citation	Reviewed by the WWC?	Intervention
Met WWC Group Design Standards without Reservations		
Carrell, S., & Sacerdote, B. (2013). *Why do college going interventions work?* (NBER Working Paper 19031). Cambridge, MA: National Bureau of Economic Research.	Yes	College counseling
Castleman, B. L., Page, L. C., & Schooley, K. (2014). The forgotten summer: Does the offer of college counseling after high school mitigate summer melt among college-intending, low-income high school graduates? *Journal of Policy Analysis and Management, 33*(2), 320–344. https://eric.ed.gov/?id=EJ1027721	Yes	Summer counseling
Murphy, T. E., Gaughan, M., Hume, R., & Moore, S. G. (2010). College graduation rates for minority students in a selective technical university: Will participation in a summer bridge program contribute to success? *Educational Evaluation and Policy Analysis, 32*(1), 70–83.	Yes	Summer bridge program
Myers, D., Olsen, R., Seftor, N., Young, J., & Tuttle, C. (2004). *The impacts of regular Upward Bound: Results from the third follow-up data collection.* Princeton, NJ: Mathematica Policy Research.	Yes	Upward Bound
Page, Lindsay C., Castleman, Benjamin, & Meyer, Katharine. (2018, May 14). *Customized nudging to improve FAFSA completion and income verification.* Available at SSRN (formerly Social Science Research Network, online): https://ssrn.com/abstract=2854345 or http://dx.doi.org/10.2139/ssrn.2854345	Yes	FAFSA
Seftor, N. S., Mamun, A., & Schirm, A. (2009). *The impacts of regular Upward Bound on postsecondary outcomes 7–9 years after scheduled high school graduation.* Princeton, NJ: Mathematica Policy Research.	Yes	Upward Bound
Met WWC Group Design Standards with Reservations		
Bettinger, E., Long, B., Oreopoulos, P., & Sanbonmatsu, L. (2012). The role of application assistance and information in college decisions: Results from the H&R Block FAFSA experiment. *Quarterly Journal of Economics*, 127(3), 1205–1242.	Yes	FAFSA
Philp, J. D. (2015, October). *FLIGHT: Final evaluation report*. Columbia, SC: The Evaluation Group.	Yes	FLIGHT

Note: FAFSA is Free Application for Federal Student Aid. FLIGHT is Facilitating Long-Term Improvements in Graduation and Higher Education for Tomorrow. WWC is What Works Clearinghouse. Studies cited in the text are also included in the report references section. Studies that were screened but ultimately excluded and not mentioned specifically in the report are not in the report references section.

Source: Authors' search of ProQuest's Education Database and the WWC website between June and December 2018 and WWC ratings in January–June 2019. The WWC confirmed ratings in July–October 2019.

Table D2. Studies that met the initial eligibility criteria but were excluded from the report because they did not meet What Works Clearinghouse (WWC) standards

Full citation	Reviewed by the WWC?	Reason for not meeting WWC standards	Intervention
Allen, L. (2001). An evaluation of the University of Missouri–Rolla minority engineering program 7-week summer bridge program. Doctoral dissertation, University of Missouri–Columbia, Rolla, MO. Available from ProQuest Dissertations and Theses database (UMI No. 3012945).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Appenzeller, E. A. (1998). Transition to college: An assessment of the adjustment process for at-risk college students. Doctoral dissertation, Claremont Graduate University and San Diego State University, Claremont and San Diego, CA. Available from ProQuest Dissertations and Theses database (UMI No. 9821495).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Cabrera, N. L., Miner, D. D., & Milem, J. F. (2013). Can a summer bridge program impact first-year persistence and performance? A case study of the New Start Summer Program. *Research in Higher Education, 54*(5), 481–498.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Chism, L. P., Baker, S. S., Hansen, M. J., & Williams, G. (2008). Implementation of first-year seminars, the Summer Academy Bridge Program, and themed learning communities. *Metropolitan Universities, 19*(2), 8–17.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Citty, J. M. (2011). Factors that contribute to success in a first year engineering summer bridge program. Doctoral dissertation, University of Florida, Gainesville, FL.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Clayton, A. B. (2016). Assisting students in the college choice process: Three essays on the role and effectiveness of college advising professionals in public high schools. Doctoral dissertation, North Carolina State University, Raleigh, NC. https://repository.lib.ncsu.edu/handle/1840.16/11038	No	Baseline equivalence is necessary and not established	Counseling / advising
Constantine, J. M., Seftor, N. S., Sama Martin, E., Silva, T., & Myers, D. (2006). *Study of the effect of the Talent Search program on secondary and postsecondary outcomes in Florida, Indiana, and Texas: Final report from phase II of the national evaluation.* Princeton, NJ: Mathematica Policy Research. https://files.eric.ed.gov/fulltext/ED493358.pdf	Yes	WWC did not provide additional information on the reason	Talent Search
Doerr, H. M., Ärlebäck, J. B., & Costello Staniec, A. (2014). Design and effectiveness of modeling-based mathematics in a summer bridge program. *Journal of Engineering Education, 103*(1), 92–114.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Douglas, D., & Attewell, P. (2014). The bridge and the troll underneath: Summer bridge programs and degree completion. *American Journal of Education, 121*(1), 87–109.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Elwell, T., West, M., & Scott, L. (2011). *State-funded mentoring program performance mixed: Take Stock and Best Buddies do well*. Report No. 11-11. Tallahassee, FL: The Florida Legislature, Office of Program Policy Analysis & Government Accountability (OPPAGA).	Yes	Baseline equivalence is necessary and not established	FLIGHT

Table D2. Studies that met the initial eligibility criteria but were excluded from the report because they did not meet What Works Clearinghouse (WWC) standards (continued)

Full citation	Reviewed by the WWC?	Reason for not meeting WWC standards	Intervention
Evans, R. (1999). A comparison of success indicators for program and non-program participants in a community college summer bridge program for minority students. *Visions, 2*(2), 6–14.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Fester, R. (2010). Participation in precollege outreach programs and the transition from high school to college. Doctoral dissertation, University of Pennsylvania, Philadelphia. https://repository.upenn.edu/dissertations/AAI3429166/	No	Baseline equivalence is necessary and not established	Summer counseling
Fletcher, S. L., Newell, D. C., Newton, L. D., & Anderson-Rowland, M. R. (2001, November). The WISE Summer Bridge Program: Assessing student attrition, retention, and program effectiveness. Paper presented at the Frontiers in Education conference, Reno, NV.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Fosnacht, K. J. (2011). Access is not enough: How pre-college programs impact students after college entry. Doctoral dissertation, UCLA, Los Angeles. https://search.proquest.com/openview/989db74c502c1a4df98309bf1843439a/1?pq-origsite=gscholar&cbl=18750&diss=y	No	Baseline equivalence is necessary and not established	Summer counseling
Gancarz, C. P., Lowry, A. R., McIntyre, C. W., & Moss, R. W. (1998). Increasing enrollment by preparing underachievers for college. *Journal of College Admission, 160*, 6–13.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Grisé, P., Chen, Y-S, Drennan, A., & Fisher, T. H. (2007). *Mentoring in Florida, 2004–2005*. Report prepared for the Florida Mentoring Partnership. Tallahassee, FL: Florida State University.	Yes	Baseline equivalence is necessary and not established	FLIGHT
Gutierrez, T. E. (2007). The value of pre-freshman support systems: The impact of a summer bridge program at UNM. Doctoral dissertation, University of New Mexico, Albuquerque, NM. Available from ProQuest Dissertations and Theses database (UMI No. 3273438).	Yes	Baseline equivalence is necessary and not established	Developmental summer bridge program
Hall, E. R. (2008). Minority student retention program: Student achievement and success program at Anne Arundel Community College. Doctoral dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 3342828).	Yes	Baseline equivalence is necessary and not established	Developmental summer bridge program
Hamilton, J. M. (1994). First academic year progress of summer 1993 high-risk students in the Fresh Start program as compared to similar students who entered Gainesville College during the fall of 1990. Gainesville, GA: Gainesville College, Office of Planning and Institutional Research.	Yes	Measures of effectiveness cannot be attributed solely to intervention	Developmental summer bridge program
Hanks, C. L., Wartes, D., Levine, R., Gonzalez, R., Fowell, S., & Owens, G. (2007). Introducing the geosciences to Alaska Natives via the Rural Alaska Honors Institute (RAHI). *Journal of Geoscience Education, 55*(6), 507–513. Retrieved October 10, 2019, from http://www.nagt.org/files/nagt/jge/abstracts/introducing_geosciences_alaska.pdf	No	Baseline equivalence is necessary and not established	Summer bridge program

Table D2. Studies that met the initial eligibility criteria but were excluded from the report because they did not meet What Works Clearinghouse (WWC) standards (continued)

Full citation	Reviewed by the WWC?	Reason for not meeting WWC standards	Intervention
Haugen, D. E. (2012). College transition programs for community college students. Doctoral dissertation, University of Nevada, Reno, NV. Available from ProQuest Dissertations and Theses database (UMI No. 3511972).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Haught, P. A. (1996, April). Impact of intervention on disadvantaged first year students who plan to major in health sciences. Paper presented at the annual meeting of the American Educational Research Association, New York.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Herndon, L. G. (2007). Evaluation of the summer bridges minority scholarship program at a community college. Doctoral dissertation, Nova Southeastern University, Broward County, FL. Available from ProQuest Dissertations and Theses database (UMI No. 3292594).	Yes	Baseline equivalence is necessary and not established	Developmental summer bridge program
Homel, S. M. (2013). Act 101 summer bridge program: An assessment of student success following one-year participation. Doctoral dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 3564815).	Yes	Baseline equivalence is necessary and not established	Developmental summer bridge program
Hudspeth, M. C., & Aldrich, J. W. (2000, June). Summer bridge to engineering. Paper presented at the American Society for Engineering Education annual conference and exposition, Washington, DC.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Johnson, A. W. (1998). *An evaluation of the long-term impacts of the Sponsor-a-Scholar program on student achievement.* Princeton, NJ: Mathematica Policy Research.	Yes	Baseline equivalence is necessary and not established	Sponsor-A-Scholar
Klein, B., & Wright, L. M. (2009). Making pre-algebra meaningful: It starts with faculty inquiry. *New Directions for Community Colleges, 145*, 67–77.	Yes	Baseline equivalence is necessary and not established	Developmental summer bridge program
Logan, C. R., Salisbury-Glennon, J., & Spence, L. D. (2000). The Learning Edge Academic Program: Toward a community of learners. *Journal of The First-Year Experience & Students in Transition, 12*(1), 77–104.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Malone, M. S. (2014). Persistence and success: Summer bridge program effectiveness. Doctoral dissertation, Johnson & Wales University, Providence, RI. Available from ProQuest Dissertations and Theses database (UMI No. 3621984).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Maples, S. C. (2002). Academic achievement and retention rate of students who did and did not participate in a university summer bridge program. Doctoral dissertation, University of Nevada, Reno, NV. Available from ProQuest Dissertations and Theses database (UMI No. 3060379).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Martinez, M. C. G. (2000). The effect of the College Exploration Early Intervention summer program on performance and retention of Hispanic disadvantaged first-year students in higher education. Doctoral dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 9987240).	Yes	Baseline equivalence is necessary and not established	Developmental summer bridge program

Table D2. Studies that met the initial eligibility criteria but were excluded from the report because they did not meet What Works Clearinghouse (WWC) standards (continued)

Full citation	Reviewed by the WWC?	Reason for not meeting WWC standards	Intervention
Maye, S. J. (1997). Evaluation of the effectiveness of the Hampton University summer bridge program. Doctoral dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 9733873).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
McEvoy, S. (2012). The study of an intervention summer bridge program learning community: Remediation, retention, and graduation. Doctoral dissertation, Claremont Graduate University, Claremont, CA. Available from ProQuest Dissertations and Theses database (UMI No. 3503243).	Yes	Baseline equivalence is necessary and not established	Developmental summer bridge program
McMinn, H. M. (2004). Assessment of the college preparatory program: A prediction model and retention study, 1995–2003. Doctoral dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 3151305).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Ohland, M., Zhang, G., Foreman, F., & Haynes, F. (2000, October). The Engineering Concepts Institute: The foundation of a comprehensive minority student development program at the FAMU-FSU College of Engineering. Paper presented at the American Society for Engineering Education/Institute of Electrical and Electronics Engineers Frontiers in Education expo, Kansas City, MO.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Outlaw, J. S. (2008). Academic outcomes of academic success programs. Doctoral dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 3319077).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Pike, G. R., Hansen, M. J., & Childress, J. E. (2014). The influence of students' pre-college characteristics, high school experiences, college expectations, and initial enrollment characteristics on degree attainment. *Journal of College Student Retention, 16*(1), 1–23.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Prather, E. N. (1996). Better than the SAT: A study of the effectiveness of an extended bridge program on the academic success of minority first-year engineering students. Doctoral dissertation, University of Cincinnati, Cincinnati, OH. Available from ProQuest Dissertations and Theses database (UMI No. 9622371).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Robert, E. R., & Thomson, G. (1994). Learning assistance and the success of underrepresented students at Berkeley. *Journal of Developmental Education, 17*(3), 4–6, 8, 10, 12, 14.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Spurling, S. (2000). The effect of process interventions and matriculation services on student persistence and success. *Journal of Applied Research in the Community College, 8*(1), 31–41.	Yes	Baseline equivalence is necessary and not established	Summer counseling
Stephan, J. L. (2010). Closing college enrollment gaps: Whether and how high schools can help. Doctoral dissertation, Northwestern University, Evanston, IL. https://search.proquest.com/docview/753512273	No	Baseline equivalence is necessary and not established	Other

Table D2. Studies that met the initial eligibility criteria but were excluded from the report because they did not meet What Works Clearinghouse (WWC) standards (continued)

Full citation	Reviewed by the WWC?	Reason for not meeting WWC standards	Intervention
Stewart, J. A. (2006). The effects of a pre-freshman college summer program on the academic achievement and retention of at-risk students. Doctoral dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 3208076).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Torres, J. D., & Cummings, T. (2000, June). Minority education in engineering, mathematics and science. Paper presented at American Society for Engineering Education annual conference and exposition, Washington, DC.	Yes	Measures of effectiveness cannot be attributed solely to the intervention	Summer bridge program
Vinson, T. L. (2008). The relationship that summer bridge and non-summer bridge participation, demographics, and high school academic performance have on first-year college students: Effects of grade point average and retention. Doctoral dissertation, Grambling State University, Grambling, LA. Available from ProQuest Dissertations and Theses database (UMI No. 3838048).	Yes	Baseline equivalence is necessary and not established	Developmental summer bridge program
Waller, T. O. (2009). A mixed method approach for assessing the adjustment of incoming first-year engineering students in a summer bridge program. Doctoral dissertation, Virginia Polytechnic Institute and State University, Blacksburg, VA.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Walpole, M., Simmerman, H., Mack, C., Mills, J. T., Scales, M., & Albano, D. (2008). Bridge to success: Insight into summer bridge program students' college transition. *Journal of The First-Year Experience & Students in Transition, 20*(1), 11–30.	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Wheatland, J. A. (2000). The relationship between attendance at a summer bridge program and academic performance and retention status of first-time freshman science, engineering, and mathematics students at Morgan State University, an historically Black university. Doctoral dissertation. Available from ProQuest Dissertations and Theses database (UMI No. 9997415).	Yes	Baseline equivalence is necessary and not established	Summer bridge program
Wolf-Wendel, L. E., Tuttle, K., & Keller-Wolff, C. M. (1999). Assessment of a freshman summer transition program in an open-admissions institution. *Journal of The First-Year Experience & Students in Transition, 11*(2), 7–32.	Yes	Baseline equivalence is necessary and not established	Summer bridge program

Note: WWC is What Works Clearinghouse. FLIGHT is Facilitating Long-Term Improvements in Graduation and Higher Education for Tomorrow. Studies cited in the text are also included in the report references section. Studies that were screened but ultimately excluded and not mentioned specifically in the report are not in the report references section.

Source: Authors' search of ProQuest's Education Database and the WWC website between June and December 2018 and WWC ratings in January–June 2019. The WWC confirmed ratings in July–October 2019.

Table D3. Studies that met the initial eligibility criteria but were excluded from the report because they did not have statistically significant positive effects on the outcomes of interest

Full citation	Reviewed by the WWC?	WWC rating	Intervention
Barnett, E. A., Bork, R. H., Mayer, A. K., Pretlow, J., Wathington, H. D., & Weiss, M. J. (2012). *Bridging the gap: An impact study of eight developmental summer bridge programs in Texas.* New York: Columbia University, Teachers College, National Center for Postsecondary Research. https://files.eric.ed.gov/fulltext/ED539188.pdf	Yes	Meets WWC standards without reservations	Developmental summer bridge program
Bergin, D. A., Cooks, H. C., & Bergin, C. C. (2007). Effects of a college access program for youth underrepresented in higher education: A randomized experiment. *Research in Higher Education, 48*(6), 727–750.	Yes	Meets WWC standards without reservations	EXCEL
Castleman, B. L., Arnold, K., & Wartman, K. L. (2012). Stemming the tide of summer melt: An experimental study of the effects of post–high school summer intervention on low-income students' college enrollment. *Journal of Research on Educational Effectiveness*, 5(1), 1–17. https://eric.ed.gov/?id=EJ952097	Yes	Meets WWC standards without reservations	Summer counseling
Castleman, B. L., Owen, L., & Page, L. C. (2015). *Report to College Bound St. Louis on the implementation and impact of the 2014 summer melt intervention utilizing Bridgit.* St. Louis, MO: College Bound.	Yes	Meets WWC standards without reservations	Summer counseling
Castleman, B. L., Owen, L., & Page, L. C. (2015). Stay late or start early? Experimental evidence on the benefits of college matriculation support from high schools versus colleges. *Economics of Education Review, 47*, 168–179.	Yes	Meets WWC standards without reservations	Summer counseling
Castleman, B. L., & Page, L. C. (2015). Summer nudging: Can personalized text messages and peer mentor outreach increase college going among low-income high school graduates? *Journal of Economic Behavior and Organization*, 115, 144–160. https://eric.ed.gov/?id=EJ1124459	Yes	Meets WWC standards without reservations	Summer counseling
Nathan, A. B. (2013). Does Upward Bound have an effect on student educational outcomes? A reanalysis of the Horizons randomized controlled trial study. Doctoral dissertation, University of Wisconsin–Madison, Madison, WI. https://search.proquest.com/docview/1355756348	No	Meets WWC standards without reservations: Does not report adequate information to compute effect sizes	Upward Bound
Rodriguez-Planas, N. (2010). *Longer-term impacts of mentoring, educational services, and incentives to learn: Evidence from a randomized trial in the United States.* Barcelona Economics Working Paper Series. Bellaterra, Spain: Autonomous University of Barcelona.	Yes	Meets WWC standards without reservations	Quantum Opportunity program
Schirm, A., Stuart, E., & McKie, A. (2006). *The Quantum Opportunity Program demonstration: Final impacts.* Washington, DC: Mathematica Policy Research, Inc.	Yes	Meets WWC standards without reservations	Quantum Opportunity program

Note: WWC is What Works Clearinghouse. Studies cited in the text are also included in the report references section. Studies that were screened but ultimately excluded and not mentioned specifically in the report are not in the report references section.

Source: Authors' search of ProQuest's Education Database and WWC website between June and December 2018 and WWC ratings in January–June 2019. The WWC confirmed ratings in July–October 2019.

Appendix E: Full description of the interventions discussed in the report

This appendix describes the studies highlighted in the report. It includes the full citation for each study, the What Works Clearinghouse (WWC) rating, a description of the intervention as implemented in the study, the sample, and the reported outcomes.

Table E1. College counseling

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Carrell, S. E., & Sacerdote, B. (2013). *Why do college going interventions work?* (NBER Working Paper No. 19031, issued May 2013, revised April 2015). *American Economic Journal: Applied Economics, 9*(3), 124–151. https://www.nber.org/papers/w19031	Meets WWC group design standards without reservations	College counseling interventions provide high school seniors with mentoring and assistance with completing college applications. In this study, college undergraduates met with high school seniors to help them navigate the steps involved in applying to college, provided feedback on their application essays, and helped them fill out paperwork, including financial aid applications. The intervention also included financial support with application fees and a $100 incentive for completing the application process.	Randomized controlled trial in which eligible students applying for the college counseling program and consenting to participate in the study were randomly assigned to the treatment and comparison groups. The comparison group could use any services the colleges provided except for college counseling.	The sample included 1,150 high school students in New Hampshire.	Postsecondary enrollment • Positive and statistically significant • Size: +5 improvement index Postsecondary persistence • Indeterminate effects

WWC is What Works Clearinghouse.
Source: Carrell & Sacerdote (2013) and WWC (2015).

Table E2. Developmental summer bridge program

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Barnett, E. A., Bork, R. H., Mayer, A. K., Pretlow, J., Wathington, H. D., & Weiss, M. J. (2012). *Bridging the gap: An impact study of eight developmental summer bridge programs in Texas.* New York: Columbia University, Teachers College, National Center for Postsecondary Research	Meets WWC group design standards without reservations	Offered in summer 2009, students received instruction in one academic area (math, reading, or writing); academic support; a college knowledge component; and a $400 stipend.	Randomized controlled trial in which eligible students applying for a developmental summer bridge program and consenting to participate in the study were randomly assigned to the treatment and comparison groups. The comparison group could use any services the colleges provided except for summer bridge programs.	The sample included 793 treatment and 525 comparison students. Students were primarily recent high school graduates enrolling at two open-admissions and six community colleges in Texas.	Credit accumulation (postsecondary persistence) • Indeterminate effects Academic performance • Indeterminate effects

WWC is What Works Clearinghouse.
Source: Barnett et al. (2012) and WWC (2015).

Table E3. EXCEL

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Bergin, D. A., Cooks, H. C., & Bergin, C. C. (2007). Effects of a college access program for youth underrepresented in higher education: A randomized experiment. *Research in Higher Education, 48*(6), 727–750.	Meets WWC group design standards without reservations	EXCEL is a "scholarship incentive and support program" for grade 8 students, sponsored by a midwestern university. It provides parental-involvement programming, weekend enrichment seminars for students to build their nonacademic skills and cultural knowledge, and scholarships to the sponsoring university.	Randomized controlled trial where students were randomly assigned to the program (EXCEL) or comparison group, stratified by prior achievement level, gender, and ethnicity.	The sample included 83 students in grade 8: 43 in the treatment and 40 in the comparison group. The sample included students from low-income households, but the authors did not disaggregate results for this group.	Postsecondary enrollment • Indeterminate effects

WWC is What Works Clearinghouse.
Source: Bergin et al. (2007) and WWC (2009).

Table E4. Facilitating Long-Term Improvements in Graduation and Higher Education for Tomorrow (FLIGHT)

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Philp, J. D. (2015, October). *FLIGHT: Final evaluation report*. Columbia, SC: The Evaluation Group.	Meets WWC group design standards with reservations	FLIGHT offered a scholarship and academic services as well as nonacademic components, including one-on-one mentoring, case management, and a report of student performance shared with parents, teachers, and guidance counselors.	Randomized controlled trial in which students were randomly assigned to the treatment and comparison groups within county and grade.	315 students in grades 7, 9, and 11 in four Florida school districts	College access and enrollment (postsecondary enrollment) • Positive and statistically significant • Size: +39 improvement index

WWC is What Works Clearinghouse.
Note: One student who had not been randomly assigned was included in the analysis, and the analysis did not account for the probability of assignment, compromising the randomized controlled trial.
Source: Philp (2015) and WWC (2019b).

Table E5. Free Application for Federal Student Aid (FAFSA) interventions

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Bettinger, E., Long, B., Oreopoulos, P., & Sanbonmatsu, L. (2012). The role of application assistance and information in college decisions: Results from the H&R Block FAFSA experiment. *Quarterly Journal of Economics, 127*(3), 1205–1242.	Meets WWC group design standards with reservations	Two intervention conditions occurred immediately after a family filed its taxes at a local H&R Block tax office. The first intervention group (FAFSA) received help completing and filing the FAFSA and identifying potential financial aid amounts based on tax information and tuition estimates for four local colleges. The second intervention group (information-only) received only potential financial aid and tuition estimates for four local colleges, and no assistance in completing the FAFSA. The control group received neither the FAFSA help nor information on financial aid or tuition estimates. All three groups received a brochure with information on the importance of college and general information on college costs and financial aid.	Randomized controlled trial in which participants were randomly assigned to one of three groups: two intervention groups (FAFSA and information-only) and one control (no-intervention) group.	The sample for the FAFSA intervention included 390 treatment and 398 comparison group participants who were 17-year-old high school seniors or recent high school graduates dependent on their parents, all of whose families had filed taxes at H&R Block tax offices in Charlotte, North Carolina, and throughout Ohio.	Postsecondary enrollment during the first year following experiment (postsecondary enrollment) • Positive and statistically significant • Size: +8 improvement index Retention in college for two consecutive years following experiment (postsecondary persistence) • Positive and statistically significant • Size: +9 improvement index
Page, Lindsay C., Castleman, Benjamin, & Meyer, Katharine. (2018, May 14). *Customized nudging to FAFSA completion and income verification.* Available at SSRN (formerly Social Science Research Network, online): https://ssrn.com/abstract=2854345 or http://dx.doi.org/10.2139/ssrn.2854345	Meets WWC group design standards without reservations	Weekly, personalized text messages related to FAFSA and financial aid. Included general and customized messages based on students' FAFSA-filling status.	School-level randomized controlled trial that randomly assigned 39 schools to the FAFSA texting intervention and 27 to business as usual.	The sample included 39 treatment and 27 comparison schools across eight school districts in the area of Houston and Austin, Texas.	Full-time postsecondary enrollment (postsecondary enrollment) • Positive and statistically significant • Size: +7 improvement index

WWC is What Works Clearinghouse.
Source: Bettinger et al. (2012); Page et al. (2018); WWC (2013, 2019a).

Table E6. Quantum Opportunity Program (QOP)

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Schirm, A., Stuart, E., & McKie, A. (2006). *The Quantum Opportunity Program demonstration: Final impacts.* Washington, DC: Mathematica Policy Research, Inc.	Meets WWC group design standards without reservations	The Quantum Opportunity Program (QOP) provided mentoring and case management, life skills and employment-readiness courses, a community service component, and financial incentives to grade 9 students. Students could be enrolled in the program for up to five years.	Randomized controlled trial in which students were randomly assigned to either QOP or a business-as-usual control group. The students included in the study were randomly selected from a pool of all eligible grade 9 students in each of the study schools.	The study included 1,069 (580 in treatment) students in grade 9 in Cleveland, Ohio; Fort Worth, Texas; Houston, Texas; Memphis, Tennessee; Philadelphia, Pennsylvania; Washington, DC; and Yakima, Washington.	Postsecondary enrollment • Indeterminate effects Earned a degree/ certificate (postsecondary completion) • Indeterminate effects
Rodriguez-Planas, N. (2010). *Longer-term impacts of mentoring, educational services, and incentives to learn: Evidence from a randomized trial in the United States.* Barcelona Economics Working Paper Series. Bellaterra, Spain: Autonomous University of Barcelona.	Meets WWC group design standards without reservations	This follow-up study of the QOP examined the same intervention as the Schirm, Stuart, and McKie (2006) study, following up with students at the end of the program and two and five years after the end of the program.	Same as above	Same as above, with three follow-up periods: at age 19 (the end of the program), 21 (two years after the program), and 24 (five years after the program	Postsecondary enrollment • Indeterminate effects Earned a degree/ certificate (postsecondary completion) • Indeterminate effects

WWC is What Works Clearinghouse.
Source: Rodriguez-Planas (2010); Schirm et al. (2006); WWC (2016b, 2017).

Table E7. Summer bridge program

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Murphy, T. E., Gaughan, M., Hume, R., & Moore, S. G. (2010). College graduation rates for minority students in a selective technical university: Will participation in a summer bridge program contribute to success? *Educational Evaluation and Policy Analysis, 32*(1), 70–83.	Meets WWC group design standards with reservations	Five-week program that included a nonacademic peer-mentoring component.	Quasi-experimental design with a treatment group of students who enrolled in the summer bridge program and a comparison group of students who chose not to participate.	The sample included 770 treatment and 1,452 comparison group freshmen at a technical university in the southeastern United States.	Graduation rates (postsecondary completion) • Positive and statistically significant • Size: +4 improvement index

WWC is What Works Clearinghouse.
Source: Murphy, et al. (2010); WWC (2007, 2009a).

Table E8. Summer counseling

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Castleman, B. L., Arnold, K., & Wartman, K. L. (2012). Stemming the tide of summer melt: An experimental study of the effects of post–high school summer intervention on low-income students' college enrollment. *Journal of Research on Educational Effectiveness, 5*(1), 1–17.	Meets WWC group design standards without reservations	Counseling services supported students in obtaining financial aid and addressing socioemotional concerns.	Randomized controlled trial in which students were randomly assigned to receive summer counseling or no counseling.	The sample included 80 treatment and 82 comparison group graduating seniors in seven high schools in Rhode Island in 2008.	Percentage of students who enrolled in college in the fall after high school graduation (postsecondary enrollment) • Indeterminate effects

Table E8. Summer counseling (continued)

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Castleman, B. L., Owen, L., & Page, L. C. (2015). *Report to College Bound St. Louis on the implementation and impact of the 2014 summer melt intervention utilizing Bridgit.* St. Louis, MO: College Bound.	Meets WWC group design standards without reservations	The Bridgit platform—a schoolwide intervention tracking students' progress toward college enrollment—was implemented in summer 2014. Based on student-created profiles indicating college attendance plans, a set of prioritized pre-enrollment steps was created by the system. A counselor was assigned to each student to monitor student progress and follow up via text message or phone as needed.	Randomized controlled trial in which researchers randomly assigned matched pairs of schools within districts to the intervention or comparison group. Researchers matched schools based on the prior year's college enrollment rate.	The sample included 10 schools from Shelby County in Tennessee and two schools from Ferguson-Florissant in Missouri. Half the schools from each district were assigned to the intervention group and half to the comparison group. At least 60 percent of students at each school were eligible for free or reduced-priced lunch.	College access and enrollment (postsecondary enrollment) • Indeterminate effects
Castleman, B. L., Owen, L., & Page, L. C. (2015). Stay late or start early? Experimental evidence on the benefits of college matriculation support from high schools versus colleges. *Economics of Education Review, 47*, 168–179.	Meets WWC group design standards without reservations	Twenty-one counselors—eight based at the University of New Mexico (UNM) and 14 based at high schools in Albuquerque Public Schools (APS)—reached out to students admitted to UNM to support completion of summer tasks needed for college enrollment in the fall. Counselors reached out via phone, email, and text message for five to six weeks over the summer.	Randomized controlled trial in which students were randomized within each high school into three groups: (1) intervention group assigned to a UNM counselor; (2) intervention group assigned to an APS counselor; and (3) comparison group.	Sample included two treatment groups, those assigned to a UNM counselor (N = 528) and those assigned to an APS counselor (N = 539), and one comparison group (N = 528).	College access and enrollment (postsecondary enrollment) • Indeterminate effects

Table E8. Summer counseling (continued)

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Castleman, B. L., & Page, L. C. (2015). Summer nudging: Can personalized text messages and peer mentor outreach increase college going among low-income high school graduates? *Journal of Economic Behavior and Organization,* 115, 144–160	Meets WWC group design standards without reservations	Study examined two summer counseling interventions: (a) automated text messaging and (b) peer mentoring. As part of the automated text-messaging intervention, students and their parents received 10 automated text messages about college enrollment tasks (for example, register for placement test and housing), along with a prompt to request help if needed. Students were linked to counselors or financial aid advisers for help. Students in the peer-mentoring group were contacted by peer mentors who assessed students' readiness for college in the fall and discussed topics such as plans for enrolling in the fall and FAFSA completion.	Randomized controlled trial where students were randomly assigned within their district to one of the two summer counseling interventions or a comparison group. In Philadelphia, students were randomly assigned to the peer-mentor intervention or the comparison group. In Dallas, students were randomly assigned within each counselor's cluster to the texting intervention or comparison group. In Boston, Lawrence, and Springfield, Massachusetts students were randomly assigned to the automated text-messaging, peer mentoring, or comparison group.	The sample included college-intending high school graduates across five sites. The peer-mentoring intervention had 934 students in the intervention group and 1,272 students in the comparison groups from Philadelphia, Boston, Lawrence, Massachusetts; and Springfield, Massachusetts. The texting intervention had 2,524 students in the intervention group and 2,535 students in the comparison group from Dallas, Boston, Lawrence, Massachusetts; and Springfield, Massachusetts.	College access and enrollment (postsecondary enrollment) • Indeterminate effects

Table E8. Summer counseling (continued)

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Castleman, B. L., Page, L. C., & Schooley, K. (2014). The forgotten summer: Does the offer of college counseling after high school mitigate summer melt among college-intending, low-income high school graduates? *Journal of Policy Analysis and Management, 33*(2), 320–344.	Meets WWC group design standards without reservations	Counseling services supported students in obtaining financial aid and addressing socioemotional concerns.	Randomized controlled trial in which eligible students were randomly assigned to receive summer counseling or no counseling.	The sample included 886 treatment and 1,487 comparison group students from the class of 2011 in Fulton County, Georgia, and Boston, Massachusetts.	Percentage of students who enrolled in college in the fall after high school graduation (postsecondary enrollment) • Positive and statistically significant • Size: +6 improvement index Percentage of students who remained enrolled in college after the spring of freshman year and after fall of sophomore year (postsecondary persistence) • Positive and statistically significant • Size: +6 improvement index

FAFSA is Free Application for Federal Student Aid. WWC is What Works Clearinghouse.
Source: Castleman et al. (2012); Castleman et al. (2015a, 2015b); Castleman & Page (2015); Castleman et al. (2014); and WWC (2018).

Table E9. Upward Bound

Study	WWC study rating	Intervention description	Study design	Sample	Outcomes
Myers, D., Olsen, R., Seftor, N., Young, J., & Tuttle, C. (2004). *The impacts of regular Upward Bound: Results from the third follow-up data collection*. Princeton, NJ: Mathematica Policy Research	Meets WWC group design standards without reservations	Upward Bound is a federal program that provides high school students from low-income households and who are first-generation college students with academic and nonacademic supports, such as cultural activities, college tours, and help with FAFSA completion, all with the aim of increasing postsecondary enrollment and completion.	Random assignment study. Applicants to set of nationally representative Upward Bound projects were randomly assigned to the intervention or a comparison group.	About 1,500 students were assigned to the intervention and about 1,300 students were assigned to the comparison group across 67 nationally representative Upward Bound projects.	College credits earned (postsecondary persistence) • Indeterminate effects
Seftor, N. S., Mamun, A., & Schirm, A. (2009). *The impacts of regular Upward Bound on postsecondary outcomes 7–9 years after scheduled high school graduation.* Princeton, NJ: Mathematica Policy Research.	Meets WWC group design standards without reservations	This follow-up study of Upward Bound examined the same intervention as the Myers et al. (2004) study, following up with students seven to nine years after high school graduation.	Same as above	Same as above	Postsecondary enrollment • Indeterminate effects College credits earned (postsecondary persistence) • Indeterminate effects Earning a bachelor's or associate degree (postsecondary completion) • Indeterminate effects

FAFSA is Free Application for Federal Student Aid. WWC is What Works Clearinghouse.
Source: Myers et al. (2004); Seftor et al. (2009); WWC (2009b, 2009c).