CUR Focus

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Students Collaborate to Advance Science: The International Situations Project

Engaging students in research experiences is considered to be a "high impact" teaching practice by the Association of American Colleges and Universities (Brownell and Swaner 2010). It also represents Learning Goal 2 in the American Psychological Association (APA) *Guidelines for the Undergraduate Major*, which state, "Students will understand and apply basic research methods in psychology, including research design, data analysis, and interpretation" (APA 2007, 13). Student involvement in research is associated with higher GPAs, usually occurs after previous psychology classes have been taken, and is important for establishing a research mindset (Taraban and Logue 2012). Here we describe an ambitious research project inviting student researchers at all academic levels to join, making it possible for them to conduct research on a question of personal interest, while simultaneously aiding the scientific community in primary research.

The benefits of engaging in primary research abound (Hunter, Laursen, and Seymour 2008; Trosset, Lopatto, and Elgin 2008; Wayment and Dickson 2008), and student research can help the scientific community now more than ever. A recent special issue of *Perspectives on Psychological Science* (November 2012) called for more replications of published studies as a response to the field's "crisis of confidence" in research. This "crisis" follows some high-profile failures to replicate published findings and a recent scandal involving a researcher who admitted to faking data in more than 50 published studies (http://en.wikipedia.org/wiki/Diederik_Stapel). Although many papers in the special issue suggested faculty could change their programs to do more replication, many academics already have set research agendas and may be unable to engage in the much-needed replication studies. In contrast, undergraduate students lack these prior commitments, creating the perfect opportunity for them to contribute to the scientific field while completing classroom requirements (Frank and Saxe 2012; Grahe et al. 2012). Additionally, students involved in collaborative projects can share data from multiple samples, creating incredibly powerful datasets that provide endless opportunities for analysis.

When undergraduates get involved in research, everyone benefits, and yet there have been very few multi-institutional research projects in psychology in which students acted as researchers while learning statistics and research methods. In the one published example of which we are aware, Alan Reifman recruited fellow instructors in research methods from the Society of Personality and Social Psychology's email list-serve. In this project, the School Spirit Study Group (2004) gathered 22 samples from students who had collected data on multiple measures of school spirit. The students evaluated the data gathered in their own project, whereas Reifman and colleagues combined the data and evaluated school spirit broadly. This project presaged the recent call for students to act as contributors to learning, and made a minor, but substantive, contribution to the field of psychology.

The Psi Beta National Research Project

The only other successful multi-institutional undergraduate research project in psychology that we are aware of is the Psi Beta Honor Society's National Research Project, which began in 2009 (Musselman and Rudmann 2013). This project is designed to provide research experiences to students rather than being focused on advancing science, but multi-institutional projects provide potential for doing both. Examples of past projects include research into phenomena such as happiness, mobile-phone addiction, and shyness. Each project includes a "seed" journal article to facilitate students' literature search, scrutiny by an institutional-review board, and scripts for recruiting participants, obtaining informed consent, and debriefing. When the data-gathering period ends, Psi Beta chapters receive datasets in Excel or SPSS formats. The number of participating chapters and the number of participants has increased since Psi Beta's initial annual study, and plans are under way to assess the national research project's educational impact.

The International Situations Project

In the academic year 2012-2013, Psi Chi (the International Honors Society in Psychology) partnered with Psi Beta on its National Research Project, which encouraged students to replicate the International Situations Project (ISP) organized by David Funder and Esther Guillaume at the University of California-Riverside. The ISP compares everyday situations and the resulting behaviors of university students across the globe, asking "How similar are the lives of university students around the world?" Data are being collected throughout the U.S., as well as within and across many other cultures.

Faculty or student researchers from any institution could participate in this project. After initial contact with the study's coordinator, researchers were sent the log-in information to distribute to potential participants (individual college students) at their institution, and instructions on steps they should follow (http://www.psichi.org/pdf/psichiadvancingscience.pdf). Research could then be conducted online and hosted by the UC-Riverside project coordinators. This was made possible by a website custom-built for this project (http://www.internationalsituationsproject.com). Researchers then recruited student participants according to the expectations of their own institution's IRB.

After being recruited and given links to the website, participants log in and provide background information about their native country and language, in addition to standard measures of ethnicity. They are then asked a single question about what they were doing at 7:00 p.m. the previous night. Common responses include "I was eating dinner with my family" and "I was studying for an exam." Finally, the situations and behaviors are quantified by using two q-sets: the Riverside Situational Q-sort (RSQ; Sherman, Nave, and Funder 2010), and the Riverside Behavioral Q-sort (RBQ; Funder, Furr, and Colvin 2000). These two instruments provide a tremendous amount of information on the situations and the behaviors associated with them, with 89 items that describe the situation, and 68 items that describe a participant's behavior in that situation. The q-sort is a forced-choice format in which items are sorted into nine categories ranging from *extremely uncharacteristic to extremely characteristic*. The nine categories form a quasi-normal distribution with only a few items landing on each extreme end, and the majority landing in the middle, more neutral categories. Q-sorts such as these provide numerous ways to analyze the psychological aspects of these situations, behaviors, their relationships, and contexts.

Currently, 10 U.S. sites have completed the study, with commitments to do so from another 5 Psi Chi locations; other institutions can still join the project. The following results reflect findings very similar to those Guillaume and Funder (2013) presented in the preliminary analyses of the cross-cultural comparisons from 12 international contributors to the project; in these preliminary international findings,

situations and behaviors appeared remarkably similar among university students across the 12 cultures examined.

In order to find out if data from institutions across the United States would replicate these findings, Psi Chi and Psi Beta gathered samples around the country from 705 participants total. Indeed, just like the cross-cultural samples, students reported similar situations, as measured by the RSQ, across all U.S. sites when the correlations among the average sample q-sort profiles (r = .88) were examined, demonstrating that the U.S. samples were more similar to each other than non-U.S. samples (r = .82). The strongest correlation among U.S. college students' situations using the RSQ was between two sets of Southern California samples (r = .95), and the smallest was between the Texas and Puerto Rico samples (r = .77). Behavioral similarity paralleled these findings. Behaviors measured by the RBQ as they pertained to the situation were also highly similar across the international samples (r = .81), but more so across the U.S. samples (r = .90). The strongest correlation of behaviors using the RBQ was between two sets of Pennsylvania samples (r = .98), and smallest between the Texas and Puerto Rico samples (r = .77).

These are fascinating results, but many more detailed questions remain to be addressed. Research questions related to the profiles' correlations include: What types of situations are most and least common? Do regional or demographic characteristics moderate the findings? In addition to addressing novel questions, these data provide value in allowing further replication of previously established effects, such as the reliability of the Interpersonal Circumplex Constructs (e.g., assured-dominant, warm-agreeable, and aloof-introverted; Markey et al. 2003) and their relationship to recently identified situational constructs (Rauthman et al. 2013), among other published constructs and profile templates that used the RBQ or RSQ. In terms of benefitting the International Situations Project, the data gathered from the multiple U.S. institutions provide a larger, more expansive, and undoubtedly more accurate U.S. sample than the single institutional sample initially collected. This more generalizable sample provides a stronger comparison to samples from many other countries. Undergraduates may choose to utilize and analyze the data they collected in their own way or in concordance with other projects.

Students as Contributing Researchers

ISP contributors can either be a group, such as an entire or partial Psi Chi or Psi Beta chapter, or individuals can participate alone. Contributors will be recognized on the UC-Riverside ISP website, and noted in publications arising from the project, thus providing students with impressive experience to cite on graduate-school applications. Further, contributors can access an impressive dataset spanning multiple regional locations, making it possible for numerous student researchers to present unique results at regional research conferences, such as the results reported at the Psi Beta poster session at the Western Psychological Association's annual meeting in April (see, for example, Uhlman et al. 2013).

Further, ambitious students who would like to independently analyze all U.S. samples will be given that option. Although contributors receive a copy of the data collected on their campus, the authors of this paper hold all samples, and if a student requests the combined datasets for purposes of publication, we will be aware of or involved in this work to help bolster its success. Students who do this could submit unique work to undergraduate or professional research journals. Thus there could be tangible benefits for participation beyond known pedagogical impacts or just helping someone collect data. In terms of swiftness, Psi Beta and Psi Chi tripled the speed with which data were gathered compared to other collaborators, making U.S. student collaborators the quickest and most robust collectors of data.

Benefits for Contributing Instructors

Psychology students at the first author's institution complete research projects that include collection of empirical data in order to complete the requirements for the major. In his research-methods class, students choose either to generate their own idea for a research project or to work on one in which the data will be shared with a PhD-level researcher. The spring 2012 section offered a choice of two projects in which the data would be offered to another researcher upon completion. The ISP was one project, and 12 students (50 percent of the class) chose this option. The spring 2013

section offered the same choices and 6 students (30 percent of the class) chose this option.

In exchange for their contribution to the ISP, the students received a rich dataset with many variables useful for testing their theories and for practicing their statistical and methodological skills. For example, students in this entry-level statistics/methods course asked questions about situational differences as a function of expressivity as measured by the RBQ, whether people who were in groups would behave differently than those who were alone. In the spring 2013 class, students examined the relationship of the Interpersonal Circumplex Model constructs (Markey et al. 2003) to one of eight situational constructs from the RSQ (Rauthman et al. 2013). Overall, their data can now contribute to psychological-theory testing as part of the larger ISP dataset.

The first author also used this project as a teaching tool in the spring 2013 section of the same course by using the ISP data for a series of learning activities. The exercises incrementally introduced novel concepts, providing multiple hands-on analyses and writing opportunities, with the final assignment being an APA-style research report regarding a specific hypothesis. For the first exercise after acting as participants in the ISP, students generated two hypotheses and wrote a brief introduction. In the following weeks, students further used the project as a source of writing inspiration; they graphed the data, identified reliability for constructs, and computed various descriptive statistics (i.e., central tendency, variance, z-scores, correlation) and inferential statistics (i.e., t-tests, regression, ANOVA). Because the Pacific Lutheran University dataset is rich both in number of cases (N = 95) and number of variables (N = 166), including open-ended situational descriptions and demographic data, the instructor could give directed guidance while students followed their own interests. (The assignments used in the spring 2013 introductory statistics/methods course at Pacific Lutheran University are available upon request.)

Although tests of pedagogical effectiveness could be developed for similar collaborative projects to determine if there are benefits beyond those already associated with undergraduates completing research (Trossett et al. 2008; Wayment and Dickson 2008), the purpose of the present project was to complete a multi-institutional project. With the successful completion of this project, we feel that more students and faculty members will be interested in benefitting from similar future opportunities.

Future Implementation

This collaborative project was advertised to thousands of members at more than 1,100 Psi Chi and 125 Psi Beta chapters. Over the course of the four Psi Beta National Research Projects, between four percent and seven percent of the chapters participated, including the 2012-2013 academic year. In the first year of Psi Chi participation, there were 47 inquiries (four percent of total possible institutions) and 11 committed contributors (less than one percent of total possible institutions, a 23-percent conversion rate from inquiries). We can compare this to similar efforts at collaborative research between PhD-level researchers, such as the Psych File Drawer project or the Open Science Collaboration, which both started within a year of the Psi Chi/Psi Beta National Research Project. The Psych File Drawer project aims to be a replication repository where researchers can upload their studies replicating published work. The directors of the Psych File Drawer project also have a "top 20 list" of studies that registered users have voted on, which lists the studies they would most like to see replicated. (Spellman 2012) The Reproducibility Project (Open Science Collaboration 2012) now includes more than 100 researchers committed to replicating all the studies published in the first three issues of the 2008 volumes of three psychology journals. The number of potential participants in both these projects includes all researchers in psychology, so the participation rate is quite small. This is a valuable comparison because it suggests that such programs are viable even with low researcher participation rates.

Both of these projects demonstrate that there potentially is broad-based interest in replicating research across the field of psychology, but that relatively few researchers in psychology now undertake such replication. With nearly 4,000 four-year institutions in the United States, 70 percent of which have psychology programs (Grahe and Hauhart 2013) and 90 percent of which offer some form of undergraduate research experience, the potential number of replications by undergraduates could be quite large, even if only a portion of the psychology programs participated. We suggest that these

possibilities could also be applicable to other fields where replication is an important part of scientific discourse.

Getting Faculty Sponsors and IRB Approval

Even with simple projects, students need guidance in order to complete them. This guidance may be as minimal as having a faculty supervisor sign an IRB form, or as involved as providing instruction on how to complete the data process or how to write reports on experimental results. Faculty time and research resources are limited, and faculty members' own research agendas require priority if they are to achieve tenure and promotion. While our project is simple to administer, finding contributors ultimately requires finding interested faculty mentors.

However, multi-institutional collaborative projects can attract faculty participants by providing various resources (such as a dedicated website and access to study materials) and richer datasets than faculty could develop and administer on their own. In time, we believe that faculty will regularly report their participation in replication programs as part of the promotion review process and receive due credit for that work. However, this will happen only after participation in collaborative replication projects demonstrates value, such as producing published papers. Faculty who join collaborative projects ultimately will build valuable connections with their peers at other institutions. By doing so, they are likely to address one of the biggest impediments to successful student participation in such projects—obtaining IRB approval for undergraduates' participation in these projects.

Many student research projects are not reviewed by IRBs because they are teaching activities, and the data gathered are not intended for public dissemination. In contrast, the ISP data are specifically intended for publication and require IRB approval. When students are unfamiliar with the process, they may be less willing to participate. Therefore, we helped undergraduates obtain IRB approval by sharing the receipt of the UC-Riverside IRB approval for exemption of data, and a sample IRB that was approved at Pacific Lutheran University that made the justification to collect data as a contribution to the larger project.

Models for Future Collaborations

Esther Guillaume, a PhD student at UC-Riverside, and David Funder, her advisor, are pursuing a publication using the ISP samples from many professional-level researchers from countries across the world (http://rap.ucr.edu/ISP.html). However, these data are valuable beyond a single paper. In past projects conducted in Funder's lab (see Riverside Accuracy Project II at www.rap.ucr.edu), dozens of papers have been published to address multiple related and tangential theoretical questions from their RAP II study that included data from three large samples (N > 200) collected at UC-Riverside.

We note that the Psi Beta National Research Project has never had an operating budget, so it is possible to administer the surveys involved in the annual research projects at a very low cost. If large organizations such as CUR or discipline-specific organizations such as the Association for Psychological Sciences (APS) encouraged such models, student or faculty researchers around the country could generate research studies to test their question of choice. This project provides a glimpse of the potential for undergraduate research in the future in which students can learn to conduct science while simultaneously contributing significant data and analyses.

References

American Psychological Association. 2007. "APA Guidelines for the Undergraduate Psychology Major." Washington, DC: Author. Retrieved from www.apa.org/ed/resources.html

Brownell, Jayne E., and Lynn E. Swaner. 2010. *Five High Impact Practices: Researche on Learning Outcomes, Completion, and Quality.* Washington D.C.: Association of American Colleges and Universities.

Franke, Michael C., and Rebecca Saxe. 2012. "Teaching Replication." *Perspectives on Psychological Science* 7(6): 600-604.

Funder, David C., R. Michael Furr, and C. Randall Colvin. 2000. "The Riverside Behavioral Q-sort: A Tool for the Description of Social Behavior." *Journal of Personality* 68(3): 451-489. *PsycINFO,* EBSCO*host* accessed February 22, 2013.

Grahe, Jon. E., and Robert Hauhart. In press 2013. "Defining the Typical Capstone Course from a National Random Sample." *Teaching of Psychology*.

Grahe, Jon. E., Alan Reifman, Anthony D. Herman, Marie Walker, Kathryn C. Oleson, Michelle Nario-Redmond, and Richard Wiebe. 2012. "Harnessing the Undiscovered Resource of Student Research Projects." *Perspectives on Psychological Science* 7(6): 605-607.

Guillaume, E., Todd, and D. C. Funder. 2013. "The International Situations Project: Examining Data from 12 Cultures." Poster presented at the 14th annual convention of the Society of Personality and Social Psychology, New Orleans, Louisiana, January 17-19, 2013.

Hunter, Anne-Barrie, Sandra L. Laursen, and Elaine Seymour. 2008. "Benefits of Participating in Undergraduate Research in Science: Comparing Faculty and Student Perceptions." In *Creating Effective Undergraduate Research Programs in Science,* edited by Roman Taraban and Richard L. Blanton, 135-169. New York: Teachers College Press.

Markey, Patrick M., David C. Funder, and Daniel J. Ozer. 2003. "Complementarity of Interpersonal Behaviors in Dyadic Interactions." *Personality and Social Psychology Bulletin* 29(9): 1082-1090. *PsycINFO*, EBSCO*host* accessed September 3, 2013.

Musselman, Robin, and Jerry Rudmann. June, 2013. "Psi Beta's National Research Projects." Presented at the 25th annual Association for Psychological Sciences conference. Washington, DC. psibeta.org/site/wp-http://psibeta.org/site/psi-beta-national-research-projects-overview

Open Science Collaboration. 2012. "An Open, Large-scale, Collaborative Effort to Estimate the Reproducibility of Psychological Science." *Perspectives on Psychological Science* 7(6): 657-660. *PsycINFO*, EBSCO*host* accessed September 3, 2013.

Rauthman, John. F., David Gallardo-Pujol, Esther Guillaume-Hanes, Elysia Todd, Christopher Nave, Ryne Sherman, Matthias Ziegler, and David Funder. March, 2013. "Introducing the Big Eight of Perceived Situation Characteristics: The DIAMONDS Model." Presented at The 1st World Conference on Personality, Stellenbosh, South Africa.

School Spirit Study Group. 2004. "Measuring School Spirit: A National Teaching Exercise." *Teaching of Psychology* 31(1): 18-21

Sherman, Ryne A., Christopher S. Nave, and David C. Funder. 2010. "Situational Similarity and Personality Predict Behavioral Consistency." *Journal of Personality and Social Psychology* 99(2): 330-343.

Spellman, Barbara A. 2012. "Introduction to the Special Section: Data, Data, Everywhere . . . Especially in my File Drawer." *Perspectives on Psychological Science* 7(1): 58-59. *PsycINFO*, EBSCO*host* accessed September 3, 2013.

Taraban, Roman, and Erin Logue. 2012. "Academic Factors that Affect Undergraduate Research Experiences." *Journal of Educational Psychology* 104(2): 499-514.

Trosset, Carol, David Lopatto, and Sarah Elgin. 2008. "Implementation and Assessment of Course-embedded Undergraduate Research Experiences: Some Explorations." In *Creating Effective Undergraduate Research Programs in Science*, edited by Roman Taraban and Richard L. Blanton, 33-49. New York, NY: Teachers College Press

Uhlman, Jennifer., Hilda Santana, Erik Castillo, Amanda Walker, Anya Chan, and Gabriel Masri. 2013. "International Situations Project: Assessing Everyday Situations." Poster presented at the 93rd annual meeting of the Western Psychological Association, Reno, NV, April 24-27, 2013.

Wayment, Heidi A. and K. Laurie Dickson. 2008. "Increasing Student Participation in Undergraduate Research Benefits Students, Faculty, and Department." *Teaching of Psychology* 35(3):194-197.

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Jerry Rudmann, PhD, co-chairs the Student Research Task Force at Irvine Valley Community College, where he also teaches courses in introductory research methods. He is a CUR Councilor for the psychology division and the executive director of Psi Beta, the national honor society in psychology for community-college students. Each year, Psi Beta offers its members the opportunity to participate in a national research project.