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Author: John Ishiyama, Stephen Hartlaub
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Sequential or Flexible? The Impact of Differently Structured Political Science Majors on the Development of Student Reasoning[1]

John Ishiyama, *Truman State University*
Stephen Hartlaub, *Frostburg State University*

This paper addresses a fundamental issue facing political science teachers: what effect does the structure of the political science curriculum have on student development? We address this question by comparing the impact of two different curricular models on the development of student *reasoning styles*, or how students think about, and make, decisions. Using both a standardized inventory developed to measure student reliance on concrete experience or abstract conceptualization when learning (Kolb 1976) and a framework initially employed by Sylvan et al. (1994), this paper assesses the development of reasoning styles of political science majors at two similar state universities, Frostburg State University (in Maryland) and Truman State University (in Missouri). Both universities are medium-sized public institutions (4000–6000 undergraduate students) that were formerly teachers' colleges. Both are located in isolated rural settings, but recruit students mostly from major urban areas. Both have similarly sized political science departments, both in terms of faculty (eight) and number of majors (150–200). The feature that differentiates the two departments is the design of their undergraduate majors. One university's major is structured around general principles, requiring students to complete mostly core classes with few electives. Most importantly, the courses are sequenced so that students are expected to take courses in a particular order, with introductory classes preceding the methodology course (taken in the second year), and with 300 level courses preceding 400 level courses. The other university's major is much more flexible. After a few introductory courses, students are allowed to take a wide variety of courses on a number of different substantive topics. Courses are not necessarily taken in sequence. Given these differences in curricular model, we would expect differences in student reasoning styles to develop. Highly structured, and sequenced, majors organized around principles should promote the development of abstract reasoning styles more so than flexible majors organized around substantive topics. This paper seeks to test this proposition.

John T. Ishiyama *is an associate professor of political science at Truman State University and research coordinator for the Ronald E. McNair Program. He has published widely in both political science and higher education journals. His teaching and research interests focus on comparative politics, with a special emphasis on democratization and political party development in the former USSR and Eastern Europe. He can be reached at jishiyam@truman.edu.*

Stephen Hartlaub *is an assistant professor and chair of the department of political science at Frostburg State University. His eclectic research agenda ranges from pedagogical theory and practice to political philosophy and New Urbanism. He received his Ph.D. from Michigan State University. He can be reached at shartlaub@mail.frostburg.edu.*

Curricular Structure and Reasoning Styles

In the past, some scholars have argued that there is a relationship between the way a major is structured and student outcomes (Wahlke 1991). In particular, the "smorgasbord" approach to structuring the political science major (where there are only a few required courses and other courses are offered as electives without any effort at sequencing courses) has been criticized. Indeed, both the Association of American Colleges and Universities (AACU) report on the Liberal Arts and Sciences, and the report produced by the APSA Task Force on Political Science (Wahlke 1991), noted that unstructured programs often lack coherence and are incapable of promoting the necessary skills required of political science students. The AACU report argued that political science major programs should consciously seek to foster (among other goals) "abstract logical thinking" and "critical analysis." The report argued that only a consciously structured major which entails sequential learning promotes the

Editor's Note
Readers may find the tables and appendixes for this article as part of PS*Online* at www.apsanet.org/PS/jan03/ishiyama.cfm

development of the "building blocks of knowledge that lead to more sophisticated understanding and . . . leaps of the imagination and efforts at synthesis" (AACU 1985, 24). The development of thinking skills cannot be accomplished "merely by cumulative exposure to more and more . . . subject matter." Majors which emphasize breadth at the expense of depth result in "shallow learning unless students also grasp the assumptions, arguments, approaches, and controversies that have shaped particular claims and findings" (Wahlke 1991, 49).

For our purposes, *structure* refers not only to how many classes are offered in a major but whether the classes are sequenced so that material in classes is consciously linked into a coherent whole. To be sure, all majors have some structure. However, in an effort to be consistent with the AACU report, we conceive of a structured major as one in which courses are consciously sequenced and linked together.

Although a relationship between the structure of the political science curriculum and the development of reasoning styles has been suggested by much of the literature, relatively little empirical work has been done to demonstrate this connection. An exception is the work of Sylvan et al. (1994) which employed a particularly useful framework to investigate the relationship between reasoning styles and decisions. Using graduate students in political science from Ohio State University and from the University of Pittsburgh, the authors surmised that differences in the style of training that students received would result in different styles of reasoning when asked to make decisions. Three distinctly different reasoning styles were identified: *case-based, explanation-based, and model-based. Case-based* reasoning involves the reference to previous specific "cases" or events

when providing a justification for a particular choice. *Explanation-based* reasoning consists of an explication that includes causal assertions. For Dejong (1993), "explanation-based learning can generally be viewed as substituting background knowledge" for particular cases. It is "used automatically to construct an explanation of a few trained exemplars" (Dejong 1993, 1). Finally, when the reasoning is 'prepackaged' into a 'law or theory' Sylvan et al. considered this an example of *model-based reasoning*.

Using a set of scenarios relating to daily life situations and more complex foreign policy decisions, respondents were asked to choose one of three outcomes. Respondents were then asked to choose from a list of decision-making processes which was closest to their own reasons. Six rationales for each question were provided, three representing affirmative responses and three representing negative responses, with each rationale corresponding to a case-based, explanation-based, or model-based reason.

The authors found that the structure of a graduate program was unrelated to reasoning styles, with most graduate students adopting abstract reasoning styles. Among other things, the authors concluded that the evidence suggested that the primary formative period of abstract reasoning styles occurred during a *student's undergraduate career*. Thus, our article in part seeks to build upon the Sylvan et al. study *and investigate the effects of curricular structure on the development of undergraduate student reasoning.*

Description of Curricula

To assess the effects of different curricular structures, Figures 1 and 2 outline the political science curricula for Frostburg State University and Truman State University. The political science student at Frostburg State University is required to take 39 hours in political science across six different subfields. Thirty-six different courses are offered in the official catalog. Every student is required to take Introduction to American Politics and either Introductory World Politics *or* Introduction to Comparative Politics. In addition, every student is required to take a Political Science Research Methods Course. Students have a wide choice of classes beyond these requirements, grouped into six areas roughly corresponding to the major subfields in Political Science (three courses in one area and one class in each of the remaining five areas). The courses are largely substantive and topical (such as area studies courses in comparative politics, and institutional classes in American politics). The bulk of classes in the Frostburg State program emphasize substance knowledge over abstract principles, resulting in a loosely structured, unsequenced, program with a wide range of courses.

The political science student at Truman State University is required to take 33 hours in political science of which 21–24 hours are for major required courses (depending on whether the student elects to seek a BA or a BS degree). About one-third fewer courses are offered at Truman (24) as opposed to the 36 offered at Frostburg State. The political science major is required to take courses in all of the major subfields of political science (American Politics, International Relations, Methodology, Comparative Politics, Public Policy, and Political Thought). Each of these courses emphasizes principles and theories over substance, with the aim of shaping the way students think about politics. Further, the team-taught capstone course (Senior Seminar) summarizes the political science experience and emphasizes connections between subfields. Over the course of the term, the students get an intensive survey of the major schools of thought in political science—many of which they have already encountered in their earlier course work. These required courses are generally taken sequentially, with each course consciously designed to build on the skills developed in previous courses. Students also have the opportunity to take elective courses (which approximate the distributional courses listed in the Frostburg State program) but these are quite limited when compared to the Frostburg State program. An elective that most students are recommended to take is Introduction to Political Science. This introduces students to broader theories of politics and concepts central to political science—it serves in part as an accessible overview of the discipline, and in part as a building-block course. The political science program at Truman emphasizes principles over substance, resulting in a structured and sequenced major where courses are designed to fit together as a coherent whole.

Given the differences in curricular structure we would expect students at the two universities to exhibit different tendencies in reasoning styles.

Design and Methodology

To test the above expectation, the dependent variable "reasoning style" was measured in two ways. The first is derived from the Kolb Learning Style Inventory created to measure individual learning styles derived from experiential learning theory (Kolb 1976, 1985). A description of the inventory appears in Appendix 1. The Kolb Learning Styles Inventory is made up of nine groups of concepts, and the respondent is asked to select the one that best describes how they learn. This inventory measures an individual's relative emphasis on four learning styles—Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). Of particular interest (for our purposes) are two of the four styles which are aligned on the cognitive development dimension: Concrete Experience and Abstract Conceptualization. Kolb (1976) states that a high score in concrete experience (CE) represents a receptive experience-based approach to learning that relies on feelings-based judgements.

To measure the extent to which a respondent tends to emphasize concrete experience (which approximates Sylvan et al.'s case-based reasoning) or abstract conceptualization (which approximates model-based or explanation-based reasoning) the respondent is first asked to rank order from the four terms in each set, assigning a 4 to the word which best characterizes their learning style, a 3 to the word which next best characterizes their learning style and so on. The CE score is then calculated by adding the numbers that appear in the first column for lines 2, 3, 4, 5, 7 and 8. The resulting sum is the CE score which can range from 6 to 24. The AC score is calculated by adding the numbers that appear in the third column for the lines 2, 3, 4, 5, 8, and 9. The resulting sum is the AC score and can also range from 6 to 24. The CE score is then subtracted from the AC score to provide the AC-CE score, which ranges from -18 to a $+18$ where a positive value indicates relatively higher propensity in the direction of model-based, abstract reasoning (model-based/explanation-based reasoning) and a negative value indicating more concrete experience, case-based reasoning.

The second way reasoning styles were measured was via the use of a modified version of the scenarios employed by Sylvan et al. (1994) (for a description see Appendix 2).

Results

Both the AC-CE (Abstract Conceptualization-Concrete Experience) inventory and the scenarios were administered

along with demographic questions and questions designed to ascertain previous educational achievement (such as ACT/SAT scores) to a total of 93 undergraduate political science students, 38 from Frostburg State University (about 22.4% of the total number of political science majors at the university) and 55 from Truman State University (about 32.4% of political science majors) (see Appendix 3).[1] From the Frostburg State sample, 26.3% of students (10 of 38) were underclass students; 42.1% were women and 76.3% were White/Caucasian. From the Truman sample, 49.1% (27 of 55) were underclass students, 32.7% were women and 76.4% were White/Caucasian. To check for the relationship between the AC-CE scores and the scores on the scenarios, a correlation procedure was conducted. The resulting coefficient was .52, which indicated a high degree of correlation between AC-CE scores and the scores on the scenarios.

Building blocks of knowledge. The authors's research finds more students who receive an intensive survey of the major schools of thought in political science through a structured curricula of sequential classes that develop more intense abstract reasoning skills. Photo courtesy of the University of Minnesota.

Tables 1 through 5 report the results of comparing the reasoning styles of political science majors at Frostburg State and Truman State Universities. Table 1 reports the difference of mean scores for the AC-CE scores across both institutions, controlling for number of years in school. As indicated, Truman underclass students tend to be slightly more inclined toward abstract conceptualization than their Frostburg counterparts (1.93 versus −0.6 respectively) but the difference is not statistically significant. However, when comparing upperclass students, although in both cases the average scores move in the direction of abstract conceptualization (model-based reasoning), the difference between Frostburg State and Truman students becomes statistically significant, with Truman upperclass students scoring at 5.27 and Frostburg upperclass students scoring 1.12. Further, when comparing the differences in mean AC-CE scores across years, although upperclassmen at Frostburg exhibit a slightly higher inclination toward abstract reasoning than their underclass counterparts (1.18 compared to −0.6 respectively) this difference is not significant. However when comparing Truman upperclass and underclass students, there is a significant difference in AC-CE scores. While the average scores at both institutions move in the direction of abstract conceptualization (model-based reasoning), these results suggest that Truman State political science students are more likely to develop abstract reasoning styles, perhaps because of the structured nature of the political science curriculum.

To support this interpretation, we need to rule out alternative explanations and test the difference between Frostburg State and Truman State students' scores on the scenarios. One possible alternative explanation for differences in reasoning styles would be that these differences are due to different academic abilities of the students rather than the structure of the political science curriculum. ACT or SAT self-reported score ranges were used to assess general academic standing. As indicated by Tables 2 and 3, there appears to be *no systematic relationship between reasoning style as measured by scenario scores and the self-reported ACT or SAT scores*[2] for both students at Frostburg State University (Table 2) and Truman State University (Table 3). In other words, there appears to be no relationship between innate academic ability and reasoning styles—thus differences in student reasoning are unlikely due to academic ability alone.

Tables 4 and 5 test the differences across the two institutions in student reasoning styles using the scenario scores. Table 4 reports the scores for the underclass students. Although it appears that Truman underclass students are slightly more inclined toward abstract reasoning (a result also indicated in the AC-CE scores reported in Table 1) the difference is not statistically significant (chi-square = 2.76). In Table 5, however, a statistically significant ($p < .01$) difference emerges when comparing Frostburg State and Truman upperclass students (chi-square = 10.73). These results further support the contention that the more structured nature of the political science curriculum at Truman State University promotes the development of abstract reasoning styles more so than Frostburg State University's more flexible approach.

Conclusion

The above results indicate an association between the structure and focus of political science curricula and differences in the levels of abstract reasoning developed by students. More of the students taking the highly structured, concept-centered political science major at Truman State University developed abstract reasoning skills than did students enrolled in the flexible, more content-oriented major at Frostburg State University.

To be sure, there are other factors that may affect the development of reasoning styles, such as course content and the quality of instruction. As to

course content we contend it is connected to the structure of the major. Majors that have fewer sequenced courses must focus on common principles in order to establish linkages across sub fields in political science—in other words, theory. Further, the quality of personnel and instruction a department has makes an enormous difference in how a major functions. Indeed, personnel selection is an important part of how a major functions, and what makes a sequenced major work is the existence of a broadly trained faculty who can make connections across sub fields in the discipline. Thus, course content and personnel, we contend, are necessarily part of the structure of the major.

Student self-selection is another possible explanation for differences observed across the two institutions. In other words, it might be contended that students with a higher predisposition to think in more abstract terms would be attracted to the university with the program that emphasizes abstract reasoning (Truman) and hence observed differences are due to students self-selecting into programs that suit their reasoning styles. This, of course, is a possibility, but two observations tend to militate against that interpretation. First, such an argument presumes that incoming freshmen have a very good idea as to the structure of the major (and make decisions for entry based upon comparisons of structure) prior to deciding to enter the university, a questionable presumption at best. For instance, when asked in the exit interviews for graduating political science majors from Truman in 2000, the majority (52%) said that the political science major was "very different" than what they had expected as freshman, with most expecting it to be more descriptive than theoretical. Second, as indicated by the results reported in Table 1, the difference between freshman majors at Frostburg and Truman in terms of the AC-CE scores was not significant, a result which questions the contention that student self-selection accounts for the principal differences in reasoning style.

These results have some important implications. Although we do not argue that one reasoning style is inherently superior to another, we feel the Truman State University program better approximates the recommendations put forth by the AACU to promote "abstract logical thinking," "critical analysis," and sequential learning. Further, given the demands of professional and graduate education (such as in law school, public policy, business school, and graduate school) which requires the ability to think beyond particular cases and to grasp theory and principles, the structure of the major at Truman State University appears to facilitate the development of the skills necessary for the rigors of professional and graduate education better than the structure of the major at Frostburg State. Although this may not be the goal of all institutions, for those schools seeking to increase the degree of preparation for graduate study among their majors, a consideration of a more highly structured and sequential major may be warranted.

Notes

1. An earlier version of this paper was presented at the 2000 Annual Meeting of the American Political Science Association, Marriot Wardman Park, August 31–September 3, 2000. Washington DC.

2. All political science majors had an equal opportunity to participate in this study. Subjects were recruited from a list of political science majors and asked to participate in the study according to standard procedures established by the Institutional Review Boards (based upon guidelines established by the American Psychological Association) at both universities. At first glance, the number of cases may be viewed as small, but given that all majors had an equal opportunity of participating in the project (and since the population of political science majors is small at both institutions) the number of cases is sufficient to adequately represent the population of majors at both universities. In addition, given that we use simple bivariate techniques (as opposed to multivariate techniques) we are not confronted with the potential degrees of freedom problems associated with small sample sizes.

3. Frostburg State University uses the SAT and Truman State University uses the ACT. The ACT scores were divided into four categories and are matched with SAT equivalents.

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