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Faculty Turnover: Discipline-Specific Attention is Warranted

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Abstract This study investigated the importance of discipline variations in understanding faculty turnover behaviors. A representative sample of university faculty in Research and Doctoral universities was obtained from a national database. Faculty members, self-identified into a primary academic area, were grouped into eight discipline clusters according to an established framework. Multiple regression models were constructed to examine within each cluster the relative importance of a list of factors that have been identified to be related to faculty turnover. Cross-discipline comparisons of within-cluster variable prioritization revealed substantial discipline variations with regard to the major factors that are critical to faculty turnover. The findings produced evidence that discipline-specific information was indispensable to institutional administrators and policy makers for effective faculty retention.

Keywords Faculty turnover · Discipline variations

Introduction

The objective of this study is to understand the importance of discipline variations in researching and managing university faculty turnover. Faculty turnover has long been a practical and research concern in higher education due to the costly monetary and academic consequences that the institutions have to bear. During the years preceding the 1990s, the number of studies surged as a result of a forecasted shortage in faculty supply (Barnes et al. 1998; Johnsrud and Heck 1994, 1998; Mooney 1989; Smart 1990; Western Interstate Commission for Higher Education [WICHE] 1992). The collective scholarly

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efforts have identified individual and environmental factors that influence faculty turnover behaviors. However, as administrators of higher education institutions compete to attract and retain high quality faculty members, they find their effort limited by the inadequacy in current knowledge—the literature on faculty turnover falls short with regard to modeling the complexity of the interrelationships of factors that comprise the process of individual turnover decision within the academic environment (Johnsrud et al. 2000). Particularly, in spite of the multilevel structure of the institutions and the lateral differences across academic disciplines, most studies of faculty turnover behaviors reached conclusions using institutional or national data without sufficiently measuring the sample heterogeneity of the multi-discipline faculty.

Academic discipline, as a variable, demands careful manipulation in research about university faculty because studies have shown that faculty members in different discipline areas have different attitudinal and behavioral patterns that are shaped by their distinctive epistemology, organizational commitments, and member social relationships (Biglan 1973; Clark 1987; McGee and Ford 1987; Smart and McLaughlin 1978; Smart and Elton 1982). Discipline variations are manifested in faculty members' different expectations for and commitments to professional responsibilities. Such variation is even more critical in the studies of turnover behaviors because higher education institutions, unlike other organizations, have a labor market that is segmented by academic disciplines and competition across the segments is limited (Youn 1992). In addition, a faculty member may move to a different institution or choose to leave academia entirely. For faculty members in different fields, demands and opportunities differ in labor markets both inside and outside academic settings (Zhou and Volkwein 2004) and not all disciplines have good nonacademic alternatives (Ehrenberg et al. 1990).

Unfortunately, the effect of discipline differences has not been thoroughly investigated in faculty turnover studies: either conclusions based on faculty samples from a few disciplines were generalized to others, or, in most cases, academic disciplines were merely included as a control variable in studies of multi-discipline samples. It is suspected that such downplay of discipline information may lead to overgeneralization or even invalid research conclusions (Smart and Elton 1982). To empirically verify the importance of discipline heterogeneity in faculty turnover behaviors, this study classifies academic disciplines into eight clusters based on an empirical framework and examines within each cluster the relative importance of a list of common factors (e.g., professional experience, research productivity, and workplace support) that have been identified as related to faculty turnover. Three research questions are addressed: First, how are the factors (e.g., professional experience, research productivity, and workplace support) prioritized in the turnover consideration by faculty within each of the discipline clusters? Second, do faculties in different discipline clusters share the same major concerns in making a turnover decision? And third, if systematic variations are revealed for faculty turnover in different discipline clusters, how can the information be used to guide faculty retention policy and practice?

Theoretical Framework

Faculty turnover can be either voluntary or involuntary. From the institutional perspective, voluntary turnovers, most likely unwanted losses, are of more concern.

Although some amount of faculty turnovers are necessary and have positive influences, such as creating opportunities for "new blood" that brings along fresh ideas (Ambrose et al. 2005; Johnsrud and Heck 1994; Rosser 2004), high turnover rate always has strong undesirable consequences including lost return on previous investment, disruption of research and teaching programs, discontinuity in student mentoring, as well as the monetary cost of recruiting a replacement and the time of other faculty diverted to the hiring process (Ehrenberg et al. 1990; Rosser 2004). In order to minimize unwanted losses, it is critical to know what factors lead a faculty member to a turnover decision and how the factors interact in the decision making process.

Extensive research has been done on employee turnover behaviors in the last century. Its findings have expanded the perspectives from merely individual factors and personal decisions to organizational variables (Johnsrud and Heck 1994; Price 1977; Steers and Mowday 1981). Cotton and Tuttle (1986), in their meta-analysis of more than 120 turnover studies, identified 26 relevant variables including individual, work-related, and contextual factors (e.g., pay, education, age, length of service, and job satisfaction). At the same time, they cautioned that the relationship between the identified factors and turnover behaviors varied within different employee populations. Additional studies (e.g., Mobley 1982; Steers and Mowday 1981) made it clear that individual expectation and evaluation of salary, promotion, job responsibility, and participation in decision making strongly influence personal interpretation of organizational experiences, and lead to varying degrees of job satisfaction and turnover intention. Thus, both objective and subjective factors should be considered in turnover studies.

The major findings in organizational research have been applied to higher education settings. In his causal model of postsecondary faculty turnover, Smart (1990) summarized that turnover theories originated from the perspectives of economics, psychology, and sociology, and classified relevant variables into three groups: (1) individual characteristics that include both demographic information (e.g., gender and marital status) and human capital measures (e.g., career age and educational level); (2) work factors, which include, but are not limited to, research time, teaching time, research productivity, participation in campus governance, and perceived influence; and (3) contextual variables, such as salary, enrollment, and organizational decline. Smart also named three types of job satisfaction (i.e., salary satisfaction, organizational satisfaction, and career satisfaction) which are faculty members' subjective interpretation of external conditions and serve as a mediating layer between objective factors and personal turnover intentions. Later, Rosser (2004) confirmed that a combination of individual characteristics, worklife issues, and satisfaction determines a faculty member's intention to leave or stay at the current position.

It is clear that voluntary turnover is a responsive decision that an *individual* faculty member undertakes when s/he perceives the work *environment* as persistently dissatisfactory with respect to one's specific personal and professional needs and expectations. Following is a review of the major *individual* and *environmental* factors in faculty turnover literature. "Individual" is defined relative to "environmental" and has a three-layer structure that consists of demographics, professional characteristics, and subjective evaluation of the work environment. Subjective variables are discussed to emphasize that personal perception of the environment is the intermediary agent between external factors and a potential turnover decision.

Individual Factors in Faculty Voluntary Turnover

Demographics

Demographic information that has been related to faculty turnover includes gender, race, marital status, family responsibility, and citizenship status (Hagedorn 1996; Zhou and Volkwein 2004). It has been argued that both gender and race impact the turnover behaviors because women as well as minority faculty members are likely to be lagged in the promotion and tenure process, and both groups, therefore, are more prone to leave before gaining tenure (Rausch et al. 1989; Sanderson et al. 1999). In a study of faculty at an urban research university, females were found more likely to leave a position than males, whereas ethnic minority faculty showed low mobility (Johnsrud and Heck 1994). However, using a national sample of university faculty Barnes et al. (1998) concluded that males were more likely to leave academia entirely. It is possible that different samples and research methods may have caused the inconsistent findings related to gender and race. Another speculation is the interaction effects between demographic and professional factors. Smith (1979) suggested that gender actually had little to do with turnover when the opportunities for advancement were taken into consideration. Smart (1990) found that gender was not a factor in the turnover of nontenured faculty, but in the tenured group, males had significantly stronger intentions to change position than female faculty. Interestingly, Ehrenberg et al. (1990) reported females were more likely to leave in full professor rank. Despite disparate findings, evidence supports that female and minority faculty often report their academic experience differently (Clark and Corcoran 1986; Johnsrud 1993) and personalized perceptions have direct impact on one's turnover decisions (Johnsrud and Heck 1994).

Besides gender and race, studies have related turnover behaviors to other demographic factors such as age and marital status (Ambrose et al. 2005; Cotton and Tuttle 1986). Consistently, higher turnover rates have been found in younger faculty members (Mobley 1982; Smart 1990). Also, married faculty with family responsibilities have more to consider when making a job transfer decision (Ambrose et al. 2005).

Professional Characteristics

Two groups of professional factors are important. The first group is human capital measures, a term from economic theory, which are often used to quantify professional training, job experience, and seniority by career age, years in position, academic rank, and tenure status. These measures of professional experience overlap, but each carries unique information. The second group of professional factors quantifies productivity, including teaching load, research productivity, and community services.

Job experience, partially indicated by academic ranks, tenure status, or career age, has been identified as an influential factor in faculty turnover (Smart 1990; Zhou and Volkwein 2004). A study based on national survey data found academic ranks to be strongly related to turnover intention (Zhou and Volkwein 2004). Ehrenberg et al. (1990) suggested that faculty members at different academic ranks had different motives for changing positions, and voluntary leaves happened more in higher ranks. However, McGee and Ford (1987) did not find academic rank to be an important factor affecting the intention to leave or remain in the current position. To some extent tenure status is correlated with academic rank. Nontenured and tenured faculty are believed to be so different in their employment experiences that separate models are often used to study and compare how some common

variables impact turnover behaviors of the two faculty groups (e.g., Smart 1990; Zhou and Volkwein 2004). Nontenured faculty reported a higher potential to leave academia (Barnes et al. 1998). In addition, career age and length of time in the institution have been found to be negatively related to turnover intention (Pfeffer and Lawler 1980; Smart 1990; Zhou and Volkwein 2004).

Productivity is another unique and complicated dimension in faculty work life. Faculty members usually assume responsibility in teaching, research, and academic and community services. However, it is difficult to quantify these tasks because they share indiscernible borders and universally accepted measures are unavailable for teaching loads, research productivity, and service contribution. As for faculty turnover, high productivity lowers turnover intention (Rosser 2004). Evidence indicates that faculty members with stronger research interests have lower turnover rates (Blackburn and Havighurst 1979; Smart 1990), but at least one study suggests that faculty members with more teaching responsibilities are less likely to think about quitting (McGee and Ford 1987). Finally, service work is often considered less rewarding because it costs countless hours but produces minimal measurable outcomes (Hagedorn 1996). Due to the lack of concrete evidence, it remains unclear how faculty services are related to turnover.

Subjective Evaluation of the Work Environment

The multitask nature of academic careers and the lack of clear definition of productivity at the institutional level often cause stress for faculty. Johnsrud and Heck (1994) reported that time pressure and work overload were important concerns for faculty who chose to leave a position. Barnes et al. (1998) found that pressure in time commitments contributed most to faculty's turnover intentions, along with a lack of community support, negative feelings about workloads and job security, and inadequate participation in decision making. By the same token, high levels of participation and influence were found to be important in retention efforts, as were adequate funding and support to faculty members' professional activities (McGee and Ford 1987; Rosser 2004).

As the major form of rewards in academic settings, salary has always attracted heated discussions, especially salary equity between genders. However, a definitive answer remains elusive as to how important salary is to faculty's turnover behavior. Some researchers (e.g., Pfeffer and Lawler 1980; Weiler 1985) argued that salary was a critical factor for turnover, but such notions encountered strong disagreement (Ambrose et al. 2005; Barnes et al. 1998; Manger and Eikeland 1990). Between these extremities, the study by Smart (1990) identified salary as an important consideration only for nontenured faculty, which was partly consistent with the findings of Ehrenberg et al. (1990) that compensation appeared to be more of a concern for assistant and associate level faculty. Other researchers (e.g., McGee and Ford 1987; Zhou and Volkwein 2004) have suggested that, similar to other reward factors, the impact of salary on turnover decisions might manifest itself in an indirect manner through personal sense of equality and satisfaction. That is, salary serves as an index of fairness, personal achievement, and future potential of the individual relative to other people at the same institution (Hagedorn 1996). The perceived equity and level of rewards may have stronger influence on turnover than that of the actual dollar value of salary.

Individual perceptions of professional environment, institutional rewards, and other professional factors translate into various levels of job satisfaction. The intercorrelation between work life quality, job satisfaction, and turnover intention has been supported by

many scholars citing empirical evidence (e.g., Hagedorn 1996; Rosser 2004; Smart 1990). Essentially, job satisfaction reflects the level of congruence between work situation and the individual (Smart et al. 1986). Although it is a construct of strong subjectivity, job satisfaction is critical in faculty turnover studies because external work conditions impact individual turnover intention through the intermediation of sociopsychological variables such as perceived fairness, commitment, and job satisfaction (Johnsrud et al. 2000; Price 1977; Smart 1990). Faculty members on rare occasions leave an institution in which they feel entirely satisfied (Burke 1988; Johnsrud and Heck 1994; Matier 1990; Rosser 2004).

Environmental Factors in Faculty Voluntary Turnover

Environmental factors reflect institutional culture and conditions shared by residential members. Studies have investigated the impact of physical conditions such as institutional declination, faculty/student ratio, and departmental size on faculty turnover (e.g., Smart 1990). However, institutional culture should not be overlooked because it consists of the shared values that "are inherent in the institution's history, tradition, academic mission, governance processes, administrative methods, and delivery processes" (Putten et al. 1997, p.133) and manifests itself in every aspect of the work environment ranging from the reward system, support for various activities, level of work autonomy, functions of campus governance to the atmosphere of academic freedom. A positive and nurturing environment permits the development of a sense of belonging and decreases turnover intention by enhancing faculty job satisfaction (Johnsrud and Heck 1994; Rosser 2004).

Research Objectives

The relatively large number of factors and their complex effects on faculty turnover often result in inconsistent and sometimes conflicting findings in studies using different samples, analytical methods, and a limited number of variables. The problem is worsened when inadequate consideration is given to the substantive variations of faculty members' commitments and behaviors in academic settings. With the knowledge that academic disciplines have a systematic impact on university faculty, this study investigates how faculty turnover varies as a function of the variations among academic disciplines. A national sample was used to identify empirically the major variables contributing to the turnover intention of faculty within similar disciplines and to compare differences in turnover-related faculty concerns across disciplines. The findings can help outline the proper handling of academic discipline as a variable in future studies of faculty turnover and guide retention policies toward addressing discipline-specific needs and concerns prioritized by faculty members.

Methods

Data Source

In this study, the data of the National Study of Postsecondary Faculty:1999 (NSOPF:99) were used to identify the major factors relevant to turnover and whether the factors vary systematically across faculty fields of expertise. The National Center for Educational

Statistics (NCES) conducted the NSOPF:99 study, in which a nationally representative sample of postsecondary faculty was surveyed through a stratified sampling process that initially included 960 degree-granting institutions and more than 27,000 full- and part-time faculty employed at these institutions. For the faculty survey, over 18,000 responses made a weighted return rate of 83%; at the institution level, the return rate was 93%. In this study, only fulltime faculty from Research and Doctoral universities were kept because, first, the highest non-retirement departure rate was reported in those institutions (Zhou and Volkwein 2004); and second, university mission, size, and quality influence faculty satisfaction and turnover (Hall 1995; Zhou and Volkwein 2004). Using faculty in Research and Doctoral institutions can remove institutional types as a confounding variable and make a moderately homogeneous sample with similar emphasis on teaching, research, and service.

Variables

The dependent variable is the self-reported likelihood of leaving the current position for another position in academic or nonacademic institutions in the next 3 years. The intention to leave a position has been validated as the single best predictor of actual turnover (Kraut 1975; Mobley 1977, 1982; Mobley et al. 1978; Steers and Mowday 1981) and used as an indicator of actual turnover in many studies (e.g., Barnes et al. 1998; Rosser 2004; Smart 1990; Zhou and Volkwein 2004).

The independent variables are the major factors that have been identified as relevant to faculty turnover. They were entered into the regression model in five sequential blocks. The first block consisted of demographic information of gender, race, age, SES (i.e., average household income per person, an indicator of financial stress and family responsibility), and U.S. citizenship. Individual characteristic measures were first entered because, as McGee and Ford (1987) suggest, studies must control for demographic and individual factors before examining work environment variables. The second block captured human capital measures including years in the current position for professional training, and academic rank and tenure status for academic experience and seniority. Previous studies have supported the differences of these measures (Hagedorn 1996); nonetheless, if any of the measures strongly overlapped and caused multicollinearity, ones with high VIF (an index of collinearity) values were to be removed. The third block included measures of workload and productivity. Because faculty responsibilities are generally outlined in terms of teaching, research, and service, the variables included the average hours per week teaching classes and working with advisees (teaching), career total publications and the dollar amount of research grants and funding (research), and average hours per week on administrative committee work (services).

The last two blocks presented participants' perceptions of the work environment and satisfaction with the major aspects of the institutional atmosphere. The fourth block consisted of faculty members' evaluations of student quality indicating how much they enjoyed interacting with students, the rated availability of support in terms of research and technology, the perceived time stress measured as the discrepancy between time spent on tasks and time preferred, and the satisfaction ratings of work autonomy and salary. These variables were grouped in the same block based on Youn's argument (1992) that they were in fact different forms of rewards in the academic settings. Variables entered in the last block were the reported satisfaction with cultural factors including the opportunity for advancement, sense of job security, faculty leadership, and academic freedom.

Models Constructed for Individual "Discipline Areas"

In the survey questionnaire of the NSOPF:99, faculty members were given more than 140 academic programs from which to name their primary area of teaching/research. A conceptual framework was needed to organize the large number of programs so that the analysis could be completed at a comprehensible level while the systematic variations of discipline areas could be preserved and studied. Thus, the framework proposed by Biglan (1973) was adopted to classify academic disciplines into eight mutually exclusive clusters based on three dimensions: (1) the *hard* versus *soft* dimension that specifies the degree to which a discipline area has a clearly delineated paradigm; (2) the *pure* versus *applied* dimension that measures the extent to which a discipline area is concerned with practical application; and (3) the *life* versus *nonlife* dimension that indicates the level to which a discipline area emphasizes the study of living or organic objects (see Smart and Elton 1982). This three-dimensional model was chosen from several different approaches of discipline classification because it has been found robust across different institutional settings (Braxton and Hargens 1996) and cross-validated by studies of departmental goals, professional careers of faculty and department heads, reward systems, faculty research productivity, and other organizational and faculty characteristics (Smart and McLaughlin 1978; Smart and Elton 1982; also see Stoecker 1993).

However, Biglan's orginal study only determined the dimensionality of 36 principal disciplines, which are far fewer than the number of program areas specified in the NSOPF:99. Additional empirical evidence from a study by Malaney (1986) had to be considered. As a result, the author was able to assign most of the 140 plus program areas into the eight clusters: Hard/Pure/Life (HPL), Hard/Pure/NonLife (HPN), Hard/Applied/Life (HAL), Hard/Applied/NonLife (HAN), Soft/Pure/Life (SPL), Soft/Pure/NonLife (SPN), Soft/Applied/Life (SAL), and Soft/Applied/NonLife (SAN). One hundred and one records were excluded from the analysis because their disciplines could not be matched with those in either Biglan's or Malaney's studies. The major disciplines classified to each cluster are presented in Table 1.

Analytical Method

Hierarchical multiple regression was the most appropriate analytical procedure because 1) the causal relationships among variables were not the focus of this study; 2) the layers of variables suggested by the literature provided a well-structured "hierarchy" for entering variables into the regression; and 3) by building individual models of an identical structure for each of the eight discipline clusters, comparisons across clusters became possible with regards to faculty members' emphases and concerns in their turnover considerations.

Because of the stratified sampling procedure by the Carnegie classification of institution types and by gender and ethnicity, data were weighted in both descriptive and inferential analyses to ensure the generalizability of the findings (Thomas and Heck 2001; also see Zhou and Volkwein 2004). It is worth noting that the raw weight provided by NCES (2002) had a mean much larger than 1. In order to obtain the correctly weighted statistics in the statistical software (i.e., SPSS), a relative weight was obtained by dividing the raw weight by its mean; this relative weight was further adjusted for the average design effect of the multistage cluster sampling procedure in order to produce correct standard errors for hypothesis testing. For more details regarding this weight adjustment procedure, please see Thomas and Heck (2001) and its application in the study by Zhou and Volkwein (2004)

Table 1 Discipline clusters defined by the biglan's model

		Life		Nonlife
Hard paradigm development				
Pure	HPL	Biochemistry	HPN	Mathematics/Statistics
		Biology/Biological Sciences		Astronomy
		Botany		Chemistry
		Genetics		Physics
		Immunology		Earth, Atmosphere, and Oceanographic
		Microbiology		(Geological Sciences)
		Physiology		Physical Sciences, Other
		Zoology		
Applied	HAL	Agricultural, Animal, Food and Plant Sciences	HAN	Computer and Information Sciences
				Computer Programming
		Allied Health Technologies & Services		Engineering
				Civil Engineering
		Dentistry		Electrical, Electronics, & Communication Mechanical Engineering
		Medicine, including Psychiatry		Chemical Engineering
		Veterinary Medicine		Engineering-Related Technologies
		Public Health		Pharmacy
		Other Health Sciences		Science Technologies

Table 1 continued

		Life		Nonlife
Soft paradigm development				
Pure	SPL	Psychology	SPN	Language (English, Chinese, French, etc.)
		Anthropology		Literature
		Area and Ethnic Studies		Linguistics
		Demography		Speech, Debate and Forensics
		Political Science and Government		English as a Second Language
		Sociology		Area Studies (Asian, Slavic, etc.)
		Other Social Sciences		Composition and Creative Writing
				Philosophy, Religion, Theology
				Social Sciences
				Archeology, Geography, History
				Economics
				International Relations
Applied	SAL	Agribusiness/Agricultural Production	SAN	Architecture and Environmental Design
		Renewable Natural Resources, incl.		City, Community, and Regional Planning
		Conservation, Fishing, Forestry		Interior Design
		Human Resources Development		Crafts, Dance, Arts, Music
		Organizational Behavior		Accounting , Banking and Finance
		Education		Business Administration & Management
		Basic Skills		Business Admin. Support
		Student Counseling/Personnel Services		Marketing and Distribution
		Health Services Administration		Advertising, Broadcasting and Journalism
		Nursing		Communications
		Home Economics		Law, Protective Services
		Parks and Recreation		Library and Archival Sciences

Note: The classification of program areas is based on the prior work of Biglan (1973) and Malaney (1986)

using NSOPF:99 data. Unless specified otherwise, significance tests were conducted at $\alpha = .05$.

Limitations

This study has some weaknesses. First, due to limitations of the data set, some potentially important variables were not included in the analyses, including academic reputation of an institution (Johnsrud and Heck 1994) and personal relationships with colleagues and administrators (Ambrose et al. 2005; Barnes et al. 1998; Manger and Eikeland 1990; Weiler 1985). Second, *turnover intention* was the outcome variable; although it is the best indicator of the actual turnover, they are different. A final turnover decision has to do with external "pulling factors" (Ambrose et al. 2005; see also Matier 1990). Expected gross return of changing to a new position has also been identified as a critical consideration in final decision making (Ehrenberg et al. 1990; Weiler 1985). Finally, the large number of independent variables made it infeasible to test the potential interactions among the variables. As Johnsrud and her colleagues (Johnsrud et al. 2000) observed, theories fall short in modeling the details of the human behaviors in an organization because of the lack of tools to model the complexity of variable interrelationships.

Analysis and Results

Nine hierarchical regression models were constructed, one for each of the eight discipline clusters and, as a comparison, one *comprehensive* model that combined faculty from all disciplines. All models had the same dependent variable and same five blocks of independent variables except that the disciplinary variance captured by the Hard/Soft, Pure/Applied, and Life/Nonlife dimensions was controlled for in the comprehensive model. In spite of the relatively large number of independent variables, none of the models showed a problem with multicollinearity (all predictor variables had a VIF value <10). The total number of faculty in the weighted sample was 3,391, of which 70.2% were male and 29.8% were female. In terms of tenure and ranks, 56.5% were tenured, 20.0% on tenure probation, 23.5% not on the tenure track. Full, associate, and assistant professors accounted for 34.8%, 28.1%, and 24.4%, respectively, and the remaining were lecturers, instructors, and others. Native Americans were absent in HPN cluster and had to be removed from the study. The sample sizes of the eight discipline models ranged from 282 to 631 (Table 3). This strong variation determined that the effect size measures (e.g., the model R^2) should be used in cross model comparisons rather than significance p values. Also, the standardized regression coefficients (β) should be used to compare the relative importance of the independent variables within discipline clusters.

General Patterns

The first noteworthy piece of evidence for disciplinary differences is that the proportion of variance in the dependent variable that could be attributed to the five blocks of independent variables varied significantly across clusters: The model R^2 ranged from .199 for SPN cluster to .350 for HPN cluster (Table 2). In addition, several significant patterns can be identified from Tables 2 and 3. First, the list of independent variables worked better for

Table 2 Hierarchical regression models of faculty turnover intentions: summary statistics of variable blocks

Variable blocks	Summary statistics	Models								
		HPL	HPN	HAL	HAN	SPL	SPN	SAL	SAN	Comprehensive
Block 1	R^2	**.171**	**.072**	**.143**	.031	**.113**	**.051**	**.140**	**.099**	**.081**
	ΔR^2	**.171**	**.072**	**.143**	.031	**.113**	**.051**	**.140**	**.099**	**.081**
	F_{chg}	**10.641**	**3.015**	**9.169**	1.273	**5.925**	**4.197**	**12.463**	**9.747**	**42.476**
	sig_F	**.001**	**.005**	**.001**	.264	**.001**	**.001**	**.001**	**.001**	**.001**
Block 2	R^2	.175	.115	.170	.046	.125	.094	**.216**	.112	.104
	ΔR^2	.026	.043	.026	.014	.012	.043	**.076**	.013	.022
	F_{chg}	3.916	4.399	4.018	1.354	1.496	8.699	**17.282**	3.125	27.974
	sig_F	.009	.005	.008	.257	.216	.001	**.001**	.025	.001
Block 3	R^2	.216	.150	.194	.080	.136	.099	.226	.121	.105
	ΔR^2	.017	.035	.024	.032	.011	.005	.010	.008	.001
	F_{chg}	2.090	2.776	2.822	2.499	.990	.722	1.676	1.487	1.155
	sig_F	.082	.027	.025	.043	.413	.577	.154	.205	.329
Block 4	R^2	**.282**	**.285**	**.275**	**.214**	.169	**.188**	**.296**	**.180**	**.169**
	ΔR^2	**.065**	**.135**	**.081**	**.134**	.034	**.089**	**.070**	**.059**	**.064**
	F_{chg}	**5.268**	**8.192**	**6.895**	**7.477**	2.219	**9.728**	**8.731**	**7.345**	**43.097**
	sig_F	**.001**	**.001**	**.001**	**.001**	.050	**.001**	**.001**	**.001**	**.001**
Block 5	R^2	.313	**.350**	**.334**	**.307**	**.275**	.199	.319	**.230**	.209
	ΔR^2	.031	**.066**	**.059**	**.093**	**.105**	.011	.023	**.050**	.040
	F_{chg}	3.844	**6.494**	**8.123**	**8.704**	**11.207**	1.863	4.351	**9.901**	42.464
	sig_F	.005	**.001**	**.001**	**.001**	**.001**	.116	.002	**.001**	.001

Note: Blocks in bold are those with $\Delta R^2 > .05$

explaining the turnover intentions of faculty members in programs of "hard" paradigm (average model $R^2 = .326$) than for those in disciplines of "soft" paradigm (average model $R^2 = .256$). Second, demographical variables in the first block contributed to more than 40% of the model R^2 in five of the eight clusters with the exception of HPN, HAN, and SPN. In particular, more than .17 in R^2 change was associated with demographic information for faculty in HPL cluster (model $R^2 = .313$), followed by .14 of SAL cluster (model $R^2 = .319$). Third, workload and productivity variables in the third block had little influence on the turnover intentions within all disciplines. This block of variables contributed less than .035 to model R^2 for all clusters, some were even below .01 (for SPN, $\Delta R^2 = .005$; for SAN, $\Delta R^2 = .008$). Finally, faculty's perception of work environment and rewards (variables in Block 4) was significant to turnover considerations in all clusters.

Patterns Specific to Discipline Clusters

More striking evidence of discipline differences can be found in Table 3. First, even though demographic variables had a significant contribution to the model R^2 in six of the eight clusters, two clusters (HAN and SPN) failed to identify any individual variables as important factors for faculty's turnover intention. Second, female faculty in HPL cluster

Table 3 Comparison of faculty turnover factors across discipline clusters

	Models										
		Comprehensive			HPL	HPN	HAL	HAN	SPL	SPN	SAL	SAN
	Sample size (weighted)	3391			368	282	391	284	334	555	545	631
	Median salary				$60,000	$59,863	$63,946	$62,998	$60,000	$60,000	$57,128	$61,332
		β	t	p	Standardized regression coefficient β							
Block 1	Gender	.022	1.332	.183	***.169***							
	Asian American	.012	.764	.445	***.131***	**.107**	***−.125***					
	African American	.039	2.527	.012			***.104***					
	Hispanic	.011	.736	.462								
	Age	***−.124***	***−5.674***	***.000***	***−.131***				***−.292***		***−.153***	***−.196***
	SES (log-transformed)	−.034	−2.126	.034							***−.117***	
	Citizenship	.020	1.210	.226		***−.189***						
Block 2	Academic rank	.001	.053	.958	**−.124**						**.102**	
	Tenure status	*−.073*	*−3.268*	*.001*		**−.108**				***−.210***	***−.277***	
	Years in current position	*−.081*	*−3.633*	*.000*		**−.147**	***−.158***			***−.136***	***−.112***	
Block 3	Teaching load	−.031	−2.022	.043				***−.170***				
	Career total publications	.034	1.782	.075					**.131**		***.118***	
	Research fund (log-trnsfmd)	.027	1.617	.106		***.130***						
	Hours/week on committee work	.014	.907	.364	***.126***	***.121***		**−.100**				
Block 4	Research support	−.035	−1.937	.053			**−.101**	***−.147***				
	Technical support	−.015	−.850	.396								
	Time constraint	.023	1.475	.140				**.103**				
	Interaction with students	*.049*	*2.645*	*.008*						***.109***		
	Work autonomy	−.047	−2.430	.015	**−.112**							***−.151***
	Salary satisfaction	***−.106***	***−5.929***	***.000***		***−.238***				***−.220***	***−.162***	

Table 3 continued

	Models	Comprehensive			HPL	HPN	HAL	HAN	SPL	SPN	SAL	SAN
	Sample size (weighted)	3391			368	282	391	284	334	555	545	631
	Median salary				$60,000	$59,863	$63,946	$62,998	$60,000	$60,000	$57,128	$61,332
		β	*t*	*p*	Standardized regression coefficient *β*							
Block 5	Job security	***−.102***	***−5.002***	***.000***	**−.103**	***−.190***	**−.102**	***−.193***	***−.311***			***−.124***
	Advancement opportunity	***−.111***	***−5.605***	***.000***		***−.149***	***−.121***	***−.147***	***−.158***	***−.112***	*−.097*	***−.100***
	Faculty leadership	*−.082*	*−4.657*	*.000*	**−.105**		***−.115***					***−.126***
	Academic freedom	*−.053*	*−3.334*	*.001*			***−.131***	**−.100**				

Note: Coefficients in Italic indicate statistical significance. Due to significantly different sample sizes, α = .05 is used for the dimensional models and α = .01 for the comprehensive model. Coefficients greater than .10 are in bold

reported a remarkably stronger intention to leave the current position ($\beta = .169$, $p = .001$). Consistent with previous studies, older faculty members were less likely to leave across all disciplines, but this pattern was identified with strong magnitude in HPL ($\beta = -.131$, $p = .041$), SPL ($\beta = -.292$, $p < .001$), SAL ($\beta = -.153$, $p = .006$), and SAN ($\beta = -.196$, $p < .001$) clusters. Another intriguing variation was associated with Asian American faculty members. Those in the Hard/Pure areas reported a much stronger turnover intention than their White colleagues ($\beta = .131$, $p = .012$ for HPL; $\beta = .107$, $p = .074$ for HPN), whereas the same ethnic minority group was more likely to stay in HAL cluster ($\beta = -.125$, $n = 35$, and $p = .023$). Even though the number was small ($n = 16$), African American faculty in HAL cluster also had much stronger turnover intention than White faculty ($\beta = .104$, $p = .019$). In SAL cluster, faculty members with lower average family income were more likely to move to a different position ($\beta = -.117$, $p = .003$).

Academic ranks, tenure status, and years in the current positions affected faculty turnover differently in various discipline clusters. Overall, academic ranks had an inconsistent relationship with turnover intention. Faculty members in higher ranks were less mobile in HPL cluster ($\beta = -.124$, $p = .071$), but more likely to leave in SAL cluster ($\beta = .102$, $p = .058$). For faculty in HPN, SPN, and SAL clusters, both tenure status and more years on the job reduced their likelihood of leaving the current position (tenure status: $\beta = -.108$, $p = .179$ for HPN, $\beta = -.210$, $p = .001$ for SPN, $\beta = -.277$, $p < .001$ for SAL; years in the current position: $\beta = -.147$, $p = .061$ for HPN, $\beta = -.136$, $p = .017$ for SPN, $\beta = -.112$, $p = .047$ for SAL). More years on the job also reduced the turnover possibility for those in HAL cluster ($\beta = -.158$, $p = .019$).

Workload and productivity measures also affected faculty turnover differently. Faculty with more research productivity reported a stronger turnover intention in SPL ($\beta = .131$, $p = .053$ for publication), SAL ($\beta = .118$, $p = .012$ for publication), and HPN clusters ($\beta = .130$, $p = .018$ for research grants and funding). Too much time spent on committee work drove faculty to other career options in the disciplines under the Hard/Pure umbrella ($\beta = .126$, $p = .007$ for HPL; $\beta = .121$, $p = .027$ for HPN), but in HAN cluster, faculty with heavier teaching assignments and/or more service work were less likely to seek another position ($\beta = -.170$, $p = .002$ for teaching, $\beta = -.100$, $p = .078$ for services).

Faculty's evaluation of the immediate work environment also showed variation in its relationship with turnover intention. Research support was critical for faculty whose discipline was in the Hard/Applied clusters ($\beta = -.101$, $p = .052$ for HAL; $\beta = -.147$, $p = .015$ for HAN). Additionally for faculty in HAN cluster, stress caused by time constraints was another important factor that increased the possibility of turnover ($\beta = .103$, $p = .065$). Faculty in HPL ($\beta = -.112$, $p = .051$) and SAN ($\beta = -.151$, $p = .001$) clusters were strongly concerned with work autonomy. Dissatisfactory salary levels had significant impact on the turnover decision for faculty in HPN ($\beta = -.238$, $p < .001$), SPN ($\beta = -.220$, $p < .001$), and SAL ($\beta = -.162$, $p < .001$) clusters.

Finally, a satisfactory institutional culture showed global importance in faculty retention. For six out of eight clusters, the sense of job security was critical in keeping faculty from leaving ($\beta = -.103$, $p = .115$ for HPL; $\beta = -.190$, $p = .009$ for HPN; $\beta = -.102$, $p = .095$ for HAL; $\beta = -.193$, $p = .009$ for HAN; $\beta = -.311$, $p < .001$ for SPL; $\beta = -.124$, $p = .009$ for SAN). Positive perception of advancement opportunities significantly decreased faculty turnover intentions in almost all clusters except for those in HPL and SAL clusters ($\beta = -.149$, $p = .025$ for HPN; $\beta = -.121$, $p = .036$ for HAL; $\beta = -.147$, $p = .048$ for HAN; $\beta = -.158$, $p = .016$ for SPL; $\beta = -.112$, $p = .038$ for SPN; and $\beta = -.100$, $p = .003$ for SAN). In general, faculty hoped for more participation in decision making, but the effectiveness of faculty leadership was of great significance to

those in HPL ($\beta = -.105$, $p = .065$), HAL ($\beta = -.115$, $p = .018$), and SAN ($\beta = -.126$, $p = .003$) clusters. Among all clusters, only faculty in the Hard/Applied disciplines showed the free expression of ideas to be an influential factor in their turnover intention ($\beta = -.131$, $p = .006$ for HAL; $\beta = -.100$, $p = .077$ for HAN).

Variations of Faculty Turnover Factors across Discipline Clusters

With the above evidence that faculty turnover has systematic variations as a function of academic discipline, the standardized regression coefficients of the independent variables were correlated between all pairs of the cluster models to further quantify the magnitude of variations across academic disciplines. As shown in Table 4, fourteen of the twenty eight (50%) Pearson correlations were below .35, indicating strong variations and dissimilarities with regards to how the major factors were prioritized by faculty in different disciplines in their turnover consideration. The correlations of regression coefficients were below .10 between SPN and SPL and between SPN and SAN. The two strongest correlations were found between HPL and SAN ($r = .657$) and between SAN and SPL ($r = .622$), but information in Table 3 indicates that, even with the moderate correlations, the two pairs of clusters shared few of the top-ranked factors that were critical in explaining faculty's turnover intentions.

Inadequacy of the Comprehensive Model

The comprehensive model used all faculty members in the sample. As shown in Table 3, the large sample size resulted in a significant regression coefficient ($\alpha = .01$ due to the large sample size) for nine variables, but only four variables had a β value greater than .10: age ($\beta = -.124$, $p < .001$), satisfaction with salary ($\beta = -.106$, $p < .001$), job security ($\beta = -.102$, $p < .001$), and advancement opportunity ($\beta = -.111$, $p < .001$). Most of the discipline-specific patterns were overlooked. For instance, in the comprehensive model, gender and minority status failed to show any significant relationship with turnover intention; none of the workload and productivity variables were found to be important. However, interaction with students was positively related to turnover intention with statistical significance although this relationship was only witnessed in one of the eight cluster models.

Table 4 The Pearson correlations of the standardized regression coefficients of the eight cluster models

Pearson *r*	HPL	HPN	HAL	HAN	SPL	SPN	SAL	SAN
HPL								
HPN	.307							
HAL	.276	**.387**						
HAN	**.378**	.342	**.465**					
SPL	**.488**	**.454**	.185	**.613**				
SPN	.222	**.464**	.152	.131	.024			
SAL	.317	**.496**	.333	**.379**	.318	**.542**		
SAN	**.657**	.233	**.487**	**.371**	**.622**	.062	.161	

Note: Correlations in bold are above .35

Discussion

The primary interest of this study is to identify whether distinctive variations of turnover behaviors exist for faculty in different disciplines. Using discipline-specific models of identical structure, the findings support that the major factors related to faculty turnover have systematic patterns that are unique to discipline clusters. As shown in the analysis, the common independent variables explained different amounts of variance in faculty turnover intentions; a great variation existed in the prioritization of these variables when faculty in different disciplines reported their turnover intentions; and the same variable may have had either a positive or negative relationship with the turnover intention depending on the discipline. All evidence leads to the conclusion that academic specialties of university faculty determine their professional values and concerns, which in turn exert direct and distinctive impact on their turnover intentions. Thus, discipline information should not be ignored in turnover research.

With that said, discipline-specific models should always be constructed to study faculty turnover whenever feasible. Given the complexity of variable relationships and the substantial variations across disciplines, a comprehensive model with a multi-discipline sample can only, at best, reveal some general patterns; discipline-specific variations often go undetected and sometimes misleading information may result. For example, in this study women and minority faculty reported turnover intentions at a significantly higher level than that of their counterparts in some of the discipline clusters (i.e., HPL, HPN, and HAL); various measures of seniority and work productivities exhibited inconsistent relationships with turnover intentions across disciplines; faculty in some disciplines might leave for the lack of research support while others leave because of dissatisfaction with salary. However, these discipline-specific issues, as valuable to effective retention as they are, are missing from the comprehensive model. Thus, both researchers and administrators need to be cautious about the inadequacy of the conclusions made from multi-discipline faculty samples. This caution can prevent inaccurate or misleading information from causing unwanted consequences including waste of limited resources and potential damage to the retention of some subgroups of faculty members.

For researchers, if individual programs have too small a faculty sample for independent analysis, a structured qualitative approach may serve as an alternative (Ambrose et al. 2005). If multi-discipline samples are combined in one statistical model, hierarchical linear modeling that differentiates class measures from individual characteristics may be used to avoid misleading information as much as possible. For administrators, the findings of this study support Burke's (1988) argument that faculty retention should primarily be the responsibility of the department because only the insiders know the specific needs and concerns shared by their faculty members. Allowing more flexibility and authority to academic midlevel administrators (e.g., college deans and department chairs) will make local management of faculty retention possible and enable efficient use of limited human and financial resources by focusing on specific faculty needs as determined by their professional interests.

Implications for Discipline-Specific Retention Policies

The eight discipline-specific models produced rich information about the major factors in faculty turnover in various academic areas; the identified key issues may be useful for guiding effective retention policies. Briefly, for programs within HPL cluster

(Biochemistry, Biology, Immunology, etc.), the priorities in faculty retention should be the reduction of committee work, more work autonomy in teaching and research, and active faculty participation in decision making. Meanwhile, a work environment that offers more accommodations to female and minority (Asian Americans in particular) faculty is equally important. For programs in HPN (Mathematics, Astronomy, Chemistry, Physics, Geological Sciences, etc.), the strong turnover intention of faculty with external research funding, as well as members who feel negatively about salary and advancement opportunities, may imply a lack of appreciation and respect within the professional environment. To help faculty retention, the evidence suggests that restructuring the reward system for faculty members (including, but not limited to, salary and benefit adjustments) can strongly affect their perceptions about how they are appreciated for their devotion to the field of hard and theoretical sciences. For nontenured junior faculty, an improved sense of job security (e.g., offer regular feedback to their work performance) may lower their turnover intention significantly. Improvement is also possible by reducing committee assignments and promoting a diverse culture to accommodate minority faculty, especially Asian Americans.

Disciplines in HAL cluster (Agricultural, Animal and Plant Sciences, Medicine, Public Health, etc.) may need to encourage more communication, supportive networks, and work collaborations in order to foster a positive academic environment and provide faculty members with a better sense of job security, more advancement opportunities, faculty leadership, and free expression of ideas. A nurturing academic culture may take a great amount of time and effort to develop, but it is critical for retaining high quality faculty members. More support in terms of research facilities and graduate assistants is also important to keep faculty from leaving the position. Faculty in HAN cluster (Computer & Information Sciences, Engineering, Pharmacy, etc.) are also concerned with research support, job security, career advancement as well as free academic atmosphere. In addition, structured guidelines and clear expectations for faculty productivity in teaching, publishing, and community service may help to reduce work stress and effectively lower faculty turnover.

For programs in SPL cluster (Psychology, Anthropology, Political Science, Sociology, etc.), faculty's top concerns are job security and advancement opportunity. It is also important to understand the reasons why faculty with a better publication record have a stronger intention to leave their position. The positive relationship between career total publications and turnover intention does not mean that the department or program should discourage faculty from pursuing research and publication. On the contrary, research productivity enhances the reputation of the department and the institution. To keep the faculty with high research productivity from leaving, it may help to offer greater rewards and recognition, such as reduction of teaching load and merit raises, for such activities. For programs in SPN cluster (Philosophy, Religion, History, Economics, Language Studies, etc.), faculty satisfaction with salary and advancement opportunities are the two key issues, especially for nontenured junior members. Further investigation is needed to clarify the causal mechanism underlying the positive relationship between student interaction and faculty turnover before any action can be taken to address this problem.

For faculty in SAL cluster (Education, Nursing, Home Economics, etc.), financial considerations are the major issue for turnover. This cluster has the lowest median salary level (Table 3) and the analysis shows that those with low family SES had a strong tendency to leave for a different position. It is expected that faculty turnover would be lowered if resources could be allocated to increase salary and compensation levels. More rewards and recognition for prolific faculty members may also help the retention of those

with high research productivity. Finally, faculty in SAN cluster (Architecture, Business, Marketing, Communications, Law, etc.) relate their turnover mainly to academic culture. They long for a career environment with more work autonomy, stronger job security, better advancement opportunities, and more effective faculty leadership.

Common Issues Shared by the Discipline Clusters

Even though strong variations exist across disciplines, some general trends do exist; two are worth mentioning. First, the results of this study support the statements of Barnes et al. (1998) that gender made little difference in faculty turnover intention because significant gender difference is found only in HPL cluster. Limited differences in turnover intentions between male and female faculty may be a sign of a diminishing gender gap in academia. However, ethnic background remains a concern. Minority faculty are still underrepresented in Research/Doctoral universities (about 16% in this sample). There are no Native Americans in the HPN cluster of 282 members (weighted size). Significant differences are found for Asian Americans and African Americans in comparison to White faculty in several of the discipline clusters. This finding suggests that the recruitment and retention of minority faculty remain a concern that deserves further investigation (Rosser 2004). It also emphasizes the need to conduct more research for individual ethnic groups rather than combining them into one category labeled "minorities." Second, the findings of this study confirm that the subjective perception of work environment plays a more critical role in faculty turnover than the objective conditions. The emphasis on institutional culture is an outcry for professional wellbeing. Retention efforts at the institutional level should be centered on an atmosphere of academic autonomy, free expression of ideas, smooth communications between faculty members and their administrators, enhanced job security, and more opportunities for advancement. A positive and nurturing atmosphere for professional growth is always desirable because it is a global concern shared by most faculty members regardless of disciplines.

Conclusion

More than 20 years ago, Steers and Mowday (1981) suggested that one way to gain a better understanding of turnover behaviors was to move beyond studies focusing on a limited number of variables. Only few studies have actually moved into the suggested direction partly because of limited data sources and the lack of powerful statistical procedures. Fortunately, in recent years, the popularity of national databases has dramatically increased the availability of large-scale data sets and the advancement of computing technology has improved statistical efficiency. This study follows the analytical model used by Smart and McLaughlin (1978), but raises the statistical complexity by including twenty-two variables in a five-block hierarchical regression analysis. The study produces convincing evidence that substantial and systematic variations exist among different disciplines with regard to the major factors driving faculty turnover. The findings further validate the argument that academic specialties of faculty members determine their professional attitudes, commitment, and behaviors. It is suggested that researchers need to pay more attention to discipline-specific patterns in future studies of faculty turnover behaviors. Further, administrators need to realize that retention efforts should go beyond general issues. By allowing more flexibility for departmental chairs and college deans, the same amount of

resources could be utilized more efficiently and effectively by addressing the concerns specific to faculty within particular academic disciplines.

Faculty turnover has positive influences as well as negative consequences (Ambrose et al. 2005; Rosser 2004; Zhou and Volkwein 2004). Higher education institutions strive to keep a low turnover rate in order to minimize the monetary loss and disruption in research and teaching programs. For individual faculty members, "loyalty to the discipline transcends loyalty to school" (Brown 1967, p. 25). With transferable teaching and research skills, they seek to have an environment that best fits personal values and professional needs. Institutions and individuals indeed identify with each other because an academic environment that nurtures individual faculty members is the only path to enhancing the reputation and development of an institution. To the extent that a reasonable turnover rate facilitates a healthy flow of ideas and knowledge, the ultimate goal of studies of faculty turnover is not to eliminate turnover, but to promote a healthy academic system and minimize the cost at both individual and institutional levels.

Future Research

This study examined turnover variations across academic disciplines using a list of common variables without making causal inferences. The smaller number of major variables identified within the cluster models makes it possible for future researchers to study the variable causality and interactions in a discipline-specific fashion and further clarify the turnover mechanism of university faculty. Also, faculty turnover intention in this study is the likelihood of an individual moving to either an academic or a non-academic position. As argued, the motivation may be different between faculty who choose to change positions within academic institutions and those who leave academia entirely. The opportunities are also different for faculty in different disciplines when seeking a nonacademic career. Therefore, future research needs to further investigate faculty turnover by separating and comparing the academic and nonacademic destinations. Finally, this study used faculty sampled from Research and Doctoral universities because institutional reputation and culture are believed to influence the turnover of faculty members (Hall 1995). This study can be replicated with samples from other types of institutions and comparisons can be made for the patterns of turnover factors across different types of institutions.

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