Gateways to Academic Leadership Positions, and Impact on Women in the Professorial Ranks

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Abstract
In gendered organizations, a critical mass of women in leadership positions is postulated to be necessary to overcome tokenism and counter the subtle barriers impeding the advancement of women. We explain prevalence of women in the academic ranks as a function of women in academic leadership positions. We examine two doctoral degree-granting institutions; one with a stronger tradition of women within all ranks and one near the bottom on most measures. Through archival data, we compare women in leadership positions and faculty ranks, patterns in type of leadership positions held, and pathways to leadership positions.

Introduction
A recent study by the American Association of University Professors (AAUP) piques interest in the current role of women in higher education. The examination of 1,445 colleges and universities reveals that while women earn more than half of all Ph.D. degrees granted to American citizens today, they still comprise only about 45% of tenure-track faculty, 31% of tenured faculty, and just 24% of full professorships in 2005-2006 (West and Curtis 2006). More women than men are in part-time or non-tenure track positions, and the increasing scarcity of women as you look at higher academic ranks is clearly shown. Participation of women is lowest in the doctoral-granting institutions, where women constitute just 34% of full-time faculty, 26% of tenured faculty, and 19% of full professors. This is a particular problem, according to West & Curtis (2006), given the status and prestige of doctoral universities as well as the fact that 47% of all full-time faculty teach in these institutions. Certainly the low representation of women at advanced professional ranks is not new or unique to higher education. However, the slow progress of women in light of their prevalence in academe's primary labor pool remains a puzzle.

Research surrounding women's less than full participation in higher education has been ongoing for several decades, primarily focusing on women as graduate students or within the professorial ranks. Early investigations describe the "chilly" academic climate experienced by women faculty, administrators, and graduate students. A range of behaviors, from overt to subtle – including assignment to more and/or more time intensive but less powerful committees, support rather than leadership roles, resource inequities, stereotyping, and unclear professional etiquette creating male discomfort which exacerbates social isolation – combine to discount, discourage, and disadvantage women at all levels in academe (Sandler 1986).

Later empirical tests demonstrate gender bias favoring men in the evaluation of candidates for faculty positions – identical curriculum vitae produced higher evaluations and greater preference to hire if the candidate was portrayed as male rather than female; both male and female evaluators exhibited this bias (Steinpreis, Anders, and Ritzke 1999). Gender bias was also documented in post-doctoral fellowship application reviews where women received undeservedly lower scores on all three evaluation parameters, resulting in 80% of the fellowships being awarded to men (54% of the applicants were men). Looked at another way, 8% of the

women who applied received a fellowship, compared to 29% of the male applicants (Wenneras and Wold 1997).

More recent research reveals increasing prevalence of women throughout the various academic ranks, yet concern that progress is due mainly to greater numbers of women applicants rather than diminishing gender bias. Such disquiet is reinforced by lingering disparities in salary and especially rank, along with deteriorating working conditions as more women are hired into the growing number of part-time and non-tenure track positions (Dugger 2001a and b). Continuing barriers for women seem especially pronounced in departments of science and engineering (Etzkowitz, Kumelgor, and Uzzi 2000; Nelson and Rogers 2004), where only 19% of full professors are women in four-year colleges and universities overall, with even lower representation in research institutions (NSF Science and Engineering Indicators 2008).

An underlying problem is that of the gendered organization, whereby work policies, interpersonal networks, and embedded attitudes have evolved from the life experience of the traditional male bread-winner, creating an unequal playing field favoring the advancement of men. Women, with a different life experience including career interruptions for child birth and rearing, domestic responsibilities, and socialization to be supportive rather than dominant, are systematically disadvantaged in this male-normed institutional environment (Acker 1992; Bailyn 2003; Hochschild 1994; Kanter 1977; Martin 1994). Stereotypes of male and female roles unconsciously pervade attitudes of both men and women, leading to a persistent pattern of overrating of men and underrating of women when work-related behavior is compared to entrenched expectations (Valian 1998).

The gendered organization concept helps us understand women's stalled momentum and the complexity of making significant and enduring change. Familiar straightforward initiatives including mentoring for women, equal-opportunity policies, and targeted faculty recruiting have not been adequate to over-ride the prevailing prejudicial undercurrent. Accomplishing meaningful change when obstacles are individually unintended but ingrained in protection of the social status quo calls for deeper and more ambitious organizational actions.

Drawing from the gendered organization perspective, we take a new look at the issues and seek to explain prevalence of women in the academic ranks as a function of women in senior leadership positions. More specifically, we compare representation of women in academic leadership positions and faculty ranks in two very similar doctoral degree-granting institutions – one with a relatively strong tradition of women in throughout the professional ranks and one near the bottom on most measures – and seek to identify relevant patterns of/pathways to leadership positions for women. In the following sections we develop a rationale for this inquiry, describe methodology and results, and conclude with discussion of implications for both future research and institutional agendas.

Women in Academic Leadership Positions

While representation of women at higher professorial ranks is disappointing, women are even more scarce on the administrative career ladder. Relatively few women advance to top academic leadership positions such as dean, provost, president or chancellor. A recent study of doctoral degree-granting institutions found only 27 of 200 institutions (13.5%) headed by women presidents, 47 (23.5%) with women provosts, and about 28% of dean positions held by women (Bilen-Green, Froelich, and Jacobson, 2008). Greater prevalence of women deans has been noted in traditionally female fields such as nursing and education (Dugger 2001a), while many social science and professional fields have shown substantial gender desegregation and an

increasing supply of women for these positions. Where women are in top positions, it is typically in smaller, less prestigious schools. With women over-represented at instructor/lecturer ranks and less likely (controlling for experience, publications, and educational attainment) and taking longer to reach the associate and full professor ranks (Dugger 2001b) which generally are tapped for leadership positions, the small number of women administrators is yet another piece of the problem.

A multitude of practices impact women's advancement through either the professorial or administrative ranks. Many barriers are embedded in the gendered organization, including the so-called "second shift" (Martin 1994, 409), where women juggle home and professional responsibilities, compounded by "the coincidence of the biological clock and the tenure clock" (Martin 1994, 409) and the "invisible job"(Martin 1994, 410) of greater academic service roles. There also is the "hidden curriculum" (Thomas, Bierema, and Landau 2004, 63), where women learn to assimilate into the male culture by downplaying their attributes, and the Catch-22 of less prevalent but apparently more necessary (women are required to prove themselves more extensively than men in order to advance) developmental experiences and informal networks to draw upon (Oakley 2000). Adding the previously described gender bias in selection, evaluation, and promotion processes, it is indeed an arduous trek to the advanced positions.

Then, the chilly climate becomes even "colder at the top" (Sandler 1986, 13) as the few women do not neatly fit into male styles and cliques, and become more isolated yet increasingly visible for scrutiny. Solo status – being the only representative of a social category in an otherwise homogenous group – exacerbates effects of stereotyping and isolation, with negative impacts on evaluation and performance (Thompson and Sekaquaptewa 2002). Often accompanying solo status, perceptions of tokenism (advancement based on social category rather than competence) diminish respect and increase pressure for women in top positions (Craig and Feasel 1998).

A critical mass of 35-40% of non-dominant group members in leadership positions is thought necessary to overcome the stigma associated with tokenism (Karsten 1994). Research has also found that workplaces with at least 35% women are better working environments for women (Collins 1998; Tolbert, Simmons, Andrews, and Rhee 1995) as the detrimental effects of solo status are removed. This is quite opposite the common practice of advancing mainly the "star" women who demonstrate achievement far surpassing both female and male colleagues. Attaining a critical mass of women in the leadership structure is especially important to position an institution for change. The observation that "few women want to go to places where few women are" (Steffen-Fluhr 2006)† describes a self-reinforcing cycle requiring bold organizational actions to interrupt.

It is logical to presume that greater numbers of women in the administrative hierarchy can jump start an organization's change process by facilitating advancement of women through the ranks. Their personal experience with pragmatic work policy obstacles and inherent understanding of subterranean barriers faced by women provide insight which, combined with levers of authority in their positions, can be instrumental to improve recruitment, retention, and promotion of female faculty. Ultimately necessary but immensely time consuming efforts to shift institutional culture away from that of the gendered organization need not fully play out (for decades!) before meaningful change can begin**.** In fact, having more women in formal leadership positions actually models the desired culture change in a conspicuous and powerful way, while opening valuable networking opportunities for both women and men to experience a new outlook. Rather than relying on familiar tactics adding more women at the front end of the

academic process and encouraging them through the career maze, we believe a demonstrated commitment and proactive approach that increases women in academic leadership positions will speed progress of women toward fuller participation in the professorial ranks.

Methodology

Two public doctoral-degree granting institutions in the same state system, similar in size and age, and located only 70 miles apart were studied. Descriptive statistics to compare institutional characteristics of the two universities were obtained from the AAUP 2006 Gender Equity study (West and Curtis, 2006) and from archival data from each university.

Archival data was assembled through cooperation with the offices of Institutional Research, Human Resource Management, and University Relations, facilitated by each university's Office of the Provost and Affirmative Action Officer. Data included organizational charts, directories, and human resource records, supplemented by personal interviews to clarify and supplement written documents. The key variable of interest is the percentage of women in various academic leadership positions, tracked over time through the archival records.

Archival data was also used for a detailed investigation of search processes used to fill administrative leadership positions throughout a three-year period. The search data was compiled from institutional records by the (recently retired) Equal Opportunity Officer knowledgeable about each of the specific administrative searches conducted during this period. Dimensions examined for each search include the following: minimum position requirements, internal versus external search process, search committee size and composition, number and gender of candidates in the pool, gender of interviewees, and gender of person hired. Search process data was examined for commonalities across the various searches and consistency with university search policies.

Results

Basic comparison of the two institutions

Basic institutional characteristics of the two universities are displayed in the comparative descriptive statistics (the 2005/2006 academic year) in Table 1. As noted, both schools are public doctoral-degree granting institutions operating in the same state system (although A is a land grant university in a larger metropolitan area), and are similarly sized at somewhat less than l3,000 students enrolled, with female students comprising 49% of enrollment in university B and 43% in university A.

Some basic differences in employment of women can be observed at the outset, with B having a higher percentage of women (39.4% compared to 27.6%) in their fulltime faculty positions, and A having a higher percentage of women (53.6% versus 46.5%) in the part-time faculty positions. The proportion of non-tenure track positions filled by women is between 56%-58% for both schools, and the proportion of tenure-track positions filled by women is also similar, with 39.9% in B and 35.6% in A. Looking at tenured faculty, we see a stark difference between the schools, with 28.9% of the tenured faculty comprised of women in B yet only 9.8% in A. The contrast is about the same for proportion of full professors who are women, with 23.2% in B and a paltry 6.7% in A.

Salary discrepancies between the two universities are not as drastic but generally show the same pattern, with salaries of women at 94.7% of men's salaries at the full professor level in A (102% in B), only 90.9% at the associate professor level in A (95.4% in university B), and

79.3% overall in A compared to 88.8% in B. University A does show a higher percentage of men's salary for women at the assistant professor level (96.2% compared to 92.5% in B).

While neither of the two universities has ever had a woman president or recently a woman vice president for academic affairs/provost, B has women in all four assistant or associate vice president positions, while A has one of three similar positions. University B has one more woman dean than A, and considerably more women department chairs/heads, as will be shown in the following analysis.

Table 1: Comparison of Institutional Characteristics as of 2005-2006 Academic Year

Institutional Characteristics	**University A**	**University B**
Carnegie classification (1)	RU/H	RU/H
Land grant university	Y	N
University type	Public	Public
Enrollment (4)	12,258	12,834
Representation of female students	43.0%	49.0%
Full-time women faculty (3)	27.6%	39.4%
Part-time women faculty (3)	53.6%	46.5%
Non-tenure-track women (3)	57.8%	56.1%
Tenure-track women (3)	35.6%	39.9%
Tenured women (3)	9.8%	28.9%
Full professors women (3)	6.7%	23.2%
Average Salary of women full professors as % of men (3)	94.7	102
Average Salary of women associate professors as % of men (3)	90.9	95.4
Average Salary of women assistant professors as % of men (3)	96.2	92.6
Average Salary of women as % of men (3)	79.3	88.8
Total Full time faculty (3)	547	520
Total Part time faculty (3)	69	86
Location population (2)	90,672	49,792
President women (4)	N	N
VPAA Provost women (4)	N	N
Assistant/Associate Vice President women (4)	1/3	4/4
Academic Deans women (4)	1/8	2/8

(1) Carnegie classification: RU = research university, VH = very high research activity, H = high research activity

(2) 2000 Census data

(3) AAUP 2006 Gender Equity Indicators

(4) Institution website.

Figure 1 compares the representation of women in academic leadership positions for the two universities between the years 1992 and 2007. During this time frame, the proportion of women in academic dean, including associate and assistant, positions has varied mostly between 22%-33% for both schools. Although, in 1992 only one woman held an academic dean position

out of a total 14 dean positions (7%) in University A. During the years 2000 and 2001, in University B there were 4-6 women academic deans in 31 academic dean positions. Perhaps the biggest difference between the two schools is with regards to representation of women in department chair/head positions. The proportion of women in department chair/head positions has been consistently much higher in University B. In University A, the proportion of women department chairs/heads has never been higher than 12%, while in University B since 2005 the proportion of women department chairs/heads has been over 30%. The very low representation of women in department chair/head positions in University A is similar to that of women in full professor positions in University A (Figure 2).

Figure 1. Percentage of Women in Leadership Positions, University A and B

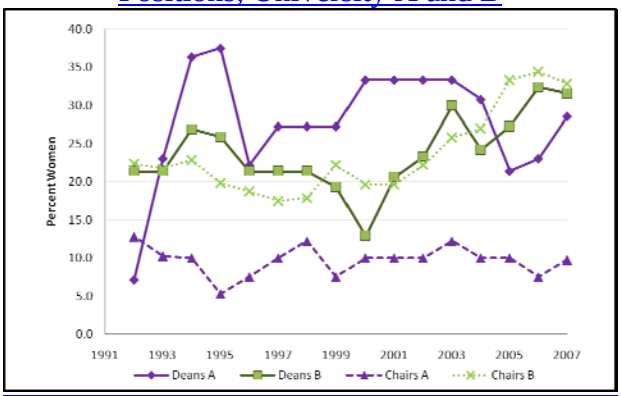
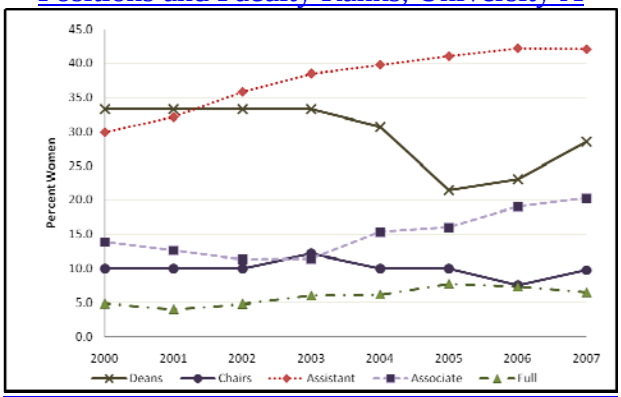


Figure 2. Percentage of Women in Leadership Positions and Faculty Ranks, University A



In fact in both universities, the representations of women in tenured and full professor positions are close to the proportion of women in department chair/head positions: 9.8% (tenured), 6.7% (full), 7.5% (chair/head) for University A; and 28.9% (tenured), 23.2% (full) , 34.4% (chair/head) for University B. Overall, the presence of women in B more closely approaches the desired critical mass of 35-40% throughout the ranks, while in A women are highly concentrated at the assistant professor (untenured) rank. Our preliminary findings support initial expectations that a higher prevalence of women in academic leadership positions, especially in department chair/head positions, facilitate greater representation of women in faculty ranks.

Search process analysis

With the bulk of women in the professional ranks concentrated at the assistant professor level in university A, reaching critical mass of women in academic leadership positions will be an incredibly long process using a strategy of internal promotion through the ranks to full professor and then to administration. Given the proposition that more women academic leaders facilitates women's progress through the ranks, it becomes additionally valuable to more rapidly increase their presence. The search process for administrative positions is a multi-faceted and critically important influence on ultimate hiring outcomes, essentially serving as a gateway to the academic leadership positions.

Results of detailed tabulation of administrative search records for the past three years (2006 to 2009) in university A are displayed in Table 2. The data show that 60% of the searches required full professor rank and/or previous administrative experience as a minimum

qualification. In view of the dearth of women with those qualifications in this particular university, internal promotion of women to administrative positions is constrained. Over three-quarters are designated as external searches, which also would be open to qualified internal candidates. These searches display the fullest use of all required search procedures according to university A's formal policies, including careful specification of the job description and qualifications, broad national posting for recruiting purposes, input from an appointed search

Table 2: Administrative Searches, University A (2006-2009)

	Minimum Qualifications		**Internal or external search or appt**	**Search Committee Characteristics**				**Candidate Pool**		**Interviewees**		**Gender of hires**
	Full Professor	**Experience**		**Chair Gender**	**Size**	**%women**	**%women Ranked**	**Size**	**%women**	**Number**	**%women**	
AG1	X		E	M	9	22	0	3	33	3	33	M**
AG2	X		E	M	11	30	10	8	0	3	0	M**
AG3	X		A*									M**
AG4			E	M	19	29	12	6	0	?		ongoing
AS1	X		E	M	6	33	17	30	52	?		ongoing
AS2	X		E	F	5	60	20	8	25	1	0	ongoing
BS1			E	F	5	75	50	5	0	1	0	M
BS2		X	E	M/F	4	25	25	12	0	1	0	M
EA1	X	X	E	M	6	0	0	8	0	0		closed
EA2	X	X	E	M	6	0	0	16	0	2	0	closed
EA3	X	X	E	M	9	11	11	8	0	2	0	closed
EA4	X	X	E	M	8	0	0	18	0	3	0	M
EA5	X		E	M	7	0	0	10	20	2	50	**F****
EA6			A									M
HD1			E	M	5	75	38	4	33	2	0	closed
PN1			E	F	8	90	30	3	100	2	100	**F**
PN2		X	E	F	10	60	40	16	30	2	50	closed
PN3			E	M	6			2	50	2	50	**F**
PN4			I			40	20	8	20	3	33	M
SM1	X		E	M	6	31	19	30	10	2	0	M
SM2	X	X	E	M	17	0	0	9	0	2	0	M
SM3	X		E	M	5							M
SM4***			I					3	33	3	33	M
GS1			I			40	40	8	50	3	67	**F**
GS2			I	M	5	75	38	4	33	2	0	closed

AG1 = Department head, College of Agriculture
AG2 = Department head, College of Agriculture
AG3 = Department head, College of Agriculture
AG4 = Department head, College of Agriculture
AS1 = Department head, College of Arts/Humanities
AS2 = Department chair, College of Arts/Humanities
EA1 = Department chair, College of Engineering
HD1 = Department head, College of Human Development
HD2 = Head, College of Human Development
PN1 = Associate dean, College of Pharmacy/Nursing
PN2 = Associate dean, College of Pharmacy/ Nursing
PN3 = Senior associate dean, College of Pharmacy/Nursing
PN4 = Associate dean, College of Pharmacy/Nursing
SM1 = Department head, College of Science/Math

EA2 = Department chair, College of Engineering	SM2 = Dean, College of Science/Math
EA3 = Department chair, College of Engineering	SM3 = Department head, College of Science/Math
EA4 = Department chair, Mechanical Engineering	SM4 = Department chair, College of Science/Math
EA5 = Department chair, College of Engineering	GS1 = Assistant dean, Graduate School
EA6 = Dean, College of Engineering	GS2 = Assistant dean, Graduate School
*spousal hire **since resigned ***department election	

committee, appropriate screening of candidates for interviews, and consistent interview protocols. Nearly a quarter of the searches are listed as either appointments or internal searches, which the table reveals largely do not utilize the various search procedures. Interestingly, 82% of the positions filled via full external search are male, while only 67% of positions filled via appointment or internal search are male.

Regardless of the varied search committee size, nearly 80% are chaired by men. The presence of women on search committees is markedly high in College of Pharmacy/Nursing searches, and glaringly negligible in College of Engineering searches. The percentage of ranked faculty on the committees who are women is notably lower than the overall percent of women on the committees in most cases, reflecting that women serving on search committees are often staff or student representatives.

Candidate pools tend to be relatively small, and generally comprised of 33% or fewer women. In the 36% of searches where women comprise half or more of the candidate pool, a woman was hired for only one-quarter of these positions. In 65% of the searches that interviewed candidates, no women were interviewed, in spite of the 55% of searches where women made up 33% or more of the candidate pool. All considered, it might not be surprising that 75% of the administrative hires made in the past three years at university A are male.

We are in the process of collecting analogous data to Table 2 from University B. It will be of interest to note if the higher numbers overall of women at senior levels at that institution is reflected in greater involvement on search committees and greater numbers of women interviewed and hired.

Discussion and Conclusions

Despite similar institutional characteristics, University A and B have very dissimilar gender participation indicators. Our initial results are consistent with the expectation that more women academic leaders, especially in department chair/head positions, lead to more women faculty in ranks. University A is apparently making efforts to attract more women assistant professors – respectable % relative to other schools, higher salary as % of men's salary – yet a very slow route to critical mass of women throughout the academic ranks.

Our initial results support that opportunities to increase women in academic leadership positions can be facilitated through careful implementation of search processes. In addition to adding gender diversity to candidate pools through recruitment efforts, institutions interested in increasing participation of academic women in leadership positions should consider:

- Using more open position qualifications in job descriptions, allowing associate professors with administrative potential to apply for leadership positions.
- Avoiding appointments, and, for internal searches, following same policies and protocols as external searches.

- Forming operationally diverse search committees, not window-dressing committees with non-faculty women and students.

References

Acker, J. 1992. From sex roles to gendered organization. *Contemporary Sociology* 21: 565-569.

Bailyn, L. 2003. Academic careers and gender equity: Lessons learned from MIT. *Gender, Work and Organization* 10: 137-153.

Bilen-Green, C., K. Froelich, & S. Jacobson, 2008. The prevalence of women in academic leadership positions, and potential impact on prevalence of women in the professorial ranks. Paper presented at WEPAN National Conference, St. Louis, MO, June 8-10, 2008.

Collins, L.H. 1998. Competition and contact: The dynamics behind resistance to affirmative action in academe. In Collins, L.H., J.D. Christler, and K. Quiz (Editors), *Career Strategies for Women in Academe: Arming Athena*. Thousand Oaks, CA: Sage.

Craig, K., & K. Feasel. 1998. Do solo arrangements lead to attributions of tokenism? Perception of selection criteria and task assignments to race and gender solos. *Journal of Applied Social Psychology* 28: 1810-1836.

Dugger, K. 2001a. "Women in higher education in the United States: I: Has there been progress?" *The International Journal of Sociology and Social Policy* 21:118-130.

Dugger, K. 2001b. Women in higher education in the United States: II: Statistics. *The International Journal of Sociology and Social Policy* 21: 131-142.

Etzkowitz, H., C. Kumelgor, & B. Uzzi. 2000. *Athena Unbound: The Advancement of Women in Science and Technology*. Cambridge, MA: Cambridge University Press.

Filatotchev, I., & S. Toms. 2003. Corporate governance, strategy and survival in a declining industry. *Journal of Management Studies* 40: 895-920.

Hochschhild, A.R. 1994. Inside the clockwork of male careers. In Meadow Orleans, K.P., and R.A. Wallace, *Gender and the Academic Experience.* Lincoln, NE: University of Nebraska Press.

Kanter, R. M. 1977. *Men and Women of the Corporation.* New York: Basic Books, Inc.

Karsten, M.F. 1994. *Management and gender: issues and attitudes.* Westport: Greenwood Publishing Group, Inc.

Kolb, D., J. Fletcher, D. Meyerson, D. Merrill-Sands, & R. Ely. 1998. Making change: A framework for promoting gender equity in organizations. *Center for Gender in Organizations Insights* 1: 1-4.

Martin, J. 1994. The organization of exclusion: Institutionalization of sex inequality, gendered faulty jobs and gendered knowledge in organization theory and research. *Organization* 1: 401-431.

Nelson, D., & D.C. Rogers. 2004. A national analysis of diversity in science and engineering: faculties at research universities. http://www.now.org/issues/diverse/diversity_report.pdf, accessed July 18, 2005.

National Science Foundation. (2008). *Science and Engineering Indicators 2008*. http://www.nsf.gov/statistics/nsf07318/pdf/nsf07318.pdf, accessed January 22, 2008.

Oakley, J.G. 2000. Gender-based barriers to senior management positions: Understanding the scarcity of female CEOs. *Journal of Business Ethics* 27: 312-334.

Sandler, B.R. 1986. *The Campus Climate Revisited: Chilly for Women Faculty, Administrators, and Graduate Students.* Washington, DC: Association of American Colleges, Project on the Status and Education of Women.

Steffen-Fluhr, N. 2006. Advancing women faculty through collaborative research networks. *Proceedings of the 2006 WEPAN Conference*. Women in Engineering Programs and Advocates Network.

Steinpreis, R.E., Anders, K.A., and Ritzke, D. 1999. The Impact of Gender on the Review of the Curricula Vitae of Job Applicants and Tenure Candidates: A National Empirical Study. *Sex Roles* 41: 09-528,

Thomas, K.M., L. Bierema, and H. Landau. 2004. Advancing women's leadership in academe: New directions for research and HRD practice. *Equal Opportunities International* 23: 62-77.

Thompson, M., & D. Sekaquaptewa. 2002. When being different is detrimental: Solo status and the performance of women and racial minorities. *Analyses of Social Issues and Public Policy* 2: 183-203.

Tolbert, P.S., T. Simmons, A. Andrews, & J. Rhee. 1995. The effects of gender composition in academic departments on faculty turnover. *Industrial and Labor Relations Review* 48: 562-579.

Valian, V. 1998. *Why So Slow? The Advancement of Women.* Cambridge, MA: MIT Press.

Wenneras, C., & A. Wold. 1997. Nepotism and sexism in peer-review. *Nature* 387: 341-343.

West, M., & J.W. Curtis. 2006 *AAUP Faculty Gender Equity Indicators 2006*, American Association of University Professors.

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