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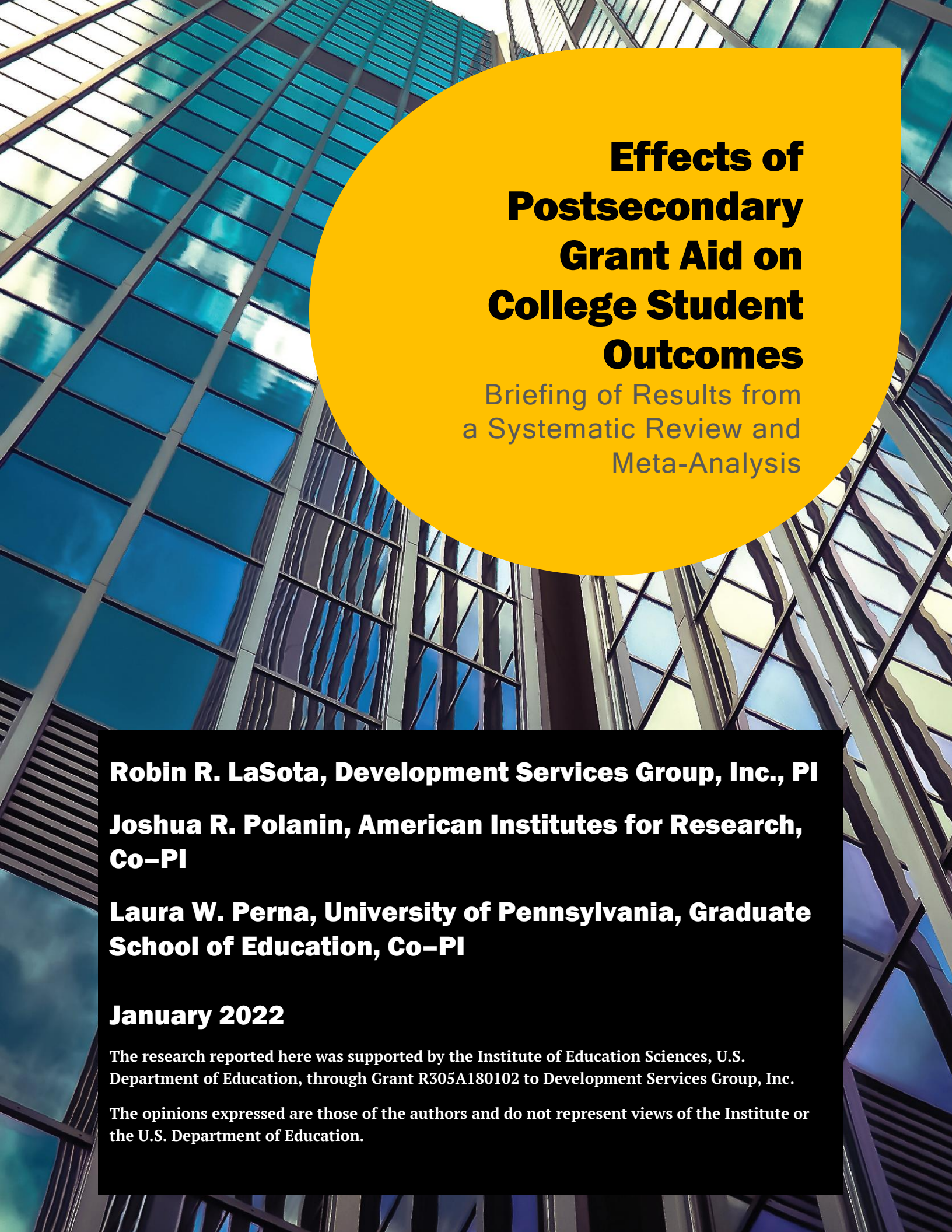

Effects of Postsecondary Grant Aid on College Student Outcomes

Briefing of Results from a Systematic Review and Meta-Analysis

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Effects of Grant Aid on College Student Outcomes

Considerable resources are allocated to college students in the form of grants.

The College Board (Ma, Pender, & Libassi, 2020)[1] reported that, in 2019–20, approximately 60% of the more than $184 billion in financial assistance awarded to undergraduates through programs sponsored by the federal government, state governments, colleges and universities, philanthropic organizations, and other entities was in the form of grants.

While many studies have examined the effects of individual grant aid programs, policymakers and program administrators need to know the conclusions they can draw across studies.

To address this knowledge need, the research team conducted a comprehensive systematic review and meta-analysis to identify what is known across studies about the effects of grants on college student outcomes from initial enrollment through postcollege employment. Our systematic searching and screening yielded 86 studies across six outcome domains (Table 1). The meta-analysis synthesized findings from 709 effect sizes from study samples representing 7,656,062 individuals.

- The first stage of the project involved completing a systematic search for research published between January 1, 2002, and January 15, 2020, and that met preestablished criteria for inclusion in the meta-analysis (Table 2).
- The second stage involved coding each identified study for the characteristics of the grant program evaluated, the effect sizes associated with the grant program in relation to each outcome, and the main design and methodological attributes of the study.
- The final stage used advanced meta-analysis modeling techniques to synthesize findings from studies that met our inclusion criteria. We also produced two Evidence Gap Maps to concisely illustrate the quantity and magnitude of effects from existing research (LaSota, Polanin, Perna, Rodgers, & Austin, under review).[2]

Grant aid has positive effects on college enrollment, credit accumulation, persistence, and degree completion.

Results of our meta-analysis show that grants have small but meaningful positive average effects on college enrollment, credit accumulation, persistence, and completion. The effects of grants on academic achievement and postcollege labor market outcomes were small and positive but not statistically significant.

Table 1. Effects of College Grant Aid Across Outcome Domains					
Outcome Domain	k (m)	ES (SE)	95% CI	*p*-value	I^2, τ^2
Enrollment	41 (153)	.07 (.03)	.01, .13	.024	95.43, 0.009
Academic Achievement	37 (109)	.03 (.03)	-.02, .09	.208	79.45, 0.004
Credit Accumulation	32 (171)	.12 (.03)	.05, .18	.001	91.64, 0.011
Persistence	39 (135)	.05 (.02)	.02, .08	.002	70.07, 0.002
Degree Completion	43 (119)	.01 (.01)	.01, .02	.007	70.21, 0.001
Postgraduation Employment	8 (22)	.05 (.03)	-.02, .12	.139	81.62, 0.002
Notes: k = number of studies, m = number of effect sizes, ES = average effect size, SE = standard error, 95% CI = confidence interval. I^2 = inconsistency index, τ^2 = tau-squared.					

Enrollment. About half (n=41; 48%) of included studies evaluated one or more enrollment outcomes. The meta-analyses show a statistically significant positive effect size (*g*) across studies (*g* = 0.07). This effect translates into a 2.8 percentage-point increase in enrollment rate for the intervention group compared with the comparison group of prospective students (46% versus 43%).

Credit Accumulation. Our meta-analysis of the 171 effects sizes in the 32 studies that examined credit accumulation revealed a moderate, statistically significant positive effect of grant aid (*g* = 0.12). We translated the average effect size into the expected number of credits earned in a single semester. Assuming an average individual from the comparison group earned 8.8 credits per semester, a student receiving grant aid would be expected to earn 9.02 credits per semester, a 1.6% increase.

Across all outcome domains, the positive effects of grant aid are generally comparable for studies of students at two-year and four-year institutions. The one exception was for effects on credit accumulation. We found that grant aid had a larger positive effect on credit accumulation for samples of students at two-year institutions and samples of students at two-year and four-year institutions combined than for students at four-year institutions.

Persistence. Of the 86 included studies, 39 studies reported 135 effect sizes for persistence outcomes. The meta-analysis revealed a statistically significant positive effect of grant aid on persistence (*g* = 0.05). Based on our estimation of control group outcome data, we estimated that 53.7% of comparison group students persisted semester to semester. Using this value, we estimate that 55.7% of intervention group students would persist semester to semester, a 2 percentage-point increase.

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Degree Completion. The 43 included studies of completion reported 119 effect sizes. The meta-analysis revealed a small, positive, statistically significant effect of grant aid ($g = 0.01$). Although an effect size of 0.01 is small, it represents a 0.4 percentage-point increase in graduation rate for the intervention group relative to the control group (33.4% versus 32.9%). Applied to the approximately 484,900 students across our studies with degree completion outcomes, a 0.4 percentage-point increase would translate to an additional 1,940 students earning degrees.

Results of the Systematic Search

Our systematic search of databases yielded 11,355 citations. We located an additional 247 citations through supplemental searches. De-duplication efforts reduced the number of citations to 9,919. We eliminated 8,500 citations after abstract screening and could not find 286 full-text reports, resulting in 1,188 reports for full-text screening. After applying our inclusion criteria, we found 97 reports linked to 86 studies. The 86 studies that met our inclusion criteria analyzed the effects of 62 individual grant aid programs. Within the 86 studies, we identified 107 intervention-comparison contrasts and 709 effect sizes (average per study = 8.24, median = 4).

Types of Grants Represented in the Meta-Analysis

Drawing on descriptions of the grants provided by study authors, we organized the 62 grant programs into the following seven categories: 1) federal grants, 2) national scholarships, 3) state-sponsored grants, 4) institutional grants, 5) student performance-based financial incentives, 6) emergency financial assistance, and 7) promise programs (Table 3).

Table 2. Criteria for Inclusion in the Systematic Review and Meta-Analysis on the Effects of College Aid Programs

Criteria	Requirements of Included Studies
Population	K–12 students meeting college aid program criteria, high school students, recent high school graduates, and adult learners.
Intervention	Grant aid to undergraduates that reduces college costs (does not have to be repaid). Aid may be awarded based on financial need and/or academic merit, place of residence, or other criteria. Aid includes grants, scholarships, "free tuition," tuition waivers, and subsidies. Tuition-price setting, athletic scholarships, individual tax savings accounts, work study, and aid programs requiring service are excluded. Aid programs that are bundled together and do not analyze the effect of one specified aid program are also excluded. Studies of the elimination or loss of grant aid meeting these intervention criteria were included and analyzed separately from the studies evaluating effects of the presence of grant aid.
Location	United States, U.S. territories, or U.S. tribal communities.
Study Design	Randomized controlled trials, regression discontinuity designs, difference-in-differences analyses, and quasi-experimental studies analyzed with student-level data are included. Studies reporting only institution-level analyses were excluded.
Comparison Groups	1) "no treatment" or inactive comparison group; or 2) cohorts of students before program promotion or availability; or 3) students who did not meet but were near the cutoff of program eligibility criteria.
Baseline Data Requirements for Non-RCTs	Option 1: For college GPA measures with HS GPA baseline (considered "direct pretest"), no additional baseline needed. For all other outcomes without "direct pretest" Options 2 and 3 apply. Option 2: Study provides measure of prior academic achievement and measure of socioeconomic status of students at baseline. Option 3: Study provides two or more measures of baseline demographics (e.g., gender, race, age).
Outcome	Initial college enrollment, academic achievement (e.g., GPA), college credit accumulation, persistence, degree completion, and postcollege labor market outcomes.
Publication Status	No restrictions, published or unpublished.

Table 3. Definitions of Grant Aid Programs Included in the Meta-Analysis	
Category	Description (See definition of Intervention in Table 2.)
Federal grants	Authorized and appropriated by the U.S. Congress to provide grant aid to college students with financial need (e.g., Pell Grant) or other designated populations. The latter include the John H. Chafee Independent Living Program for youth in foster care under age 19, Education and Training Vouchers for students formerly in foster care under the age of 26 (formerly age 22), and the Health Resources and Services Administration (HRSA) program, Scholarships for Disadvantaged Students, targeted to students enrolled in health sciences programs at 4-year institutions.
National scholarships	Grant aid funded by a national philanthropic or nonprofit organization and awarded to students who meet specified eligibility criteria (e.g., academic, noncognitive) to attend a college or university across the nation. Programs may include mentoring and other supports. Examples include Gates Millennium Scholarship, National Merit Scholarship, and Dell Scholars.
State-sponsored grants, based on merit criteria	Grant aid (covering some portion of the costs of attendance) to college students meeting academic criteria who enroll in in-state public and/or private postsecondary institutions. The amount of grant aid may vary by type of institution and level of academic merit of students, using established criteria (e.g., ACT/SAT total score, high school GPA of at least 2.5 or higher, top 10% HS class rank, exceptional achievement on state standardized tests). Some programs have tiered funding for students meeting higher thresholds of academic merit (e.g., higher than 3.0 HS GPA versus lower than 3.0 GPA).
State-sponsored grants, based on need criteria	Provide grant aid (covering some portion of the costs of attendance) to college students meeting need-based criteria who enroll in in-state public and/or private postsecondary institutions. Programs typically require students to complete the Federal Application for Financial Student Assistance (FAFSA) and define financial need based on a maximum threshold for Expected Family Contribution (EFC). These programs may require that federal Pell grant dollars be applied first to the students' costs of attendance.
State-sponsored grants, based on both merit and need criteria	Have both need-based and academic merit-based eligibility criteria.
Institutional grants	Grant aid awarded from the institution of attendance that has institution-developed eligibility requirements that may be based on financial need, academic or noncognitive merit (e.g., leadership), or a combination of need and nonneed criteria. This aid may only be used at the particular institution(s) awarding the grant. Note: Institutional athletic scholarships are excluded from this systematic review.
Student performance-based financial incentives	Grant aid awarded to students who achieve specified performance measures, including earning a minimum GPA, registering for a specified number of credits or specific courses, attending advising sessions, and participating in support programs (tutoring, advising, etc.). The duration of the student performance-based aid available varies by program (e.g., 1 term, 2 terms, up to 6 terms). Unlike most other aid programs, the monetary award is provided directly to the student and may be applied to costs of college attendance at the discretion of the student.
Emergency financial assistance	Grant aid to students to address a temporary financial emergency that poses a substantial barrier to continued enrollment (e.g., loss of job, unexpected increase in rent, car repairs). Some programs give the aid to the student directly; others make payments directly to providers (e.g., landlord, car repair shop).
Promise program	Grant aid available to students who attend particular high schools or live in a designated substate community and/or provide an early commitment (that is, before HS senior year) or clear message of availability of student grant aid for eligible students meeting program requirements.

Table 4. Translated Effect Sizes

Outcome Domain	Translation Metric	Control Group Base Rate (if applicable)	Translated Effect Size	% Point Difference (if applicable)
Enrollment – Combined	Percentage	43.4%	46.2%	+2.8
Enrollment – 2 year	Percentage	35.0%	35.6%	+0.6
Enrollment – 4 year	Percentage	31.0%	32.1%	+1.1
Enrollment – Any	Percentage	73.0%	77.0%	+4%
Academic Achievement	WWC Improvement Index	NA	+1.3	NA
Credit Accumulation	Number of Credits Earned Per Semester	8.88	10.02	13% increase, or +1.14 credits per term
Persistence	Percentage	53.7%	55.7%	+2
Degree Completion	Percentage	32.9%	33.4%	+0.5
Completion – 2 year	Percentage	20.0%	20.3%	+0.3
Completion – 4 year	Percentage	36.0%	36.6%	+0.6
Completion – Any	Percentage	31.0%	31.2%	+0.2
Postgraduation Employment	Percentage	76.0%	77.4%	+1.4

Note: To improve the interpretability of effect sizes, we calculated translated effect sizes. Translated effect sizes are based on estimated outcomes for the control group using information available in the included studies. Not all studies reported this information and these estimated outcomes may not be representative of outcomes for all students and institutions across the United States.

For three outcome domains—enrollment, persistence, and completion—we transformed the effect into proportions and calculated a percentage-point difference between intervention and control groups. The enrollment domain includes three enrollment outcomes: enrollment in any postsecondary institution, enrollment in a 2-year institution, and enrollment in a 4-year institution. Using information reported by studies included in this meta-analysis, we calculated an average comparison group enrollment rate for each of these three enrollment outcomes. We calculated a within study average at the contrast level, and then a weighted average by the total number of study participants across all studies. We estimated that 73% of the control groups enrolled in any postsecondary institution, 35% enrolled in a 2-year institution, and 31% enrolled in a 4-year institution. The weighted average college enrollment rate for the control group across all enrollment outcomes was 43.4%. Using a similar approach, from available information in included studies, we estimate that the weighted average persistence rate for the control group was 53.7%. Across studies of completion with available information, 31% of the control group earned any degree, 20% earned an associate degree, and 36% earned a bachelor's degree. The weighted average degree-completion rate for the control groups across all degree completion outcomes in our dataset was 32.9%.

For academic achievement, we converted the average effects into the WWC's Improvement Index metric (WWC, 2020),[3] which is the expected percentile gain in the typical student in the control distribution had received the intervention. For credit accumulation, the average control group rate derived across studies in our dataset that reported credits earned (within individual academic semesters/terms) is 8.88 credits per semester (SD 1.24). For the postgraduation employment outcome domain, we elected to use the Bureau of Labor Statistics base rate of 76% employment to translate this effect size (BLU, 2021).[4]

Larger Annual Grant Award Amounts Tend to Show Larger Positive Effects

With the goal of helping to inform program design, we examined whether effects vary based on the seven categories of grants (Table 3), as well as seven other program characteristics: 1) whether the aid may be applied at 2-year or 4-year institutions, 2) presence of need- or merit-based eligibility requirements, 3) number of years of residence or participation (for example, in a locale or school) in advance of college enrollment required to be eligible for the maximum grant award, 4) duration of aid measured as the maximum number of semesters students may receive the grant aid, 5) average award amount, 6) types of costs covered by the grant (e.g., tuition only), and 7) presence of nonfinancial supports.

Moderator analyses showed that the positive effects of grants did not vary based on grant program category or other program characteristics.

Although not statistically significant, a review of the pattern of coefficients suggests that the magnitude of the positive effects of grants increases with the average annual amount of the grant aid award. This pattern held for all outcome domains except postcollege labor market outcomes (where we identified only a small number of studies).

Gaps in the Evidence Base on the Effects of Grants

Using evidence gap mapping, we find that the strongest bodies of evidence are for state and institutional grants. Some of the strongest evidence is for the effect of institutional grants on enrollment ($g = 0.17$, $p \geq .05$) and persistence ($g = 0.15$, $p < .01$).[5] The state-sponsored grant category has the largest number of studies, with examinations of the effects of state-sponsored grants on degree completion representing the largest number of effects. Studies of federal grants have large effect sizes on enrollment, academic achievement, and credit accumulation, but relatively few studies that met our inclusion criteria examined these and other outcomes.

Few studies examined the effects of promise programs, national scholarships, and emergency financial assistance. While the number of promise programs has increased over the last decade, these programs are relatively new compared with other types of aid programs, and fewer studies of them have been conducted to date. Across all categories of grant programs, few studies evaluated effects on postcollege labor market outcomes.

With regard to eligibility requirements, a second evidence gap shows that included studies most commonly examined need-based programs, followed by merit-based programs. Need-based programs have relatively strong positive effects on enrollment ($g = 0.13$, $p \geq .05$), academic achievement ($g = 0.08$, $p \geq .05$), and credit accumulation ($g = 0.13$, $p < .05$). Merit-based programs have relatively strong positive effects on enrollment ($g = 0.13$, $p < .05$) and credit accumulation ($g = 0.10$, $p < .01$). Our evidence gap map shows fewer studies examining programs that require both need and merit or that require neither need nor merit. None of the

included studies examined the effects of programs that require neither need nor merit on academic achievement, credit accumulation, or labor market outcomes.

Implications for Financial Aid Policy and Practice

Findings from this systematic review and meta-analysis demonstrate that grant aid has positive effects on college enrollment, credit accumulation, persistence, and completion. The research base, and thus our conclusions about the positive effects, is particularly strong for institutional and state grants. Although the positive effects may be small in magnitude, even small improvements can translate into improved outcomes for large numbers of students. Further suggesting the benefits of allocating resources to grant aid, available evidence suggests that the positive effects of grants increase with the amount of the award.

Our analyses suggest that grants improve college student outcomes regardless of their eligibility requirements and other characteristics. While this finding may indicate that program design does not matter, it is important to remember that eligibility and other requirements have important consequences for equity that are not teased out in our analyses. For example, we find that both need-based and merit-based grants are associated with improved college student outcomes. But need-based grants are awarded to students with financial need—and may thus help improve equity, whereas merit-based grants are awarded to students who meet specified academic requirements—and thus benefit students who, on average, come from more affluent families and attend better resourced K-12 schools.

Even with the evidence presented in this brief, there is more we need to know to better inform financial aid policy and practice. We encourage financial aid policymakers and practitioners to work with researchers to further advance research-based knowledge of the effects of grant programs with different characteristics on outcomes of interest for different groups of students.

Implications for Future Research

1. Future researchers should consistently and completely report study characteristics and other information needed for meta-analyses. Our meta-analysis is limited by the level of reporting in individual studies. Even with our best efforts to estimate baseline information and obtain needed unpublished information from study authors, we had to exclude studies because of missing information. We also found inconsistent reporting of key descriptive information about the studied grant program (e.g., dollar amount of grants received). Some studies did not describe characteristics of the student sample, including students' prior academic achievement, socioeconomic status, racial/ethnic identity, and age. Consistent reporting of these characteristics will improve the conclusions that may be drawn in future meta-analyses.

2. We also encourage future researchers to more closely consider how and why their approach aligns with the approaches used in prior research. For example, within each of the outcome domains, we found many distinct outcome measures. Authors also varied in the number and type of student characteristics they included as control variables. The mean number of covariates in the included studies was 9.8 (median=9) but ranged from 1 to 44. These and other variations challenge efforts to estimate the magnitude of the effects of grants across studies.

3. Future meta-analyses should identify how the effects of grant aid on student outcomes vary based on the demographic characteristics of students who were eligible for, or received, grant aid. Some of the studies that met our inclusion criteria reported subgroup analyses by gender (n=24), race/ethnic groups (n=24), socioeconomic status (n=22), and academic achievement (n=18). Smaller numbers of studies analyzed differences in effects for other groups, including students who were and were not the first in their families to attend college. Determining the effects of grant aid on college outcomes for students from low-income families and other underserved groups is essential, given the many benefits that come with higher education and persistent gaps across groups in college outcomes.

4. The evidence gap maps demonstrate that we know more about the effects of some types of grants than others. Included studies more frequently examined the effects of grants on enrollment and completion, and less frequently examined the effects on postcollege labor market outcomes. More studies have examined the effects of state and institutional grants, while fewer studies have examined the effects of national scholarships, federal targeted grant aid, and promise programs. The relatively low number of studies examining promise programs is not surprising given their relatively recent emergence (Perna & Leigh, 2018).[6] Emergency financial aid programs are growing, particularly through the COVID19 pandemic, and our review suggests that little is known about the effects of these programs. More is known about the effects of programs that award grants based on need or merit, whereas fewer studies have examined the effects of programs that consider both need and merit or neither need nor merit.

5. In addition to further exploring the effects of different categories of grants, future research should also consider the effects of grants on additional outcomes. We found few studies that analyzed the effects of grant aid on labor market outcomes. Also of potential interest to financial aid administrators and policymakers, but infrequently examined, are the effects of grant aid on student loan debt, net price, and unmet need.

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