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Harnessing the Undiscovered Resource of Student Research Projects

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Abstract

This article suggests that undergraduate research can help advance the science of psychology. We introduce a hypothetical "question-list paradigm" as a mechanism to do this. Each year, thousands of undergraduate projects are completed as part of the educational experience. Although many of these studies may not contain sufficient contributions for publication, they provide a good test of the replicability of established findings across populations at different institutions and geographic locations. Thus, these projects could meet the needs of recent calls for increased replications of psychological studies while simultaneously benefiting the student researchers, their instructors, and the field in general.

Keywords

collective research, experimental replication, data collection, pedagogy, undergraduate research, "question-list paradigm"

Imagine if the Association for Psychological Science published a list of 10 research questions each spring. Across the nation, faculty and students at undergraduate institutions could choose to study one or more of these questions through replication; data collection might also include inviting participants to complete additional measures of personality, attitudes, or background information, providing a richer data source. Once each project was completed, the collected data, along with a brief APA-style report, could be submitted to a Web portal. The most impressive projects might receive awards and stipends.

Students in capstone and research-methods courses are an underutilized resource for the field of psychology. Presently, a large portion of undergraduate psychology majors complete a senior-level course with the goal of integrating material from across the discipline (Grahe & Hauhart, 2012; Hauhart & Grahe, 2010, 2012; Perlman & McCann, 1999); about half of these courses require some sort of empirical data collection (Hauhart & Grahe, 2010, 2012). Given that more than 80,000 students in the United States graduate with a bachelor's degree in psychology each year (National Center for Educational Statistics, 2008), the potential for contributing to large databases is substantial, and even more so if international collaboration is sought. Perlman and McCann (2005) described six different content courses that included active research activities in their national study of undergraduate research. With more than 70% of schools requiring at least one course involving research experience (i.e., in which the students complete canned experiments; Cooney & Griffith, 1994; Perlman & McCann, 2005) and almost all providing at least one opportunity to conduct research, the number of undergraduate research studies conducted each year is staggering.

The primary purpose of most undergraduate research projects is to further class and departmental learning objectives (Brakke, Crowe, & Karukstis, 2009; Taraban & Blanton, 2008). Not surprisingly, only a small fraction of student research advances scientific progress. For instance, Perlman and McCann (2005) reported that only 10% of student projects were presented beyond the classroom, at conferences or through submission for publication. Student projects often attempt replication or a small advance on some established question using a single sample; coupled with the fact that these students are still developing writing skills, this leads to few published student projects. Consequently, most of these data are "lost" to the discipline. However, if students are encouraged to conduct replications as part of an effort to document

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and archive replications, collected classroom projects could contribute significantly to the field.

For years, methodologists have called for more replications (e.g., Cohen, 1994; Lubin, 1957; Rosenthal, 1969). This special issue reflects a growing trend in modern psychology to coordinate experimental replications of published research. The Psych File Drawer project (Spellman, 2012) and the Reproducibility Project (http://openscienceframework.org/project/EZcUj/wiki/home) are both major efforts to collate replication studies across institutions.[1] Yet graduate students and faculty may remain reluctant to replicate published studies because such work provides few opportunities for tenure and promotion. In contrast, undergraduate students in research-methods and capstone courses can find more motivation to generate this kind of meaningful data. Faculty at teaching institutions who spend their time guiding these projects could report the number of projects they submitted and the forums the projects were submitted to (e.g., Psych File Drawer), providing evidence of teaching-related research activity for their own evaluations. Recognition of the value of replication projects within the field could raise the profile of such work and thus its value in meeting tenure requirements.

Already, the scores of undergraduate presentations at APA regional conferences each year demonstrate that honors and capstone students regularly replicate studies that are "in vogue." Although many of these replication studies fail to demonstrate a novel effect, they often provide valuable replication information that goes unnoticed. Further, past efforts to generate collective undergraduate research projects (Grahe et al., 2012; School Spirit Study Group, 2004) have demonstrated that undergraduates generate reliable and valid findings in research-methods classes with associated pedagogical benefits. Though there are challenges in managing teaching-related research projects across multiple institutions, a question-list paradigm addresses many of the challenges associated with undergraduate research contributions.

One major impediment to the success of any collective undergraduate research project is the need to obtain local institutional review board (IRB) approval. Given that an estimated 90% of class projects are withheld from public forums (Perlman & McCann, 2005), many instructors likely do not need or want to obtain IRB approval for their class's research. In places where local IRBs have complicated, time-consuming review processes or at institutions with shorter academic terms, there might not be enough time to gain approval and conduct the project within the academic term. However, if there is a more standard research protocol and if the data are making a meaningful contribution, the students and faculty might be in the position to submit proposals earlier and find the IRB process worthwhile. Further, restricting questions to topics and projects that likely warrant an expedited IRB status would make the process less cumbersome.

A potential problem in student projects is poor data resulting from experimental error. Students who are just learning research skills may be more likely to make errors in the development of research materials or in specific data-collection activities. However, although effect sizes might decrease because of increased error terms, these objections are outweighed by the fact that student research could represent another opportunity to establish generalizability. Demonstrating an effect across multiple student projects would indicate a robust finding, particularly if it was established across conceptual replications.

A question-list paradigm and the online collection of data through web portals further facilitate the onerous coordination of projects, because replications are matched to studies. If such a system is endorsed by the field in general and by specific organizations in particular, instructors and students will be motivated to join the community. Thus, even in the face of the aforementioned challenges, undergraduate researchers can contribute to a massive replication initiative because they are already engaging in replications as part of their current learning process.

In sum, the time has come for psychology to combine the benefits of national organization and undergraduate research requirements to strengthen both student training and the quality of our science. Whether a question list is developed using a "top-down" approach as posited in the opening paragraph, or using a "bottom –up" approach as reflected by the Psych File Drawer project and the Reproducibility Project, whereby popular sentiment determines the questions of interest, we are ready, as a discipline, to collaborate effectively and raise our research to another level.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Note

1. Another question-list paradigm, geared toward coordinating undergraduates' efforts in original research rather than replication research, is the Collective Undergraduate Research Project (Grahe, 2010). This project calls upon students to conduct individual replications of novel research questions using experimental designs and measuring behaviors, such as evaluating the generalizability of motion energy analysis (Ramseyer & Tschacher, 2011) as a measure of behavioral synchrony in experiments or examining the cultural or psychological impact of situations (Sherman, Nave, & Funder, 2010).

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