

2005 AIR RESEARCH GRANT PROPOSAL

Equity in the Academic Labor Market: An Analysis of Academic Disciplines

Datasets of interest:

National Study of Postsecondary Faculty
The Survey of Earned Doctorates
Integrated Postsecondary Education Data System

Grant Amount Requested: \$27, 092

Principal Investigator:

Dr. Paul D. Umbach
Assistant Professor
Educational Leadership and Policy Studies
University of Iowa
N491 Lindquist Center
Iowa City, IA 52242-1529
Email: paul-umbach@uiowa.edu
Voice: 319-335-5373
Fax: 319-384-0587

Authorized Institutional Representative:

William F. Decker
Vice President for Research
University of Iowa
201 Gilmore Hall
Iowa City, IA 52242-1320
Email: ann-ricketts@uiowa.edu
Voice: 319-335-2123
Fax: 319-335-2130

Principal Investigator

Authorized Institutional Representative

Equity in the Academic Labor Market: A Multi-level Analysis of Academic Disciplines

Project Summary

This research project will use data from the National Survey of Postsecondary Faculty (NSOPF), the Survey of Earned Doctorates (SED), and the Integrated Postsecondary Education Data System (IPEDS) to examine differences in the academic labor market for women and people of color. In particular, this study examines the effect of disciplinary conditions on the labor market experiences of college faculty. The primary objectives of this study are (1) to examine gender and racial diversity in the pipeline to faculty positions in various disciplines; (2) to assess earnings differences among faculty by race/ethnicity and gender and the extent to which labor market conditions and disciplinary characteristics explain these differences; and (3) to explore employment differences among faculty by race/ethnicity and gender and the extent to which labor market conditions and disciplinary characteristics explain these differences. More specifically, this study seeks to understand the impact of disciplinary characteristics, such as labor supply, labor demand, racial/ethnic diversity, and gender representation, on academic labor market outcomes for women and people of color.

This study is the first of its kind to provide a comprehensive view of the impact of race and gender in disciplinary labor markets. In doing so, this research will offer several innovations. First, it will integrate data from three sources to describe the current diversity of people in the pipeline to a faculty position within various disciplines. Second, this study will be the first to use hierarchical linear modeling (HLM) to assess the impact of disciplinary characteristics (e.g. diversity of a discipline). Third, this study will be one of the first to examine the impact that labor market conditions, such as supply and demand, have on explaining the wage gap and other labor market outcomes.

Table of Contents

| | |
|--|----|
| Project Summary | 2 |
| Project Description | 4 |
| Statement of Problem | 4 |
| Proposal of Work | 8 |
| Description of Policy Relevance | 14 |
| Innovative Aspects of the Research | 15 |
| Dissemination Plan | 16 |
| Audience for the Project | 17 |
| References Cited | 18 |
| Biographical Sketch | 23 |
| Budget | 27 |
| Current and Pending Support | 30 |
| Facilities, Equipment, and Other Resources | 31 |

Project Description

A. Statement of Problem

By all accounts, the United States is becoming an increasingly diverse. Many have argued that higher education plays an important role in preparing students to live and work in this increasingly diverse society (Gurin, 1999; Milem & Hakuta, 2000; Rudenstine, 1996, March/April). Some have suggested that the diversification, both gender and racial, of college faculty is an important component of preparing students to be citizens in a pluralistic society (Cole & Barber, 2003; Hurtado, 2001; Hurtado, Milem, Clayton-Pedersen, & Allen, 1998; Smith, 1989).

Although affirmative action has been portrayed as a way form increasing the number of faculty of color and women faculty in higher education, it has done little to substantially increase their representation in the academe (Aguirre, 2000; Higgerson & Higgerson, 1991; Johnsrud & Sadao, 1998). In fact, even with the rapid increases in diversity in America, the racial diversity of faculty changed very little in the last 30 years (Perna, 2001; Trower & Chait, 2002). Additionally, while women outnumber men among undergraduates, women still are under-represented in the faculty ranks. The small number of women and people of color in particular disciplines, such as science and engineering, is even more striking.

The under-representation of women and people of color in academe raises many questions related to equity in the academic labor market. Probably most important, are women and people of color treated fairly in the academic labor market? What conditions exist that may explain these inequities? What impact does academic discipline have on explaining these differences?

A common line of inquiry of the academic labor market is salary equity research. In the forty years since the passing of the Equal Pay Act of 1964, researchers and policy makers have attempted to assess salary equity among faculty members. The focus of most of this research has

been to identify factors that explain the gender gap in pay or what some call the unexplained wage gap. Nearly all of these studies seek to identify the pay gap between men and women that cannot be explained by differences in faculty characteristics and institutional attributes. They find that even after controlling for education, productivity, experience, institution type, and academic discipline, women earn less than men (Barbazet, 2002; Barbezat, 1991; Bellas, 1993, 1994, 1997; Perna, 2001; Toutkoushian, 1998; Toutkousian, 1998). Recent reports of the American Association of University Professors (1996, 1997, 2001) and the U.S. Department of Education (Bradburn & Sikora, 2002; Nettles, Perna, & Bradburn, 2000) support these assertions.

Although faculty salary equity has been studied extensively, several important conditions of the academic labor market remain unstudied or understudied. In particular, few have studied the specific impact that disciplinary labor markets have gender and racial inequities. For example, we know little about the impact that supply of Ph.Ds in a particular discipline has on salaries and salary equity. We also do not know what affect the racial and gender composition of a particular discipline has salaries. Furthermore, other differences in additional labor market outcomes, such as rank and part-time/full-time status, very often are overlooked in the research on college faculty. Finally, the impact of race/ethnicity on labor market outcomes has been studied far less frequently than gender.

Purpose and Research Questions

Given the continued labor market inequities and the gaps in the current research, this study explores explanations for gender- and racial-related labor market outcomes not adequately addressed in previous studies. In particular, this study integrates and expands on the research by exploring the effect of attributes of the academic discipline and conditions of disciplinary labor markets. That said, this study asks several questions:

1. What is the representation of women and people of color in the pipeline into the disciplinary labor market?
2. What effect does academic discipline have on the labor market outcomes of faculty of color and women faculty?

- a. Do structural characteristics (e.g., representation of women) and labor market conditions (e.g., supply, demand) of the academic discipline explain the gender and racial differences in salaries?
 - b. Do structural characteristics (e.g., representation of women) and labor market conditions (e.g., supply, demand) of the academic discipline explain the gender and racial differences in other labor market outcomes such as rank and part-time/full-time status?
3. After controlling for individual characteristics, labor market conditions, and structural characteristics, do inequities persist? Have these inequities changed in the 1990s?

Review of the Relevant Literature and Theoretical Framework

This study combines human capital theory, labor market theory, and structural theory as a framework to explore racial and gender differences in labor market outcomes. Human capital theorists use individual characteristics to explore differences in rewards, while structural theorists explore elements of organizations, social structures, and labor market conditions to explain these differences (Perna, 2001; Youn, 1992). Economists use human capital theory to explain the non-physical attributes of an individual that affect career mobility and earnings. The most common attributes discussed by human capital theorists are an individual's knowledge, skills, education and training (Becker, 1993). Human capital theory suggests that individuals accumulate human capital through investments in education, training and work experiences, which then can be exchanged for increased earnings, power and occupational status (Becker, 1993; Rosenbaum, 1986).

Implicit in human capital theory is that individuals are the primary actors in career rewards, and their opportunities depend solely on the amount they are willing to invest in education and work experiences. Some researchers suggest individual work differences between men and women explain gender differences. They argue that men out-publish women and therefore men earn more (Cole & Zuckerman, 1984; Long, 1990; Persell, 1983). Others argue that differences in salaries between men and women can be explained by the amount of time spent on research (Bognanno, 1987). Women tend to spend less time on research, and as a result, earn less money. Studies also

suggest a cultural bias that devalues women and people of color and the work they do (Aguirre, 2000; Bellas, 1993).

Researchers argue that, because of this sole focus on individual attributes, human capital theory inadequately explains the complexities of social structures and labor markets (Perna, 2003; Rosenbaum, 1986). Some turn to structural theory and theories related to labor markets to explain these complex factors that impact salaries. Structural theory suggests that salary inequities are caused in part by the way in which positions are structured and labor markets are segmented (Youn, 1992). Youn (1992) found that academic labor markets are unique in that they are segmented by academic discipline, institution type, job task (primarily teaching, research, or administration), or job status (e.g., academic rank or full-time/part-time).

Research applying structural theory to faculty salaries reveals that sex differences are caused by market segmentation resulting from the greater likelihood that women work in institutions with lower prestige and focus on work roles that are not rewarded (Smart, 1991). Women also tend to teach in fields where the pay is lower, such as the arts and humanities (Bergmann, 1985). Researchers find that faculty in disciplines with high proportions of women faculty earn less than those in disciplines with high proportions of male faculty (Barbezat, 1991; Bellas, 1994; Bellas, 1997).

While labor markets are generally national in scope, academic labor markets are considered by many to be segmented into a number of separate markets for each discipline (Bowen & Sosa, 1989; Toutkoushian, 2003). This makes sense both theoretically and empirically. Theoretically, individuals qualified to teach in a particular field define the supply of faculty labor; and those seeking to hire an individual qualified to teach in that field determine demand. Empirically, many have found that faculty within a particular discipline are more similar in their earnings than faculty from different disciplines (Smart, 1991; Barbezat, 1991; Bellas, 1994; Bellas, 1997). For these

reasons, this study seeks to understand labor market conditions of the discipline that affect salaries and salary inequities.

B. Proposal of Work

To answer the above research questions, this project will rely on all three administrations of the NSOPF (NSOPF:88, 93, 99), the Survey of Earned Doctorates, and Completions Data from the Integrated Postsecondary Data System.

The Datasets

The IPEDS Completions survey collects degree completions by level (associate's, bachelor's, master's, doctor's, and first-professional) and by race/ethnicity and gender of recipient, and by 6-digit CIP code. IPEDS data include all institutions offering postsecondary educational programs. For this study, Completions data will provide a national perspective of the two stages in the pipeline to college faculty: undergraduate degree recipients and doctoral degree recipients.

Since 1958, the SED has collected data from individuals earning doctoral degrees from U.S. institutions. With an approximate response rate of 92% for each of the five most recent administrations, the SED provides a comprehensive picture of a major component of supply and demand in the academic labor market. Included in the dataset are variables such as discipline of degree, race/ethnicity, gender, and work activities planned.

The three administrations of the NSOPF offer a unique way to understand the complex issue of market outcomes because the data represent a stratified sample of faculty from across the United States. Because data were collected in 1988, 1993, and 1999, NSOPF provides a complete picture of salaries in the 1990s. The first cycle of NSOPF was conducted in 1987-1988 (NSOPF:88) with a sample of over 11,000 instructional faculty from 480 institutions. The response rate for the survey was 76 percent. The 1992-93 study (NSOPF:93) included 974 public and private not-for-profit degree-granting postsecondary institutions and 31,354 faculty and instructional staff. The response

rate for the survey was 84 percent. The 1998-99 study (NSOPF:99), included 960 degree-granting postsecondary institutions and approximately 28,600 faculty and instructional staff. A subsample of 19,813 faculty and instructional staff was drawn for additional survey follow-up. Approximately 18,000 faculty and instructional staff questionnaires were completed for a weighted response rate of 83 percent.

Phase 1

I will conduct this study in two phases resulting in three manuscripts that address different aspects of equity for faculty of color and women faculty in disciplinary labor markets.

In the first stage of the project, I will integrate the three datasets described above to write a descriptive report of diversity in the pipeline to the college faculty ranks. Some have argued that too few people of color and women are in the pool of PhDs (Cole & Barber, 2003; Mickelson & Oliver, 1991; Turner, Myers, & Creswell, 1999), while others have suggested disproportionate tenure rates and pre-tenure departure rates (Menges & Exum, 1983). The representation of women faculty and faculty of color in the sciences and engineering are particularly low (Cole & Barber, 2003; Mickelson & Oliver, 1991; Turner et al., 1999). However, none of this research applies nationally representative data to assess the representation of women and people of color in the pipeline to academe.

I will use IPEDS, SED, and NSOPF to trace the pipeline to the academic labor market. First, using IPEDS completions data, I will provide a ten-year perspective (1990 to 2000) of degree completers (undergraduate and graduate) by race/ethnicity and gender, by academic discipline and institution type. Second, I will use the SED (from 1980 to 2000) to describe the doctoral degree earners by race/ethnicity and gender, by academic discipline and institution type. Additionally, I will compare work plans of people of color and women to their white male counterparts with particular attention paid to disciplinary differences. Finally, I will use NSOPF examine racial and

gender differences by academic discipline of those reaching the faculty ranks. I also will explore differences by institution type, rank, and employment status (part time or full time).

Stage 2

In the second stage of the project, I will use HLM to analyze the impact of human capital, structural characteristics of the discipline and disciplinary labor market conditions on faculty salaries. Handling both human capital characteristics, labor market conditions, and structural attributes presents a unique challenge to researchers. The problem lies in the challenge of how to handle these disciplinary effects in the models. Should researchers aggregate to the group (discipline) level and ignore the impact of individuals, or should researchers attach group-level characteristics and ignore obvious assumptions about the statistical tests we use?

In the past, researchers of faculty salary equity have attempted to solve this problem in three ways. First, they built statistical models attaching group level variables to individuals. Variables such as institution type (Fairweather, 1996; Toutkoushian, 1998), whether the discipline is a high-paying field or not (Fairweather, 1996), gender composition of the discipline (Bellas, 1997), average number of courses taught in a discipline (Fairweather, 1996), and institutional type (Bradburn & Sikora, 2000; Nettles, et al., 2002) have all been attached to individuals in ordinary least squares regression models. Models using this strategy have four problems. First, they violate a fundamental assumption of regression by treating the observations as if they were independent of one another. The impact of being nested within a discipline is overlooked in such models. Second, using these methods make it very difficult to partition what can be attributed to disciplinary membership and what can be attributed to the individual. Third, these approaches can result in inaccurate parameter estimates or inappropriate degrees of freedom, thus leading to poor or even misleading policy analyses. Finally, they are limited in their ability to explore the interaction effects of disciplines and individuals.

Others (Perna, 2001; Smart & McLaughlin, 1978) have collapsed disciplines into categories such as those proposed by Biglan, reducing variability and masking true differences between disciplines. These studies are useful in finding the differences, but they do little to explore the attributes of the discipline that may explain salary inequities.

A third approach commonly taken by researchers is to build a model for every discipline or institution type. Using this approach, researchers build dozens of models in a single study to examine and control for disciplinary differences (Fairweather, 1996; Toutkoushian, 1998). This approach is problematic from a policy analysis standpoint. These models can be difficult to interpret and fall short of providing a clear and parsimonious analysis. In an attempt to simplify, researchers often collapse disciplines into larger categories and use these categories to build only a handful models. Again, this strategy can hide the differences between disciplines that have been placed into larger categories. But more important, this method tells policy makers and researchers very little about what might be explaining differences between disciplines.

Only recently have higher education researchers begun to recognize the need to analyze data taking into account the nested organizational structures of higher education (Ethington, 1997; Porter & Umbach, 2001). They employ hierarchical linear modeling (HLM) techniques in an attempt to appropriately handle the complex organizational effects of colleges and universities and provide the tools necessary to arrive at results that are more accurate. Yet few, if any, studies of salary equity at colleges and universities have used HLM to examine the contextual effects of academic disciplines on faculty salary equity (Loeb, 2003; Perna, 2003). This study employs hierarchical linear modeling (HLM) to examine disciplinary and individual characteristics related to labor market outcomes. I will construct models for all three NSOPF administrations to examine differences over time.

Dependent Variables. I will produce two manuscripts in this stage of the analysis. I will use self-reported faculty salary as the focus of the first manuscript. In an attempt to restrict

institutional differences to allow me to focus on academic disciplines, I will limit my sample to Research Universities for this stage of the analysis. This stage of the analysis also will be restricted to full-time, instructional faculty. The dependent variable will be derived from three questions related to salary awarded by the institution (basic salary, other teaching not in basic salary, supplements not in basic salary, non-monetary compensation from institution, and other income from this institution). The natural logarithm of salary will be used to obtain a more normally distributed dependent variable and to aid in the interpretation of the results.

For the second manuscript of this phase of the project of the project, I will model other labor market outcomes. For example, I will use rank, employment status (tenured/tenure-track, part-time, and full-time nontenurable), and institution type (Carnegie Classification) as dependent measures. Given the nature of these outcomes, I will employ multinomial HLM and logistic HLM.

Independent variables. All of the models will include the same independent variables. For example, Several human capital variables will be included in the analyses at level-1 (individual level). Because an investment in education has been found to result in an increase in earnings (Fairweather, 1996; Fox, 1981; Smart, 1991), I will include a series of dummy-coded variables to represent educational attainment. In addition to variables representing investments in education, I will include several experience variables in the model. Because faculty work experiences most often begins in graduate school, I will include whether the faculty member was a research assistant or teaching assistant while in graduate school. Faculty rank also will be included in the model. Whether the faculty member is serving as a department chair will be included in the models as well.

Research indicates that wages increase with experience, but the rate of the impact of experience decreases over time (Fairweather, 1996; Fox, 1981). To represent experience, I will create a composite variable that includes age, years since highest degree and years in current rank

(Perna, 2001). A squared term for experience will be added to account for the decrease in the return of investments of experience over time.

Research has shown that faculty earn greater rewards for research than other types of activities (Bowen & Schuster, 1986; Fairweather, 1993; Fairweather, 1996). Several measures will be included in the models to represent research, teaching and service. First, two standard research productivity measures will be included in the models: the number of publications (the sum of number of articles published in refereed professional or trade journals, creative works published in juried media and chapters in edited volumes) and grant dollars produced. Because the impact of publications on earnings has been shown to decrease over time (Fairweather, 1995), I will square the number of publications and include it in the model. The average number of credit hours the faculty member spent in class per week during the fall semester will represent instructional productivity. Also included in the models will be a percentage of time allocated to administration and service.

Dummy-coded variables representing demographics will be included in the models as well. Faculty will be coded according to racial/ethnic group and will be included in the models as African American/Black, Asian/Pacific American, and Other faculty of color (Caucasian/White is the omitted category). Gender will be added to the model as a dummy-coded variable as well.

In HLM, I am able to allow the intercept and independent variables to vary by discipline. In addition to allowing the intercept to vary, I will vary both race/ethnicity and gender. I then can model the intercept (average salary) and the gender and race slopes using disciplinary characteristics. Thus, where I am able, I will allow gender and race to vary and will model the resulting slope coefficients.

At level 2 (the discipline level), several structural and labor market variables will be included in the models. Research suggests that faculty activities are rewarded differently across

disciplines (Smart & McLaughlin, 1978). It is reasonable to assume that the differences for these rewards can be attributed to the focus and values of faculty within a discipline. To test for these differences, disciplinary averages for time spent on service, administration, and teaching will be included in the models. In addition, it also is reasonable to expect that work experience and education will be rewarded differently across disciplines. Educational variables, such as the proportion of Ph.D.s within a discipline and proportion of professional degrees within a discipline will be included in the models. To represent experience, disciplinary averages for experience will be added in the models at level 2.

Several labor market conditions will be tested in the models. Faculty in disciplines with high proportions of women tend to have lower than those disciplines with low proportions of women (Barbezat, 1991; Bellas, 1994; Bellas, 1997; Perna, 2001). I will include the percentage of women in each discipline and the percentage of people of color in a discipline in the level-2 models. I also will test both supply and demand in the models. I will construct estimates of supply and demand for each discipline using IPEDS and SED. I also plan to test estimates of the racial and gender diversity of the market supply of each discipline. I will estimate demand in two ways. First, I will use the SED and calculate the number of recent hires in each discipline. For senior hires, I will calculate the number of hires among faculty at the rank associate and full professor.

C. Description of Policy Relevance

I expect this study to have important implications for future research and policy. Methodologically, this study will be the first of its kind to use HLM provide accurate estimates of the impact that various contextual variables have on labor market outcomes. The inability to partition the variance between the individual and academic discipline prevented previous research from adequately exploring the impact of multiple individual and disciplinary characteristics on salary and arrive at accurate estimates of their effects.

The study will also inform research by estimating the impact of the interaction of individual and labor market characteristics. Previous research has looked at individual characteristics in isolation of the market context. For example, previous research has not accurately assessed the impact that the proportion of women faculty in a discipline or institution has on salaries.

Understanding the impact that organizational structures have on salary inequities, such as gender diversity in academic disciplines, will provide a framework for future research on salary inequities.

Individual campuses will also benefit from the models presented in this study. As campuses explore ways to study faculty salaries, they can draw from analytic methods used in this study to explore the impact that structural characteristics of subunits (e.g., departments, colleges).

This study also is expected to inform policy discussions at the national and institutional level. Understanding the impact of the labor market conditions on inequities among faculty will be invaluable to institutions seeking to create an equitable environment for diverse faculty members. These findings also are expected to have tremendous implications for policy makers and the courts as they attempt to understand labor conditions among college faculty. Using ten years of data that accurately represent faculty at four-year institutions across the country, this study will contribute significantly to the policy discussions related to faculty salary equity.

D. Innovative Aspects of the Study

This research project will offer several innovations. First, it will integrate data from three sources to describe the current diversity of people in the pipeline to a faculty position within various disciplines. Little empirical research has assessed the current diversity of those in the pipeline to the academic labor market. Research that has addressed the pipeline have typically offered qualitative evidence (Smith, 1989) or limited samples (Cole & Barber, 2003). This study uses three national datasets to assess the diversity in the pipeline to academe.

Second, this study will be the first to use hierarchical linear modeling to assess the impact of disciplinary characteristics (e.g. diversity of a discipline). Past research examining likely provided inaccurate estimates of disciplinary effects and was not able to assess adequately the conditional effects of discipline on gender and racial differences in labor market experiences. This study is likely to provide a powerful methodological technique that can be used in future studies of academic labor markets.

Third, this study will be one of the first to examine the impact that supply and demand have on explaining the wage gap and differences in other labor market outcomes. Does a field with a large labor supply effect labor market experiences have a differential effect on the labor market experiences of underrepresented groups differently? Does the gender and racial composition of the labor supply have an effect on the earnings of underrepresented groups? This study will provide answers to these questions.

Finally, this study is one of the first to examine labor market experiences of people of color using national datasets. In the past, the number of faculty of color has been too small to model differences in salaries and other market outcomes. Given the sampling structure of NSOPF and the small increases in representation of faculty of color in recent years, I am able to model the racial differences in salaries and other outcomes.

E. Dissemination Plan

The dissemination plan for the project centers around three research papers suitable for publication in peer-reviewed journals. Given the importance of the research, I will present all three manuscripts at national conferences. The first paper will describe the pipeline to the college faculty ranks and will be presented at the 2005 annual meeting of the Association for the Study of Higher Education (ASHE). The second manuscript will explore the effects of gender and race on faculty pay. More specifically, it will examine the effect that disciplinary characteristics, such as supply and

diversity, have on explaining the wage gap. I will present this manuscript at the 2006 annual conference for the Association for Institutional Research. The third manuscript will examine the effect that disciplinary characteristics have in explaining the wage gap. I will present this paper at the 2006 conference for the American Educational Research Association.

I will make the appropriate revisions to each paper based on the feedback from conference presentations and from feedback from colleagues. I then plan to submit the papers to peer-refereed journals in the field of higher education, such as *Research in Higher Education*, *The Review of Higher Education*, and *The Journal of Higher Education*.

F. Audience for the Project

Several groups will be interested in the results from this project. For example, faculty who study academic labor markets will be interested in impact that supply and demand have on labor market inequities. They also will be interested in the use of HLM in the study of labor market outcomes. The introduction of HLM to labor market studies provides researchers with a powerful analytic tool that will allow them to answer questions related to equity and diversity that previously went unanswered.

Administrators and institutional researchers also will have a great deal of interest in the study. Administrators responsible for issues of equity on their campus will gain insight into the impact of discipline on equity. Institutional researchers responsible for provide information and analyses useful to senior college administrators will glean new techniques for examining issues of equity on their campus.

References Cited

- Aguirre, A. (2000). *Women and minority faculty in the academic workplace: Recruitment, retention, and academic culture*. San Francisco, CA: Jossey-Bass.
- American Association of University Professors. (1996). Not so bad. *Academe*, 82(2), 14-22.
- American Association of University Professors. (1997). Not so good. *Academe*, 83(2), 12-88.
- American Association of University Professors. (2001). *"uncertain times: The annual report on the economic status of the profession"*. Washington, D.C.: American Association of University Professors.
- Ashraf, J. (1994). Differences in returns to education: An analysis by race. *American Journal of Economics and Sociology*, 53(3), 281-290.
- Barbazet, D. A. (2002). History of pay equity studies. In R. K. Toutkoushian (Ed.), *Conducting salary-equity studies: Alternative approaches to research. New directions for institutional research (number 115)* (pp. 69-96). San Francisco, CA: Jossey-Bass.
- Barbezat, D. (1991). Updating estimates of male-female salary differentials in the academic labor market. *Economic Letters*, 36, 191-195.
- Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education*. Chicago, IL: The University of Chicago Press.
- Bellas, M. L. (1993). Faculty salaries: Still a cost of being female? *Social Science Quarterly*, 74(1), 62-75.
- Bellas, M. L. (1994). Comparable worth in academia: The effects on salaries of sex composition and labor-market conditions of academic disciplines. *American Sociological Review*, 59, 807-821.
- Bellas, M. L. (1997). Disciplinary differences in faculty salaries: Does gender bias play a role? *Journal of Higher Education*, 68(3), 299-321.
- Bergmann, B. R. (1985). "Comparable worth" for professors. *Academe*, 71(4), 8-10.
- Bognanno, M. (1987). Women in professions: Academic women. In K. Koziara, M. Mokow, & L. Tanner (Eds.), *Working women, past, present, and future*. Washington, D. C.: Bureau of National Affairs.
- Bowen, H. R., & Schuster, J. H. (1986). *American professors: A national resource imperiled*. New York: Oxford University Press.

- Bradburn, E. M., & Sikora, A. C. (2002). *Gender and racial/ethnic differences in salary and other characteristics of postsecondary faculty: Fall 1998*. Washington, D. C.: U.S. Department of Education, National Center for Education Statistics.
- Cole, S., & Barber, E. (2003). *Increasing faculty diversity: The occupational choices of high-achieving minority students*. Cambridge, MA: Harvard University Press.
- Cole, J. R., & Zuckerman, H. (1984). The productivity puzzle: Persistence and change in patterns of publication among men and women scientists. In M. W. Steinkamp & M. Maehr (Eds.), *Advances in motivation and achievement*. Greenwich, CT: JAI.
- Ethington, C. A. (1997). A hierarchical linear modeling approach to studying college effects. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 12, pp. 165-194). New York, NY: Agathon Press.
- Fairweather, J. S. (1993). Academic values and faculty rewards. *The Review of Higher Education*, 17(1), 179-182.
- Fairweather, J. S. (1995). Myths and realities of academic labor markets. *Economics of Education Review*, 14(2), 179-192.
- Fairweather, J. S. (1996). *Faculty work and public trust: Restoring the value of teaching and public service in American academic life*. Boston: Allyn and Bacon.
- Fox, M. F. (1981). Sex, salary, and achievement: Reward dualism in academia. *Sociology of Education*, 54, 71-84.
- Gurin, P. (1999). Expert report of patricia gurin. In Mich. (Ed.), *The compelling need for diversity in higher education, gratz et al. V. Bollinger et al, no. 97-75237 and grutter et al. V. Bollinger et al. No. 97-75928*. Ann Arbor, MI: The University of Michigan.
- Hearn, J. C. (1999). Pay and performance in the university: An examination of faculty salaries. *The Review of Higher Education*, 22(4), 391-410.
- Higgerson, M., & Higgerson, R. (1991). Affirmative action guidelines: Do they impede progress? *CUPA Journal*, 42(4), 11-14.
- Hurtado, S. (2001). Linking diversity and educational purpose: How diversity affects the classroom environment and student development. In G. Orfield & M. Kurlaender (Eds.), *Diversity challenged: Evidence on the impact of affirmative action*. Cambridge, MA: Harvard University Press.
- Hurtado, S., Milem, J., Clayton-Pedersen, A., & Allen, W. (1998). Enacting campus climates for racial/ethnic diversity through educational policy and practice. *The Review of Higher Education*.

- Johnsrud, L., & Sadao, K. (1998). The common experience of otherness: Ethnic and racial minority faculty. *Review of Higher Education, 21*, 315-342.
- Loeb, J. W. (2003). Hierarchical linear modeling in salary-equity studies. In R. K. Toutkoushian (Ed.), *Unresolved issues in conducting salary-equity studies. New directions for institutional research (number 117)* (pp. 69-96). San Francisco, CA: Jossey-Bass.
- Long, J. S. (1990). The origins of sex differences in science. *Social forces, 68*, 1297-1315.
- Menges, R. J., & Exum, W. H. (1983). Barriers to the progress of women and minority faculty. *The Journal of Higher Education, 54*, 123-144.
- Mickelson, M. L., & Oliver, M. L. (1991). Making the short list: Black candidates and the faculty recruitment process. In P. G. Altbach & K. Lomotey (Eds.), *The racial crisis in American higher education*. Albany, NY: SUNY Press.
- Milem, J. F., & Hakuta, K. (2000). The benefits of racial and ethnic diversity in higher education. In D. Wilds (Ed.), *Minorities in higher education: Seventeenth annual status report* (pp. 39-67). Washington, D. C.: American Council on Education.
- Nettles, M. T., Perna, L. W., & Bradburn, E. M. (2000). *Salary, promotion, and tenure status of minority and women faculty in U.S. Colleges and universities*. Washington, D. C.: U.S. Department of Education, National Center for Education Statistics.
- Perna, L. (2001). Sex and race differences in faculty tenure and promotion. *Research in Higher Education, 42*(5), 541-567.
- Perna, L. W. (2001). Sex differences in faculty salaries: A cohort analysis. *The Review of Higher Education, 24*(3), 283-307.
- Perna, L. W. (2003). Studying faculty salary equity: A review of theoretical and methodological approaches. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research (volume xviii)* (pp. 323-388). Boston, MA: Kluwer Academic Publishers.
- Persell, C. H. (1983). Gender, rewards, and research in education. *Psychology of Women Quarterly, 8*, 33-47.
- Pfeffer, J., & Langton, N. (1993). The effect of wage dispersion on satisfaction, productivity, and working collaboratively: Evidence from college and university faculty. *Administrative Science Quarterly, 38*, 382-407.
- Porter, S. R., & Umbach, P. D. (2001). Analyzing faculty workload using multilevel modeling. *Research in Higher Education, 42*(2), 171-196.

- Rudenstine, N. (1996, March/April). The uses of diversity. *Harvard Magazine*, 48-62.
- Rosenbaum, J. E. (1986). Institutional career structures and the social construction of ability. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 139-171). New York, NY: Greenwood Press.
- Smart, J. C. (1991). Gender equity in academic rank and salary. *Review of Higher Education*, 14(4), 511-526.
- Smart, J. C., & McLaughlin, G. W. (1978). Reward structures and academic discipline. *Research in Higher Education*, 8, 39-55.
- Smith, D. G. (1989). *The challenge of diversity: Involvement or alienation in the academy*. Washington, D.C.: The George Washington University.
- Toutkoushian, R. K. (1998). Racial and marital status differences in faculty pay. *Journal of Higher Education*, 69(5), 513-541.
- Toutkousian, R. K. (1998, May 17-19). *A summary of two studies on pay disparities by race and gender: Evidence from the 1988 and 1993 nces surveys*. Paper presented at the 38th Annual Meeting of the Association for Institutional Research, Minneapolis, MN.
- Trower, K., & Chait, R. (2002). Faculty diversity: Too little for too long. *Harvard Magazine*, 33-37.
- Turner, C. S., Myers, S. L. J., & Creswell, J. W. (1999). Exploring underrepresentation: The case of faculty of color in the midwest. *The Journal of Higher Education*, 70, 27-59.

Biographical Sketch

Paul D. Umbach is an Assistant Professor of Higher Education in the Department of Educational Policy and Leadership Studies at the University of Iowa. Prior to his current position, he worked for several years in various positions in institutional research at Old Dominion University, Tidewater Community College, and the University of Maryland. After earning his Ph.D. in Higher Education at the University of Maryland, he served for two years as a Research Analyst and Project Manager at the National Survey of Student Engagement in the Indiana University Center for Postsecondary Research.

He has considerable experience analyzing national datasets, particularly NSOPF and IPEDS. After attending 1999 Summer Institute on the Databases of the National Center for Education Statistics, he has used the data to produce manuscripts for presentation at national conferences and for publication in peer-reviewed journals. This research and other work by Dr. Umbach has been published in leading higher education journals such as *Research in Higher Education*, *The Journal of Higher Education*, *The Journal of College Student Development*, *The Review of Higher Education*, and *Planning for Higher Education*. Dr. Umbach has also been a contributor to other AIR publications such as the *AIR Professional File* and *New Directions for Institutional Research*. He is a frequent presenter at the annual meetings of AIR and ASHE and has taught graduate classes on research methods and college faculty and conducted workshops on hierarchical linear modeling.

This project is an extension on Dr. Umbach's research on issues of equity and diversity in the careers of college faculty and experiences of college students. It capitalizes on his knowledge of the research in the area and his expertise in hierarchical linear modeling.

BRIEF CURRICULUM VITAE

Education

- Ph.D. Higher Education, University of Maryland, 2003
Department of Education Policy and Leadership
- M.S.Ed. Higher Education Administration, Old Dominion University, 1997
- B.S. Psychology, Old Dominion University, 1994

Professional Work Experience

- 2004-present Assistant Professor, Department of Educational Policy and Leadership Studies, The University of Iowa
- 2003-2004 Project Manager, Faculty Survey of Student Engagement (FSSE), Center for Postsecondary Research, Indiana University Bloomington
- 2002-2004 Research Analyst, National Survey of Student Engagement (NSSE), Center for Postsecondary Research, Indiana University Bloomington
- 2000-2002 Graduate Research Assistant, Diverse Democracy Project, University of Maryland
- 1998-2000 Graduate Assistant, Office of Institutional Research and Planning, University of Maryland
- 1996-1998 Research Associate, Institutional Research and Assessment, Tidewater Community College
- 1996 Intern, University Planning and Institutional Research, Old Dominion University

Selected Publications

Journal Articles

- *Umbach, P. D. & Wawrzynski, M. R. (in press). Faculty do matter: The role of college faculty in student learning and engagement. *Research in Higher Education*.
- *Umbach, P. D. & Kuh, G. D. (in press). Student experiences with diversity at liberal arts colleges: another claim for distinctiveness. *The Journal Higher Education*.
- *Pascarella, E. T., Cruce, T. M., Umbach, P. D., Wolniak, G. C., Kuh, G. D., Hayek, J. C., Carini, R. M., Gonyea, R. M., & Zhao, C. (in press). College selectivity and good practices in undergraduate education: How strong is the link? *The Journal of Higher Education*.
- *Milem, J. F. & Umbach, P. D., Liang, C. (2004). Exploring the perpetuation hypothesis: The role of colleges and universities in desegregating society. *Journal of College Student Development*, 45, 6, p. 688-700.
- *Umbach, P. D. & Milem, J. F. (2004). Applying Holland's typology to the study of differences in student views about diversity. *Research in Higher Education*, 45, 6, p. 625-649.
- *Porter, S. R. & Umbach, P. D. (2004). What works best? Collecting alumni data with multiple technologies. *AIR Professional File*, 90, p. 1-7.
- *Milem, J. F. & Umbach, P. D. (2003). Examining the perpetuation hypothesis: The influence of pre-college factors on students' predispositions regarding diversity activities in college. *Journal of College Student Development*, 45, 5, p. 611-624.
- *Umbach, P. D. & Porter, S. R. (2002). How do academic departments impact student satisfaction? Understanding the contextual effects of departments. *Research in Higher Education*, 43, p. 209-234.

- *Porter, S. R. & Umbach, P. D. (2002). We can't get there in time: Assessing the time between classes and classroom disruptions. *Planning for Higher Education*, 30, 2, p. 35-40.
- *Porter, S. R. & Umbach, P. D. (2001). Analyzing faculty workload data using hierarchical linear modeling. *Research in Higher Education*, 42, 2, p. 171-196.
- *Birnbaum, R. & Umbach, P. D. (2001). Scholar, steward, spanner, and stranger: The four career paths of college presidents. *The Review of Higher Education*, 24, 3, p. 203-217.

Book Chapters

- Kuh, G. D., & Umbach, P. D. (2004). College and character: Insights from the National Survey of Student Engagement. In J. Dalton and T. Russell (Eds.). *Assessing character outcomes in college*. New Directions in Institutional Research (Vol. 122) . San Francisco: Jossey-Bass.
- Umbach, P. D. (2004). Best practices in web surveys. In Porter, S. R. (Ed.), *Overcoming survey research problems*. New Directions for Institutional Research (Vol. 121). San Francisco: Jossey-Bass.
- Milem, J. F., Umbach, P. D., & Ting, M.P. (2004). Educating citizens for a diverse democracy: How students learn from diversity in college. In R. L. Hampton & T. P. Gullotta (Eds.), *Promoting racial, ethnic, and religious understanding in America*. Washington, DC: Child Welfare League Press.

Selected Research Paper Presentations (* indicates refereed paper, + indicates invited paper)

- * Umbach, P. D. (November, 2004). *The unique contribution of faculty of color to undergraduate education*. Paper presented at the 29th Annual Meeting of the Association for the Study of Higher Education, Kansas City, MO.
- * Umbach, P. D., Boon, R. D., Kuh, G. D., Buckley, J. A. (November, 2004). *Race and student major: Understanding differences in environments*. Paper presented at the 29th Annual Meeting of the Association for the Study of Higher Education, Kansas City, MO.
- *Umbach, P. D., Palmer, M. M., Hannah, S. J., & Kuh, G. D. (June, 2004). *Intercollegiate athletes and effective educational practices: Winning combination or losing effort?* Paper presented at the 44th Annual Association for Institutional Research Forum, Boston, MA.
- *Umbach, P. D. & Wawrzynski, M. R. (June, 2004). *Faculty do matter: The role of college faculty in student learning and engagement* Paper presented at the 44th Annual Association for Institutional Research Forum, Boston, MA.
- * Umbach, P. D., Kinzie, J. L., Thomas, A. D., Palmer, M. M., Kuh, G. D. (November, 2003). *Women students at coeducational and women's colleges: How do their experiences compare?* Paper presented at the 28th Annual Meeting of the Association for the Study of Higher Education, Portland, OR.
- *Milem, J. F. & Umbach, P. D., Liang, C. (November, 2003). *Exploring the perpetuation hypothesis: The role of colleges and universities in desegregating society*. Paper presented at the 28th Annual Meeting of the Association for the Study of Higher Education, Portland, OR.
- *Umbach, P. D. & Kuh, G. D. (May, 2003). *Student experiences with diversity: Another distinctive imprint of liberal arts colleges?* Paper presented at the 43rd Annual Association for Institutional Research Forum, Tampa, FL.
- *Porter, S. R. & Umbach, P. D. (May, 2003). *How do faculty spend their time? Exploring changes in faculty work in the last decade*. Paper presented at the 43rd Annual Association for Institutional Research Forum, Tampa, FL.

- *Umbach, P. D. (November, 2002). *Who wants to be a college president? Forms of capital and the career aspirations of senior college administrators*. Paper presented at the 27th Annual Meeting of the Association for the Study of Higher Education, Sacramento, CA.
- *Milem, J. F. & Umbach, P. D. (November, 2002). *Examining the perpetuation hypothesis: The influence of pre-college factors on students' predispositions regarding diversity activities in college*. Paper presented at the 27th Annual Meeting of the Association for the Study of Higher Education, Sacramento, CA.
- *Umbach, P. D. & Milem, J. F. (June, 2002). *Applying Holland's typology to the study of differences in student views about diversity*. Paper presented at the 42nd Annual Association for Institutional Research Forum, Toronto, Canada.
- *Porter, S. R. & Umbach, P. D. (June, 2002). *Academic disciplines and students: Exploring student-environment fit*. Paper presented at the 42nd Annual Association for Institutional Research Forum, Toronto, Canada.
- *Umbach, P. D. (November, 2001). *Faculty salary equity: Understanding the contextual effects of academic discipline*. Paper presented at the 26th Annual Meeting of the Association for the Study of Higher Education, Richmond, VA.
- *Milem, J. F. & Umbach, P. D. (November, 2001). *Understanding the difference that diversity makes: Disciplinary differences in faculty views about diversity in higher education*. Paper presented at the 26th Annual Meeting of the Association for the Study of Higher Education, Richmond, VA.
- *Umbach, P. D. & Porter, S. R. (June, 2001). *How does the diversity of academic departments impact student satisfaction? Understanding the contextual effects of departments*. Paper presented at the 41st Annual Association for Institutional Research Forum, Long Beach, CA.
- *Porter, S. R. & Umbach, P. D. (June, 2001). *What works best? Collecting alumni data with multiple technologies*. Paper presented at the 41st Annual Association for Institutional Research Forum, Long Beach, CA.
- *Umbach, P. D. (November, 2000). *Looking beyond lucky number seven: Providing a deeper understanding of presidential longevity*. Paper presented at the 25th Annual Meeting of the Association for the Study of Higher Education, Sacramento, CA.
- *Porter, S. R. & Umbach, P. D. (May, 2000). *Will increasing course loads save money? A multilevel analysis of faculty research productivity*. Paper presented at the 2000 Southern Association for Institutional Research Conference, Myrtle Beach, SC.
- *Umbach, P. D. (May, 2000). *Understanding strategic planning and enrollment management: A case study of a research university*. Paper presented at the 40th Annual Association for Institutional Research Forum, Cincinnati, OH.
- *Umbach, P. D. & Porter, S. R. (May, 2000). *Analyzing faculty workload data using hierarchical linear modeling*. Paper presented at the 40th Annual Association for Institutional Research Forum, Cincinnati, OH.
- *Birnbaum, R. & Umbach, P. D. (November, 1999). *Scholar, steward, spanner, and stranger: The four career trajectories of college presidents*. Paper presented at the 24th Annual Meeting of the Association for the Study of Higher Education, San Antonio, TX.
- *Umbach, P. D., Stapleton, L., & LaManque, A. (November, 1999). *Faculty workload policies: Maximizing multiple outputs at a research university*. Paper presented at the 24th Annual Meeting of the Association for the Study of Higher Education, San Antonio, TX.

Selected Symposia & Workshops (* indicates refereed, + indicates invited)

- *Milem, J. F., Umbach, P. D., Ting, M. P., Fries-Britt, S. L. , Kelly, R. D. , Alimo, C., VanCollins, J., Hurtado, S., & Waters, R. (November, 2001). *Integrating research and practice: Learning from studies of racial climate at one university campus*. Symposium presented at the 26th Annual Meeting of the Association for the Study of Higher Education, Richmond, VA.
- *Umbach, P. D. & Porter, S. R. (May, 2002; May, 2003) *Multi-level modeling: Understanding and Applying HLM to Studies of Students and Faculty*. Full-day workshop presented at the Annual Meetings of Association for Institutional Research.

Editorial Board Memberships and Reviewing Activities

| | |
|-----------------|--|
| 2004-present | Member, Editorial Board, <i>Journal of College Student Development</i> |
| 2004-present | Consulting Editor, <i>Research in Higher Education</i> |
| 2003-2004 | Reviewer, ASHE Conference research paper proposals |
| 2001-2002 | Reviewer, AERA Conference research paper proposals |
| 2001-2002, 2004 | Reviewer, AIR Conference research paper proposals |

Professional Service

| | |
|--------------|---|
| 2004-present | Member, AERA-J Dissertation Awards Committee |
| 2003-2004 | Session Chair, Annual Forum of AIR |
| 2003 | Session Chair, Annual Meeting of ASHE |
| 2000-2003 | Member, Forum Publications Editorial Advisory Committee |

Fellowships and Awards

- The 2003 Charles F. Elton Best Paper Award for paper presented at the 43rd Annual Association for Institutional Research Forum
- Graduate Student Policy Seminar Member, Association for the Study of Higher Education, 2000
- Graduate Student Employee of the Year, University of Maryland, 1999-2000 Academic Year
- AIR-NCES Fellow, 1999 Summer Institute on the Databases of the National Center for Education Statistics

Budget

A. Salary and Wages

| | |
|---|-----------------|
| Principal Investigator--one month summer salary (FY05 base salary = \$55,000; 3% cost-of-living increase) | \$6,294 |
| Graduate Research Assistant: 25%-time fiscal year appointment for one assistant.(FY05 base salary for 50%-time fiscal appointment = \$18,932; 3% cost-of-living increase) | \$9,750 |
| Total Personnel | \$16,044 |

B. Fringe Benefits

| | |
|--|----------------|
| Principal Investigator; one month summer @ 27.3% | \$1,718 |
| Graduate Research Assistant (25% -time) @ 16.6%; | \$1,618 |
| Total Fringe Benefits | \$3,336 |

C. Travel

| | |
|--|----------------|
| Travel for PI to ASHE conference in Philadelphia in 2005.(airfare=\$400; hotel=\$173 x 4 days ;meal= \$40 x 5 days ; ground transportation=\$100; conference fee \$100) | \$1,492 |
| Travel for PI and graduate assistant to AIR conference in New Orleans in 2006.(airfare=\$380; hotel=\$165 x 4 nights; meals \$40 x 5 days; ground transportation=\$150) total travel costs per person= \$1,390. Conference fee of \$405 for the PI and \$110 for the graduate assistant. | \$3,295 |
| Travel for PI to AERA conference in San Francisco in 2006.(airfare=\$490; hotel=\$190 x 4 nights ;meal \$40 x 5 days ; ground transportation \$100; conference fee \$100) | \$1,650 |
| Total Travel | \$6,437 |

D. Materials and Supplies

| | |
|-------------------------------------|--------------|
| Postage/ mailing expenses | \$100 |
| Copying/printing expenses | \$300 |
| Total Materials and Supplies | \$400 |

E. Other

| | |
|---|--------------|
| Graduate Assistant tuition scholarship \$875; per union negotiated agreement. | \$875 |
| Total Other | \$875 |

TOTAL PROJECT COSTS \$27,092

Budget Justification

A. Salary and wages

One month of summer salary will allow the principal investigator to devote one month in the summer of 2005 to the research project. He will devote the month to developing a disciplinary crosswalk for the three national data sets, preparing datasets for analyses, and conducting the descriptive analysis. Additionally, the principal investigator will prepare the first manuscript of the study during the summer.

The principal investigator will hire a 10 hour/week graduate research assistant for the fiscal year to work on the project. The graduate assistant will help in creating data sets, analyzing data, searching relevant literature, and writing manuscripts for presentation and publication.

B. Fringe benefits

Fringe benefits include health, dental, life and disability insurance, social security, and retirement benefits based on annual wages. The University of Iowa projected fringe benefit rates are as follows:

| | YEAR 1 |
|--------------------------|---------------|
| FACULTY | 27.3% |
| GRADUATE STUDENTS | 16.6% |

C. Travel

The principal investigator will use the travel money to offset the costs to register for and travel to the Annual Meetings of the Association for the Study of Higher Education, the Association for Institutional Research, and the American Educational Research Association. At these conferences, the principal investigator will present papers describing the results of the proposed research.

Travel money will also be used for a graduate assistant to attend the Annual Meeting of Association for Institutional Research to co-present (with the principal investigator) a paper of the results described in the proposed research. Attendance at the meeting will be an excellent opportunity to mentor a young scholar and an opportunity for the graduate assistant to network with others in the field.

D. Materials and supplies

The money budgeted for materials and supplies will be used to offset the costs associated with printing copies of papers, photocopying research articles, and mailing copies of drafts of the manuscripts to other researchers and experts for their critical feedback. Research materials and supplies will offset the costs of copying research articles.

E. Other

In July, 2003 the Iowa Board of Regents and the University of Iowa Graduate Employee Union (COGS) agreed in their negotiated contract to establish a tuition scholarship program which requires all graduate assistants holding a 25%-time or greater appointment to receive a minimum tuition scholarship based on the number of credits in which they are enrolled. A resulting Tuition Scholarship Policy (based on OMB Circular A-21, A-21 clarification of 1/5/01, and the Congressional Research Service “Federal Taxation of Student Aid: Summary of 1999 Rules”) was adopted by the University which allows researchers to charge the costs of these tuition scholarships to external grants and contracts that permit such costs. Tuition scholarship = \$875 for 25% time fiscal year appointment.

Current and Pending Support

The project described here currently receives no financial support from other agencies.

Facilities, Equipment and Other Resources

The University of Iowa will provide the principal investigator and the graduate research assistant all of the computer equipment required to complete the studies described in this proposal. In addition to computer equipment, the University will provide software to include SAS, SPSS, and HLM (Hierarchical Linear Modeling). The University of Iowa also will assume responsibility for the indirect costs associated with this project.