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Goal Orientation in Political Science Research Instruction

Ian G. Anson¹

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Abstract: In recent years, scholar-educators have examined a variety of new approaches for teaching research in political science. Many of these inquiries begin with the observation that research activities cause some students to experience trepidation and aversion. The result is often poor performance in courses which assign research. In this project, I review and assess an approach to student research which focuses upon goal-orientation as a determinant of engagement. In doing so, I introduce three strategies for reconsidering goal orientation in the political science classroom. These include client consulting, low-cost survey deployment, and exit polling. These project-based courses are designed to reorient student attitudes towards the research process thanks to the identification of an external audience. Based on a pilot study of a goal-oriented learning experience, results provide suggestive evidence for the benefits of this approach in the undergraduate research setting.

Keywords: Undergraduate Research, Research-Based Learning, Active Learning, Scholarship of Engagement

¹ Assistant Professor, Department of Political Science, University of Maryland, Baltimore County. 1000 Hilltop Cir., 305 PUP, Baltimore, MD 21250. iganson@umbc.edu

In recent years, scholar-educators in political science have reinvigorated discussions about how to improve research methods instruction. These inquiries are motivated by the observation that students often lack feelings of efficacy when engaging in undergraduate research (e.g., Druckman 2015; Hubbell 1994; Murphy 2015; Rom 2015). Many scholars have admitted that among contemporary undergraduates in political science programs, the research enterprise is frequently viewed with fear and disinterest (e.g., Hubbell 1994). Not only are students anxious about having to design and test empirical hypotheses, they also often dread having to employ empirical tools (quantitative or otherwise) to evaluate these hypotheses. Some students may also experience *stereotype threat* when engaging in research in the undergraduate classroom, resulting in anxiety-induced performance gaps across gender or other descriptive characteristics (e.g., Cassese et al. 2015; Steele and Aronson 1995).² Given this situation, it is no wonder that many instructors struggle to convey the excitement they feel when performing their own research to their students.

I argue that students often feel little motivation or excitement when asked to perform undergraduate research because they (often rightly) believe their finished product will have no tangible *real-world impact* or importance. Students' classroom experiences often omit the most important dynamic of truly exciting research: the knowledge that the research will surpass the confines of one's computer (or the columns of a gradebook) to impact a meaningful audience.

Goal-oriented learning theories assert that writing should be performed in order to solve a problem, enlighten others, clarify a theory, or lead to personal edification, among other intrinsic intentions (e.g., Flower and Hayes 1981).³ The objective of the present study is to describe and examine three strategies for goal reorientation among undergraduate researchers in political science. The goal-orientation approach is expected to increase students' level of engagement with the research process, resulting in heightened content acquisition and decreased "methods-aversion."

Goal orientation can be manipulated through a variety of pedagogical innovations. In particular, I argue that the *type of data* analyzed by student researchers is a critical determinant of engagement. This is because specialized data collection procedures can yield benefits to real-world audiences for student research.

Many undergraduate research experiences require the analysis of "canned" datasets which have been collected by a third party. Students often choose variables from a common

² As students possess culturally-inscribed perceptions of the 'stereotypical researcher', those who reflect on differences between their own characteristics and this model become increasingly concerned about successfully completing the research task—potentially to the detriment of their performance.

³ Note that by goal-orientation I refer to the pursuit of intrinsic goals such as autonomy, competence, and relatedness (e.g., Vansteenkiste et al. 2008). These intrinsic goals can be contrasted with extrinsic goal orientations, which are more closely associated with the short-lived 'instrumental' goals I identify below.

codebook for their analyses, resulting in the creation of many nearly-identical projects semester after semester. In the present study, I draw on recent research in political science education to present and summarize three strategies for the acquisition of goal-oriented datasets. These data increase the *stakes* of students' research vis-a-vis real-world audiences, as those audiences can use the data collection to inform their own practices and interests.

From 2017-2018, I assigned three semester-long projects in upper-level seminar courses. These courses took place at a mid-size Carnegie high research activity state university. First, the "national survey" project gave students in one section an opportunity to include survey questions of their own design on a large national survey omnibus (N = 510). The second project, the "client consulting" project, reoriented students' goals by asking them to work as research consultants for a nonprofit community organization. Finally, the "exit polling" project allowed students to design and field a county-wide election exit poll. The poll, deployed during early voting and on Election Day at eight polling places, would reach over 500 voters during the 2018 midterm elections and garner media attention.

One of the three projects, the national survey project, provided the opportunity for a pilot study of student attitudes and learning outcomes (N = 26). Using a pre-post survey instrument combined with qualitative interviewing techniques, I assess the impact of the national survey experience on student interest in research, confidence in performing future research, objectively-assessed research skills, and content knowledge. The results of this pilot study provide suggestive evidence in favor of increased student enthusiasm, strong performance on a content knowledge battery, and a reduction in stereotype threat. In a concluding section, I comment on the diversity of approaches available to scholar-teachers who seek to reorient students' goal-setting behavior through the acquisition of real-world data.

Research on Student Research

Existing research on the undergraduate research experience largely examines core methods courses. As these courses are often required for political science majors, many scholars have recently examined avenues for improvement of these course experiences. Some work has focused on new techniques for presenting the basics of research design, using tools like data visualization, new standards and models, scaffolding assignments and active-learning strategies, and peer template modeling (e.g., Kollars and Rosen 2017; Fisher and Justwan 2017; Marfleet, Dille, and Dille 2005; Murphy 2015). Others focus on ways that instructors can incorporate departmental and university resources in order to guarantee student success, either by inviting librarians to actively participate in the course administration experience, or by coordinating across the department to ensure that students possess sufficient prior experience in political science to guarantee success (Bergbower 2017; A. Shannon and Shannon 2016).

Other existing research has focused more attention on the student experience, especially given the discovery that many political science students express substantial amounts of "math aversion" when queried (Buchler 2009). Bernstein and Allen (2013), for example,

propose low-stakes assessments and a draft model as a potential pathway to student success. Other work has taken on the problem of stereotype threat in student research. Cassese et al. (2015), for example, propose the design of a course which combines research design with the study of gender politics to help overcome this form of threat among women enrollees.

Among these contributions, some have recently focused on overcoming student apathy towards research. One proposal is to involve students in the instructor's research enterprise (Druckman 2015; Huerta 2015). Druckman (2015) proposes a course design in which students participate in an instructor's quest for publication in a scholarly journal. By bringing students on as collaborators in "research teams", students contribute to the project's completion and eventual submission for review. Other scholars have examined the effectiveness of exit polling as a way to increase student engagement towards research (e.g., Grimshaw et al. 2004; Berry and Robinson 2012; Emery, Howard, and Evans 2014). These studies show that students' efforts in polling real voters engenders enthusiasm and intimate knowledge of the voting process.

Currin-Percival and Johnson (2010) provide a third potential model for project-based student learning. In a quasi-experimental design, the authors examine how students' knowledge of research methods is improved by participation in a random-digit-dialing survey project. The project, deployed as part of a course on public opinion, asked students to work in an experiential laboratory in which public opinion polling was conducted throughout the semester (See also Cole 2003; Jones and Meinhold 1999).

Together, these contributions give us a strong foundation for a unified theory of goal orientation in political science student research. In the next sections, I define goal orientation and identify *novel data generation* as the principal source of the reviewed strategies' effectiveness. Then, I compare three strategies for goal orientation: the exit poll, the national survey, and client consultation—the latter approach having been rarely examined in the literature. I conclude by assessing the evidence for each method's effectiveness.

Goal-Oriented Learning

Writing studies research tells us that when writing for a course, beginning writers often reflect first upon the *purpose* of their composition (Cho and Choi 2018; Flower and Hayes 1981; Magnifico 2010). Rooted in research on goal-oriented learning, this purposive approach assumes that intrinsic goals dramatically increase motivation and learning (e.g., Ryan and Deci 2000). Novice writers target specific goals—either implicitly or explicitly identified—as the motivation for their composition (Bruning and Kauffman 2015). As a result, beginning writers are very sensitive to interventions which influence their perceptions of a composition's genre, purpose, and expected audience.

In order for a writer to more consciously reflect upon personally-meaningful goals, they must identify the existence of a "rhetorical problem." Ultimately, a composition finds purpose when it solves important problems like an audience's lack of awareness of an issue, a gap in the scientific literature, or an unsolved issue in a local community. By

identifying the topics, audiences, and exigencies that constitute rhetorical problems, students generate compelling reasons to improve their writing. The result is increased motivation, as the attainment of external problem-solving goals surpass the basic motivations inherent to course projects. Students only feel a strong sense of purpose in their writing when external goals and audiences are clearly identified prior to engagement in the task (Flower and Hayes 1980).

Otherwise, undergraduates often fall back upon *instrumental* goals, like the desire to complete a paper with a minimally satisfactory score, or the desire to please the instructor.⁴ These goal orientations often result in lackluster performance. Some intimidated—but otherwise competent—students may lower their expectations further due to stereotype threat, faltering self-confidence, and other insecurities (Zeidner 1991). In this way, students who “just hope to pass” or who are “aiming for a C in this course” fall victim to their own instrumental goal-setting. Students and instructors leave the writing experience frustrated and dissatisfied.

When it comes to extensive projects featuring well-defined research questions, theories, hypotheses, methodologies, empirical analyses, and discussions, the problem of instrumental goal-setting is particularly acute. As task complexity increases, the appeal of “mailing it in” for a minimally-satisfactory grade becomes greater for busy, stressed students (e.g., C. J. Evans, Kirby, and Fabrigar 2003). When students encounter the arduous process of research and yet lack meaningful goal orientation, the resulting efforts are often uninspired.⁵

Data sourcing is a critical avenue for goal reorientation in political science. The current approach seeks to expand the goal orientation of a semester-long research project in two principal ways. It grants ownership of the “front end” of the research design to students, while simultaneously convincing students that successful completion of the research project can serve external goals. These include assisting local residents in need, contributing to scholarly research, communicating novel findings to a local audience, and informing public-sphere debate about a topical issue. However, these goals can only be attained if students possess a vehicle for the generation of truly novel empirical observations.

⁴ This nomenclature corresponds to the ‘extrinsic’ goals identified in some scholarship on goal orientation (e.g., Ryan and Deci 2000).

⁵ Some readers might be inclined to wonder whether students’ preparations, rather than their motivations, are the principal cause of poor performance in methods courses. It is certainly possible that some students fail to grasp key concepts in research due to their weak quantitative and critical reasoning skills. However, the present study examines goal orientation because unlike students’ high school or community college preparation, this is a variable over which instructors can assert control.

Goal-Oriented Approaches In Practice

An effective goal-oriented approach to student learning views the classroom as a laboratory with few “right answers” and rare instances of top-down theorizing. Instead, students are asked to consider their prior expectations about a topic, and to generalize conclusions by examining evidence from specific cases or attempts at the completion of a task (Prince and Felder 2006). In physics education, this approach has been successfully applied to basic and advanced topics. Instead of introducing a concept through lecture, instructors using this method will ask their students to replicate a classic experiment that will reveal the concept. Students analyze the empirical data they have collected, in order to discover the principles for themselves. Afterwards, a debrief provides further detail about the subject and its modern applications. One basic example from elementary physics is the force-sensor experiment. Students vary the mass of rolling blocks and measure their force and acceleration, in an attempt to inductively derive the formula $F = m * a$ (Hestenes 1987).

As this example demonstrates, inductive approaches work well when students play an active role in the collection of data that inform a meaningful theory. By marrying this insight with the literature on goal orientation, we arrive at a strategy for activating student engagement that is of special utility for political science research. Instead of offering students data with little relevance to real-world affairs, students can be tasked with the inductive generation of data that will be of interest to an external audience.

If instructors can grant students the opportunity to acquire real-world data, they can also identify an external audience that will be interested in receiving students’ research findings. Whereas in the physics classroom, students will likely receive little outside attention for deriving basic Newtonian equations, politics and adjacent topics are perennially important for local audiences. If an instructor can identify a data collection strategy that will reveal important findings to the local audience, can more effectively bring students’ research experiences to life.⁶

Below, Table 1 enumerates a series of steps that instructors can consider when seeking to design a goal oriented research project. These steps should be accomplished far in advance of the first class meeting.

[Table 1 about here.]

These five steps summarize the goal-oriented approach. Instead of beginning the course with a stock dataset on hand and a list of acceptable research questions, students are presented with a mission. This is because instructors will have already sought out a

⁶ It is similarly possible for instructors to identify a variety of audiences stemming from a single data generating exercise. For example, one might imagine a variety of audiences stemming from the collection of exit poll data. Local journalists, incumbent politicians, campus stakeholders, activist groups, and nonprofits might all benefit from tailored analyses of exit polls.

relevant audience, such as a community organization or a local political constituency (Step 1), and found ways to reach that audience through some form of communication (Step 2). Going further, instructors will have thought carefully about how to generate data that will be informative to this audience (Step 3). Next, they will have synthesized this data collection exercise within to the broader learning objectives and plan of the course in question (Steps 4 and 5). Without careful thought invested into these steps, a goal-oriented research project can be seriously compromised.⁷

In the next sections, I introduce three examples of goal-oriented research projects in action. Before further detailing these pedagogical approaches, I find it important to echo several caveats expressed by Druckman (2015) in his work on teaching research methods. The next section details just three possible solutions among many that can solve the “enthusiasm gap” in student research. These approaches were specifically tailored to upper level courses in research methods, public opinion, and voting behavior, respectively. The same conceptual framework of inductive learning, real-world data generation, and goal reorientation can apply to courses across a wide variety of substantive topics—to say nothing of the panoply of methodological approaches available to students of politics. The same approach could be adapted to case study methods, content analysis, interviewing, experiments, archival research, and a number of other forms of data collection.

Project 1: The 2017 POLI Omnibus Project

The 2017 POLI Omnibus Project was the title of a large-scale national survey conducted by students in the Fall 2017 section of an upper-level special topics course entitled “Public Opinion”. It had a total enrollment of 26 students. The omnibus covered political and social topics, with an emphasis on issues of importance in contemporary public opinion research, as well as current events. The omnibus was entirely conceived, organized, pre-tested, and distributed by students enrolled in the course. The overall N of the survey totaled 510 respondents from across the United States. Respondents were recruited on the Amazon MTurk platform, and responses were collected using the Qualtrics survey platform. Students applied for and received IRB exemption prior to the implementation of the survey.⁸

At the outset of the semester, students were told that they would have the opportunity to poll a large number of Americans about whatever political topics they wanted to investigate. To arrive at topics that would reorient students’ goal-setting, the class engaged in small-group and large-group discussions. During these sessions, students identified what kinds of public perceptions they thought were understudied, personally interesting, or

⁷ In keeping with the points introduced in an earlier footnote, it is also possible to exchange the positions of steps 1-2 and 3. Sometimes, instructor might first encounter a unique opportunity for data generation that might be of interest to a variety of audiences. Thanks to an anonymous reviewer for this point.

⁸ IRB exemption for the present SoTL study was also applied for and approved with UMBC IRB Approval #Y18IA18036.

interesting to a nonspecialist audience. The array of topics identified by the students far surpassed the theoretical scope of even the most inclusive national political omnibus surveys. A brief summary of these topics is shown in Table 2.

[Table 2 about here.]

As seen in Table 2 above, the agenda of student research was far-reaching in scope. Popular topics included the role of new media in shaping and structuring public beliefs, the causes and effects of perceptions of the President, Congress, and political parties, and the U.S. prison system. While surveys like the World Values Survey (WVS), the American National Election Study (ANES), or the Cooperative Congressional Election Study (CCES) provide insight into many of these topics, no existing survey simultaneously treats these subjects with the same level of detail or theoretical focus. As students developed topics, read peer-reviewed literature on their subjects, and guided each other through the process of question identification, their questions began to congeal into tractable subjects of political analysis. It was at this stage that students were introduced to the logic of theorizing, operationalizing, and formal hypothesis testing.

Students next worked inductively to write a survey omnibus on the Qualtrics survey platform. They devised survey questions through group work, discussed the fit between measurement and concept, and tinkered with question wording and response options. One student devised a question tapping beliefs about the institution of an official language in the U.S. Through small-group discussion, the student came to realize the importance of a preamble which explains the subject to respondents, ultimately arriving at the following question wording:

An official language is a language that is approved and legalized by the government. That language is used to conduct business, used in courts of law, printed on ballots, and taught in schools. Do you think that English should be the official language of the United States? (Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree)

After the students' questions had been refined, group discussion took place, in which students debated issues like question order, randomization, satisficing, item nonresponse and other concerns. They collectively approved the questionnaire and distributed it on Amazon MTurk in November 2017. Students took great pleasure in watching the response collection occur in real time. The next week, students began to view and analyze the data on the Qualtrics platform, using histograms and crosstabs to assess relationships and to describe the sample. Students were introduced to the logic of crosstabulation and the interpretation of χ^2 statistics and p-values. At this point, students workshopped their final projects and informally presented findings at a "research symposium". The semester project concluded in December.

Project 2: Consulting for the CHOICE Program

The Choice Program, organized under the direction of the Shriver Center at UMBC, seeks to intervene in the lives of at-risk youth in Baltimore City and its surrounding counties (<http://choice-staging.umbc.edu>). It calls on the service of more than 50 Americorps volunteers in order to perform services across the Baltimore metropolitan area. One of its

highest-impact services is the Choice Intensive Advocacy Program, which pairs volunteers with youth as an alternative to incarceration. Young participants must complete daily face-to-face visits with caseworkers at their places of residence, schools, and/or in the community. Choice Program administrators expect that this program will reduce youths' risk of criminal recidivism while reducing costly and dangerous experiences of incarceration.

While the Choice Program collects a large amount of data on the visits performed by its workers and the youth themselves, they have recently experienced a backlog in the analysis of these data. Undergraduate political science students enrolled in a methods course were called upon to remedy this situation. The course took place in Spring of 2017, and included 13 advanced undergraduates. The students roleplayed as "research methodology consultants," working in teams to assess the research questions of the client, the features of collected data, and the types of analysis necessary to find results. The seminar met once weekly for a 2.5 hour time period. In each session, students collaborated in thinking about how to answer the Choice Program's key descriptive and inferential research questions after learning about specialized research topics such as data visualization, aggregation, analysis of variance, regression diagnostics, and lowess smoothing.

Prior to an initial meeting with Choice Program administrators in Spring of 2017, the class discussed the program, its goals, and the potential impact of consulting for the program on community outcomes. Students in the course unanimously agreed that the Choice Program was providing an essential service that might serve to improve the lives of residents of Baltimore City. They also agreed that consulting for the program would be beneficial to its service delivery. The goal reorientation process occurred as a result of these discussions, as students developed a sense of responsibility to engage in high-quality work in order to best serve the goals of their community partner. Representatives from the organization were next invited to participate in a Q&A meeting, in which the students collected information about the program, the data they were to analyze, and the range of research questions that the program had in mind.

The project required students to comb through nearly 500,000 individual records of meetings with at-risk youth (around ten visits per volunteer per day over a three-year period). The data had been hand-recorded by volunteers using an unwieldy database front-end, and as such, records were prone to errors and omissions. Undaunted, students cleaned and analyzed this data to determine how the timing, locations, and frequency of visits associated with successful completion of the program. At the conclusion of the course, students presented their findings to Choice Program administrators, fielding questions and speculating as to the broader meaning of the findings.

Ultimately, students felt a sense of satisfaction in knowing that the Choice Program had benefited from their high-quality work. Excerpts from their final projects were curated by the instructor and relayed to the program, and the program responded by offering their thanks to each student.

Project 3: The 2018 Retriever Exit Poll

In November of 2018, students at UMBC conducted an exit poll of Baltimore County voters. This large, diverse, and populous county, home to nearly a million people, is also a pivotal political bellwether in the state of Maryland. Baltimore County has almost always voted for the winning Gubernatorial candidate across its history—an especially salient observation given that 2018’s general election was uniquely interesting to observers. The election pitted incumbent Republican Governor Larry Hogan against a progressive Democratic candidate, Ben Jealous, in a state well known for its large base of Democratic support. The anomalous nature of Hogan’s moderate Republican governorship stood in contrast to the national background of political polarization, declining ticket-splitting, and growing partisan hostility (Mason 2018). Understanding why Baltimore County voters supported Hogan in 2018 represents a critical case in the study of American voting behavior.

With the election only a few months away, students at UMBC enrolled in an upper-level courses entitled “Voting and Political Behavior.” Unbeknownst to these 25 enrollees, the final project in the course would ask them to analyze data they would collect through participation in the inaugural Retriever Exit Poll. But going further, the exit poll itself would be designed and implemented by those same students; every survey question, every design decision, and every response collected would be entirely the responsibility of the students enrolled in the course.

In the first eight weeks of the course, students learned the basics of survey design while simultaneously acquiring content knowledge related to voting behavior. As the semester went on, students used part of the two-and-a-half hour class session for breakout sessions, in which groups formulated research questions and identified topics of interest. Each week, news articles related to the 2018 election were posted to the course’s LMS platform. Students wrote weekly reading responses to these news items, critically evaluating the news in light of the theories introduced in the week’s substantive reading. These low-stakes exercises culminated in a questionnaire design session that lasted the full period. Students collaborated using a Google Doc to debate, edit, and finalize question wording in real time. Students ensured that items related to each group’s research questions were included on the survey. The final course session before survey deployment incorporated a pre-test, in which students took the survey and corrected last-minute problems.

The exit poll was implemented as a paper survey, distributed at eight polling precincts selected to maximize basic demographic representativeness at the county level. Students worked in teams of 3 over four hour time slots, reaching out to voters using informed consent scripts.

At the conclusion of the course, students performed quantitative analyses of the exit poll data in their final projects. As there were no formal course prerequisites, the analyses relied upon basic bivariate tools such as crosstabs and their associated p-values (based on χ^2 tests). Student researchers were also asked to perform a low-stakes reflection on their experience at the polls.

The high point of the semester was the release of the poll's results at the 2018 Election Night Extravaganza, hosted by the UMBC Political Science Department and the Student Government Association. Students, wearing t-shirts emblazoned with the words "UMBC Political Science" and the University's athletic logo, cheered the release of the topline to the attendees at the event. Later, these results were written up as an op-ed in the *Baltimore Sun*, and appeared in the online and print editions.⁹ All course enrollees' names were listed as co-authors of the op-ed. Students were able to share their work on social media and some sent the print edition home to their parents. Students' work was therefore communicated to a wide variety of audiences of relevance to their lives—families, student peers, local political observers, and Governor Hogan himself, whose campaign manager wrote to congratulate the students on their efforts.

Comparing Goal Oriented Approaches

The three goal-oriented approaches described above vary in several respects. First, we must consider the degree and nature of investment on the part of both instructors and students. One explanation for why goal-oriented research projects are relatively rare in the discipline is that such data collection exercises require a great deal of "front-end" work on the part of the instructor. To summarize these considerations, Table 3 presents a side-by-side comparison of the three research projects described above.

[Table 3 about here.]

Table 3 first shows us that the goal orientation of each project is related to the audience that the students are expected to consider when writing. In imagining a goal-oriented learning project it is important to consider which audience is likely to stimulate student interest and 'buy-in' to the greatest degree. It is incumbent upon the instructor to make this audience as relevant as possible for students in the course. In the national survey project, the audience includes the university community and other students in the course, as well as the broader scholarly community. Students were encouraged to develop innovative question wording for their projects because this would increase the research's relevance for these audiences. In the consulting project, the audience was the community organization, who relied upon the course enrollees for data analysis. Finally, the university exit poll provided perhaps the most dramatic goal re-orientation, as students were told the results would be shared with the local political community as well as the media.

The costs of these projects were often substantial, however. The national survey was the most expensive, costing around \$1,000 due to the length of the survey and rising fees on Amazon MTurk. The exit poll cost around \$500, due to the need to print the surveys, purchase snacks and drinks for poll workers, print t-shirts, and source office supplies. While not all of these purchases were requirements for the poll's success, the t-shirts

⁹ <https://www.baltimoresun.com/opinion/op-ed/bs-ed-op-1130-retriever-poll-20181129-story.html>

(which formed the bulk of the expense) were instrumental in legitimizing the poll workers in the eyes of prospective survey takers.

Based on qualitative observations of student enthusiasm towards the audience, outcomes of interest also varied across the three projects. Student enthusiasm was moderate in the national survey project, high in the consulting project, and extremely high in the exit poll. As each successive attempt at goal re-orientation raised the real-world stakes of the research, the students responded with excitement about their potential contribution to the audience. Student trepidation towards research was relatively similar at the outset of each semester, despite these raised stakes. Qualitative evidence does also tell us that students' enthusiasm towards research increased in Project 3 to a greater extent than it did in the other projects, however. Students were more likely to report discussing the research with their friends outside of class, recounting their experience to parents and partners, and mentioning the research in other courses.

These observations suggest that as goals are oriented towards increasingly meaningful audiences, student engagement spills over to influence their conversations and work priorities. These comparisons, though limited in their analytical rigor, provide some early evidence in favor of the above theory of goal re-orientation. But to assess these effects from a quantitative perspective, I next turn to a pre-post survey analysis of student perceptions and performance.

Assessing The Effects of Goal Re-Orientation

Several design elements of these projects are expected to have impacts on students' perceptions of research, their confidence, and their retention of the basics of research design. The inductive, goal-oriented format, as discussed above, is expected to increase students' enthusiasm towards the process of performing original research by the conclusion of the semester. In addition, we might expect students for whom the project was their first formal introduction to political science research to witness the greatest increase in enthusiasm and confidence by the conclusion of the semester. Those with prior research design experience may have acquired preexisting skills which make them more willing to express enthusiasm, to evince confidence in their ability to write original research, and to possess background knowledge of research design. As such, we might expect students who had previously completed the core research methods course in the political science major to be less influenced by the treatment than those for whom the project was their first foray into original research.

- H1 (Enthusiasm). *In a pre-post comparison of enrollees, I hypothesize that enthusiasm towards research will be greater at the conclusion of the semester than at the outset.*
- H2 (Confidence). *In a pre-post comparison of enrollees, I hypothesize that confidence in research skills will be greater at the conclusion of the semester than at the outset.*

- H3 (Knowledge of Research). *In a pre-post comparison of enrollees, I hypothesize that knowledge of research design will be greater at the conclusion of the semester than at the outset.*
- H4 (Novice Researchers) *I hypothesize that novice researchers will demonstrate greater increases in (enthusiasm/confidence/knowledge) than those with prior research experience.*

Methods and Data

Current scholarship on the student research experience identifies a number of strategies for measuring outcomes of interest (Siver, Greenfest, and Haeg 2016). In the present analysis I rely on pre-post survey methods and semi-structured interviewing to inform the four hypotheses described above. In the POLI Omnibus course (Project 1; Fall 2017), a voluntary survey was implemented in Week 2 and Week 15 of the semester (N = 26).¹⁰ Students were asked to provide their Campus ID number on the survey so that their responses could be linked to the end-of-semester survey.

The survey tapped a number of relevant considerations for the present study. To measure confidence in various aspects of the research process, students were asked to report confidence in their academic writing skills, their ability to formulate a research question, their ability to use quantitative tools to answer a question, their ability to work collaboratively to perform research, and their ability to formulate a hypothesis (all represented by five-point Likert items). Students were also asked to report their enthusiasm towards writing papers for classes, and their enthusiasm in performing original research on a political topic (once again on five-point scales). Finally, students' objective understanding of research design was assessed through a question battery that tapped the concepts of sampling, generalizability, the Weak Law of Large Numbers, representativeness, and hypothesis formation. Each question took values of 1 (correct) or 0 (incorrect) out of four possible options. See the Supplementary Information for full question wording.

For each of these three question batteries, additive scales were calculated for each student responding to the pre-semester and post-semester survey results. For measures of enthusiasm and confidence, Likert ratings were added and divided by the number of items. For the measure of knowledge, an additive scale ranging from 0 (none correct) to 5 (all correct) was created. After these scales were produced, students' start-of-semester scores were subtracted from their end-of-semester scores to produce a difference score for the i th student on the j th measure (δ_{ij}). This difference score was rescaled for all items besides the knowledge battery so that a decline in the variable was coded -1, an increase was coded 1, and no change was coded 0.

¹⁰ The pre-semester survey was administered in Week 2 to account for the drop-add period.

In each case, hypothesis testing is performed using one-sample, one-tailed t-tests against the null hypothesis of a mean student pre-post difference ($\bar{\delta}_j$) of 0. For robustness, one-tailed Wilcoxon sign-rank tests were also performed with the same null hypothesis. In support of these findings, semi-structured interviewing was performed during office hours discussions after the submission of the final project. Students were asked about their perceptions of the project, and whether and how they felt the project would be of use to them now that the course had concluded. These post-semester interviews totaled 5 meetings of approximately 15 minutes each.

Results

Overall, we see promising quantitative results emerge from the pre-post survey questionnaire. In Table 4, below, I provide a simple summary of the results as captured by one-sample, one-tailed t-tests (accompanied by Wilcoxon sign-rank tests as a robustness check). These t-tests assess the null hypothesis of no pre-post difference in the i th student's responses to the surveys.

[Table 4 about here.]

We see immediately from Table 4 that the results of the study are all in the expected positive direction. Students appear to have increased in their knowledge of research design by approximately 0.68 points on average, on a five-point scale ($p = 0.04$). This increase in knowledge is substantial given that many students performed well on the knowledge battery in the pre-test (indicating substantial preexisting knowledge of the research process).¹¹ While the knowledge battery was designed to be difficult, tapping concepts that were discussed only at a much earlier stage of the semester, we see a strong indication of research design-specific content recall.

In addition, students' confidence in their ability to perform good research in political science increased. However, while the magnitude of this shift was large (0.32 on a scale from -1 to 1), there was substantial polarization in the confidence measure. This decreased the statistical significance of the outcome relative to the items below it. 63% of students experienced an increase in confidence, while only one student experienced no change in their confidence. The rest (32%) experienced a decline in confidence. This bimodal finding contrasts with the enjoyment items in the third and fourth rows of Table 4: the majority of students experienced no change (a pre-post score of 0) in response to these items. Overall, despite some declining confidence, the majority of students in the present study left the course feeling that they were capable of performing meaningful and well-crafted research.

We see mixed evidence of an increase in self-reported enjoyment of the research process, again due to the large number of students whose enjoyment remained the same across the period. 21% of students who reported having no enjoyment of the research process prior to the study did report enjoying the research process, however ($p = 0.05$). While we might hope for a higher proportion of students to have switched over from this pessimistic prior

¹¹ The mean pre-test score was 2.43 out of five.

sentiment in the post-test, we must also remember that 63% of students reported enjoying research in the pre-test. Thus, the post-test witnessed an increase in enjoyment of research from around 3/5 of the class to more than 4/5 of the class (84%). Such near-unanimity in the post-test is remarkable in itself.

Finally, we also see evidence that students came to enjoy writing their research papers to a greater extent ($\delta = 0.26$, $p = 0.03$). In post-semester interviews, I asked students why writing the present paper was specifically more enjoyable than those they had written in the past. Students reported that their topics were interesting to them, and this led them to be more invested in reporting the results of their survey projects to peer audiences. But more importantly, students reported the greatest enjoyment writing the sections of the paper in which the survey design was described. Students relished the opportunity to describe the process through which they had created and fielded the Omnibus. Because the Omnibus had been created through collaborative, free-flowing peer discourse, the students' ownership over this part of the project resonated in post-semester discussions.

Effects of Expertise

Finally, I investigate whether prior expertise in research leads to a diminution in the effects described above. In a series of regression models, I include a dummy variable which reports whether students have previously passed the department's core research methods course. Table 5 describes the effects of the completion of this course on the pre-post difference scores of interest. While these figures are suggestive of important variation in the uptake of skills and perceptions of research, all results are nonsignificant and should be considered preliminary and suggestive at best.

[Table 5 about here].

The results described in Table 5 are only consistent with expectations in the case of knowledge of research design. Here we see that those with preexisting knowledge of research methods derived from the core methods course experienced a decrease in the treatment effect (perhaps because of the existence of a ceiling effect among high performers). However, perceptions of enthusiasm and confidence in research skills were actually *heightened* among students who had previously completed the research methods course. The implications of these suggestive findings are not fully clear at this stage. Perhaps these students were most likely to have been underwhelmed by their prior research experience, and hence possessed stronger prior negative sentiments that were corrected by the treatment. Or, novice researchers were relatively unaffected by the treatment because they lacked the basic skills to fully benefit from the treatment. Regardless, future work should continue to investigate how the current approach differentially influences students at various stages in their development as researchers.

Conclusions

The present study describes three approaches to research project design for undergraduates in political science. However, there exists a multiplicity of possible

approaches to teaching goal-oriented research to undergraduates, which are limited only by the creativity and time constraints of the instructor. They rely specifically upon techniques that fit best in upper-level seminars. Doubtlessly, these considerations mean that the exact specifications of the 2017 POLI Omnibus, the Choice Program project, and the 2018 Retriever Exit Poll will be difficult for some readers to integrate into their own course designs.

Nevertheless, the present study speaks to the importance of several core principles in research methods instruction—foremost among them the expansion of students' *goal-orientation* when conducting research. There are many avenues to help students expand their goal-orientation beyond instrumental considerations that do not require grant funding or the setting of a special topics course on public opinion. As online data availability grows, so too do opportunities for instructors to seek out relevant data producers to serve as the audience of subsequent student research. The second key aspect of the present study design is the inductive nature of the course experience. For instructors willing and able to relax the assumptions of the research experience to allow students the freedom to collaborate inductively on topics, questions, and hypotheses, the reward is likely to be an invigorated sense of purpose in students' writing.

The present study is certainly not without its limitations. Low power, limited opportunities for data collection, and the inability to compare the present results to a baseline are all major concerns. An ideal test of the theory of goal orientation presented above might experimentally or quasi-experimentally manipulate all the possible dimensions of goal orientation outlined in Table 1. For example, a course taught across multiple sections might be an appropriate setting to manipulate goal orientation by interacting data collection and audience considerations. In some conditions, students might collect and analyze novel data in service of a well-identified external audience. In others, students might analyze "stock" data for the benefit of the audience, while in still others students would examine novel data for their own benefit rather than that of an audience. Finally, students in a control condition might examine "stock" data in a more conventional class setting.

In general, though, future research on methods instruction is now poised to consider the effects of goal-orientation and inductive learning in the research process in greater detail, especially as scholars seek to better understand what groups and subpopulations are best served by certain approaches to research instruction.

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