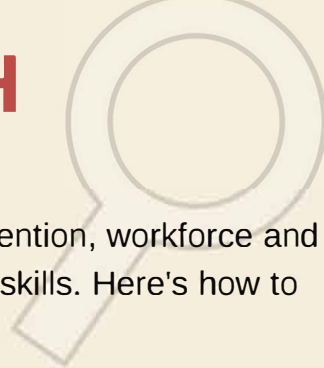# UNDERGRADUATE RESEARCH
How Mentors Make It Meaningful

Undergraduate research can be associated with increases in retention, workforce and graduate school preparation, and enhanced scientific reasoning skills. Here's how to optimize the student's experience.

OUTLINE EXPECTATIONS

Click the icon to find out more

Research experiences should cultivate critical thinking, the ability to work independently, and other professional skills. Identify key goals for the experience, and plan ahead accordingly.

FIND SUPPORT

Click the icon to find out ore

Both associate-level and baccalaureate-level institutions can offer vibrant research experience programs. Look for resources that will help your students meet the experience's goals. The Council on Undergraduate Research, Psi Beta, and Psi Chi—along with your own institution—all have resources to help you.

SCAFFOLD THE EXPERIENCE

Click the icon to find out ore

Create experiences in which students can continuously build upon their existing knowledge and research skills.

CONSIDER ETHICS

Click the icon to find out ore

Good mentorship includes displaying empathy, compassion, and respect towards the mentee. Additionally, student researchers may experience physical, psychological, and social risks as a result of conducting research. Mentors should mitigate such risks and recognize when they occur.

MEET FREQUENTLY

Click the icon to find out ore

Student researchers should have opportunities for one-on-one meetings at least once every other week. Additionally, mentors should regularly offer feedback on mentee performance and solicit mentee's feedback and input

CREATED BY THE STP UNDERGRADUATE RESEARCH PRESIDENTIAL TASK FORCE

Improving Undergraduate Research STP Presidential Task Force
Under the charge of 2019 STP President Dr. Richard L. Miller

Karen Z. Naufel, Ph.D. (Co-Chair)
Georgia Southern University

Manisha Sawhney, Ph.D. (Co-Chair)
University of Mary

Guy Boysen, Ph. D.
McKendree University

Suzanne Wood, Ph.D.
University of Toronto

Kristin Flora, Ph. D.
Franklin College

Julie C. Hill, Ph. D.
La Salle University

Jenna Scisco, Ph. D.
Eastern Connecticut State University

Kenneth Forster, Ph. D.
Savannah College of Art and Design

Outline Expectations

Overview

For a good research experience in psychology, it is imperative the mentor and student expectations are clearly defined, this includes defining the roles, activities, and expectations of both the mentor and mentee (Anderson & Shannon, 1988; Keyser et al., 2008; Pfund et al., 2006; Shanahan et al., 2015). These can be outlined in a syllabus and in informed consents for research assistants (Naufel & Le, 2017).

An effective research experience should enhance a student's understanding of the research process, including hands-on skills, critical thinking, scientific reasoning, etc. (Adedokun et al., 2014; Lopatto, 2004, 2007; Seymour et al., 2004). The research experience should also be able to promote team spirit and collegiality (Shanahan et al., 2015), promote professional identity development (Brown et al., 2009; Lechago et al., 2009; Linn et al., 2015; Shanahan et al., 2015; Van Vliet et al., 2013), and help students to plan ahead accordingly.

Resources

- Syllabus tips: Project Syllabus contains links that provide tips for creating strong syllabi for outlining expectations
- Informed consent tips: Naufel and Le (2017) describe the role of crafting an informed consent, including a link to for a template

References and Further Readings

- Anderson, E. M., & Shannon, A. L. (1988). Toward a conceptualization of mentoring. *Journal of Teacher education*, *39*(1), 38-42. https://doi.org/10.1177/002248718803900109
- Adedokun, O. A., Zhang, D., Parker, L. C., Bessenbacher, A., Childress, A., & Burgess, W. D. (2012). Understanding how undergraduate research experiences influence student aspirations for research careers and graduate education. *Journal of College Science Teaching*, *42*(1), 82–90.
- Keyser, D. J., Lakoski, J. M., Lara-Cinisomo, S., Schultz, D. J., Williams, V. L., Zellers, D. F., & Pincus, H. A. (2008). Advancing institutional efforts to support research mentorship: A conceptual framework and self-assessment tool. *Academic Medicine*, *83*(3), 217-225. doi: 10.1097/ACM.0b13e318163700a
- Lechago, S. A., Love, J. R., & Carr, J. E. (2009). Recommendations for recruiting and managing undergraduate research assistants. *The Behavior Therapist*, *32*, 120–122.
- Lopatto, D. (2004). Survey of undergraduate research experiences (SURE): First findings. *Cell Biology Education*, *3*(4), 270–277. https://doi.org/10.1187/cbe.04-07-0045

- Linn, M. C., Palmer, E., Baranger, A., Gerard, E., & Stone, E. (2015). Undergraduate research experiences: Impacts and opportunities. *Science*, *347*(6222), Article 1261757. https://doi.org/10.1126/science.1261757
- Naufel, K. Z., & Le, J. (2017). Do we do no harm? Acknowledging the unacknowledged risks to the psychology student researcher. In R. L. Miller & T. Collette (Eds.), *Teaching Tips: A Compendium of Conference Presentations on Teaching, 2015-16* (pp. 602-604)*.* The Society for the Teaching of Psychology. http://teachpsych.org/ebooks/teachingtips
- Shanahan, J. O., Ackley-Holbrook, E., Hall, E., Stewart, K. & Walkington, H. (2015). Ten salient practices of undergraduate research mentors: A review of the literature. *Mentoring & Tutoring: Partnership in Learning, 23*(5), 359-376. https://doi.org/10.1080/13611267.2015.1126162
- Van Vliet, K. J., Klingle, K. E., & Hiseler, L. E. (2013). The mentorship of undergraduate students in counselling psychology research. *Counselling Psychology Quarterly*, *26*(3-4), 406–426. https://doi.org/10.1080/09515070.2013.844095

Find Support

Overview

The type of support mentors need may be institution specific. Research experience occurs in various forms at various institutions, including two-year, four-year, and research-intensive universities. At community colleges and associate-level institutions, research may be incorporated into coursework (Budruk, 2014; Cejda & Hensel, 2009); or, it may involve collaborating with research universities (Brothers & Higgins, 2008), independent research with faculty (Budruk, 2014; Brothers & Higgins, 2008), service projects (Henseil & Cejda, 2014), courses with research in a non-lab setting (Perez, 2003), and applied research in local communities (Cejda, 2009).

Four-year institutions may have similar experiences as two-year institutions. Additionally, there may be summer undergraduate research programs (Singer & Weiler, 2009), capstone courses (Hauhart & Grahe, 2010), and different opportunities for students to work with faculty mentors in preparation for graduate school (Merkel, 2003).

Additionally, institutions may vary with the type of research infrastructure available to mentors. An Office of Sponsored Programs and Research, or similar office, can help faculty find extramural funding, including funding sources designated for smaller programs or for undergraduate research. Additionally, research may require approval from an ethics office or board, such as an Institutional Review Board, Research Ethics Board, or Institutional Animal Care and Use Committee. The resources below can help.

Resources
- Human ethics tips: The APA's Committee on Associate and Baccalaureate Education's (2016) [guidebook for starting an Institutional Review Board](#)
- Animal research ethics tips: The APA's Committee on Animal Research and Ethics (2012) has information about [ethically conducting research with animals](#)
- Undergraduate research tips: Council of Undergraduate Research's (Hensel, 2012) ebook *[Characteristics of Excellence in Undergraduate Research](#)*
- Psychology undergraduate research tips: Miller et al.'s (2008) e-book *[Developing, Promoting, & Sustaining the Undergraduate Research Experience in Psychology](#)*
- Psi Chi research tips: Psi Chi's [resources for conducting research, including options for joining a collaborative research project](#)
- Psi Beta research tips: Beta's [resources for conducting research, including options for joining a collaborative research project](#)

References and Further Readings

- American Psychological Association Committee on Animal Research and Ethics. (2012). *Guidelines for Ethical Conduct in the Care and Use of Nonhuman Animals in Research.* https://www.apa.org/science/leadership/care/care-animal-guidelines.pdf
- American Psychological Association Committee on Associate and Baccalaureate Education. (2016). *The Institutional Review Board: A college planning guide.* https://www.apa.org/ed/precollege/undergrad/ptacc/irb-college-guide.pdf
- Brothers, M., & Higgins, T. (2008). Research models that engage community college students. *CUR Focus*, *29*(1), 12-17.
- Budruk, A.K. (2014). Undergraduate chemistry research at Mesa Community College. In Hensel & Cejda (Eds.), *Tapping the potential of all: Undergraduate research at community colleges,* (pp. 29-35)*.* Council of Undergraduate Research. https://www.cur.org/assets/1/7/tapping_potential_final_web.pdf
- Cejda, B. D & Hensel, N. (Eds.). (2009). *Undergraduate Research at Community Colleges.* Council on Undergraduate Research. https://www.cur.org/assets/1/7/Undergraduate_Research_at_Community_Colleges_-_Full_Text_-_Final.pdf
- Hauhart, R.C., & Grahe, J.E. (2010). The undergraduate capstone course in the social sciences: Results from a regional survey. *Teaching Sociology*, 38(1), 4-17. https://doi.org/10.1177/0092055X09353884
- Hensel, N. (Ed.). (2012). *Characteristics of Excellence in Undergraduate Research.* Council of Undergraduate Research. https://www.cur.org/assets/1/23/COEUR_final.pdf
- Merkel, A. C. (2003). Undergraduate research at the research universities. *New Directions for Teaching and Learning*, *93*, 39–54. https://doi.org/10.1002/tl.87
- Miller, R. L., Rycek R. F., Balcetis, E., Barney, S. T., Beins, B. C., Burns, S. R., Smith, R. & Ware, M. E. (2008). *Developing, Promoting, & Sustaining the Undergraduate Research Experience in Psychology.* Society for the Teaching of Psychology. http://teachpsych.org/ebooks/ur2008/index.php
- Perez, J. A. (2003). Undergraduate Research at Two-Year Colleges. *New Directions for Teaching and Learning, 93*, 69–78. https://doi.org/10.1002/tl.89
- Perlman, B., & McCann, L. I. (2005). Undergraduate research experiences in psychology: A national study of courses and curricula. *Teaching of Psychology*, *32*(1), 5–14. https://doi.org/10.1207/s15328023top3201_2
- Psi Beta. (2018). *Chapter Resources.* https://psibeta.org/chapter-resources/
- Psi Chi. (2019). *Resources: Conducting Research.* https://www.psichi.org/page/ConductingResearch#.XfJ-ypNKgmJ
- Singer, J., & Weiler, D. (2009). A longitudinal student outcomes evaluation of the Buffalo State College Summer Undergraduate Research Program. *CUR Focus*, *29*(3), 20-25.

Scaffold the Experience

Overview

Scaffold research experiences so that expectations, ownership, and independence increase over time (Brown et al., 2009; Van Vliet et al., 2013; Shanahan et al., 2015). In other words, students may be begin by working on a mentor's project with tight guidance. Once students demonstrate they are capable of taking on more responsibility, mentors can adjust their expectations. Eventually, students can move to implementing a study from start to finish under the guidance of their mentor.

Resources

- APA undergraduate guidelines: The American Psychological Association Guidelines for the Undergraduate Major have learning outcomes for foundational and baccalaureate levels for research design. These can provide a framework for what students should be able to do given their particular level.
- Research scaffolding tips: Reavis and Thomas (2019) discuss how they scaffold research experience in their lab.

References and Further Reading

- Brown, R. T., Daly, B. P., & Leong, F. T. L. (2009). Mentoring in research: A developmental approach. *Professional Psychology: Research and Practice*, *40*, 306–313. https://doi.org/10.1037/a0011996
- Reavis, R. D., & Thomas, M. A. (2019). Building a scaffolded research experience for undergraduates. *Frontiers in Psychology*, *10*, 524. https://doi.org/10.3389/fpsyg.2019.00524
- Shanahan, J. O., Ackley-Holbrook, E., Hall, E., Stewart, K. & Walkington, H. (2015). Ten salient practices of undergraduate research mentors: A review of the literature. *Mentoring & Tutoring: Partnership in Learning, 23*(5), 359-376. http://dx.doi.org/10.1080/13611267.2015.1126162
- Van Vliet, K. J., Klingle, K. E., & Hiseler, L. E. (2013). The mentorship of undergraduate students in counselling psychology research. *Counselling Psychology Quarterly*, *26*(3-4), 406–426. https://doi.org/10.1080/09515070.2013.844095
- Wood, S. (2019). Undergraduate research assistant leadership for rigorous, high quality research. *Frontiers in Psychology, 10,* 474. https://doi.org/10.3389/fpsyg.2019.00474

Carefully Consider Ethics

Overview

Good research experience can equip students with a multitude of benefits. However, working with undergraduate researchers can also create unique ethical dilemmas. For instance, undergraduate researchers have less professional experience in research, and they may be friends or classmates with participants. This in experience, combined with the dual relationships, can create situations where confidentiality is hindered or coercion to participate is enhanced (Corts & Tatum, 2019).

Additionally, certain research projects may encumber risks to the undergraduate researcher. For instance, researchers can experience bodily harm (such as a participant potentially hurting the student), emotional angst (such as experiencing distress after seeing unpleasant stimuli repeatedly), or hindered social relationships (such as acting as a confederate who performs socially unacceptable behavior; Naufel & Beike, 2013). To create solid research experience, it is important to both foster trust between the student and mentor and consider these risks prior to implementing the research. Mentors can foster such trust by abiding by the Research Assistant Bill of Rights or providing mentees opportunities to have informed consent (Naufel & Beike, 2013).

Resources

- Ethical dilemmas: Corts and Tatum (2019) have a book that discusses the ethical dilemmas that are associated with mentoring undergraduate researchers
- Research Assistant Bill of Rights: Naufel and Beike (2013) discuss risks to researchers and outline a Research Assistant Bill of Rights for student researchers
- Risk to research assistants self-assessment: Naufel (2017) and Naufel and Le (2017) have a quick reference table to help supervisors evaluate the extent that a study poses risk to research assistances.

References and Further Readings

- Corts, D. P., & Tatum, H. E. (2019). *Ethics in Undergraduate Research: A Practical Guide for the Student Scientist*. SAGE.
- Naufel, K. Z., & Beike, D. R. (2013). The ethical treatment of research assistants: Are we forsaking safety for science? *Journal of Research Practice*, *9*, Article M11.
- Naufel, K. Z. (2017, April). Do no harm (Unless it's to a research assistant?): Protecting student researchers from risk. *APS Observer, 30*(4), 35-36. https://www.psychologicalscience.org/observer/do-no-harm-unless-its-to-a-research-assistant

- Naufel, K. Z., & Le, J. (2017). Do we do no harm? Acknowledging the unacknowledged risks to the psychology student researcher. In R. L. Miller & T. Collette (Eds.), *Teaching Tips: A Compendium of Conference Presentations on Teaching, 2015-16* (pp. 602-604). The Society for the Teaching of Psychology. http://teachpsych.org/ebooks/teachingtips

Meet Frequently

Overview

Mentors should be available and approachable (Keyser et al., 2008; Shanahan et al., 2015), student researchers should meet with mentors at least once a week, and mentors should offer clear communication and support the student researcher's transition to independence (Brown et al., 2009; Shanahan et al., 2015). Additionally, mentors should possess and exhibit dispositions such as patience, empathy, encouragement, positive regard, respect (Anderson & Shannon, 1988; Brown et al., 2009; Keyser et al., 2008; Shanahan et al., 2015).

Some organizations have specific guidelines for how often mentors should meet with students. For instance, the Guidelines for Mentors at NIH (2015) notes the following:
- Student/mentee inquiries should be replied to within a day; and
- Student/mentees and mentors should meet at least every two weeks.

Resources

- NIH guidelines for mentors: The National Institutes of Health provides guidelines for student and postdoctoral mentors
- NSF mentorship tips: The National Science Foundation has a Mentorship/Mentee lab manual, which includes Meeting Journal templates in Appendix D. It also contains other great tips for mentoring students.

References and Further Readings

- Brown, R. T., Daly, B. P., & Leong, F. T. L. (2009). Mentoring in research: A developmental approach. *Professional Psychology: Research and Practice*, *40*, 306–313. https://doi.org/10.1037/a0011996
- Keyser, D. J., Lakoski, J. M., Lara-Cinisomo, S., Schultz, D. J., Williams, V. L., Zellers, D. F., & Pincus, H. A. (2008). Research mentorship: A conceptual framework and self-assessment tool. *Academic Medicine*, *83*(3), 217–225. http://doi.org/10.1097/ACM.0b13e318163700a
- National Science Foundation. (2013). Mentoring: A Guidebook for Mentors and Mentees. https://www.opm.gov/wiki/uploads/docs/Wiki/OPM/training/Mentoring/Mentoring%20Workbook_2013-2014.pdf
- Shanahan, J. O., Ackley-Holbrook, E., Hall, E., Stewart, K. & Walkington, H. (2015). Ten salient practices of undergraduate research mentors: A review of the literature. *Mentoring & Tutoring: Partnership in Learning, 23*(5), 359-376. https://doi.org/10.1080/13611267.2015.1126162