HERDING CATS IN UNIVERSITY HIERARCHIES:

THE IMPACT OF FORMAL STRUCTURE ON DECISION-MAKING IN AMERICAN RESEARCH UNIVERSITIES*

THOMAS H. HAMMOND
DEPARTMENT OF POLITICAL SCIENCE
MICHIGAN STATE UNIVERSITY
EAST LANSING, MI 48824
(E-MAIL: THAMMOND@MSU.EDU)

Abstract. This paper presents a "bottom-up" perspective on how the formal structures of American research universities might affect the outcomes from their decision-making processes. It is posited that different ways of structuring the university will affect the bottom-up flow of information, advice, and conflicts over policy implementation in predictable ways. In particular, different structures will bring different kinds of information, different packages of advice, and different sets of conflicts to the top-level administrator. A top-level administrator who is designing a formal structure for her university will thus want to design a structure which brings to her the kinds of information, advice, and conflicts which she considers most important.

* To be presented at the conference on "Governance in Higher Education," Cornell University, June 4-5, 2002. I would like to thank Robert Birnbaum, Marvin Peterson, M. Christopher Brown, Craig Volden, and Ken Koford for their encouragement on this project and their helpful comments on earlier drafts of this paper.

I. INTRODUCTION

Research universities in the United States are often described in relatively non-hierarchical terms, and there are good reasons for this perspective. Department chairs and higher-level administrators, for example, find it all but impossible to fire tenured faculty members: as long as these faculty members meet minimal standards of teaching and personal behavior, they can remain employed until they make their own decision to retire. Moreover, the initial recommendations on promotion and tenure are largely in the hands of departmental faculty members, and higher-level reviews of these recommendations are generally conducted by committees dominated by tenured faculty members. Proposals to change departmental curricula are also largely in the hands of departmental faculty members, and higher-level reviews of these proposals are generally made by committees dominated not by administrators but by other faculty members.

Furthermore, the faculty members' disciplinary training, coupled with their own personal concerns and interests, largely govern their choices of research topic; higher-level administrators can affect these decisions only at the margin. And those faculty members who are most productive (in publications and especially in grantsmanship) are often in a position of strength when bargaining with department chairs and higher-level administrators: a threat to decamp for another university usually carries considerable weight in salary negotiations and related matters.

These general characteristics of research universities have given rise to a well-known simile: managing institutions populated by academics such as these is like "herding cats." In fact, Cohen and March (1974) have even developed a conception of research universities as "organized anarchies": the faculty members' problematic goals, unclear technology, and fluid participation in decision-making are taken as suggesting that the universities can be described in decidedly non-hierarchical terms. The views of Cohen and March have been echoed by other students of these academic institutions as well. For example, in describing research universities as organ-

ized anarchies, Birnbaum (1988, ch.7) suggests that:

> The traditional organization chart with its boxes representing offices connected by lines representing channels of authority provides one very powerful metaphor for thinking about tight coupling organizational structure. But a metaphor more appropriate for loose coupling is that of "streams" (Cohen and March, 1974). A stream can be thought of as a flow of "something" that travels through an organization as the Gulf Stream flows through the Atlantic Ocean. (pp.159-160).

In particular, following Cohen and March, Birnbaum identifies three independent streams, involving problems, solutions, and participants, which interact to produce choices and decisions. It is only when a specific problem from one stream, a specific set of participants from another stream, and a specific solution from a third stream all randomly happen to converge on a particular choice point (e.g., in some multi-member decision-making forum or in someone's office) at the same time that a decision gets made.[1]

Nevertheless, even though American research universities have many non-hierarchical tendencies, this perspective should not be overemphasized. The reason is simply that research universities, like most other large institutions, retain significant hierarchical features. For example, every university, whether public or private, has some kind of governing board in which authority over institutional management is vested.[2] While the members of the governing boards usually delegate much of their authority to a president (or whatever the chief administrative officer is called), they generally have the authority to select who this president is. The president in turn usually delegates major responsibility for academic matters to a provost, though the president usually decides who the provost will be. The provost in turn usually delegates substantial responsibility to the deans of the colleges and schools, though she generally plays a major role in selecting these deans. While the faculty may play a role on search committees for selection of the provost and the deans, the final decisions are usually in the hands of the president (for the

[1] For a sustained critique of the "organized anarchies" metaphor of Cohen and March (1974), as well as its intellectual predecessor, the "garbage can" model of Cohen, March, and Olson (1976), see Bendor, Moe, and Shotts (2001).

[2] For a brief review of the history of governing boards in higher education in America see Duryea (1973).

choice of the provost) and provost (for the choice of the deans).

Despite the delegation, each of these administrative officials retains substantial authority over critical aspects of university decision-making. At Michigan State University, for example, the authority of the president, of the provost, and of the deans are officially described as follows:

- The President, as the principal executive officer of the University, shall exercise such powers as are inherent in the position in promoting, supporting, or protecting the interests of the University and in managing and directing all of its affairs; may issue directives and executive orders not in contravention of existing Board policies; shall be responsible for all business policies as heretofore enacted or modified or hereafter established subject to the general policies established by the Board; shall instruct the proper administrative officers to prepare an annual budget which upon approval, shall be recommended to the Board; shall be responsible for the preparation of the annual reports of the Board; shall exercise such other powers, duties, and responsibilities as are delegated or required by the Board of Trustees.[3]

- The Provost shall be the principal academic officer of the University and administer the various colleges, special units and academic support facilities; shall be responsible for assembling and administering the academic budget; shall be responsible for faculty personnel administration including procedures for faculty appointments and terminations, salaries and promotions, working conditions, and tenure; shall be responsible, with advice from the faculty, for development of new academic programs and for keeping existing programs updated and in conformity with University educational policies; shall be responsible for insuring that administrative procedures preserve academic freedom and insure academic responsibility; shall be responsible for supervising procedures and policies related to the admission of students, and liaison with high schools and community colleges; shall be responsible for supervising the registration process and for the orientation of new students; shall be responsible for administering academic facilities and support units such as Libraries, Computer Laboratory, Instructional Development and Telecommunication Services, and the Museum; shall be responsible for liaison with State Department of Education.[4]

- Deans and directors of other academic units separately reporting to the provost are responsible for educational, research, and service programs of the respective college or separately reporting unit. This responsibility includes budgetary matters, physical facilities and personnel matters in his or her jurisdiction taking into account the advisory procedures of the college or separately reporting unit.[5]

Of course, the deans further delegate responsibility for many aspects of departmental management to the department chairs, and it is primarily at the departmental level that this relatively hierarchical structure begins to break down. For example, while selection of a department chair is sometimes solely a faculty responsibility and sometimes officially the responsibility of the dean and provost, choice of a chair is usually heavily influenced by the faculty members of the

[3] From Section 4 of the *Bylaws of the Michigan State University Board of Trustees*.
[4] Reformatted and slightly edited from Section 4 of the *Bylaws of the Michigan State University Board of Trustees*.

department involved. Even so, a department chair can still retain substantial powers. At Michigan State, for instance, the powers of the chair are officially described in the following terms:

- A department chairperson or school director serves as the chief representative of his or her department or school within the university. He or she is responsible for educational, research, and service programs, budgetary matters, physical facilities, and personnel matters in his or her jurisdiction, taking into account the advisory procedures of the unit. The chairperson or director has a special obligation to build a department or school strong in scholarship, teaching capacity, and public service.[6]

In sum, the administrators at Michigan State are given broad, significant, and clearly-specified responsibilities, and there is no reason to think that administrators at Michigan State are unique in this regard. It is presumably for this reason that the literature on universities often refers to a hierarchical ranking of the authority of the president, provost, deans, and department chairs; see, e.g., Clark and Youn (1976: 16-18). And for the same reason, it is easy to construct a traditional "organization chart" for a university (an enterprise which Birnbaum implicitly criticizes, as quoted above) from these descriptions of formal authority and responsibilities; indeed, most universities probably have such a chart.[7]

But while American research universities retain significant hierarchical features, there is some variation in the characteristics of their hierarchies. To illustrate some of the possible variations in formal organizational structure among research universities, consider two kinds of structural differences between the University of Michigan in Ann Arbor and Michigan State University in East Lansing. At the University of Michigan the Department of Physics is separate from the Department of Astronomy, whereas at Michigan State University these two fields of study are combined in a single Department of Physics and Astronomy. For the university's decisions involving physicists and astronomers, does it matter that the physicists and astronomers are grouped together (as at Michigan State) or separately (as at the University of Michigan)? More

[5] From section 2.1.2.2 of the *Michigan State University Bylaws for Academic Governance*.
[6] From section 2.1.2.1 of the *Michigan State University Bylaws for Academic Governance*.
[7] For the organization chart at Michigan State University see **http://opbweb.opb.msu.edu** under the heading of "Long Range Planning."

generally, does it matter for university decision-making how the basic organizational units—normally considered to be the "departments"—are defined?

Similarly, at the University of Michigan there is a College of Literature, Science, and the Arts which includes most of the non-professional schools, colleges, and programs, whereas at Michigan State University there is a College of Natural Science, a separate College of Social Science, and another separate College of Arts and Letters. For university decisions involving natural scientists, social scientists, and students of the humanities, does it matter whether these scholars are grouped together (as at the University of Michigan) or separately (as at Michigan State)? More generally, does it matter for university decision-making how the basic units are grouped together into colleges and schools?

The questions just asked are not trivial or obscure: at one time or another, *every* university has had to make decisions as to what its basic organizational units would be and how these basic units would be grouped together. Those who made these decisions presumably had some reasons for making these decisions. That is, the decision-makers presumably expected the consequences from some structural choices to be more desirable than the consequences from other structural choices. One would thus guess that decision-making on these organizational issues would have attracted scholarly attention.

Indeed, such fundamental questions about what the basic organizational units are and about the impact of how these basic units are grouped together lie at the heart of almost every theory of organization, bureaucracy, and both public and private management. These questions have certainly been critical to organization theorists at least since publication of Luther Gulick's classic essay, "Notes on the Theory of Organization."[8] And Alfred Chandler's classic study of the or-

[8] Gulick's essay (along with the larger "principles of administration" literature) was subjected to a scornful attack by Herbert Simon in his well-known essay, "The Proverbs of Administration" (1946). For a defense of Gulick's essay against Simon's criticisms see Hammond (1990).

ganization of business firms, *Strategy and Structure: Chapters in the History of Industrial Enterprise* (1962), likewise made clear to economists and students of business administration the critical importance of a firm's structure to its decision-making practices.[9]

Interestingly, however, while academic researchers on universities have extensively probed the reasons for, and impact of, the *non*-hierarchical relationships within the university, remarkably little research seems to have been conducted on how the different ways in which the universities are hierarchically organized might affect the university's decision-making.[10] It seems very unlikely that a university's hierarchical structure is completely irrelevant to its decision-making processes and outcomes. But apparently no such research has been reported in the academic literature on the institutions of higher education.[11]

Thus we have something of an anomaly. On the one hand, the hierarchy of the research university—how the basic units are defined and how these basic units are grouped together—virtually *defines* the administrative context within which faculty members and administrators conduct a substantial portion of their work. But on the other hand, researchers on the institutions of higher education seem to have developed essentially no rigorous understanding, derived from either theoretical or empirical research, of how this hierarchy affects how universities work. The purpose of this paper is thus to stimulate thinking and research on the following question:

- How does the hierarchical structure of American research universities affect their decision-making processes and outcomes?

The next section, part II, describes some of the most basic aspects of university hierarchies: what the basic units are, why they have become the basic units, and how these basic units are as-

[9] See Hammond (1994) for a reanalysis of *Strategy and Structure* and the literature on corporate structures which it stimulated.

[10] Personal communications to the author from three eminent experts on research on higher education institutions—Robert Birnbaum at the University of Maryland (3-28-01), Marvin Peterson at the University of Michigan (3-19-01), and M. Christopher Brown at the University of Illinois (3-23-01)—all testified to the almost complete lack of a research literature on the impact of alternative organizational forms on university decision-making.

sembled into the larger hierarchy we call "the university." Part III examines a university's hierarchy as a dependent variable (e.g., why does a university have a particular structure?) and then briefly introduces the study of the structure as an independent variable (e.g., what impact does a particular kind of structure have on decision-making?). The next four sections examine in more depth the university hierarchy as an independent variable. Introduced in part IV, the following sections discuss how a university's formal structure can affect how top-level administrators perceive problems which may need attention (part V), how a menu of possible choices is constructed for the top-level administrators (part VI), and how their final choices are implemented (part VII). Part VIII then characterizes the nature of the choices that the designers of university hierarchies might be expected to face. Part IX concludes the essay.

II. THE BASIC BUILDING BLOCKS OF A UNIVERSITY'S HIERARCHY

The two fundamental aspects of a hierarchy are what the basic units are (i.e., what are the "building blocks"), and how these basic units are clustered together to form the hierarchy. In a university, these basic units are generally referred to as "departments," and these departments are then grouped together into "colleges" or "schools."

A. THE BASIC UNITS: "DEPARTMENTS"

The basic units of any university are, for the most part, a given—a constant, in effect—whose characteristics are only occasionally given much consideration. However, the definition of these basic units involves some interesting conceptual, historical, and organizational issues.

In theory, how to group faculty members into "departments" or "academic programs" could be based on many different principles of organization. For example, all faculty members could be clustered into two groups, one based on "pure research" and the other based on "applied re-

[11] For just one example, Brown's *Organization & Governance in Higher Education* (2000), an edited volume which contains 40 separate selections, makes essentially *no* reference to the impact of the universities' formal structures.

search." Or the faculty members could be clustered into three groups, one based on the "hard sciences," one based on the "soft sciences," and one based on the "arts and humanities." Or the faculty members could be clustered into three groups, one based on "theoretical research," a second based on "empirical research," and a third based on "normative research. Or the faculty members could be clustered into groups which focus on various kinds of social, political, or economic problems (e.g., "medical problems," "urban problems," "environmental problems," "transportation problems," and so forth). Or faculty members could even be clustered into groups which focus primarily on either "undergraduate teaching" or "graduate teaching."

Each of these groups could then be further subdivided on the basis of any of the other principles of organization. For example, faculty members engaging in "empirical research" could be further subdivided into two groups, one which focuses on "field research" and the other which focuses on "laboratory experiments."

In fact, there is essentially an *infinite* number of different principles on which the grouping (or subdividing) of faculty members could conceivably be based. However, Pahre (1995: 243-244) argues that academic disciplines are primarily defined by agreement on some general class of phenomena—he refers to it as a *dependent variable*—which the members of the discipline are trying to explain. Thus, political scientists are united in trying to explain political phenomena, and thus are housed in a department of political science; economists are united in trying to explain economic phenomena, and thus are housed in a department of economics; psychologists are united in trying to explain psychological phenomena, and thus are housed in a department of psychology; and so forth. What the departments in a university are *not* based on, Pahre suggests, is a common interest in some *independent variable*; as he remarks (1995: 244), "It is…telling that groups of scholars clustered around anything other than dependent variables do not organize

themselves as a discipline, or even a formal subfield of some discipline."[12]

However, what is defined to be a particular "dependent variable" around which disciplinary discourse is organized is not completely constrained; "dependent variables" are themselves subject to definition (and redefinition). For example, it may well be that a critical influence on how some kinds of faculty members come to be grouped together into "departments" in a university is simply how the various academic disciplines evolved historically. Every academic discipline has come to include some kinds of subjects, concerns, and methodological approaches but not others, and one can find historical studies of the origins of many different disciplines.

For example, in the late 1800's a national "social science" association was formed in the U.S., but it quickly split into two separate associations, one involving "economics" and the other involving "political science." In the following century these two disciplines, each with its own national association (the American Economic Association and the American Political Science Association respectively), evolved quite independently from each other.[13] A key distinction might seem to be that economists were primarily interested in explaining "private" behavior involving the functioning of private markets and that political scientists were primarily interested in explaining "public" behavior involving the function of governmental institutions. But given the intimate and unavoidable interactions between economic and political institutions, this separation into "economics" and "political science" left some topics not clearly in just one field.

For instance, where does the study of interest groups belong (particularly those interested in "economic" matters)? And there are a variety of larger questions, involving the legal foundations of private enterprise (e.g., private property rights, contract law, and so forth) and the origins

[12] Most of Pahre's discussion refers to the social and natural sciences. However, it is less clear how to classify fields such as mathematics and statistics (though they are often grouped with the natural sciences) and various fields in the arts. The "dependent variable" classification scheme seems less relevant or useful for these kinds of cases. For example, one could argue that the discipline of statistics is organized around the development of a particular kind of *methodology* for conducting tests of the impact of an independent variable on a dependent variable.

[13] For relevant histories see Furner (1975) and Haskell (1976).

of governments, in which what causes what is not entirely clear. For example, do private business organizations exist because governments create the legal foundations required for the existence of these private business organizations? Or do governments exist because private business interests demanded (and even helped create) the governmental institutions which could supply the public goods needed by the private businesses? It is not clear what the dependent variable actually is here; that is one of the big debates within the field of "political economy."

In fact, one could probably comb through academia and find a great many such fields of study which, for largely historical reasons, have not come to be defined as a particular dependent variable and thus included within the ambit of some academic "discipline." So when universities officially endorse the study of these particular fields, the fields often end up being organized as "inter-disciplinary" programs of one sort or another and run jointly by faculty members from two or more other discipline-based departments. For example, one consequence of the split between economics and political science is that subjects which bridged this gap—such as "political economy"—did not end up with a clear institutional or disciplinary home (even though "political economy" as a field of study antedated *both* "political science" and "economics"—consider, e.g., Adam Smith, David Ricardo, and John Stuart Mill). In recent decades, of course, numerous universities have created various kinds inter-departmental "programs" in "political economy" (see, e.g., the program institutionally housed inside the Graduate School of Business at Stanford University), but there seems to exist no *department* of political economy at any major American research university.[14] One can likewise think of other fields of inter-disciplinary study such as "Urban Studies," or "American Studies," or "African-American Studies," or "Women's Studies," or "Environmental Studies," or "Asian Studies," or "African Studies," or "Latin American Studies," or "European Studies," or "Russian Studies," which have a wide range of institutional em-

bodiments in different universities and whose faculty associates are characterized by a wide range of questions, concerns, methodologies, and disciplinary approaches.

Not only are some legitimate fields of study not clearly included within any one "discipline," but closer inspection also shows that relatively few disciplines, at least in the social sciences, are defined by any kind of integrated and coherent set of questions, concerns, and methodological approaches. Economics is perhaps the most integrated and coherent of the social sciences, but many economics departments are split between microeconomic theorists (who may be accused of developing theory without data) and econometricians (who may be accused of analyzing data without theory). The other social sciences—political science, sociology, psychology, anthropology—are less integrated and coherent. Some "disciplines" are even divided between the social sciences and the natural sciences. For example, the field of "geography" is divided between geographers with a primary interest in the *social* world (e.g., geographers whose interests strongly overlap those of sociologists and even urban planners, who are in turn usually housed in Departments of Sociology and Departments of Urban Planning respectively) and geographers with a primary interest in the *physical* world (e.g., physical geographers, whose research interests strongly overlap those of geologists, who are in turn usually housed in Departments of Geology or Earth Sciences).[15]

Furthermore, while Pahre's (1995) argument that what defines a "discipline" is the effort to explain some common dependent variable, this seems less applicable to the *applied* departments and schools in a university. At the least, we would have to amend his formulation by arguing that each of these applied departments is oriented not around explaining some common dependent variable but improving, saving, or redesigning some common object.

[14] Searching for "political economy department" with the Google search engine on the World-Wide-Web turned up no such examples in the top 40 or 50 listings.

[15] For an interesting discussion of divisions within several other social sciences as well see Dogan and Pahre (1989).

In general, how each field of study came to be considered a "discipline" (pure or applied) and then institutionally embodied in an academic "department" involves some rich and complex issues. But *whatever* their origins, what came to be considered "the departments" in a university can be expected to structure, and perhaps thereby influence, how those scholars interested in any particular field of study interact with other scholars at that university.

B. Grouping the "Departments" into "Colleges" and "Schools"

The same wide range of principles which could be used to cluster faculty members into "departments" can also be used to group these "departments" into "colleges" and "schools." One common principle (followed by the University of Michigan in its creation of a College of Literature, Science, and the Arts) is to group together all departments and programs which do not involve "professional" training, i.e., which do not involve the granting of degrees for "applied" work in law, business, medicine, dentistry, engineering, nursing, social work, and so forth. In effect, the fundamental division is between the professional schools and the non-professional schools.[16] A different principle breaks the non-professional schools into categories involving the natural sciences, the social sciences, and the arts and humanities (e.g., as with Michigan State University's creation of separate colleges for these three areas). As has already been noted, just as there is an infinite number of different principles on which the grouping of faculty members into departments and programs can be based, there is an infinite number of different principles on which the grouping of departments and programs into colleges and schools could be based.

III. A University's Structure as Independent and Dependent Variable

A university's structure can be seen as both something to be explained and as something which explains other things. For example, we can try to explain why the university has a particular formal structure; that is, we can treat the formal structure of a university as a *dependent variable*.

We can also try to explain what impact the formal structure has on university decision-making; that is, we can treat the formal structure of a university as an *independent variable*. This section of the paper focuses primarily on treating the university structure as a dependent variable. At the end of this section, and for the next four sections thereafter the focus is primarily on treating the university structure as an independent variable which affects university decision-making.

A. UNIVERSITY STRUCTURE AS DEPENDENT VARIABLE

As a dependent variable, the university's hierarchy can be seen the outcome of forces both outside and inside the university. For example, a particular structure may be chosen because social, political, and economic interests outside the university wanted something from the university, and so worked with the legislature, the governor, the university's governing board, the university administration, or the faculty (or some combination of these) to ensure supply by the university of what these interests wanted. In fact, for land-grant universities (such as Michigan State), one of the main reasons for the creation of the state university in the first place was to supply various kinds of practical services—*useful* knowledge—to residents in the state. This meant, in effect, that the structure of the university—both in the definition of the basic units, and in the grouping of these subunits into colleges and schools—had to be designed so as to facilitate the creation and dissemination of this useful knowledge.

One prime example of the creation and dissemination of useful knowledge is the creation of a College of Agriculture within the larger university whose "constituency" in the broadest sense is the agricultural community in the university's state.[17] The resulting departments thus focused, as at Michigan State, on fields such as agricultural economics, agricultural engineering, botany and plant pathology, crop and soil sciences, entomology, food science, horticulture, and forestry. When also associated with an Agricultural Experiment Station of the U.S. Department of Agri-

[16] For an analysis of the role of professional schools in American universities see Halpern (1987).

culture (as again is the case at Michigan State, for example), a College of Agriculture provides a means of entrée into the university for agricultural interests and an organizational means for the university to communicate with (and, not incidentally, to try to gain the support of) these interests. Efforts to significantly reorient the teaching or research activities of a College of Agriculture, or even dismember it and reallocate its constituent parts to other colleges at the university (e.g., at Michigan State the Department of Agricultural Economics could plausibly go to the College of Social Science, and the Departments of Agricultural Engineering, Botany and Plant Pathology, Crop and Soil Sciences, Entomology, Food Science, Horticulture, and Forestry could all plausibly go to the College of Natural Science) might thus be expected to arouse considerable concern on the part of these interests. These interests might then make their concerns known to the governor and state legislators (who control a significant portion of the budget of public research universities) and to members of the university's governing board.

From this perspective, then, one could interpret some aspects of the university's hierarchy from the viewpoint of contingency theory, which argues that structures are designed to handle critical problems, involving various kinds of political or economic uncertainties, which an organization faces.[18] Relationships with the large and powerful agricultural sector in a state might plausibly be seen as involving uncertainties regarding a critical constituency, and thus a structure is designed (e.g., a College of Agriculture) whose primary purpose is to handle this contingency.

Of course, other aspects of a university's structure—such as a College of Social Science or a College of Arts and Humanities—probably have fewer critical external constituencies. Hence, it is less clear that contingency theory will have anything useful to offer here.

Moreover, other aspects of a university's structure may even have been left up to some of the faculty members themselves. At Michigan State, for example, when the College of Social

[17] Indeed, the original name of Michigan State University was "Michigan Agricultural College."

Science and the School of Business were being created several decades ago, lore has it that the faculty members in the Department of Economics had some influence over where they would be located, and supposedly they chose to be located in the School of Business because they expected their salaries to be closer to the higher salaries earned by business school professors (who were also in some demand by industry) than to the lower salaries of the other social scientists (who were in much less demand outside the university).

B. Structure as Independent Variable

We can also treat formal structure as an independent variable. That is, instead of trying to determine why a particular structure was chosen, we can try to determine what the actual impact of some structure actually is. Indeed, because the impact of formal structures is not well understood (for either theorists or practitioners), it may well be that whatever the original *intentions* were in selecting some structure, the *actual impact* may have turned out to be quite different. Hence, treating the structure as an independent variable makes considerable sense. The purpose is to develop some ways of conceptualizing the impact of a university's formal structure on various kinds of decisions made by the university.

IV. Orientation, Advising, and Policy Implementation

In previous work aimed at developing a political science of hierarchies (see Hammond 1986, 1990, 1993, 1994; Hammond and Horn 1984, 1985; Hammond and Miller 1985; Hammond and Thomas 1989, 1990), I have made the argument that, while much of organization theory takes a "top-down" perspective, construction of an adequate theory of organizational structure and organizational design first requires an understanding of the "bottom-up" flow of information, policy recommendations, and conflicts over policy implementation. Only when these bottom-up processes are understood will it be possible to develop an adequate top-down theory of why a

[18] For a recent review of contingency theory see Donaldson (2001).

particular structure would or should be chosen.

The policymaking process in an organization can be seen as involving three fundamental steps: I will call them *orientation*, *advising*, and *policy implementation*. *Orientation* refers to problem recognition and problem definition, that is, the processes by which the administrators become aware of the existence of a problem. Problem recognition and problem definition by administrators does not occur automatically. Instead, the administrators must perceive that there is a problem requiring attention. Moreover, the problem that is perceived can usually be perceived, defined, or understood in several different ways. The perception and definition of a problem depend in part on the collection and assessment of some body of data. For most large institutions (and large research universities would certainly qualify), no single administrator can possibly give due consideration to every piece of relevant data. My argument here will be that different formal structures can create different sets of information for the administrators, and these different sets of information can sometimes be expected to lead decision-makers to different definitions of the problem, or even to lack of recognition that there is a problem at all.

Advising refers to the process by which the administrators gather advice from subordinates on what to do about the problem that has been identified. Addressing a problem requires consideration of the options that may be available. The act of choice by an administrator involves a comparison of the available options. My argument here will be that different formal structures will create different "menus" of possible choices for the decision-making administrator; given different menus, the administrator can sometimes be expected to make different choices.

Policy implementation refers to the process by which some administrator puts into effect the policy that he or she has selected, given the menu of available options. While implementation is a complex and multi-faceted process (as are orientation and advising), a key aspect of implementation involves the resolution of conflicts among subordinates over *precisely* what new policy the

administrator actually intended. Such disputes can freeze implementation of the policy until the disputes are somehow resolved. The disputes can be resolved in two different ways. A dispute can be resolved by "horizontal" compromise or concession among the individuals involved. Or the dispute can be resolved by referring it "vertically" upwards to some common administrative superior; this administrative superior can then use his or her formal authority to decree a solution. My argument will be that different formal structures will "route" such conflicts to different administrative superiors, and if these administrative superiors have different policy preferences, the disputes may be resolved in different ways in the different structures.

V. The Orientation Process in University Hierarchies

A top-level administrator (such as the provost) cannot personally pay attention to all the problems that confront the university: she has limited time and energy, and she may not have the specialized knowledge that would allow her even to recognize the existence of various kinds of problems. Hence she might have to rely on other people, including her subordinates in the colleges and departments, to keep her informed about various problems her university faces.

It is often the university's bottom-level employees who initially perceive and collect the raw data indicating a problem to which the top-level administrator should pay attention. But many different bottom-level employees will be scanning the environment and sending messages upward—to their department chairs or program administrators, to the deans, or to the provost—about potential problems. If the provost tries to read all these messages, and engage in back-and-forth communications to truly understand the issues under discussion, she will be overwhelmed by their volume. Hence, the middle-level administrators, such as the department chairs and the deans, will normally collect, collate, and aggregate the reports from the bottom-level employees into summary documents which are then forwarded to the provost. Hence, what the provost

normally sees is not the *raw data* that the bottom-level employees see but a highly aggregated or condensed *interpretation* by the middle-level administrators of what the bottom-level employees see. The administrator will then base her choices about what problems to attend to on these interpretations from the middle-level administrators. March and Simon (1958) refer to this process as "uncertainty absorption," and they note that

> Through the process of uncertainty absorption, the recipient of a communication is severely limited in his ability to judge its correctness. Although there may be various tests of apparent validity, internal consistency, and consistency with other communications, the recipient must, by and large, repose his confidence in the editing process that has taken place, and, if he accepts the communication at all, accept it pretty much as it stands. (p.165)

My central argument here is that the way in which the subordinates are clustered together in "departments" and other academic units such as "programs," how these academic units are grouped together into "colleges" and "schools," and how the responsibilities for assessing particular kinds of data are assigned to these various organizational units, can affect what kinds of inferences the top-level administrators can draw from the raw data flowing into the university via the bottom-level employees. That is, the formal structure of the university can affect just how "uncertainty absorption" takes place. Indeed, even when the bottom-level employees are seeing and collecting exactly the same raw data and so are sending identical reports upward, different kinds of comparisons among different sets of aggregated information can be expected to take place in different kinds of organizational structures. The different problems that are identified, or that fail to be identified (and thus the different things that the top-level administrators thereby learn, or fail to learn) can have important consequences for the university.

A. Different Inferences from the Same Set of Messages

To illustrate these arguments, consider the following model involving how four departments—the departments of Entomology, Agricultural Economics, Genetics, and Sociology—can be grouped into two colleges. The goal is to determine whether a shift from a structure based on a

College of Natural Science and a College of Social Science to a structure based on a College of Agriculture and a College of Literature, Science, and the Arts (LSA) can affect the inferences drawn by the provost about where to assign a new development officer whose task is to help some college attract outside grants. The model focuses on what the provost infers from messages the four department chairs and the two deans send upward as to whether there are opportunities for advancement from investments in their respective departments and colleges.[19]

Assume the following four messages are sent upward from the bottom in each structure:

- the chair of the Entomology Department always sends the message that there are "Many opportunities for advances in studies in entomology " (considering the grants that are available for entomologists, the "market" for new entomological findings, and the job market for graduate students with degrees in entomology);
- the chair of the Genetics Department always sends the message that there are "Many opportunities for advances in studies in genetics" (considering the grants that are available for genetics studies, the "market" for new genetics findings, and the job market for graduate students with degrees in genetics); and
- the chair of the Agricultural Economics Department always sends the message that there are "Few opportunities for advances in studies in agricultural economics" (considering the grants that are available for agricultural economists, the "market" for new studies in agricultural economics, and the job market for graduate students with degrees in agricultural economics);
- the chair of the Sociology Department always sends the message that there are "Few opportunities for advances in studies in sociology" (considering the grants that are available for sociologists, the "market" for new studies in sociology, and the job market for graduate students with degrees in sociology).

Now consider the structures in Fig. 1. In the top structure, the Entomology Department and

[19] For simplicity I assume that the chair of each department sends a "sincere"—a non-strategic—message upward about research opportunities and prospects. While it is quite unlikely that a chair will explicitly downgrade his or her department's research opportunities and prospects, as two chairs do in the illustration, the differential evidence they could advance would alert the relevant dean that there are fewer such opportunities than in other departments.

the Genetics Department are grouped in a College of Natural Science, while the Agricultural Economics Department and the Sociology Department are grouped in a College of Social Science. Assume that each dean—the dean of the College of Natural Science and the dean of the College of Social Science—must aggregate the information from the two subordinate departments before passing it up the hierarchy to the provost. Thus, when the Natural Science dean receives the messages that there are “Many opportunities for advances in studies in entomology” from the Entomology chair and “Many opportunities for advances in studies in genetics” from the Genetics chair, he might plausibly summarize these messages in a memo to the provost which states that there are "Many opportunities for advances in studies in the natural sciences." In contrast, the Social Science dean would receive the message that there are “Few opportunities for advances in studies in agricultural economics" and "Few opportunities for advances in studies in sociology." He might thus summarize these reports in a message to the provost which states that there are “Few opportunities for advances in studies in the social sciences." One conclusion the provost might draw from these two messages is that, "There is reason to think that by assigning the new development officer to the College of Natural Sciences, we can generate additional revenues for the university; however, few improvements are possible in the College of Social Sciences, so the new development official will not be assigned to it."

[Figure 1 about here]

Now assume that these four departments are organized in a different way (see the bottom diagram in Figure 1): there is now a College of Agriculture which contains the Departments of Entomology and Agricultural Economics, and a College of Literature, Science, and the Arts (LS&A) which contains the Departments of Genetics and Sociology. Assume that the same four department chairs send precisely the same messages as before upward to their deans, who now have the titles of “Dean of Agriculture” and “Dean of Literature, Science, and the Arts.” How-

ever, the Agriculture dean is receiving mixed messages: from the Entomology chair he is receiving the message that there are “Many opportunities for advances in studies in entomology,” whereas from the Agricultural Economics chair he is receiving the message that there are “Few opportunities for advances in studies in agricultural economics.” Hence, the Agriculture dean might send a message that there are “Mixed opportunities for advances in agricultural studies” to the provost. Similarly, the Dean of LS&A is receiving mixed messages: from the Genetics chair he is receiving the message that there are “Many opportunities for advances in studies of genetics,” whereas from the Sociology chair he is receiving a message that there are “Few opportunities for advances in studies in sociology.” Hence, the dean of LS&A might send the message that there are “Mixed opportunities for advances in studies in LS&A” to the provost.

In this structure, then, the provost receives the message that there are “Mixed opportunities for advances in agricultural studies" and "Mixed opportunities for advances in studies in LS&A." One conclusion she might draw from these ambiguous messages is that "There is mixed evidence on whether there are opportunities for advancement in either college." She might then simply decide to retain the new development officer at the provost level, and perhaps use this person on other projects not depicted here; meanwhile she could simply just monitor the two colleges until some more promising opportunities appear in the future.

In sum, it seems plausible to expect that the provost might draw different inferences from the same four messages which are being processed in the two different kinds of structures. So if a top-level university administrator is dependent on others (such as the chairs and deans) to summarize and transmit information to her, the structure may affect what information she receives, what inferences she draws about her organization and the outside world, and thus how the organization's problems are framed and defined (Tversky and Kahneman, 1981). In fact, even if precisely the same raw data come up from the bottom, different structures may process and

summarize these data in different ways for the administrator. We can summarize this as:

Proposition 1: Since different organizational structures may process the same raw data in different ways, the top-level administrator may draw different inferences from the messages sent upward by bottom-level employees.[20]

B. WHAT ROLE FOR STRATEGIC BEHAVIOR?

The fact that the structure of a university might lead the top-level administrator to make different inferences from the same initial set of messages can be seen as an example of "bias" and "distortion" in the inference process. However, if the initial perceptions of "reality" by department chairs are partial and fragmentary (which is inevitable), and if information aggregation and condensation have to go on (which they do), perhaps all that should be said is that there are several reasonable ways to interpret the information. If there is not any obvious reason to think, at least *a priori*, that one inference is necessarily "more accurate" or "more reasonable" than another, perhaps the terms "bias" and "distortion" should be avoided because of their unjustifiably negative connotations. Without knowing more about the ultimate implications of each inference, we cannot necessarily say that one inference is *better* than the other; it may be that all we can say is that the inferences are simply *different*.

One noteworthy feature of the preceding analysis is that structure appears to affect information processing, and thus what the top-level administrator learns, even in the absence of self-interested or opportunistic behavior by subordinates. Of course, one can imagine a version of the Figure 1 example in which department chairs try to influence what the top-level administrator learns by deliberately distorting the information they send her. And one might reasonably guess that the particular kinds of distortions imparted would differ between the two kinds of structures. But even with completely "honest" department chairs who are interested only in what is “good for the university” and who thus attempt to "tell the truth" as they know it, the discussion sug-

gests that biases can be expected in hierarchical information processing.[21]

VI. The Advisory Process in University Hierarchies

Even when a top-level administrator does perceive a problem, how to solve it may remain unclear. She may realize that she needs to improve the performance of the university, for example, but she may not have any specific idea of how to do this. For this reason she may solicit advice from subordinates on what specific goals the university should pursue—e.g., "Should I cut the budget for one kind of program and add more resources to these other kinds of programs"—and how to pursue them. With their recommendations in hand, she can then make her choices.

The university's structure can be expected to influence this policymaking process in four ways. First, the advice which reaches the top-level administrator will be a function of the university's structure: different structures may provide *different sets of options*—call them *choice sets*—from which she may choose. Given different choice sets, we can thus expect the top-level administrator to make different choices, depending in part on how different the choice sets are.

Second, the structure of the university may influence the basic characteristics of the options themselves. That is, *what kinds of options* end up in the top-level administrator's choice set may be influenced by the structure.

Third, the structure may influence what *criteria* the top-level administrator uses to evaluate and compare the options in the choice set. The kinds of options coming to her in one kind of structure may suggest particular kinds of criteria by which the options might be evaluated and

[20] Kim (1992) models organizational information processing under uncertainty, with Bayesian decision-makers. He formally demonstrates how different structures can lead to different inferences from the same raw data.

[21] Even here, of course, it is possible that a chair interested only in what is good for the university might distort information because he thinks this will lead the provost to make a better decision for the university. This might happen especially if the chair believes that other chairs are sending distorted information for their own self-interested reasons. Our chair might then believe that he has to distort his own information in order to counteract the ("illegitimate") actions of the others. Since the other chairs might fear the same thing about our first chair, there may be a Nash equilibrium in which everyone lies, even though everyone may prefer to tell the truth and may prefer that everyone else tell the truth too.

compared, while the different kinds of options produced by a different structure may suggest other kinds of criteria by which the options might be evaluated and compared.

Fourth, the structure will affect what the top-level administrator *learns about how to choose* among these options. Since a particular structure will routinely present a top-level administrator with particular kinds of options, she will, over time, learn more about what is involved in making these particular kinds of choices rather than what is involved in making other kinds of choices.

This section will address each of these matters in turn.

A. The Impact of Structure on Choice Sets

For a top-level administrator to plan intelligently requires understanding what opportunities the university's current (and potential) departments and programs provide for advancing the university as a whole. Each top-level administrator with experience in the university will have accumulated a considerable store of knowledge about these opportunities. But since each top-level administrator necessarily follows some particular career path, she thereby gains less experience in some aspects of the university than in others. Thus she will be at least somewhat dependent on other employees for advice about how to solve the problems she has identified.

Much of this information and advice will come from low-ranking subordinates since it is often these subordinates—e.g., faculty members, chairs, program directors, and deans—who will discover and recognize these new opportunities. The subordinates' contribution to strategic planning will then take the form of advice to superiors on how to pursue these opportunities. So when a top-level administrator adopts a new program for the university, or decides to manage some old program in a new way, it is often because a subordinate has urged this upon her.

Of course, a top-level administrator may request that a study be conducted so that a set of alternative recommendations can be made available to her. But in the end, she must make a choice, and it is often the case that her only real choice is whether to accept the recommendation

of those subordinates who aggregated the recommendations from the various subordinates. Her last true discretion may have been exercised in establishing the structural context for the university and choosing the personnel for the study. She can send the study back, but she cannot change it substantively without reorganizing the university or recruiting a new study committee.

Now let us consider how the university's structure may influence the set of options made available to the top-level administrator. To give the following illustration some bite (and even poignancy) it will be constructed as a question of promotion and tenure.

Each academic department will have its own standards, expectations, and practices involving promotion and tenure, and universities normally have one or more stages of review at higher levels as well (e.g., at the college or school level and at the level of the provost). How the university is organized may affect who gets tenure and who does not. The reason is that at any one level of review (e.g., at the level of the department, the college or school, or provost), a tenure decision involving any one candidate will depend, at least to some degree, on *who else* is being considered for tenure. That is, "what the competition is" will affect who succeeds and who fails. Thus, how a "department" is defined (e.g., is it a combined "Department of Physics and Astronomy" or is there a "Department of Physics" which is separate from a "Department of Astronomy"?), and what "departments" are grouped together into a "college" or "school" will thus affect who is on the "menu" of candidates for tenure at any one level of review.

Moreover, it is rarely the case that if a candidate is turned down for tenure at one level of review, he or she is reinstated for consideration at any of the higher levels. Thus, if how a "department" or "college" or "school" is constructed happens to lead to a negative judgment on some one candidate at a relatively low level of review, this candidate is likely to be denied tenure at the university level. In contrast, with some other definitions of these basic administrative units the candidate's name may remain on the "live" list throughout the higher-level review processes.

For example, consider the departments and colleges in Fig. 2; they are the same departments and colleges as in Fig. 1. In this example, each of the four departments will be assumed to have two candidates for tenure: the Department of Entomology has candidates **s** and **t**, the Department of Genetics has candidates **u** and **v**, the Department of Agricultural Economics has candidates **w** and **x**, and the Department of Sociology has candidates **y** and **z**. Assume that the chair of each department has authority to recommend no candidate, just one candidate, or both candidates. To simplify the example, assume that each chair recommends just one candidate.[22] Each dean will then take the two candidates forwarded by the chairs and (again to simplify) recommend just one to the provost. The provost will then take the two candidates forwarded by the deans and (again to simplify) recommend just one to the president and board of trustees.[23] The question is: of these eight candidates for tenure, which one will receive it?

[Figure 2 about here]

As shown in the list of preference orderings at the bottom of Figure 2, the chair of Entomology judges **s** to be a stronger candidate than **t**, and so recommends **s** to the dean of the College of Natural Science. Similarly, the chair of Genetics judges **v** to be a stronger candidate than **u**, and so recommends **v** to the dean of the College of Natural Science. The chair of Agricultural Economics judges **w** to be a stronger candidate than **x**, and so recommends **w** to the dean of the College of Social Science. And the chair of Sociology judges **y** to be a stronger candidate than **z**, and so recommends **y** to the dean of the College of Social Science.

The dean of the College of Natural Science thus gets recommendations of **s** and **v** from his

[22] For simplicity, let us also assume that the subordinates do not know what their superiors' choices would be. This inhibits their ability to engage in strategic behavior, and this will be taken to mean that they always recommend the option which is, in their judgment, the "best" by whatever criteria they happen to use.

[23] The preferences of the administrators and top-level administrator are to be treated here as “latent,” in the sense that when presented with a pair of options, each official will spend time and energy deciding which is the better option; the choices that each would make, if forced to, are summarized in Figure 2B. What is listed for the administrators and top-level administrator here should not be treated as clear-cut preferences which they have at the out-

subordinate departments, Entomology and Genetics. Since he judges **s** to be a stronger candidate than **v**, he recommends **s** to the provost. And the dean of the College of Social Science gets recommendations of **w** and **y** from his subordinate departments, Agricultural Economics and Sociology. Since he judges **y** to be a stronger candidate than **w**, he recommends **y** to the provost.

Finally, the provost compares the promotion-and-tenure cases of candidates **s** and **y**; her choice set is thus {**s**,**y**}. Judging **s** to be a stronger candidate than **y**, she decides to award tenure to candidate **s**.

Now compare what happens to this promotion-and-tenure process in the bottom structure in Figure 2; note that the Entomology and Agricultural Economics Departments are both now in a "College of Agriculture" and that the Genetics and Sociology Departments are both now in a "College of Literature, Science, and the Arts." Assume that the same four department chairs make the same four recommendations as before; in effect, then, the chair of Entomology recommends **s** to the dean of Agriculture, the chair of Agricultural Economics recommends **w** to the dean of Agriculture, the chair of Genetics recommends **v** to the dean of LS&A, and the chair of Sociology recommends **y** to the dean of LS&A.

The dean of Agriculture receives recommendations of **s** and **w** from his subordinate departments; considering **w** to be a stronger candidate than **s**, he recommends **w** to the provost. Similarly, the dean of LS&A receives recommendations of **v** and **y** from his subordinate departments; considering **v** to be the stronger candidate than **y**, he recommends **v** to the provost. The provost, judging **w** to be the stronger candidate than **v**, then decides to award tenure to candidate **w**.

But note that the choice sets for the provost were *completely* different: in the second structure it was {**w**,**v**} whereas in the first structure it was {**s**,**y**}.

Thus, in these two different structures, despite the fact that the four department chairs made

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set. If they had such clear-cut preferences at the outset, they would have no reason to consult their respective sub-

precisely the same four recommendations in each case, the different groupings of the departments into colleges produced completely different choice sets for the provost, and thus produced a completely different choice for tenure. So we can conclude with the following:

Proposition 2: Different formal structures can produce different sets of options for consideration by the top-level administrator, and thus can produce different final choices.

While this proposition is phrased in a relatively weak manner, it is actually possible to prove a much stronger result: it is *impossible* to design an organization—see Hammond and Thomas (1989)—so that when the structure changes, the outcome is guaranteed not to change. In other words, "neutral hierarchies" cannot exist. It is also important to note that the proof of this result does not depend on any assumptions of self-interest or strategic behavior. It is the formal structure alone which drives the result, not the characteristics or behavior of the individuals in the structure. That is, even if the individual actors are complete automatons, with no conception of self-interest whatsoever, the structure can still affect outcomes.

Not only can the structure, just by itself, affect promotion-and-tenure outcomes but there is also an undesirable aspect of the choice of **s** and **w** in these two structures. Assume that the provost, each dean, and each department chair is able to make a judgment about the quality of all eight candidates for tenure (see the preference orderings in Fig. 2). In the top structure, *all seven administrators* prefer candidate **u** to the final choice, candidate **s**, while in the bottom structure *all seven administrators* prefer candidate **u** to the final choice, candidate **w**. The reason this happens is that only the chair of Genetics can recommend option **u**, and his judgment was that candidate **u** was weaker than candidate **v**, thus eliminating candidate **u** from further consideration. (Candidate **v** was eliminated from further consideration by the dean of the College of Natural Science in the first structure and by the dean of LS&A in the second structure.)

Thus it is possible for the candidate ultimately awarded tenure by the provost to be judged

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ordinates.

worse than some other candidate by *all* administrators in the university. We thus see that subject-matter jurisdictions, while integral to specialization and decentralization in a university, can nonetheless have some undesirable side-effects. In other words, individual specialization and organizational efficiency do not *necessarily* go hand-in-hand.[24] So we also have:

Proposition 3: Organizational structures with department-specific and college-specific jurisdictions can lead the top-level administrator to make Pareto-inferior choices.

B. THE STRATEGIC PROVISION OF ADVICE

As noted above, the structure will affect outcomes even if subordinates are not self-interested. Nonetheless, when the top-level administrator is dependent on subordinates for advice, this does give subordinates an opportunity to manipulate her choices by providing advice different from what they "truly" think is "best." In general, we can state:

Proposition 4: Each subordinate may be able to improve organizational outcomes for himself by recommending an option different from what he most prefers.

Hammond (1986: 393-398) and Hammond and Horn (1983, 1985) illustrate ways in which a subordinate in a multi-level hierarchy can improve outcomes for himself by misrepresenting his own views.

While no method of making social choices is completely immune to manipulation (Gibbard, 1973; Satterthwaite, 1975; Walker, 1980), how significant is this problem in hierarchies? After all, not all situations are "ripe" for manipulation by subordinates. How often situations are “ripe” depends both on the details of the university's advisory process and on the preferences of faculty members, chairs, deans, and provost. Sometimes there is nothing a subordinate can do to improve outcomes for himself by misrepresenting his views. For example, Hammond and Horn (1985) calculate the frequency with which a subordinate in a two-level hierarchy might find it profitable to engage in strategic behavior. The general lesson from this particular model is that

[24]For an extensive examination of this general point, using concepts from social choice theory, see Hammond and

strategic behavior is beneficial mostly when there are relatively few subordinates and relatively few options under consideration. In richer and more complex organizational contexts, strategic behavior by any one individual is less likely to be beneficial for that individual.

Even when a situation is ripe for manipulation, this does not mean that an individual will be able to discover or deduce a good strategy. One difficulty is that strategizing requires accurate information about the likely choices of other actors. This information may not be easy to get in a hierarchy, and without it attempts at strategizing may be as likely to hurt the manipulator as help. A second difficulty is that even when the necessary information about other actors' preferences is in hand, the calculations needed to use the information can be very complex. This is especially true if many subordinates are simultaneously attempting to behave strategically. Each subordinate may have to make some very subtle calculations of precisely how he should modify his advice, given that the advice of others may depend on what he does. This is a much more difficult computational problem than if only one subordinate is acting strategically.[25] Others have reached similar conclusions about the difficulty of calculating strategies. From a laboratory study of manipulation, for example, Burton and Obel (1984: 174) concluded that "It is not obvious how to misrepresent advantageously even if one so desires. That is, an adequate procedural understanding of the process does not necessarily imply that one can game it."

There is one final point to make about strategic behavior: it might actually have positive consequences for the university. In the Fig. 2 example, it was observed that the candidates recommended for tenure, **s** and **w**, in the two structures were inferior in every administrator's eyes to candidate **u**, who was rejected for tenure. These inferior outcomes can be avoided if at least one official behaves strategically. In the top structure in Figure 2, for example, if the chair of the Genetics Department forwards not candidate **v** (whom he judges to be better than

Miller (1985) and Miller (1992, ch.4).

[25] The strategizing required in two-level hierarchies is described in Hammond and Horn (1985), while Hammond and Horn (1984) discusses the far greater complexities of strategizing in three-level hierarchies.

Genetics Department forwards not candidate **v** (whom he judges to be better than candidate **u**) but candidate **u**, then the dean of the College of Natural Science receives recommendations of candidates **s** and **u**. Since this dean prefers candidate **u** to candidate **s**, he forwards candidate **u** to the provost. The provost's choice set is now {**u**,**y**} and she would choose candidate **u** over candidate **y**. Since the Pareto inferior choice, **s**, is avoided here if the chair of the Genetics Department behaves strategically, we can conclude that strategic behavior can have virtues not only for an individual for the whole university as well.

Hence we can advance:

Proposition 5: The administrators may all prefer the outcomes from strategic behavior to the outcomes that result when everyone behaves sincerely.

Of course, this example presumed that only one administrator (the chair of the Genetics Department) behaved strategically. It is not clear what the equilibrium outcome would be (i.e., what candidate would the provost end up recommending for tenure) if *all* department chairs behaved strategically in the tenure review process.

C. WHAT KINDS OF OPTIONS?

In abstract terms, a budget request from a subordinate to an administrative superior is a set of advice from a subordinate regarding what expenditures the superior should approve. If the budget of a large organization is to be comprehended by some top-level administrator, there has to be some aggregation of expenditures. Otherwise the administrator would be inundated by such a mass of detail that it could not be digested. One virtually universal response to this problem is to give the budget a hierarchical structure consisting of nested categories of expenditures.

However, these nested categories of expenditures can be defined and grouped together in a wide variety of ways. For example, the budget format can be defined in terms of "line-items" (such as salaries, benefits, travel, and the huge variety of physical materials ranging from paper for photocopiers to new flooring for the basketball arena to specialty reagents for biochemistry

laboratories). Or the budget format could be defined in terms of organizational units, most commonly the departments (each of which would then produce requests for salaries, benefits, and physical materials for itself). Whatever format is adopted, how the administrator thinks about the budget and what the administrator learns about it will be structured, in good part, by the budget's major categories of expenditures.

The importance of the budget format can be seen by looking at the format from the viewpoint of what it tells the provost and deans about the academic units under them. In his remarks on individual decision-making in *How Colleges Work*, Birnbaum (1988: ch.3) remarks that college officials

> commonly simplify the required calculations through the application of heuristics—that is, shortcuts, rules of thumb, or guiding principles—that assist them in making judgments under conditions of uncertainty. These heuristic principles enable them to generalize, to make judgments, and to function in an equivocal environment. (p.70)

Birnbaum then highlights two heuristics—"representativeness" and "availability"—that, he suggests, often lead to biased judgments. Citing Tversky and Kahneman (1982), Birnbaum notes that "Representativeness relies in part on stereotypes that lead people to make judgments of relationships on the basis of whether things *resemble* each other in some way." And referring to Nisbett and Ross (1980), he notes that "the second heuristic, availability, leads people to make judgments of relationships on the basis of the ease with which examples can be imagined or brought to mind and are therefore cognitively 'available.'"

Interestingly, however, while Birnbaum (and Tversky and Kahneman, and Nisbett and Ross) are referring to individual decision-making, the hierarchy of expenditures which characterizes the budget format may have the same kind of impact on administrative decision-making.[26] For example, any particular budget format will be based on some fundamental assumptions about the

[26] In fact, while Tversky and Kahneman (1981, 1982) has received the bulk of attention from academics, I find Tversky (1972a, 1972b) and Tversky and Sattath (1979)—which characterize individual decision-making as involving a hierarchical "elimination by aspects" process—to be equally powerful and provocative.

basis on which individual expenditures will be considered to be "like" or "unlike" each other. Thus, budgetary decision-making based on a budget format in which expenditures are grouped together on the basis of some kind of resemblance or commonality may be subject to the "representativeness bias." And since any one budget format will make comparison of some kinds of categories of expenditures easier than comparisons of other kinds of categories of expenditures, budgetary decision-making may also be subject to the "availability" bias.

To illustrate these arguments, consider a budget format whose broadest categories are based on "line-items": this line-item format would draw the provost's attention to sizes of, and requests for increases in, line-items such as salaries, health benefits, travel, physical materials, and so forth. Comparisons of spending options would thus take place in terms of allocations across line-item categories. If this budget format were the only one available, it would be difficult and time-consuming for the top-level administrators to break this line-item budget down and re-aggregate the numbers in terms of, say, the basic academic units. Their attention would thus be drawn away from questions involving comparisons of the departments and colleges.

In contrast, a budget format whose broadest categories are based on the basic academic units (e.g., the colleges, and within each college the departments) would draw the attention of the top-level administrators to the sizes of, and requests for increases in, the academic units' budgets. Comparisons of spending options would thus take place in terms of allocations across academic units. If this budget format were the only one available, it would be difficult and time-consuming for the top-level administrators to break this academic-unit budget down and re-aggregate the numbers in terms of line-items. Their attention would thus be drawn away from questions involve comparisons of the various line-item categories.

In sum, dealing with highly-aggregated budget categories economizes on the top-level administrator's time and energy, but only at the cost of having her questions, and thus what is

learned, structured by the budget categories themselves. If she knows *a priori* what questions she would like to ask, she may be able to force the units under her to prepare the budget using a budget format that better suits these kinds of questions. But she would somehow have to develop this *a priori* understanding.

If the academic units become the basic categories for the budget format, it is here that we can see the potentially great importance of how the academic units are defined. For example, consider the case in which Michigan State University has a combined Department of Physics and Astronomy and the University of Michigan has a separate Department of Physics and Department of Astronomy. This suggests that the supervising dean at Michigan State—the dean of Natural Science at Michigan state—will be presented with an aggregated request which combines expenditures for *both* physics and astronomy, whereas the supervising dean at the University of Michigan—the dean of Literature, Science, and the Arts—will be presented with one request for physics and a separate request for astronomy. At Michigan State, the chair of the Department of Physics and Astronomy will thus play a major role *within his or her own department* in determining allocations to physics-related activities, on the one hand, and astronomy-related activities, on the other. In contrast, at the University of Michigan it is the dean of LS&A who will play the major role in determining what allocations should go to the physics-related activities in the Department of Physics as compared to the allocations that should go to the astronomy-related activities in the Department of Astronomy. The chair of the Physics Department will have very little impact on the budget of the Astronomy Department, and the chair of the Astronomy Department will have very little impact on the budget of the Physics Department.

Similarly, at Michigan State the requests from political science, psychology, and sociology will go to the dean of the College of Social Science, the requests from mathematics, physics-astronomy, and chemistry will go to the dean of the College of Natural Science, and the requests

from classical studies, English, and German will all go to the dean of Arts and Letters; the requests from the deans of Social Science, Natural Science, and Arts and Letters would then all go to the provost for review, comparison, and decision, and it is the provost who would determine the allocations among the three colleges. In contrast, at the University of Michigan requests from *all* of these departments would go to the dean of LS&A, and it would be this dean who would determine the allocations among all the departments. Unlike at Michigan State, then, the provost at the University of Michigan would be less directly involved in all these particular department-vs.-department comparisons.

On the other hand, the provosts in both universities would get heavily involved in matters involving allocations across the various professional schools (e.g., medicine, business). The reason is that at both universities the provost is the lowest common administrative superior for the professional schools. In general, then, we can state:

Proposition 6: Different organizational structures can produce different kinds of options for consideration by the top-level administrator.

D. Learning and the Suggestion of Criteria for Choice

Whatever the nature of the choice set given to the top-level administrator (which options? what kind of options?), a further aspect of policymaking—how she goes about deciding what advice to accept—can also be influenced by the structure. Choosing among options involves the selection of criteria by which to evaluate and compare the options. The nature of the options in the choice set will suggest *which particular criteria* will be most useful and appropriate for evaluating and comparing the options.

For example, if requests from the College of Natural Science are to be compared by the top-level administrator against the requests from the College of Social Science, the proposals will tend to have one common denominator—the variable of the natural sciences versus the social sciences. Consideration of proposals in the choice set will thus tend to be conducted in terms of

whether the top-level administrator expects advances in the natural sciences to be more beneficial to the university than advances in the social sciences. But if the requests are from the College of Agriculture and the College of LS&A, the competing requests will have a different common denominator—the variable of practical agricultural benefits versus general disciplinary advancement—for use in making comparisons. In this case, consideration of proposals in the choice set will tend to be conducted in terms of whether the top-level administrator thinks the university will benefit more from increased service to the agricultural community or general disciplinary advances in letters, the sciences, and the arts. In either case, only with extra work will the top-level administrator be able to analyze a set of proposals in terms of criteria for comparison different from those implied by the organization's structure. This yields:

Proposition 7: The organizational structure, and thus the characteristics of the top-level administrator's choice set, suggests some kinds of criteria rather than other kinds of criteria on which to base comparisons of options.

Finally, since a structure exposes the top-level administrator to some kinds of proposals rather than others, and since some kinds of criteria for comparing proposals are more available than others, it seems reasonable to argue that what she *learns* about proposals and how to compare them will also be influenced by the structure. In different structures she will learn different things as she works at making decisions. A top-level administrator at the head of the first kind of structure (involving the Colleges of Natural Science and Social Science) will, over time, become expert at making comparisons and choices among the natural sciences versus the social sciences; she will learn less about making choices between agriculture and the general academic disciplines. On the other hand, at the head of the second kind of structure (involving the Colleges of Agriculture and LS&A) she would become expert at making comparisons and choices between agriculture and the academic disciplines, but would learn less about making choices between the natural sciences and the social sciences. So we can state:

Proposition 8: To the extent that a top-level administrator learns about different kinds of issues by making comparisons among different sets of options, the organizational structure will influence what is learned.[27]

VII. THE POLICY IMPLEMENTATION PROCESS IN UNIVERSITY HIERARCHIES

Even if a top-level administrator has been able to identify the key problems facing her university, and has been able to choose what response to make, the problem remains that her chosen policy must be implemented. It is difficult, however, for the top-level administrator to describe how to implement her chosen policy in such a way that *all* possible contingencies are covered by her instructions. Even if subordinates try in good faith to do what they are told, unforeseen contingencies will arise for which the top-level administrator's initial instructions will prove unclear.

Without clear instructions, subordinates with different responsibilities and concerns will often develop different views on how to solve these unanticipated problems. Since different solutions to these problems will affect how each subordinate does his work and, in the long run, will also affect what happens to each subordinate's career, a subordinate may be inclined to press for one kind of solution rather than another.[28]

If subordinates cannot settle differences of opinion among themselves, higher-level administrators may be called upon to resolve them. Economists have occasionally remarked on this conflict-resolution role that administrators can play. For example, Boulding once suggested that:

> The hierarchical structure of organizations can largely be interpreted as a device for the resolution of conflicts, with each grade of the hierarchy specializing in resolving the conflicts of the grade beneath it. The very structure of an organization can be regarded as a "constitution," a constitution being defined as a previously agreed method of resolving conflicts which have not yet arisen. We can go even further and argue that virtually all organizational decisions are the end product of a process of conflict resolution between the points of view of various sections and departments. (1964: 48-49)

Every administrator will thus have responsibility for settling conflicts among the subordinates

[27] Hammond (1993) offers a more extensive discussion of how structures affect the nature of the comparisons which lie at the heart of learning and decision-making.

beneath her. For each administrator, the contents of this class of conflicts will be influenced by the structure: some kinds of conflicts will be routed to the administrator in one kind of structure while other kinds of conflicts will be routed to him in another kind of structure. How the top-level administrator's policies are ultimately implemented will thus depend on the structure, and what the administrators and top-level administrator learn from this conflict resolution process will also be influenced by the structure.

A. Structure and the Routing of Conflicts

To analyze the impact of the structure on the routing and resolution of conflicts, we will assume that there is substantial interdependence among the bottom-level faculty members and administrators: in effect, how one bottom-level employee does his job is presumed to affect how some other bottom-level employees do their jobs. For example, there might be some kind of joint program in which two or more departments are required to carry out a particular task, and they cannot agree on how to do this. Or there might be some common resource which is in short supply, and the departments cannot agree on who gets to use how much. Or it might be that one department's activities impose costs (i.e., negative externalities) on another department and the second department may object to these costs being imposed on it.

When conflicts about how to carry out a task cannot be resolved "horizontally" by the employees directly involved, they may consider referring their conflict upward to superiors for resolution. Several factors affect this decision. For example, employees might sometimes find it in their mutual interest to resolve the dispute themselves. The reason is that the superior who settles the dispute might impose a decision that neither employee likes. In this case, the employees would be better off settling their differences and never letting superiors get involved.

[28] This might happen for purely cognitive reasons, but the different "political" interests of the departments and programs may lead their chairs to deliberately interpret ambiguous instructions in ways which are beneficial to their departments and programs.

However, horizontal settlement must appeal to *both* employees. If one employee prefers the solution likely to be imposed from above to what could be agreed on horizontally, he will be less likely to agree to a horizontal compromise. In general, then, we can state:

Proposition 9: For each employee involved in a conflict, the greater the value of the policy that would be imposed by a superior or superiors, compared to the value of the policy that could be agreed on horizontally, the more desirable it is to refer the conflict upward.

This kind of sophisticated behavior requires, of course, that subordinates be able to guess how their superior or superiors might resolve the dispute.

For her own part, the superior may not want to be drawn into subordinates' disputes. For example, he may not want to take a position on the subordinates' dispute because to do so would be time-consuming, might irritate one or both subordinates, and might be politically costly to his career. In general, taking no position at all is sometimes the safest thing to do. So the superior may threaten to impose penalties on subordinates who force him to get involved in their conflicts. Rational subordinates would then be more inclined to settle their own differences. Hence:

Proposition 10: The greater the penalties associated with referring a conflict upward, the more likely employees will reach a horizontal agreement.

Also affecting the subordinates' decisions to send a conflict upward is the severity of the dispute. A employee who feels especially strongly about some issue may find it worthwhile to risk the possibility of a penalty for bothering his superiors; he may also find it worthwhile to risk an adverse decision from some superior. So we can state:

Proposition 11: The greater the severity of conflict between two employees, the greater the probability they will refer their conflict upward for resolution.

If employees have perfect knowledge of each other's preferences as well as how a superior would resolve a dispute, no conflict should ever be referred upward. The reason is that if both parties to the conflict prefer a horizontal settlement to what the superior would impose, the conflict will be settled horizontally. And if at least one employee prefers what the superior would

impose to what might be agreed on horizontally, the other employee would be in a weak strategic position and would agree to a compromise. In either case, a horizontal settlement should be expected. So if a conflict is in fact sent upward, the reason must be due to factors like subordinate misperception of, or uncertainty about, what solution a superior would be likely to impose. In what follows, the assumption is made that these latter conditions generally prevail, so that conflicts are generally sent upward for resolution.

If a conflict is sent upward, it will normally rise no higher than the lowest common superior of the employees involved; a subordinate relatively infrequently "appeals" a decision over the head of his superior (though probably more at universities than institutions such as government agencies and business firms). For every pair of subordinates, then, the structure determines who their lowest common superior is. It follows that the grouping of employees in a structure affects how high in the structure the conflict might rise before resolution. Hence:

Proposition 12: For a conflict which is not horizontally resolved, the structure determines how high the conflict might have to rise before it is resolved by the lowest common superior of the employees involved.

For example, conflicts between department chairs over interdependent activities *within* the same college would normally rise to the level of the college's dean for resolution (e.g., for arbitration, mediation, or decision by fiat). In other cases, this mutual superior will be several levels higher in the structure and may, in fact, be the provost or even the president of the university. Thus, conflicts between department chairs over interdependent activities *between* two or more colleges might normally rise to the level of the provost for resolution.

To illustrate, consider the two structures in Figure 1. In the top structure, any conflict between the Entomology Department and the Genetics Department (perhaps over the features of some joint inter-departmental program) might rise to the dean of the College of Natural Science for resolution. Similarly, a conflict between the Agricultural Economics Department and the So-

ciology Department might rise to the dean of the College of Social Science for resolution. However, a conflict between any department in the College of Natural Science and any department in the College of Social Science (such as a conflict between the Entomology and Agricultural Economics Departments, or a conflict between the Genetics and Sociology Departments) might have to rise to the level of the provost for resolution.

In contrast, several of these conflicts would be handled differently in the bottom structure. For example, the conflict between the Entomology and Genetics departments might now have to rise to the level of the provost for resolution; previously it would have been handled at a lower level, by the dean of the College of Natural Science. Similarly, the conflict between the Agricultural Economics and Sociology departments might now have to rise to the level of the provost for resolution; previously, it would have been handled at a lower level, by the dean of the College of Social Science. But the conflict between the Entomology and Agricultural Economics departments would now be mediated or resolved by the dean of Agriculture; previously, it would have been resolved at a higher level, by the provost. And the conflict between the Genetics and Sociology departments would now be resolved by the dean of LS&A; previously, it would also have been resolved by the provost.

For these reasons, how subordinates are grouped together in the hierarchy (e.g., how faculty members are grouped together into "departments" or "programs" and how these "departments" or "programs" are grouped together into "schools" or "colleges") can be expected to affect how high in the organization any conflict over implementation can be expected to rise. Some structures will resolve the conflict at a low level in the hierarchy, while other structures will route the conflict all the way to the top. We can thus pose the following corollary to Proposition 12:

Proposition 13: For a conflict which is not horizontally resolved, structures based on some methods of grouping will resolve the conflict at low levels, while structures based on other methods of grouping may route the conflict to higher levels for resolution.

Proposition 13 links questions about different methods of grouping to questions about "centralization" and "decentralization" in a university. If each structure resolves some conflicts at low levels and other conflicts higher up, a change in structure means that some conflicts previously resolved lower down will now be resolved higher up, and vice versa. That is:

Proposition 14: To structure an organization so that some kinds of conflicts rise to the top for resolution implies that other kinds of conflicts will be resolved at lower levels.

In other words, "centralizing" the resolution of some disputes means that the resolution of other disputes will be decentralized.

Next, it seems reasonable to think that conflicts resolved at low levels will be resolved in terms of the preferences of the low-level employees or administrators, while conflicts resolved at higher levels will be resolved in terms of the preferences of the higher-level administrators or top-level administrator. In other words, to the extent that the resolution of conflicts involves policymaking (i.e., decisions about precisely how the firm's operational tasks are to be carried out), the structure can be expected to influence the firm's policies. Hence we have:

Proposition 15: If the beliefs and preferences of the officials at the lower levels are different from those of officials at the middle and top, the structure will affect how conflicts are resolved and thus will affect what policies the employees in conflict at the bottom are ultimately told to implement.

B. Learning from Involvement in Conflict Resolution

Since what a top-level administrator learns stems, in part, from involvement in subordinates' conflicts, the way conflicts are processed in different kinds of structures has implications for what the top-level administrator learns. We begin by noting the following:

Proposition 16: For each administrator and the top-level administrator, the structure determines which kinds of conflicts come to her for resolution and which do not.

In the top structure in Figure 1, for example, by getting involved in conflicts between the College of Natural Science and the College of Social Science, the provost will learn much about the differing virtues and perspectives of these two colleges. She will not learn as much about the de-

tails and nuances of the different departments within the College of Natural Science or about the details and nuances of the different departments within the College of Social Science. In the bottom structure, on the other hand, by getting involved in conflicts between the College of Agriculture and the College of LS&A, the provost will learn much about the differing virtues and perspectives of these two colleges. She will not learn as much about the details and nuances of the different departments in the College of Agriculture or about the details and nuances of the different departments in the College of LS&A.

From this perspective, then, the structure will have a systematic effect on what the top-level administrator learns and about what he remains ignorant:

Proposition 17: Because a top-level administrator learns about different kinds of issues in part by resolving conflicts among subordinates, the organizational structure will influence what she learns.

VII. Prescription and Contradiction in the Design of University Hierarchies

The structure of the university affects what information the top-level administrator sees, and so it affects what strategic problems she perceives and how she defines these problems. It affects what options are made available to her, and it affects the criteria she uses in choosing among the options. Finally, it affects what disputes over implementation come to her for resolution.

Of course, this bottom-up perspective on structure and decision-making might be criticized for treating the top-level administrator as an overly passive recipient of whatever the structure brings to her. Rounding out this bottom-up picture, then, requires attention to the role the top-level administrator might play; rarely will she be an innocent victim of structural arrangements.

From the bottom-up perspective, the obvious role for the top-level administrator is to design the structure in the first place. But even if structure does affect policymaking, and even if it is the top-level administrator's role to select the structure, it is still not clear what structure she should choose. The literatures on organizational design and strategic management do contain

some prescriptions. However, the bottom-up approach to organizational structure leads us to the conclusion (outlined below) that two of the major prescriptions are mutually incompatible. More importantly, it also clarifies the nature of the structural choices and tradeoffs which this incompatibility poses for the top-level administrator.

At the heart of strategy formulation for a university is the matter of what the top-level administrator and her subordinate administrators *learn* about problems facing the university, about proposals for solving these problems, and about disputes over implementation of the solutions. I have argued here that the structure can affect this learning process. Each person's location in the structure means that the top-level administrator will learn some things and not other things; indeed, learning about some things *implies* not learning about other things. Whatever conceptual categories the top-level administrator uses to define and create her university's structure, what she learns from the structure can be summarized in the following way:

Proposition 18: The orientation, policymaking, and implementation tasks all produce information for the top-level administrator relevant to *inter*-category perspectives, comparisons, and conflicts. This administrator's choice of structural categories is thus equivalent to a decision that she will remain ignorant about *intra*-category perspectives, comparisons, and conflicts.

If structure systematically affects what the top-level administrator learns and about what she remains ignorant, the key structural design question then becomes this: *What should the top-level administrator learn and about what should she remain ignorant?*

One common prescription found in the strategic management literature on corporations advances a prescription directly relevant to this question: since the top-level administrator's primary responsibility is to address the key strategic issues facing her university, it follows that the top-level administrator should design a structure which makes her as well-informed as possible about these key strategic issues. If the top-level administrator believes that some decisions for her university are more critical than others, and if she wants to be the person who makes the

critical decisions, then each possible structure should be evaluated in terms of the extent to which it brings to her what she needs to learn—the information, advice, and conflicts—for making these critical decisions. How should she do this?

At this point a second common prescription might seem to be relevant. This prescription, advanced by the contingency theory and organizational design literatures, is to "match" the structure to the categories used to classify the objects or activities in the organization's environment: each important category should be assigned its own division or department, presumably headed by its own administrator. A good "fit" between structure and environment, it is argued, will enhance the university's performance in the environment. In thinking about strategic issues for her university, the top-level administrator might thus create a set of organizational categories (e.g., organizational subunits such as "programs") which "match" the most important categories in the environment. For example, these categories might correspond to the separate "markets" for the university's products (e.g., who hires its students?) or to particularly important political constituencies of the university (e.g., the agricultural community in the state) or to the different governmental bodies which are important sources of government funding for the university (e.g., to the state legislature, or to federal agencies such as the National Science, National Institutes of Health, Department of Agriculture, Defense Department, or a regulatory body such as the Environmental Protection Agency?).

Moreover, by grouping together those activities which are most relevant to each of these critical categories of the environment, the transaction costs of the administrators responsible for each of the critical programs will be minimized. That is, all those activities which must go on for any one program to be successful, with regard to that particular category, will be contained *within* the realm of authority and responsibility of that program's administrators.

But now assume—not unreasonably—that some organizational subunit contains activities

which are more important for the university's survival than the objects or activities in the other organizational subunits. It would thus seem that the top-level administrator's strategic management responsibilities require her to be exposed to information regarding the particular, detailed content of these critical activities. However, a conflict between the "matching prescription" and the "strategic management prescription" now becomes clear: a structure whose subunits match those of the university's environment will cut the top-level administrator off from crucial sources of information, advice, and conflicts from *within* this subunit of greatest interest. If there is a single consumer of the university's products (its students or its research) or some key government institutions, then it is the top-level administrator's *subordinate* (e.g., the program's administrator) dealing with this most critical contingency who will end up making the most critical decisions regarding the program's design and management, not the top-level administrator herself. That is, the top-level administrator will not be able to perform the major role that the strategic management literature assigns to her, which is to make the most critical strategic decisions. This top-level administrator may decide *that* some critical decision will or should be made, but it will be the administrator's subordinate who actually makes the decision.

Ironically, then, it is only if the top-level administrator wants *someone else* in her university to become most knowledgeable about the most critical categories of the environment that she should select an organizational structure whose categories "match" those of the environment. If the categories embodied in the university's structure correspond to the categories of the environment, this means that the top-level administrator will remain relatively ignorant about what is going on *within* each category, including the most critical one. So it turns out that the "strategic management prescription" regarding proper structural design may directly contradict the "matching prescription." That is, we now have:

Proposition 19: If the top-level administrator is to be well-informed about the most critical category in her university's environment, the categories on which the university is

> structured should *cut across* the categories used for classifying (and matching) key elements of the university's environment.

It is only in this fashion that the top-level administrator can design a structure which enables her to fulfill some of her most important strategic management responsibilities.

This argument also suggests that the prescriptions of transaction-cost minimization (see, e.g., Williamson 1985, Chandler 1962) may be incompatible with the continuing involvement of the top-level administrator in what she considers the university's most critical issues. In a structure which places interdependent academic units within the same department or college, so as to make it administratively easy for involved faculty members and administrators to work with each other in the design and management of a program, the top-level administrator might be able to play a strategic role in deciding *that* her university would do whatever the program is intended to do, and thus that there should be a department or college which does this. However, she would be unable to have nearly as much say in determining the particular features of program that is ultimately designed and implemented; the selection of the program's features, and the making of tradeoffs among the features, would largely be determined *within* the department or college. But if it is the particular mix of tradeoffs that will determine the program's ultimate success, then she has, in effect, delegated that decision to others.

In other words, for all the undoubted costs of a structure which imposes a heavy burden of coordination on the university's top-level administrators, this structure would nonetheless provide the top-level administrator with an institutionalized opportunity to learn a great deal about the nature of her university's most critical "products" or activities, and thereby play a direct role in their definition and ultimate success. To choose a structure which makes it easiest for program administrators and faculty members to work with each other (i.e., which minimizes *their* transaction costs) is equivalent to cutting the top-level administrator off from intra-unit debates about what should be the key characteristics of these critical activities.

Moreover, while a structure which minimizes the transaction costs of the key program's administrators may enhance the top-level administrator's ability to judge the relative "success" of the program, compared to the "success" of other university programs, this structural form would not necessarily provide the information or understanding for the top-level administrator as to *why* the various programs had such different success rates, nor does it necessarily put the top-level administrator in a position to learn what to do about poorly performing programs. Thus, a structure that minimizes the program administrators' transaction costs may be able to tell the top-level administrator *that* the program is not successful, but it tends to cut her off from information which could tell her *why* the program is not successful.

In fact, from this perspective, one might even argue that a structure which minimizes the program administrators' transaction costs in performing their duties will also serve to *increase* the top-level administrator's transaction costs involved in understanding why the program performs (well or poorly) as it does. Indeed, a structure which increases the program administrators' transaction costs in performing their duties may actually decrease the top-level administrator's transaction costs involved in understanding why the program performs (well or poorly) as it does. Thus it may be accurate to say that each possible structure reduces some administrators' transaction costs while increasing the transaction costs of other administrators. It follows that structural design hinges on the question of whether the administrator's transaction costs are more important, or less important, than those of her subordinates. Unfortunately, it is not yet clear whose transaction costs it is most important for the university to minimize.

These arguments suggest that the structural design of a university involves choices among imperfect, even unpalatable, alternatives. Hence, choosing among structural alternatives entails making tradeoffs. The bottom-up approach advanced here cannot, by itself, tell a top-level administrator how to make the tradeoffs. But this approach to the formal structure of the university

does suggest some ways of clarifying what the costs and benefits of each kind of structure might be. The approach may thus help in clarifying our understanding of the nature of the structural choices that a top-level administrator may face. It is only when the nature of the alternatives is understood can an adequate theory of structural choice be developed for the university.

IX. CONCLUSIONS

In this paper I have discussed a variety of ways in which the formal structures of American research universities *might* affect the universities' decision-making processes and outcomes. A university's formal structure, I am conjecturing, has extensive and systemic effects *on what problems are* perceived and how they are defined (the "orientation process"*), on what options are made available for choice* (the "advisory process"), and *on how conflicts over the final choice are resolved* (the "implementation process"). I am also conjecturing that by aggregating information in different ways, by presenting different kinds of options for choice, and by bringing some kinds of conflicts but not others to the top-level administrator, the formal structure has an important impact *on what the top-level administrator learns*. Finally, I have suggested that the problem of *organizational design* necessarily involves tradeoffs between strategic goal-setting, on the one hand, and involvement in the details of how any one goal is pursued: no formal structure will easily allow the top-level administrator to do both.

Unfortunately, while I have presented some general—and hopefully useful—ways of thinking about the impact of formal structure, many of the propositions remain at a very high level of generality. Much remains to be done to turn them into testable hypotheses.

There are some variables which may dampen the impact of the formal structure. For example, top-level administrators with a long history in the university will have had many opportunities over the years to learn about each department and program; hence, the formal structure may

have a much smaller impact on such an administrator. In contrast, I would guess that the formal structure may have a greater impact on top-level administrators who are new to the university (and who are relatively uninformed about the kinds of institutions that universities are).

In addition, I have simply assumed that the information that the president, provost, and deans receive comes *only* from subordinates. However, it is undoubtedly the case that these administrators receive a great amount of information directly from outside the university, which means that the formal structure will have had essentially no "filtering" or "aggregating" impact on what these officials learn from these external sources. My guess is that information and messages about potential problems that the university is facing will be particularly important. Nonetheless, unless the internally-generated information is completely ignored by these top-level administrators, it seems reasonable to think that the internal structure might continue to play at least some role (albeit perhaps attenuated in some considerable degree). Only if the external information flows were to completely *counteract* the internal information flows would the structure be irrelevant, and for at least some important issues (such as tenure decisions and perhaps at least some important budgetary decisions) it seems unlikely that there will be external sources of information which would be able to play this counteracting role.

For these kinds of reasons, then, how much impact any given kind of structure *actually* has on any university's decision-making processes and outcomes is an empirical matter, as is the question of whether different structures in different universities actually lead to the different kinds of decision-making processes and outcomes that are hypothesized here. But by laying out a broad and reasonably coherent set of concepts and arguments about the possible impacts of formal structures, I hope to have put other researchers in a better position to conduct serious empirical investigations of these potentially important matters.

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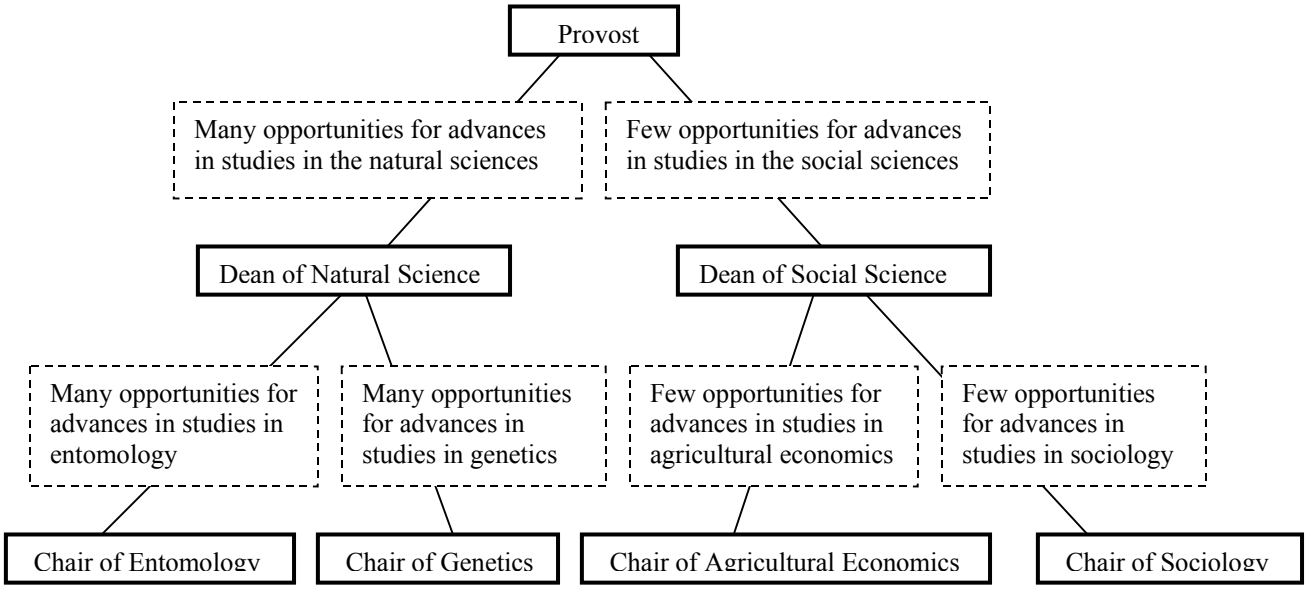
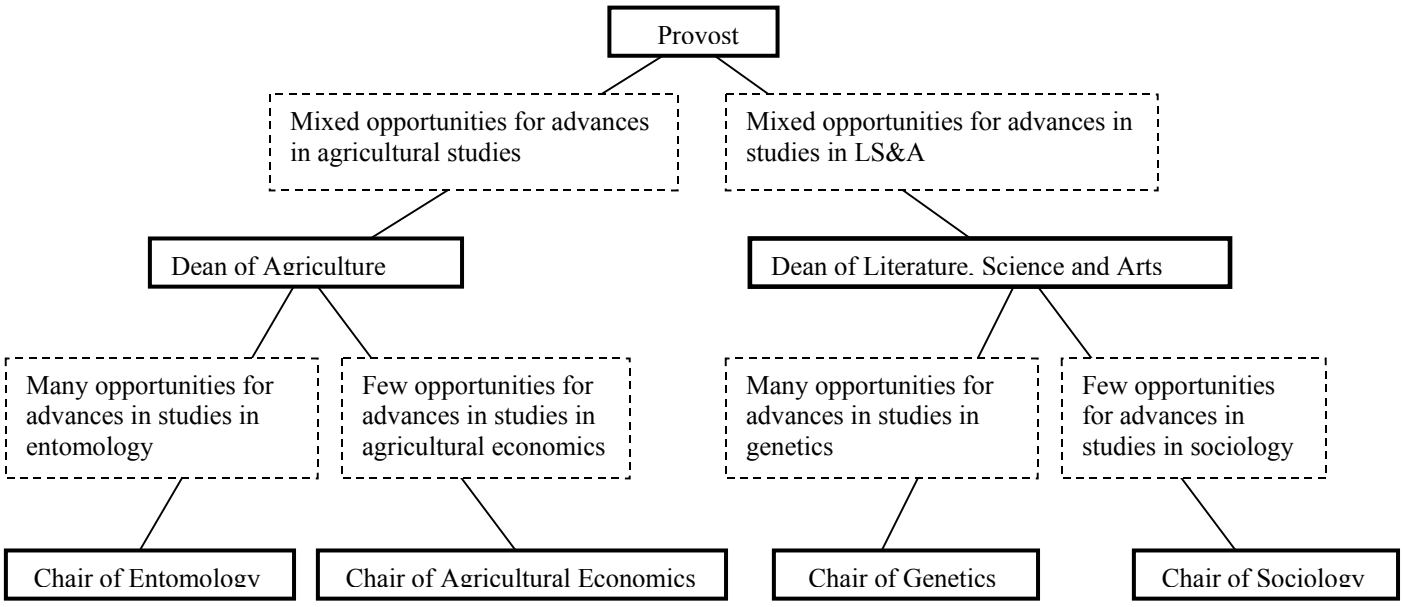
Figure 1
How The Same Information Is Processed in Different Ways
in Two Different University Structures





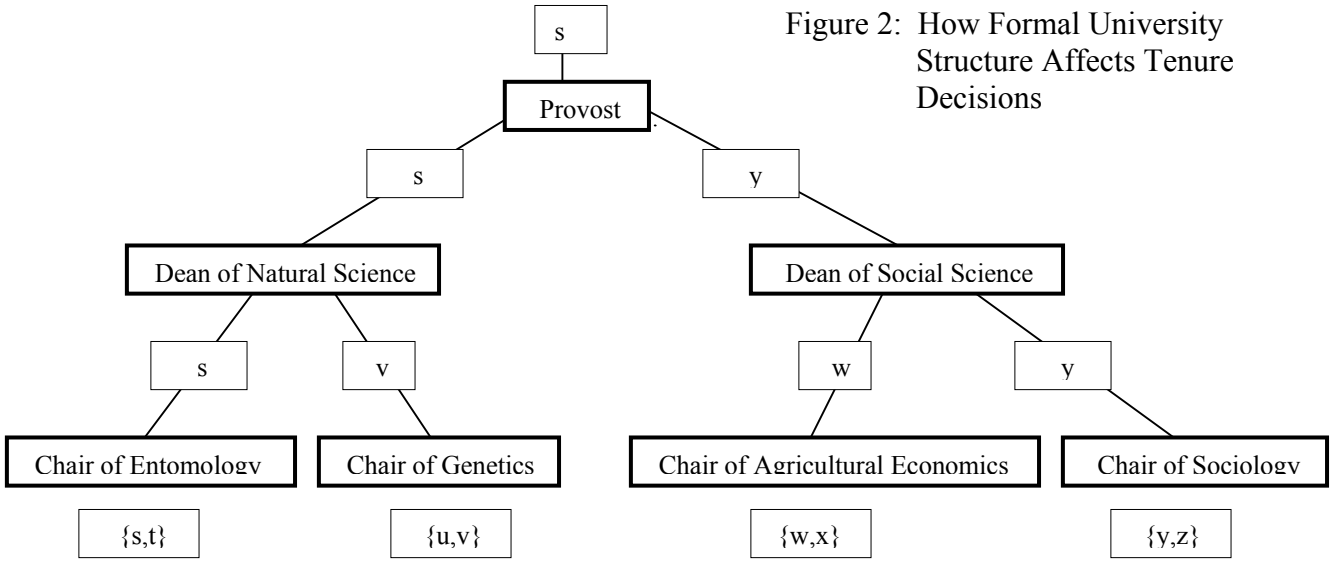
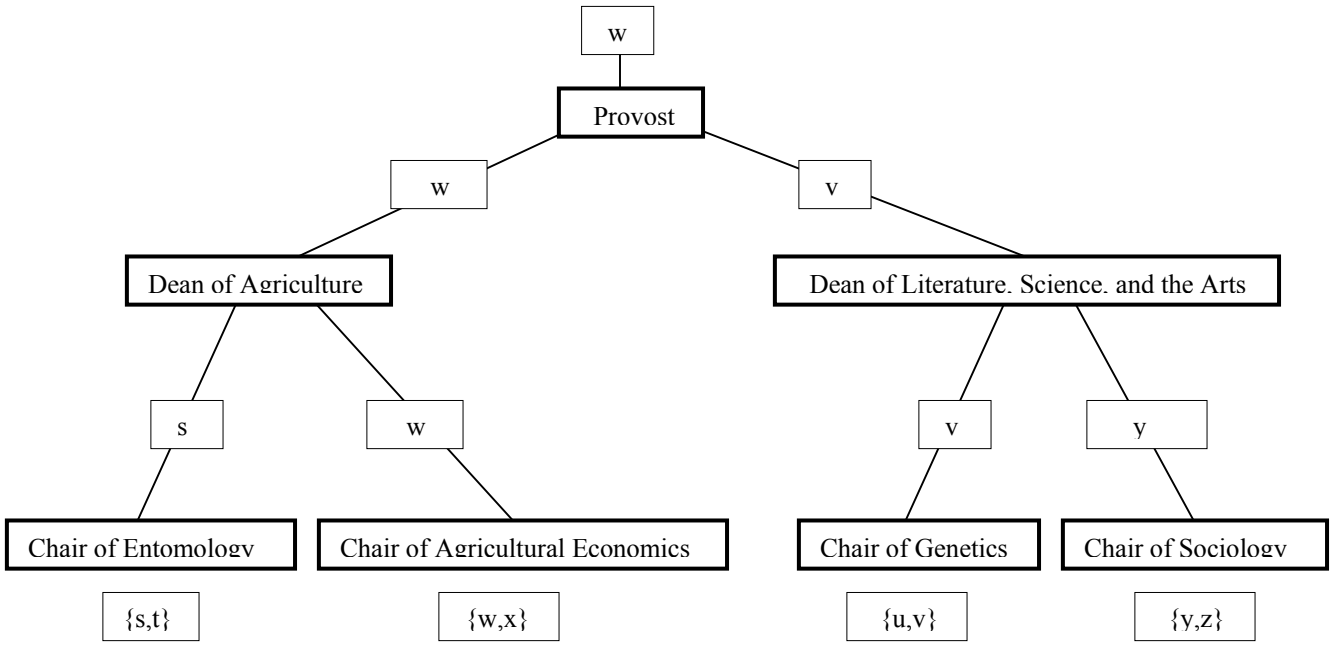


Figure 2: How Formal University Structure Affects Tenure Decisions



PREFERENCE ORDERINGS:

Chair of Entomology	Chair of Genetics	Chair of Agricultural Economics	Chair of Sociology	Dean of Natural Science/ Dean of Agriculture	Dean of Social Science/ Dean of LS&A	Provost
u	z	y	x	u	v	u
x	v	t	u	x	x	s
v	u	z	s	w	y	w
s	y	u	w	s	t	y
t	t	v	y	t	u	z
w	x	s	z	v	w	v
y	s	w	t	z	s	x
z	w	x	v	y	z	t