

Power to Do...What? Department Heads' Decision Autonomy and Strategic Priorities

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Abstract Using questionnaire data from the 2010 Survey of Academic Chairs, the study focuses on decision autonomy, a component of the power wielded by science, technology, engineering and mathematics (STEM) department chairs in U.S. research extensive universities. A “power index” is developed to measure chairs’ decision autonomy, specifically their control of resources employed in negotiations with faculty job candidates. The study asks: What determines the degree of decision autonomy power possessed by department heads; and, what are the strategic implications of department heads’ degree of this particular aspect of power? Results of an ordered logistic regression model show that having more power is associated with being hired from outside the current university, being male, and with department size. The power index is employed to predict departmental strategic priorities. Results show that the power index is positively associated with a strategic priority for research. The results show a negative relationship between degree of chair decision autonomy and a priority to increase faculty lines. A student-focused strategy is not predicted by the power index but is related to the size, with larger departments placing less emphasis on numbers or quality of students.

Keywords Department chair · Autonomy · Administrative priorities · Diversification · Departmental strategy · Power and authority

Introduction

Managerial power has been the subject of a great many organizational studies and continues to be as relevant today as it was in the early sixteenth century when one particularly famous bureaucrat, Niccolo Machiavelli, was reflecting about his experiences during his service in the Florentine militia. As is the case for most concepts receiving sustained and

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near universal attention, power has many meanings and, when it has been measured, has been measured in a wide variety of ways. The approach here considers power as part and parcel to the institutions in which it is exercised and the characteristic activities of the institutional context, in this case U.S. universities.

Officials in universities, as in most formal organizations, wield a wide array of power and decision resources, depending on institutional rules and norms, organizational culture and, of course, the managerial and political abilities of the individual. For this reason, among others, most researchers (e.g. Finkelstein 1992; Meehan and Wright 2011; Gao and Jain 2012) view power as multidimensional and seek to identify particular components of power. The present study focuses on just one component of power: power-as-decision autonomy. While this approach captures only part of what is generally contained in the power concept, it is crucial to organizational outcomes. The particular realm of decision autonomy of interest here is department heads' power, their autonomy in the use of resources related to recruiting new faculty members. In our conception, decision autonomy is viewed as an enacted aspect of power, one flowing from several sources including not only the norms and rules of institutions but also the characteristics and behaviors of individuals. Our allocation conception is consonant with the power literature (e.g. Salancik and Pfeffer 1974; Pfeffer 1981).

The study employs data from a national questionnaire survey of university department chairs at US research universities. Our research approach entails developing a "power index" measuring department chairs' decision autonomy related to their negotiations with faculty job candidates. We then employ that index as we ask two questions: What determines the degree of decision autonomy possessed by department heads; and, what are the strategic implications of department heads' levels of power?

Conceptualizations of Power in the Organization Studies Literature

Despite the fact that the conception of power employed in this paper is only one aspect, the study nonetheless benefits from broader theories and research about power and, thus, we begin with a synoptic overview of the power literature in the organization studies literature. In later sections of the paper, we employ some of these studies as cues for our hypotheses.

While the study of power has a long pedigree, conceptualizations continue to be divergent and controversial (for an overview see Krackhardt 1990). As Brass and Burkhardt (1993, p. 441) note, the study of power has "been plagued and blessed by the multitude of theories and approaches that have been offered." Even today, the study of power has certain aspects of the "bottomless swamp" (Dahl 1957, p. 201) mused about more than 60 years ago.

While there are many reasons for the checkered history of power studies, not the least of these is the vulnerability of some theories to fundamental attribution errors (Drory and Romm 1990). While there have been improvements over Dahl's definition of power as "the extent to which A can get B to do something that B would not otherwise do," many subsequent conceptions (e.g. Saunders 1981) nonetheless remain hampered by the fact that we can never know what "B would otherwise do." Conceptual problems flow as well from the inability of theorists and researchers to decide (among other controversies) whether power is potential, enacted or both (Wrong 1968; Bacharach and Lawler 1980); to agree on the relation of formalism, hierarchy and authority to power (Kanter 1979; Molm 1990); and to disentangle the resources invested in individuals (Schein 1977) and organizations from the power-related behavior enabled by those resources (Pfeffer 1981; Hardy et al. 2003).

For critiques of power conceptualizations see Drory and Romm (1990) and Fairholm (2009).

The ambiguity of power concepts in research universities is in part owing to disciplinary fissures. Not only do concepts of power tend to vary according to discipline, they often diverge between different fields in the same discipline (Astley and Sachdeva 1984). Thus, for example, political scientists focusing on political leaders have developed a distinctive approach to power (e.g. Dahl 1957; Bacharach and Baratz 1962) compared to those focusing on international relations and conflict (Claude 1962; Barnett and Duvall 2005). Likewise, sociologists focusing on community power structures (e.g. Hunter 1953) have developed concepts of power that are different from those that study formal organizations (e.g. Mechanic 1962).

Many power studies have examined the dynamics of power within groups or coalitions (e.g. Hickson et al. 1971; Pfeffer et al. 1976), including Emerson's seminal study of power-dependence relations and the tendency toward balance in these relations (1962). Emerson argues that power is a "property of the social relation; it is not an attribute of the actor" (Emerson 1962, p. 32). He goes further to define power as the dependency of one actor on another. Especially relevant to the present study, Emerson suggests that power can reside in the ability for one actor to grant resources to another in order to further the second's gratification. One can see in this seminal piece that control over resources could be appropriately used as an operationalization for power, but Emerson cautions that there is no one correct operationalization for his theory of power-dependency.

Another well established perspective in the power literature (see especially Kanter 1979; French and Raven 1959) argues power resides in the position and not the person. This point, too, is particularly relevant to the present study since our decision autonomy concept does not and cannot distinguish between positional and personal bases of this power dimension. Kanter posits that productive power depends on "open channels of to supplies, support and information" (1979, p. 65). This, too, suggests the viability of a resource discretion notion of power. She builds on Emerson's work by adding support and information elements to power theory. Although channels of supplies, support and information do not necessarily create an autonomous individual with a large degree of individual discretion, certainly these open channels contribute to autonomy.

Perhaps most relevant to the present study is Salancik and Pfeffer's (1974) use of distribution of departmental resources as a measure of power in the academic setting. The authors examine power within academia, but do so at an institutional level. In a later study, Pfeffer (1981) argues "individuals within the organization that can provide the most critical and difficult to obtain resources come to have power in the organization" (p. 101). In subsequent work, Pfeffer defines power as "the potential ability to influence behavior" (1992, p. 45) [our italics].

Decision Autonomy as a Dimension of Power

While there is much disagreement on the nature and the appropriate conceptualization of power, one of the few points of near consensus is that power is multidimensional. From the more general consideration of power discussed above, we turn to our narrower conception focusing on decision autonomy. The ability to engage in autonomous decision-making and behavior is one widely recognized dimension of power (Montanari 1978; Barnett and Duvall 2005, 1992; Caza et al. 2011).

If power is multidimensional, decision autonomy is multifaceted. The facet we examine empirically is department chairs' ability to make independent decisions about the provision of resources to candidates for faculty positions. Given the central importance of faculty members to the mission of research universities, the manner in which they are recruited to positions is of vital importance to our understanding of how these institutions operate. Thus, when negotiating with a job candidate, does the department head have the ability, for example, to decide about whether to offer a higher salary, more computer resources or a reduced teaching load? Are these decisions made alone, or in conjunction with those at higher levels of organizational authority, such as deans or vice-provosts? If a department head has the unfettered ability to make decisions about allocating resources for job candidates, then that department head is, in our terms at least, more powerful. By contrast, those who share such decision prerogatives with deans or provosts or other administrators are deemed as having less power.

Clearly, there are many dimensions of chair power not reflected in this limited ability to wield resources. Power may well involve relationships with other departments, managing coalitions of faculty and other interests or, fund-raising. It is also possible that persons who do not have autonomous decision-making power may be more powerful than is manifest, owing to such factors as the ability to collaborate with others. Nevertheless, we feel that decision autonomy is at least a relevant dimension of power, though by no means the last word in gauging the power of department chairs.

Resources are often used as proxies for power within organizations. Consistent with Kanter (1979) we argue that academic department heads with high levels of individual discretion have a more open channel for resources. Productive power is a function of these open channels (Kanter 1979), thus suggesting that these open channels will produce positive results for the department chair. The degree of autonomous decision-making available to department chairs captures the "openness" of the channels.

We make no normative judgment about whether such power of autonomous decision-making related to faculty hiring is inherently good or bad. The effectiveness and organizational value of such power doubtless depends on a wide variety of factors not examined in our study, factors such as the ability of the department chair, the attentiveness of faculty members, institutional traditions, and ancillary organizational procedures and routines.

A major limitation of our study is that there are many dimensions of department chairs' power not tapped by our measure. For example, such factors as the ability to make committee and other such assignments, the ability to appoint faculty and others to administrative positions, and the ability to speak for the department in inter-departmental or university-wide meetings are just a few examples of other sorts of decision-making arenas in which department chairs wield more or less power. The ability to bargain unilaterally with job candidates may not correlate with these other activities and attendant prerogatives. Nevertheless, we expect that power in one realm often spills over into others and that it is rarely the case that line managers of any sort have highly segmented powers. We believe this not only because power is a combination of the situational, the institutional and the personal, but also because the few studies in the research literature that have looked at the relation of various types of power tend to find more integration than segmentation (Finkelstein 1992; Rose 1998). Finally, while department chairs' autonomous ability to make decisions about hiring incentives perhaps seems a small component of accumulated power, the utility of this index of power is an empirical question. If autonomy in hiring decisions is truly a pale reflection of power, then it would be unlikely to predict the departments' strategic priorities. However, we shall see in subsequent sections that it does do this.

One thorny issue emerging from our particular approach, a decision autonomy approach to power, resembles a problem confronted in previous studies of power—the possible need for disassociation of power emanating from the person from power emanating from the position. While we provide precise information about our power measures in another section of this paper, we note here that our measure of chairs' decision autonomy in the provision of resources walks a fine line between traditional concepts of “power” and “authority.”

The ability of chairs to make decisions is almost always a function of some blend of the personal with the formal and institutional and is almost always difficult if not impossible to separate these bases of power. In this respect, our study resembles many others (see Peabody 1962 for a discussion of the blurring of types of authority and power). Authority is usually defined in terms of the prerogatives that accrue from formal rules in one's formal position (see for example Adams and Romney 1959).

In all likelihood, the decision autonomy of department chairs, much like other mid-level administrators (Harris and Raviv 2005), most often accrues from some combination of vested authority and social and personal attributes and dynamics. Indeed, the intermixing of power and formal authority, or what some (Baker et al. 1999) call formal and informal authority, seems the rule more than the exception. In the present study our limited data do not permit us to sort this mixing.

Much of the empirical literature surrounding academic department chairs aims to define the ambiguous, often conflicting, roles and responsibilities of these administrators (e.g. Carroll and Wolverton 2004). Few studies address empirically power in academic departments and none examine ways in which academic chair power affects strategic decision-making. However, as we see in the brief review presented below, there is at least some literature on academic department chairs that is broadly relevant to the present study.

Relevant Literature on Department Chairs

The literature on department chairs is not nearly as developed as the literature on power and, moreover, much of the work is focused on means of developing leaders (Knight and Holen 1985; Knight and Trowler 2001; Stark et al. 2002), preventing burnout (Wolverton et al. 1999, 1994), and chair-faculty communication (Creswell and Brown 1992; Czech and Forward 2010). In short, the extant literature on department chairs generally focuses on topics quite different from those we examine here (for an overview of the department chair literature see Bryman 2007; Moses and Roe 1990).

In many studies, department chairs are seen as a liaison between subordinate faculty and institutional administration (Wolverton et al. 1999), but they are most commonly viewed as leaders within the department and key decision makers within the institution (Carroll and Wolverton 2004; Tucker 1984). Because of their important leadership and administrative roles within an institution, it is useful to understand how department chair power operates and how that influences strategic departmental priorities.

Carroll and Wolverton (2004) suggest that five factors influence the career progression of the department chair: Personal identity, professional identity, hiring mechanism, disciplinary identity and motivation. These factors predict which faculty become department chairs, how long they remain in the position and what they do after leaving the position. These all provide valuable insight into the power of individuals in the chair position and as such we use this study to frame our power determinant model.

In terms of personal and demographic attributes, department chairs are relatively homogeneous. Although women and minorities are more likely than in the past to become department chairs (National Science Foundation 2011), it is nonetheless the case that the position is still predominantly the preserve of white males (Kaplan et al. 1996; Carroll and Wolverson 2004; Turner 2003; Conrad et al. 2010).

From a perceptual basis at least, the department chair occupies in many cases a sort of halfway house between faculty and administration. Carroll and Wolverson (2004) report that 40 % of all department chairs view their roles exclusively as faculty members and only 5 % view themselves as purely administrative. We can see the temporal nature of the position in that 70 % of all department chairs return to faculty positions after their term as chair (Carroll and Wolverson 2004). One might well expect that a desire to return to a faculty position would be associated with a lack of commitment to the chair position and perhaps less power (as we hypothesize below).

To some extent the power and autonomy of the department chair is likely related to the process by which chairs are appointed to the position (Carroll and Wolverson 2004). The most common means of appointment are direct administrative appointment by an administrative superior and faculty vote; often the two are combined in some manner (e.g. faculty identifying three acceptable candidates with the dean picking one among them). Carroll (1991) contends that a more hierarchical institutional process generally encourages chairs to remain in the position for longer than the faculty process.

Any study of department chairs does well to take into account disciplinary differences in hiring norms and chair expectations and prerogatives (Greene et al. 2011). In a now somewhat dated study Carroll (1991) reports that the chairs in the physical and natural sciences are more often hired through hierarchical institutional processes and retain their position for longer periods. This suggests that those in the physical and natural sciences might be expected to have more power than in other fields, especially compared to the social sciences where appointment processes are usually less hierarchical and department chairs often rotate.

Motivation for accepting the chair is a final factor influencing career paths of department chairs (Carroll and Wolverson 2004). Some chairs accept the position for extrinsic reasons, such as a feeling of obligation, pressure from an upper administrator or a desire for increased salary. Others may accept the position as a route to advancement or to develop a career path. Members of the latter group also typically remain in the chair position longer than the former (Carroll and Gmelch 1992).

Hypotheses: Determinants of Chairs' Power

Our paper considers two fundamental questions: What determines power, and what are the strategic implications of power? As discussed above, our operationalization of power measures department chairs' decision-making autonomy regarding the provision of resources to job candidates (we describe the specific measurement approach in a section below).¹ The specific hypotheses we present draw in part from the literature on department chairs and to some extent from the general literature on power. We also draw from our own intuition and experiences as members of the faculty and, in the case of the senior author, as

¹ For convenience, much of the discussion below uses the term "power" rather than "decision-making autonomy dimension of power," but it is important to keep in mind that we are focusing a single aspect of power.

a department chair. This more grounded approach is necessary because there are so few directly comparable studies and so many gaps in knowledge about this aspect of power in university administration.

We expect that a major determinant of chairs' power will be their route to becoming chair, specifically whether they were hired from within the current university or from the outside. We hypothesize, *ceteris paribus*, that those who are hired from outside the focal university will tend to be more powerful. Studies (Lindbeck and Snower 1986; Gottfries 1992) have shown that outsiders tend to have greater ability to bargain for both themselves and their organizational unit. That does not necessarily mean the outsider's early advantage is sustained. Moreover, the outsider advantages seem to be attenuated by whether the previous incumbent was an outsider (Lindbeck and Snower 2001). While some studies of executive succession show superior performance by those recruited from the outside, most of this work is focused on CEOs and uses stock performance and profits as indicators (e.g. Huson et al. 2004; Lubatkin et al. 1989).

While the evidence certainly is not clear-cut, we hypothesize that chairs hired from outside the university now employing them will have greater power. Certainly there may be insider advantages, such as knowing about existing political coalitions and in some instances greater trust, but it is often the case that outsiders are brought in either because they are viewed as superior choices or, related, because there is a desire for increased quality or performance. In such cases it is more likely that the requisite power will be conferred to permit individuals the ability to initiate change and enhance performance.

Related, we expect that those who have become chair due to a department norm or procedure for the rotation of faculty into the chair position will have less power. Again, it is possible that such individuals would benefit from university experience and accumulated good will, but we expect that to become chair as a rotator will undercut the power of the chair, in part because the procedure will diminish the importance of individual leadership and political power attributes.

Hypothesis 1 Higher levels of power will tend to be positively associated with the chairs' recruitment from the outside the current university and will be negatively associated with entry into the position as part of a rotating chair procedure or norm.

Related, we expect that those who have had previous experience as a department chair will likely have greater power. The expectation is that those recruited from outside the focal university will, if they were chairs elsewhere, be perceived as having been successful elsewhere and, thus, will be more likely to have power conferred. It is also possible that previous experience provides the individual with skills to develop increased power in a new setting. Thus,

Hypothesis 2 Higher levels of power will tend to be positively associated with the chair having previously served as a department chair at another university.

Along the same line of reasoning, that those with relevant experience from outside the current university will have more power, we expect that current chairs who have served previously in industry or worked in government will tend to have more power, either because they will be perceived as more cosmopolitan in outlook and experience or because they will have developed a set of skills not uniform among chairs. It is, of course, possible that those who have worked in industry or government will have accumulated less "insider's knowledge" about university settings and have less power. Nevertheless, we hypothesize that those with government or industry experience will have more power if they have also had considerable experience working outside a university setting. Thus,

Hypothesis 3 Higher levels of power will tend to be positively associated with the chair having previously worked in industry or government.

We expect that chair power will be associated with gender, specifically that women chairs will tend to have less power. There is a vast organizational literature on the marginalization of women and the particular barriers women face when assuming leadership positions, including, among many others, sex role stereotyping (Schein 1975; Ely 1995), inferior or nonexistent mentoring (Noe 1988; Feeney and Bozeman 2008), and less expansive and dense social network ties (Brass 1985; Solomon et al. 1986). We see no obvious reason why universities should have vastly different sex role-power dynamics than other managerial settings and, moreover, the few studies (e.g. Carroll 1991; Wolverson et al. 1994) examining gender and sex roles related to university administration seem consonant with studies conducted in other settings.

Hypothesis 4 Women department chairs will tend to have lower levels of power than men.

Among the control variables we expect to be particularly important, department size stands out. In all likelihood the size of the department affects much of its governance and resource processes and there are good reasons to expect that decision autonomy will in part be a function of size (measured here in terms of the number of doctoral graduates). We also employ field disciplines as controls.

Finally, the time-as-chair control effects likely prove complicated. In general, we expect that those who have served longer as chair, in the incumbent position, will have more power (Singh and Harianto 1989; Brown and Moshavi 2002). However, this expectation is possibly mitigated by the fact that older persons will, of course, have had the ability to serve longer as will those who have been tenured for longer (assuming that for most chair positions, tenure is a prerequisite). Thus, we must control for professional age, which is calculated from the year of the earned doctorate.

Hypotheses: Implications of Power for Strategic Choice

While it is not necessarily the case that chairs' level of power affects strategic choice, it is certainly the case that power affects strategy in most other managerial realms (for an overview of the research on this topic see Bourgeois 1980; Hambrick 1981; Oliver and Holzinger 2008). While research on the relationship between power and strategy in universities tends to be more anecdotal and historical (e.g. Trow 1985; Buckland 2009), the literature is consistent in its claims that power matters to strategy (Rayner et al. 2010).

Since there is remarkably little research focused on the relationship of power to particular strategic choices of universities' departments and department chairs, the next hypotheses are to a large extent intuitive. Work in management, which is quite relevant to the hypotheses developed above for power determinants, is generally not as relevant here simply because so many of the strategic choices are specific to the higher education sector.

With respect to the first dimension of priorities, gender and racial diversification of faculty and students, we expect that the more powerful chairs will tend to place more emphasis on this priority. The reason is that many of the more powerful are also likely to have as a personal objective moving up the administrative ladder. Increasing the diversity of students and faculty provides a measurable accomplishment, one visible and important to external constituencies. It is also likely the case that those with the least power will feel

that they have limited ability to affect increasing the department's diversity, especially inasmuch as this objective usually takes concerted effort by many as well as greater recruiting effort and resources. Regarding diversity, we hypothesize as follows:

Hypothesis 5 Having greater power will tend to be positively associated with a higher priority for diversity.

The second set of priorities focuses on students and teaching; this construct includes increasing the number of students taught, increasing the number of classes offered and increasing the quality of classroom teaching. One aspect of the hypothesis, increasing the number of students taught, may have more to do with university-level attributes than with department-level attributes, and may relate as much to contemporary environmental conditions (e.g. scarcity and enrollment increase) as to the general flow of department-level strategy. Thus, we present the null hypothesis in this case:

Hypothesis 6 Having greater power will not be significantly associated with higher priority for increasing the quality and number of students.

In the case of research as a strategic priority, it may well be the case, given the pervasiveness of this priority, that there is little variance to explain. However, this is an advantage of employing an index rather than single variables pertaining to increasing research ranking (which is important to nearly 90 % of the chairs). Our expectation here is that having more power will be associated with a focus on improving research. In many cases, chairs have been brought in from outside the university for the express purpose of “shaking up” a department and enhancing its research. We hypothesize as follows:

Hypothesis 7 Having greater power will be significantly and positively associated with a higher priority for research.

Finally, we anticipate that the more powerful chairs will be especially interested in increasing the number of faculty lines. In universities, just as in other institutional contexts, status, advancement, and the ability to achieve other strategic objectives tends to depend in part of the ability to recruit additional key human resources. Our hypothesis:

Hypothesis 8 Having greater power will be significantly and positively associated with a higher priority for adding faculty.

We employ several control variables in connection with the above hypotheses about strategic priorities. In the first place, we control for discipline, using the same dummy variables as in the analysis of power determinants. We control for size, again in terms of the number of doctoral students produced by the department in the last three. Finally, we control for the race and gender of the department chair, as well as the interaction of these two variables with the power index. While there is little research demonstrating that either race or gender has any significant effect on strategic choices at the level of the academic department (for an exception, see Bellas and Toutkoushian 1999), there is considerable theorizing that nonwhites and women are likely to exert different influences than their majority male counterparts.

Data and Methods

Data come from the 2010 Survey of Academic Chairs/Heads, which focuses on Science, Technology, Engineering and Mathematics (STEM) department chairs in research

extensive universities. This population is important because of the disproportionate impact these departments and universities have on the production of the nation's doctoral-level scientific workforce, as well as performing important roles in other parts of the scientific enterprise.

Sample Design

The sampling frame targeted the population of STEM department chairs and heads at Carnegie Extensive (2000) universities. Of the 151 universities in this institutional population, 149 STEM doctoral degree-granting universities were included. To identify the STEM department chairs, three graduate research assistants were employed to develop the lists of department chairs. Using the Internet, the assistants were instructed to identify all focal STEM departments at the university, and to identify the name and contact information of the department chair. The objective was to obtain a broad range of STEM departments, including: Public health ($n = 237$), social science ($n = 232$), life science ($n = 226$), physical science ($n = 437$), and engineering ($n = 673$). Including 27 “other” scientific disciplines, a total of 1,832 STEM department chairs in 149 universities are included in the target population.²

Survey Administration

The study protocol was reviewed and approved by the Institutional Review Board of the University of Georgia. The data collection phase of the study, which took place in two waves, began in spring of 2010 and concluded in the early summer 2010. In both waves 1 and 2, respondents were first sent a pre-notice letter informing them about the study and requesting their cooperation in completing a survey to be mailed later. Approximately 1 week after the initial pre-notification letter, the survey packet was mailed to the potential respondents.

The cover letter accompanying the survey outlined the study objectives, indicated the voluntary nature of the study, requested participation, and provided contact details. About 10 days after the survey packet was mailed, a combination thank you/reminder postcard was sent to all respondents. Two months after the mailing of the postcard thank you/reminder, a new cover letter and replacement survey packet were sent to non-respondents. The cover letter included in the replacement packet emphasized the importance for everyone to respond (unless for some reason the respondent chose not to respond). This final mailing emphasized that this was the last opportunity for the respondents to complete the survey.

² All analyses are conducted using disciplinary—not departmental—indicators; sensitivity analyses indicated that collapsing departments into disciplines in this manner does not affect substantive conclusions. The departments included in the physical science discipline include physics, mathematics, chemistry, statistics, computer science, and earth and atmospheric science. Departments included in the social science discipline are sociology and economics; each is a quantitatively oriented social science discipline and included in the NSF definition of science. Life science disciplines are departments of biology, agriculture and ecology. Public health disciplines include departments of biostatistics, epidemiology, environmental health science, behavioral science, and health policy and management. The engineering discipline encompasses any engineering department present at a focal institution.

Response Rate

Overall, 43 % of targeted respondents participated, a response rate consistent with other independent research (e.g. not by the federal government) on doctoral level scientists working in STEM disciplines. Chi Square tests of difference indicate that engineers were less likely and life scientists were more likely to respond compared to other disciplinary groups. Because we sought to develop a census of STEM chairs in these types of research universities, the names were collected without regard to gender; however, gender was coded by reference to first names and using Internet photographs of target respondents. We observed no statistically significant difference in response rates between male and female chairs. Any scientists or engineers from underrepresented racial or ethnic groups are included exclusively by self-selection into the survey from the population of 1,832; there is no way to test for differences in response rate by race/ethnicity.

While we have been unable to identify population parameters or large samples for department chairs to which to compare our set of respondents, we are able to compare the chair demographic attributes to characteristics of a representative sample of all U.S. university faculty, as reported in the 2004 Survey of Academic Researchers (Bozeman and Gaughan 2011). Naturally, the department chairs are older compared to the sample of all university faculty and more likely to be male (though this factor interacts with age and cohort), but in nearly every other respect, such as race, family composition, work history, and career timing, the chair sample closely resembles the more general sample of faculty.

Descriptive Statistics

Recall that to be eligible for the study, all target respondents were department chairs in science, technology, engineering and math (STEM) fields at Carnegie research extensive universities in the United States. Hence, each person has an earned doctorate and is tenured. As one would expect, the sample members are advanced in their careers, having earned the doctorate on average almost 27 years ago. Consistent with these institutions and fields, this sample is overwhelmingly male and white. They have had a diversity of career experiences, however, with 40 % having been a postdoctoral fellow, one in five working in government, one-third working in industry, and one-tenth serving as department chair at another university.

Measurement of Primary Constructs

Measurement of demographic and career-related variables as discussed in the preceding section is quite straightforward. Our two central constructs—priorities and power—rely on more complex measurement models. In this section, we discuss how we used confirmatory factor analysis to develop the departmental priorities measures, followed by a description of the power index.

The Departmental Priorities Measures

Respondents were asked to indicate the extent to which each of several possible priorities was viewed as important to their department. Table 1 provides the 10 items and the frequency of responses distributed on a four point ordinal scale where 1 = not that important and 4 = top priority.

Table 1 Departmental priorities “Please assess the extent to which you consider the following to be departmental priorities”

	Not that important (1)	Somewhat important (2)	Very important but not a top priority (3)	Top priority (4)
Increasing the amount of sponsored research	6 (0.8 %)	45 (5.8 %)	226 (29.4 %)	470 (61.0 %)
Adding tenure track lines	45 (5.8 %)	116 (15.1 %)	250 (32.5 %)	330 (42.9 %)
Increasing the racial diversity of faculty	48 (6.2 %)	232 (30.1 %)	334 (43.4 %)	130 (16.9 %)
Increasing the gender diversity of faculty	91 (11.8 %)	248 (32.2 %)	297 (38.6 %)	111 (14.4 %)
Increasing the number of classes offered	312 (40.5 %)	275 (35.7 %)	136 (17.7 %)	23 (3.0 %)
Increasing the number of students taught	213 (27.7 %)	227 (29.5 %)	207 (26.7 %)	98 (12.7 %)
Improving the quality of graduate students	15 (1.9 %)	61 (7.9 %)	284 (36.9 %)	385 (50.0 %)
Increasing the racial diversity of students	91 (11.8 %)	234 (30.4 %)	307 (39.9 %)	114 (14.8 %)
Increasing the gender diversity of students	189 (24.5 %)	248 (32.2 %)	229 (29.7 %)	80 (10.4 %)
Improving the quality of classroom teaching	33 (4.3 %)	232 (30.1 %)	315 (40.9 %)	163 (21.2 %)

The table shows considerable variance in the importance of the various strategic issues. The goal strongest priority, on average, is “increasing the amount of sponsored research,” with 90.4 % indicating that the objective is either a top priority or very important.

A practical problem with determining the relationship of our power index to the various strategic priorities is that each could be identified as a distinct model. In the interest of space and analytic convenience, we investigated the dimensionality of the strategic priorities, expecting that priorities would combine into interpretable dimensions. A principal components factor analysis was performed, employing Varimax rotation procedures³ and extracting factors to the conventional one eigenvalue level. The results, shown in Table 2, indicate that items load on dimensions that have intuitive appeal as strategic factors.

At the conventional one-eigenvalue level, four factors emerge. Naming the factors with reference to the most heavily loading variables (and focusing only on loadings in excess of $\pm .50$ or greater), the four dimensions are diversity, students, research and adding faculty. The loadings in each case seem interpretable with little “noise” or “shadow factors.” For example, “quality of graduate students” has its variance nearly evenly split among two factors, which is not in most cases desirable, but the split “makes sense” inasmuch as the concern with quality students is both to support the education or teaching mission but, at the same time, enhance the ability of the department to conduct research. A conservative approach would entail possible deletion of a “cross-loading” variable (i.e. one that loads to

³ While Varimax rotation does not in most cases provide the factor structure most representative of the original correlation matrix based variance (Burnset al. 2001), it is especially useful in cases where one is seeking to develop discrete dependent variables based factor scores (Dien 2010).

Table 2 Principal component results for department priority items (rotated factor loadings)

	Factor dimensions			
	Priority:Diversity	Priority:Students	Priority:Research	Priority:Add faculty
Research ranking	.091	-.147	.774	.243
Sponsored research	.064	.053	.693	-.059
Adding tenure track lines	.123	.010	.103	.863
Faculty racial diversity	.832	-.067	.050	.190
Faculty gender diversity	.801	.027	.066	.109
Increasing number of classes offered	.094	.661	-.087	.490
Increasing the number of students taught	-.051	.740	-.068	.052
Quality of graduate students	.168	.494	.527	-.082
Student racial diversity	.811	.137	.082	-.012
Student gender diversity	.779	.206	.130	-.058
Quality of classroom teaching	.320	.612	.170	-.227

Extraction method: Principal component analysis

Rotation method: Varimax rotation with Kaiser normalization

the extent of $\pm .40$ or greater) but such an approach is less attractive in cases where the split seems to reflect a parsing of variance that is, potentially, theoretically meaningful (e.g. La Greca and Lopez 1998). We argue that the educational and research value of graduate students justifies maintenance of the cross-loaded variable (Lodahl and Gordon 1972; Kyvik and Smeby 1994; Bozeman and Boardman *in press*).

While the use of factor analysis is helpful in terms of developing more parsimonious measures, one must note its limitations. Factor analysis is most powerful as a means of identifying latent structure among a set of variables. Our use of the technique, also a common one, relates more to data reduction than the identification of new relationships among the set of variables. Thus, our usage is to reflect the known inter-correlation properties of the initial correlation matrix rather than identifying new properties and theoretically evocative latent structures. This is, of course, a common and appropriate use of factor analysis (Fabrigar et al. 1999; Conway and Huffcutt 2003). Nonetheless, it is important to remember that factor analysis in general has no basis in inferential statistics and, thus, that its confirmatory requirements are stringent (see Costello and Osborne 2005).

It is also important to acknowledge that controversy remains about using ordinal level data in factor analysis. While this is a common practice, especially in instances using questionnaire-based ordinal scales, the factoring out of ordinal level data turns out to be a more problematic procedure than does the factoring of interval level data. While studies show that factor analysis outcomes tend to be quite robust for ordinal data (Flora and Curran 2004), the quality of results diminishes with smaller sample size.

The Power Index

The department chairs responding to our questionnaire were asked the following question:

“In negotiations with prospective new faculty, some department heads are able to add incentives to contracts. Of the following resources, which ones can be offered

Table 3 Recruitment resources: “Of the following resources that add incentives to prospective new faculty, which ones can be offered with the resources you have in the department and which require additional involvement (resources or approval) from other offices?”

	No outside involvement needed (1)	Requires Dean’s involvement (2)	Requires provost/VP involvement (3)	Requires President’s involvement (4)	Not available
Additional salary	43 (5.9 %)	529 (72.2 %)	106 (14.5 %)	8 (1.1 %)	47 (6.4 %)
Course reduction(s)	516 (68.6 %)	183 (24.3 %)	11 (1.5 %)	0 (0.0 %)	42 (5.6 %)
Teaching assistants	509 (68.8 %)	105 (14.2 %)	8 (1.1 %)	0 (0.0 %)	118 (16.0 %)
Summer money	195 (27.0 %)	388 (53.7 %)	49 (6.8 %)	1 (0.1 %)	90 (12.5 %)
Research money	131 (18.3 %)	414 (57.8 %)	134 (18.7 %)	3 (0.4 %)	34 (4.8 %)
Research assistants	312 (42.8 %)	273 (37.5 %)	48 (6.6 %)	3 (0.4 %)	93 (12.8 %)
Start-up money	85 (12.0 %)	418 (59.0 %)	192 (27.1 %)	3 (0.4 %)	10 (1.4 %)
Spousal hiring assistance	48 (6.7 %)	184 (25.8 %)	343 (48.1 %)	23 (3.2 %)	115 (16.13 %)
Computing/software	606 (81.3 %)	118 (15.8 %)	9 (1.2 %)	0 (0.0 %)	12 (1.6 %)
Laboratory space	399 (54.7 %)	215 (29.5 %)	20 (2.7 %)	3 (0.4 %)	92 (12.6 %)
Laboratory supplies	400 (55.3 %)	181 (25.0 %)	23 (3.2 %)	2 (0.3 %)	118 (16.3 %)
Moving expenses ^a	302 (40.6 %)	352 (47.3 %)	65 (8.7 %)	4 (0.5 %)	21 (2.8 %)
Travel funds	428 (58.2 %)	262 (35.7 %)	24 (3.3 %)	1 (0.1 %)	20 (2.7 %)

^a The responses for “Moving expenses” violated the parallel regression assumption and thus were excluded from our index. Excluding these responses allowed us to perform ordered logistic regression

with the resources you have in the department and which require additional involvement (resources or approval) from other offices?”

A list of thirteen resource types was then provided, including such items as additional salary, course reductions, and summer money. Respondents were asked to indicate whether the provision of the resource “requires President’s involvement,” “requires Provost or Vice President involvement,” “requires Dean’s involvement,” or “no outside involvement needed.” Table 3 provides a frequency distribution of the resource type and the approvals needed.

The power index reflects chairs’ decision autonomy which is measured by the extent to which department chairs answer that “no outside involvement needed” to offer a given resource during negotiation. Table 3 shows that there is a great deal of variance with respect to the approvals needed for each resource type. Note that the column, “not available,” indicates that the respondent answered that negotiation is not available on this basis. For example, 6.4 % of respondents indicated that negotiating for additional salary was not available at their institution. This is accounted for in a final adjustment described in item three below.

Since we use an ordinal logistic regression to examine the determinants of power, we test whether each of the resource types violate the parallel regression assumption (Long 1997). Using a Brant test, we determine that 12 of the 13 resource types are ordered in nature. Moving expenses as a resource violates the parallel regression assumption. We therefore construct the power index without including moving expenses as a resource.⁴

⁴ The authors thank the anonymous reviewer that suggested testing for the parallel regression assumption.

The authors acknowledge that there are many useful ways to measure power and that decision autonomy is only one of these. Moreover, the research focuses on only one aspect of decision autonomy, the ability of chairs to make decisions related to hiring. This is a major limitation of the study. Common experience of academic administrators as well as results from the academic literature (Tucker 1984; Tucker and Bryan 1988; Lee 2009) show us that there are many realms in which chairs may have influence including, for example, curriculum reform, tenure and promotion decisions, initiation of new programs and degrees, budget execution and fund raising, just to name a few. In future studies we hope to have a more comprehensive measure. However, the current study is circumscribed by the fact that the authors are employing data that were designed for purposes other than explicit analysis of power, authority or autonomy of department chairs. Thus, measuring decision autonomy in terms of the chair's discretion with respect to hiring is not the only useful indicator or the single best indicator, it is simply the single best currently available indicator.

Another limitation is in part remediated by the procedures we have used in connection with decision autonomy variables. The power index reflects the aggregate decision autonomy of chairs. However, it is important to recognize that some types of discretion are quite common and others uncommon. Thus, the index provides a simple weighting for the various items, giving more weight to the uncommon types of discretion (e.g. spousal hires) and less weight to the common types of discretion (e.g. computer and software). The steps in creating the index follow:

1. Each of the 12 ordered negotiating resources items was transformed into a dummy variable with 1 = the department head needs no outside involvement in decisions about the resource and 0 = all else (i.e. required involvement of deans, provosts and vice presidents or presidents). The procedure resulted in a set of dummy variables correspondent to each of the resource items.⁵
2. To take into account the fact that some types of negotiating decision autonomy are much more uncommon, all "1" values were multiplied by the inverse of the proportion. Thus, for example, all respondents (73 %) who had the autonomous ability to decide about providing summer support money received a score of 0.27.
3. After recoding values with the above weighting scheme, the 12 negotiating resource proportions were added and divided by the number of valid responses to the twelve item scale. This last adjustment retains department chairs who indicated "not available" to one or more indicators. The resulting sum is the power index used in analyses.

Results for Power Determinants

Our findings report the results of an ordered logistic regression analysis in Table 4. Since the dependent variable, the power index, does not meet interval level data requirements, we employ ordered logistic regression. Results of the ordered logistic regression show that a variety of factors predict department chair power, as measured by the power index, but not

⁵ In a procedure not reported in this paper, we developed a power index based simply on the summation of these dummies. The results were very close to the ones reported in this paper. However, we use the more complicated measure because it is closer to the concept of power employed. Tables for the simple additive measure are available from the authors.

Table 4 Ordered logistic regression of predictors of power index

Independent variables	Coeff.	SE
Motivation for accepting chair position		
Chairs/heads rotate in the department	-0.375	0.179**
Recruited from outside	0.385	0.195**
Career opportunities		
Previously served as department chair at another university	0.376	0.270
Previous experience in government	-0.010	0.182
Previous experience in industry	0.209	0.166
Demographic		
Female	-0.509	0.224**
Year of terminal degree	-0.007	0.012
Year became department chair/head	-0.005	0.014
Discipline		
Engineering	0.465	0.196**
Public health	0.605	0.275**
Social science	-0.195	0.258
Life science	0.454	0.237*
Number of doctoral degrees conferred by the department in the last 3 years	0.008	0.002***
Likelihood ratio	-2,830.884	
Observations		610

*** $p < .01$; ** $p < .05$; * $p < .10$

all of the hypothesized determinants are significantly related. Results are reported in Table 4.

With respect to Hypothesis 1, results show that the path to the chair's position does, indeed, affect power as measured by the decision autonomy based power index. While there is a significant positive effect of assuming the chair's position based on being recruited from the outside, there is a negative effect of becoming the department chair as a result of norms or rules favoring the rotation of incumbent faculty into the chair position.

Having served as a chair at another university provides a positive but not significant effect on the likelihood of greater power. Likewise, the effects of having had a position in industry tend to be positive, but no significant effect is observed for either previous work in government or industry.

As expected from previous studies, the coefficient for female and the power index is negative and significant, indicating that women department chairs tend to have less power than men chairs. These findings are perhaps attenuated by the fact that only 13.6 % of chairs are women, but the obvious threats to selection bias do not seem problematic. Women chairs tend to have less time served and to be much more common in some fields (e.g. social sciences) than others (e.g. engineering). However, since the ordered logistic regression model controls for field and for time served as chair, the direct negative effect of being a female chair persists. Thus, the result provides evidence to support hypothesis 4.

The results for various control variables are notable. Most important, the size of the department, as measured by number of doctoral degrees awarded, has a strong effect on chair power. It is perhaps no surprise that those presiding over larger departments, will

have more power and in all likelihood a more prominent position in the university. Given the pervasiveness of size effects, its use as a control seems crucial.

Neither professional age nor the number of years served as department chair is significantly related to power in faculty recruitment negotiations. This latter seems somewhat surprising inasmuch as one would assume the possibility for learning and experience to contribute to power (McClelland and Boyatzis 1982). Of course, it is also the case that many chairs (and many managers of all sorts) have their greatest power when beginning the position due to recent negotiations and to the good will (“honeymoon period”) that often occurs at the beginning of managers’ tenure (Helmreich et al. 1986). Chairs in engineering, life sciences, and public health tend to have more power than chairs in the physical sciences.

Results for Strategic Priorities

In examining the effects of power on the department’s strategic priorities, we use OLS regression in connection with the factor scores associated with the factor dimensions presented in Table 2. This analytic approach is supported by much of the literature on multivariate statistical applications (Sharma 1996; Hutcheson and Sofroniou 1999; Skrondal and Laake 2001) as well as by Monte Carlo data simulations as tests of robustness (MacKinnon and Magee 1990; Lastovicka and Thamodaran 1991; Wall and Li 2003).⁶

The multivariate results for diversity as a departmental strategy are presented in Table 5. Our findings are not in accord with all the hypotheses we presented above. In the model predicting diversification priority we see that, unexpectedly, the power index is not significantly associated with diversification. The control variable, number of doctoral degrees offered by the department during the past 3 years, is a strong predictor, indicating that larger departments tend to provide a strong emphasis on diversity, perhaps because a lack of diversity is more apparent in larger programs. There are no significant effects among the remaining variables.

Table 6 gives the regression results for the relation of power to teaching priorities. As hypothesized, the level of chair power does not predict this priority. However, the number of doctoral degrees is, again, significantly related ($-.005$; $p < .000$), but in this case the relationship is negative. Larger programs give less emphasis to expanding capacity and improving quality, perhaps simply because there are sufficient numbers already that increasing numbers of students or classes is not desirable. It is also notable that a field effect emerges for the student priority. Chairs from social sciences departments report less support for this set of priorities as do chairs in engineering relative to their colleagues in the physical sciences.

Regarding research as a strategic emphasis, our hypothesis was that research priorities would be significantly related to the power index, though the expectation was somewhat attenuated simply because there is less variance for this strategic priority than for any of the others. In fact, the regression results show a modest significant positive effect of chair power on a strategic emphasis for improving research. However a number of other

⁶ The approach is also supported by a simple heuristic analysis we performed. We took the highest loading (in terms of factor loadings on the respective factor dimension) variable for each of the strategy dimensions and regressed the power index and control variables in a simple OLS model. The results were quite close to the OLS regression using the factor scores as dependent variables. In every case, if the dimensional variable was significant the single variable representation of that dimension was significant and with the same valence. Results are available from the authors.

Table 5 OLS regression of diversity as a departmental strategy

Independent variables	Unstd. Coeff. (B)	Std. Coeff. (B)	SE
Power index	−0.007	0.059	0.005
Demographics			
Female	0.096	0.031	0.181
Race: non-white	0.078	0.025	0.185
Interactions with power index			
Power index interaction with female	−0.003	−0.011	0.018
Power index interaction with non-white	0.013	0.025	0.185
Discipline			
Engineering	0.079	0.038	0.101
Public health	−0.129	−0.042	0.140
Social science	−0.193	−0.063	0.139
Life science	0.036	0.013	0.129
Number of doctoral degrees conferred by the department in the last 3 years	0.009	0.261	0.001***
Constant	−0.278		0.100***
R^2	0.102		

*** $p < .01$; ** $p < .05$; * $p < .10$

variables in the model predict a priority for research, including all the discipline variables. Since the reference variable here is physical sciences, this implies that compared to all other disciplines included in this analysis, departments and department chairs in the physical sciences are significantly more likely to have a strong strategic priority for enhanced research.

Interestingly, and somewhat unexpectedly, the control variables related to race may have a modest relation to a strategic priority for research, with nonwhite chairs⁷ being somewhat more likely to have a greater priority for a departmental strategy emphasizing research (Table 7).

Finally, we consider the relationship between a strategic emphasis on new faculty lines and power. We had hypothesized that there would be a significant relationship with the power index and, indeed, there is. But it is not in the direction we anticipated. Chairs with more power tend to report that adding faculty lines is a less important priority than is the case for other chairs. This seems to us an interesting finding, indicating perhaps that new faculty lines are viewed more as teaching assets than research assets. The fact that the social sciences dummy is positively associated gives some support to this view (social sciences departments often have large undergraduate core classes and high student-faculty ratios). However, it is possible that the relationship is owing to omitted variable bias. Needing more faculty lines may be indicative of an under-resourced department, which, in turn, would perhaps attract less powerful chairs or even be explained in part by the diminished power of the chair. It may also be true that those chairs with increased power have greater ability to hire and therefore need not identify faculty lines as a top priority (Table 8).

⁷ Since 69 % of the nonwhite chairs are Asian, it would not be misleading to interpret the variable as a proxy for having an Asian chair.

Table 6 OLS regression of students as a departmental strategy

Characteristic	Unstd. Coeff. (B)	Std. Coeff. (B)	SE
Power Index	−0.002	−0.018	0.006
Demographics			
Female	−0.029	0.009	0.184
Race: non-white	0.178	0.058	0.189
Interactions with power index			
Power index interaction with female	0.005	0.018	0.018
Power index interaction with non-white	0.019	0.077	0.015
Discipline			
Engineering	−0.219	−0.106	0.102**
Public health	−0.010	−0.003	0.142
Social science	−0.559	−0.181	0.141***
Life science	−0.051	−0.018	0.131
Number of doctoral degrees conferred by the department in the last 3 years	−0.005	−0.163	0.001***
Constant	0.236		0.11**
Observations	608		
R^2	0.070		

*** $p < .01$; ** $p < .05$; * $p < .10$

Overall, the results show, as expected, that power does relate to strategic choice. Of course we must treat the findings with caution. While it is not likely that these results are spurious—it would be surprising if there were no relationship between power and strategic priorities—the research is limited by the fact that university-level data are included in the models and by the fact that it is not possible with these data to compare the objective status with the perceived needs of departments. Another limitation is that causal direction is not assured in these models. It may well be the case that there is reciprocal causality between power and strategic priorities and, particularly, that the presence of certain strategic priorities are conducive to more powerful chairs. Fuller understanding awaits further research and multilevel data and analysis.

Conclusions

Department chairs have many roles and responsibilities for their own academic department, but also within the postsecondary institution within which the department functions. These responsibilities include both managerial and leadership tasks (Bowman 2002). Certainly one can see how the findings presented above can inform empirical work regarding decision-making by academic department heads, specifically setting strategic department priorities.

Academic department chairs influence not only their own department, but also institutional policy and procedures; faculty appointment, promotion and tenure; other personnel; budgets and student interaction with the institution (Tucker 1984). We must therefore understand development of department chair power and how that power influences strategic priorities. Department chairs make a great deal of administrative decisions

Table 7 OLS regression of research as a departmental strategy

Characteristic	Unstd. Coeff. (B)	Std. Coeff. (B)	SE
Power index	0.011	0.087	0.005*
Demographics			
Female	0.275	0.092	0.181
Race: non-white	0.372	0.123	0.186**
Interactions with power index			
Power index interaction with female	-0.018	-0.062	0.018
Power index interaction with non-white	-0.020	-0.084	0.015
Discipline			
Engineering	-0.289	-0.141	0.101***
Public health	-0.469	-0.157	0.140***
Social science	-0.602	-0.199	0.140***
Life science	-0.490	-0.177	0.130***
Number of doctoral degrees conferred by the department in the last 3 years	0.001	0.020	0.001
Constant	0.180		0.100*
Observations	608		
R^2	0.058		

*** $p < .01$; ** $p < .05$; * $p < .10$

Table 8 OLS regression of adding faculty as a departmental strategy

Characteristic	Unstd. Coeff. (B)	Std. Coeff. (B)	SE
Power index	-0.015	-0.125	0.006***
Demographics			
Female	-0.175	-0.057	0.186
Race: non-white	-0.023	-0.007	0.190
Interactions with power index			
Power index interaction with female	0.024	0.080	0.018
Power index interaction with non-white	0.006	0.024	0.016
Discipline			
Engineering	0.032	0.015	0.104
Public health	-0.179	-0.058	0.143
Social science	0.417	0.135	0.143***
Life science	0.052	0.019	0.133
Number of doctoral degrees conferred by the department in the last 3 years	-0.001	-0.029	0.001
Constant	0.072		0.103
Observations	608		
R^2	0.07		

*** $p < .01$; ** $p < .05$; * $p < .10$

for institutions of higher education. As shown in this study these decisions are clearly influenced by the power of the individual department chair and therefore contribute to the study of higher education.

Research in higher education often overlooks strategic decisions of academic department chairs. This is surprising considering it has been argued that department heads make 80 % of administrative decisions in colleges and universities (Tucker 1984). Save for the research of Wolverson et al. (2005), studies examining department chairs were published decades ago (e.g. Gmelch and Burns 1993; Hoyt and Spangler 1979) or are qualitative in nature (Hubbell and Homer 1997) and have limited generalizability. Given the leadership role of the academic department chair, it is useful to understand the development of power and how power affects strategic decision-making. Many (e.g. Wolverson et al. 2005; Tucker 1984) have made the argument that academic department chairs have the power to influence policy and procedure at the departmental and institutional level, but no previous study has operationalized chair power. Managing personnel is among the three main job functions of academic department chairs (Wolverson et al. 1999; Wolverson et al. 2005). Thus it seems useful to measure power using a systematic index of the level of discretion in provision of resources at play in faculty hiring negotiations. This focus on power and the allocation of resources complements a long and useful tradition in power studies, including power in universities (Pfeffer 1981; Tucker and Bryan 1988).

Taking this resource discretion focus, one can now see from our findings that academic department chairs vary considerably in power. Particularly notable, powerful chairs often preside over departments with large doctoral programs. Size has pervasive, independent impacts, so much so that future studies will likely wish to incorporate new measures of size and compare and contrast them. At the level of the individual, rotating chairs tend to be less powerful and those attracted from outside have more power. Consistent with much of the higher education literature focused on both faculty and administrators, being female often means being less powerful. This power gap between men and women managers seems no different in universities than in other organizations (Ragins and Sundstrom 1989). It will be useful to develop longitudinal data to determine possible changes as the percentage of female chairs continues to increase.

Although it is interesting to understand the determinants of power, it is perhaps more useful to examine how these differing levels of decision autonomy relate to strategic departmental priorities for the chairs. We can be confident from our findings that chair decision autonomy does influence strategic department priorities. We examine how power relates to four strategic departmental priorities: diversity, students, research and new faculty lines. Surprisingly, we find that power does not significantly affect a chair's commitment to diversity as a priority. Quite possibly this focus signals that upwardly mobile chairs have no need to develop a record that will appeal to search committees, many of which have diverse composition and ask pointed questions about diversity commitment. Somewhat less cynical is the possibility that change in universities, an institution where diversity is much discussed but where progress, especially in faculty hires, and even more especially in the hiring of members of underrepresented minority groups, tends to be very slow (National Science Foundation 2011).

Moreover, this finding illustrates well an element of complexity in the study. It is generally quite difficult to make confidence-inspiring inferences about the relationships of decision autonomy, our one component of power, to particular strategic priorities. This is because both the putative independent variable (power) and the dependent variable (reported strategic priority) have multiple and multi-level determinants. Thus, for example, decision autonomy could pertain largely to the individual (some chairs may be better at

negotiating autonomy), or to institutional context (some universities give more power to chairs than others do) or to some combination or interaction of the two. To put it another way, it is not possible, given the current data, to separate out elements of authority from elements of power. Strategic priority issues face much the same analytical problem. When a powerful chair reports a strong priority for diversity it may be because the chair has championed this priority or, perhaps, because the college unit, the college executives, or the faculty have insisted on it. It could be the case that the chair is a neutral bureaucrat charged with effective administration but not with agenda setting. Again, we see a possible confusion of authority with power and we cannot sort out causality, at least not without multi-level data (which we do not have in this study). At this point, then, we can only say that these results must be treated with more than the usual caution and we can hope that studies with better data can build on the current findings.

The ambiguities are blunted in their importance only because we find that power has only a modest relationship to research as a priority. The major story for the research strategy is discipline, with the research emphasis in the physical sciences being significantly more important than in the other disciplines.

Somewhat unexpectedly, we find a negative and strong relationship between power and the priority to increase faculty lines within the department. As we suggested above, this may be owing to the fact that low power departments tend to have large undergraduate teaching loads, especially core and service courses, such that they are constantly under-resourced on teaching faculty. The fact that the social science dummy is significant in this equation is suggestive.

A student-focused strategy is not predicted by the power index. Other than disciplinary dynamics, the most important factor with respect to students is the size of the department: Larger departments place less emphasis on having more students or increasing student quality. The disciplinary dynamics are those one might predict, with social sciences and engineering being negatively related (both tend to have relatively high student to faculty ratios).

In previous sections of this paper we identified many limitations to the current paper but it is worth reiterating some of these. In the first place, our focus on decision autonomy as an aspect of recruitment negotiation power means that we capture only one aspect of chair power. Related, it is at least possible that in some cases department chairs with less autonomy may, in other respects and for different reasons, be more powerful than those with greater decision autonomy. Related, like most previous studies, we are not able to disentangle the power or decision autonomy that flows from individual attributes and behaviors from sources related to authority structures and formal rules. In all likelihood, it is often the case that decision autonomy is based on a complex mix of the formal and the personal or situational.

The focus of this paper exclusively on STEM disciplines provides some insight into how power and authority processes operate in major research institutions. STEM disciplines and departments are a significant part of the modern American research university, but the institutional dynamics in departments so heavily dependent on external funding streams may be quite different from those in other parts of the university. The recent events regarding presidential succession at the University of Virginia suggest that departments in the humanities, in particular, may be affected by higher levels of administrative and political control than those on the science side of the institution. Future work should include departments in the humanities and use a more expansive definition of the social sciences than that included in this study to give a more generalizable view of power and authority dynamics in research universities as a whole.

Other limitations relate more to the data than to conceptualization and measurement. The data are based entirely on questionnaire responses and suffer from the usual limitations of questionnaires. The response rate, while not lower than most studies published in the literature, nonetheless leaves the possibility of selection bias, especially with the large number of variables examined here.

Future research on academic department chairs should continue to examine the relationship of power to strategic decision-making. Understanding of this complex relationship could be expanded using institutional data. Such data would allow comparison of objective department needs and priorities to the managerial roles and personal motives of the department heads, comparing their relative importance to strategic outcomes. Likewise, studies using integrated, multiple methods would be most helpful. Finally, studies able to tap several dimensions of power would be especially useful.

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