Supplemental Material

CBE—Life Sciences Education

Goodwin *et al*.

SUPPLEMENTAL INFORMATION

Who is represented in the research on undergraduate research experiences in the natural sciences? A review of literature.

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S1. Copy of article coding rubric, provided to student coders

Guide for finding information: Where this information is often included

- Introduction- This section will provide background information on the study. While this may not be directly related to the information for our research question, some of the necessary information for completing the form could be found in this section (e.g., details on the type of research experience, where the study was conducted, etc.)
- Methods- This section will allow us to determine how the data was collected for the particular study and the type of study being conducted (e.g., qualitative, quantitative). This section may also show us which types of information were collected from students and could provide examples of the survey/interview questions that were asked/students responded to which would be helpful in collecting the information in the form.
- Results- This section will allow us to determine whether the demographic information that the study included (if it includes it) has been included in the analysis. For quantitative research studies, this often comes in the form of statistical analyses, such as regression, ANOVA, t-tests, etc. For qualitative research studies, you will specifically be looking for if any of the research findings, quotes, student responses were broken down or analyzed.
- Supplemental information/files/materials- This is a supplemental document that provides additional information for readers to help with their interpretation of the study. Authors often choose to put data and information in the supplemental material that is not directly relevant to the research question/study but can assist with specifics of how the research was conducted, additional data that was collected, and how one may go about repeating a particular study.

Helpful tips:

- Starting with a ctrl+f search for the term you are interested in can be a good start to save time. However, it is important to note that even if the search does not come back with results from an initial search, this does not mean the paper is lacking information. You must then go to the paper to ensure that this information is not included elsewhere or with language other than the term you are using.

Article parameters:

- Types of studies: all ***empirical*** studies on student participation in undergraduate research **(must include student data**)
    - Examples include: survey, focus groups, interviews, questionnaires, reflections, registrar data, etc.
    - Does not include a dissertation, book, essay, or editorial about undergraduate research that is just opinions and does not have data
    - Does not include non-peer reviewed research (e.g., research presented at a conference)

- Context of research project (not major): natural sciences (biology, chemistry, physics, geosciences, STEM)
    - Not psychology, not education, no engineering
- Database: Google Scholar
- Timeline: studies from 2014-2020 (set this in Google Scholar); date that the article was initially published (not published online); refer to Google Scholar for this information
- Types of research experiences: Undergraduate research experiences (UREs), Apprenticeships, Course-based undergraduate research experiences (CUREs), Course-based research experiences (CREs) (see below)

Quality control checklist:

1. Check contents of article against quality control parameters to determine if it meets criteria
    a. "Keep" - article remains in library
    b. "Delete" - article should be deleted
    c. If there is an instance of disagreement, the instructor will provide final review/decision
2. Verify that the citation listed is the APA citation from Google Scholar (paste in from Google Scholar) and that the link is correct to the article
3. Check to see if article is repeated in the library; delete any repeats
4. If an article requires ILL access, verify that the article is in shared folder (save/edit naming of file to be [Author last name et al.] (Year)
5. Return to meet as a group to discuss any inconsistencies and/or delete articles from library

Article tracking information:

- Coder initials
- Group members- names of your three coding members
- Article number- from article library Google sheet
- APA citation of article (using Google Scholar)
- Journal (full name of journal, not abbreviated)
- Year published (add option for outside of year, 2013)

Study characteristics:

- *Type of experience*
    - Course-based undergraduate research experience (CUREs)- this can also include course-based research experiences (CREs), research-focused lab courses; research embedded into a course that students take (e.g., assignments, quizzes, class meetings, etc.)
    - Undergraduate research experience (UREs)- other synonyms can include research apprenticeship/internship/mentorship, traditional research experiences, research experiences for undergraduates (REUs), summer research experiences, required research

experiences as part of curriculum (likely not part of a course; if it were part of a summer course, it would be a CURE)
    - Both CURE/URE- study includes data from students who participated in both CURE/URE (e.g., comparison study between CURE students and URE students)
    - Other (please list) - If study specifically references that it is not a CURE/URE but involves undergraduate research (will be re-reviewed to see if this meets our article library parameters)
- *Number of research participants*
    - Total number of research participants who actually were surveyed, interviewed, or participated in class/program, etc. ("response rate" = number/percent of student who actually completed survey/study (often quantitative); not total number that were sent a survey)
    - We are not interested in the total number of students in course/research unless they tell us about demographics of these students
    - Range values: 1-20, 21-50, 51-100, 101-200, 201-500, 500+
    - May have a post-hoc group review for sample size discrepancies (afterwards)
- *Discipline of the research experience (chose the most closely related discipline of the research experience)*
    - Biology (also life sciences, microbiology, genetics, physiology, ecology, evolution, biomedical, environmental science, etc.)
    - Health sciences (includes premed, nursing, etc.)- code this as "biology" if it is not specific to health/health-related majors
    - Biochemistry
    - Chemistry
    - Physics
    - Geology (also includes geosciences)
    - STEM
        - NOTE: STEM is ok, but if it is purely engineering or mathematics focused, should not be included in study.
        - If study includes research areas in one of the disciplines we are excluding (e.g., engineering, math, humanities), it would be coded here
        - If the study includes research areas that are "STEM", we would include it (even if some students may be outside of natural science disciplines)
    - STEM + non-STEM (ex: collect data on STEM students but could include social sciences; other students could be included in dataset)
    - Does not specify

- *Methods*
    - Qualitative- majority of student data through interviews, focus groups, reflections, etc. ("words"); source of information is often through verbal/written form
    - Quantitative- majority of student data through the use of surveys, scales, instruments, etc. ("number");
        - Often includes specific statistical analyses (e.g., regression, ANOVA, p-values, etc.

- *Did this study take place at an international institution?*
    - If the data were collected from students at an institution outside of the United States (e.g., Australia's ALURE program), select 'yes.'
- *Does this study meet our parameters?*
    - This is a final check to ensure that the study does, in fact, meet our parameters
        - 2014-2020, empirical data, URE/CURE, undergraduate populations (not exclusive high school or graduate school)

Demographics - Reported with numbers

Which of the following demographics are *reported* from students? (Check all that apply)

- Systematically collected from students- from university registrar, survey
- Does not need to specify method of data collection if it is reported
- Sample sizes, %, number of students, specifics (e.g., 40% women, 13 first-generation students, mean age of 21, average GPA of 3.5)
- Demographic data could be reported in-text and not necessarily in a table format
- If no demographics are reported from students, select the box "No demographics are reported from students"

Demographics - Analysis

Which of the following demographics are *<u>included</u>* in the analyses? (Check all that apply)

- These are statistical, qualitative, and quantitative **comparisons** between or within certain groups of students belonging to certain demographic groups (e.g., women score higher than men, first-gen students report this, etc.)
- Note: The finding or summary of the comparison could be reported in the results/discussion but the more specific information (e.g., stats, models, regressions, etc.) could be presented in the supplemental material
- If population/sample of students are homing in on one specific identity (e.g., only students with disabilities) and results are considering the unique experiences of these students, it would be coded as "included" here
- If no demographics are included in analyses, select the box "No demographics are included in analysis"

Demographics - Location

- Where are the demographics of the study? (select all that apply)
    - In article (e.g., figures, tables, text)
    - Supplemental material
    - No student demographics were presented in this study

<u>Demographics can include:</u>

- Gender identity- (e.g., gender- man/woman, sex- male, female)
- Race/ethnicity- includes information on race, ethnicity, origin, racial background, underrepresented racial minority (URM)
- College generation status- includes information on college generation status, parental education level

- Major- includes information on the major of students in the study
- Grade-point-average (GPA)
- Year in school- includes if it is taken of each student (e.g., freshman, sophomore, junior, senior); this could also include number of credits earned
- Age of participants
- Socioeconomic status- could also include household income levels, Pell grant status
- Disability/ability status- if study includes only anxiety/depression, code as "mental health status"
- Mental health status- e.g., anxiety, depression
- LGBTQ+ status
- Caregiving status
- International student status
- Commuter status- also includes home/situation (e.g., live on campus, commute, etc.) or distance from home institution
- Residency status- in-state/out-of-state student status
- Military status
- Religion
- Community college transfer status
- Career goals or career interest (if it is an outcome, e.g., where students go after URE, this would be an outcome, not a demographic)
- Employment status
- Honor's students
- Standardized testing scores (e.g., SAT, ACT, AP scores)
- Prior research experience- previous research experience
- Type of institution student comes from- community college, Master's, Research-intensive, predominantly undergraduate (includes transfer student status)
- Language spoken (e.g., native language)
- Enrollment status- full-time, part-time, online, etc.
- Other (please specify)

Reminder about outcomes:

- Many studies will often consider the effects, impacts, outcomes, etc. of student experiences from participating in UREs/CUREs. It is important to note that we are <u>not</u> interested in collecting information on the outcomes that studies report on from students. These are not considered demographics (thus, are not related to our research questions).
- Common outcome measures that you may encounter could include:
    - Graduation/retention rates
    - Persistence in research, science, STEM (e.g., Persistence in the Sciences (PITS) Survey)
    - Assessments/surveys (e.g., Laboratory Course Assessment Survey (LCAS)
    - Concept inventories
    - Grades/performance data

S2. Complete list of search terms used

The terms in the "Research and Discipline Search Terms" column were first used individually to search for articles about CUREs and UREs. Additional searches were done systematically combining the "Research and Discipline" search terms with the "Demographic Search Terms."

Research and Discipline Search Terms	Demographic Search Terms
• Undergraduate research • Undergraduate research experience • UREs • Course-based undergraduate research experience • Course-based research experience • CURE • CRE • Apprenticeships • Independent research • Research apprenticeships • Undergraduate research + biology • Undergraduate research experience and Underrepresented minority • UREs + biology • Undergraduate research + chemistry • Undergraduate research experience + chemistry • UREs + chemistry • Undergraduate research + physics • Undergraduate research experience + physics • UREs + physics • Undergraduate research + geosciences • Undergraduate research experience + geosciences • UREs + geosciences	• Demographics • Representation • Student identity • Social identity • Underrepresented minority • URM • Underserved students • GPA • Academic ability • Underperforming • Gender • Sex • Female • Woman • Race/ethnicity • Race • Ethnicity • Black • African American • Hispanic • Latinx • Asian • Low-income • Pell eligible • Transfer • Veteran • First generation • First-generation • Caregiver • LGBT

S3. Copy of Google coding form

Literature Review Coding Form

Please be sure to have the coding dictionary open and available for reference while you complete the coding form. The coding dictionary can be found here: https://docs.google.com/document/d/1deZQoW2CR4AvyzMoASWb-UDggL-aSRQgwZbv5LEI3Ko/edit.

Coder Initials (e.g. LEG)

Your answer

Which group are you in? (List the three group members)

Your answer

Article # (from article library Google sheet)

Your answer

APA Citation (using Google Scholar's reference)

Your answer

Literature Review Coding Form

Study Characteristics

What type of research experience(s) does the article cover? (If "Other" is selected, leave a note for why you selected this because we will re-review to ensure it meets parameters)

- ○ Undergraduate research experiences (UREs)
- ○ Course-based undergraduate research experiences (CUREs)
- ○ Both UREs and CUREs
- ○ Other: ________________

How many participants were included in the study? (Select a "flag for review" if you encountered any issues)

- ☐ 1-20
- ☐ 21-50
- ☐ 51-100
- ☐ 101-200
- ☐ 201-500
- ☐ >500
- ☐ Not specified
- ☐ Flag for review- unclear, combining samples, etc.

What was the discipline of the research experience? Choose the most closely related discipline.

- ○ Biology (includes life sciences, microbiology, genetics, physiology, ecology, evolution, environmental science, biomedical, etc.)
- ○ Health sciences (e.g. nursing, premed, etc.)
- ○ Biochemistry
- ○ Chemistry
- ○ Physics
- ○ Geology (includes geosciences)
- ○ STEM
- ○ STEM + non-STEM
- ○ Does not specify

What methods did the paper use? (Choose all that apply)

- ☐ Quantitative (e.g. survey, instruments, scales)
- ☐ Qualitative (e.g. interview, focus groups, open-ended questions)

Did this study take place at an international institution?

- ○ Yes
- ○ No

Does the study meet our parameters to be included in our analysis? (If you are unsure, select "Other" and leave a note in the feedback box for re-review)

- ○ Yes
- ○ No
- ○ Other: ________

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Literature Review Coding Form

Student Demographics - Reported with numbers

These data are systematically collected from students through the university registrar, survey, questionnaire, etc. It does not necessarily need to specify the method of data collection, as long as the data are reported. Data to look for would be total number of students within a particular group, sample sizes (n), percentages of students, averages, etc. (e.g. 40% women, 13 first-generation students, mean age of 21, average GPA of 3.5). See the coding dictionary for additional details.

Which of the following demographics are reported from students? (Check all that apply. If none are reported, select "No demographics are reported")

- [ ] Gender identity
- [ ] Race/ethnicity
- [ ] College generation status
- [ ] Major
- [ ] Grade-point-average (GPA)
- [ ] Year in school (e.g. freshman, sophomore, junior, senior if collected from each student)
- [ ] Age of participants
- [ ] Socioeconomic status (e.g.household income levels, Pell grant status)
- [ ] Disability/ability status
- [ ] Mental health status (e.g. anxiety, depression)

- [ ] LGBTQ+ status
- [ ] Caregiving status
- [ ] International student status
- [ ] Commuter status (e.g. live on campus, commute, etc.)
- [ ] Residency status (e.g. in-state/out-of-state student status)
- [ ] Military status
- [ ] Religion
- [ ] Career goals or career interest
- [ ] Employment status
- [ ] Honor's students
- [ ] Standardized testing scores (e.g. SAT, ACT, AP scores)
- [ ] Prior research experience (e.g. previous research experience)
- [ ] Type of institution student comes from
- [ ] Language spoken (e.g. native language)
- [ ] Number of credits earned
- [ ] No demographics are reported from students
- [ ] Other: ______

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Literature Review Coding Form

Student Demographics - Analyzed

These are statistical, qualitative, and quantitative comparisons between or within certain groups of students belonging to certain demographic groups (e.g. women score higher than men, first-generation students report this, etc.). The finding or summary of the comparison could be reported in the results/discussion but the more specific information (e.g. stats, models, regressions, etc.) could be presented in the supplemental material
If population/sample of students are honing in on one specific identity (e.g. only deaf students) and results are considering the unique experiences of these students, it would be coded as “included” here. See the coding dictionary for additional details.

Which of the following demographics are included in analyses of students? (Check all that apply. If none are reported, select "No demographics are reported")

- [ ] Gender identity
- [ ] Race/ethnicity
- [ ] College generation status
- [ ] Major
- [ ] Grade-point-average (GPA)
- [ ] Year in school (e.g. freshman, sophomore, junior, senior if collected from each student)
- [ ] Age of participants
- [ ] Socioeconomic status (e.g.household income levels, Pell grant status)
- [ ] Disability/ability status

- [ ] Mental health status (e.g. anxiety, depression)
- [ ] LGBTQ+ status
- [ ] Caregiving status
- [ ] International student status
- [ ] Commuter status (e.g. live on campus, commute, etc.)
- [ ] Residency status (e.g. in-state/out-of-state student status)
- [ ] Military status
- [ ] Religion
- [ ] Career goals or career interest
- [ ] Employment status
- [ ] Honor's students
- [ ] Standardized testing scores (e.g. SAT, ACT, AP scores)
- [ ] Prior research experience (e.g. previous research experience)
- [ ] Type of institution student comes from
- [ ] Language spoken (e.g. native language)
- [ ] Number of credits earned
- [ ] No demographics are included in analyses of students
- [ ] Other: ____________________

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Literature Review Coding Form

Student Demographics - Mentioned without numbers

These demographics are not systematically but are mentioned in the article in passing or in the methods (but do not report on overall percentages of what is reported). The data does not appear to be systematically collected from a survey, university registrar, etc. An article could generally mentioning who students are (e.g. “mix of men and women”), but has the absence of numbers, percentages, etc. that would be evident of systematic data collection. If there is more specificity, it would be counted in the next section as "reported" (e.g. mention in text, but report percentages in table). If the study program/course/institution is focused on a particular demographic or broadly about the students who may participate (e.g. LEAP for transfer students) but does not specifically report # of students, etc. it would be coded here. See the coding dictionary for additional details.

Which of the following demographics are mentioned about students? (Check all that apply. If none are mentioned, select "No demographics mentioned")

- ☐ Gender identity
- ☐ Race/ethnicity
- ☐ College generation status
- ☐ Major
- ☐ Grade-point-average (GPA)
- ☐ Year in school (e.g. freshman, sophomore, junior, senior if collected from each student)
- ☐ Age of participants
- ☐ Socioeconomic status (e.g.household income levels, Pell grant status)
- ☐ Disability/ability status

- [ ] Mental health status (e.g. anxiety, depression)
- [ ] LGBTQ+ status
- [ ] Caregiving status
- [ ] International student status
- [ ] Commuter status (e.g. live on campus, commute, etc.)
- [ ] Residency status (e.g. in-state/out-of-state student status)
- [ ] Military status
- [ ] Religion
- [ ] Career goals or career interest
- [ ] Employment status
- [ ] Honor's students
- [ ] Standardized testing scores (e.g. SAT, ACT, AP scores)
- [ ] Prior research experience (e.g. previous research experience)
- [ ] Type of institution student comes from
- [ ] Language spoken (e.g. native language)
- [ ] Number of credits earned
- [ ] No demographics are mentioned about students
- [ ] Other: ____________

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Literature Review Coding Form

Student Demographics - Location

Where are the demographics located in the paper? Select all that apply.

- [ ] Within article (e.g. methods, text, figures, tables)
- [ ] Supplemental material
- [ ] No demographics were presented in this study

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Type of institution (Check all that apply)

- [ ] Multi-institutional
- [ ] Doctoral/Research-intensive/Research institution
- [ ] Masters granting/Comprehensive institution
- [ ] Primarily undergraduate institution/small liberal arts college/undergraduate institution
- [ ] Community college/ junior college/2-yr institution
- [ ] Public
- [ ] Private
- [ ] Does not specify
- [ ] Other...

Is it a historically black college or university (HBCU)?

- ◯ Yes
- ◯ No
- ◯ Does not specify

Is it a Hispanic-serving institution?

- ◯ Yes
- ◯ No
- ◯ Does not specify

Is it an international institution?

- ◯ Yes
- ◯ No
- ◯ Does not specify

What is the geographic region of the institution(s)? (If it is international, put the country in the "Other" option)

- [ ] North
- [ ] South
- [ ] East
- [ ] West
- [ ] Northeast
- [ ] Southeast
- [ ] Southwest
- [ ] Northwest
- [ ] Does not specify
- [ ] Other...

Literature Review Coding Form

Feedback

Did you have any questions, concerns, or issues with this paper? Additionally, if you are unsure whether the article meets our parameters (2014-2020, empirical data, URE/CURE, etc.), please note that here:

Your answer

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Submit

S4. Research Article Library

1 Adedokun, O. A., Parker, L. C., Childress, A., Burgess, W., Adams, R., Agnew, C. R., ... & Teegarden, D. (2014). Effect of time on perceived gains from an undergraduate research program. CBE-Life Sciences Education, 13(1), 139-148.

2 Aikens, M. L., Robertson, M. M., Sadselia, S., Watkins, K., Evans, M., Runyon, C. R., ... & Dolan, E. L. (2017). Race and gender differences in undergraduate research mentoring structures and research outcomes. CBE-Life Sciences Education, 16(2), ar34.

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14 Byars-Winston, A., Leverett, P., Benbow, R. J., Pfund, C., Thayer-Hart, N., & Branchaw, J. (2020). Race and ethnicity in biology research mentoring relationships. Journal of Diversity in Higher Education, 13(3), 240.

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16 Carpi, A., Ronan, D. M., Falconer, H. M., & Lents, N. H. (2017). Cultivating minority scientists: Undergraduate research increases self, efficacy and career ambitions for underrepresented students in STEM. Journal of Research in Science Teaching, 54(2), 169-194.

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S5. Studies by discipline and research type

Discipline	Total Research Papers (n=147) % (n)	Papers on Independent UREs (n=90) %(n)	Papers on CUREs (n=53) % (n)	Papers on both Independent UREs and CUREs (n=4) % (n)
Biochemistry	0 (1)	0 (0)	2 (1)	0 (0)
Biology	46 (67)	28 (25)	74 (39)	75 (3)
Chemistry	5 (8)	4 (4)	8 (4)	0 (0)
Geosciences	3 (4)	3 (3)	2 (1)	0 (0)
Health sciences	2 (3)	3 (3)	0 (0)	0 (0)
Physics	1 (2)	2 (2)	0 (0)	0 (0)
STEM	32 (47)	42 (38)	15 (8)	25 (1)
STEM + non-STEM	10 (15)	17 (15)	0 (0)	0 (0)

S6. Specific demographics reported and considered in analysis across all research papers

Demographic Variable	Reported (n = 147) % (n)	Considered in Analysis (n = 147) % (n)
Gender	79.59 (117)	43.54 (64)
Race/ethnicity	69.38 (102)	41.50 (61)
Major	42.86 (63)	17.69 (26)
Grade-point-average (GPA)	17.69 (26)	14.29 (21)
Generation status	28.57 (42)	14.29 (21)
Prior research experience	18.37 (27)	12.92 (19)
Class level (year in school)	44.22 (65)	11.56 (17)
Career goals	14.29 (21)	8.84 (13)
Standardized testing scores	6.80 (10)	6.12 (9)
Age	19.73 (29)	6.12 (9)
Socioeconomic status	12.24 (18)	5.44 (8)
Number of credits earned	2.72 (4)	2.72 (4)
Mental health status	2.04 (3)	2.04 (3)
Honor’s student	2.04 (3)	2.04 (3)
Employment status	2.72 (4)	2.04 (3)
Disability status	4.08 (6)	2.04 (3)
Community college transfer student	2.04 (3)	1.36 (2)

Demographic Variable	Reported (n = 147) % (n)	Considered in Analysis (n = 147) % (n)
English as second language	3.40 (5)	1.36 (2)
Commuter status	2.72 (4)	1.36 (2)
Caregiving status	1.36 (2)	1.36 (2)
State residency status	0.68 (1)	0.68 (1)
Religious identity	0.00 (0)	0.00 (0)
Military status	0.00 (0)	0.00 (0)
LGBTQ+ status	0.00 (0)	0.00 (0)
International student status	0.00 (0)	0.00 (0)
No demographics included	12.25 (18)	38.10 (56)

S7. Specific demographics reported and considered in analyses by URE type

Demographic Variable	Reported n (%)		Considered in Analysis n (%)	
	Independent URE* (n = 94)	**CURE (n = 57)**	**Independent URE (n = 94)**	**CURE (n = 57)**
Gender	82.98 (78)	73.68 (42)	53.19 (50)	28.07 (16)
Race/ethnicity	72.34 (68)	64.91 (37)	51.06 (48)	26.32 (15)
Major	40.42 (38)	43.86 (25)	20.21 (19)	12.28 (7)
Grade-point-average (GPA)	21.28 (20)	10.53 (6)	15.96 (15)	12.28 (7)
College generation status	29.79 (28)	24.56 (14)	15.96 (15)	10.53 (6)
Prior research experience	22.34 (21)	10.53 (6)	15.96 (15)	7.02 (4)
Class level	43.62 (41)	45.61 (26)	13.83 (13)	8.77 (5)
Career goals	14.89 (14)	12.28 (7)	10.64 (10)	5.26 (3)
Standardized testing scores	6.38 (6)	7.02 (4)	5.32 (5)	7.02 (4)
Age	24.47 (23)	10.53 (6)	7.45 (7)	3.51 (2)
Socioeconomic status	12.77 (12)	14.03 (8)	7.45 (7)	3.51 (2)
Number of credits earned	3.19 (3)	1.75 (1)	3.19 (3)	1.75 (1)
Mental health status	3.19 (3)	0.00 (0)	3.19 (3)	0.00 (0)
Honor's status	3.19 (3)	0.00 (0)	3.19 (3)	0.00 (0)
Employment status	3.19 (3)	1.75 (1)	3.19 (3)	0.00 (0)
Disability status	5.32 (5)	3.51 (2)	3.19 (3)	0.00 (0)
Community college	3.19 (3)	1.75 (1)	2.13 (2)	1.75 (1)

Demographic Variable	Reported n (%)		Considered in Analysis n (%)	
	Independent URE* (n = 94)	**CURE (n = 57)**	**Independent URE (n = 94)**	**CURE (n = 57)**
transfer student				
English as a second language	4.25 (4)	1.75 (1)	2.13 (2)	0.00 (0)
Commuter status	2.13 (2)	3.51 (2)	2.13 (2)	0.00 (0)
Caregiving status	2.13 (2)	0.00 (0)	2.13 (2)	0.00 (0)
State residency status	0.00 (0)	1.75 (1)	0.00 (0)	1.75 (1)
Religious identity	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
Military status	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
LGBTQ+ status	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
International student status	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
No demographics included	9.57 (9)	17.54 (10)	29.79 (28)	52.63 (30)

* Four papers which contained data on multiple types of research experiences are included in both the "Independent UREs" and "CUREs" columns.

S8. Analyses of demographic variable use by study research type

	All Studies (n=147)	Independent UREs (n=90)	CURES (n=53)	Statistical Test
Studies with ≥1 Demographic Variable				
	% (n)	% (n)	% (n)	**χ^2 test** [a]
Reported	88 (129)	91 (82)	83 (44)	$\chi^2(1) = 1.38$, $p = 0.24$
Considered in analyses	62 (91)	71 (64)	47 (25)	$\chi^2(1) = 7.15$, $p < 0.01$
Average Number of Unique Demographic Variables				
	Mean (SD)	Mean (SD)	Mean (SD)	**Welch's *t*-test** [b]
Reported	4.1(2.6)	4.46 (2.6)	3.55 (2.3)	$t = -2.13$, $df = 121.04$, $p < 0.05$
Considered in analyses	2.1 (2.5)	2.64 (2.7)	1.28 (1.9)	$t = -3.56$, $df = 135.32$, $p < 0.001$

Four papers that considered both independent UREs and CUREs are omitted from these analyses. [a] Pearson's chi-square test for independence evaluated differences in the proportion of independent UREs or CUREs that reported or considered at least one demographic variable in analyses. [b] Welch's *t*-tests evaluated differences in the average numbers of different demographic variables reported or considered in analysis by research type.

S9. Specific demographics reported and considered in analyses by methodological type

Demographic Variable	Represented % (n)			Considered in Analysis % (n)		
	Quant (n = 80)	Qual (n = 17)	Mixed (n = 50)	Quant (n = 80)	Qual (n = 17)	Mixed (n = 50)
Gender	80 (64)	76.47 (13)	80 (40)	51.25 (41)	41.18 (7)	32 (16)
Race/ ethnicity	71.25 (57)	70.59 (12)	66 (33)	48.75 (39)	47.06 (8)	28 (14)
Major	43.75 (35)	41.18 (7)	42 (21)	23.75 (19)	0 (0)	14 (7)
Grade-point-average (GPA)	18.75 (15)	0 (0)	22 (11)	18.75 (15)	0 (0)	12 (6)
College generation status	30 (24)	11.76 (2)	32 (16)	18.75 (15)	0 (0)	12 (6)
Prior research experience	22.5 (18)	23.53 (4)	10 (5)	18.75 (15)	5.88 (1)	6 (3)
Class level	41.25 (33)	47.06 (8)	48 (24)	17.5 (14)	0 (0)	6 (3)
Career goals	13.75 (11)	17.65 (3)	14 (7)	8.75 (7)	29.41 (5)	2 (1)
Standardized testing scores	8.75 (7)	0 (0)	6 (3)	8.75 (7)	0 (0)	4 (2)
Age	20 (16)	11.76 (2)	22 (11)	8.75 (7)	0 (0)	4 (2)
Socioeconomic status	10 (8)	11.76 (2)	16 (8)	7.5 (6)	0 (0)	4 (2)
Number of credits earned	2.5 (2)	0 (0)	4 (2)	2.5 (2)	0 (0)	4 (2)
Mental health status	0 (0)	0 (0)	6 (3)	0 (0)	0 (0)	6 (3)
Honor's status	3.75 (3)	0 (0)	0 (0)	3.75 (3)	0 (0)	0 (0)
Employment status	3.75 (3)	5.88 (1)	0 (0)	2.5 (2)	0 (0)	2 (1)

Demographic Variable	Represented % (n)			Considered in Analysis % (n)		
	Quant (n = 80)	Qual (n = 17)	Mixed (n = 50)	Quant (n = 80)	Qual (n = 17)	Mixed (n = 50)
Disability status	6.25 (5)	0 (0)	2 (1)	2.5 (2)	0 (0)	2 (1)
Community college transfer student	0 (0)	0 (0)	6 (3)	1.25 (1)	0 (0)	2 (1)
English as a second language	5 (4)	0 (0)	2 (1)	1.25 (1)	0 (0)	2 (1)
Commuter status	2.5 (2)	0 (0)	4 (2)	2.5 (2)	0 (0)	0 (0)
Caregiving status	2.5 (2)	0 (0)	0 (0)	2.5 (2)	0 (0)	0 (0)
State residency status	0 (0)	0 (0)	2 (1)	0 (0)	0 (0)	2 (1)
Religious identity	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Military status	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
LGBTQ+ status	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
International student status	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
No demographics included	11.25 (9)	11.76 (2)	14 (7)	30 (24)	35.29 (6)	52 (26)

S10. Analyses of demographic variable use by study method type

	All Studies (n=147)	Quantitative (n=80)	Mixed Methods (n=50)	Qualitative (n=17)	Statistical Test
Studies with ≥1 Demographic Variable					
	% (n)	% (n)	% (n)	% (n)	**χ^2 test [a]**
Reported	88 (129)	89 (71)	86 (43)	88 (15)	$\chi^2(2) = 0.22$, $p = 0.90$
Considered in analyses	62 (91)	70 (56)	48 (24)	65 (11)	$\chi^2(2) = 6.38$, $p = 0.04$
Average Number of Unique Demographic Variables					
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	**ANOVA[b]**
Reported	4.1(2.6)	4.2 (2.7)	4.1 (2.5)	3.4 (2.1)	$F(2, 144) = 0.834$, $p = 0.44$
Considered in analyses	2.1 (2.5)	2.7 (2.8)	1.5 (2.1)	1.3 (1.3)	$F(2, 144) = 5.04$, $p < 0.01$

[a] Pearson's chi-square test for independence evaluated differences in the proportion of quantitative, mixed methods, and qualitative studies that reported or considered at least one demographic variable in analyses. [b] ANOVA evaluated differences in the average numbers of different demographic variables reported or considered in analysis by study type.

S11. Full linear and logistic regression results

We used linear and logistic regression models to explore patterns in how studies on undergraduate research experiences reported and considered demographic variables over time.

1. *Logistic regression to test if the likelihood of studies reporting one or more demographic variables changed between 2014 and 2020*

Model: Reporting at least one demographic variable ~ year

	Estimate	Std. Error	z-value	p-value
(Intercept)	-81.28804	271.79129	-0.299	0.765
Year	00.04127	0.13474	0.306	0.759

2. *Logistic regression to test if the likelihood of studies considering one or more demographic variables in analyses changed between 2014 and 2020*

Model: Considering at least one demographic variable in analysis ~ year

	Estimate	Std. Error	z-value	p-value
(Intercept)	-225.10810	185.24081	-1.215	0.224
Year	0.11183	0.09183	1.218	0.223

3. *Linear Regression to test if the average number of demographic variables reported changed between 2014 and 2020*

Model: # of demographic variables reported ~ year

	Estimate	Std. Error	t-value	p-value
(Intercept)	-182.01132	230.00256	-0.791	0.43
Year	0.09226	0.11402	0.809	0.42

F-statistic: 0.6547 on 1 and 145 DF, p-value: 0.4198

4. *Linear Regression to test if the average number of demographic variables considered in analyses changed between 2014 and 2020*

Model: # of demographic variables considered in analyses ~ year

	Estimate	Std. Error	t-value	p-value
(Intercept)	1.542e+00	2.228e+02	0.007	0.994
Year	2.944e-04	1.104e-01	0.003	0.998

F-statistic: 7.103e-06 on 1 and 145 DF, p-value: 0.998