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Keywords

Learning, Academic Success, Correlates of Learning, Learning in Sociology

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Correlates of Success in the Sociology Major

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Abstract

My focus in this exploratory study is on factors related to success in the sociology major. One hundred, fourteen graduating majors from a mid-sized, public university completed a self-administered questionnaire. Students reported that talking with others about the material as well as using application, real world examples, and review strategies are critical to their learning. In multiple regression analyses, there is limited evidence for a positive relationship between several interpersonal academic/study behavior variables and success. Multiple and ordinal regression analyses point to a negative relationship between age and success in the sociology major at this institution. Implications for teaching and learning in sociology and other disciplines are discussed.

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Introduction

This scholarship of teaching and learning study is part of a series of studies which arose from a “teaching problem” (Bass 1999) I had in teaching sociology senior experience. Over several years, I noticed a wide range in level of interest and involvement in the senior thesis as well as in understanding of key aspects of the discipline of sociology. As all students in this course are about to graduate with Bachelor’s degrees in sociology, I believed this to be problematic. Thus, I hoped to learn more through several studies about how sociology majors at my institution believe they best learn the discipline, why they became sociology majors, and what factors appear to be related to doing well in the discipline.

Though I study sociology majors at a U.S. institution in this research, I believe the research questions, prior literature, methods, and findings are relevant to faculty members and students in other disciplines and other nations. This scholarship of teaching and learning study falls somewhere between classroom action research and more traditional educational research.

For this study, I collected data from senior sociology majors at one mid-sized, public, Midwestern university using a self-administered questionnaire. My primary objectives were the following: 1. to obtain student beliefs about what helps them learn the discipline, 2. to uncover the learning behaviors or experiences, both in- and out-of-class, that distinguish more and less successful learners of sociology, and 3. to assess any demographic or attitudinal factors related to learning and success. Based on my experience with teaching, discussions with other sociologists about student success, and the extant literature, I conceptualized success in the major as doing

well academically and feeling engaged in the discipline. For the purpose of this study, then, I measured success with four variables including sociology GPA, expected senior thesis grade, self-reported engagement in the discipline, as well as a combined measure. A range of demographic, attitudinal, and behavioral variables serve as the potential correlates of success.

Literature Review

Past relevant research on learning or success in various disciplines has involved the use of questionnaires or secondary analysis to assess the role of demographic variables, academic background, interest, or motivation within a discipline (e.g., Eckstein, Schoenike, and Delaney 1995; Meeker, Fox, and Whitley 1994; Neuman 1989; Paulsen and Gentry 1995; Szafran 1986). In addition, there has been analysis of quantitative data from questionnaires or institutional data sets about students' academic views and behaviors (e.g., Dietz 2002; Hofer 1999; Howard 2005; Nist, et. al 1991; Park and Kerr 1990; Rau and Durand 2000). These studies generally report the correlates of dependent variables such as greater points earned, higher test scores, course grade, or overall GPA. Significant correlates of these dependent variables in one or more of these studies have included some background variables, pre-test score, grade point average (GPA), self-efficacy, motivation and epistemological beliefs, as well as attending class, doing the assigned readings, taking practice exams, effort, metacognitive work, and an academic ethic.

Program assessment has been one area of research on learning and success in sociology specifically that goes beyond learning in one course or learning as a result of one teaching strategy (e.g., Hartmann 1992; Moore 2002; Weiss, Cosbey, Habel, Hanson, and Larsen 2002). Most of the published work on assessment in sociology discusses suggested strategies for doing program assessment rather than data on learning processes and outcomes. The empirical research that does exist here has focused on learning outcomes at the aggregate level and without determining specific experiences or correlates of learning outcomes. See Wagenaar (2002, 2004) and Weiss (2002) for reviews of assessment work in sociology.

Others in sociology have discussed definitions of important general skills/learning processes such as critical sociological thinking (Grauerholz and Bouma-Holtrop 2003), higher level thinking in sociology (Geertsen 2003), and deep structure learning (Roberts 2002). Work has begun on using a measure of one of these concepts to assess learning in a particular course (Grauerholz and Bouma-Holtrop 2003).

Recent research related to success in the major conducted by staff members at the American Sociological Association focused on students' reasons for majoring in sociology, self-perceived knowledge and skills acquired in the major, participation in various learning activities, satisfaction with program outcomes, and plans for the future (American Sociological Association 2006). Three-fourths to 90 percent of students in this national sample of graduating sociology majors report strongly agreeing that they have a variety of sociological conceptual abilities; 44 to 69 percent strongly agree that they acquired various sociological skills (e.g., evaluate research methods, write a report). There were a few significant differences in these perceptions by type of institution, race/ethnicity, and gender.

There have been at least five past empirical studies on correlates of learning and success in sociology courses but the focus of all of these was on introductory level

students, not majors. These studies used quantitative questionnaires and scales. Over fifteen years ago, Szafran (1986) studied factors influencing prior knowledge and grade in the introductory course. Year in school, GPA, and parents' education all significantly related to course pretest score, and GPA and pretest score were significantly related to course grade. Neuman (1989) extended Szafran's work and wrote "This study confirms Szafran's finding that pretest scores and GPA predict posttest (final exam) scores with no direct effects from demographic, family background, or prior course work variables. Both studies found few effects on pretest score, course grade, or learning from gender, high school sociology courses, or age" (p. 25). Neuman also looked at pre-post test score differences for the course and reported that "Students learn more if they enter the course knowing less, have a higher GPA, and studied a foreign language" (p. 25).

In a study on the development of the sociological imagination by students at a private, Catholic institution, Eckstein, Schoenike, and Delaney (1995) found significant relationships between some student demographic variables and successful development. Specifically, non-Catholic students and students from less privileged backgrounds were more likely to develop the sociological imagination compared to other students. More recently, Dietz (2002) focused on success in the large introductory sociology course as measured by total points earned in the course. Class attendance and reading the required materials were significantly and positively related to total points. Factors unrelated to success included self-reported study time and use of virtual learning tools. Study group participation was negatively related to total points earned. Finally, in a study of Introduction to Sociology students over seven semesters, Howard (2005) focused on correlates of course grade. He found working fewer hours for pay, reading the assignments, class attendance, and taking the practice exams to be significantly and positively related to course grade.

Thus, there is very limited evidence that overall grade point average, some demographic factors, and some study behaviors may be related to learning or success as measured by academic achievement in introductory sociology as well as in some other disciplines. The exploratory study I present here makes unique contributions to the literature on learning in sociology and related disciplines. The population consists of all graduating sociology senior majors for two years at one institution. My focus is on student perceptions of how they learn in our discipline as well as on factors related to success in the major as measured by multiple variables.

Methods

Respondents

The 114 students in the study constitute almost the full population of graduating seniors for two full years with only seven students failing to complete the questionnaire. No sampling was used. Institutional Review Board approval was obtained for the study. Students completed the voluntary and anonymous questionnaire during one of their required capstone course sessions. Self-reported average overall GPA of the sample was 2.83; sociology GPA was 3.01. Seventy-four percent of the students who completed the questionnaire were female and seventy-six percent chose Caucasian as their race. Students ranged in age from 21 to 52 with a mean age of 23.5. Finally, first generation college students made up 51 percent of the sample.

In comparison, of the students in the ASA study (American Sociological Association 2006) using a probability sample of sociology graduating majors around the nation, 77 percent were female and 75 percent were Caucasian. The mean age of the

students in the ASA study was 23.6. Finally, overall GPA was 3.39 and sociology GPA was 3.22 in the ASA study. The ASA researchers, however, believe that the self-reported GPAs in their study were biased upward as 22 and 50 percent of their

sample did not report overall and/or sociology GPA, respectively. There was very little missing data on those items in the present study. Thus, the sample of graduating sociology majors in the local study presented here reflects, demographically, graduating sociology majors in a national probability sample.

Measures

The questionnaire contained four sections: demographic and background, study experiences and behaviors, sociological imagination, and learning styleⁱ. All variables are measured via self-report. Students were asked their sex, age, race, family social class, first generation college student status, full- or part-time student status, current GPA, approximate sociology GPA, expected senior thesis grade (A=4, B=3, C=2, D=1, F=0)ⁱⁱ, average level of motivation in sociology courses (1=not at all motivated; 5=very motivated), overall level of engagement in the discipline of sociology (1=not at all engaged; 5=very engaged), and the most important factor in selecting sociology as their major (open ended).

Next, students were asked for one specific strategy they use that best helps them learn sociology (open ended), how often they use that strategy both to learn in fields other than sociology and in other areas of life (1=not at all; 5=very often), to indicate their level of agreement with the statement "I am confident in my ability to successfully learn sociology (1=disagree strongly; 5=agree strongly), to make a general attribution about why they do well in sociology courses when they do (1=luck and fate; 5=own effort or ability), and to indicate, using the scale 1=never to 5=very often, how frequently they engaged in each of 20 academic or study related activities as a sociology major (e.g., discussed course material with others out of class; came to class well prepared). These 20 behaviors or activities appear in Table 1.ⁱⁱⁱ

Students were also asked, using open-ended questions, what most helped them learn the sociological imagination or sociological perspectives as well as to think about a very difficult time learning an idea or skill in sociology, and what did they do to learn this?

Finally, success in sociology was measured using sociology GPA, expected senior thesis grade, and self-perceived level of engagement in the discipline. In addition, summing respondents' scores on sociology GPA, expected senior thesis grade, and self-perceived level of engagement in the discipline created a 3-item measure of academic success in sociology that could range from 1 to 13, with higher scores indicating greater success (actual range of 6.6 to 13.0; mean = 10.1). Thus, there were four dependent measures of success in the major.^{iv}

Results

Descriptive Analyses

The four most common sets of reasons given for selecting Sociology as a major included interesting topics or material (39%), wanting to know about the role of social forces in why people behave the way they do (16%), "other" which included many unique responses made by only 1 or 2 people that did not fit the other categories (15%), and the positive influence of a particular sociology class or teacher

(10%). Thus, these students chose sociology, primarily, for reasons related to content or interpersonal connections.

On a scale of 1 (not at all motivated; not at all engaged) to 5 (very motivated; very engaged), the average level of motivation in sociology courses was 4.02; students reported an average level of engagement in the discipline at 3.89. Students' mean score on agreeing that they are confident in their ability to learn sociology successfully was 4.4 (1=disagree strongly; 5=agree strongly) and was also 4.4 when asked to make an attribution about their success in sociology courses (1= luck and fate; 5=own effort or ability). The students, then, report being motivated and engaged in sociology, confident in their ability to succeed, and believing that success is due to their own internal traits or behaviors.

The three most common strategies given in response to the question, "explain one specific strategy you use that best helps you learn sociology," were the following.

- apply theory or concept to real situations/examples (24%)
- read-write-review-repeat strategies (24%)
- always read materials and do assignments (24%)

Using a 1= not at all and 5=very often scale, the mean response to the question, how often do you use this strategy to learn in other fields was 4.1 and to learn in other areas of life was 3.7. Thus, students reported they often learned using this same strategy in other academic fields and outside their academic life.

Students reported the following three responses in terms of what "most helped them to learn the sociological imagination and/or sociological perspectives."

- use real life examples/apply concepts (31%)
- good class or professor (23%)
- having ideas repeated, integrated, and reinforced in a course or in multiple courses (12%)

The most common strategies to learn a particularly difficult skill or idea in sociology included talk with the professor (31%), talk with or work with peers, a partner, or a study group (23%), reread and study more (19%), and repetition, persistence, practice (13%).

Finally, Table 1 contains the list of a variety of study and academic behaviors along with the mean score on how often students report having engaged in each (1=never; 5=very often). As can be seen from the table, the behaviors students reported engaging in most often (mean score greater than the midpoint of 3.0) included the following: completed all homework on time, used email to interact with faculty, discussed course material with others outside of class, came to class well prepared, met with advisor, participated actively in class, formed/participated in a study group, met with faculty member outside of class, and shared written work with peers for feedback.^v

Table 1: Mean score on frequency of each behavior (1=never; 5=very often) (N = 114)

<u>Item</u>	<u>Mean</u>
Completed all required homework on time	4.37
Used email to interact with faculty	4.18
Discussed course material with others out of class	4.15
Came to class well prepared.	4.06
Met with your advisor	3.89
Participated, actively, in class	3.78
Formed/participated in a study group	3.42
Met, out-of-class, with a faculty member	3.40
Shared my written work with peers for feedback	3.07
Went to a campus, public presentation or lecture	2.74
Turned in optional drafts of work for feedback	2.68
Spent more than 30 hours per week on homework	2.61
Engaged in a Service Learning opportunity	2.36
Tutored another student	2.18
Participated in a campus club or organization	2.07
Assisted a faculty member on research	1.82
Served as an Undergraduate teaching assistant	1.79
Went on a field trip related to academics	1.65
Participated in Sociology Club	1.34
Presented at Undergraduate research symposium	1.22

Multiple Regression Analyses

To assess the relative contribution of the independent variables, I ran a simple least squares regression for each of the four continuous dependent measures with 26 independent variables. All of the overall regression equations (F values) were significant at $p < .05$. The percent of variance accounted for (R squared) for each dependent variable follows: 37 percent for sociology GPA, 40 percent for expected senior experience grade, 57 percent for engagement, and 60 percent for the 3-item success measure. As can be seen in Table 2, however, only a few individual variables were significant.

Table 2: Betas for Multiple Regression Results for each Dependent Measure (N = 88-109)

	SocGPA	SenThes	Engage	3-item
<u>Indep.Var.</u>				
sex	.053	.054	-.030	.053
age	.137	-.254*	-.198*	-.227*
race	-.011	.130	-.122	.030
motivation	.067	-.085	.363*	.193*
confidence	-.081	-.052	.005	-.009
attribution	.199	.299*	-.071	.152
assist faculty	-.116	-.064	.188*	.027
serv learn	-.168	.047	-.161	-.075
disc material	.051	.055	.193	.168
study group	-.247*	.168	-.021	-.176
clubs	.193	.143	.053	.092
presentations	.154	.123	.010	.068
field trips	-.045	-.048	-.086	-.105

tutored others	.288*	-.134	.179	.023
met advisor	.038	-.070	.154	.142
met faculty	-.030	.258*	-.230*	-.109
homework	.189	.180	.125	.277*
soc club	.117	-.036	.022	.101
drafts	.089	-.051	-.159	-.148
prepared	-.122	.114	-.002	-.061
hours homework	.022	.018	.043	.017
participation	-.062	.079	.199*	.211*
feedback	.077	.139	.022	.222*
email fac	-.134	-.129	.061	-.147
undergrad TA	.034	.187	.183	.282*
res sympos	.053	-.037	.050	.043

$p < .05$

More specifically, frequency of study group involvement and tutoring other students were significant for sociology GPA. The beta for frequency of involvement in a study group, however, was negative. In the regression on expected senior thesis grade, age, attributions for success in the major, and the frequency of meeting with faculty outside of class were significant. Age, motivation in sociology courses, and frequency of assisting faculty with research, meeting with faculty outside of class, and participating actively in class were significant in the regression on engagement. Finally, for the regression on the combined measure, age, motivation, serving as a TA^{vi}, and the frequency of doing all homework on time, participating actively in class, and obtaining feedback were all significant. In all three instances where age was significant, the beta was negative. Meeting with faculty had a positive beta in the equation for expected senior thesis grade but a negative beta for engagement. All other betas were positive.

Ordinal Regression Analyses

Finally, I split the students in to three groups—low, medium, and high success—based on their total score for the measure combining all three single success items: sociology GPA, expected senior thesis grade, and level of engagement in the discipline. Using this new variable, an ordinal regression analysis was run. Variables entered in to the model included age, sex, race, attribution, confidence, motivation and the academic/study behaviors. Due to N size, cell sizes, and limits on the number of variables in the equation, however, the numerous academic/study behaviors were reduced to three new variables created based on face validity and Cronbach's alpha. The first new variable consisted of the mean frequency score on several items related to interpersonal study behaviors (e.g., discuss course material with others outside of class and emailed faculty members; $\alpha = .70$). Several other items were combined to create an out-of-class learning opportunity variable (e.g., participation in sociology club and attending campus presentations; $\alpha = .63$), and the third new variable was preparation (e.g., completing all homework on time and coming to class well prepared; $\alpha = .50$).

The overall ordinal regression model was significant (Chi-square = 19.98; $p = .018$). One Goodness of Fit statistic (deviance Chi-square) was not significant (Chi-square = 174.949; $p = .321$), as is desired in this analysis, but Pearson Chi-square Goodness of Fit was significant (Chi-square = 203.819; $p = .027$). Parameter estimates and related statistics for the individual variables indicated that only age was significant. See Table 3 for details of these results.

Table 3: Ordinal Logistic Regression Analyses for High, Medium, and Low Success Students (N=89)

<u>Variable</u>	<u>Parameter Estimates</u>	<u>Wald</u>	<u>Significance</u>
Age	-.225	4.217	.04*
Motivation	.263	.761	.38
Confidence	.468	1.625	.20
Attribution	.298	.892	.35
Interpersonal	.357	.729	.40
Out-of-Class	.100	.070	.79
Preparation	.311	.515	.47
Sex	-.279	.333	.56
Race	.337	.435	.51

* $p < .05$

Discussion

Though the students studied here were all sociology majors at a U.S. institution, faculty members and students in other disciplines and other nations can learn from, and should attempt to replicate, these preliminary findings. Across the three open-ended questions about study strategies that work best in sociology, interpersonal strategies such as talking with others about the material, using application and “real life”/personally relevant examples, and various forms of persistence, review and repetition approaches were mentioned by the largest percentage of the students. Students indicated the tendency to use similar strategies in sociology and in courses in other disciplines. Vermetten, Lodewijks and Vermunt (1999) found evidence that students show some personal consistency in learning strategies across contexts in addition to context-specific aspects of use. The strategies reported by the students here appear to involve both surface and deep learning, and these findings replicate those found in several qualitative studies of senior sociology majors (McKinney 2004, 2005a,b) as well as fit much of the recent, general literature on learning in higher education (e.g., Bain 2004; Baxter-Magolda 1999; Biggs & Moore 1993; Chickering and Gamson 1987; Kuh, Nelson, & Umbach 2004; Light 2001; Svinicki 2004; Umbach & Wawrzynski 2005).

Implications of these findings are that faculty members should consider increasing opportunities for students to discuss material with others and to engage with the material or skills using authentic and active assignments or tasks. This might include strategies such as additional well-structured group work, peer review, or problem-based learning. Instructors could offer assignments that connect directly to students' experiences in college and/or in the work world. In addition, we should assist students in learning and using optimal review strategies and offer opportunities for correction of assignments, multiple drafts, and similar learning techniques. Faculty might involve others on campus (staff in learning centers) to help with these strategies and attempt to obtain additional resources (e.g., teaching assistants, smaller classes) if time is a barrier to reading and providing feedback on drafts of student work. Though these implications may not seem very remarkable or innovative to many readers of this journal, there are instructors in sociology and other disciplines who rarely use such strategies. Faculty members should replicate this work in their own contexts. With such information, instructors can move ahead with appropriate ways to implement the suggestions which arose from this local SoTL study and, perhaps, share them with colleagues.

In terms of the multivariate results related to success, though overall equations were significant, few individual variables were significant. One demographic variable, age, was significant with a negative beta in three of the regressions on success in sociology (engagement, expected senior thesis grade, and the 3-item measure) as well as in the ordinal regression for low, medium, and high success. Eckstein, Schoenike, and Delaney (1995) found significant relationships between performance in sociology and student social background. Yet, Szafran (1986) and Neuman (1989) reported no direct relationships between several background variables and post-test scores in a sociology class. Clearly we need more research on the role, if any, of demographic factors in success in sociology as well as work to uncover the specific processes at work here. We can speculate, however, on some possible processes.

For example, are older students somehow marginalized--less involved in the department or do they feel less attachment to academic peers or faculty members? In correlational analyses, age was not significantly related to motivation, attributions, confidence, or overall GPA. Age was, however, significantly and negatively related to four of the academic study behaviors including the frequency with which they discuss material outside of class with others, complete all homework on time, come to class well prepared, and email faculty members. Perhaps older students have more off-campus and non-academic obligations than younger students that limit their time on task in these significant ways. Time on task is considered an important variable for student success (Chickering and Gamson 1987). Additional research and intervention should focus on these factors as possible key prior or intervening variables. Future research should also assess whether age of majors is related to success in other disciplines.

The only other variables that were significant with, in this case, positive betas in at least two of the regressions on success in sociology (engagement and 3-item measure of academic success) were motivation in sociology classes and the frequency of participating actively in class. Of course, it is possible—even likely—that the latter relationship in particular is the result of more successful students choosing to participate more frequently in class than other students.

Rau and Durand (2000) found evidence for an academic ethic--a set of behaviors--among students that are related to success. Little evidence was found in this study for some type of academic ethic related to academic achievement. There are, however, several key differences between their study and this one. Their sample was not restricted to sociology majors or to seniors; rather, it was a probability sample of all students at one institution living in the residence halls. In addition, success was measured by overall GPA. Finally, academic ethic consisted both of general study behaviors and (lack of) drinking behaviors.

Past research on success in Introduction to Sociology courses points to the importance of some academic behaviors especially attending class, reading assignments, and taking practice exams (Dietz 2002; Howard 2005). There was some evidence in this study for interpersonal behaviors, broadly defined, as related to success. Assisting faculty members with research, tutoring others, meeting with faculty outside of class, and participating actively in the classroom setting were all related to one or two measure of success. In addition, students frequently noted interpersonal academic strategies as helping them learn sociology in response to the open-ended questions. The multi-item interpersonal strategy variable, however, was not significant in the ordinal regression on success. Thus, the ideas of an academic ethic and of the role of interpersonal study behaviors are both intriguing; future

research with sociology students and students in other majors should continue to pursue these ideas.

Interestingly, in this data, frequency of participating in a study group was negatively related to one measure of success, sociology GPA. Similarly, Dietz (2002) found a negative relationship between study group participation and total points earned in an introductory course. Perhaps students struggling with grades are more likely to participate in these groups. Or, students may not be very adept at organizing and running such groups so as to learn from participation in them. Clearly, the role of study groups in student academic success—and the particular features and processes involved—needs additional research.

There was weak evidence, at best, that student attitudes or perceptions about their abilities and efforts (motivations, attributions, and confidence) were related to success in the major. Motivation was positively related to two measures of success and making internal attributions was related to one measure. Perhaps students are not very self-aware and accurate in these perceptions or tend to respond in a socially desirable manner. Though there was variance on these measures, there was a tendency to respond on the upper end of the scales. It is also possible that such variables simply do not matter in success. In fact, despite measures of a wide range of possible independent variables in this study --including some demographics, attitudes, and behaviors-- with the exception of age and some interpersonal study behaviors, we have little evidence about what relates to student success in the major for students at this institution using the measures in this study. The fact of these sparse significant findings, however, is a finding that should intrigue and puzzle us, and stimulate more refined questions and methods. Thus, it is critical that additional research improve on the measures of the variables in this study as well as test the importance of other variables such as SES, peer influence, maturity, level of study skills, general ability to think critically, having a mentor, and use of specific pedagogies in the curriculum and co-curriculum.

Finally, one issue in our program, and perhaps in others, is helping majors succeed in completing their senior thesis at an acceptable or better level. Results from this study indicate that expected senior thesis grade is related to age, attributions, and meeting with faculty outside of class. More specifically, younger majors, those making more internal (seeing causes of events as residing in the self and over which we have some control) rather than external attributions (seeing causes in factors outside the self and beyond self control) for doing well in the major, and those meeting more often with faculty outside of class, expect to earn a higher grade on their senior thesis. As a faculty, then, we will need to consider strategies to reach out and support older students, and to encourage and reward (even require) students to have outside class interactions with us. In addition, we can help students by offering attributional retraining (Menec and Perry 1995) through explaining to students about attributions and their relationship to future behaviors, working with students to make more 'accurate' attributions for their academic successes and failures, and modeling internal attributions of our own successes and failures for our students.

Limitations of this study include that the data is correlational only; we can not determine, of course, the causal direction of any of the significant relationships. This is not an uncommon situation for small, local SoTL studies given practical and ethical limitations or for exploratory research questions where independent variables are not those that can be manipulated in an experimental design. Yet, future work should consider more innovative measures and methods including qualitative and longitudinal designs. The cross-sectional design creates some challenges as well. For example, sociology gpa was earned over the last two years or so by these students

yet some of the other measures (e.g., attributions) are measured during their final semester. Though not an ideal solution, the measures of these other variables did ask students to respond about attributions, etc. throughout their time as a sociology major. In addition, the population of majors is from only a two-year period in one major at one institution. Furthermore, the data is all self-report data which may have various biases. The measure of engagement, for example, is a one-item, global self report measure. Though student perception of engagement is of interest here, the use of other measures of engagement (e.g., ratings of faculty, behavioral indicators, measures of multiple dimensions of engagement) could influence the results. In an on-going, longitudinal study, engagement will be looked at via multiple measures and as a possible “independent” variable.

Along with the many future research ideas already noted, we should create improved measures of study behaviors or an academic ethic, extend the work to samples of students in other majors, and use longitudinal, quasi-experimental and qualitative methods to better assess causality and process. In addition, it is important that these results be replicated with majors at other institutions and in other nations. More research is also needed to ascertain the importance of demographics vs. attitudes vs. behaviors for student success, as well as how correlates of success vary by measure of success or learning. Finally, studies on the effectiveness of any interventions based on these results are critical.

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i Given the low Cronbach's alphas for these particular learning style measures and no significant bivariate relationships between these measures and the dependent variables, learning style was dropped from the analyses for this paper. In addition, The Sociological imagination variables are being considered for another paper.

ii Estimated senior thesis grade was used as data collection occurred near the end of the semester and after much feedback on drafts but before final theses had been graded and returned.

iii Factor analysis of these 20 behaviors was inconclusive with few items clearly loading on the seven factors that emerged. These results and the interest in how specific behaviors correlate with success is why the behaviors are studied

as separate variables in most analyses. The behaviors came from those in prior studies, my knowledge of what was offered to students at my institution, and conversations with several students.

iv Although I use the terms independent and dependent variables, I recognize that the design and data of this study do not permit causal conclusions. This language is used for three reasons: 1. this is how the variables are viewed theoretically, 2. dependent and independent variables must be designated in the multivariate analyses, and 3. time order—the independent variables generally occur prior to or concurrent with the dependent variables.

v Two of these items were recoded to never or at least once for further analyses when appropriate. This was due to a lack of variance and the nature of the experiences. That is, twenty-nine percent of the students reported serving as an undergraduate TA at least once and 12 percent reported presenting at the annual undergraduate research symposium at least once.

vi T-tests were also run with serving as an undergraduate TA and participating in the research symposium as the grouping variables and the 4 success measures as the “dependent” variables. Students who had served as a TA had significantly higher means or success on all four measures. There were no significant differences on any of the success measures by participation in the research symposium.