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Student Research in an Introductory Psychology Course: Outcomes of Two Experiential Learning Projects and Implications for Instruction of Human Subjects Research

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Abstract

The present study describes student learning and personal outcomes associated with learning research methods in introductory psychology, via one of two semester-long projects: one involving performing naturalistic observation of the behavior of community members, and the other involving performing a 60-minute interview of local veterans regarding a psychological concept (incorporating features of service-learning). Both projects taught the same basic research concepts. Among students completing the observational project (n = 38), strong Time 1 scores on a research methods quiz declined slightly by Time 2 assessment; interest in aggregating and interpreting data declined; and personal attitudes about community service did not change over the course of the semester. Among students completing the service-learning project (n = 41), quiz scores and interest in research did not change, and attitudes about community service changed in some ways over time (depending on student age). It is concluded that encouraging original scholarly inquiry among introductory-level students can have various academic and personal benefits to students, but that service-learning elements in such projects may increase their attractiveness to students. Limitations and recommendations for future research are discussed.

Keywords: Service-learning, teaching research methods, teaching psychology, community service attitudes.

Undergraduate research projects have become a recommended means of teaching students how knowledge in generated in a variety of fields (Kardash, 2000; Seymour et al., 2004). The hallmarks of well-designed undergraduate projects include mentorship by faculty with expertise in that research approach; meaningful student input to the research process and product; application by the student of accepted research methods to the question at hand; and the ultimate creation of a product that can be subjected to appropriate review within the discipline (Hakim, 1998). Much of the existing literature on undergraduate research that meets these hallmarks focuses on senior capstone products. Such activities have been shown to increase student confidence in their professional abilities, deepen student knowledge of a given research topic as well as the research process, contribute to a sense of collaboration and collegiality with faculty (Seymour, Hunter, Laursen, & Deantoni, 2004), help students feel integrated into their chosen discipline

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(Hakim, 1998), and improve student mastery of research-related tasks (Kardash, 2000). Accordingly, many institutions have undertaken to incorporate formal undergraduate research projects into their curricula (O'Quin, 1996; Searight, Ratwick, & Smith, 2010). The value of these projects to learning among advanced students is gaining empirical support; however, less attention has been paid to how such projects might be employed in introductory-level courses, such as introductory psychology (e.g., Kazmerski & Blasko, 1999), and what effects they might have on learning and attitudes about research at the 100-level (though Thieman, Clary, Olson, Dauner, and Ring (2009) is a notable exception). This is an interesting question for instructors of various introductory courses in psychology, sociology, history, and communications to consider, because fields such as these that use human subjects-based research methods can lend themselves well to the creation of active learning projects by instructors (Elias & Pratkanis, 2006). However, as many students who take such courses are not majors, instructors considering using such projects in their pedagogy should understand how introductory-level students respond to the task of carrying out such original empirical projects.

Integrating Service-Learning Into Teaching Research Methods

Service-learning is educational coursework that incorporates service to the community in classroom activity, either throughout a course or in specific projects (Bringle & Hatcher, 2009). Service-learning balances the learning goals of students, with the needs of community members or organizations (McCann, 1996). When college students are involved in service-learning, they are not only given a unique and emotionally engaging opportunity to explore and apply course concepts, they also are exposed to a diversity of ideas and experiences that are thought to enhance their personal maturing process and development as citizens (Conway, Amel, & Gerwien, 2009; Deeley, 2010; Moely, McFarland, Miron, Mercer, & Ilustre, 2002; Peterson, 2009).

Student outcomes associated with service-learning have been studied relatively more in relation to psychology than to other fields, possibly due to the ease with which psychological concepts can be demonstrated in real-world community work (Kretchmar, 2001). Such projects have been found to offer various benefits to students. For example, participation in service-learning in a psychology course may result in reductions in self-entitlement attitudes among college students (Hoffman & Wallach, 2007) and increased empathy (while students completing general interviews of individuals of their choice, or general research papers, showed no change; Lundy, 2007). In a meta-analytic study of various outcomes of service-learning (in which almost a quarter of all included studies involved psychology courses), Conway et al. (2009) found that service-learning enhanced academic, personal, social, and citizenship outcomes for students, with the largest changes found in academic outcomes and in attitudes about people receiving help through these activities.

Based on such studies, it seemed reasonable to believe that incorporating some service-learning into an introductory psychology course might confer similar benefits. However, none of the studies included in this meta-analysis or elsewhere have specifically examined projects involving service-learning as a forum for teaching human subjects research

methods. Students new to fields which utilize human subjects research methods often view learning about such research as difficult, unpleasant, or both. Therefore, it seems important to see whether incorporating service-learning as the particular experiential learning approach to this material not only increases student engagement and interest, but also confers academic and personal benefits in addition to that typical of experiential learning. If such an integration showed promise, such projects might be useful to instructors in various fields doing research with human subjects.

Research Project Descriptions

Every student taking introductory psychology from the present author has completed one of the two original research projects described below as a course requirement. Most students have completed the Observational Project (OP), with the Service-Learning Project (SL) representing a more recently-added variant.

The Observational Project

The Observational Project was designed to reinforce the basic concepts of empirical research with human subjects in a student-centered way, encouraging their creativity within a firm and helpful structure of ethical and procedural guidelines. All students received a long and highly detailed document at the beginning of the semester outlining all requirements of the project, and were placed in groups on the first day of class to begin their work. In this project, groups of 4-6 students developed a simple hypothesis about a specific behavior they predicted they would observe in public. These hypotheses were initially based on student's own beliefs about human behavior. For their first step in the project, students decided what interesting observable behavior they would like to study, and made a prediction about either who they would observe engaging in it (e.g., what age or gender of person will perform the behavior), or the circumstances under which they will observe it (e.g., what time of day, alone/with others, etc.). Students have most often been interested in social behavior, study behavior, eating behavior, hygiene behavior, driving behavior, or behaviors associated with personal appearance. Students then located and read two scholarly sources on that behavior (or a closely related one), made a plan for data collection that included date(s), location(s), operationalization of all variables, recording of data using a chart, and a plan for observing in a completely unobtrusive manner (e.g., such that no individual being observed would be able to find out that they were being observed). After these plans were agreed upon within the group, every group was required to propose their study to the instructor for consultation and approval (failing to complete this consultation would halt the project and result in a total project grade of 0). The consultation was aimed at providing each group specific and useful feedback about all aspects of their plans, and to ensure the ethical soundness of student ideas; students received significant mentoring in these meetings, as well as encouragement of group cohesion. Afterwards students submitted binding academic contracts detailing their research plans, signed by all members and the instructor. Students then set their own schedule for observing, aggregating, and interpreting their data relative to their hypothesis and previous research. Work days were included in the course schedule to ensure that students would have some time for face-to-face work on the project. All

groups presented their findings in class at the end of the semester, and were expected to be able to answer appropriate questions about their projects. All students also submitted a brief individual report of their work. Grades were assigned based 50% on the presentation given, and 50% on the individual written report. Individual students could also be penalized for lack of group participation through the results of an anonymous peer evaluation.

The Service-Learning Project

Some research has indicated that even very short-term participation in service-learning activity can confer benefits to college students (Reed, Hawley, Reber, & DuBois, 2005). Therefore, a variant of the project that focused on the same research and ethical concepts was developed, using interview methodology (rather than observational methodology). Students carried out the Service-Learning Project by planning, administering, and interpreting a 60-minute interview of local veterans. This focus was chosen for three reasons; 1) the surrounding community has a very high concentration of veteran residents (approximately 10% of county residents are veterans), so it was likely that the project would be meaningful for many students; 2) the campus has many students, staff, and some faculty who are veterans, so it was easy to connect with the local veterans organizations via this existing network; and 3) anecdotes from personal veteran contacts indicated that they often felt ignored, underappreciated, or misunderstood by civilian community members, and this project looked like an opportunity to address that. Having students interview veterans seemed a way to honor their service, and in so doing would meet the spirit of service-learning pedagogy (specifically of striving to meet a real community need).

In this project, groups of 4-6 students were required to choose a research topic from a predetermined list from the textbook; examples of project topics included obedience, memory, stress, personality, and development from adolescence to adulthood. Students proposed hypotheses about how a local veteran would view their topic, wrote interview questions that would test their hypotheses, sought approval from the instructor for their questions and interview plans, and received in-class training on how to conduct a sound research interview and record data. Students were also instructed on how to identify common themes in veteran responses to their questions, and how to present their findings after the interview was complete. In preparation for this project, the Commander of the local Disabled American Veterans (DAV) chapter (to which all veteran volunteers belonged) was heavily consulted. Strong assurances were also provided to the DAV members that 1) students would not be permitted to ask personal questions about wartime or distressing experiences; 2) the instructor would painstakingly review all questions to make sure they were appropriate and contained no sensitive wording or content, and 3) all veteran volunteers would have the opportunity to review all interview questions before the interviews took place. When students completed their proposal consultations with the instructor, reword or replacement of questions would occur as appropriate. Professional and respectful conduct during the interviews was also strongly emphasized as absolutely necessary to their group's success. Students were also encouraged to consider their role in bearing witness to the thoughts and (if the veterans chose) experiences of their veteran interviewees as an act of service. Students were also reminded that the veterans were do-

ing a great service to them as students by volunteering time for the project. There were no adverse outcomes reported by the students or by the veterans in this project; rather, all verbal reports were positive in nature from both sides. Projects were graded in the SL the same way as in the OP. A summary of how these two projects compare in goals and tasks is presented in Table 1.

Table 1. Summary of Differences Between Observational and Interview Projects.

Research Component		Observational Project	Service Learning Project
Overall goal of project		Learn psychological research methods by carrying out a quantitative study of publicly observable behavior	Learn psychological research methods by carrying out a qualitative study of veteran opinions about psychological topics
Research topic		Developed by students	Offered by instructor
	Example	*Relation between obesity and restaurant choices*	*Humanistic theory of personality*
Research hypothesis		Regarding who would show specific behavior(s), or under what circumstances	Regarding themes emerging from veteran responses to student interview questions
	Example	*People with high body mass index (BMI) will more often choose to eat at buffet-style restaurants, than at similarly-priced deli-style restaurants*	*Veterans will tend to disagree with humanistic theory, especially with the assertion that all people are inherently good*
Data collection method		Quantitative, observational	Qualitative, interview
	Example	*Students went to both types of restaurants, observing 20 males and 20 females eating at each restaurant, recording BMI estimates (referring to a standardized pictorial guide)*	*Students wrote questions assessing beliefs about humanistic theory, and recorded answers during an interview (audiotaping with permission)*
Aggregating data, drawing conclusions		Typically averaging instances of target behaviors within groups (e.g., male/female, younger/older)	Team discussion and identification of most common themes emerging from veteran responses
	Example	*At the buffet-style restaurant, 75% of diners had BMIs within the obese range; at the deli-style restaurant, 30% of diners had BMIs within the obese range* *-Therefore, hypothesis was supported*	*Veterans shared mixed responses to questions about humanistic theory; though they referred to "some bad apples," they stated many times that most people are basically good* *-Therefore, hypothesis was partially supported*

Research Questions and Hypotheses

Each of these projects has been completed by more than one class over the past few years. Therefore it should be noted that this initial foray into assessing some important outcomes of these projects does not address every interesting aspect deserving of study, but focuses narrowly on the following hypotheses:

- that student knowledge of research methods would improve among students completing both projects (H1);
- that students in both groups would show increased interest in conducting research over the course of the project (H2);
- that only students completing the SL project would show changes in civic attitudes (H3); and,
- that veteran interviewees would report more positive attitudes about college students and our institution after participating in the SL project (H4).

Method

Participants

All student participants were enrolled in one of two introductory psychology courses during the fall of 2010 (total $N = 81$ at Time 1). In the OP group, 39 of 44 enrolled students completed the survey measures at Time 1 (88.6%). These students had a mean age of 21.0 years ($SD = 3.8$), and were comprised of 22 females (56.4%), 31 freshmen and sophomores (79.5%), and 35 Whites (89.7%). In the SL group, 42 of 44 enrolled students completed survey measures at Time 1 (95.5%). These students had a mean age of 20.9 years ($SD = 4.8$), were comprised of 26 females (61.9%), 37 freshmen and sophomores (88.1%), and 39 Whites (92.9%). Eleven students (13.5% of the total sample) completed measures at Time 1 but not Time 2; 6 (54.5% of all noncompleters) of those students were in the OP group, while 5 (45.5% of all noncompleters) of those students were in the SL group.

All veteran participants were invited to complete a brief survey before they were interviewed by students in the SL group. Ten of the 12 participating veterans provided informed consent to complete the survey (83.3%) at Time 1. One of these respondents did not report age, gender, or past participation in activities at our institution, but answered other demographic items. Veteran age ranged from 26 to 66 years, with a mean of 53.22 years ($SD = 13.74$); 8 veterans were male (88.9%), 9 were White (90.0%), and 4 (40.0%) indicated that they had participated in an activity at our institution previously. Seven of these 10 veterans returned a mailed survey 8 weeks after their participation in the SL project was completed; demographics of the Time 2 participants were thus largely identical to Time 1.

Table 2. Items Measuring Student Knowledge of Research Methods in Psychology.

The activities of human subjects researchers are carefully monitored by independent parties.
Human subjects researchers think a lot about the tools they use in their studies to measure human characteristics and behavior.
Human subjects researchers are only able to study people by performing experiments.
Human subjects researchers try to collect data to prove their own assumptions correct.
For a case study, a human subjects researcher studies a single person in great detail.
A "variable" in a research study is defined as the particular group of people that a researcher plans to study.
If a researcher uses random assignment in a study, it means that he or she is putting human subjects into study groups based on some characteristic they have in common (for example, putting all the men in one group, and all the women in the other group).
Deception of human subjects by researchers (that is, providing participants with misleading or untrue information) is permitted in some studies of human behavior.
Informed consent means informing human subjects of where they should go to participate in a study.
When collecting data with surveys, human subjects researchers should ask as many questions as possible to get as much data as they can on a topic.
A hypothesis is a statement the researcher makes about what he or she expects to find in a particular study.
Statistics are useful to human subjects researchers because they allow researchers to look at broad trends in their data, not just individual pieces of information.
"Sampling" refers to how the researcher selects what measurement tools to use in his or her study.
A correlation coefficient expresses the direction and strength of relationship between two study variables.
Once a researcher completes a study, its findings can be released to the public without any need for review by other researchers in that field.

Note. This quiz was developed solely for this research project; students did not earn points towards their grade on this quiz. Students answered each item on this quiz as either True or False. Scores were calculated by totaling the number of correct answers students provided.

Measures

Knowledge of research methods. A standardized measure of knowledge regarding psychological research methods could not be located for this project. Therefore, a 15-item true-false quiz covering basic concepts covered in the course was developed, focusing on research with human subjects (items provided in Table 2). Scores were totaled based on number of items correct for each student. No grades were assigned for scores on this quiz, and the items were not taken from any other assessment tools in the course.

Interest in performing psychological research activities. A standardized measure of interest in performing various research activities could not be located. Therefore, 7 items (provided in Table 3) that corresponded to the main tasks of both the OP and SL were composed, asking students to indicate their interest in each aspect of research (on a 5-point scale from 1, *not at all interested*, to 5, *extremely interested*). Mean responses to individual items were examined in study analyses.

Community service attitudes. The Community Service Attitudes Scale (CSAS; Shiarella, McCarthy, & Tucker, 2000) is a 46-item, theoretically-driven measure of college student attitudes regarding community service. The items assess 8 aspects of these attitudes in separate subscales. *Awareness* of community needs (CSAS-Awareness) is assessed with 4 items; perception of *Actions* that can meet the need (CSAS-Actions) is assessed with 5 items; perceiving one's own *Ability* to help (CSAS-Ability) is assessed with 3 items; one's sense of *Connectedness* to one's community that motivates helping (CSAS-Connectedness) is assessed with 6 items; one's sense that personal or situational *Norms* obligate one to help (CSAS-Norms) is assessed with 5 items; one's sense of *Empathy* for those in need (CSAS-Empathy) is assessed with 3 items; thoughts about *Costs* (CSAS-Costs) and *Benefits* (CSAS-Benefits) to oneself of helping, which are assessed with 6 items each; beliefs about the *Seriousness* of the consequences of not helping others (CSAS-Seriousness) is assessed with 5 items; and one's *Intention* (CSAS-Intention) to engage in community service or not is assessed with 3 items. Regarding CSAS-Intention, one of the original items assessed student interest in doing "this service-learning activity," an item that was only applicable to the SL group and thus not appropriate for this study. Therefore, that item was replaced with an item assessing past community service (*"I have participated in a community service project in the past"*). Students responded to all items on a 7-point scale, with 1 = *strongly disagree* or *extremely unlikely*, and 7 = *strongly agree* or *extremely likely* (with the scale points regarding likelihood applied only to CSAS-Costs and CSAS-Benefits). As indicated in Table 3, alphas for all scales were in the acceptable range at Time 1, and were nearly identical at Time 2. As past research has indicated few differences by gender on CSAS scores (Bauer et al., 2007), gender analyses were not attempted.

Veteran surveys. A standardized measure of attitudes about college students could not be located. Therefore, a 9-item measure was composed assessing various attitudes about college students aged 18-23 (see Table 4), containing 2 additional items regarding impressions of the institution. For the Time 2 survey, 7 items were added specifically regarding the SL. All items were answered on a 4-point scale from 1=*strongly agree* to

Table 3. Descriptive Statistics for All Study Measures by Student Project Group, Time 1.

Item or Scale	OP Group $n = 38$		SL Group $n = 41$	
	M	*SD*	*M*	*SD*
Human Subjects Research Quiz	11.39	2.39	11.24	1.95
Interest in Research Activities				
• Developing an original research question	2.71	1.21	2.95	1.05
• Reviewing past research on that topic	2.74	1.03	2.88	1.17
• Creating a method for collecting data	2.55	1.20	2.78	1.23
• The act of collecting data itself	3.08	1.38	3.41	1.22
• Organizing and analyzing that data to make meaningful conclusions	3.05	1.18	3.12	1.19
• Presenting findings in a public forum (e.g., research presentation)	2.61	1.37	2.88	1.25
• Writing up findings for publication in a journal or other medium	2.26	1.06	2.63	1.09

Community Service Attitudes Scale	α	*M*	*SD*	*M*	*SD*
CSAS-Awareness	.86	6.23	.65	6.17	.64
CSAS-Actions	.90	5.66	.77	5.65	1.04
CSAS-Ability	.90	5.26	1.04	5.30	1.15
CSAS-Connectedness	.90	5.10	1.07	4.84	1.11
CSAS-Norms	.94	5.92	.73	6.01	.92
CSAS-Empathy	.72	5.59	.98	5.48	1.06
CSAS-Costs	.80	4.84	.90	4.77	1.16
CSAS-Benefits	.86	5.81	.89	5.81	.90
CSAS-Seriousness	.86	4.79	1.01	5.01	1.10
CSAS-Intention to Engage	.84	4.99	1.60	4.85	1.54

Note. Data from two students, one in the OP Group and one in the SL group, were eliminated from these analyses due to being extreme outliers on the CSAS scales. *T*-tests of means over the two groups revealed no significant differences on any of these variables at the beginning of this study.

Table 4. Veteran Survey Items, and Reported Attitudes Towards the SL Project.

Item	Time 1		Time 2	
	FAV	UNFAV	FAV	UNFAV
I very much enjoy interacting with college students.	100	0	100	0
I believe that college students are very hard-working.	100	0	85.7	14.3
I believe that college students express gratitude for the benefits they enjoy in their lives.	100	0	57.1	42.9
I believe that college students are informed about current events.	90	10	85.7	14.3
I believe that college students mostly make choices that benefit only themselves.	10	90	42.9	57.1
I believe that college students are not very patriotic.	60	40	57.1	42.9
I believe that college students work hard to improve society.	90	10	57.1	42.9
I believe that college students hold themselves to high moral standards.	90	10	42.9	57.1
I believe that college students are not very respectful of others.	80	20	71.4	28.6
I think that college students should perform community service as part of their education.	-	-	100	0
My impression of IU Kokomo has been generally positive up to this point.	10	90	100	0
My views of students attending IU Kokomo are generally positive.	90	10	100	0
I found participating in this interview activity interesting.	-	-	100	0
I found this interview activity personally satisfying.	-	-	100	0
I felt that the questions students asked were interesting.	-	-	100	0
I felt that I personally benefited from participating in this activity.	-	-	100	0
I believe that the students found this activity beneficial.	-	-	100	0
I would be willing to participate in a similar activity at IU Kokomo in the future.	-	-	71.4	28.6

Note. Items 1-9 and 11-12 were administered at both Time 1 and Time 2; items 10 and 13-18 were only administered at Time 2. "FAV" refers to percentages of respondents indicating favorable attitudes toward students or the project, while "UNFAV" refers to percentages of respondents indicating unfavorable attitudes towards students or the project.

4=*strongly disagree*. Because of the very small sample size in this study, only descriptive data for individual items on these measures were examined.

Procedure

During the second week of the semester, a trained research assistant administered all student measures in class. This administration occurred 1 week after an in-class lecture overviewing research methods in psychology. The second administration occurred during the 12th week of class, after the students had spent several weeks working on their projects (either OP or SL) but before their final in-class presentations on their projects were given. At both administrations, students provided informed consent and were offered extra credit for participation. As noted above, veteran participants were asked for consent to participate when they arrived for their student interviews, before meeting the students; they received their Time 2 informed consents and surveys by mail 8 weeks after the interviews were concluded, and returned them in pre-addressed envelopes. All aspects of this study were reviewed and approved by IRB.

Results

Means and standard deviations by group for all student measures at Time 1, as well as alphas for the CSAS measures, are provided in Table 3. Examinations of these variables revealed that two variables, CSAS-Awareness and CSAS-Ability, were highly skewed; a square root transformation to correct this skewness was performed on these variables before running the necessary parametric tests. Independent sample *t*-tests of means for all Time 1 variables were nonsignificant, indicating that the two groups of students were equivalent on all variables at the beginning of the study.

To address H1 regarding knowledge about psychological research methods, paired *t*-tests for the human subjects research quiz scores from Time 1 to Time 2 were performed. In the OP group, scores on the research methods quiz decreased significantly from Time 1 to Time 2 (*M*'s 11.63 to 10.78, $t(1, 31) = 2.47$, $p < .05$). In the SL group, scores on the human subjects quiz did not change from Time 1 to Time 2 (*M*'s 11.31 to 10.89, $t(1, 35) = 1.52$, *ns*). This result was contrary to the hypothesis that students in both groups would improve on their knowledge of research methods. However, it should be noted that students first completed this quiz one week after having heard a lecture on the topic, perhaps contributing to inflated Time 1 scores; by the time they took this quiz again, 10 weeks had passed. So the appropriate interpretation of this finding may be that completing the SL project contributed to greater savings of information related to research methods, compared to completing the OP project.

To address H2 regarding interest in performing research activities, paired *t*-tests were performed, this time for each of the 7 measured activities associated with research. In the OP group, one of these comparisons resulted in a significant change from Time 1 to Time 2, with students reporting decreased interest in organizing and analyzing data (*M*'s 3.03 to 2.50, $t(1, 31) = 2.79$, $p < .01$). In the SL group, none of these comparisons were significant; that is, there were no significant changes in the SL group from Time 1 to Time 2

in student interest in any measured research activity. This is interesting given that at Time 2, all students were in the stage of the project that required aggregating and interpreting the data they had collected; perhaps this finding can be interpreted to mean that students found quantitative data analysis to be less interesting than qualitative data analysis. This would imply that in terms of student experience of performing psychological research, the SL project was slightly better able to hold student interest than the OP project.

To address H3 regarding attitudes about community service, paired *t*-tests of each of the CSAS scales from Time 1 to Time 2 were performed. In the OP group, there were no changes in any of these variables from Time 1 to Time 2 (e.g., none of the *t*-tests were significant). In the SL group, there were also no changes in these variables from Time 1 to Time 2. As student age was thought to be a possible moderating factor in civic attitude change, each group of students (OP vs. SL) was divided into two age groups by median split. The median age in the OP group was 20 years, while the median age in the SL group was 19 years. In the OP group, no significant differences on any of the CSAS scales were found among younger or older students. However, among younger students in the SL group, CSAS-Empathy increased from 5.50 to 5.93, $t(1, 17) = -2.16$, $p < .05$. Among older students in the SL group, CSAS-Norms decreased from 6.14 to 5.73, $t(1, 18) = 2.87$, $p = .01$. In accord with hypotheses, then, civic attitudes changed significantly only among students completing the SL project; the few changes that were revealed, though, varied by age.

To address H4 above regarding attitudes of veterans participating in the SL project, I examined percentages of veterans generally reporting favorable or unfavorable views towards college students or the project before and after their participation (no inferential tests were attempted). It appears safe to conclude based on these descriptive findings (reported in Table 4) that attitudes towards college students may have changed pre to post participation in this project, perhaps becoming less idealized and more reality-based. Throughout the process, veteran interviewees reported overwhelmingly positive experiences of the project itself after participation, and participation in this project may have contributed to some desirable changes in their opinions about the educational institution.

Discussion

This study is unique in examining whether service-learning projects can serve as a vehicle for instructing college students about research methods using human subjects. Teaching research methods via experiential learning has been shown to be helpful in both course content mastery (Bringle & Hatcher, 1996) and personal development (Searight et al., 2010), important findings given that human subjects research is challenging to engage students in via traditional lectures or assigned readings. As service-learning is a form of experiential learning which appears to confer broad personal and academic benefits (Deeley, 2010; Kenworthy-U'Ren, 2008; Sessa, London, Natale, & Hopkins, 2010), it is important to investigate its potential in relation to teaching human subject-based research methods used in not only psychology, but also sociology, communications, public health, and even business and economics. Given concerns about the burdens on faculty regard-

ing the time required to arrange and assess service-learning projects (Heckert, 2010; Bulot & Johnson, 2006), it is especially important to assess the value of incorporating such projects into the curricula of introductory-level courses, where coverage is broad and time is limited.

The main findings of this study did not all conform to hypotheses. Scores on knowledge of research methods did not increase over the course of the term in either the OP or SL group (who scored equally well at Time 1), contrary to expectations. However, as already noted, this may have been due to the timing of administration of the measure relative to in-class coverage of research methods, resulting in inflated Time 1 scores in both groups of students. Interestingly, though, these high knowledge scores remained unchanged in the SL group through the end of the term, while they fell significantly in the OP group. This can be interpreted as evidence that service-learning projects may contribute to better retention of information about research methods compared to projects using other experiential methods to teach the same material. Such a finding should be viewed as significant given that introductory-level courses provide a foundation of knowledge that advanced courses later draw upon. Greater retention of knowledge of research methods may therefore confer benefits extending into upper-level courses in that discipline (though this is of course an empirical question requiring later investigation).

Also contrary to expectations, there was no evidence for overall increases in student interest in performing human subjects research in either group; in fact, students in the OP group actually reported decreased interest in aggregating and analyzing data by the end of the term. However, students in the SL group showed no such drop in interest in data analysis. In a mixed group of students such as that which typically enrolls in introductory psychology (or other introductory-level courses in the disciplines already mentioned), any pedagogy which does not "turn off" students to research methods deserves consideration by instructors. Therefore, service-learning may be a worthwhile option.

In accord with expectations, only students in the SL group showed changes in their attitudes about community service over the course of the term. However, those changes varied with student age, and were not in the direction that might have been anticipated. For younger students performing service-learning, significant increases in empathy were detected. This echoes past research (Lundy, 2007), and could be expected. For older students performing service-learning, however, significant decreases in one's sense that personal or situational norms obligate oneself to serve others, were found. This finding seems counterintuitive and even undesirable at first; however, one possible (and less troubling) explanation for this is worth considering. Many of the older students in this study were local community members who may have been aware of community needs, but unaware of the ways in which veterans continued to serve the community long after their enlistments ended. These more mature and sophisticated students were observed to most often lead the interactions with the veterans during interviews, and during their interactions often inquired about various issues of local importance. Perhaps these interactions helped these students become more informed about the many ways in which local veterans were working to better the community. Therefore, when responding to survey items assessing present need for volunteers, these students may have recalled these con-

versations and felt that community needs were being addressed more effectively than they had previously believed. If intentions to volunteer had correspondingly decreased in this group, this finding would be more troubling; however, there was no evidence for this. Therefore, this finding may simply represent students in this group becoming better informed about the active role of veterans in the community. Regarding instructor time to prepare each project, the SL project did require approximately 7-8 more hours of time to prepare than the OP project, but that investment appears justified by various results favoring the use of service-learning.

The inclusion of veteran surveys in this study was made to address a long-standing problem in research on service-learning: lack of attention to how community partners view their participation in service-learning projects (Bringle & Hatcher, 2006). For example, the meta-analysis previously discussed (Conway et al., 2009), did not attempt to quantify findings about community partners, possibly because the studies included in their analysis did not report such data. In this study, it was interesting to see how veterans viewed college students before and after interacting with them. It appeared that these veteran participants had some idealized notions about today's college students (e.g., that students are hard-working, moral, grateful, informed about the world, and respectful of others), and that some of those ideas may have become more nuanced or even negative after the actual interactions. In addition, it was very interesting to see the wide divide between how these veterans viewed college students before the interviews (e.g., overwhelmingly positive) compared to how they viewed the educational institution (e.g., overwhelmingly negative). Given the prominent role that institutions of higher education often seek to hold in communities, it may be of use for researchers or campus administrators to learn more about how active and engaged members of the community view different aspects of their local campus. In this small but influential sector of the community, attitudes about the institution appeared to completely "flip" after participation in this project. Considering the various concerns that the veteran group had about what the experience would be like for these volunteers, it is very reassuring to know that this project appeared to be conducted appropriately and to their satisfaction.

Limitations and Recommendations

Several limitations must be acknowledged which may have impacted the study results. Assignment of students to conditions was nonrandom; it may be that students who enrolled in the class which did the SL project (which met in the morning) differed in motivation or conscientiousness from students who enrolled in the class which did the OP project (which met in the afternoon). However, whether this was the case is unknown. It is also possible that instructor investment of additional effort preparing the SL project changed student perceptions of instructor enthusiasm or expectations regarding that project. Changes in these perceptions might have been reflected in reported student attitudes about interest in research or community service. A limitation already acknowledged is that some measures used in this study were developed specifically for this research, and thus may be limited in their validity. It is also a limitation that the sample of veterans in this study was too small for inferential tests to be performed. Future studies should seek to address some or all of these issues if possible. In addition, studies which seek to un-

cover exact mechanisms of student change (rather than just the end outcomes of those changes; e.g., Sessa et al., 2010) should continue to be attempted, particularly among diverse groups of students in different kinds of communities.

Despite its limitations, the findings of this study may be useful to instructors in various fields who wonder whether incorporating service-learning into their courses is worth the effort and time. The standard coverage of most introductory-level courses in various disciplines includes the main research methods of that field, and in disciplines where human subjects research is performed, experiential learning has been shown to add pedagogical value. As it is a goal to have students recall information for the long term, the present findings indicate that service-learning may do that more effectively than some other kinds of experiential learning. In addition, the fact that younger students doing service-learning in this study developed greater empathy towards community members in need is also a finding that instructors in diverse fields should find persuasive. As college education ideally leads to not only better employment opportunities, but also a greater sense of oneself as a needed member of the community, increasing student empathy for others should be strongly encouraged.

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