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Collegiate schemas: The influence of institutional met expectations on tenure-track faculty job satisfaction

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Collegiate schemas: The influence of institutional met expectations on tenure-track faculty job satisfaction

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Dedication

I would like to dedicate this dissertation to my wife Emily, my son Andrew, and my daughter Kathryn, without whose love and support I would have not finished this work. I would also like to thank Dr. Stephen Porter and Dr. Florence Hamrick for their help and mentorship during this long process.

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Abstract

"Met expectations" research into job satisfaction (Locke, 1976; Porter & Steers, 1973) has shown that the expectations employees bring to their jobs influence their overall job satisfaction. At colleges and universities, faculty job satisfaction is important because it can provide a measure of overall institutional effectiveness (Cameron, 1978), and can directly influence decisions to leave the institution (Mobley, 1977; Smart, 1990; Zhou & Volkwein, 2004). This study used multiple regression analyses to determine if tenure-track faculty job satisfaction is influenced by the differences between the colleges and universities, as measured by institutional characteristics, where faculty earned their bachelor's and doctorate degrees and their current institution of employment. This study posited that faculty form mental models or schemas of college and university work environments based on their undergraduate and graduate school experiences. These collegiate schemas create expectations for future work experiences among college and university faculty. Faculty job satisfaction was determined using responses to questions from the National Science Foundation's 2001 Survey of Doctorate Recipients. Faculty degree history was obtained from the Survey of Earned Doctorates. Institutional characteristics examined included institutional type, size, expenditures, reputation, geographic location, and racial/ethnic diversity, and were acquired from the Integrated Postsecondary Education Data System (IPEDS).

Chapter 1: Introduction

The issue of faculty satisfaction is not simply an academic one. It is a critical component of the health and future of higher education (Hagedorn, 2000). Faculty job satisfaction is important because it can provide a measure of overall institutional effectiveness and well-being (Cameron, 1978; Hagedorn, 2000), and can directly influence decisions to leave the institution (Bluedorn, 1982; Mobley, 1977; Smart, 1990; Zhou & Volkwein, 2004). If faculty members are generally satisfied with their jobs, it can also encourage graduate students to consider the faculty life.

A talented and respected faculty is the cornerstone of any college or university and its mission to educate and generate research and new ideas (Gappa, Austin, & Trice, 2007; Schuster & Finkelstein, 2006). Outstanding faculty can draw regional and national recognition for an institution of higher education, attract research dollars, help recruit students, and generally improve the reputation of a college and university (Ulrich, 1998). For this reason, the ability to recruit and retain talented faculty is one of the highest priorities of colleges and universities (Matier, 1990).

While these past studies have examined the influence of institutional characteristics on faculty satisfaction, they focused on characteristics of the faculty member's college or university of employment or *employing institution*. This study examines whether the colleges and universities where faculty earned their bachelor's and doctoral degrees, or *degree institutions*, influence subsequent faculty job satisfaction. Specifically, I use regression analysis to look at selected differences between employing institutions and degree institutions and examine impacts on job satisfaction.

The purpose of this study is to determine if institutional characteristic differences between tenure-track assistant faculty members' degree institutions and employing institution affect job satisfaction. The use of differences between institutional characteristics serves as a proxy for measuring relative similarities of work environments – in other words, to measure the degrees of putative distances between *schemas* formed during undergraduate and graduate education and the realities of faculty members' current work environments. These schemas provide scripts by which people make sense of objects, situations, and sequences (Bieber & Worley, 2006). Schemas help individuals to "interpret events, organize experiences in memory…predict the course of future events, and, indeed, act in the social world" (Bieber & Worley, 2006, p. 1012).

For most people these schemas formed by attending a college or a university probably have little to no practical effect. Even if a schema sets expectations for how a college or university "should" be, it would likely have little impact on most college alumni. The vast majority of those who attended college likely view their experience as a means to further their education and earn credentials for their careers. For those who have attended only one college, they might assume that their college was typical of all colleges or, alternately, represented an ideal collegiate experience. Alumni belief that their collegiate experience represented the ideal may sustain many collegiate rivalries and alumni foundations. Even a person who attended multiple institutions of higher education may have only a vague conception that one of their institutions was "better" or simply "different" from the other. However, these collegiate schemas, derived from personal educational experiences and the

set of expectations they generate, could have a significant impact on college and university faculty.

Past research has found that the needs and expectations employees bring to their jobs can influence their overall work satisfaction (Kalleberg, 1977) and unmet expectations can negatively impact job satisfaction and influence employee attrition (Lawler, 1973; Locke, 1976; Louis, 1980; Porter & Steers, 1973; Turnley & Feldman, 2000; Wanous, 1973; Wanous, Poland, Premack, & Davis, 1992). Past "organizational contexts shape [employee] perceptions of what their present conditions 'ought' to be." (Kirschenbaum & Mano-Negrin, 2002, p. 535). If faculty members form work environment expectations from prior higher education experience, unmet expectations may similarly influence their job satisfaction.

A possible mediator for any collegiate schemas effects would be formal and informal socialization that prepares faculty for working within an academic environment. Faculty socialization should serve to help graduate students form realistic expectations about their future work and work environment. In fact, graduate education has long played a significant role in socializing graduate students to future work as faculty (Austin & Wulff, 2004; Golde & Dore, 2001). Furthermore, orientation and other socialization programs are available for new faculty to ease their transition (Gappa et al., 2007).

However, there are two reasons to suspect that neither type of socialization is sufficient for managing a faculty member's work environment expectations. The first is that graduate students typically receive little formal socialization to faculty life, and, as a result, have limited understandings of faculty work and the differences in faculty experiences between disparate institutions and institutional types (Austin, 2002; Bess, 1978; Gappa et al.,

2007; Golde & Dore, 2000, 2001, 2004; Lovitts, 2001, 2004; Wulff, Austin, Nyquist, & Sprague, 2004). Additionally, socialization to faculty roles has traditionally been informal with new faculty left to navigate academia on their own (Gappa et al., 2007; Olsen, 1993; Perlman, McCann, & McFadden, 1999).

The second reason that socialization does not sufficiently manage work environment expectations is the tendency to resist new information. Research suggests that even if faculty members were provided with comprehensive orientation programs, people tend to ignore new data in favor of expectations and schemas formed from early experiences (Bieber & Worley, 2006; Derry, 1996; Labianca, Gray, & Brass, 2000; Morgan & Schwalbe, 1990; Valian, 1998). Bieber and Worley (2006) found that graduate students who planned to pursue faculty careers were either not being socialized to their work roles or resisted socialization by their graduate school mentors. As a result, these graduate students often held notions of faculty life at odds with those of their professors. Bieber and Worley (2006) posited that students form an *ideal script* or schema of faculty life during their undergraduate years. It was as undergraduates that students first had interactions with faculty members and that experience led them to consider careers as college or university professors (Austin, 2002; Bieber & Worley). These ideal scripts of faculty life were found to be remarkably resilient despite the graduate students' experience with faculty whose work life differed greatly from students' ideal scripts.

If these collegiate schemas exist, then they create expectations for how a university "should" operate. Discrepancies between these expectations and the job realities of employing institutions are hypothesized to influence job satisfaction.

Problem

Colleges and universities are concerned about faculty satisfaction and retaining qualified faculty.

Purpose

The purpose of this study is to determine if institutional characteristic differences between a tenure-track assistant faculty's degree institutions and their employing institution, representing work environment expectations derived from schemas, affect their job satisfaction.

Primary Hypothesis

The job satisfaction of a tenure-track assistant professor is influenced by collegiate schemas, or expectations of the college or university workplace that are formed, in part, during the faculty member's experiences with their undergraduate and doctoral institutions of higher education. These changes in higher education work environment, as measured by differences in institutional characteristics, affect faculty work satisfaction.

Secondary Hypothesis #1

The amount of change that faculty experience, as measured by differences in institutional characteristics, negatively impacts faculty work satisfaction, regardless of whether or not the change is considered positive or negative (e.g., an increase in institutional prestige).

Secondary Hypothesis #2

The amount and the direction of the change experienced by faculty, as measured by differences in institutional characteristics, are important in understanding the impact on

faculty work satisfaction. Applying hygiene theory (Herzberg, Mausner, Peterson, & Capwell, 1957), faculty who perceive their employing institutions as approximately equal to or "better" than their institutions of education may not have improved job satisfaction. However, faculty who perceive their employing institutions as "worse" than their degree institutions will have significantly lower levels of job satisfaction.

Secondary Hypothesis #3

As research shows that early work environment experiences tend to hold primacy for personal schemas, I expect faculty bachelor's institutions to exhibit a greater influence on faculty work environment expectations. If supported by the models, results should show that differences in faculty work satisfaction are better explained by differences between bachelor's institutions and employing institutions rather than differences between doctoral institutions and employing institutions.

Definitions

Employing institution: A faculty member's college or university of current employment at the time the Survey of Earned Doctorates was administered.

Degree institutions: The colleges or universities where faculty members earned their bachelor's *and* doctoral degrees.

Doctoral institution: The college or university where faculty members earned their doctorates.

Bachelor's institution: The college or university where faculty members earned their bachelor's degrees.

Collegiate schema: A cognitive model that frames expectations about higher education institutions and is generated from prior experience within colleges and universities.

Method

I used multivariate ordinary least squares (OLS) regression to examine relationships between variables and the predictive power of the independent variables on the dependent variables. Multivariate regression allows for (a) predictions about the impact of one variable on another, (b) the ability to control for the influence of variables that may affect the dependent variable but are not part of the hypothesis, and (c) the use of both continuous and categorical independent variables (Tabachnick & Fidell, 2007).

Theoretical Perspective

I propose a theoretical framework based on cognitive schema theory (Bartlett, 1932; Piaget, 1926) to help account for faculty work environment expectations. Organizational studies literature alternatively refers to these schemas as *frames* or *lenses* which contain "ideas or assumptions" that help people negotiate a social or physical space (Bolman & Deal, p. 12).

College and university faculty are relatively unique in that they have significant prior experience in an environment that will later become their place of employment. While other professions provide internships to provide potential future employees with exposure to job expectations and work environments, the amount of time that a new faculty member spends in the higher education environment prior to their first day on the job, albeit as a student, can easily exceed 10 years. I hypothesize that these experiences in undergraduate and graduate school inform *collegiate schemas*, or mental models that frame expectations about higher

education institutions. Faculty member satisfaction is influenced by the degree that the employing institutions meets the expectations that faculty bring with them from their prior higher education experiences.

I hypothesize that there are three main components of collegiate schemas that form the institutional context of faculty job expectations. These three components are institutional prestige, institutional resources, and institutional mission and culture. Institutional context is a factor in job satisfaction because, for example, teaching at a small, liberal-arts college can be very different from teaching at large research institution. Resource expectations, such as the amount of money provided for instruction or research support, can also differ across institutions. Cultural expectations can form when faculty members attended a college or university with a very different mission from their current institution.

Importance of the Study

The study provides three main contributions to the literature. It adds to the understanding of the factors that influence faculty satisfaction and intent to leave. It provides a new approach to examining institutional fit for faculty. Finally, it has implications for future faculty and how they are socialized for their careers in academia.

Summary

Faculty satisfaction and faculty attrition that may result from low job satisfaction are concerns for colleges and universities. Faculty satisfaction is influenced by myriad factors including those related to institutional characteristics of the employing college or university. One established method for accounting for job satisfaction is the met expectations hypothesis that looks at differences between job expectations and the realities of the job and employing

organization. This study uses cognitive schemas as a theoretical approach to examine how institutional characteristic differences may represent faculty work expectations and impact their job satisfaction. In the Literature Review, I will outline past research and review the theoretical model in detail.

Chapter 2: Literature Review

In this chapter I will first cover the importance of the faculty job satisfaction and discuss what factors influence it. Next, I will briefly review how job satisfaction can impact faculty retention before discussing how this study fits within the larger literature of employee and work job satisfaction. Then I will review the met expectations research on job satisfaction that this study uses as the basis for its analysis across degree and employing institutions. Finally, I will review cognitive schema theory that serves as the theoretical framework for this study.

Importance of Faculty Satisfaction

The ability to recruit and retain talented faculty is one of the highest priorities of institutions of higher education (Matier, 1990). The academic faculty provides the cornerstone of colleges and universities and their missions to educate and generate research and new ideas (Gappa et al., 2007; Schuster & Finkelstein, 2006). Faculty represent an institution's intellectual capital which is an organization's "only appreciable asset" that can draw regional and national recognition, research dollars, students, and generally improve the college or university (Ulrich, 1998, p. 15). Ultimately, "it is the work of the faculty that is essential to achieving the excellence that colleges and universities envision" (Gappa et al., 2007, p. 4). Therefore colleges and universities have a key interest in attracting and retaining this intellectual capital (Gappa et al., 2007; Ulrich, 1998).

Intellectual capital requires both competence, as measured by the average talent level of faculty, and commitment, as measured by the average retention rate of those faculty (Ulrich, 1998). Colleges and universities work to attract and retain a talented pool of faculty

and must compete for that talent with other universities and private industry, often at a global level. This is especially true of the small number of "superstar" faculty that can garner multiple job offers (Rosovsky, 1990). At the national level, there is a need for colleges and universities to ensure that faculty life is sufficiently attractive to encourage talented people to be drawn to an institution and remain as professors (Rosovsky). One important way to do this is to understand faculty job satisfaction and find ways to improve it.

Faculty Job Satisfaction

Job satisfaction can be defined as "an overall affective orientation on the part of individuals toward work roles which they are presently occupying" (Kalleberg, 1977, p. 126). Yet even among upper administration at colleges and universities, faculty job satisfaction is not necessarily a high priority. "Faculty satisfaction is at best a trivial concern easily superseded by the more urgent concerns of student outcomes such as academic achievement and financial efficiency" (Hagedorn, 2000, p. 5).

One possible reason for the relatively low priority placed on job satisfaction is that faculty members at U.S. colleges and universities report high levels of overall job satisfaction, averaging between 78% and 88% depending on the survey (Gappa et al., 2007). Of faculty responding to the National Survey of Postsecondary Faculty (NSOPF), 84.6% in 1999 (Clery, 2002) and 87.5% in 2004 (Gappa et al.) indicated that they were either "very satisfied" or "somewhat satisfied" with their job overall regardless of gender, race or ethnicity, institutional type, and full-time or part-time status. This high level of satisfaction is accompanied by a fundamental aspect of faculty work not easily duplicated in other professions: freedom to pursue knowledge within a community of scholars in a workplace

dedicated to learning (Bowen & Schuster, 1986). However, job satisfaction can directly influence faculty decisions to leave an institution (Bluedorn, 1982; Mobley, 1977; Smart, 1990; Zhou & Volkwein, 2004) and overall averages are less useful for individual institutions seeking to retain faculty members. Faculty may enjoy their profession relative to all others, but there are many colleges and universities where they can pursue their profession. High levels of satisfaction with faculty work in general do not preclude faculty from exploring other institutions of higher education.

Despite its importance, the reasons why one faculty member is more satisfied than another are not easily delineated. Many factors in combination influence faculty job satisfaction including institutional characteristics, personal characteristics, and work experiences (Austin & Gamson, 1983; Cameron, 1978; Zhou & Volkwein, 2004). Personal and work experience factors include recognition of one's work, professional autonomy (Gappa et al., 2007; Hagedorn, 2000; Lindholm, 2003; Olsen, Maple, & Stage, 1995), challenging work, ability to form meaningful relationships (Gappa et al.; Hagedorn; Lindholm), workload (Hagedorn; Olsen, 1993), colleagues (Hagedorn; Lindholm; Olsen), job security (Olsen), gender, race, and ethnicity (Gappa et al.; Olsen et al., 1995; Trower & Bleak, 2004) among others.

Institutional characteristics that impact job satisfaction include the size of a college or university (Hagedorn; Lindholm), institutional culture (Hagedorn; Johnsrud & Rosser, 2002; Lindholm; Olsen), financial and other campus resources (Gappa et al.; Johnsrud & Rosser; Lindholm; Olsen), geographic location (Gappa et al.; Lindholm), academic status or prestige (Hagedorn; Lindholm; Olsen), and salary and other forms of compensations (Gappa et al.,

2007; Hagedorn, 2000; Johnsrud & Rosser, 2002; Lindholm, 2003; Olsen, 1993). Since this study examines the effects of relative differences between institutions, I will focus primarily on institutional characteristics that influence job satisfaction. These variables are discussed in more detail in Chapter 3.

Despite high levels of job satisfaction, it is important to remember that reported averages for all faculty members can also mask significant differences by subgroup. For example, when faculty members report their job satisfaction about more specific aspects of their job (e.g., salary, work/life balance), significant differences emerge by gender, race and ethnicity, tenure status, and academic rank (Gappa et al., 2007; Hagedorn, 2000; Lindholm, 2003; Olsen, 1993; Seifert & Umbach, 2008; Smart, 1990; Zhou & Volkwein, 2004). Some differences by subgroup can introduce bias in the reported levels of satisfaction and include faculty age, experience, and academic rank. Older faculty and those of higher rank are less likely to leave their institution except for retirement (Smart; Zhou & Volkwein) and tend to have higher levels of job satisfaction than younger faculty with lower rank (Hagedorn). Studies of non-faculty employees have found similar positive correlations between age or work experience in job satisfaction (Herzberg et al., 1957; Kalleberg, 1977) and a tendency to consider aspects of the job that meet expectations as more important than those aspects that did not meet expectations (Taris, Feij, & Capel, 2006). Over time, this effect can introduce bias due to attrition because less satisfied faculty tend to leave and more satisfied faculty tend to remain.

These lower levels of job satisfaction among younger faculty are most pronounced among tenure-track assistant professors. One study found that only 75% of tenure-track

faculty members were satisfied with their job (Trower & Bleak, 2004). A reason for this relative lack of job satisfaction may be due to the rigor and competitive nature of life on the tenure-track. Heavy workloads, high levels of job scrutiny, and stress to publish for probationary faculty members may leave many in doubt about their decision to pursue a job in academia (Gappa, Austin, & Trice, 2007). In part due to their greater variability in reported job satisfaction and relative lack of experience, this study focuses on tenure-track, assistant professors, who have little to no previous experience as faculty members.

Effects of Job Satisfaction on Faculty Turnover

A major factor related to attrition is the degree to which individuals are satisfied with their jobs (Bluedorn, 1982; Mobley, 1977; Mobley, Griffeth, Hand, & Meglino, 1979; Porter & Steers, 1973). A meta-analysis of job attrition studies found that the corrected correlation between job satisfaction and attrition was -0.24 (Carsten & Spector, 1987). That correlation may seem low, but considering that "job satisfaction is actually a very distal cause of turnover, and turnover is a low base rate event, an overall corrected correlation of -0.24 between these two variables is actually quite remarkable" (Jex, 2002, p. 129). Other studies have found that job satisfaction consistently accounts for about 16% of the variation in employee turnover across multiple professional fields (Locke, 1976; Mobley et al.; Porter & Steers).

This link between job satisfaction and faculty turnover may help explain why 23% of non-retiring, full-time faculty reported that they were likely to leave their job within the next three years (Lindholm, Szelenyi, Hurtado, & Korn, 2005). Of that group, 41% planned to leave for a job at another college or university (Lindholm et al.). While turnover can be

expensive for all professions because new employees must be recruited, hired, and trained to replace those that leave (Jex, 2002), turnover in academia can be especially expensive. This expense is due to the large amounts of time and start-up costs that colleges and universities dedicate to recruiting new faculty members (Smart, 1990; Zhou & Volkwein, 2004). While some turnover is natural and not a cause for alarm (Zhou & Volkwein), the faculty who leave are often those the college or university most wanted to retain (Johnsrud & Rosser, 2002). These costs of faculty job dissatisfaction and high turnover "can ill be afforded as we face a diminished pool of faculty applicants and tightening budgets" (Olsen, 1993, p. 468).

Job Satisfaction Theories

This next section briefly outlines the three major theoretical approaches to job satisfaction that have emerged over the years from the fields of psychology, sociology, and organizational studies. I am reviewing these approaches for two primary reasons: the first is to provide a context for the broad range of factors that influence job satisfaction, and the second is to identify which approaches informed the theoretical framework for this study.

The three approaches to job satisfaction include: the impact of job characteristics, the impact of social information processing, and the influence of personal disposition (Jex, 2002). The job characteristics approach defined job satisfaction as resulting from the comparison that employees made between what their job provides and what they expect the job to provide (Jex, 2002; Lawler, 1973). Two criticisms of the job characteristic approach stem from the belief that jobs are not objective entities but social constructions created by employees, and the belief that the job characteristic approach depends on the assumption of need fulfillment, for which there is little empirical evidence (Salancik & Pfeffer, 1978).

Social Information Processing theory proposed two alternatives for how people develop a sense of job satisfaction (Salancik & Pfeffer). The first is that employees retroactively construct a sense of satisfaction based on commitment to an organization. For example, employees may rationalize that a long tenure within an organization must be the result of being satisfied with the job. The second alternative involves social construction of job satisfaction in which employees form notions of satisfaction based on interactions with other employees. For example, an employee who interacts largely with disgruntled employees will probably report lower levels of job satisfaction.

More recently, studies of job satisfaction have focused on dispositional or personality approaches to job satisfaction. Personality approaches focus on the pre-existing dispositions of employees and their impact on the level of satisfaction with a job independent of the type of job or organization for which they work, (Jex, 2002). For example, one study found that adolescent job satisfaction predicted later job satisfaction in adulthood regardless of the type of job held in adolescence or adulthood (Staw, Bell, & Clausen, 1986).

Job satisfaction is probably determined by a combination of job characteristics, social information processing, and the effects of disposition. However, most empirical evidence favors the influence of job characteristics (Jex), the approach used in this study.

Informed by the prior research, this study uses a job characteristics approach to employee satisfaction that examines the extent to which a job and employer meet an employee's expectations for the job, also known as *met expectations* (Porter & Steers, 1973). This was deemed the most reasonable approach for examining whether prior experience in higher education influenced expectations, and in turn, satisfaction, with one's current higher

education work setting. Met expectations research will be covered in greater detail in the next section.

Met Expectations Research

The met expectations hypothesis emerged from the job characteristics approach to job satisfaction as a way to understand why some employees are more satisfied or dissatisfied than others (Porter & Steers, 1973; Wanous et al., 1992). This research examined applicants for jobs who were later hired and examined differences between initial job and organization related expectations and actual job experiences (Locke, 1976; Porter & Steers, 1973). "Met expectations may be viewed as the discrepancy between what a person encounters on the job in the way of positive and negative experiences and what he expected to encounter" (Porter & Steers, p. 152). The needs and expectations that employees bring to their jobs influence their overall work satisfaction (Kalleberg, 1977), and unmet expectations can negatively impact job satisfaction and influence employee attrition (Lawler, 1973; Locke, 1976; Louis, 1980; Porter & Steers, 1973; Turnley & Feldman, 2000; Wanous, 1973; Wanous et al., 1992). Past "organizational contexts shape [employee] perceptions of what their present conditions 'ought' to be." (Kirschenbaum & Mano-Negrin, 2002, p. 535). Additionally, the more the aspects of a new situation differ from the previous one "the more [issues] the newcomer potentially has to cope with" (Louis, 1980, p. 235).

L. W. Porter and Steers (1973) measured the impact of applicants' job expectations on their later job satisfaction as employees. Drawing on past research, I am conducting a variation on their work by examining the expectations formed from prior experiences and their influence on perceptions of the current job experience (Moser, 2005; Porter & Steers,

1973; Taris et al., 2006; Turnley & Feldman, 2000; Wanous et al., 1992). Prior work experience does have a positive impact on employee outcomes when entering a new work environment. Studies have found that prior experience has a positive impact on employee socialization (Beyer & Hannah, 2002; Carr, Pearson, Vest, & Boyar, 2006), employee retention (Kirschenbaum & Mano-Negrin, 2002), job satisfaction (Rakestraw & Weiss, 1981), and influences the aspects of a job that an employee finds most important (Kalleberg, 1977). As opposed to new employees who are exposed for the first time to the work skills and norms of their job, "veteran newcomers" draw from cognitive frameworks and behaviors learned from past experience to help make sense of a new work environment (Brett, Feldman, & Weingart, 1990; Carr et al., 2006; Feldman, 1981). These veterans have "internalized beliefs, values, and job expectations unique to their industries" (Carr et al., 2006, p. 347) and as a result tend to be retained at higher rates than new employees (Beyer & Hannah, 2002).

A logical conclusion to met expectations research is that lower expectations may be desirable because they are more likely to be met (Porter & Steers, 1973). Theoretically better than low expectations are realistic expectations or what Feldman (1981) referred to as a *realistic job preview*. One method of testing for realistic job expectations is to look at job hires where the organizational context remains constant. Several studies have found that employees hired for different jobs or promoted within an organization had significantly fewer unmet expectations, experienced greater job satisfaction, and were more committed to the organization than outside hires (Moser, 2005; Wanous et al., 1992). Other studies have

shown that people hired based on referrals by current employees had more realistic job expectations (Breaugh & Mann, 1984) and higher job satisfaction (Latham & Leddy, 1987).

Met expectations among college faculty. The same discrepancy between expectations and realities can be observed when faculty members move from one college or university to another. "The new institution's workings are inevitably different enough from those of the previous institution to cause problems" (Menjes, 1999, p. 3). While most future faculty are trained and socialized at research universities, most faculty work at colleges and universities with less emphasis on research (Gappa et al., 2007). For example, one study (Daly & Dee, 2006) reported that faculty with research-driven theoretical training experienced expectation conflicts at urban institutions with a more community-centered research focus aimed at solving social problems. A new faculty member expecting a large research agenda at such a college or university may experience "culture shock" to find a "life dominated by teaching and punctuated by occasional opportunities for research" (Menjes, 1999, p. 3). The met expectations hypothesis would predict that if the faculty at those urban universities had been educated at colleges or universities with similar teaching and research priorities, they should experience less work dissonance and greater job satisfaction (Daly & Dee, 2006).

Expectancy theory critique. One potential critique of the met expectations hypothesis stems from expectancy theory, with which it shares some common characteristics (Wanous et al., 1992). Expectancy theory looks at two factors that influence job applicant choice of an organization or employer: the applicant's expectations of the organization's characteristics, and the value the applicant places on those characteristics (Lawler, 1973;

Vroom, 1966; Vroom & Deci, 1971; Wanous, 1977). Because future faculty have some degree of choice in their employing institutions, expectancy theory would predict that future faculty choose a tenure-track job that best meets their needs or fit their expectations. If true, little discrepancy should be found between job expectations and job reality, and therefore little, if any, impact on job satisfaction. Expectancy theory predicts that faculty will try to select an institution that is the best match to their expectations. However, there is also evidence, presented in the following section, that most faculty have limited job options. While future faculty ultimately chose their jobs, their choice of tenure-track jobs may be very limited due to the academic job market.

Limited availability of tenure-track positions. The limited number of available tenure-track jobs currently available is very different from the "sellers" market in the 1960s and early 1970s when colleges and universities experienced rapid growth, faculty jobs were plentiful, and new professors could expect rapid advancement up the ranks (Altbach, 2005; Zusman, 2005). This period of hiring resulted in an "age bulge" in which large numbers of those faculty hired in the 60s and 70s are still working today, thereby limiting the number of available jobs (Altbach, 2005). Due to budget constraints, these faculty members are increasingly replaced upon retirement with non-tenure-track faculty (Altbach, 2005; Schuster & Finkelstein, 2006). While the number of professors in higher education has doubled since the 1970s and faculty hires are expected to increase (Jones, 2002-2003), a shrinking proportion of these positions will offer the possibility of tenure (Altbach, 2005; Austin, 2002; Gappa et al., 2007; Schuster & Finkelstein, 2006; Zusman, 2005). From 1975 to 1998, the proportion of assistant professors that comprise the total number of faculty has shrunk from

30.4% to 22.5% (Schuster & Finkelstein, 2006). The result is that it now takes longer for Ph.D. graduates to find permanent career positions (Zusman, 2005).

Anecdotal evidence also supports the conjecture that there are limited job options for new doctorate recipients. There is a belief, especially in some fields, that "[tenure-track] jobs are so scarce, even the best candidates are not guaranteed a position" (Zapp, 2007, March 9, p. C3). Henry Rosovsky, former Dean of Arts and Sciences at Harvard University, found that "places for young scholars in all institutions and practically all fields have diminished" (1990, p. 140). August and Waltman (2004) speculated that the reason their study found no significant difference in junior faculty satisfaction with salary was because junior faculty were simply happy to have a tenure-track job. If true, tenure-track faculty may be more likely to take jobs at institutions of higher education that they would normally not consider due to limited job opportunities. These non-preferred colleges or universities are more likely to be schools with institutional characteristics very different from those colleges and universities in which faculty were trained and with which they are most familiar. Job scarcity may therefore serve to reduce the self-selection bias that might exist if new faculty were able to choose employing institutions that best meet their needs and expectations.

Cognitive dissonance critique. Yet another critique of met expectations comes from cognitive dissonance theory outlined by Festinger (1957). Cognitive dissonance predicts that job applicants who accepted their second or third job choice, would later rate the job they chose as being much more desirable than they had initially. Faculty who may have accepted a job at a college or university that did not meet their expectations may rationalize the choice as being a better fit after the fact. Several studies have found evidence to support this effect

(e.g., Vroom, 1966). However, in a follow-up with the respondents from Vroom's initial study (1966), Vroom and Deci (1971) found that employees' higher ratings of second and third job choice desirability, likely due to the need to reduce cognitive dissonance, had dropped significantly by the end of the first year on the job. When the respondents were again asked to rate their job two and a half years later, their lower ratings of job desirability remained consistent (Vroom & Deci, 1971). This finding implies that while cognitive dissonance may cause job seekers initially to rationalize their second or third job choice as the better or best choice, the effect is temporary.

Expectations provide context by which faculty members evaluate their employing institution, and it is important to examine the origin of these expectations. The literature suggests that employees with previous work experience apply their learned expectations to their current job. The next section will explore some of the institutional characteristics of institutions of higher education that may help form expectations of work environment.

Institutional Characteristics that Influence Faculty Satisfaction

The relevant institutional characteristics that have been shown to influence faculty job satisfaction have been grouped into three broad categories that include: (a) institutional and academic reputation, (b) institutional financial resources, and (c) institutional diversity, culture, and mission. For a complete list of the variables and their sources, see the Methods section.

Institutional and academic reputation. The reputation or "institutional label" of the college or university where a faculty member is employed serves as an important factor in academic work (Rosovsky, 1990). Faculty report that institutional reputation and status were

important in helping them achieve their professional ambitions (Lindholm, 2003). The selectivity of the student admission process, a variable used in determining some institutional rankings (e.g., U.S. News and World Report) is another factor that influences faculty satisfaction (Hagedorn, 2000). Past studies have also found a negative relationship between perceived levels of institutional or organizational status and turnover (Porter & Steers, 1973). This study includes variables for institutional academic prestige including rate of admitted undergraduate students, standardized test scores, six-year undergraduate graduation rates, and percentage of graduate students.

Institutional financial resources. Not only is the amount and availability of financial and campus resources important to faculty job satisfaction (Gappa et al.; Johnsrud & Rosser; Lindholm; Olsen), past studies found a negative relationship between institutional financial conditions or "resource adequacy" and voluntary turnover (Porter & Steers, 1973; Smart, 1990; Zhou & Volkwein, 2004). Faculty have reported that it was essential for their success that their university provide quality structural support for such things as adequate lab and office space, money for professional conferences, to provide relief from courses, and sabbaticals (Lindholm, 2003; Olsen, 1993). Dissatisfaction with research funding was also found to be a significant factor in faculty attrition (Moore & Gardner, 1992).

Individual salary. Salary has been shown to have a negative correlation with job satisfaction and intent to stay with an organization (Herzberg et al., 1957; Porter & Steers, 1973; Vroom & Deci, 1971). While most studies of faculty have found positive correlations between faculty salary and job satisfaction (Burke, 1987; Hagedorn, 2000; Matier, 1990; Smart, 1990), the general consensus among researchers is that salary is not a primary factor

in faculty job satisfaction. Average faculty salaries vary considerably across institutional type and the salary gap between them appears to be widening over time (Schuster & Finkelstein, 2006). The average salary of faculty members also differs significantly by institutional control with faculty at private colleges and universities being paid significantly more than faculty at public colleges and universities (Schuster & Finkelstein, 2006). Faculty respondent's reported salary has been included as a variable in this study to represent faculty compensation.

Institutional diversity, culture, and mission. The mission, culture, and diversity of an institution are often interrelated and help define its character and personality. Below I will discuss variables related to diversity and critical mass, institutional culture and mission, as well as elements of geographic region.

Critical mass and diversity. Critical mass, or the "level of representation that brings comfort or familiarity within the education environment" (Hagedorn, Chi, Cepeda, & McLain, 2007), is an important factor for underrepresented populations at institutions of higher education. Underrepresented populations at colleges and universities without critical mass may feel marginalized, experience loneliness, isolation, and "culture shock" (Carter, 1999; Hagedorn et al., 2007). For example, colleges with high percentages of White students tend to not emphasis multiculturalism as a high campus priority (Carter, 1999). This study used as variables the percentage of enrolled minority students and the percentage of enrolled female students to represent institutional critical mass and diversity.

Culture and mission. This study examined variables for institutional size, the size and urbanization of institutional setting, geographic region, Carnegie Classification, and

institutional control to represent institutional mission and culture. Lindholm, Astin, Sax, and Korn (2002) found that faculty ranked three factors as the most important to their decision to work at their college or university: institutional emphasis on teaching, geographic location of the college or university, and colleagues. Research has also shown that faculty satisfaction is influenced by institutional size, control, and mission (Austin & Gamson, 1983; Hall, 1995; Kalleberg, 1977; Volkwein, Malik, & Nepeirski-Prancl, 1998), as well as institutional climate and culture (Hagedorn, 2000). One example of the effect of institutional mission and culture is that Black students attending Historically Black Colleges and Universities (HBCUs) experience greater levels of academic development, engagement, connection, and acceptance than Black students attending predominately White institutions (Carter, 1999).

Geographic location is a significant factor in job satisfaction. Seventy percent of faculty in one survey reported that geographic region is one of the most important characteristics of a faculty job (Gappa et al., 2007). Differences in the size and urbanization of the areas in which colleges and universities are located may also have an impact. A study of relocated employees found that the size of the city was the major predictor of location preference (Pinder, 1977). Another reason for this influence of geography might be because a specific geographic region represents a *home base* or typifies regional or cultural differences valued by a faculty member.

A fact that supports further consideration of the idea of a home base is a tendency for both undergraduate and graduate students to stay close to home. Data from the Beginning Postsecondary Study (BPS) show that 80.6% of all undergraduate college students, 76.5% of Whites, 85.6% of Blacks, and 90.7% of Hispanic or Latino students attended their first

college less than 50 miles from home (National Center for Education Statistics, 2006). However, students who scored higher on admissions tests scores and had higher high school GPAs were more likely to attend school further away from home. For those students with SAT scores above 1400, only 35.9% stayed within 50 miles of home to attend college and 29.1% attended college more than 500 miles from home (National Center for Education Statistics, 2006). Related to GPA, 61.5% of student receiving a 3.5 or above attended school within 50 miles of home (National Center for Education Statistics, 2006). While high school GPA and standardized admissions tests certainly do not measure a person's aptitude for excellence as a professor, it is likely that many future faculty had higher than average GPAs and test scores and could have been more likely to have attended college farther from home.

A similar influence for geographic region was found among people applying to graduate business schools. Montgomery (2002) found that applicants were 98% less likely to attend a business school if it was outside of their home region, and 65% less likely to consider the school as a first choice for attendance. These findings support the idea that the location of a faculty member's undergraduate institution may provide a reasonable proxy for the location of their home region. The study of graduate business students is less definitive and may be skewed by part-time students, but it does provide support for the idea that students tend to resist moving great distances for graduate education. Similarly, it may be difficult for faculty to take a job that involves relocating across geographic regions.

Individual characteristics related to job satisfaction. In addition to institutional characteristics, a number of individual faculty member characteristics can impact job

satisfaction. These factors, reviewed below, include academic field, prior work experience, gender, race and ethnicity, and marital and family status.

Academic field. It is important to control for faculty members' academic field because faculty experience, even at the same institution, may be different, based on academic field and department (Gappa et al., 2007). Disciplines have different cultures that influence faculty work and satisfaction (Clark, 1997; Golde & Dore, 2004; Hagedorn, 2000; Lindholm, 2003; Seifert & Umbach, 2008).

Prior work experience. Tenure-track assistant professors were selected for this study in part because they are less likely to have had prior higher education work experience. A concern was that some recent doctorate recipients might have taken non-tenure-eligible positions while they searched for tenure track jobs. However, there is little evidence that this happens as "part-time and full-time academic work tend to constitute fairly independent career tracks" (Schuster & Finkelstein, 2006, p. 215). Few non-tenure-eligible faculty members are ever able to move into tenure-track jobs (Finkelstein, Liu, & Schuster, 2003) and 80% of all full-time faculty have reported only full-time job experience (Schuster & Finkelstein, 2006).

Gender, race, and ethnicity. A broad literature exists documenting the differences by gender for many issues that impact faculty job satisfaction. For a review of some of these issues there are several good research articles (Amey, 1996; August & Waltman, 2004; Gappa et al., 2007; Hagedorn, 2000; Mason & Goulden, 2002; Nerad, Aanerud, & Cerny, 2004; Perna, 2001b; Schuster & Finkelstein, 2006; Tack & Patitu, 1992; Tierney & Bensimon, 1996; Valian, 1998; Zhou & Volkwein, 2004). Faculty satisfaction also differs by

race and ethnicity (Nerad et al., 2004; Olsen et al., 1995; Seifert & Umbach, 2008; Tierney & Bensimon, 1996). Similarly, faculty of color, especially underrepresented faculty of color, perceive aspects of faculty life differently from White colleagues (Austin & Wulff, 2004; Gappa et al., 2007; Johnsrud & Rosser, 2002; Lindholm, 2003; Matier, 1990; Menjes, 1999; Olsen et al., 1995; Perna, 2001a, 2001b; Seifert & Umbach, 2008; Tack & Patitu, 1992; Trower & Bleak, 2004). For a review of variables that mediate faculty job satisfaction by race and ethnicity, see Seifert and Umbach (2008).

Marital and family status. Marital status and the number of dependents can also play a significant role in faculty job satisfaction. Married women with doctorates disproportionately move for their husband's career and accept non-tenure-track employment (Nerad et al., 2004). Some studies have found that family size and family responsibilities are positively correlated with employee turnover, especially among women (e.g., Austin & Gamson, 1983). For this reason, Seifert and Umbach (2008) recommended including interaction effects of gender and whether a faculty member had dependents to help capture the multiple roles that exist for faculty members outside of their jobs. Other studies have not found significant family or marital status effects (Smart, 1990; Zhou & Volkwein, 2004), though Kalleberg (1977) found that the number of dependents influenced other factors, such as the value employees placed on salary.

Theoretical Framework: Collegiate Schemas

I have adopted a theoretical framework based on cognitive schema theory to help frame faculty work environment expectations. College and university faculty are relatively unique in that they have significant prior generalized experience in an educational

environment that will later become their work environment. Other professions offer internships to afford potential future employees with exposure to job roles and work environments; however, these are of comparatively limited duration. The amount of time that a new faculty member spends in a higher education environment prior to their first day on the job can easily exceed 10 years. These experiences in undergraduate and graduate school inform *collegiate schemas*, or mental models that frame expectations about higher education institutions. Faculty satisfaction is influenced by the degree that the employing institution meets these expectations that faculty bring with them from their prior higher education experiences. I propose that there are three main components of collegiate schemas:

1. Institutional context of faculty work expectations: Future faculty form ideal or idealized conceptions of the faculty work life during their undergraduate and graduate education. These conceptions of faculty work life are grounded in the institutional context that these degree institutions provide and probably endure even after idealized notions of faculty life become more realistic with experience.
2. Institutional resource expectations: The level of institutional resources, faculty support, and prestige at faculty member's degree institutions provide implicit and explicit expectations for future higher education work environments. For example, a faculty member who earned a degree at a well-funded research university might have higher expectations for the level of research funding at her employing institution.
3. Institutional mission and culture expectations: The characteristics of an institution that contribute to its institutional type, mission, and culture at faculty member's

degree institutions provide implicit and explicit expectations for future higher education work environments. For example, a faculty member working at a predominately White college would likely have different expectations for institutional commitment to diversity had he or she attended a Historically Black College or University (HBCU).

Cognitive schema theory. These expectations about what a college or university "should" be, or "should" be like are generated, at least in part, by schemas. Schemas, or categories of knowing that people use to interpret the world, were first used by Piaget (1926) to describe aspects of the learning process of children. For example, a person may possess a schema, based on experience, that all bears are brown until they see a polar bear, resulting in a modification of that schema, or an alternative explanation that supports the current schema. Similar to this Piagetian notion, but emerging from cognitive science research, is the concept of a cognitive schema (Bartlett, 1932; Piaget, 1926), also referred to as a cognitive *script* (Abelson, 1981; Bolman & Deal, 2003; Labianca et al., 2000; Morgan & Schwalbe, 1990; Valian, 1998); *memory structure* (R. C. Anderson, Spiro, & Montague, 1977; Derry, 1996); *mental model* or *construct* (Derry, 1996; Morgan & Schwalbe, 1990; Valian, 1998); a general context for knowledge (R. C. Anderson et al., 1977; Morgan & Schwalbe, 1990); *cognitive framework* (Labianca et al., 2000); *prototype* (Morgan & Schwalbe, 1990); and even *stereotype* (Valian, 1998).

Cognitive schemas are formed from personal experience and stored in long-term memory (Morgan & Schwalbe, 1990), and these long-term memory schemas "are activated in response to environmental input, providing context for interpreting experience" (Derry,

1996, p. 167). In addition to this role as interpreter, schemas also help people organize memories, make judgments about groups and individuals, generate scripts to help navigate social situations, and, most important to this study, make predictions about the future (Abelson, 1981; Bieber & Worley, 2006; Valian, 1998). These cognitive schemas can become so ingrained in a person's thought process as to not be perceived on a conscious level without effort (Valian, 1998).

Cognitive schemas, in theory, are constantly modified by new information and experiences, but once a schema forms it tends to be very resistant to change (Bartlett, 1932; Bieber & Worley, 2006; Derry, 1996; Labianca et al., 2000; Morgan & Schwalbe, 1990; Valian, 1998). "People spend more time attending to the earliest information they receive…and that much of the information they retain over time is based on impressions from this first exposure" (Morgan & Schwalbe, 1990, p. 152). This tendency to favor early impressions has been found in organizations where, for example, employee resistance to change stems more from ingrained schemas than self-interest (Labianca et al., 2000).

Why one collegiate schema does not fit all. Most people, even those who have worked many years in higher education, have had experience with only a limited number of colleges or universities, much less different institutional types and cultures. Therefore, they are disproportionately shaped by the institutional contexts with which they have experience. However, there is no "system" of American higher education, and to subscribe to one ignores the impressive diversity of academic missions, norms, priorities, values, and institutional history that exist at these often very distinct colleges and universities (Clark, 1997;

Rosovsky, 1990). Despite this fact, initial collegiate schemas would likely endure because of the rooted difficulty in thinking beyond one's experiences and context.

A similar concern that helps illustrate the impact of institutional context is that researchers recognize this issue and are careful to note the potential pitfalls of generalizing results from one context to another. A good example comes from a study of two universities by Matier (1990):

> The particular results of this research are not immediately transferrable to many other higher education settings, for the present findings are highly contextualized by the type, cultural milieu, and geographic location of the institutions under investigation. (p. 58)

If research findings are difficult to transfer across higher education settings, I expect similar difficulty in transferring experiences and resultant expectations from one college or university setting to another.

Socialization to faculty work. One critique of any influence of prior experience in an education setting may have on faculty job satisfaction, is that faculty have been socialized to their work during their time in graduate school (M. S. Anderson & Swazey, 1998; Austin, 2002; Golde & Dore, 2000). The faculty socialization process within graduate education has been recognized since the late 1970s as a significant part of preparation for a faculty career (Austin & Wulff, 2004; Golde & Dore, 2001). The primary role it serves is one of *anticipatory socialization*, or the first stage of professional socialization that involves learning about and socialization to a job and organization before one becomes a member (Feldman, 1976, 1981). Anticipatory socialization works best when it provides the employee

with an accurate conception of both the new job and the organization, creating a *realistic job preview* (Feldman, 1981; Wanous, 1989). A thorough socialization process should provide a realistic job preview that significantly reduces any discrepancy between faculty work environment expectations and the reality of working for that institution (Porter & Steers, 1973). As I have discussed above, studies have shown significantly fewer unmet expectations and higher job satisfaction for internal hires (Moser, 2005). Internal hires have already experienced a job preview and have more realistic expectations.

Socialization in graduate school. One response to this critique is that in practice, graduate students tend to receive little systematic socialization to faculty work. As a result, they have a limited understanding of faculty work life and the differences in faculty experiences between different institutions and institutional types (Austin, 2002; Bess, 1978; Gappa et al., 2007; Golde & Dore, 2000, 2001, 2004; Lovitts, 2001, 2004; Wulff et al., 2004). One explanation for this shortcoming is that the faculty workplace has changed dramatically over time so that past notions of faculty preparation are outdated (Austin, 2002). Another possible explanation may originate from the tendency to view higher education as largely homogenous. While new members of an organization tend to seek out information when they perceive a great deal of work environment uncertainty (Miller & Jablin, 1991), future faculty members may not seek out information about different institutional contexts if they regard different colleges and universities as essentially the same. Whatever the reason for the lack of formal socialization, doctoral students need to be provided with "a more realistic, versatile notion of the academic profession…depending on institutional context" (Nyquist, Woodford, & Rogers, 2004, p. 212).

One strategy to address the limitations of current faculty socialization is the Preparing Future Faculty Program (PFF). PFF was created by a collaboration between the Council of Graduate Schools and the Association of American Colleges and Universities (AAC&U) in 1993 to help graduate students interested in the professoriate become competent in all aspects of faculty responsibilities including teaching, research, and service (Pruitt-Logan & Gaff, 2004). Part of the program involves having graduate students, who are typically educated at large research universities, serve as teaching assistants at non-research-oriented institutions such as liberal arts colleges or community colleges (Pruitt-Logan & Gaff). From a collegiate schema prospective, this experience should help expand a student's experiences with different colleges and universities and provide additional institutional context for faculty roles. Findings from a recent PFF survey support this idea. Of the approximately 4,000 "core participants" in the program during PFF's first 10 years, participants reported one of the main benefits of the program was gaining an understanding of the wide variety of institutions of higher education where they might be employed (Pruitt-Logan & Gaff).

Socialization as faculty. The role socialization process rarely improves once a student becomes a new faculty member. Socialization to faculty roles has typically been informal and new faculty often must learn on the job how to navigate their academic environments (Gappa et al., 2007; Olsen, 1993; Perlman et al., 1999). This limited orientation may explain why new faculty tend to feel isolated and perceive a lack of collegiality in their jobs (Austin, 2002; Menjes, 1999). As mentioned previously, new employees seek out new information, especially in an uncertain environment. However, employees are much less likely to seek out information if they perceive there is a social cost

in requesting information, such as the risk they will appear incompetent (Miller & Jablin, 1991). Lacking a systematic orientation to different institutions, I expect new faculty to rely on their collegiate schemas to provide them with the same cognitive scripts and mental maps to help navigate their new environment.

Socialization and the role of schemas. One counterargument to the idea that degree institutions play a role in constructing collegiate schemas is that attending college is qualitatively different from an internship, summer job, or direct experience working as a faculty member. The explicit purpose is not the same. Students attend college ostensibly to gain an education and earn a degree, not to "try out" higher education as a future work environment. However, future faculty members are a reasonably small subset of college students and there is evidence that many, if not most of them, began contemplating faculty work and the faculty work environment as undergraduates.

Bieber and Worley's study (2006) of graduate students' perceptions of faculty life found that graduate students were either not being socialized or resisted socialization by graduate school mentors into their respective disciplines or professions. These graduate mentors had little influence on doctoral student notions of faculty life. Instead, Bieber and Worley (2006) believe that most students formed an *ideal script* or schema of faculty life during their undergraduate years. It was during this time that students first had interactions with faculty members that motivated them to consider the life of an academic (Austin, 2002; Bieber & Worley, 2006). These ideal scripts were found to be remarkably resistant to any conflicting information. Bieber and Worley (2006) discovered that:

> Once established and modified to include our respondent's own image of self-as-faculty, this 'script of an ideal faculty life' continued to exist relatively unchanged for the vast majority of our respondents, despite subsequent negative experiences or conflicting information encountered in graduate school. (p. 1032)

Also supporting the influence of collegiate schemas is research by Lovitts (2004) that found graduate students who had established close relationships with faculty during their undergraduate years were disappointed when they did not have a similar experience in graduate school. Students who had attended a liberal arts college as undergraduates were especially disappointed (Lovitts, 2004). This research suggests that even if a perfect curriculum existed for socializing people to faculty work, unmet expectations may still play a significant factor in perceptions of new collegiate environments.

While ideal scripts provide a window into understanding how collegiate schemas may function, collegiate schemas as defined for this study differ from ideal scripts in two significant ways. The first is that collegiate schemas do not attempt to represent knowledge of faculty work, but utilize institutional characteristics as representative of higher education job environment expectations. They do not provide insights into teaching or research techniques, but instead provide an organizational and environmental context for faculty work. The art of teaching may not differ significantly by institutional type, but the emphasis on teaching may differ from one college or university environment to another. A faculty member with job expectations based on experience at a small liberal arts institution or teaching college may experiences some dissonance with the priority of teaching at a research university.

The second difference is that collegiate schemas are not ideals. Nor are the work environment expectations that faculty form necessarily idealistic in nature. They are instead mutable mental models that provide a baseline of experience by which similar future experiences within institutions of higher education are evaluated. These expectations if not met, may result in dissonance and job dissatisfaction. Conversely, if these expectations are exceeded by an employing institution, we would expect to see higher levels of job satisfaction.

The influence of shared knowledge. Another possible criticism of collegiate schemas is that faculty may not need to have personally experienced other higher education institutional types or settings to make meaningful comparisons between them and their employing institutions. Instead, they may have friends on the faculty at different institutions with whom they share experiences. This is especially likely for faculty members who create partnerships with faculty at other institutions as part of their scholarly work and attend national and international conferences. Through these connections, faculty could make informed comparisons in salary, institutional prestige, and other institutional characteristics such as institutional monetary support.

Summary of Literature Review

In summary, faculty satisfaction and possible subsequent faculty attrition is a concern for colleges and universities. Faculty satisfaction is influenced by myriad factors including those related to institutional characteristics of the employing college or university. One established method for accounting for employee and faculty satisfaction is the met expectations hypothesis that looks at differences between faculty expectations and the

realities of the job and employing organization. This study uses cognitive schemas as a theoretical model to help explain how institutional characteristics and work environments may provide additional or alternative indicators or faculty job satisfaction. Next in the Methods section, I will detail the statistical design, faculty sample, data sources, and variables used to test my hypotheses.

Chapter 3: Methods

This study compares characteristics of the institutions where faculty earned their bachelor's and doctoral degrees with those of their employing institutions to test the collegiate schema hypotheses. Multivariate ordinary least squares (OLS) regression analysis was used to determine if differences between these institutional characteristics predict faculty job satisfaction. The primary hypothesis for this paper is that the colleges and universities where faculty have earned degrees establish a context or set of expectations about the higher education work environment that later influences faculty perceptions of their higher education work environment.

Data Source

Three potential pools of data were identified to obtain faculty job satisfaction responses. These included the National Survey of Postsecondary Faculty (NSOPF), the Association of American Universities Data Exchange's Faculty Satisfaction Survey (AAUDE-FSS), and the Survey of Doctorate Recipients (SDR). The principal requirements for inclusion in this study were the ability to match the survey responses of individual faculty not only to their employing institution, but also to their degree institutions.

The NSOPF is a National Center for Education Statistics (NCES) survey that has regularly surveyed a wide cross-section of faculty at U.S. institutions of higher education. Last conducted between 2003 and 2004, the NSOPF sampled 35,000 faculty and instructional staff at public and private not-for-profit degree granting institutions of higher education (National Science Foundation, 2012). The NSOPF can match individual faculty respondents with their current institution of employment, but due to their system for preserving

confidentiality, cannot identify individual respondents. NCES does not maintain a list of faculty names who responded to the survey for more than a few months after the initial survey has been conducted (L. Zimbler, personal communication, October 9, 2008). It was, therefore, not possible to match individual NSOPF faculty responses to their educational history.

A more recent survey of faculty satisfaction, the AAUDE-FSS, was administered at 12 Association of American University (AAU) member institutions between the fall of 2007 and the spring of 2008 (S. Gahn, personal communication, November, 2008). The survey included a number of questions related to job satisfaction, work environment fit, and work and non-work stressors. While theoretically possible to match faculty survey responses on the AAUDE-FSS to degree history, the process is cumbersome. First, IRB approval would be required from each participating university, and then each university would need to match faculty respondents to educational history prior to removing respondent names from the data. This was deemed an overly cumbersome and unreliable method of obtaining a limited institutional sample that included only AAU members, a group not representative of the population of four-year colleges and universities.

Ultimately, I chose the Survey of Doctorate Recipients as my source of faculty satisfaction data. The SDR is a longitudinal follow-up survey to the Survey of Earned Doctorates (SED) that targets a stratified random sample of SED completers with doctorates in science, social sciences, engineering, and health fields (National Science Foundation, 2012). The SDR surveys these U.S. doctorate recipients regarding their current and past employment, including questions about job satisfaction, until they reach the age of 76

(National Science Foundation, 2012). The SDR, through its link to the SED, can also match individual faculty responses to self-reported college degree history. Of the available administrations of the survey, I initially chose the 2003 SDR over the most recent 2006 SDR because the 2003 survey instrument includes 10 questions related to faculty job satisfaction. The 2006 survey includes only one overall job satisfaction question. However, during the application process for obtaining SDR data, the staff at NSF discovered significant race/ethnicity coding errors in SDR 2003 and SDR 2006 data. The NSF personnel, uncertain how long it would take to correct the coding problems, advised me to use data from the 2001 SDR. The 2001 administration of the SDR did not include an overall job satisfaction question, but it did include the other nine job satisfaction questions.

The SDR data, for the reasons outlined above, was a very good fit for testing the hypotheses of this study, but the instrument has several limitations. First, due to its focus on recipients of a doctorate, it does not include non-doctoral terminal degrees. Second, two of the academic fields in the SDR, engineering and health sciences, draw from professionals who may have significant work experience prior to work as faculty. This prior work experience might serve to mediate any met expectations effects between degree institutions and employing institutions. Additionally, professionally oriented programs like engineering can differ substantially from more theoretically oriented disciplines and these differences may influence perceptions of work satisfaction (Schuster & Finkelstein, 2006). Third, the SDR tends to survey more science, technology, engineering, and mathematics (STEM) field faculty, as defined by NSF, and relatively few faculty from the arts and humanities (see Table 1 for a more list of academic categories)

Table 1

Summary of Academic Categories for Faculty in Sample

Academic Category	n	%
Computer/Math Sciences	75	10.8%
Life Sciences	87	12.5%
Physical Sciences	93	13.3%
Social Sciences	257	36.9%
Engineering	86	12.3%
Non-Science & Engineering	99	14.2%
Total	697	100.0%

Ethics

The use of individually identifiable data from the National Science Foundation's Survey of Doctorate Recipients required an application for a restricted data license. The restricted data license required that no data provided be released outside of this project and that no data that could identify respondents be inadvertently or deliberately disclosed. For that reason, NSF required that I suppress data in some tables. Survey data had to be analyzed on a password protected computer designated for working with restricted data, located in a secure location, and physically disconnected from the internet. All data were returned to the National Science Foundation at the conclusion of the study. The use of NSF data does not imply NSF endorsement of the research methods or conclusions contained in this report.

Sample

The SDR respondents chosen for this study consisted of faculty who:

- Received their doctorate within 10 years of the survey's administration

- Received both bachelor's and doctoral degrees from a U.S. college or university
- Were employed full-time as assistant professors for less than 10 years
- Worked at four-year, not-for-profit, U.S. institutions of higher education
- Indicated that their primary job responsibilities were teaching or research
- Were on the tenure-track

I chose tenure-track professors because they are new or "probationary" professors who tend to be younger in age and have less faculty job experience. As mentioned in the literature review, older faculty tend to be more satisfied (Smart, 1990; Zhou & Volkwein, 2004) and less likely to leave (Herzberg et al., 1957; Kalleberg, 1977). This positive correlation between age and job satisfaction has also been found in non-faculty workers (Beyer & Hannah, 2002; Brett et al., 1990; Carr et al., 2006; Moser, 2005; Porter & Steers, 1973).

Increased job satisfaction with age is likely the result of two factors: self-selection bias, and lowered job expectations. Self-selection bias is the result of attrition; faculty who were less satisfied tend to leave a university over time. Some dissatisfied faculty stay at one university, while some very satisfied faculty leave, but the trend over time would result in the retention of the satisfied and thus higher levels of satisfaction among older faculty.

Lowered job expectations result from employees expecting less from their work situation or having their expectations of the work environment become more realistic over time. Faculty members who have spent more time at a college or university may not necessarily be more satisfied, but instead less dissatisfied. This is the result of internalizing

or coming to terms with the reality of their work environment resulting in expectations that better match reality (Vroom, 1966; Vroom & Deci, 1971).

Job experience can be a factor for tenure-track faculty because the tenure ranks includes full and associate professors in addition to assistant professors. Faculty members of higher rank, but without tenure, tend to have more experience prior to starting the tenure track (S. Gahn, personal communication, April, 2008). In order to formally recognize this experience and attract these people to their institution, colleges and universities often grant them a higher starting tenure status and typically, a correspondingly higher salary (S. Gahn, personal communication, April, 2008). To help address this issue, I further limited the sample to only assistant professors on the tenure-track who have served as assistant professors for less than 10 years.

I could have controlled for faculty, age, experience, and rank in the model instead of excluding older faculty with more experience and higher rank from the sample. However, as the study examined the role of previous higher education experience on cognitive schemas, I hypothesized that newer faculty with less faculty job experience were more likely to draw upon their higher education experiences as undergraduate and doctoral students. For this reason, the sample is further narrowed to include only faculty who received their doctorate within the last 10 years.

I limited the sample to faculty at four-year, not for profit U.S. institutions of higher education to minimize variation in faculty responses due to job role. Included in the sample were only those faculty who indicated that their primary work activity was research or teaching. Of the faculty respondents who indicated that teaching was their primary activity,

only those who also spent at least 10 percent of their time conducting basic or applied research were kept in the final sample. This led to only one faculty member being dropped from the sample. All faculty who indicated research as their primary activity also spent at least 10 percent of their time teaching.

I wanted to minimize the variation in faculty job responsibilities while recognizing that the percent of time spent on research to teaching varies across institutions. If the sample was too narrowly defined by faculty role, it might exclude faculty who spend more time teaching than conducting research (e.g., those that work at liberal arts institutions). Finally, I excluded faculty who had not received both their undergraduate and doctoral degrees from U.S. colleges or universities due to the difficulty in obtaining comparable institutional characteristics from foreign institutions of higher education.

Merging SDR and IPEDS data. For the study it was necessary to match faculty member's bachelor's, doctoral, and employing institution to its corresponding Integrated Postsecondary Education Data System (IPEDS) institutional characteristics. Record-level Survey of Doctorate Recipient (SDR) data was needed to make the match and therefore it was first necessary to obtain a restricted data license from the National Science Foundation (NSF). While some SDR data are publically available through the NSF website, a restricted data license, and the accompanying stringent security requirements, was needed to obtain potentially identifiable NSF data.

After receiving the complete 2001 SDR dataset, the variables relevant to the study were merged with IPEDS data. As detailed above in the discussion of the study's sample, only the job satisfaction responses of faculty educated in the United States, who had earned a

doctorate within the last 10 years, and were employed in education, health sciences, or research at non-medical school institutions of higher education were kept in the dataset.

Faculty respondents employed at specialized medical schools were dropped from the study for two reasons. The first reason is that their jobs and work environment culture differ greatly from most institutions of higher education. The second reason is that medical schools receive unusually high levels of research funding per student compared to non-medical colleges and universities. For the survey respondents, this resulted in institutional spending per student that was more than six standard deviations above the mean.

These constraints narrowed the dataset from approximately 40,000 respondents to 3,680. Demographic variables (e.g., race and ethnicity, sex, marital status) for each faculty member in the final sample were maintained as covariates in the regression models. Finally, some characteristics of degree institutions (e.g., Carnegie Classification, geographic region) were also available through IPEDS, but maintained for the purpose of conducting validity checks.

In selecting IPEDS data for the merge with SDR data, it seemed logical to use 2001-2002 IPEDS data as it was the period of time closest to the 2001 SDR administration date. This provided a close approximation of the collegiate environment, in terms of institutional characteristics, that existed for faculty at their employing institutions while they were completing the survey. One limitation of choosing the 2001-2002 IPEDS data is that SDR faculty respondents attended college for their bachelor's and doctoral degrees prior to 2001. IPEDS data from 2001-2002 would not reflect the institutional characteristics of each faculty

member's university at the time of attendance and formation of the hypothesized collegiate schema.

A hypothetical faculty respondent could have earned both her bachelor's and doctoral degrees from Michigan State University and later accepted a faculty position at Michigan State. To match IPEDS characteristics to each period of time would require three different IPEDS datasets for one person who had attended only one university. Matching each IPEDS collection period to each year of attendance would likely require dozens of separate datasets, many of which would have had missing variables or, depending on the year, used different methodologies for calculating similar variables.

Such a match would be imprecise, burdensome, and likely unnecessary due to the relatively stable nature of institutional characteristics at institutions of higher education over time. For this reason, I decided to use the IPEDS data available that was closest to the time of the SDR administration. For all institutional characteristics in the model, with one exception, the 2001-2002 IPEDS data were used. The exception was for the degree of urbanization variable, which was not available until 2005 in IPEDS. Fortunately, the level of urbanization category for a community surrounding a college or university is unlikely to change substantially over a period of four years.

After downloading the institutional characteristics from IPEDS, three distinct merges were run to create the final dataset. IPEDS data was first matched by UNITID, a unique identifier for each institution of higher education in IPEDS, to the bachelor's institution of each faculty member. This was then followed by matches of IPEDS data to each doctoral institution and then to each employing institution. Of the 2,565 faculty who met the

sampling criteria, 1,680 matched all three of their institutions (i.e., bachelor's, doctoral, and employing) to the IPEDS data. The final factor for determining the study's sample was tenure status. While full-time assistant faculty at colleges and universities with no tenure system were likely similar to their tenure-track peers, I decided to minimize any variability in satisfaction due to rank and status by selecting only tenure-track assistant faculty. This final group comprised 934 or 55.6% of the remaining sample. The complete Stata 11.0 syntax for the SDR and IPEDS dataset transformations, as well as the requisite data merges, variable recoding, and statistical analysis are available in the Appendix.

Sample Size

Due to missing institutional expenditure and standardized test data, only 697 of the 934 faculty respondents in the final sample had complete data for all variables. Data appeared to be missing at random because the proportion of faculty by academic field, race/ethnicity, gender, marital status and citizenship did not differ substantively between the original group of 934 and the final sample of 697. Of these faculty members in the final sample, 11% were employed in Computer or Mathematics fields, 13% were employed in the Life Sciences, 13% in the Physical Sciences, 37% in the Social Sciences, and 12% in Engineering. Sixty-eight percent of faculty self-identified as White, 12% as Black, 10% Hispanic, 7% Asian, 2% Native American, and .3% Other. Of the faculty in the sample, women comprised 43% of the respondents, 64% of respondents were married, 35.1% of respondents had dependent children, and 97% of respondents were U.S. citizens. Forty-eight percent of respondents had been working at their institution for less than three years and the other 52% had been working there between three and eight years.

Alpha level. As is standard practice for many statistical analyses, the alpha level for determining the threshold of statistical significance in this study was set at $\alpha = .05$.

Collinearity. Problems with collinearity among the independent variables were identified using a correlation matrix and an examination of the variance inflationary factors within the models. Variables with higher inflationary factors and high correlation with other variables were considered for removal from the models. Prior research was used as a guide to determine which of two highly correlated variables should be dropped.

Heteroskedasticity. Issues with heteroskedasticity, or non-normal distribution of the dependent variable, were examined using White's test. To correct for issues with heteroskedasticity, robust standard errors were used in all models.

Variables and Covariates

This study is unusual not due to the dependent variables or covariates chosen for the different models. The institutional characteristics chosen as a basis for the independent variables were determined by a review of previous research in faculty job satisfaction. What makes this study unusual, and perhaps unique, is its use of difference scores to measure differences in institutional characteristics between institutions. As the analysis of difference scores in a regression model can be challenging, this next section makes a special effort to explain the use of difference scores, in addition to reviewing the covariate and dependent variables used.

Dependent variable. Faculty job satisfaction, or rather the factor score of responses to several questions about job satisfaction, is the dependent variable for this study. The 2001 SDR included nine different job satisfaction questions that included satisfaction with salary,

benefits, job security, job location, opportunities for advancement, intellectual challenge, level of responsibility, degree of independence, and contribution to society. The nine questions used a four-point Likert-type scale with the following labels: "Very Satisfied," "Somewhat satisfied," "Somewhat dissatisfied," "Very dissatisfied."

In order to create an overall measure of faculty job satisfaction I used Varimax rotated principal component factor analysis to create a factor score from the nine job satisfaction components (Spector, 1992). Two distinct factors emerged: work satisfaction, and compensation satisfaction (see Table 2 below). The work satisfaction factor score included six job satisfaction items related to satisfaction with opportunities for level of responsibility, intellectual challenge, degree of independence, contribution to society, advancement, and job location (Cronbach's $\alpha = .80$). The compensation factor score loaded on three items related to satisfaction with salary, benefits, and job security (Cronbach's $\alpha = .63$). Both factor scores are standardized scores, meaning that their coefficients are reported in terms of standard deviations.

The compensation satisfaction factor was dropped from the analysis for two reasons. The first was that this study focused on the impact of cognitive schemas and met expectations on faculty perceptions of work. While compensation can certainly influence faculty job satisfaction, the regression models used in this study already control for factors that likely influence differences in compensation across institutions (i.e., relative institutional wealth, institutional size, and Carnegie Classification) as well as faculty salary. The second reason for dropping the compensation satisfaction factor score was that it is only constructed from three items where Spector (1992) recommends using five to nine items, and its

relatively low alpha of .63, falls below the generally accepted threshold of .70 (Nunnally, 1978).

Table 2

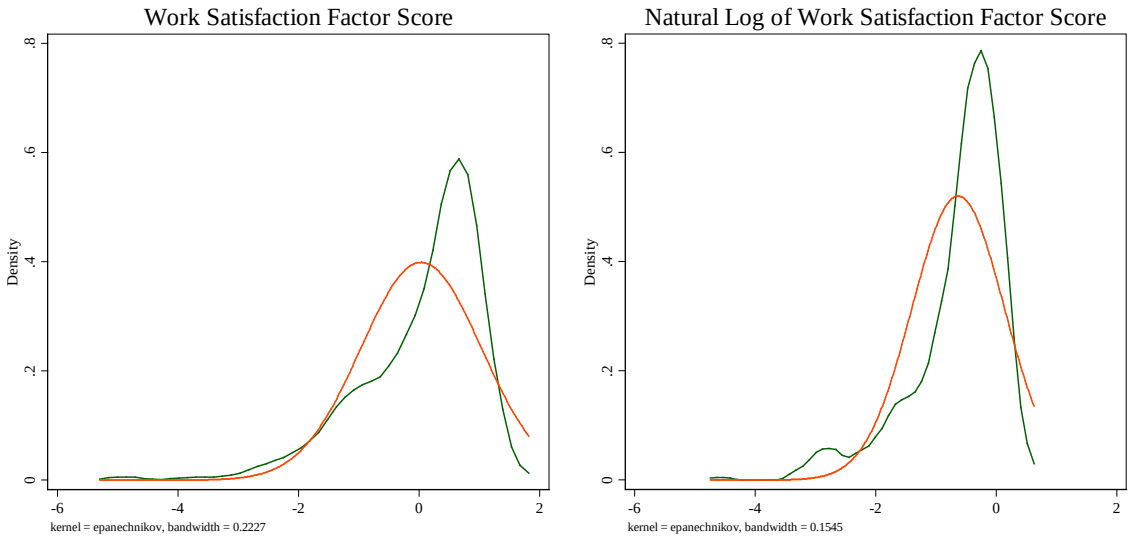
Summary of Factor Analysis Results

Job Satisfaction Component	Work Satisfaction (Factor 1)	Compensation Satisfaction (Factor 2)	Uniqueness
Level of responsibility	**0.794**	0.196	0.331
Intellectual challenge	**0.767**	0.236	0.356
Degree of independence	**0.710**	0.117	0.483
Contribution to society	**0.709**	0.072	0.492
Advancement	**0.569**	**0.538**	0.387
Location	**0.413**	0.219	0.782
Salary	0.259	**0.735**	0.394
Job security	0.257	**0.570**	0.609
Benefits	0.054	**0.830**	0.308

Orthogonal Varimax rotation factor analysis
Bolded numbers indicate factor loadings > .40

Tests for normal distribution of the work satisfaction dependent variable found problems with heteroskedasticity. The standard technique for adjusting a non-normally distributed dependent variable is to obtain the natural logarithm of the variable (Tabachnick & Fidell, 2007). This technique was used to transform the faculty salary covariate variable in the models, but the natural log of the factor score for faculty work satisfaction did not improve the normality of the distribution (see Figure 1 below). Instead, I chose to address issues of heteroskedasticity by using robust standard errors in the regression models.

Figure 1. Distributions of Regular vs. Logged Work Satisfaction Factor Score



Independent variables. The selection of independent variables for this study were guided by the theoretical model of collegiate schemas detailed in Chapter 1. I hypothesized that institutional prestige, institutional resources, and institutional mission and culture form the institutional context of faculty job expectations that form collegiate schemas. The next section details the institutional characteristics selected to test this schema theory.

These independent variables were obtained from the Integrated Postsecondary Education Data System (IPEDS) and merged with the SDR data using the IPEDS unique college code "UNITID" common to both datasets. The resulting combined dataset was comprised of four principal parts:

- Job satisfaction and faculty demographic data from the SDR
- IPEDS characteristics for each faculty member's bachelor's institution
- IPEDS characteristics for each faculty member's doctoral institution

- IPEDS characteristics for each faculty member's employing institution

These variables serve as proxies for, to the degree possible using institutional characteristics, factors that make each college and university distinct. For this reason, the variables cover a breadth of characteristics, ranging from institutional spending to the percent of enrolled minority undergraduate students.

Measures of institutional prestige. The level of institutional resources, faculty support, and prestige at faculty member's degree institutions are included in the study because I hypothesized that these measures of institutional wealth and prestige help provide implicit and explicit expectations for future higher education work environments.

Three measures of institutional prestige were originally selected based on the literature review: institutional acceptance rates, standardized test scores, and six-year graduation rates. Graduation rates were eventually dropped as an indicator because it was highly correlated with standardized test scores (r = .89) and created problems of multicollinearity in the models. Acceptance rates were also dropped from the models due to a strong correlation with standardized test scores (r = -.68). This correlation is logical because most selective colleges and universities tend to use standardized test scores as a prominent factor in selecting students for acceptance. I expected that institutional prestige would be a factor for work satisfaction if faculty members experienced substantial change when changing institutions (i.e., moving to an institution that this substantially higher or lower in prestige).

Standardized test scores were included in the model because the average standardized scores of a student body is a typical measure of student academic ability and an institution's

academic prestige. As mentioned above, standardized test scores are also strong predictors of graduation and acceptance rates. For this study, standardized test scores were reported in terms of SAT (Scholastic Aptitude Test) scores. Reported averages of ACT (American College Testing) scores were converted to an SAT equivalent.

Measures of institutional resources. Two variables related to institutional resources were originally considered for the models: non-hospital spending per Full Time Equivalent (FTE) student and research spending per FTE student. Funding was reported in terms of FTE students to standardize the amount across institutions of different size. Non-hospital spending was used instead of total institutional spending because colleges and universities with medical schools tend to have significantly higher institutional expenditures compared to similar colleges or universities without medical schools (J. Schuh, personal communication, March, 2007). Non-hospital spending was included in the model as a proxy for relative institutional wealth or resources. Faculty members who have experience working at relatively well-funded institutions may be less satisfied at an institution with fewer resources.

Research spending per FTE was used to account for relative differences in institutional research productivity. However non-hospital spending and research spending were highly correlated (r = .72) and created problems with multicollinearity in the models. This high correlation is likely the result of two factors: an institution with more money can spend more for each spending category, and research grant money can contribute a significant amount of money to an institution's total spending. I considered dropping non-hospital spending from the model, but determined I needed both a measure of institutional wealth and a measure of relative priority given to research spending. As a result a new

variable was created that measured the percentage of non-hospital expenditures spent on research. This measure was not highly correlated with non-hospital spending per FTE (r = .20) and replaced the measure for research spending per FTE in the models.

Measures of institutional mission and culture. These variables measure characteristics of an institution that contribute to its institutional type, mission, and culture and are also believed to contribute to establishing implicit and explicit expectations for future higher education work environments. The variables detailed below include: Carnegie Classification, the percentages of the student body that are female students, minority students, and graduate students; the geographic region in which an institution is located; the level of urbanization of the institution location; and institutional size.

Carnegie Classification. The Carnegie Classification is often used as a method of categorizing institutions of higher education by academic mission (Carnegie Foundation for the Advancement of Teaching, 2011). The classification is also often viewed as an indicator of academic prestige with many institutions aspiring to research university status. However, the Carnegie Classification is not an ordinal ranking, but a normative taxonomy. Institutions are not ranked by how well they fit into their respective classification and therefore all institutions within a classification must be considered as similar, if not identical in institutional type. This presented a problem in trying to measure discrete changes in Carnegie Classification as faculty moved across institutions. For example, would it be considered a substantive change in institutional culture if a faculty member moved from a research intensive doctoral university to a research extensive doctoral university? Similarly, a

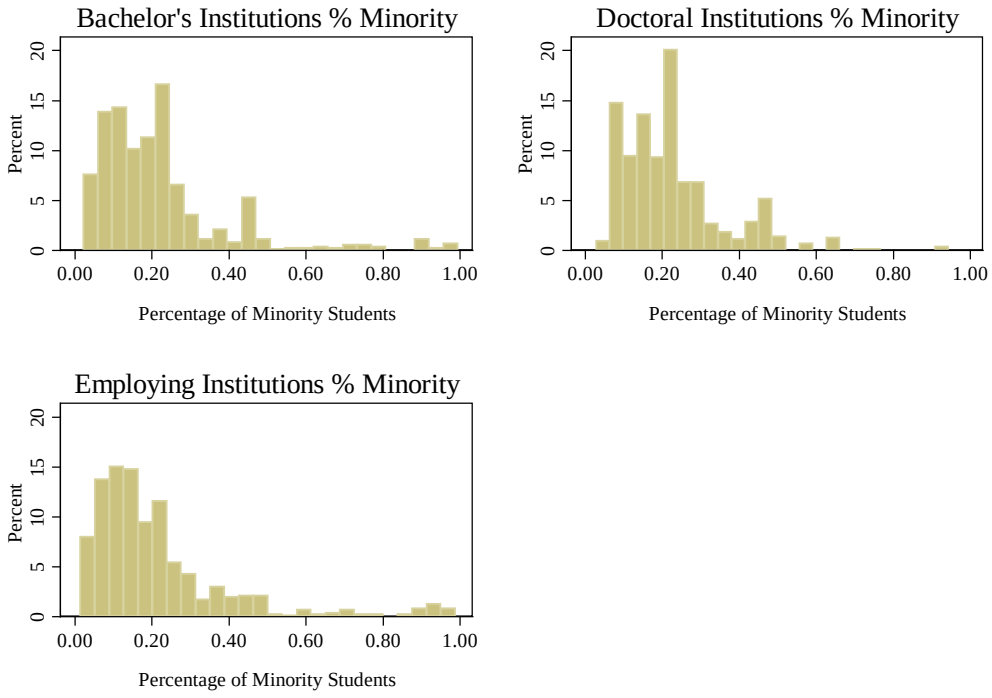
faculty member moving from Harvard University to Iowa State University might experience significant differences in institutional culture without any change in Carnegie Classification.

Instead of using the Carnegie Classification, I decided to look at the measures used by the Carnegie Foundation to create their classification (Carnegie Foundation for the Advancement of Teaching, 2011). Among the baccalaureate, master's, and doctoral institutions in our sample, the variables being used are: the number of FTE (Full-Time Equivalent) students, the ratio of graduate students to undergraduate students, and level of research activity. In some cases, the Carnegie Foundation also considers the degree of urbanization. These variables provide more concrete measures and they have the benefit of being directly observable. It is plausible to assume that a faculty member could notice gross differences in institutional size, percentage of graduate students, and relative importance of the institutional research mission across different institutions.

Percent minority students. Several variables were used to measure the racial composition of each institution depending on the regression model. For Models 1-4 I used a variable that describes the percent of minority students in an institution's student body. Percent minority was defined as the percentage of students at an institution who identify with a racial or ethnic group other than White. For Model 5 and Model 6 I used three different variables to look at the racial composition of each institution: the percent of Black students, the percent of Hispanic students, and the percent of Asian students in the student body. Based on the literature, colleges and universities with large percentages of White or minority students often differ in institutional culture and mission. I expect that faculty who experience

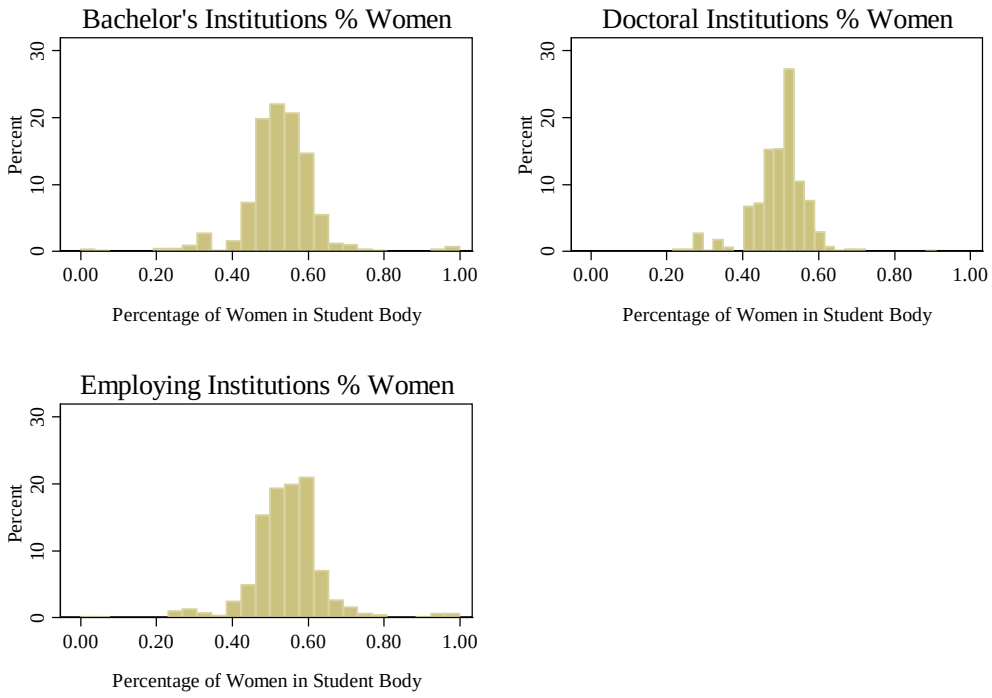
large changes in the proportion of minority students will have significantly lower levels of work satisfaction.

Figure 2. Distribution of Percent Minority Students for Bachelor's, Doctoral, and Employing Institutions



Percent female students. This variable represents the percentage of a college or university's student body that is female. Like the variable for minority students above, I hypothesized that faculty who experience large shifts in the proportion of women among the student body would be less satisfied with their job. For example, a faculty member who attended a women's college for their bachelor's degree may feel less comfortable working at an institution with substantially fewer women.

Figure 3. Distribution of Percent Female Students for Bachelor's, Doctoral, and Employing Institutions



Changes in geographic region. Previous studies found that geographic region was a factor in faculty satisfaction (Gappa et al., 2007; Lindholm et al., 2002). The eight geographic regions used by IPEDS include: New England, Mid East, Great Lakes, Plains, Southeast, Southwest, Rocky Mountains, and the Far West.

To control for changes in geographic region, a dichotomous variable was created to indicate whether or not a faculty member had changed region when moving from one institution to another. The region variable does not assign values to the different regions but instead indicates an absolute change. As indicated in Chapter 2, 80.6% of undergraduate college students attend an institution less than 50 miles from their home. For this reason, I

expect that for most faculty members the region where they earned their bachelor's degree is their "home" region. I expect that faculty members who did not change geographic regions for their job have greater work satisfaction.

Degree of urbanization for the institutional setting. A change in the degree of urbanization may impact faculty work satisfaction in a way that is similar to changes in geographic region. This is a continuous variable with four different degrees of urbanization (i.e., rural, town, suburb, city). Higher values indicate higher levels of urbanization or population density. I expected this variable to control for situations in which a faculty member from an institution like the University of Maryland, College Park in the Washington, D.C. suburbs moves to Virginia Tech in Blacksburg, Virginia. Both institutions are similar in size, mission, and geographic region but differ significantly in their degree of urbanization.

Institutional size. The number of FTE students serves as a control for institutional size in the models. If institutional size is a predictor of faculty satisfaction, I expect it will be a factor in situations where faculty are moving from very small to very large institutions or from very large institutions to very small ones.

Difference scores. It is important to remember that each of the institutional characteristic variables listed above do not represent an individual college or university. Instead they represent the differences between two institutions: the college or university attended for a degree and the college or university of employment. As this study tests for the potential impact of both degree institutions on satisfaction at an employing institution, two categories of regression models were created, each using the same institutional characteristic variables, but each with a different set of difference score values. The first category of

models used variables representing the differences between a faculty member's bachelor's institution and employing institution. The second category used variables that represent the differences between a faculty member's doctoral institution and his or her employing institution.

Examining the impact of differences in institutional characteristics on faculty satisfaction is not an intuitive notion. It may be best to think of these differences as *distances*, much as the difference between two measures of longitude and latitude on a map defines geographical distance. Therefore, according to the hypothesized collegiate schema, a faculty member trained at a doctoral institution but working at a master's institution may experience a sense of distance or displacement from their prior work environment experience. In the hypothetical example below, a faculty member who works at the University of California-Davis received her bachelor's degree from Northwestern University and her Ph.D. from Virginia Tech (see Table 3 and Table 4 below). In one of the examples shown in Table 4, the SAT difference score is calculated by subtracting the Northwestern average 75th percentile SAT score (1480) from the average University of California-Davis SAT score (1280). This formula resulted in a difference score value of -200 representing that the average student SAT score dropped 200 points in the faculty member's move from Northwestern to UC-Davis. Using the same technique, the move from Virginia Tech to UC-Davis resulted in an SAT difference score of 0 because there was no difference in average SAT scores between the two schools.

Table 3

Examples of Creating Difference Scores from Institutional Variables.

Category of Institution	Institution Name	Research Dollars Spent per FTE Student	Average 75th Percentile SAT Scores
Institution where faculty member received their Bachelor's degree	Northwestern University	$23,178	1480
Institution where faculty member received their Doctoral degree	Virginia Tech	$7,985	1280
Institution where faculty member was employed at time of survey	University of California-Davis	$12,742	1280

Table 4

Example Formula for Calculating Difference Scores

Unit of measurement	What the difference variable measures		Employing Institution		Degree Institution
Research dollars spent per FTE student	Dollar change going from the Bachelor's Institution to the Employing Institution	=	UC-Davis	-	Northwestern
	-$10,436	=	$12,742	-	$23,178
	Dollar change going from the Doctoral Institution to the Employing Institution	=	UC-Davis	-	Virginia Tech
	$4,757	=	$12,743	-	$7,985
Average 75th percentile SAT scores	SAT change going from the Bachelor's Institution to the Employing Institution	=	UC-Davis	-	Northwestern
	-200	=	1280	-	1480
	SAT change going from the Doctoral Institution to the Employing Institution	=	UC-Davis	-	Virginia Tech
	0		1280		1280

Dichotomous difference variables. In creating these institutional characteristic difference scores, some of the variables indicate differences in real numbers (i.e. continuous variables), like the examples of research spending and SAT scores illustrated above. However, the difference score variable for geographic region is a dichotomous or dummy variable. Instead of representing a value difference or distance, this dummy variable represents a change in status. For example, if a faculty member's undergraduate institution was located in the Northeast region, but he or she is employed at an institution in the Southwest region, the value of "1" indicates a change in geographic region, whereas a value of "0" indicates no change. This measure is, in effect, an absolute value because it measures only change and not the direction or, in some cases, the magnitude, of the change.

This dichotomous variable was created out of necessity. For the geographic region measurement, the literature review indicated that a change in geographic region was a significant factor in faculty satisfaction. However, there are eight geographic regions recorded by IPEDS and no objective methodology to determine directionality. It was not practical to create dichotomous variables showing movement between each region nor possible to determine whether moving, from, for example, the Northeast region to the Southwest region, was objectively better or worse.

Criticism of difference scores. The use of variables to represent the differences between two measures, or difference scores, has been identified as potentially problematic (Edwards, 1993, 1994, 1999, 2001). Edwards' principle objections related to construct reliability of the differences between two psychometric measures (e.g., questions that try to measure mental processes), and whether difference scores "confound the effects of their

components" (Edwards, 1994, p. 53). While the independent variables for this study are technically difference scores, they are constructed from institutional characteristics reported to the U.S. Department of Education, not psychometrics. For this reason, I do not anticipate the cited problems with construct reliability.

Interaction variables. Several variables are included in the model to look for interaction effects across multiple variables. These variable look at the how differences between faculty by sex and race/ethnicity on work satisfaction vary according to the change in percentages of women and minority students.

Covariates. The covariates used in the model control for characteristics shown by the literature to impact faculty satisfaction but are not part of the hypotheses. The variables include academic field, age, sex, marital status, whether or not the person has dependent children, citizenship, race/ethnicity, salary, duration of employment at their current institution, and whether they are working in a field similar to their doctoral degree (see Table 5 below). Based on the literature review, I expect that many of these variables will show statistically significant impact on the dependent variables.

Table 5

Summary of Covariate Variables Used in All Models

Covariates	M	SD	Min	Max
Faculty working in field related to doctoral degree field	0.95	0.22	0	1
Employed in Computer or Mathematics field	0.11	0.31	0	1
Employed in Life Science field	0.12	0.33	0	1
Employed in Physical Sciences field	0.13	0.34	0	1
Employed in Social Sciences field	0.37	0.48	0	1
Employed in Engineering field	0.12	0.33	0	1
Employed at current institution for less than three years	0.48	0.50	0	1
Age in years	36.18	6.23	26	62
Female	0.43	0.50	0	1
Marital status	0.64	0.48	0	1
U.S. Citizen	0.97	0.17	0	1
Asian	0.07	0.26	0	1
Black	0.12	0.33	0	1
Hispanic	0.10	0.30	0	1
Dependent children	0.35	0.48	0	1
Faculty salary (in logged dollars)	10.80	0.33	6.6	11.8

Independent variables by model. This analysis used two types of difference scores to test the primary and secondary hypotheses. These two types of difference scores reflect two different perspectives on change as perceived by faculty members:

1. The amount of change, as measured by differences in institutional characteristics, negatively impacts faculty work satisfaction, regardless of whether or not the change is considered positive or negative (e.g., an increase in institutional

prestige). This is colloquially referred to as the "change is always bad" hypothesis.

2. The amount and the direction of the change, as measured by differences in institutional characteristics, are important in understanding the impact on faculty work satisfaction. This is similarly nicknamed the "direction of change matters" hypothesis because some changes may have positive effects while others negatively impact satisfaction.

For the purpose of testing these two hypotheses, two different model categories were created: one that used difference scores based on strict differences and the other that used difference scores based on absolute values (see Table 6 below for an example of the two types of difference scores). A faculty member moving from Northwestern to UC-Davis would experience a strict difference loss of 200 SAT score points. Conversely, a faculty member moving from UC-Davis to Northwestern would experience a strict difference net gain of 200 SAT points. However, in terms of absolute values, both faculty members experienced a net change of 200 points. As expected, faculty moving between institutions with identical SAT scores, as with the example institutions of UC-Davis and Virginia Tech, would register zero difference in both strict and absolute differences.

Table 6

Example of Strict and Absolute Difference Variables for SAT Scores

Unit of Measurement	Employing Institution		Degree Institution		SAT Change, Strict Difference	SAT Change, Absolute Difference
Average 75th percentile SAT scores	UC-Davis 1280	-	Northwestern 1480	=	-200	+200
	Northwestern 1480	-	UC-Davis 1280	=	+200	+200
	Virginia Tech 1280	-	UC-Davis 1280		0	0
	UC-Davis 1280	-	Virginia Tech 1280		0	0

Within each category, a model was created to examine the institutional characteristic differences between faculty's bachelor's institutions and employing institutions, and another model for the differences between faculty's doctoral institutions and employing institutions. This resulted in four different regression models in which the values of the difference scores varied. See below for a summary of the independent and interaction variables for each model. It is important to note that the percentage differences are differences in proportions (e.g. changes from 0 to 1). For example, a faculty member who earned her bachelor's degree at an institution with 50% women and is now employed at an institution with 90% women would have a differences score of +.40 or + 40%. They experienced a relative 40 percentage point increase in the percentage of women in the student body.

Table 7

Independent Variables for Bachelor's to Employing Institution, Strict Differences

Difference scores showing strict differences	M	SD	Min	Max
Difference scores				
Change in the number of FTE† Students (in 1,000 student units)	-1.2	15.5	-46.7	46.6
Change in SAT score equivalent	-70.3	153.4	-643	520
Change in degree of urbanization for institutional setting	0.1	1.2	-3	3
Change in geographic region (dichotomous)	0.6	0.5	0	1
Change in the percentage of women in the student body	2%	12%	-54%	72%
Change in the percentage of minority students in the student body	0%	19%	-86%	86%
Change in the percentage of institutional expenditures spent on research	-3%	13%	-46%	42%
Change in total non-hospital expenditures per FTE† student ($1,000 units)	-11.4	33.7	-138.5	119.9
Change in the percentage of graduate students in the student body	-4%	18%	-67%	59%
Change in the percentage of Asian students in the student body	-2%	9%	-60%	59%
Change in the percentage of Black students in the student body	2%	15%	-90%	89%
Change in the percentage of Hispanic students in the student body	0%	8%	-52%	58%
Interaction Variables (percent of women or minority students in the student body)				
Female faculty X Change in the percentage of women	1%	9%	-54%	72%
Asian faculty X Change in the percentage of minority students	0%	5%	-57%	63%
Black faculty X Change in the percentage of minority students	0%	12%	-86%	86%
Hispanic faculty X Change in the percentage of minority students	0%	6%	-59%	68%

† FTE = Full Time Equivalent

Table 7 (continued)

Independent Variables for Bachelor's to Employing Institution, Strict Differences

Difference scores showing strict differences	M	SD	Min	Max
Interaction Variables (percent Black, Asian, Hispanic in the student body)				
Black faculty X Change in the percentage of Hispanic students	0%	2%	-40%	33%
Asian faculty X Change in the percentage of Hispanic students	0%	2%	-21%	33%
Hispanic faculty X Change in the percentage of Hispanic students	0%	5%	-42%	58%
Black faculty X Change in the percentage of Black students	0%	12%	-90%	89%
Asian faculty X Change in the percentage of Black students	0%	4%	-29%	86%
Hispanic faculty X Change in the percentage of Black students	0%	4%	-14%	82%
Black faculty X Change in the percentage of Asian students	0%	3%	-32%	59%
Asian faculty X Change in the percentage of Asian students	0%	4%	-60%	26%
Hispanic faculty X Change in the percentage of Asian students	0%	4%	-32%	28%

† FTE = Full Time Equivalent

Table 8

Independent Variables for Bachelor's to Employing Institution, Absolute Differences

Difference scores showing absolute differences	M	SD	Min	Max
Difference scores				
Change in the number of FTE† Students (in 1,000 student units)	11.2	10.9	0.0	46.7
Change in SAT score equivalent	129.4	108.2	0	643
Change in degree of urbanization for institutional setting	0.8	0.9	0	3
Change in geographic region (dichotomous)	0.6	0.5	0	1
Change in the percentage of women in the student body	8%	9%	0%	72%
Change in the percentage of minority students in the student body	12%	15%	0%	86%
Change in the percentage of institutional expenditures spent on research	9%	9%	0%	46%
Change in total non-hospital expenditures per FTE† student ($1,000 units)	21.3	28.5	0.0	138.5
Change in the percentage of graduate students in the student body	13%	13%	0%	67%
Change in the percentage of Asian students in the student body	6%	8%	0%	60%
Change in the percentage of Black students in the student body	6%	13%	0%	90%
Change in the percentage of Hispanic students in the student body	4%	7%	0%	58%
Interaction Variables (percent of women or minority students in the student body)				
Female faculty X Change in the percentage of women	4%	8%	0%	72%
Asian faculty X Change in the percentage of minority students	1%	5%	0%	63%
Black faculty X Change in the percentage of minority students	3%	12%	0%	86%
Hispanic faculty X Change in the percentage of minority students	1%	6%	0%	68%

† FTE = Full Time Equivalent

Table 8 (continued)

Independent Variables for Bachelor's to Employing Institution, Absolute Differences

Difference scores showing absolute differences	M	SD	Min	Max
Interaction Variables (percent Black, Asian, Hispanic in the student body)				
Black faculty X Change in the percentage of Hispanic students	0%	2%	0%	40%
Asian faculty X Change in the percentage of Hispanic students	0%	2%	0%	33%
Hispanic faculty X Change in the percentage of Hispanic students	1%	5%	0%	58%
Black faculty X Change in the percentage of Black students	2%	12%	0%	90%
Asian faculty X Change in the percentage of Black students	0%	4%	0%	86%
Hispanic faculty X Change in the percentage of Black students	0%	4%	0%	82%
Black faculty X Change in the percentage of Asian students	1%	3%	0%	59%
Asian faculty X Change in the percentage of Asian students	1%	4%	0%	60%
Hispanic faculty X Change in the percentage of Asian students	1%	4%	0%	32%

† FTE = Full Time Equivalent

Table 9

Independent Variables for Doctoral to Employing Institution, Strict Differences

Difference scores showing strict differences	M	SD	Min	Max
Difference scores				
Change in the number of FTE† Students (in 1,000 student units)	-9.1	15.8	-47.2	42.3
Change in SAT score equivalent	-103.3	142.2	-600	330
Change in degree of urbanization for institutional setting	0.3	1.1	-3	3
Change in geographic region (dichotomous)	0.6	0.5	0	1
Change in the percentage of women in the student body	5%	11%	-60%	72%
Change in the percentage of minority students in the student body	-1%	21%	-61%	85%
Change in the percentage of institutional expenditures spent on research	-10%	12%	-45%	33%
Change in total non-hospital expenditures per FTE† student ($1,000 units)	-32.4	109.3	-869.4	101.2
Change in the percentage of graduate students in the student body	-11%	16%	-68%	45%
Change in the percentage of Asian students in the student body	-5%	10%	-59%	30%
Change in the percentage of Black students in the student body	4%	16%	-62%	89%
Change in the percentage of Hispanic students in the student body	0%	8%	-48%	58%
Interaction Variables (percent of women or minority students in the student body)				
Female faculty X Change in the percentage of women	2%	8%	-34%	72%
Asian faculty X Change in the percentage of minority students	0%	5%	-48%	64%
Black faculty X Change in the percentage of minority students	2%	13%	-34%	85%
Hispanic faculty X Change in the percentage of minority students	0%	7%	-40%	72%

† FTE = Full Time Equivalent

Table 9 (continued)

Independent Variables for Doctoral to Employing Institution, Strict Differences

Difference scores showing strict differences	M	SD	Min	Max
Interaction Variables (percent Black, Asian, Hispanic in the student body)				
Black faculty X Change in the percentage of Hispanic students	0%	2%	-9%	30%
Asian faculty X Change in the percentage of Hispanic students	0%	2%	-11%	44%
Hispanic faculty X Change in the percentage of Hispanic students	0%	5%	-14%	58%
Black faculty X Change in the percentage of Black students	2%	13%	-17%	89%
Asian faculty X Change in the percentage of Black students	0%	4%	-11%	86%
Hispanic faculty X Change in the percentage of Black students	0%	4%	-9%	81%
Black faculty X Change in the percentage of Asian students	0%	4%	-33%	30%
Asian faculty X Change in the percentage of Asian students	0%	4%	-54%	26%
Hispanic faculty X Change in the percentage of Asian students	-1%	4%	-33%	21%

† FTE = Full Time Equivalent

Table 10

Independent Variables for Doctoral to Employing Institution, Absolute Differences

Difference scores showing absolute differences	M	SD	Min	Max
Difference scores				
Change in the number of FTE† Students (in 1,000 student units)	14.6	10.9	0.0	47.2
Change in SAT score equivalent	137.3	109.8	0	600
Change in degree of urbanization for institutional setting	0.7	0.9	0	3
Change in geographic region (dichotomous)	0.6	0.5	0	1
Change in the percentage of women in the student body	8%	9%	0%	72%
Change in the percentage of minority students in the student body	14%	16%	0%	85%
Change in the percentage of institutional expenditures spent on research	13%	9%	0%	45%
Change in total non-hospital expenditures per FTE† student ($1,000 units)	37.9	107.5	0.0	869.4
Change in the percentage of graduate students in the student body	15%	13%	0%	68%
Change in the percentage of Asian students in the student body	7%	9%	0%	59%
Change in the percentage of Black students in the student body	7%	15%	0%	89%
Change in the percentage of Hispanic students in the student body	4%	7%	0%	58%
Interaction Variables (percent of women or minority students in the student body)				
Female faculty X Change in the percentage of women	4%	8%	0%	72%
Asian faculty X Change in the percentage of minority students	1%	5%	0%	64%
Black faculty X Change in the percentage of minority students	3%	13%	0%	85%
Hispanic faculty X Change in the percentage of minority students	2%	7%	0%	72%

† FTE = Full Time Equivalent

Table 10 (continued)

Independent Variables for Doctoral to Employing Institution, Absolute Differences

Difference scores showing absolute differences	M	SD	Min	Max
Interaction Variables (percent Black, Asian, Hispanic in the student body)				
Black faculty X Change in the percentage of Hispanic students	0%	2%	0%	30%
Asian faculty X Change in the percentage of Hispanic students	0%	2%	0%	44%
Hispanic faculty X Change in the percentage of Hispanic students	1%	5%	0%	58%
Black faculty X Change in the percentage of Black students	3%	13%	0%	89%
Asian faculty X Change in the percentage of Black students	0%	4%	0%	86%
Hispanic faculty X Change in the percentage of Black students	0%	4%	0%	81%
Black faculty X Change in the percentage of Asian students	1%	4%	0%	33%
Asian faculty X Change in the percentage of Asian students	1%	4%	0%	54%
Hispanic faculty X Change in the percentage of Asian students	1%	4%	0%	33%

† FTE = Full Time Equivalent

Statistical Design

This study uses multivariate ordinary least squares (OLS) regression to examine relationships between variables and the predictive power of the independent variables on the dependent variables. Multivariate regression allows for (a) predictions about the impact of one variable on another, (b) the ability to control for the influence of variables that may affect the dependent variable but are not part of the hypothesis, and (c) the use of both continuous and categorical independent variables (Tabachnick & Fidell, 2007). This analysis was applied to the six regression models.

Primary hypothesis. The job satisfaction of a tenure-track assistant professor is influenced by collegiate schemas, or expectations of the college or university workplace that are formed, in part, during the faculty member's experiences with their undergraduate and doctoral institutions of higher education. These changes in a higher education work environment, as measured by differences in institutional characteristics, affect faculty work satisfaction.

Secondary hypothesis #1: More change leads to less satisfaction. The amount of change that faculty experience, as measured by differences in institutional characteristics, negatively impacts faculty work satisfaction, regardless whether or not the change is considered positive or negative (e.g., an increase in institutional prestige).

Secondary hypothesis #2: The direction of the change matters. The amount and the direction of the change, as measured by differences in institutional characteristics, are important in understanding the impact on faculty work satisfaction. Applying hygiene theory, faculty who perceive their employing institution as approximately equal to or "better"

than their institutions of education may experience no change in work satisfaction. However, faculty who perceive their employing institution as "worse" than their degree institutions will have significantly lower levels of work satisfaction.

Secondary hypothesis #3: The bachelor's experience is more important. As research shows that early work environment experiences tend to hold primacy for personal schemas, I expect faculty bachelor's institutions to exhibit a greater influence on faculty work environment expectations. If supported by the models, results should show that differences in faculty work satisfaction are better explained by differences between bachelor's institutions and employing institutions rather than differences between doctoral institutions and employing institutions.

Summary

This chapter outlined the methodology used to conduct the study, including data selection, sampling, statistical tests, procedures used for matching data across multiple datasets. Special attention was placed on describing the difference scores or variables that record changes at a faculty member's employing institution, relative to their bachelor's or doctoral institution. The next chapter details the findings from these analyses that will be used to test the study's primary hypothesis and three secondary hypotheses.

Chapter 4: Results

The purpose of this study was to determine if institutional characteristic differences between tenure-track assistant faculty members' degree institutions and employing institution affect job satisfaction. Differences between institutional characteristics served as a proxy for measuring relative similarities of, or distances between, work environment schemas of institutions of higher education. This section outlines the results related to the primary hypothesis and four secondary hypotheses found during data analysis.

Basic Frequencies

After completing the match between the SDR and IPEDS data, the sample was narrowed to: assistant professors who received their doctorate in the last 10 years; were employed full-time at a four-year, not-for-profit U.S. institution of higher education; had served less than 10 years as an assistant professor primarily as a teacher and researcher. Left were 1,677 professors, of which 933 were on the tenure-track (see Table 11 below). This number was further reduced to 697 when all faculty with missing data were dropped from the analysis.

Table 11

SDR Faculty Respondents with Assistant Professor Rank

Tenure status	n	%
Tenure track	933	55.6%
No tenure for my job	299	17.8%
Not on tenure-track	294	17.5%
Tenured	118	7.0%
Not applicable	33	2.0%
Total	1,677	100%

Of these 933 assistant professors, 10.0% (N = 168) faculty members were employed at the same institution they attended for their bachelor's degree. Even more faculty 11.5% (N = 192) worked at the same institution where they earned their doctorate. Of the smaller subset of 697 tenure-track faculty members with no missing data, 9.9% (N = 69) earned their bachelor's degree, and 4.9% (N = 34) earned their doctorate at the same institution where they worked. Another 11.5% (N = 80) attended the same institution for both their bachelor's and doctoral degree, but only 1.7% (N = 12) worked at the same institution where they received both degrees.

Examining the institutional characteristics of the degree and employing institutions in the final sample of 697, 56.4% (N = 393) of faculty attended a public institution for their bachelor's degree. Seventy-two percent (N = 502) attended a public school for their doctorate, and 64.4% (N = 449) of faculty respondents were employed at a public college or university. The Carnegie Classifications of the degree and employing institutions are

detailed in tables Table 12, Table 13, and Table 14 below. As would be expected, there is a narrower range of Carnegie Classifications for doctoral degree institutions due to the more limited number of institutions that offer doctorates.

Table 12

Bachelor's Institutions Attended by Final Faculty Sample

Carnegie Classification Code	n	%
Doctoral/Research Universities--Extensive	385	55.2%
Masters Colleges and Universities I	118	16.9%
Baccalaureate Colleges--Liberal Arts	101	14.5%
Doctoral/Research Universities--Intensive	66	9.5%
Baccalaureate Colleges--General	18	2.6%
Masters Colleges and Universities II	7	1.0%
Schools of engineering and technology	n/c	n/c
Total	697	100%

n/c: Suppressed due to low count

Table 13

Doctoral Institutions Attended by Final Faculty Sample

Doctoral Institutions Attended by Final Faculty Sample		
Carnegie Classification Code	n	%
Doctoral/Research Universities--Extensive	658	94.4%
Doctoral/Research Universities--Intensive	35	5.0%
Masters Colleges and Universities I	n/c	n/c
Total	697	100%

n/c: Suppressed due to low count

Table 14

Employing Institutions for Final Faculty Sample

Carnegie Classification Code	n	%
Doctoral/Research Universities--Extensive	315	45.2%
Masters Colleges and Universities I	190	27.3%
Baccalaureate Colleges--Liberal Arts	67	9.6%
Doctoral/Research Universities--Intensive	63	9.0%
Baccalaureate Colleges--General	36	5.2%
Masters Colleges and Universities II	18	2.6%
Baccalaureate/Associates Colleges	n/c	n/c
Associates Colleges	n/c	n/c
Other specialized institutions	n/c	n/c
Schools of engineering and technology	n/c	n/c
Total	697	100%

n/c: Suppressed due to low count

Table 15 below details the race and ethnicity of the tenure-track assistant professors in the final sample. Table 16 below shows a cross-tabulation of faculty primary job responsibilities. The 56 faculty that did not have basic nor applied research as their primary job responsibility listed teaching as their primary job responsibility. Those 56 faculty also indicated that either basic or applied research was a significant part of their job responsibilities (more than 10%).

Table 15

Race and Ethnicity of Faculty in Sample

Race/Ethnicity of Faculty in Final Sample		
Race/Ethnicity	n	%
White	476	68.3%
Black	84	12.1%
Hispanic	69	9.9%
Asian	49	7.0%
Native American	17	2.4%
Other	n/c	n/c
Total	697	100.0%

n/c: Suppressed due to low count

Table 16

Primary Work Activities of Faculty in Sample

Primary Work Activity	Applied Research	Not Applied Research	Total
Basic Research	287	215	502
Not Basic Research	139	56	195
Total	426	271	697

Hypotheses and Resulting Statistical Models

Primary hypothesis. The job satisfaction of a tenure-track assistant professor is influenced by collegiate schemas, or expectations of the college or university workplace that are formed, in part, during the faculty member's experiences with their undergraduate and doctoral institutions of higher education. These changes in higher education work environment, as measured by differences in institutional characteristics, affect faculty work

satisfaction. To test this hypothesis, six different multivariate regression models were incorporated to examine the two types of institutional characteristic differences between employing and degree institutions (i.e., institutional differences between a bachelor's institution and the employing institution, and institutional differences between a doctoral institution and employing institution).

Additionally, different interaction variables were incorporated into some of the models. Models 1 and 2 used no interaction variables, whereas 3 and 4 incorporated interaction variables combining race/ethnicity with the variable measuring the change in the percentage of minority students in the student body. Models 5 and 6 used interaction variables looking at the interaction between faculty race/ethnicity and the change in the percentage of Black, Asian, and Hispanic students in the student body.

Secondary hypothesis #1: More change leads to less satisfaction. The amount of change that faculty experience, as measured by differences in institutional characteristics, negatively impacts faculty work satisfaction, regardless of whether or not the change is considered positive or negative (e.g., an increase in institutional prestige). In order to test this hypothesis, Models 2, 4, and 6 use absolute values of difference scores. These absolute values will look at the total amount of change regardless of directionality (see Table 6 above for examples).

Secondary hypothesis #2: The direction of the change matters. The amount and the direction of the change, as measured by differences in institutional characteristics, are important in understanding the impact on faculty work satisfaction. To test this hypothesis, Models 1, 3, and 5 use the strict values of the differences scores rather than the absolute

values. For these values, it matters whether or not a faculty member experiences a positive or a negative change as they move from one institution to another.

Secondary hypothesis #3: The bachelor's experience is more important. As research shows that early work environment experiences tend to hold primacy for personal schemas, I expect faculty bachelor's institutions to exhibit a greater influence on faculty work environment expectations. To test this hypothesis, each of the six models examined whether differences in faculty work satisfaction are better explained by differences between bachelor's institutions and employing institutions or by differences between doctoral institutions and employing institutions.

Statistically Significant Findings by Model

Before reviewing the statistically significant findings, I would first like to make two clarifications on the variables in the model. First, the non-hospital spending listed in IPEDS for one university, the California Institute of Technology (Cal Tech), was a considerably higher amount per full-time equivalent student ($895,326 per FTE) than any other university. This value corresponded to a z-score of 16.3 and therefore the non-hospital FTE value for three faculty who had attended Cal Tech was set to missing.

The second clarification relates to the referent category for race and ethnicity in the six models. The models specifically examine race and ethnicity effects for Asian, Black, and Hispanic faculty. As a result, the referent category, or the category by which these are compared is comprised of White faculty (N = 633), American Indian faculty (N = 27), and Other faculty (N =3). As White faculty comprise 95% of this referent category it effectively

reflects the responses of White faculty and will be referred to as such in the following chapters.

Model 1: Strict differences in institutional characteristics with no interaction effects. Having a job in a field related to one's doctoral degree was a strong predictor of faculty job satisfaction looking at the institutional differences between bachelor's and employing institution in Model 1.1 (b = .708, $t(697) = 3.41$, $p < .001$) as well as the institutional differences between doctoral and employing institution in Model 1.2 (b = .674, $t(697) = 3.29$, $p = .001$) (see Table 17 below). Faculty working in an academic field related to their doctoral degree scored .71 to .67 SD higher on the work satisfaction factor score than faculty working in a field not related to their doctoral degree.

Black faculty in Model 1.1 (b = -.312, $t(697) = -2.06$, $p = 0.040$) showed significantly lower job satisfaction than the referent group for race which included faculty who identified as White. Black faculty in Model 1.2 rated their satisfaction lower, but not at a statistically significant level (b = -.274, $t(697) = -1.83$, $p = 0.067$).

Table 17

Model 1: Strict Differences in Institutional Characteristics with no Interaction Effects

Variable	Model 1.1 (BA to Employer)	Model 1.2 (PhD to Employer)
Faculty working in field related to doctoral degree field	0.708***	0.674**
Employed in Computer or Mathematics field	0.033	0.015
Employed in Life Science field	0.199	0.143
Employed in Physical Sciences field	0.198	0.231
Employed in Social Sciences field	-0.135	-0.153
Employed in Engineering field	0.146	0.075
Employed at current institution for less than three years	0.124	0.125
Age in years	-0.005	-0.007
Female	0.025	0.046
Marital status	0.127	0.122
U.S. Citizen	-0.011	0.045
Asian	-0.122	-0.111
Black	-0.312*	-0.274
Hispanic	-0.132	-0.099
Dependent children	0.022	0.012
Faculty salary (in logged dollars)	0.195	0.142
Change in the number of FTE Students (in 1,000 student units) ‡	-0.002	-0.000
Change in SAT score equivalent ‡	0.000	0.000
Change in degree of urbanization for institutional setting ‡	-0.061	-0.055
Change in geographic region [1]	-0.108	-0.067
Change in the percentage of women in student body ‡	0.157	-0.199
Change in the percentage of minority students in the student body ‡	-0.039	-0.177
Change in the percentage of institutional expenditures spent on research ‡	0.774	0.742
Change in total non-hospital expenditures per FTE student ($1,000 units) ‡	-0.003	-0.000
Change in the percentage of graduate students in the student body ‡	-0.033	-0.100
intercept	-2.568	-1.903
N	697	697
Adjusted R^2	0.058	0.062

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

‡ = difference scores (employing institution - degree institution)

1 = dichotomous variable, change in status = 1, no change = 0

Model 2: Absolute differences in institutional characteristics with no interaction effects

Examining absolute differences between institutions, Model 2 also found that a job in a field related to one's doctoral degree was a strong predictor of faculty work satisfaction between bachelor's and employing institution in Model 2.1 (b = .679, $t(697)$ = 3.23, p = .001) as well as the institutional differences between doctoral and employing institution in Model 2.2 (b = .706, $t(697)$ = 3.40, p < .001) (see Table 18 below). Faculty working in an academic field related to their doctoral degree rated their work satisfaction .68 to .71 SD higher than faculty working in a field not related to their doctoral degree.

Finally, the absolute difference or change in non-hospital expenditures per FTE student was a significant predictor of faculty work satisfaction in Model 2.1. Faculty members who experienced substantial changes (in terms of absolute value) in the amount of institutional spending when moving from the bachelor's to employing institution had significantly higher levels of work satisfaction (b = .004, $t(697)$ = 2.41, p = .016). Faculty members who experienced the largest change in expenses per student (i.e., 138.5 in $1,000 units or $138,500 in absolute change or difference between institutions) experienced a .55 SD increase in work satisfaction. A faculty member who earned his bachelor's degree at an institution that spent $10,000 per student and then worked at an institution that spent $40,000 per student would experience a .12 SD increase in work satisfaction.

Table 18

Model 2: Absolute Differences in Institutional Characteristics with no Interaction Effects

Variable	Model 2.1 (BA to Employer)	Model 2.2 (PhD to Employer)
Faculty working in field related to doctoral degree field	0.679**	0.706***
Employed in Computer or Mathematics field	0.020	-0.021
Employed in Life Science field	0.182	0.173
Employed in Physical Sciences field	0.209	0.210
Employed in Social Sciences field	-0.138	-0.150
Employed in Engineering field	0.110	0.071
Employed at current institution for less than three years	0.127	0.112
Age in years	-0.005	-0.006
Female	0.051	0.042
Marital status	0.135	0.109
U.S. Citizen	0.013	0.005
Asian	-0.111	-0.090
Black	-0.242	-0.272
Hispanic	-0.094	-0.116
Dependent children	-0.010	0.018
Faculty salary (in logged dollars)	0.165	0.168
Change in the number of FTE Students (in 1,000 student units) †	-0.001	0.004
Change in SAT score equivalent †	-0.001	-0.001
Change in degree of urbanization for institutional setting †	-0.050	-0.061
Change in geographic region 1	-0.078	-0.058
Change in the percentage of women in the student body †	-0.208	0.488
Change in the percentage of minority students in the student body †	-0.422	-0.069
Change in the percentage of institutional expenditures spent on research †	-0.122	-0.820
Change in total non-hospital expenditures per FTE student ($1,000 units) †	0.004*	0.000
Change in the percentage of graduate students in the student body †	-0.077	0.113
intercept	-2.163	-2.188
N	697	697
Adjusted R^2	0.063	0.062

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† = absolute value of difference scores |employing institution - degree institution|

1 = dichotomous variable, change in status = 1, no change = 0

Model 3: Strict differences in institutional characteristics with interaction effects by percent minority

Model 3 incorporated interaction effects between faculty race/ethnicity and the percentage of an institution's student body that was minority or non-White. Model 3 also used strict differences, rather than absolute differences when calculating difference scores between institutions. As with Model 1 and Model 2, Model 3 found that a job in a field related to one's doctoral degree was a strong predictor of faculty work satisfaction between bachelor's and employing institution in Model 3.1 (b = .715, $t(697) = 3.46$, $p < .001$) as well as the institutional differences between doctoral and employing institution in Model 3.2 (b = .675, $t(697) = 3.30$, $p = .001$) (see Table 19 below). Faculty working in an academic field related to their doctoral degree rated their work satisfaction .72 to .68 SD higher than faculty working in a field not related to their doctoral degree.

Black faculty in Model 3 showed significantly lower work satisfaction than White faculty. This was true for both Model 3.1 that examined differences between bachelor's and employing institutions (b = -.328, $t(697) = -2.15$, $p = .032$) and Model 3.2 with differences between doctoral and employing institutions (b = .297, $t(697) = -1.96$, $p = .050$). In this model, Black faculty rated their work satisfaction .33 SD lower than White faculty. However, this result is complicated by the other variable in the model that examines the interaction effects of Black racial identity and the percentage of minority students in the student body. As a result, the coefficient for Black racial identity in Model 3.1 and Model 3.2 are only correct when there is zero difference in the percentage of minority students when moving from a bachelor's or doctoral institution to an employing institution (i.e., the

difference score for percentage minority is equal to zero). Therefore, this significant result for Black faculty racial identity is only valid for faculty employed at the same institution where they earned either a bachelor's or doctoral degree.

Finally, the percent of non-hospital expenditures per FTE student was a nearly significant predictor of faculty work satisfaction in Model 3.1 at $p = .052$ ($b = -.004$, $t(697) = -1.95$, $p = .052$). I will not normally report non-significant results, but I mention this due to similar findings in other models and because the result is quite close to the established alpha cutoff.

Table 19

Model 3: Strict Differences in Institutional Characteristics with Interaction Effects

Variable	Model 3.1 (BA to Employer)	Model 3.2 (PhD to Employer)
Faculty working in field related to doctoral degree field	0.715***	0.675**
Employed in Computer or Mathematics field	0.023	0.017
Employed in Life Science field	0.174	0.146
Employed in Physical Sciences field	0.178	0.233
Employed in Social Sciences field	-0.145	-0.143
Employed in Engineering field	0.140	0.072
Employed at current institution for less than three years	0.129	0.141
Age in years	-0.010	-0.008
Female	0.044	0.051
Marital status	0.129	0.122
U.S. Citizen	-0.013	0.064
Asian	-0.113	-0.109
Black	-0.328*	-0.297*
Hispanic	-0.127	-0.103
Dependent children	-0.024	0.011
Faculty salary (in logged dollars)	0.196	0.143
Change in the number of FTE Students (in 1,000 student units) ‡	-0.001	-0.000
Change in SAT score equivalent ‡	0.000	0.000
Change in degree of urbanization for institutional setting ‡	-0.057	-0.054
Change in geographic region [1]	-0.118	-0.067
Change in the percentage of women in student body ‡	0.332	-0.171
Change in the percentage of minority students in the student body ‡	-0.402	-0.274
Change in the percentage of institutional expenditures spent on research ‡	0.779	0.764
Change in total non-hospital expenditures per FTE student ($1,000 units) ‡	-0.004	-0.000
Change in the percentage of graduate students in the student body ‡	0.041	-0.078
Female x Change in the percentage of women in the student body ‡	-0.295	-0.079
Asian x Change in the percentage of minority students in the student body ‡	0.234	-0.610
Black x Change in the percentage of minority students in the student body ‡	0.886	0.226
Hispanic x Change in the percentage of minority students in the student body ‡	0.696	0.513
intercept	-2.517	-1.912
N	697	697
Adjusted R^2	0.059	0.059

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
‡ = difference scores (employing institution - degree institution)

Model 4: Absolute differences in institutional characteristics with interaction effects by percent minority

Model 4 incorporated absolute values of difference scores and interaction effects between faculty race/ethnicity and the percentage of an institution's student body that was minority or non-White. As with previous models, Model 4 found that a job in a field related to one's doctoral degree was a strong predictor of faculty work satisfaction between bachelor's and employing institution in Model 4.1 (b = .688, $t(697) = 3.30$, p = .001) as well as the institutional differences between doctoral and employing institution in Model 4.2 (b = .706, $t(697) = 3.42$, $p < .001$) (see Table 20 below). Faculty working in an academic field related to their doctoral degree rated their work satisfaction .69 to .71 SD higher than faculty working in a field not related to their doctoral degree. Unlike Model 3, Model 4 found no significant differences by race/ethnicity using absolute value difference scores.

As with Model 2.1, the absolute difference in non-hospital expenditures per FTE student was a significant predictor of faculty work satisfaction in Model 4.1. Faculty members who experienced substantial changes (in terms of absolute value) in the amount of institutional spending when moving from the bachelor's to employing institution had significantly higher levels of work satisfaction (b = .004, $t(697) = 2.35$, p = .019). In fact, the coefficient for non-hospital was the same in both Model 2.1 and Model 4.1, despite the addition of interaction variables to Model 4.

Table 20

Model 4: Absolute Differences in Institutional Characteristics with Interaction Effects

Variable	Model 4.1 (BA to Employer)	Model 4.2 (PhD to Employer)
Faculty working in field related to doctoral degree field	0.688**	0.706***
Employed in Computer or Mathematics field	0.015	-0.020
Employed in Life Science field	0.206	0.186
Employed in Physical Sciences field	0.200	0.200
Employed in Social Sciences field	-0.124	-0.132
Employed in Engineering field	0.117	0.082
Employed at current institution for less than three years	0.137	0.116
Age in years	-0.005	-0.007
Female	0.139	0.142
Marital status	0.147	0.131
U.S. Citizen	0.028	0.038
Asian	0.099	0.036
Black	-0.208	-0.319
Hispanic	-0.188	-0.321
Dependent children	-0.005	0.016
Faculty salary (in logged dollars)	0.169	0.164
Change in the number of FTE Students (in 1,000 student units) †	-0.000	0.004
Change in SAT score equivalent †	-0.001	-0.001
Change in degree of urbanization for institutional setting †	-0.050	-0.056
Change in geographic region [1]	-0.093	-0.056
Change in the percentage of women in the student body †	0.368	1.066
Change in the percentage of minority students in the student body †	-0.279	-0.251
Change in the percentage of institutional expenditures spent on research †	0.199	-0.843
Change in total non-hospital expenditures per FTE student ($1,000 units) †	0.004*	0.000
Change in the percentage of graduate students in the student body †	-0.085	0.136
Female x Change in the percentage of women in the student body †	-1.018	-1.100
Asian x Change in the percentage of minority students in the student body †	-1.576	-0.830
Black x Change in the percentage of minority students in the student body †	-0.238	0.263
Hispanic x Change in the percentage of minority students in the student body †	0.607	1.378
intercept	-2.316	-2.209
N	697	697
Adjusted R^2	0.064	0.063

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
† = absolute value of difference scores |employing institution - degree institution|
1 = dichotomous variable, change in status = 1, no change = 0

Model 5: Strict differences in institutional characteristics with interaction effects by percent of Black, Asian, and Hispanic

Model 5 incorporated interaction effects between faculty race/ethnicity and the percentage of Black students, the percentage of Asian students, and the percentage of Hispanic or Latino(a) students in the student body. Model 5 used strict differences when calculating difference scores between institutions. As with Models 1-4, having a job in a field related to one's doctoral degree was a strong predictor of faculty work satisfaction between bachelor's and employing institution in Model 5.1 (b = .738, $t(697) = 3.48$, $p < .001$) as well as the institutional differences between doctoral and employing institution in Model 5.2 (b = .687, $t(697) = 3.31$, $p < .001$) (see Table 21 below). Faculty working in an academic field related to their doctoral degree rated their work satisfaction .74 to .69 SD higher than faculty working in a field not related to their doctoral degree.

Black faculty in Model 5.1 (b = -.322, $t(697) = -2.08$, $p = .038$) showed significantly lower work satisfaction than White faculty. However, this result is complicated by the three variables that examine interaction effects using Black racial identity. Therefore this coefficient is only correct when there is no difference in the percentage of Hispanic, Asian, and Black students when moving from a doctoral to an employing institution (i.e., the value of these variables is equal to zero). Hence, this significant result for Black faculty is only valid for faculty employed at the same institution where they earned their bachelor's degree. Similarly, Hispanic faculty in Model 5.2 were significantly less satisfied than White faculty (b = -.325, $t(697) = -2.32$, $p = .021$). As with the significant finding for Black faculty in

Model 5.1, this result is only valid for Hispanic faculty employed at the same institution where they earned their doctorate.

Table 21

Model 5: Strict Differences in Institutional Characteristics, Interaction Effects by Race

Variable	Model 5.1 (BA to Employer)	Model 5.2 (PhD to Employer)
Faculty working in field related to doctoral degree field	0.738***	0.687***
Employed in Computer or Mathematics field	0.027	0.042
Employed in Life Science field	0.159	0.142
Employed in Physical Sciences field	0.149	0.215
Employed in Social Sciences field	-0.156	-0.159
Employed in Engineering field	0.130	0.059
Employed at current institution for less than three years	0.116	0.131
Age in years	-0.008	-0.009
Female	0.021	0.049
Marital status	0.135	0.126
U.S. Citizen	0.031	0.083
Asian	-0.030	-0.157
Black	-0.322*	-0.325
Hispanic	-0.170	-0.325*
Dependent children	-0.023	0.028
Faculty salary (in logged dollars)	0.184	0.143
Change in the number of FTE Students (in 1,000 student units) ‡	-0.001	0.000
Change in SAT score equivalent ‡	0.000	0.000
Change in degree of urbanization for institutional setting ‡	-0.055	-0.057
Change in geographic region [1]	-0.115	-0.057
Change in the percentage of women in student body ‡	0.340	-0.113
Change in the percentage of Asian students in the study body ‡	-0.813	-0.149
Change in the percentage of Black students in the study body ‡	-0.516	-0.426
Change in the percentage of Hispanic students in the student body ‡	0.290	-0.786
Change in the percentage of institutional expenditures spent on research ‡	0.871	0.860
Total non-hospital institutional expenditures ($1,000 units) ‡	-0.003	-0.000
Change in the percentage of graduate students in the student body ‡	0.046	-0.152
N	697	697
Adjusted R^2	0.058	0.058

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
‡ = difference scores (employing institution - degree institution)
1 = dichotomous variable, change in status = 1, no change = 0

Table 21 (continued)

Model 5: Strict Differences in Institutional Characteristics, Interaction Effects by Race

Variable	Model 5.1 (BA to Employer)	Model 5.2 (PhD to Employer)
Sex x Change in the percentage of women in the student body ‡	-0.240	-0.049
Black x Change in the percentage of Hispanic students ‡	-1.010	-0.233
Asian x Change in the percentage of Hispanic students ‡	-1.308	0.559
Hispanic x Change in the percentage of Hispanic students ‡	-0.386	1.587
Black x Change in the percentage of Black students ‡	1.109	0.428
Asian x Change in the percentage of Black students ‡	-0.021	-0.493
Hispanic x Change in the percentage of Black students ‡	2.256	2.072
Black x Change in the percentage of Asian students ‡	0.295	-0.315
Asian x Change in the percentage of Asian students ‡	1.606	-1.397
Hispanic x Change in the percentage of Asian students ‡	0.546	-2.104
intercept	-2.404	-1.889
N	697	697
Adjusted R^2	0.058	0.058

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

‡ = difference scores (employing institution - degree institution)

1 = dichotomous variable, change in status = 1, no change = 0

Model 6: Absolute differences in institutional characteristics with interaction effects by percent of Black, Asian, and Hispanic

Model 6 used absolute values of difference scores and interaction effects between faculty race/ethnicity and the percentage of Black students, the percentage of Asian students, and the percentage of Hispanic or Latino(a) students in the student body. As with all models, Model 6.1 and 6.2 found that having a job in a field related to one's doctoral degree was a strong predictor of faculty work satisfaction between bachelor's and employing institution in Model 6.1 (b = .700, $t(697)$ = 3.25, p = .001) as well as the institutional differences between doctoral and employing institution in Model 6.2 (b = .715, $t(697)$ = 3.34, p < .001) (see Table 20 below). Faculty working in an academic field related to their doctoral degree rated their work satisfaction .70 to .72 SD higher than faculty working in a field not related to their doctoral degree.

As with the finding in Model 5.2, Model 6.2 shows Hispanic faculty employed at the same institution where they earned their doctorate were significantly less satisfied than White faculty (b = -.480, $t(697)$ = -2.58, p = .010). The absolute change in the percentage of Hispanic students in the student body was also a statistically significant predictor of faculty work satisfaction (b = 1.196, $t(697)$ = 2.07, p = .038). Faculty members who experienced an absolute change in the percentage of Hispanic students at their employing institution, relative to their bachelor's institution, were significantly more satisfied. However, the model also includes variables that look at the interaction of the percentage of Asian students with Black, Asian, and Hispanic identity, meaning the results are only valid for faculty that are neither Asian, Black, nor Hispanic. As a result, these findings apply to faculty members who

identify as White in their racial identity. A hypothetical White faculty member who worked at a university where the student body was 20% Hispanic, yet earned their doctorate at an institution where the student body was 5% Hispanic, would rate their work satisfaction as .18 SD higher (i.e. .15 or 15% change times the coefficient 1.196). As these are absolute values, the reverse is also true for White faculty who experienced a similar drop in the percent of Hispanic students on campus.

Similarly, in Model 6.1, White faculty members who experienced a larger absolute change in the percentage of Black students at their employing institution, relative to their bachelor's institution, reported significantly lower work satisfaction (b = -1.172, t(697) = -2.05, p = .041). For example, a White faculty member who experienced a 50 percentage point increase in the percentage of Black students from bachelor's to employing institution, would be predicted to report .a 59 SD lower work satisfaction score.

The absolute change in the percentage of women in the student body from the doctoral to employing institution (Model 6.2) was a significant predictor of faculty work satisfaction (b = 1.352, t(697) = 2.49, p = .013). As the model also included a variable with the interaction between the variable for the percentage of women in the student body and the variable for sex, this finding is only valid for male faculty in the model. A male faculty member who experienced the largest absolute change in the proportion of men or women in the student body (i.e., 60 percentage point difference) should report a .81 SD increase on their work satisfaction factor score. The difference in this example could be the result of a faculty member moving from a doctoral institution that was 80% male to an employing institution that was 20% male, or vice versa.

As with previous models, the absolute difference in non-hospital expenditures per FTE student was a significant predictor of faculty work satisfaction in Model 4.1. Faculty members who experienced substantial changes (in terms of absolute value) in the amount of institutional spending when moving from the bachelor's to employing institution had significantly higher levels of work satisfaction (b = .004, $t(697) = 2.38$, p = .017). As with Model 2.1 and 4.1, the coefficient for non-hospital expenditures was the same in Model 6.1, despite the addition of more interaction variables to the model. Finally, Hispanic faculty who experienced large changes in the proportion of the Asian students have significantly higher levels of work satisfaction (b = 2.832, $t(697) = 2.24$, p = .025).

Table 22

Model 6: Absolute Differences in Institutional Characteristics, Interaction Effects by Race

Variable	Model 6.1 (BA to Employer)	Model 6.2 (PhD to Employer)
Faculty working in field related to doctoral degree field	0.700**	0.715***
Employed in Computer or Mathematics field	0.016	-0.032
Employed in Life Science field	0.186	0.178
Employed in Physical Sciences field	0.189	0.164
Employed in Social Sciences field	-0.130	-0.173
Employed in Engineering field	0.113	0.042
Employed at current institution for less than three years	0.139	0.125
Age in years	-0.005	-0.008
Female	0.139	0.140
Marital status	0.139	0.117
U.S. Citizen	0.049	-0.010
Asian	0.054	-0.146
Black	-0.177	-0.214
Hispanic	-0.192	-0.480*
Dependent children	0.007	0.037
Faculty salary (in logged dollars)	0.148	0.159
Change in the number of FTE Students (in 1,000 student units) †	-0.001	0.004
Change in SAT score equivalent †	-0.001	-0.001
Change in degree of urbanization for institutional setting †	-0.036	-0.064
Change in geographic region 1	-0.102	-0.058
Change in the percentage of women in the student body †	0.549	1.352*
Change in the percentage of Asian students in the student body †	0.635	-0.739
Change in the percentage of Black students in the student body †	-1.172*	-1.038
Change in the percentage of Hispanic students in the student body †	-0.054	1.196*
Change in the percentage of institutional expenditures spent on research †	-0.286	-0.892
Change in total non-hospital institutional expenditures ($1,000 units) †	0.004*	0.000
Change in the percentage of graduate students in the student body †	-0.114	0.117
N	697	697
Adjusted R^2	0.059	0.067

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
† = absolute value of difference scores |employing institution - degree institution|
1 = dichotomous variable, change in status = 1, no change = 0

Table 22 (continued)

Model 6: Absolute Differences in Institutional Characteristics, Interaction Effects by Race

Variable	Model 6.1 (BA to Employer)	Model 6.2 (PhD to Employer)
Sex x Change in the percentage of women in the student body †	-1.172	-1.197
Black x Change in the percentage of Hispanic students †	-0.249	-4.957
Asian x Change in the percentage of Hispanic students †	-0.016	-2.269
Hispanic x Change in the percentage of Hispanic students †	0.144	-0.658
Black x Change in the percentage of Black students †	0.508	0.956
Asian x Change in the percentage of Black students †	0.851	0.804
Hispanic x Change in the percentage of Black students †	2.410	2.827
Black x Change in the percentage of Asian students †	-0.783	0.705
Asian x Change in the percentage of Asian students †	-2.230	1.475
Hispanic x Change in the percentage of Asian students †	-0.753	2.832*
intercept	-2.108	-2.028
N	697	697
Adjusted R^2	0.059	0.067

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

† = absolute value of difference scores |employing institution - degree institution|

1 = dichotomous variable, change in status = 1, no change = 0

Summary

This chapter reviewed the significant findings for each of the six statistical models used to the test the primary and secondary hypotheses. Next in Chapter 5, I provide interpretations and evaluations of the implications for the significant findings from this chapter and whether or not they support the hypotheses of this research.

Chapter 5

Introduction

The purpose of this study was to determine if institutional characteristic differences experienced by tenure-track assistant faculty, relative to their degree institutions, impacted their job satisfaction. The use of differences in institutional characteristics between colleges and universities served as a proxy for measuring relative similarities of work environments. This chapter will discuss the findings from Chapter 4 and how they support the study's collegiate schema theoretical framework and other hypotheses.

Support for the Three Main Components of Collegiate Schemas

I posited three main components of the institutional faculty job expectations that comprise collegiate schemas: institutional prestige, institutional resources, and institutional mission and culture. These components serve as proxies for factors that contribute to the distinctiveness of each higher education instiution and were selected based on past research into faculty work satisfaction. These studies found significant work satisfaction effects for academic status or prestige (Hagedorn; Lindholm; Olsen), salary and other forms of compensation (Gappa et al., 2007; Hagedorn, 2000; Johnsrud & Rosser, 2002; Lindholm, 2003; Olsen, 1993), financial and other campus resources (Gappa et al.; Johnsrud & Rosser; Lindholm; Olsen), the size of a college or university (Hagedorn; Lindholm), institutional culture (Hagedorn; Johnsrud & Rosser, 2002; Lindholm; Olsen), and geographic location (Gappa et al.; Lindholm).

Findings for institutional prestige. I expected that institutional prestige, as measured by standardized test scores, would be a significant predictor of work satisfaction if

faculty employing institutions were substantially higher or lower in academic prestige, relative to the prestige of their bachelor's or doctoral degree institutions. However, there was no evidence in any of the models that differences in standardized test scores, either strict or absolute, impacted faculty work satisfaction. This finding was surprising, largely because it defies commonly accepted wisdom that faculty members who attended highly selective colleges and universities for their degrees would be less satisfied working at a less-selective institution.

The fact that institutional presige did not impact faculty work satisfaction in the models may be due to several factors. The first is that contrary to the notion of collegiate schemas, faculty members may not retain an institutional context from their degree institutions that influences their perception of the institution where they are employed. Second, faculty may not internalize their school's relative selectiveness as a measure of prestige that affects them professionally. Faculty members are likely more interested in the relative standing of their academic department or discipline, a measure of prestige that may or may not correlate with the selectivity of the student body as a whole. Finally, faculty may have come to terms with the change in institutional prestige when they accepted the faculty job and it is not a factor their overall work satisfaction.

Findings for institutional resources. I hypothesized that differences in institutional resources would be a factor in faculty work satisfaction because faculty members who have experience working at relatively well-funded institutions may be less satisfied at an institution with fewer resources. The results for this hypothesis are mixed. Differences in total non-hospital FTE expenditures, relative to a faculty member's bachelor's institution did

predict faculty work satisfaction in the absolute difference models. However, the difference in the percent of expenditures spent on research was not a significant predictor of work satisfaction in any of the statistical models.

One possible explanation for the significant impact of total institutional expenses, but not for the relative change of the percent spent on research, may be due to faculty not having direct knowledge of or experience with an institution's expenditures as faculty or as students. They may generally be aware of an institution's relative wealth and resources but they are not privy to how those funds are allocated outside of their academic focus and personal experience. As I discuss later in the limitations of the study, missing IPEDS financial data for several colleges and universities may have also impacted the findings.

Strict differences vs. absolute differences in institutional spending. One of the more interesting findings related to how total institutional expenditures per student differed by strict and absolute difference models. In the models that examined strict differences between institutions (Models 1, 3, and 5), faculty who experienced changes in the amount of institutional resources spent per student, did not report significantly different levels of job satisfaction. Conversely, faculty who experienced the largest absolute change in the amount of total institutional expenditures per student between bachelor's institution and employing institution (Models 2.1, 4.1 and 6.1), were significantly more satisfied. This would suggest that on the average, increases or decreases in relative institutional wealth from bachelor's to employing institution do not significantly improve or reduce job satisfaction. However, the overall or absolute change in institutional expenses does have a positive work satisfaction impact.

One explanation is that institutional type is playing a role in these findings. For research universities, a large part of the operating budget is dedicated to research and funded by money from external research grants (Austin & Wulff, 2004). These schools may have high amounts of money spent per student, but relatively small amounts are spent directly on instruction or student services. Instead these students may benefit more indirectly from the research experience of faculty and the opportunity to become involved in research. Conversely, at institutions with an undergraduate teaching mission, there is less emphasis on research, and as a result lower total expenditures per student (Austin & Wulff). Some faculty prefer to work at research institutions and are likely more satisfied, on average, at an institution with greater relative resources. Other faculty will prefer to spend more time teaching and are more satisfied at teaching colleges where less money is spent per student. Some of these faculty members attended a relatively wealthy college but are now working happily at a less wealthy institution. The effect of these two groups of faculty were not significant on their own, but when combined using the absolute value of the differences in institutional wealth, created an overall significantly positive finding on work satisfaction. This finding would appear to refute secondary hypothesis #1 or the "change is always bad" hypothesis. In this case, as with the percentages of women and Hispanics in the student population, change may represent the conscious choice of individual faculty.

One reason for a bachelor's to employing institution effect but not a doctoral institution to employing institution effect is likely due to the lack of variability across doctoral-granting institutions. Relatively few institutions offer doctorates and they tend to have similar missions (Austin & Wulff, 2004). Faculty respondents making the transition

from doctoral institution to employing institution would likely experience little change in spending per student if they took a job at a research university.

Ultimately, the significant findings for the amount of money spent per student may have less to do with institutional expenditures than serve as a proxy for institutional mission. Colleges and universities that dedicate a significantly larger percentage of their resources toward research likely differ significantly in institutional mission from those institutions that dedicate relatively low levels of funds toward research. As discussed in Chapter 2, past research has found that faculty members expecting a large research agenda at a teaching or community college may experience "culture shock" when they accept employment at a college with a high priority on teaching and little opportunity for research (Menjes, 1999). The opposite is likely also true.

Findings for institutional mission and culture. The next section will review findings for the model variables used to measure the characteristics of an institution that contribute to its institutional type, mission, and culture. I hypothesized that they contribute to the establishment of implicit and explicit expectations for future higher education work environments.

Change in the percent minority students. Based on the literature, I believed that colleges and universities with large percentages of minority students differ in institutional culture, and often in institutional mission. I expected that faculty who experienced large changes in the proportion of minority students will have significantly lower job satisfaction. This expectation was not supported by the statistical models. The difference in the percentage of minority students was not a significant factor in faculty work satisfaction. One

explanation for the lack of significant results is that by combining multiple races and ethnicities into a single measure of minority students, the individual effects of the different races and ethnicities were lost. Significant findings for variables that examined specific racial categories in Model 6 support this hypothesis.

Change in the percent of Asian, Black & Hispanic students. Model 5 and Model 6 featured variables that looked at the change in the percent of Asian, Black, and Hispanic students in the student body. As detailed in Chapter 4, White faculty who experienced larger absolute changes in the proportion of Black students in the student body, relative to their bachelor's institution, were less satisfied. White faculty who experienced larger absolute changes in the proportion of Hispanic students in the student body at their employing institution, relative to their doctoral institution, reported significantly higher levels of work satisfaction.

One explanation for these results might be that White faculty experience discomfort with changes in the levels of student body racial diversity. This supports a finding by Carter (1999) who found that colleges with high percentages of White students tend to not emphasise multiculturalism as a high campus priority. However, the difference in the proportion of Black students was only significant in the absolute difference model (Model 6) that measures total amounts of change. If White faculty were significantly less comfortable working at an institution with a larger proportion of Black students relative to their bachelor's institution, the percent of Black students would have been significant in the strict difference model (Model 5).

Furthermore, this does not necessarily explain why White faculty who experienced greater changes in the proportion of Hispanic students in the student body, positive or negative, were more satisfied. An alternative explanation is that these differences are largely due to changes in institutional mission or geographic region for which the models did not effectively control. For example, of the White faculty who experienced the greatest absolute change in the percent of Black students (see Table 23 below), many either moved in or out of the Southeast, a region with a higher percentage of Black students in the general population, or experienced significant shifts in size of institution. Region, institutional size, and the interaction between the two, suggest that changes in institutional mission and geographic region may better explain why White faculty, on average, reported significantly lower levels of job satisfaction.

Table 23

List of Selected Bachelor's and Employing Institution Characteristics for White Faculty Who Experienced High Absolute Change in the Percentage of Black Students

Absolute change % Black students	Bachelor's Institution				Employing Institution			
	% Black in Student Body	State	Region	Student FTE	% Black in Student Body	State	Region	Student FTE
80%	13%	FL	Southeast	24,282	93%	FL	Southeast	11,471
74%	10%	FL	Southeast	10,318	84%	LA	Southeast	3,823
38%	6%	SC	Southeast	2,898	44%	GA	Southeast	3,550
37%	4%	NY	Mid East	6,940	41%	MA	New England	547
32%	28%	NY	Mid East	10,708	60%	NY	Mid East	4,203
29%	6%	NY	Mid East	23,035	35%	GA	Southeast	3,204
28%	1%	ME	New England	1,237	29%	NY	Mid East	9,854
27%	1%	NY	Mid East	2,478	28%	MI	Great Lakes	3,946
27%	2%	CO	Rocky Mountains	1,908	29%	GA	Southeast	21,211
27%	8%	NJ	Mid East	31,268	35%	NY	Mid East	6,368
26%	0%	MN	Plains	1,978	26%	LA	Southeast	7,073
26%	5%	MO	Plains	23,512	31%	TN	Southeast	15,857
24%	6%	VA	Southeast	25,981	30%	IL	Great Lakes	3,020
24%	0%	UT	Rocky Mountains	29,729	24%	GA	Southeast	13,418
23%	26%	LA	Southeast	7,073	3%	PA	Mid East	8,304
22%	26%	LA	Southeast	7,073	4%	KY	Southeast	11,557
22%	7%	NC	Southeast	6,164	29%	GA	Southeast	21,211
21%	2%	IA	Plains	25,938	24%	IL	Great Lakes	4,393
21%	23%	LA	Southeast	13,410	2%	GA	Southeast	1,950
21%	2%	WA	Far West	3,167	23%	MS	Southeast	13,357
21%	4%	MN	Plains	1,922	25%	MI	Great Lakes	22,068
20%	11%	MA	New England	8,838	31%	TN	Southeast	15,857

A similar pattern emerges looking at the White faculty who experienced large absolute changes in the proportion of Hispanic students in the student body (i.e., moving from a doctoral institution with a large percentage of Hispanic students to an employing institution with a small percentage of Hispanic students or vice versa). Generally, the faculty who experienced the largest absolute change in the proportion of Hispanic students were moving from or to the Southwest or Far West regions of the country. As with the significant

findings for differences in Black students in the student body, changes in geographic region, rather than preferences for student body racial composition may better explain the results for White faculty.

Without further study, it is not possible to determine whether changes in the proportion of minority students impact White faculty members' average satisfaction or whether the proportion of minority students serves as a proxy for another measure. It is also possible that, like the hypothesized collegiate schemas, White faculty form expectations of collegiate student body diversity during their undergraduate years. Large changes in the percentages of Black students at their employing institution, relative to their undergraduate experience, may generate a degree of discomfort that, on average, influences their job satisfaction.

Table 24

List of Selected Bachelor's and Employing Institution Characteristics for White Faculty Who Experienced High Absolute Change in the Percentage of Hispanic Students

Absolute change % Hispanic students	Bachelor's Institution				Employing Institution			
	% Hispanic in Student Body	State	Region	Student FTE	% Hispanic in Student Body	State	Region	Student FTE
58%	5%	IL	Great Lakes	37,735	63%	TX	Southwest	5,248
48%	53%	IA	Plains	25,938	5%	VT	New England	2,290
44%	1%	TX	Southwest	49,037	45%	CA	Far West	15,848
43%	10%	MA	New England	21,162	53%	FL	Southeast	24,282
43%	2%	NJ	Mid East	1,566	45%	CA	Far West	15,848
42%	8%	TX	Southwest	49,037	50%	TX	Southwest	2,909
40%	10%	OH	Great Lakes	7,702	50%	TX	Southwest	2,909
40%	41%	AR	Southeast	13,740	1%	MO	Plains	1,289
36%	5%	TX	Southwest	49,037	41%	NM	Southwest	13,189
34%	2%	LA	Southeast	29,541	36%	TX	Southwest	6,106
34%	1%	NC	Southeast	23,330	35%	NY	Mid East	9,854
33%	13%	CA	Far West	23,701	46%	TX	Southwest	17,371
30%	5%	MD	Mid East	9,913	35%	NY	Mid East	9,854
28%	13%	CA	Far West	27,318	41%	NM	Southwest	13,189
28%	29%	IA	Plains	1,500	0%	WV	Southeast	2,468
28%	29%	MN	Plains	2,725	1%	MN	Plains	2,725
28%	29%	MN	Plains	3,051	1%	WI	Great Lakes	8,186
28%	29%	NM	Southwest	19,673	1%	IN	Great Lakes	1,012
27%	29%	NM	Southwest	19,673	1%	SC	Southeast	21,322
27%	29%	PA	Mid East	5,967	1%	NC	Southeast	18,202
27%	2%	MI	Great Lakes	2,839	29%	NM	Southwest	19,673
25%	3%	CA	Far West	22,883	29%	NM	Southwest	19,673
24%	12%	TX	Southwest	5,248	36%	TX	Southwest	6,106
24%	5%	NY	Mid East	2,675	29%	NM	Southwest	19,673
23%	2%	OK	Southwest	1,690	25%	CA	Far West	26,738
22%	24%	MI	Great Lakes	36,885	1%	NC	Southeast	4,306
22%	9%	CA	Far West	22,883	31%	CA	Far West	9,330
21%	24%	UT	Rocky Mountains	29,729	3%	UT	Rocky Mountains	29,729

Change in the percent of female students. I hypothesized that faculty who experience large shifts the proportion of women among the student body would be less satisfied with their job. Instead, the regression models showed that male faculty who

experienced large changes in the proportion of male or women among the student body, relative to their doctoral institutions, had significantly higher levels of work satisfaction. One explanation for this unexpected result is that most doctoral institutions are large universities with proportions of men and women that are similar to that of the U.S. population. As shown in Figure 3 above, the variability in the proportion of men to women is relatively low for doctoral institutions compared the bachelor's and employing institutions. As a result, many, if not most faculty, will be employed at an institution with a different proportion of men and women than their doctoral institution.

Furthermore, many of the employing institutions are relatively small institutions of less than 10,000 students. While the regression models controlled for institutional size, smaller schools are more likely to differ in institutional missions from larger doctoral-granting institutions. For example, of the three faculty members who had experienced the greatest absolute change in the percent of women in the student body, two of those faculty members were employed by military colleges. Faculty who experienced these large shifts in the proportion of men or women in the student body were very likely aware of the difference in gender proportion and made a conscious choice to work at an institution very different from their doctoral institution. If these faculty did make such an informed choice, it is not unexpected that they might report higher levels of job satisfaction.

Changes in geographic region. I had expected that faculty who did not change geographic regions for their job, relative to their degree institutions would have greater work satisfaction. This hypothesis was not supported by the regression models. Change in geographic region was not a significant predictor of work satisfaction in any of the six

models. Even though about 60% of faculty changed regions relative to where they earned their degrees, the academic job market may prepare future faculty for the possible need to move across different geographic regions to secure a tenure-track job. It is also possible that the categories IPEDS uses for geographic region do not effectively measure the complex effects related to significant changes in geographic region.

Changes in the degree of urbanization for the institutional setting. I included the degree of urbanization variable to take into account the faculty that many institutions of similar size, mission, and geographic region differ significantly in their urban environment. I had expected that a change in the degree of urbanization might impact faculty job satisfaction in a way that was similar to changes in geographic region. However, changes in the degree of urbanization did not significantly impact faculty satisfaction in any of the six models. As with geographic region, this lack of significant findings may be due to faculty being flexible about job location, or a limitation in the IPEDS measure of urbanization.

Changes in institutional size. I anticipated that institutional size might significantly influence faculty satisfaction in situations where faculty move from very small to very large institutions or vice versa. However, none of the models showed a significant effect in job satisfaction for faculty who experienced large changes in institutional size relative to their degree institutions. For faculty, the most important factor unit of size may be the size of their department. The size of the overall institution may have less impact on their lives, or have been controlled by other variables such as the percent spent on research.

These findings lend support for previous research related to institutional mission and culture, but do not support prior research that found geographic location and institutional size

to be significant predictors of job satisfaction (Austin & Gamson, 1983; Hall, 1995; Kalleberg, 1977; Volkwein et al., 1998). However, as has been discussed, the previous studies looked only at the geographical location and institutional size of the employing institution and did not look at the comparative differences between degree and employing institutions.

Statistically significant covariate findings. The finding that faculty are significantly and substantially more satisfied with their jobs if they are working in a field related to their doctoral degree is not surprising, but it is important. Academic departments may be tempted to recruit a professor from an outside field in the hope that his or her different perspective will foment innovation. This finding should make colleges and universities more hesitant to make such a hire. Likewise, faculty members should be cautious about accepting such a job offer. Interdisciplinary cross-fertilization of ideas may be better accomplished through collaborations across academic departments than expanding academic field diversity within a department.

Model 1 showed that Black faculty had significantly lower levels of job satisfaction than White faculty. This supports a number of previous studies (Nerad et al., 2004; Olsen et al., 1995; Seifert & Umbach, 2008; Tierney & Bensimon, 1996). Model 3 and Model 5 also showed that Black faculty had significantly lower job satisfaction than White faculty, but the use of race and ethnicity interaction variables require a different interpretation than in Model 1. Instead the results indicate that Black faculty who took a job at the same institution they attended as undergraduates have significantly lower work satisfaction than similar White faculty. Likewise Hispanic faculty who are employed by their doctoral institutions are

significantly less satisfied with their jobs. These results, if they can be generalized to the larger faculty population, have significant implications for how colleges and universities recruit Black and Hispanic faculty.

Support for the Research Hypotheses

Primary hypothesis. This study hypothesized that expectations of the collegiate workplace formed, in part, by experiences as undergraduate and doctoral students influence the work satisfaction of tenure-track assistant professors. These university workplace expectations or collegiate schemas establish the context by which faculty view future higher education institutions.

This study found limited support for collegiate schemas in the six regression models. The findings suggest that relative institutional wealth between colleges and universities and the diversity of their student bodies can influence faculty work satisfaction. In some cases, the findings for student body diversity may serve as proxies for changes in institutional culture or mission. Surprisingly, differences in institutional prestige, geographic region, institutional size, and research spending across institutions did not predict faculty work satisfaction in the models.

Another possible reason for the limited findings in the difference score models may reside with faculty choice. Even if it difficult for new Ph.D.s to obtain a tenure-track job at the institution of their choice, they may be able to find a job at the institutional type of their choice. For example, a faculty member who wants to work at a small liberal arts college may not receive a job offer at their first choice of Amherst, but may instead accept a job at Grinnell, Wabash, or Vassar. If most faculty have the ability to choose their workplace

institutional type, then most of the experienced changes in institutional characterics relative to their degree institutions would be due to conscious choice. Such a choice should create little cognitive dissonance and little impact on work satisfaction.

Support for secondary hypothesis #1: More change leads to less satisfaction. I hypothesized that the amount of change experienced by faculty, as measured by differences in institutional characteristics, negatively impacts faculty work satisfaction, regardless of whether or not the change is considered positive or negative. Support for this "more change is always bad" hypothesis was limited and mixed. Faculty members who experienced greater absolute change in institutional spending per student relative to their bachelor's institution were significantly more satisfied with their work. Likewise, White faculty members who experienced larger absolute changes in the percentage of Black students in the student body were less satisfied. However, male faculty who experienced a greater absolute change in the gender composition or proportion of Hispanics in the student body of their employing institutions, relative to their doctoral institution, reported significantly higher levels of job satisfaction.

These findings run counter to expectations that differences in institutional prestige or selectivity would exhibit a greater influence on faculty work satisfaction. Perhaps faculty are better able to anticipate and prepare for differences in geographic region or institutional selectivity, whereas the influences of substantial shifts in racial diversity are more difficult to anticipate.

Secondary hypothesis #2: The direction of the change matters. I also hypothesized that the amount and direction of an experienced change, instead of the absolute

change, as measured by differences in institutional characteristics, impact faculty work satisfaction. The idea that faculty who experienced relative increases in institutional resources would exhibit greater work satisfaction makes intuitive sense. However, no statistically significant results were found among institutional characteristic difference variables for any of the three strict difference models (Model 1, Model 3, and Model 5). These findings lend more support for the absolute change hypothesis as measured in secondary hypothesis #1.

Secondary hypothesis #3: The bachelor's experience is more important. As research shows that early work environment experiences tend to hold primacy for personal schemas, I expected bachelor's institutions to exhibit a greater influence on faculty work environment expectations. Bieber and Worley (2006) had suggested that students form an *ideal script* or schema of faculty life during their undergraduate years, but the results suggest that both bachelor's and doctoral institution experiences have an influence.

This is logical because, while undergraduates form many first and lasting impressions of collegiate life, doctoral student experiences are more current and potentially more relevant to students' future faculty roles. Even a future faculty member who receives little formal socialization to faculty life would likely receive some degree of anticipatory socialization. It is also likely that this anticipatory socialization would, lacking knowledge of a future employer, be done within the context of the doctoral institution.

Bieber and Worley (2006) had found that students' ideal scripts of faculty life, formed during their undergraduate years, were remarkably resilient to contradictory information learned as doctoral students. It may be true that these ideal scripts are formed

early, but based on the results of this study, it would appear that either the collegiate schemas are more malleable, or future faculty do not appreciate how the work life of their faculty ideal may be influenced by their bachelor's institution's mission or culture.

Delimitations

Only faculty who received both bachelors and doctoral degrees from U.S. colleges and universities were included in the study due to the difficulty in making comparisons of institutional characteristics across different countries. The SDR survey focused on STEM fields and therefore only faculty working in science, technology, engineering, mathematics, and social science fields were included in the sample. As a result, faculty with non-doctoral terminal degrees and faculty working in the arts and humanities were not included in the sample. Furthermore, while there exists a body of literatere on the impact of personality or disposition on job satisfaction, these variables were not addressed in the analyses because the targeted data sets do not include such variables.

Finally, this study does not review the impact of academic labor markets defined as the "buying and selling of faculty labor for use by colleges and universities," (Toutkoushian, 2003, p. 267) except to discuss how they might limit available tenure-track job choice for recent doctoral recipients. The focus of this study is faculty job satisfaction, and while labor market issues do affect employee decisions to leave in general (March & Simon, 1958; Mobley et al., 1979), external academic labor market influences have been found to have little to no effect on faculty decisions to leave one's college or university (Johnsrud & Rosser, 2002).

If faculty members believe that good alternative jobs are available, it does positively impact employee intentions to resign, but it does not predict actual attrition (Matier, 1990; Zhou & Volkwein, 2004). Note that current economic times likely emphasize the importance of supply and demand in the academic labor market and may affect satisfaction accordingly. However, the data for this study were collected around 2001 and are likely not representative of current times.

Limitations

This study simplified job satisfaction and work environment expectations into a series of variables that cannot capture the full complexity of either phenomenon. However, this simplification is necessary for these analyses that focus on degrees of environmental differences and similarities. Additionally, while this study examines job satisfaction at employing institutions, it is unknown whether faculty had a positive or negative experience at their degree institutions. Also an unknown are the levels of experience or engagement that future faculty had with their degree institutions. They may have had limited exposure to each campus and thus limited knowledge of how various institutional characteristics impacted the environment.

Another limitation of this study is that while a case has been made that institutional characteristics of a college or university can serve as a proxy for work environment expectations, these characteristics cannot capture individual faculty member's mental processes regarding their transition between the two environments. Additionally, faculty members who have had other experiences in higher education outside of their degree institutions, such as participation in Preparing Future Faculty programs (PFF), may

experience less impact on their job satisfaction by institutional characteristics differences between degree and employing institutions. Unfortunately, the possible influence of PFF cannot be tested due to the inability to match PFF participation with SDR respondents.

Missing data were another important limitation for this study. Specifically, I refer to missing institutional financial data within the IPEDS system. Several colleges and universities did not report basic expenditure data during the 2001-2002 reporting period. Many of these institutions were located in New York, Pennsylvania, and New Jersey and were branch or system campuses. For example, the State University of New York (SUNY) institutions reported aggregated financial data for all SUNY schools, but did not report individual institution financial data until 2005. This resulted in missing data for any faculty member who attended a SUNY institution for a degree or later worked at a SUNY school. As a result, these faculty members were dropped from the final models. Early testing of regression models prior to dropping faculty members with missing data, demonstrated the impact of missing data on coefficients. Future studies should focus on time periods with less missing financial data or consider the feasibility of multiple imputation to account for the missing data.

Finally, as this study found only moderate support for the impact of differences in institutional characteristics on job satisfaction, it is possible that collegiate schemas have limited influence or that existing socialization to faculty roles mediates any noticeable effect. Depending on the supply and demand within different disciplines (e.g., STEM vs. Humanities), different levels of job candidate self-selection may be operating as well, and the analyses cannot capture this or control for it.

Another possible factor is that tenure-track faculty may have prior experience in the form of post-doctoral fellowships. The number of faculty who reported completing a post-doc doubled between 1975 and 1992 among the natural sciences (Schuster & Finkelstein, 2006). Not only would a post-doc experience provide additional experience and socialization to higher education, the experience may be more similar to the work of a faculty member than that of a student.

Implications

The findings from this study make three main contributions to the literature. They provide evidence to support a new approach to examining institutional fit for faculty. They add to our understanding of factors that influence faculty satisfaction, and they have implications for future faculty career choices and socialization to the professoriate.

A new approach to examining institutional fit. This study broke new ground by looking at how prior higher education experience might influence later faculty job satisfaction. This study attempted to measure empirically the degree of institutional change experienced by faculty. While there were relative few difference variables that showed significant difference, they did support the idea that the context of past higher education experience has some influence faculty job satisfaction. These findings suggest that future studies on faculty satisfaction should work to control for the institutional expectations that faculty bring with them to their employing institution.

New factors that influence faculty satisfaction. This study provides support for the influence of collegiate schemas or expectations of future work in an institution of higher education. However, these schemas appear to largely reflect general concepts of institutional

mission (i.e., relative institutional resources) and institutional culture (i.e., differences reflected in substantial shifts in the student body racial or gender composition).

The results also provide some support for overcoming commonly accepted wisdom related to institutional prestige. The models showed no support for the idea that a faculty member moving from a very selective college or university to take a job at a less selective institution experiences a drop in work satisfaction. While this study was unable to measure changes in prestige for department or academic field, the findings suggest that relative changes in institutional prestige have no quantifiable impact on work satisfaction.

Implications for faculty career and socialization. Future study could help determine the degree to which realistic job previews can modify prior expectations. If work expectations are malleable, then programs like Preparing Future Faculty (PFF) and the NSF Center for the Integration of Research, Teaching, and Learning (CIRTL) can play a role in socializing graduate students to different institutional cultures and missions. If these prior expectations for faculty work are less resistant to socialization, then the results of this study can assist faculty in choosing colleges and universities that offer the best institutional fit for their needs.

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Appendix

STATA 11.0 Syntax Used in Data Merging and Analysis

```
use sdr, clear

*********************************
*** Keep Relevant Variables ***
*********************************
keep wrkg fptind ftpret embus emsize emed edtp facrank tensta ocedrlp wa* sat* salary ///
salarp wkswk wkswkp ch* fac* phdrcnt phd* adq* phdsatis marsta marind ch* ctzusin ctz*
///
hispanic hispcat native pacific asian black white age gender baacyr badgrus  ///
instcod resplcus resploc carneg baincd bamemg bameng bacarn bargn mrincd dgryr hdincd ///
sdrincd sdrcarn sdrmeng sdrmemg sdryr sdrrgn bthst race raceth eddad edmom cohort ch*
nr* wtsurvy ocprmg ocpr oclst strt* pathmos

* instcod = employing university ipeds code
* baincd = bachelor's degree university ipeds code
* mrincd = most recent degree univeristy ipeds code
* hdincd = highest degree university ipeds code
* sdrincd = first doctorate university ipeds code // only 6 of 3,680 do not overlap with hdincd

*********************************
*** Narrow Sample by Responses ***
*********************************
keep if wrkg=="Y" // keep people who were employed at time of survey
keep if embus=="04" | embus=="06" | embus=="11" // keep people employed in educ, health
serv, or research
keep if emed=="Y" // keep if employer an educational institution
keep if edtp=="3" | edtp=="4" | edtp=="5" | edtp=="6" | edtp=="7" // keep if 2-year or 4-year
college, med school, research inst., other
*drop if tensta=="3" // drop tenured faculty from sample
keep if badgrus=="Y"  //keep if bachelor's institution was in U.S.
keep if resplcus=="Y" //keep if doctorate institution was in U.S.
keep if dgryr>=1990 // keep if earned doctorate in last 10 years
*keep if ocedrlp=="1" | ocedrlp=="2"

** leaves with 3680, but probably lose more in the bachelor's match

*****************************************
*** Rename Institution Codes for merge ***
*****************************************
rename instcod unitid_inst
```

```
rename baincd unitid_ba
rename sdrincd unitid_phd

save sdr_thin, replace

*************************************************************
*use diss_ipeds1, clear  // 2002 most of the data
*use diss_ipeds2, clear // act tiotopm enrollment expenditure, carnegie, institutional type,
region
*use diss_ipeds3, clear  // locale & updated carnegie class 2005 data, pulled in 2009
*use diss_ipeds4, clear // percent women 2002
*use diss_ipeds5, clear  // graduation rates 2002
*use diss_ipeds6, clear // percent minority 2002
*use diss_ipeds7, clear  // average salary & employee count 2002
*use diss_ipeds_fte, clear // fte 2002
*use diss_ipeds_zip_2009, clear // zip, longitude & lattitude 2009
use ipeds_ug_grad_2009, clear  // graduate student numbers 2009

*********************
*** Merge Datasets   ***
*********************

*** Merge ipeds2 & ipeds3 ***
use diss_ipeds2, clear
merge unitid using diss_ipeds3
rename _merge _merge1
sort unitid
save diss_ipeds_merge, replace

*** Add ipeds4 to the merge ***
merge unitid using diss_ipeds4
rename _merge _merge2
sort unitid
save diss_ipeds_merge, replace

*** Add ipeds5 to the merge ***
merge unitid using diss_ipeds5
rename _merge _merge3
sort unitid
save diss_ipeds_merge, replace

*** Add ipeds6 to the merge ***
merge unitid using diss_ipeds6
rename _merge _merge4
```

```
sort unitid
save diss_ipeds_merge, replace

*** Add ipeds7 to the merge ***
merge unitid using diss_ipeds7
rename _merge _merge5
sort unitid
save diss_ipeds_merge, replace

*** Add ipeds_fte to the merge ***
merge unitid using diss_ipeds_fte
rename _merge _merge6
sort unitid
save diss_ipeds_merge, replace

*** Add ipeds_fte to the merge ***
merge unitid using diss_ipeds_zip_2009
rename _merge _merge7
sort unitid

*** Add ipeds_ug_fte to the merge ***
merge 1:1 unitid using ipeds_ug_grad_2009
rename _merge _merge8
sort unitid

save diss_ipeds_merge, replace

use diss_ipeds_merge, clear

*** Still unsure about keeping medical schools ***

*** Drop medical schools ***
drop if carnegie==52 // medical schools
drop if carnegie==53 // other separate health profession school

*** Drop schools with "not applicable" Carnegie classifications for undergrad and grad ***
// drop if ccipug<0 & ccipgrad<0

************************
*** Clean Variables ***
************************

*** hbcu ***
replace hbcu=. if hbcu==-3
```

```
replace hbcu=0 if hbcu==2
label define label_hbcu 0 "Not HBCU", add
label define label_hbcu 2 "", modify

*** Derived Variables ***

*** Instruction spending per student FTE ***
gen instructfte=f1c011/fte if  !missing(f1c011)
replace instructfte=f2e011/fte if missing(f1c011) & !missing(f2e011)
lab var instructfte "Instructional spending per student FTE"

*** Research spending per student FTE ***
gen researchfte=f1c021/fte if  !missing(f1c021)
replace researchfte=f2e021/fte if missing(f1c021) & !missing(f2e021)
lab var researchfte "Research spending per student FTE"

*** Public Service spending per student FTE ***
gen pubservfte=f1c031/fte if  !missing(f1c031)
replace pubservfte=f2e031/fte if missing(f1c031) & !missing(f2e031)
lab var pubservfte "Public Service spending per student FTE"

*** Academic spending per student FTE ***
gen academicfte=f1c051/fte if  !missing(f1c051)
replace academicfte=f2e041/fte if missing(f1c051) & !missing(f2e041)
lab var academicfte "Academic spending per student FTE"

*** Student Services spending per student FTE ***
gen studentfte=f1c061/fte if  !missing(f1c061)
replace studentfte=f2e051/fte if missing(f1c061) & !missing(f2e051)
lab var studentfte "Student Services spending per student FTE"

*** Total spending per student FTE ***
gen totalfte=f1c151/fte if  !missing(f1c151)
replace totalfte=f2e131/fte if missing(f1c151) & !missing(f2e131)
lab var totalfte "Total spending per student FTE"

*** Non-Hospital total spending per student FTE ***
gen nonhosptfte=(f1c151-f1c121)/fte if  !missing(f1c151)
replace nonhosptfte=(f2e131-f2e091)/fte if missing(f1c151) & !missing(f2e131)
lab var nonhosptfte "Non-Hospital total spending per student FTE"

*** Non-Hospital total spending 2002 ***
gen nonhospt=f1c151-f1c121 if  !missing(f1c151)
replace nonhospt=f2e131-f2e091 if missing(f1c151) & !missing(f2e131)
```

```
lab var nonhospt "Non-Hospital total spending for 2002"

destring f3e07, replace
destring enrlft, replace

gen acceptrate=admssn/applcn  // Percentage of students applying who were accepted
lab var acceptrate "Percentage of students applying who were accepted"

destring enrlt, replace
gen yield=enrlt/admssn  // Percentage of students accepted who chose to attend
lab var yield "Percentage of students applying who were accepted"

gen ftprcnt=enrlft/enrlt  // Percentage of students attending full time

destring satvr75, replace
gen sat75=satvr75+satmt75 // Combined SAT scores for students in the 75th percentile,
compare to actcm75
lab var sat75 "Combined SAT scores at 75th percentile"

*** RACE/ETHNIC COMPOSITION OF STUDENT BODY, AS PERCENTAGE ***

gen pctstd_w=efwom/eftotal  //  Percent of Students that are Women
lab var pctstd_w "Percentage of total student body that is women"

gen pctstd_m=efmen/eftotal //  Percent of Students that are Men
lab var pctstd_m "Percentage of total student body that is men"

drop eflevel // variable not needed

gen pct_white=efrace22/eftotal //  Percent of Students that are White
lab var pct_white "Percentage of total student body that is White"

gen pct_black=efrace18/eftotal //  Percent of Students that are Black, non-Hispanic
lab var pct_black "Percentage of total student body that is Black, non-Hispanic"

gen pct_latino=efrace21/eftotal //  Percent of Students that are Latino
lab var pct_latino "Percentage of total student body that is Latino/Hispanic"

gen pct_asian=efrace20/eftotal //  Percent of Students that are Asian
lab var pct_asian"Percent of total student body that is Asian"

gen pct_amind=efrace19/eftotal //  Percent of Students that are American Indian
lab var pct_amind"Percent of total student body that is American Indian"
```

```
gen minority = pct_black + pct_latino + pct_asian + pct_amind
lab var minority "Percentage of student body comprised of known minority students"

gen nonwhite=1-pct_white
lab var nonwhite "Percentage of student body not identified as White"

gen underminor = pct_black + pct_latino + pct_amind
lab var underminor "Percentage of Black, Latino, and American Indian students"

*** GRADUATION RATES, TOTAL AND BY GENDER ***

drop grtype // not needed, artifact of the IPEDS download

gen grate=grrace24/enrlt
lab var grate "Rough estimate of graduation rate"

gen gr_women=grrace16/enrlw
lab var gr_women "Rough estimate of female graduation rate"

gen gr_men=grrace15/enrlm
lab var gr_men "Rough estimate of male graduation rate"

drop contract arank // not needed, artifacts of the IPEDS download

drop _merge* idx_* efalevel

save diss_ipeds_done, replace

*** Create Separate data sets for BA, PHD, and Work Inst. Characteristics ***

use diss_ipeds_done, clear

** add suffix to each variable ***
preserve
drop year fips f1c011 f1c021 f1c031 f1c051 f1c061 f1c121 f1c151 f2e011 ///
f2e021 f2e031 f2e041 f2e051 f2e091 f2e131 f3e01 f3e02 f3e03 f3e07 ///
applcn admssn enrlt enrlm enrlw enrlft enrlpt satvr25 satvr75 ///
satmt25 satmt75 acten25 acten75 actmt25 actmt75 actcm25 eftotal efmen ///
efwom efrace22 efrace18 efrace21 efrace20 efrace19 efrace23 ///
grrace24 grrace15 grrace16 grrace22 grrace18 grrace21 grrace20 gradtotal ///
grrace19 grrace23
renvars, postfix(_ba)
sort unitid_ba
save ipeds_bachelors, replace
```

```
restore

preserve
drop year fips f1c011 f1c021 f1c031 f1c051 f1c061 f1c121 f1c151 f2e011 ///
f2e021 f2e031 f2e041 f2e051 f2e091 f2e131 f3e01 f3e02 f3e03 f3e07 ///
applcn admssn enrlt enrlm enrlw enrlft enrlpt satvr25 satvr75 ///
satmt25 satmt75 acten25 acten75 actmt25 actmt75 actcm25 eftotal efmen ///
efwom efrace22 efrace18 efrace21 efrace20 efrace19 efrace23 ///
grrace24 grrace15 grrace16 grrace22 grrace18 grrace21 grrace20 gradtotal ///
grrace19 grrace23
renvars, postfix(_phd)
sort unitid_phd
save ipeds_phd, replace
restore

preserve
drop year fips f1c011 f1c021 f1c031 f1c051 f1c061 f1c121 f1c151 f2e011 ///
f2e021 f2e031 f2e041 f2e051 f2e091 f2e131 f3e01 f3e02 f3e03 f3e07 ///
applcn admssn enrlt enrlm enrlw enrlft enrlpt satvr25 satvr75 ///
satmt25 satmt75 acten25 acten75 actmt25 actmt75 actcm25 eftotal efmen ///
efwom efrace22 efrace18 efrace21 efrace20 efrace19 efrace23 ///
grrace24 grrace15 grrace16 grrace22 grrace18 grrace21 grrace20 gradtotal ///
grrace19 grrace23
renvars, postfix(_inst)
sort unitid_inst
save ipeds_employer, replace
restore

************************************************************

use sdr_thin, clear

sort unitid_ba

merge m:1 unitid_ba using i:\data\diss_data\ipeds_bachelors
rename _merge _merge_ba
drop if _merge_ba==2
tab _merge_ba

sort unitid_phd

merge m:1 unitid_phd using i:\data\diss_data\ipeds_phd
rename _merge _merge_phd
drop if _merge_phd==2
```

```
tab _merge_phd

sort unitid_inst

merge m:1 unitid_inst using i:\data\diss_data\ipeds_employer
rename _merge _merge_inst
drop if _merge_inst==2
tab _merge_inst

drop if _merge_ba==1 & _merge_phd==1 & _merge_inst==1
drop if _merge_ba==1 & _merge_phd==1 & _merge_inst==3
drop if _merge_ba==1 & _merge_phd==3 & _merge_inst==1
drop if _merge_ba==3 & _merge_phd==1 & _merge_inst==1

gen all3=0
replace all3=1 if _merge_ba==3 & _merge_phd==3 & _merge_inst==3
tab all3 // 2,382 matches for all three

gen ba_inst=0
replace ba_inst=1 if _merge_ba==3 & _merge_phd==1 & _merge_inst==3
tab ba_inst  // 71 instances of match for ba & inst, but not for phd

gen phd_inst=0
replace phd_inst=1 if _merge_ba==1 & _merge_phd==3 & _merge_inst==3
tab phd_inst // 768 instances of match for phd & inst, but not for ba (could be problematic
because could include non-US BA)

gen ba_phd=0
replace ba_phd=1 if _merge_ba==3 & _merge_phd==3 & _merge_inst==1
tab ba_phd // 251 instances of match for ba & phd, but not for inst (may not be useful, but
keeping for now)

save sdr_ipeds_merge, replace

** add graduation rates **

** STEP 1 **
use gradrate2008, clear
sort unitid_ba

use sdr_ipeds_merge, clear
sort unitid_ba
merge m:1 unitid_ba using gradrate2008
drop if _merge==2
```

```
rename gradrate gradrate_ba
drop _merge
save sdr_ipeds_merge, replace

** STEP 2 ***
use gradrate2008, clear
sort unitid_phd

use sdr_ipeds_merge, clear
sort unitid_phd
merge m:1 unitid_phd using gradrate2008
drop if _merge==2
rename gradrate gradrate_phd
drop _merge
save sdr_ipeds_merge, replace

** STEP 3 ***
use gradrate2008, clear
sort unitid_inst

use sdr_ipeds_merge, clear
sort unitid_inst
merge m:1 unitid_inst using gradrate2008
drop if _merge==2
rename gradrate gradrate_inst
drop _merge
save sdr_ipeds_merge, replace

use sdr_ipeds_merge, clear

drop adq* badgrus bargn bacarn bargn bthst carneg

** keep only if primary job responsibilites are teaching or research **
keep if waprsm=="1" | waprsm=="2"
gen teach=0 if !mi(waprsm)
replace teach=1 if waprsm=="1"

** keep only faculty at 4-year institution **
keep if edtp=="4"

tab watea if waprsm=="2"
tab wabrsh if waprsm=="1"
tab waaprsh if waprsm=="1"
tab wabrsh if waprsm=="1" & waaprsh=="N"
```

```
drop if waprsm=="1" & waaprsh=="N" & wabrsh=="N" // drop faculty member whose primary work activity is teaching, but does not spend at least 10% of time on applied OR basic research

destring tensta, replace
label define tenure 1 "Not applicable" 2 "No tenure for my job" 3 "Tenured" 4 "Tenure track" 5 "Not on tenure-track"
label values tensta tenure

*** drop US Service Academies due to difference in institutional mission a large amount of money spent per student ***
drop if obereg_ba==0
drop if obereg_phd==0
drop if obereg_inst==0

keep if all3==1 // keep only those with matches for all 3 institutions
keep if tensta==4 // keep only tenure-track faculty

tab2 watea wabrsh waaprsh
tab watea waprsm

tab ocedrlp
destring ocedrlp, replace
label define related 1 "Closely related" 2 "Somewhat related" 3 "Not related"
label values ocedrlp related

gen relatedjob=ocedrlp
recode relatedjob (2 3 = 0)
label define related2 0 "Not closely related" 1 "Closely related"
label values relatedjob related2

gen yearsatjob=2001-strtyr
replace yearsatjob=10 if yearsatjob>10

sum yearsatjob, detail
gen yrsjob2less=0
replace yrsjob2less=1 if yearsatjob<=2

gen yrsjob3more=0
replace yrsjob3more=1 if yearsatjob>=3


gen children=0
```

```
replace children=1 if chun12=="Y"
lab var children "Children under 12 dummy"

rename black black1
gen black=0
replace black=1 if black1=="Y"
lab var black "Black dummy variable"
drop black1

rename white white1
gen white=0
replace white=1 if white1=="Y"
lab var white "White dummy variable"
drop white1

rename asian asian1
gen asian=0
replace asian=1 if asian1=="Y"
lab var asian "Asian dummy variable"
drop asian1

rename pacific pacific1
gen pacific=0
replace pacific=1 if pacific1=="Y"
lab var pacific "Pacific Islander dummy variable"
drop pacific1

rename native native1
gen native=0
replace native=1 if native1=="Y"
lab var native "Native American dummy variable"
drop native1

rename hispanic hispanic1
gen hispanic=0
replace hispanic=1 if hispanic1=="Y"
lab var hispanic "Hispanic dummy variable"
drop hispanic1


gen female=0 if !missing(gender)
replace female=1 if gender=="F"
lab var female "Female dummy variable"
drop gender
```

```
gen married=0 if !missing(marind)
replace married=1 if marind=="Y"
lab var married "Married dummy variable"
drop marind

destring raceth, replace
label define raceth 1 "Hispanic" 2 "White" 3 "Black" 4 "Asian" 5 "Native American" 6
"Other"
label values raceth raceth
drop race

tab raceth, gen(race)
rename race1 hispanic1
rename race2 white1
rename race3 black1
rename race4 asian1
rename race5 native1
rename race6 other
gen other1=0
replace other=1 if native1==1 | other==1

destring ctzn, replace
rename ctzn citizen
label define citizen 1 "U.S. native" 2 "U.S. naturalized" 3 "Permanent res." 4 "Temp. res."
label values citizen citizen
lab var citizen "Citizenship status in United States"

gen uscitizen=0 if !missing(ctzusin)
replace uscitizen=1 if ctzusin=="Y"
lab var uscitizen "US citizen dummy variable"
drop ctzusin

destring bamemg sdrmemg, replace
label define major1 1 "Computer/Math Sciences" 2 "Life Sciences" 3 "Physical Sciences" 4
"Social Sciences" 5 "Engineering" 6 "Non-S&E degrees" 9 "Missing"
label values bamemg major1
label define major2 1 "Computer and Info Sciences" 2 "Math Sciences" 3 "Bio & Ag
Sciences" 4 "Health Sciences" 5 "Physical Sciences" 6 "Social Sciences" 7 "Psychology" 8
"Engineering"
label values sdrmemg major2

destring ocprmg, replace
```

```
label define jobfield 1 "Computer/Math Sciences" 2 "Life Sciences" 3 "Physical Sciences" 4
"Social Sciences" 5 "Engineering" 6 "Non-S&E"
label values ocprmg jobfield

tab ocprmg, gen(job)
rename job1 compmath
rename job2 lifesci
rename job3 physci
rename job4 socsci
rename job5 eng
rename job6 nonstem

destring edtp, replace
label define edtp 3 "Two year college" 4 "Four year college" 5 "Med school" 6 "University
research inst." 7 "Other"
label values edtp edtp

*** Importance variables ***

destring facadv facben facchal facind facloc facresp facsal facsec facsoc, replace
revv facadv facben facchal facind facloc facresp facsal facsec facsoc, gen(impadv impben
impchal impind imploc impresp impsal impsec impsoc) // reverse scales for satisfaction
variables
label define import 4 "Very important" 3 "Somewhat important" 2 "Somewhat unimportant"
1 "Not important at all"
label values impadv impben impchal impind imploc impresp impsal impsec impsoc import
drop facadv facben facchal facind facloc facresp facsal facsec facsoc

*** Satisfaction variables, label and reverse the scale ***

destring satadv satben satchal satind satloc satresp satsal satsec satsoc, replace
revv satadv satben satchal satind satloc satresp satsal satsec satsoc, gen(satisadv satisben
satischal satisind satisloc satisresp satissal satissec satissoc) // reverse scales for satisfaction
variables
label define satis 4 "Very satisfied" 3 "Somewhat satisfied" 2 "Somewhat dissatisfied" 1
"Very dissatisfied"
label values satisadv satisben satischal satisind satisloc satisresp satissal satissec satissoc satis
drop satadv satben satchal satind satloc satresp satsal satsec satsoc
*** Create an overall satisfaction factor score ***
egen satisadd=rowtotal(satis*), missing
label var satisadd "Additive factor score"

egen js=rowtotal(satisadv satischal satisind satisresp satissoc satisloc), missing
egen ps=rowtotal(satissec satisben satissal), missing
```

```
gen jobsatis=js/6
replace jobsatis=1 if jobsatis<2
replace jobsatis=2 if jobsatis>=2 & jobsatis<3
replace jobsatis=3 if jobsatis>=3 & jobsatis<4

gen paysatis=ps/3
replace paysatis=1 if paysatis<2
replace paysatis=2 if paysatis>=2 & paysatis<3
replace paysatis=3 if paysatis>=3 & paysatis<4

factor satisadv satisben satischal satisind satisloc satisresp satissal satissec satissoc, pcf
rotate
predict satisjob satispay

*screeplot
*loadingplot

alpha satisadv satisben satischal satisind satisloc satisresp satissal satissec satissoc, item std
gen(satisscale) //.8182 reliability
alpha satisadv satischal satisind satisresp satissoc satisloc, item std gen(satisjob2) //.7978
reliability
alpha satissec satisben satissal, item std gen(satispay2) // 0.6254 reliability
alpha satisadv satischal satisind satisresp satissoc satisloc, item gen(satisjob3) //.7812
reliability
alpha satissec satisben satissal, item gen(satispay3) // 0.6248 reliability

gen log_satisjob=log(satisjob)  // satisjob kurtosis issue, satispay normally distributed
gen sqrt_satisjob=sqrt(satisjob)

*kdensity satisjob, normal
*kdensity log_satisjob, normal
*kdensity sqrt_satisjob, normal // select this one

swilk satisjob log_satisjob sqrt_satisjob // both dependent skewed, sqrt resolves kurtosis
swilk satispay
sktest satisjob log_satisjob sqrt_satisjob
sktest satispay

*create a satisfaction scale that weights relative importance, research show to be a nogo, but
trying anyway*
gen combo=(satisadv*impadv) + (satisben*impben) + (satischal*impchal) +
(satisind*impind) + (satisloc*imploc) + (satisresp*impresp) + (satissal*impsal) +
(satissec*impsec) + (satissoc*impsoc)
```

```
corr satisjob satispay satisjob2 satispay2 satisscale satisadd satisjob3 satispay3

gen satisjob_hi=0
replace satisjob_hi=1 if jobsatis>=3
lab var satisjob_hi "higher job satisfaction for logit"

gen satispay_hi=0
replace satispay_hi=1 if paysatis>=3
lab var satispay_hi "higher pay satisfaction for logit"

lab var satisscale "Scale with all satis items"
lab var satisjob "Scale that includes satis locat, advance, intel chall, respon, indepen &
contrib"
lab var satispay "scale with security, salary & benefits"

/*hist satisjob, saving(sj1, replace)
hist log_satisjob, saving(sj2, replace)
hist sqrt_satisjob, saving(sj3, replace)
graph combine sj1.gph sj2.gph sj3.gph

hist satispay, saving(sp1, replace)
hist log_satispay, saving(sp2, replace)
hist sqrt_satispay, saving(sp3, replace)
graph combine sp1.gph sp2.gph sp3.gph*/


*** Variable for when BA & INST, PHD & INST, or BA & PHD are same schools ***
gen same_bainst=0 // number of faculty working at their BA institution
replace same_bainst=1 if unitid_ba==unitid_inst & !missing(unitid_ba)
lab var same_bainst "BA and INST are same university"
tab same_bainst

gen same_phdinst=0
replace same_phdinst=1 if unitid_phd==unitid_inst & !missing(unitid_phd)
lab var same_phdinst "PHD and INST are same university"
tab same_phdinst

gen same_baphd=0
replace same_baphd=1 if unitid_ba==unitid_phd & !missing(unitid_phd)
lab var same_baphd "BA and PHD are same university"
tab same_baphd

gen same_all=0
```

```
replace same_all=1 if same_bainst==1 & same_phdinst==1
lab var same_all "BA, PHD, and INST are same university"
tab same_all

gen father=.
replace father=1 if eddad=="A" | eddad=="B"
replace father=2 if eddad=="C"
replace father=3 if eddad=="D"
replace father=4 if eddad=="E"
lab var father "Father's education level"
drop eddad

gen mother=.
replace mother=1 if edmom=="A" | edmom=="B"
replace mother=2 if edmom=="C"
replace mother=3 if edmom=="D"
replace mother=4 if edmom=="E"
drop edmom

label define ed 1 "High School less than HS" 2 "Some College" 3 "BA degree" 4 "Grad
degree"
label values father mother ed

***  Calculating Net Change Variables ***

label define region 0 "US Service schools" 1 "New England" 2 "Mid East" 3 "Great Lakes" 4
"Plains" 5 "Southeast" 6 "Southwest" 7 "Rocky Mountains" 8 "Far West"
label values obereg_ba obereg_phd obereg_inst region

gen region_bi=0
replace region_bi=1 if obereg_inst != obereg_ba
lab var region_bi "Change in region between BA and INST, 1 = change in region"

gen region_pi=0
replace region_pi=1 if obereg_inst != obereg_phd
lab var region_pi "Change in region between PHD and INST, 1 = change in region"

gen carnegie_bi=0
replace carnegie_bi=1 if carnegie_inst != carnegie_ba & !missing(carnegie_inst)
lab var carnegie_bi "Change in Carnegie classification between BA and INST, 1 = change in
Carnegie class"

gen carnegie_pi=0
replace carnegie_pi=1 if carnegie_inst != carnegie_phd & !missing(carnegie_inst)
```

```
lab var carnegie_pi "Change in Carnegie classification between PHD and INST, 1 = change
in Carnegie class"

*** Change in Institutional Control ***
gen control_bi=0
replace control_bi=1 if control_inst != control_ba
lab var control_bi "Change in Inst. Control between BA and INST, 1 = change in control"

gen control_pi=0
replace control_pi=1 if control_inst != control_phd
lab var control_pi "Change in Inst. Control between PHD and INST, 1 = change in control"

*** Change in undergrad grad focus ***
gen highug_ba=0
replace highug_ba=1 if  ccenrprf_ba<5
lab var highug_ba "1=High BA undergrad enrollment or higher"

gen highug_phd=0
replace highug_phd=1 if  ccenrprf_phd<5
lab var highug_phd "1=High PHD undergrad enrollment or higher"

gen highug_inst=0
replace highug_inst=1 if  ccenrprf_inst<5
lab var highug_inst "1=High INST undergrad enrollment or higher"

gen enroll_bi=0
replace enroll_bi=1 if highug_inst != highug_ba
lab var enroll_bi "Change in focus on Grad or UG enrollment between BA and INST, 1 =
change in enrollment focus"

gen enroll_pi=0
replace enroll_pi=1 if highug_inst != highug_phd
lab var enroll_pi "Change in focus on Grad or UG enrollment between PHD and INST, 1 =
change in control"

*** Change in locale (type of city or town) of Institution ***
gen locale_bi=0
replace locale_bi=1 if locale_inst != locale_ba
lab var locale_bi "Change in locale between BA and INST, 1 = change in locale"

gen locale_pi=0
replace locale_pi=1 if locale_inst != locale_phd
lab var locale_pi "Change in locale between PHD and INST, 1 = change in locale"
```

```
gen fte_bi = fte_inst - fte_ba
lab var fte_bi "Change in FTE students from BA to INST"
gen locale_ba2=.
replace locale_ba2=1 if locale_ba==11 | locale_ba==12 | locale_ba==13
replace locale_ba2=2 if locale_ba==21 | locale_ba==22 | locale_ba==23
replace locale_ba2=3 if locale_ba==31 | locale_ba==32 | locale_ba==33
replace locale_ba2=4 if locale_ba==41 | locale_ba==42 | locale_ba==43
lab var locale_ba2 "Combined city, suburb, town, rural options"
label define urban 1 "city" 2 "suburb" 3 "town" 4 "rural"
label values locale_ba2 urban

gen locale_phd2=.
replace locale_phd2=1 if locale_phd==11 | locale_phd==12 | locale_phd==13
replace locale_phd2=2 if locale_phd==21 | locale_phd==22 | locale_phd==23
replace locale_phd2=3 if locale_phd==31 | locale_phd==32 | locale_phd==33
replace locale_phd2=4 if locale_phd==41 | locale_phd==42 | locale_phd==43
lab var locale_phd2  "Combined city, suburb, town, rural options"
label values locale_phd2 urban

gen locale_inst2=.
replace locale_inst2=1 if locale_inst==11 | locale_inst==12 | locale_inst==13
replace locale_inst2=2 if locale_inst==21 | locale_inst==22 | locale_inst==23
replace locale_inst2=3 if locale_inst==31 | locale_inst==32 | locale_inst==33
replace locale_inst2=4 if locale_inst==41 | locale_inst==42 | locale_inst==43
lab var locale_inst2  "Combined city, suburb, town, rural options"
label values locale_inst2 urban

gen locale_bi2=locale_inst2-locale_ba2
lab var locale_bi2 "Change in degree of urbanization BA to INST"

gen locale_pi2=locale_inst2-locale_phd2
lab var locale_pi2 "Change in degree of urbanization PHD to INST"

gen locale_bi2_abs=abs(locale_bi2)
gen locale_pi2_abs=abs(locale_pi2)

gen fte_bi1 = fte_bi/1000
lab var fte_bi1 "Change in 1,000 FTE students from BA to INST"
gen fte_bi1_abs=abs(fte_bi1)

gen fte_pi = fte_inst - fte_phd
lab var fte_pi "Change in FTE students from PHD to INST"
gen fte_pi1 = fte_pi/1000
lab var fte_pi1 "Change in 1,000 FTE students from PHD to INST"
```

```
gen fte_pi1_abs=abs(fte_pi1)
*** Change in diversity ***

gen pct_black_bi = pct_black_inst - pct_black_ba
lab var pct_black_bi "Change in proportion of black students from BA to INST"
gen pct_black_bi_abs=abs(pct_black_bi)

gen pct_black_pi = pct_black_inst - pct_black_phd
lab var pct_black_pi "Change in proportion of black students from PHD to INST"
gen pct_black_pi_abs=abs(pct_black_pi)

gen pct_asian_bi = pct_asian_inst - pct_asian_ba
lab var pct_asian_bi "Change in proportion of asian students from BA to INST"
gen pct_asian_bi_abs=abs(pct_asian_bi)

gen pct_asian_pi = pct_asian_inst - pct_asian_phd
lab var pct_asian_pi "Change in proportion of asian students from PHD to INST"
gen pct_asian_pi_abs=abs(pct_asian_pi)

gen pct_latino_bi = pct_latino_inst - pct_latino_ba
lab var pct_latino_bi "Change in proportion of Latino students from BA to INST"
gen pct_latino_bi_abs=abs(pct_latino_bi)

gen pct_latino_pi = pct_latino_inst - pct_latino_phd
lab var pct_latino_pi "Change in proportion of Latino students from PHD to INST"
gen pct_latino_pi_abs=abs(pct_latino_pi)

gen minority_bi = minority_inst - minority_ba
lab var minority_bi "Change in proportion of Minority students from BA to INST"
gen minority_bi_abs=abs(minority_bi)

gen minority_pi = minority_inst - minority_phd
lab var minority_pi "Change in proportion of Minority students from PHD to INST"
gen minority_pi_abs=abs(minority_pi)

gen nonwhite_bi = nonwhite_inst - nonwhite_ba
lab var nonwhite_bi "Change in proportion of Non White students from BA to INST"

gen nonwhite_pi = nonwhite_inst - nonwhite_phd
lab var nonwhite_pi "Change in proportion of Non White students from PHD to INST"

gen underminor_bi = underminor_inst - underminor_ba
lab var underminor_bi "Change in proportion of underrepresented minority students from BA
to INST"
```

```
gen underminor_pi = underminor_inst - underminor_phd
lab var underminor_pi "Change in proportion of underrepresented minority students from
PHD to INST"

gen pct_women_bi = pctstd_w_inst - pctstd_w_ba
lab var pct_women_bi "Change in proportion of Women students from BA to INST"
gen women_bi_abs=abs(pct_women_bi)

gen pct_women_pi = pctstd_w_inst - pctstd_w_phd
lab var pct_women_pi "Change in proportion of Women students from PHD to INST"
gen women_pi_abs=abs(pct_women_pi)

*** Change in spending ***

gen instruct_bi = instructfte_inst - instructfte_ba
lab var instruct_bi "Change in instructional spending by FTE, BA to INST"

gen instruct_pi = instructfte_inst - instructfte_phd
lab var instruct_pi "Change in instructional spending by FTE, PHD to INST"

gen research_bi = researchfte_inst - researchfte_ba
lab var research_bi "Change in research spending by FTE, BA to INST"
gen research_bi1 = research_bi/1000
lab var research_bi1 "Change in $1,000 units research spending by FTE, BA to INST"
gen research_bi1_abs=abs(research_bi1)


gen research_pi = researchfte_inst - researchfte_phd
lab var research_pi "Change in research spending by FTE, PHD to INST"
gen research_pi1 = research_pi/1000
lab var research_pi1 "Change in $1,000 units research spending by FTE, PHD to INST"
gen research_pi1_abs=abs(research_pi1)


gen pct_research_ba=researchfte_ba/nonhosptfte_ba
gen pct_research_phd=researchfte_phd/nonhosptfte_phd
gen pct_research_inst=researchfte_inst/nonhosptfte_inst

gen pct_research_bi=pct_research_inst - pct_research_ba
gen pct_research_bi_abs=abs(pct_research_bi)

gen pct_research_pi=pct_research_inst - pct_research_phd
gen pct_research_pi_abs=abs(pct_research_pi)
```

```
gen student_bi = studentfte_inst - studentfte_ba
lab var student_bi "Change in student services spending by FTE, BA to INST"

gen student_pi = studentfte_inst - studentfte_phd
lab var student_pi "Change in student services spending by FTE, PHD to INST"

gen nonhospt_bi = nonhosptfte_inst - nonhosptfte_ba
lab var nonhospt_bi "Change in non-hospital spending by FTE, BA to INST"
gen nonhospt_bi1 = nonhospt_bi/1000
lab var nonhospt_bi1 "Change in $1,000 units non-hospital spending by FTE, BA to INST"
gen nonhospt_bi1_abs=abs(nonhospt_bi1)

gen nonhospt_pi = nonhosptfte_inst - nonhosptfte_phd
lab var nonhospt_pi "Change in non-hospital spending by FTE from PHD to INST"
gen nonhospt_pi1 = nonhospt_pi/1000
lab var nonhospt_pi1 "Change in $1,000 units non-hospital spending by FTE, PHD to INST"
gen nonhospt_pi1_abs=abs(nonhospt_pi1)

gen total_bi = totalfte_inst - totalfte_ba
lab var total_bi "Change in total spending by FTE, BA to INST"
gen total_bi1 = total_bi/1000
lab var total_bi1 "Change in $1,000 units total spending by FTE, BA to INST"
gen total_bi1_abs=abs(total_bi1)

gen total_pi = totalfte_inst - totalfte_phd
lab var total_pi "Change in total spending by FTE, PHD to INST"
gen total_pi1 = total_pi/1000
lab var total_pi1 "Change in $1,000 units total spending by FTE, PHD to INST"
gen total_pi1_abs=abs(total_pi1)

gen cai_bi = cai_inst - cai_ba
lab var cai_bi "Change in College Affordability Index, BA to INST"

gen cai_pi = cai_inst - cai_phd
lab var cai_pi "Change in College Affordability Index, PHD to INST"

gen avesalt_bi = avesalt_inst - avesalt_ba
lab var avesalt_bi "Dollar change in Average Ten Track Salary, BA to INST"

gen avesalt_pi = avesalt_inst - avesalt_phd
lab var avesalt_pi "Dollar change in Average Ten Track Salary, PHD to INST"

gen avesalt_bi_hi=0
```

```
replace avesalt_bi_hi=1 if avesalt_bi>0
lab var avesalt_bi_hi "Average Ten Track Salary higher at INST than BA"

gen avesalt_pi_hi=0
replace avesalt_pi_hi=1 if avesalt_pi>0
lab var avesalt_pi_hi "Average Ten Track Salary higher at INST than PHD"

*** Selectivity Difference Variables ***
gen acceptrate_bi =acceptrate_inst - acceptrate_ba  // lose 22 BA, 23 PHD and 86 INST due
to missing acceptrate
lab var acceptrate_bi "Rate change in UG Acceptance Rate, BA to INST"
gen acceptrate_bi_abs=abs(acceptrate_bi)

gen acceptrate_pi =acceptrate_inst - acceptrate_phd
lab var acceptrate_pi "Rate change in UG Acceptance Rate, PHD to INST"
gen acceptrate_pi_abs=abs(acceptrate_pi)


qui sum acceptrate_bi, detail
gen acceptrate_bi_hi=0
replace acceptrate_bi_hi=. if acceptrate_bi>r(p25) & acceptrate_bi<r(p75)
replace acceptrate_bi_hi=1 if acceptrate_bi>=r(p75)
lab var acceptrate_bi_hi "Average Accept Rate higher at INST than BA"

qui sum acceptrate_pi, detail
gen acceptrate_pi_hi=0
replace acceptrate_pi_hi=. if acceptrate_pi>r(p25) & acceptrate_pi<r(p75)
replace acceptrate_pi_hi=1 if acceptrate_pi>=r(p75)
lab var acceptrate_pi_hi "Average Accept Rate higher at INST than PHD"

gen gradrate_bi =gradrate_inst - gradrate_ba
lab var gradrate_bi "Rate change in 6 year graduation rate BA to INST"

gen gradrate_pi =gradrate_inst - gradrate_phd
lab var gradrate_pi "Rate change in 6 year graduate rate PHD to INST"

qui sum gradrate_bi, detail
gen gradrate_bi_hi=0
replace gradrate_bi_hi=. if gradrate_bi>r(p25) & gradrate_bi<r(p75)
replace gradrate_bi_hi=1 if gradrate_bi>=r(p75)
lab var gradrate_bi_hi "Average 6 year graduate rate higher at INST than BA"

qui sum gradrate_pi, detail
gen gradrate_pi_hi=0
```

```
replace gradrate_pi_hi=. if gradrate_pi>r(p25) & gradrate_pi<r(p75)
replace gradrate_pi_hi=1 if gradrate_pi>=r(p75)
lab var gradrate_pi_hi "Average 6 year graduate rate higher at INST than PHD"

gen actc_ba=.
replace actc_ba=1510 if actcm75_ba==34
replace actc_ba=1460 if actcm75_ba==33
replace actc_ba=1420 if actcm75_ba==32
replace actc_ba=1380 if actcm75_ba==31
replace actc_ba=1340 if actcm75_ba==30
replace actc_ba=1300 if actcm75_ba==29
replace actc_ba=1260 if actcm75_ba==28
replace actc_ba=1220 if actcm75_ba==27
replace actc_ba=1190 if actcm75_ba==26
replace actc_ba=1150 if actcm75_ba==25
replace actc_ba=1110 if actcm75_ba==24
replace actc_ba=1070 if actcm75_ba==23
replace actc_ba=1030 if actcm75_ba==22
replace actc_ba=990 if actcm75_ba==21
replace actc_ba=950 if actcm75_ba==20
replace actc_ba=910 if actcm75_ba==19
replace actc_ba=870 if actcm75_ba==18
replace actc_ba=830 if actcm75_ba==17

gen actc_phd=.
replace actc_phd=1510 if actcm75_phd==34
replace actc_phd=1460 if actcm75_phd==33
replace actc_phd=1420 if actcm75_phd==32
replace actc_phd=1380 if actcm75_phd==31
replace actc_phd=1340 if actcm75_phd==30
replace actc_phd=1300 if actcm75_phd==29
replace actc_phd=1260 if actcm75_phd==28
replace actc_phd=1220 if actcm75_phd==27
replace actc_phd=1190 if actcm75_phd==26
replace actc_phd=1150 if actcm75_phd==25
replace actc_phd=1110 if actcm75_phd==24
replace actc_phd=1070 if actcm75_phd==23
replace actc_phd=1030 if actcm75_phd==22
replace actc_phd=990 if actcm75_phd==21
replace actc_phd=950 if actcm75_phd==20
replace actc_phd=910 if actcm75_phd==19
replace actc_phd=870 if actcm75_phd==18
replace actc_phd=830 if actcm75_phd==17
```

```
gen actc_inst=.
replace actc_inst=1510 if actcm75_inst==34
replace actc_inst=1460 if actcm75_inst==33
replace actc_inst=1420 if actcm75_inst==32
replace actc_inst=1380 if actcm75_inst==31
replace actc_inst=1340 if actcm75_inst==30
replace actc_inst=1300 if actcm75_inst==29
replace actc_inst=1260 if actcm75_inst==28
replace actc_inst=1220 if actcm75_inst==27
replace actc_inst=1190 if actcm75_inst==26
replace actc_inst=1150 if actcm75_inst==25
replace actc_inst=1110 if actcm75_inst==24
replace actc_inst=1070 if actcm75_inst==23
replace actc_inst=1030 if actcm75_inst==22
replace actc_inst=990 if actcm75_inst==21
replace actc_inst=950 if actcm75_inst==20
replace actc_inst=910 if actcm75_inst==19
replace actc_inst=870 if actcm75_inst==18
replace actc_inst=830 if actcm75_inst==17

replace sat75_ba=actc_ba if missing(sat75_ba)
replace sat75_phd=actc_phd if missing(sat75_phd)
replace sat75_inst=actc_inst if missing(sat75_inst)

gen sat75_bi = sat75_inst - sat75_ba  // 139 missing due to missing scores
lab var sat75_bi "Change in SAT scores 75th percentile UG Acceptance Rate, BA to INST"
gen sat75_bi_abs=abs(sat75_bi)

gen sat75_pi = sat75_inst - sat75_phd  //  127 missing due to missing scores
lab var sat75_pi "Change in SAT scores 75th percentile UG Acceptance Rate, PHD to INST"
gen sat75_pi_abs=abs(sat75_pi)

gen log_salary=log(salary)
gen sqrt_salary=sqrt(salary)

*kdensity salary, normal
*kdensity sqrt_salary, normal
*kdensity log_salary, normal // use log

gen gradft_bi = gradft_inst - gradft_ba  //
lab var gradft_bi "Change in % of student body comprised of graduate students, BA to INST"
gen gradft_bi_abs=abs(gradft_bi)

gen gradft_pi = gradft_inst - gradft_phd  //
```

```
lab var gradft_pi "Change in % of student body comprised of graduate students, PHD to
INST"
gen gradft_pi_abs=abs(gradft_pi)

gen asian_minor_bi=minority_bi*asian1
gen black_minor_bi=minority_bi*black1
gen hispanic_minor_bi=minority_bi*hispanic1
gen other_minor_bi=minority_bi*other1
gen female_women_bi=female*pct_women_bi

gen asian_minor_pi=minority_pi*asian1
gen black_minor_pi=minority_pi*black1
gen hispanic_minor_pi=minority_pi*hispanic1
gen other_minor_pi=minority_pi*other1
gen female_women_pi=female*pct_women_pi

gen asian_minor_bi_abs=minority_bi_abs*asian1
gen black_minor_bi_abs=minority_bi_abs*black1
gen hispanic_minor_bi_abs=minority_bi_abs*hispanic1
gen other_minor_bi_abs=minority_bi_abs*other1
gen female_women_bi_abs=female*women_bi_abs

gen asian_minor_pi_abs=minority_pi_abs*asian1
gen black_minor_pi_abs=minority_pi_abs*black1
gen hispanic_minor_pi_abs=minority_pi_abs*hispanic1
gen other_minor_pi_abs=minority_pi_abs*other1
gen female_women_pi_abs=female*women_pi_abs

gen black_latino_bi=pct_latino_bi*black1
gen asian_latino_bi=pct_latino_bi*asian1
gen hispanic_latino_bi=pct_latino_bi*hispanic1

gen black_black_bi=pct_black_bi*black1
gen hispanic_black_bi=pct_black_bi*hispanic1
gen asian_black_bi=pct_black_bi*asian1

gen black_asian_bi=pct_asian_bi*black1
gen hispanic_asian_bi=pct_asian_bi*hispanic1
gen asian_asian_bi=pct_asian_bi*asian1

gen black_latino_bi_abs=pct_latino_bi_abs*black1
gen asian_latino_bi_abs=pct_latino_bi_abs*asian1
gen hispanic_latino_bi_abs=pct_latino_bi_abs*hispanic1
```

```
gen black_black_bi_abs=pct_black_bi_abs*black1
gen hispanic_black_bi_abs=pct_black_bi_abs*hispanic1
gen asian_black_bi_abs=pct_black_bi_abs*asian1

gen black_asian_bi_abs=pct_asian_bi_abs*black1
gen hispanic_asian_bi_abs=pct_asian_bi_abs*hispanic1
gen asian_asian_bi_abs=pct_asian_bi_abs*asian1

gen black_latino_pi=pct_latino_pi*black1
gen asian_latino_pi=pct_latino_pi*asian1
gen hispanic_latino_pi=pct_latino_pi*hispanic1

gen black_black_pi=pct_black_pi*black1
gen hispanic_black_pi=pct_black_pi*hispanic1
gen asian_black_pi=pct_black_pi*asian1

gen black_asian_pi=pct_asian_pi*black1
gen hispanic_asian_pi=pct_asian_pi*hispanic1
gen asian_asian_pi=pct_asian_pi*asian1

gen black_latino_pi_abs=pct_latino_pi_abs*black1
gen asian_latino_pi_abs=pct_latino_pi_abs*asian1
gen hispanic_latino_pi_abs=pct_latino_pi_abs*hispanic1

gen black_black_pi_abs=pct_black_pi_abs*black1
gen hispanic_black_pi_abs=pct_black_pi_abs*hispanic1
gen asian_black_pi_abs=pct_black_pi_abs*asian1

gen black_asian_pi_abs=pct_asian_pi_abs*black1
gen hispanic_asian_pi_abs=pct_asian_pi_abs*hispanic1
gen asian_asian_pi_abs=pct_asian_pi_abs*asian1

global covariates "relatedjob compmath lifesci physci socsci eng yrsjob2less age female
married uscitizen asian1 black1 hispanic1 children log_salary"

global corr "gradft_bi pct_research_bi research_bi1 nonhospt_bi fte_bi1 pct_black_bi
pct_latino_bi pct_women_bi minority_bi acceptrate_bi sat75_bi locale_bi2 region_bi
female_women_bi asian_minor_bi black_minor_bi hispanic_minor_bi"
global corr1 "mast2doc_bi doc2mast_bi bach2doc_bi doc2bach_bi bach2mast_bi
mast2bach_bi fte_bi1 gradft_bi research_bi1 pct_research_bi sat75_bi"
global corr2 "mast2doc_pi doc2mast_pi bach2doc_pi doc2bach_pi bach2mast_pi
mast2bach_pi fte_pi1 gradft_pi research_pi1 pct_research_pi sat75_pi"
global corr3 "carnegie_pi fte_pi1_abs gradft_pi_abs research_pi1_abs pct_research_pi_abs
sat75_pi_abs"
```

```
global corr4 "carnegie_bi fte_bi1_abs gradft_bi_abs research_bi1_abs pct_research_bi_abs
sat75_bi_abs"
global corr5 "carnegie_bi fte_bi1 gradft_bi research_bi1 pct_research_bi sat75_bi"

global vars_bi "fte_bi1 sat75_bi locale_bi2 region_bi pct_women_bi minority_bi
pct_research_bi nonhospt_bi1 gradft_bi"
global vars_pi "fte_pi1 sat75_pi locale_pi2 region_pi pct_women_pi minority_pi
pct_research_pi nonhospt_pi1 gradft_pi"

global vars_bi_interaction "fte_bi1 sat75_bi locale_bi2 region_bi pct_women_bi minority_bi
pct_research_bi nonhospt_bi1 gradft_bi female_women_bi asian_minor_bi black_minor_bi
hispanic_minor_bi"
global vars_pi_interaction "fte_pi1 sat75_pi locale_pi2 region_pi pct_women_pi minority_pi
pct_research_pi nonhospt_pi1 gradft_pi female_women_pi asian_minor_pi black_minor_pi
hispanic_minor_pi"

global vars_bi_interaction2 "fte_bi1 sat75_bi locale_bi2 region_bi pct_women_bi
pct_asian_bi pct_black_bi pct_latino_bi pct_research_bi nonhospt_bi1 gradft_bi
female_women_bi  black_latino_bi asian_latino_bi hispanic_latino_bi black_black_bi
asian_black_bi hispanic_black_bi black_asian_bi asian_asian_bi hispanic_asian_bi"
global vars_pi_interaction2 "fte_pi1 sat75_pi locale_pi2 region_pi pct_women_pi
pct_asian_pi pct_black_pi pct_latino_pi pct_research_pi nonhospt_pi1 gradft_pi
female_women_pi  black_latino_pi asian_latino_pi hispanic_latino_pi black_black_pi
asian_black_pi hispanic_black_pi black_asian_pi asian_asian_pi hispanic_asian_pi"

global inter_bi_female "female pct_women_bi female_women_bi"
global inter_bi_black "black1 minority_bi black_minor_bi"
global inter_bi_asian "asian1 minority_bi asian_minor_bi"
global inter_bi_hispanic "hispanic1 minority_bi hispanic_minor_bi"
global inter_pi_female "female pct_women_pi female_women_pi"
global inter_pi_black "black1 minority_pi black_minor_pi"
global inter_pi_asian "asian1 minority_pi asian_minor_pi"
global inter_pi_hispanic "hispanic1 minority_pi hispanic_minor_pi"


/*global vars_bi_abs "relatedjob compmath lifesci physci socsci eng yrsjob2less age female
married uscitizen asian1 black1 hispanic1 children log_salary carnegie_bi fte_bi1_abs
acceptrate_bi_abs sat75_bi_abs locale_bi2_abs region_bi women_bi minority_bi
research_bi1_abs"
global vars_pi_abs "relatedjob compmath lifesci physci socsci eng yrsjob2less age female
married uscitizen asian1 black1 hispanic1 children log_salary carnegie_pi fte_pi1_abs
acceptrate_pi_abs sat75_pi_abs locale_pi2_abs region_pi women_pi_abs minority_pi_abs
research_pi1_abs"
```

```
global vars_bi_inter_abs "relatedjob compmath lifesci physci socsci eng yrsjob2less age
female married uscitizen asian1 black1 hispanic1 children log_salary carnegie_bi fte_bi1_abs
acceptrate_bi_abs sat75_bi_abs locale_bi2_abs region_bi women_bi_abs minority_bi_abs
research_bi1_abs female_women_bi_abs asian_minor_bi black_minor_bi_abs
hispanic_minor_bi_abs"
global vars_pi_inter_abs "relatedjob compmath lifesci physci socsci eng yrsjob2less age
female married uscitizen asian1 black1 hispanic1 children log_salary carnegie_pi fte_pi1_abs
acceptrate_pi_abs sat75_pi_abs locale_pi2_abs region_pi women_pi_abs minority_pi_abs
research_pi1_abs female_women_pi_abs  asian_minor_pi_abs black_minor_pi_abs
hispanic_minor_pi_abs" */

global vars_bi_abs "fte_bi1_abs sat75_bi_abs locale_bi2_abs region_bi women_bi_abs
minority_bi_abs pct_research_bi_abs nonhospt_bi1_abs gradft_bi_abs"
global vars_pi_abs "fte_pi1_abs sat75_pi_abs locale_pi2_abs region_pi women_pi_abs
minority_pi_abs pct_research_pi_abs nonhospt_pi1_abs gradft_pi_abs"

global vars_bi_inter_abs "fte_bi1_abs sat75_bi_abs locale_bi2_abs region_bi women_bi_abs
minority_bi_abs pct_research_bi_abs nonhospt_bi1_abs gradft_bi_abs
female_women_bi_abs asian_minor_bi_abs black_minor_bi_abs hispanic_minor_bi_abs"
global vars_pi_inter_abs "fte_pi1_abs sat75_pi_abs locale_pi2_abs region_pi women_pi_abs
minority_pi_abs pct_research_pi_abs nonhospt_pi1_abs gradft_pi_abs
female_women_pi_abs  asian_minor_pi_abs black_minor_pi_abs hispanic_minor_pi_abs"

global vars_bi_inter_abs2 "fte_bi1_abs sat75_bi_abs locale_bi2_abs region_bi
women_bi_abs pct_asian_bi_abs pct_black_bi_abs pct_latino_bi_abs pct_research_bi_abs
nonhospt_bi1_abs gradft_bi_abs female_women_bi_abs  black_latino_bi_abs
asian_latino_bi_abs hispanic_latino_bi_abs black_black_bi_abs asian_black_bi_abs
hispanic_black_bi_abs black_asian_bi_abs asian_asian_bi_abs hispanic_asian_bi_abs"
global vars_pi_inter_abs2 "fte_pi1_abs sat75_pi_abs locale_pi2_abs region_pi
women_pi_abs pct_asian_pi_abs pct_black_pi_abs pct_latino_pi_abs pct_research_pi_abs
nonhospt_pi1_abs gradft_pi_abs female_women_pi_abs  black_latino_pi_abs
asian_latino_pi_abs hispanic_latino_pi_abs black_black_pi_abs asian_black_pi_abs
hispanic_black_pi_abs black_asian_pi_abs asian_asian_pi_abs hispanic_asian_pi_abs"


destring ocpr, replace
label define label_ocpr 110880 "Computer Engineers"
label define label_ocpr 182760 "Computer Science", add
label define label_ocpr 182860 "Math Science", add
label define label_ocpr 210210 "Agricultural and Food Scientists", add
label define label_ocpr 220230 "Biological scientists", add
label define label_ocpr 220250 "Medical Scientists", add
label define label_ocpr 220270 "Biological and Life Scientists", add
```

```
label define label_ocpr 282710 "Agriculture", add
label define label_ocpr 282730 "Biological Science", add
label define label_ocpr 282870 "Medical Science", add
label define label_ocpr 282970 "Natural Science", add
label define label_ocpr 311930 "Chemistry", add
label define label_ocpr 321940 "Geologists", add
label define label_ocpr 321950 "Oceanographers", add
label define label_ocpr 331960 "Physics", add
label define label_ocpr 382750 "Chemistry", add
label define label_ocpr 382770 "Earth, Envir. and Marine Science", add
label define label_ocpr 382890 "Physics", add
label define label_ocpr 412320 "Economists", add
label define label_ocpr 422350 "Political Scientists", add
label define label_ocpr 432360 "Psychology", add
label define label_ocpr 442310 "Anthropology", add
label define label_ocpr 442370 "Sociology", add
label define label_ocpr 452380 "OTHER Social Scientists", add
label define label_ocpr 482780 "Economics", add
label define label_ocpr 482900 "Political Science", add
label define label_ocpr 482910 "Psychology", add
label define label_ocpr 482930 "Sociology", add
label define label_ocpr 482980 "OTHER Social Science", add
label define label_ocpr 520850 "Chemical Engineers", add
label define label_ocpr 540870 "Computer Engineers", add
label define label_ocpr 540890 "Electrical and Electronics Engineers", add
label define label_ocpr 550910 "Industrial engineers", add
label define label_ocpr 560940 "Mechanical Engineers", add
label define label_ocpr 570830 "Agricultural Engineers", add
label define label_ocpr 570840 "Bioengineers and Biomedical Engineers", add
label define label_ocpr 570900 "Environmental Engineers", add
label define label_ocpr 582800 "Engineering", add
label define label_ocpr 611410 "Administrators", add
label define label_ocpr 621110 "Health Practitioners", add
label define label_ocpr 621120 "Registered Nurses, Pharmacists, Dieticians, Therapists", add
label define label_ocpr 621140 "OTHER Health Occupations", add
label define label_ocpr 632570 "Precollegiate Education", add
label define label_ocpr 642740 "Business, Commerce, and Mrkt", add
label define label_ocpr 642790 "Education", add
label define label_ocpr 642810 "English", add
label define label_ocpr 642820 "Foreign Language", add
label define label_ocpr 642830 "History", add
label define label_ocpr 642840 "Home Economics", add
label define label_ocpr 642850 "Law", add
label define label_ocpr 642880 "Physical Education", add
```

```
label define label_ocpr 642920 "Social Work", add
label define label_ocpr 642940 "Theology", add
label define label_ocpr 642960 "OTHER Health Specialty", add
label define label_ocpr 642990 "OTHER, Non S&E", add
label define label_ocpr 680100 "Artists, Editors, Entertainers", add
lab val ocpr label_ocpr

*********************************************
* Remove non-hospital outlier (Cal Tech @ $895,326 per fte student, zscore = 16.3 )
 zscore nonhosptfte_ba
tab instnm_ba if z_nonhosptfte_ba>6
sort z_nonhosptfte_ba
list instnm_ba z_nonhosptfte_ba
tab instnm_ba if z_nonhosptfte_ba>6, sum(z_nonhosptfte_ba)
list z_nonhosptfte_ba if instnm_ba=="California Institute of Technology"

replace nonhospt_bi1=. if instnm_ba=="California Institute of Technology"
replace nonhospt_bi1_abs=. if instnm_ba=="California Institute of Technology"
replace nonhospt_pi1=. if instnm_inst=="California Institute of Technology"
replace nonhospt_pi1_abs=. if instnm_inst=="California Institute of Technology"
*********************************************

* Drop missing variables *
drop if mi(fte_bi1)
drop if mi(sat75_bi)
drop if mi(pct_women_bi)
drop if mi(minority_bi)
drop if mi(pct_research_bi)
drop if mi(nonhospt_bi1)
drop if mi(gradft_bi)

drop if mi(fte_pi1)
drop if mi(sat75_pi)
drop if mi(pct_women_pi)
drop if mi(minority_pi)
drop if mi(pct_research_pi)
drop if mi(nonhospt_pi1)
drop if mi(gradft_pi)

use sdr_ipeds_final, clear

corr $corr
corr $corr1
corr $corr2
```

```
corr $corr3
corr $corr4
corr $corr5

* Variable Frequency tables *
sum $covariates, separator(0)

sum $vars_bi_interaction, separator(0)
sum $vars_bi_interaction2, separator(0)
sum $vars_bi_inter_abs, separator(0)
sum $vars_bi_inter_abs2, separator(0)

sum $vars_pi_interaction, separator(0)
sum $vars_pi_interaction2, separator(0)
sum $vars_pi_inter_abs, separator(0)
sum $vars_pi_inter_abs2, separator(0)

* Occupation Categories Table *
tab ocpr
tab ocpr ocprmg
tab ocprmg

*** show that all faculty in sample except 1 are engaged in teaching and research as primary
activities ***
tab1 wabrsh waaprsh
tab watea if wabrsh=="N" & waaprsh=="N"

*** CHAPTER 4 TABLES ***
* why missing research & nonhospt spending *
tab instnm_ba if mi(researchfte_ba) // 55 missing financial data (Pennsylvania & NY
Schools)
tab instnm_inst if mi(researchfte_inst) // 61 missing financial data (Pennsylvania, NY, & NJ
Schools)

tab instnm_inst if mi(fte_bi) // 8 inst. missing fte data


list instnm_inst pct_research_inst instnm_phd pct_research_phd pct_research_pi if
!mi(pct_research_pi) & pct_research_pi>.2 | pct_research_pi<-.2, clean

list instnm_inst nonhosptfte_inst instnm_ba nonhosptfte_ba nonhospt_bi if !mi(nonhospt_bi)
& nonhospt_bi>20000 | nonhospt_bi<-20000, clean

*** Schools more likely to employ faculty with own BA ***
```

```
tab instnm_ba if same_bainst==1

*** Schools more likely to employ faculty with own PHD ***
tab instnm_phd if same_phdinst==1

** Distribution of Dependent Variables, chose sqrt_satisjob and satispay **
kdensity satisjob, scheme(s1color) normal saving(dv1.gph, replace) title("Work Satisfaction
Factor Score", size(vlarge)) legend(off) xtitle("") xsize(4) ysize(3)
kdensity sqrt_satisjob, scheme(s1color) normal saving(dv2, replace) title("Distribution,
Square Root of Job Satis Scale", size(medium)) legend(off) xtitle("") xsize(4) ysize(3)
kdensity log_satisjob, scheme(s1color) normal saving(dv3.gph, replace) title("Natural Log of
Work Satisfaction Factor Score", size(vlarge)) legend(off) xtitle("") xsize(4) ysize(3)
kdensity satispay, scheme(s1color) normal saving(dv4, replace) title("Distribution, Pay Satis
Scale", size(medium)) legend(off) xtitle("") xsize(4) ysize(3)
graph combine dv1.gph dv2.gph dv3.gph dv4.gph
graph combine dv1.gph dv3.gph dv4.gph, scheme(s1color) xcommon ycommon xsize(8)
ysize(4)
graph combine dv1.gph dv3.gph, scheme(s1color) xcommon ycommon col(2) xsize(8)
ysize(4)

* distribution of % minority variable *
hist minority_ba, scheme(s1color) percent ytitle("Percent") xtitle(" ""Percentage of Minority
Students") saving(pctm1, replace) title("Bachelor's Institutions % Minority")
xvarformat(%3.2f)
hist minority_phd, scheme(s1color) percent ytitle("Percent") xtitle(" ""Percentage of
Minority Students") saving(pctm2, replace) title("Doctoral Institutions % Minority")
xvarformat(%3.2f)
hist minority_inst, scheme(s1color) percent ytitle("Percent ") xtitle(" ""Percentage of
Minority Students") saving(pctm3, replace) title("Employing Institutions % Minority")
xvarformat(%3.2f)
graph combine pctm1.gph pctm2.gph pctm3.gph, scheme(s1color) ycommon xcommon

* distribution of % female variable *
hist pctstd_w_ba, scheme(s1color) percent ytitle("Percent") xtitle(" ""Percentage of Women
in Student Body") saving(pctw1, replace) title("Bachelor's Institutions % Women")
xvarformat(%3.2f)
hist pctstd_w_phd, scheme(s1color) percent ytitle("Percent") xtitle(" ""Percentage of Women
in Student Body") saving(pctw2, replace) title("Doctoral Institutions % Women")
xvarformat(%3.2f)
hist pctstd_w_inst, scheme(s1color) percent ytitle("Percent ") xtitle(" ""Percentage of
Women in Student Body") saving(pctw3, replace) title("Employing Institutions % Women")
xvarformat(%3.2f)
graph combine pctw1.gph pctw2.gph pctw3.gph, scheme(s1color) ycommon xcommon
```

```
kdensity sat75_bi, saving(abs1.gph, replace) title("SAT Difference Score", size(vlarge))
legend(off) xtitle("") xsize(4) ysize(3)
kdensity sat75_bi_abs, saving(abs2.gph, replace) title("Absolute Value of SAT Difference
Score", size(vlarge)) legend(off) xtitle("") xsize(4) ysize(3)
graph combine abs1.gph abs2.gph, ycommon col(2) xsize(9) ysize(4)

***************
*** Exploratory ***
***************

tab obereg_ba same_bainst, col chi2  // some differences by region
tab obereg_ba same_baphd, col chi2  // no differences by region
tab obereg_phd same_phdinst, col chi2 // some diff by region

tab control_ba same_bainst, col chi2  // same for tenure-track
tab control_phd same_phdinst, col chi2 // essentially the same by public-private
tab control_inst same_phdinst, col chi2 // essentially same

regress satisjob same_baphd
estat imtest, white
regress satispay same_baphd
estat imtest, white

regress satisjob same_bainst
estat imtest, white
regress satispay same_bainst
estat imtest, white

regress sqrt_satisjob same_phdinst
estat imtest, white
regress satispay same_phdinst
estat imtest, white

regress satisjob gradtotal_bi
estat imtest, white
regress satispay gradtotal_bi
estat imtest, white

regress sqrt_satisjob gradtotal_pi // not sig
regress satispay gradtotal_pi // not sig

**************** Regression Models **********************
estimates clear
*drop predict*
```

```
* Model 1.1 (BI, no interactions, strict)
regress satisjob $covariates $vars_bi, vce(hc3)  // relatedjob, black1
estimates store model1_1

* Model 1.2 (PI, no interactions, strict)
regress satisjob $covariates $vars_pi, vce(hc3) // relatedjob, black1, pct_research
*predict test1
*twoway scatter test1 pct_research_pi || lfit test1 pct_research_pi, saving(1_2lfit, replace)
xsize(4) ysize(4) ytitle(" ") xtitle(" ") title("Linear Prediction Plot")
*twoway scatter test1 pct_research_pi || qfit test1 pct_research_pi, saving(1_2qfit, replace)
xsize(4) ysize(4) ytitle(" ") xtitle(" ") title("Quadratic Prediction Plot")
*graph combine 1_2lfit.gph 1_2qfit.gph, ycommon xsize(6.5) ysize(3.3) l1title("Work
Satisfaction Fitted Values") b1title("Change in the Percent of Expenditures Spent on
Research")
*cprplot pct_research_pi
estimates store model1_2

* Model 2.1 (BI, no interactions, absolute)
regress satisjob $covariates $vars_bi_abs, vce(hc3)  // relatedjob, SAT75, nonhostp
predict abs21
twoway scatter abs21 nonhospt_bi1_abs || lfit abs21 nonhospt_bi1_abs, ytitle("Work
Satisfaction Fitted Values"" ") xtitle(" " "Absolute Change in the Percent of Expenditures
Spent on Research")
estimates store model2_1

* Model 2.2 (PI, no interactions, absolute)
regress satisjob $covariates $vars_pi_abs, vce(hc3)  // relatedjob, black, pct_reserach
predict abs1
twoway scatter abs1 nonhospt_pi1_abs || lfit abs1 nonhospt_pi1_abs, ytitle("Work
Satisfaction Fitted Values"" ") xtitle(" " "Absolute Change in the Percent of Expenditures
Spent on Research")
*cprplot pct_research_pi_abs
estimates store model2_2

* Model 3.1 (BI, pct_minority interactions, strict)
regress satisjob $covariates $vars_bi_interaction, vce(hc3)  // relatedjob, black1, nonhospital
spending)
estimates store model3_1

* Model 3.2 (PI, pct_minority interactions, strict)
regress satisjob $covariates $vars_pi_interaction, vce(hc3)  // relatedjob, black1, nonhospital
spending)
*predict test2
```

```
*twoway scatter test2 pct_research_pi || lfit test2 pct_research_pi, saving(3_2lfit, replace)
xsize(4) ysize(4) ytitle(" ") xtitle(" ") title("Linear Prediction Plot")
*twoway scatter test2 pct_research_pi || qfit test2 pct_research_pi, saving(3_2qfit, replace)
xsize(4) ysize(4) ytitle(" ") xtitle(" ") title("Quadratic Prediction Plot")
*graph combine 3_2lfit.gph 3_2qfit.gph, ycommon xsize(6.5) ysize(3.3) l1title("Work
Satisfaction Fitted Values") b1title("Change in the Percent of Expenditures Spent on
Research")
*cprplot pct_research_pi
estimates store model3_2

* Model 4.1 (BI, pct_minority interactions, absolute)
regress satisjob $covariates $vars_bi_inter_abs, vce(hc3)  // relatedjob
estimates store model4_1

* Model 4.2 (PI, pct_minority interactions, absolute)
regress satisjob $covariates $vars_pi_inter_abs, vce(hc3)  // relatedjob
*predict abs2
*twoway scatter abs2 pct_research_pi_abs || lfit abs2 pct_research_pi_abs, ytitle("Work
Satisfaction Fitted Values"" ") xtitle(" " "Absolute Change in the Percent of Expenditures
Spent on Research")
*predict predict1
*twoway scatter predict1 women_pi_abs if female==1, msymbol(Oh) || scatter predict1
women_pi_abs if female==0, msymbol(D) ///
*|| lfit predict1 women_pi_abs if female==1 || lfit predict1 women_pi_abs if female==0
*cprplot pct_research_pi_abs
*cprplot women_pi_abs
estimates store model4_2

* Model 5.1 (BI, pct_race interactions, strict)
regress satisjob $covariates $vars_bi_interaction2, vce(hc3)  // relatedjob, black1, pct_asian
*predict predict2
*twoway scatter predict2 pct_asian_bi if black1==0 & asian1==0 & hispanic1==0,
msymbol(s) || scatter predict2 pct_asian_bi if black1==1 | asian1==1 | hispanic1==1,
msymbol(T) ///
*|| lfit predict2 pct_asian_bi if black1==0 & asian1==0 & hispanic1==0 || lfit predict2
pct_asian_bi if black1==1 | asian1==1 | hispanic1==1
*twoway scatter predict2 nonhospt_bi1 || lfit predict2 nonhospt_bi1, saving(5_1lfit, replace)
xsize(4) ysize(4) ytitle(" ") xtitle(" ") title("Linear Prediction Plot")

*cprplot pct_asian_bi
estimates store model5_1

* Model 5.2 (PI, pct_race interactions, strict)
regress satisjob $covariates $vars_pi_interaction2, vce(hc3)  // relatedjob, black1, pct_asian
```

```
*predict test3
*twoway scatter test3 pct_research_pi || lfit test3 pct_research_pi, saving(5_2lfit, replace)
xsize(4) ysize(4) ytitle(" ") xtitle(" ") title("Linear Prediction Plot")
*twoway scatter test3 pct_research_pi || qfit test3 pct_research_pi, saving(5_2qfit, replace)
xsize(4) ysize(4) ytitle(" ") xtitle(" ") title("Quadratic Prediction Plot")
*graph combine 5_2lfit.gph 5_2qfit.gph, ycommon xsize(6.5) ysize(3.3) l1title("Work
Satisfaction Fitted Values") b1title("Change in the Percent of Expenditures Spent on
Research")
*cprplot pct_research_pi
estimates store model5_2

* Model 6.1 (BI, pct_race interactions, absolute)
regress satisjob $covariates $vars_bi_inter_abs2, vce(hc3)  // relatedjob, pct_black_abs
*predict predict3
*twoway scatter predict3 pct_black_bi_abs if black1==0 & asian1==0 & hispanic1==0,
msymbol(s) || scatter predict3 pct_black_bi_abs if black1==1 | asian1==1 | hispanic1==1,
msymbol(T) ///
*|| lfit predict3 pct_black_bi_abs if black1==0 & asian1==0 & hispanic1==0 || lfit predict3
pct_black_bi_abs if black1==1 | asian1==1 | hispanic1==1
*twoway scatter predict3 nonhospt_bi1_abs || lfit predict3 nonhospt_bi1_abs, saving(6_1lfit,
replace) xsize(4) ysize(4) ytitle(" ") xtitle(" ") title("Linear Prediction Plot")

estimates store model6_1

* Model 6.2 (PI, pct_race interactions, absolute)
regress satisjob $covariates $vars_pi_inter_abs2, vce(hc3)  // relatedjob, pct_black_abs
*predict abs3
*twoway scatter abs3 pct_research_pi_abs || lfit abs3 pct_research_pi_abs, ytitle("Work
Satisfaction Fitted Values"" ") xtitle(" " "Absolute Change in the Percent of Expenditures
Spent on Research")
/*predict predict4
twoway scatter predict4 women_pi_abs if female==1, msymbol(Oh) || scatter predict4
women_pi_abs if female==0, msymbol(D) ///
|| lfit predict4 women_pi_abs if female==1 || lfit predict4 women_pi_abs if female==0*/
*cprplot pct_research_pi_abs
*cprplot women_pi_abs
estimates store model6_2

estimates tab model1_1 model1_2, star b(%7.3f) stats(N r2_a)
estimates tab model2_1 model2_2, star b(%7.3f) stats(N r2_a)
estimates tab model3_1 model3_2, star b(%7.3f) stats(N r2_a)
estimates tab model4_1 model4_2, star b(%7.3f) stats(N r2_a)
estimates tab model5_1 model5_2, star b(%7.3f) stats(N r2_a)
estimates tab model6_1 model6_2, star b(%7.3f) stats(N r2_a)
```

```
list instnm_ba pct_black_ba obereg_ba instnm_inst pct_black_inst obereg_inst
pct_black_bi_abs if pct_black_bi_abs>.2 & !mi(pct_black_bi_abs) & white1==1, clean // list
of pct_black_abs if White
list pct_black_ba stabbr_ba obereg_ba fte_ba pct_black_inst stabbr_inst obereg_inst fte_inst
pct_black_bi_abs if pct_black_bi_abs>.2 & !mi(pct_black_bi_abs) & white1==1, clean // list
of pct_black_abs if White

list instnm_ba instnm_inst pct_asian_bi if pct_asian_bi>.2 & !mi(pct_asian_bi) &
white1==1, clean // list of pct_asian if White
list instnm_ba instnm_inst pct_asian_bi if pct_asian_bi<-.2 & !mi(pct_asian_bi) &
white1==1, clean // list of pct_asian if White
list pct_asian_ba stabbr_ba obereg_ba fte_ba pct_asian_inst stabbr_inst obereg_inst fte_inst
pct_asian_bi satisjob if pct_asian_bi>.2 | pct_asian_bi<-.2 & !mi(pct_asian_bi) &
white1==1, clean // list of pct_asian_abs if White
list pct_asian_bi satisjob if pct_asian_bi>.2 | pct_asian_bi<-.2 & !mi(pct_asian_bi) &
white1==1, clean // list of pct_asian_abs if White
list pct_latino_pi satisjob if pct_latino_pi>.2 | pct_latino_bi<-.2 & !mi(pct_latino_bi) &
white1==1, clean // list of pct_hispanic_abs if White
list pct_latino_phd stabbr_ba obereg_ba fte_ba pct_latino_inst stabbr_inst obereg_inst
fte_inst pct_latino_pi_abs satisjob if pct_latino_pi_abs>.2 | pct_latino_pi_abs<-.2 &
!mi(pct_latino_pi_abs) & white1==1, clean // list of pct_hispanic_abs if White

********** BI DIAGNOSTICS **********
estat vif

predict final1, stdp
* normal probability plot of std residuals *
pnorm final1, grid title("Normal Probability Plot: BA-INST Job Satisfaction")
* residual versus fitted value plot *
rvfplot, yline(0) title("Residual vs. Fitted Plot: BA-INST Job Satisfaction")
* residual plus component plot *
cprplot black_minor_bi,  title("Component + Residual Plot: BA-Employer Institution Job
Satisfaction")
** Interaction effect Graph **

* residual versus predictor plot *
rvpplot control_bi, yline(0) title("Residual vs. Predictor Plot: BA-INST Job Satisfaction")

* leverage - cook's d *
predict cooksd1, cooksd
generate index1=_n
graph twoway scatter cooksd1 index1, title("Cook's D Plot: BA-INST Job Satisfaction")
* leverage - dfits *
```

```
predict dfits1
graph twoway scatter dfits1 index1, title("Leverage: BA-INST Job Satisfaction")

graph twoway scatter satisjob black_minor_bi, msize(small) || lfit satisjob black_minor_bi,
lwidth(thick) /// KEEP
ytitle("Job Satisfaction Factor Score (satisjob)" " ") ///
legend( label(1 "Plot of each respondent") label(2 "Lowess or locally weighted regression
line") rows(3) symxsize(6))


twoway scatter satisjob minority_bi if black1==1, msize(small) || lfit satisjob minority_bi if
black1==1, lcolor(navy) lwidth(medthick) ///
legend( label(1 "Plot of Black faculty") label(2 "Lowess line for Black faculty") rows(1)
size(small) symxsize(6)) ytitle("Job Satisfaction Factor Score (satisjob)" " ")

twoway scatter satisjob minority_bi if black1==0, msize(small) || lfit satisjob minority_bi if
black1==0, lcolor(navy) lwidth(medthick) ///
legend( label(1 "Plot of Black faculty") label(2 "Lowess line for Black faculty") rows(1)
size(small) symxsize(6)) ytitle("Job Satisfaction Factor Score (satisjob)" " ")


*** Plotting differences in Institutional Pairings by Percentage Minority Students ***
tabstat satisjob  satisloc satisadv satischal satisind satisresp satissoc,stat(mean n)
by(qrt_minority_bi)

tabstat satisjob  satisloc satisadv satischal satisind satisresp satissoc if black1==1,stat(mean)
by(qrt_minority_bi)

gsort -minority_ba minority_inst
list instnm_ba minority_ba instnm_inst minority_inst if qrt_minority_bi==1

gsort -minority_bi
list satisjob minority_ba hbcu_ba minority_inst hbcu_inst minority_bi if qrt_minority_bi==6,
clean  //less satisfied group
list satisjob minority_ba hbcu_ba minority_inst hbcu_inst minority_bi if qrt_minority_bi==1,
clean

gsort satisjob
list satisjob minority_ba hbcu_ba minority_inst hbcu_inst minority_bi if qrt_minority_bi==6,
clean  //less satisfied group
list satisjob minority_ba hbcu_ba minority_inst hbcu_inst minority_bi if qrt_minority_bi==1,
clean

preserve
```

```
keep if black1==1
gsort -minority_bi
list satisjob minority_ba hbcu_ba minority_inst hbcu_inst minority_bi if qrt_minority_bi==1,
clean
list satisjob minority_ba hbcu_ba minority_inst hbcu_inst minority_bi if qrt_minority_bi==6,
clean
restore

preserve
keep if black1==1
gsort satisjob
list satisjob minority_ba hbcu_ba minority_inst hbcu_inst minority_bi if qrt_minority_bi==1,
clean
list satisjob minority_ba hbcu_ba minority_inst hbcu_inst minority_bi if qrt_minority_bi==6,
clean
restore

****************** PI Diagnostics  ****************************

estat imtest, white

predict final3, stdp
* normal probability plot of std residuals *
pnorm final3, grid title("Normal Probability Plot: PHD-INST Job Satisfaction")
* residual versus fitted value plot *
rvfplot, yline(0) title("Residual vs. Fitted Plot: PHD-INST Job Satisfaction")
* residual plus component plot *
cprplot doc2mast_pi, title("Component + Residual Plot: PHD-INST Job Satisfaction")
cprplot doc2bach_pi, title("Component + Residual Plot: PHD-INST Job Satisfaction")
* residual versus predictor plot *
rvpplot doc2mast_pi, yline(0) title("Residual vs. Predictor Plot: PHD-INST Job
Satisfaction")

graph twoway scatter satisjob doc2mast_pi || qfit satisjob doc2mast_pi //keep

* leverage - cook's d *
predict cooksd3, cooksd
generate index3=_n
graph twoway scatter cooksd3 index3, title("Cook's D Plot: PHD-INST Job Satisfaction")
* leverage - dfits *
predict dfits3
graph twoway scatter dfits3 index3, title("Leverage: PHD-INST Job Satisfaction")

*** Plotting differences in Institutional Pairings by Carnegie Classification ***
```

```
tabstat satisjob satisadv satischal satisind satisresp satissoc satisloc ,stat(mean)
by(doc2mast_pi)
list instnm_phd instnm_inst if doc2mast_pi==1

tabstat satisjob satisadv satischal satisind satisresp satissoc satisloc ,stat(mean)
by(doc2bach_pi)
list instnm_phd instnm_inst if doc2bach_pi==1

tabstat satisjob satisadv satischal satisind satisresp satissoc satisloc ,stat(mean) by(uscitizen)
tabstat satispay satissal satisben satissec ,stat(mean) by(uscitizen)


**********************
** Interactions Tests **
**********************
** BI analysis **
test $inter_bi_female  // does not influence satisjob
test $inter_bi_black // SIGNIFICANCE
test black1
test minority_bi
test black_minor_bi
test $inter_bi_asian // does not influence satisjob
test $inter_bi_hispanic // does not influence satisjob
estimates store reg1

** PI analysis **
test $inter_pi_female  // does not influence satisjob
test $inter_pi_black // does not influence satisjob BLACK
test black1
test minority_pi
test black_minor_pi
test $inter_pi_asian // does not influence satisjob
test $inter_pi_hispanic // does not influence satisjob
estimates store reg2

** ABS Value BI analysis **
regress satisjob $covariates $vars_bi_inter_abs, vce(hc3) beta
estimates store reg3

** ABS Value PI analysis **
qui regress satisjob $covariates $vars_pi_inter_abs, vce(hc3) beta

cprplot pct_research_pi_abs
```

```
test female women_pi_abs female_women_pi_abs
test female female_women_pi_abs
test women_pi_abs female_women_pi_abs
test female
test women_pi_abs
test female_women_pi_abs
estimates store reg4

estimates tab reg1 reg2, star b(%7.2f) stats(N r2_a)
estimates tab reg3 reg4, star b(%7.2f) stats(N r2_a)

*************************************************************************
estimates clear

** BI analysis extra interactions **
qui regress satisjob $covariates $vars_bi_interaction2, vce(hc3)

cprplot pct_asian_bi

preserve
drop if nonhospt_bi>750000 & !mi(nonhospt_bi)
drop if nonhospt_bi<-800000 & !mi(nonhospt_bi)
cprplot nonhospt_bi1
restore

test black1 pct_black_bi black_black_bi
test black1  // SIG
test pct_black_bi
test black_black_bi
test pct_asian_bi black_asian_bi asian_asian_bi hispanic_asian_bi
test pct_asian_bi asian_asian_bi
estimates store reg5

** PI analysis extra interactions **
regress satisjob $covariates $vars_pi_interaction2, vce(hc3)
cprplot pct_research_pi
cprplot pct_women_pi
estimates store reg6

** ABS Value BI analysis extra interactions **
regress satisjob $covariates $vars_bi_inter_abs2, vce(hc3)
cprplot
estimates store reg7
```

```
** ABS Value PI analysis extra interactions **
regress satisjob $covariates $vars_pi_inter_abs2, vce(hc3) beta
cprplot women_pi_abs
list instnm_ba pctstd_w_ba instnm_phd pctstd_w_phd instnm_inst pctstd_w_inst
women_pi_abs if women_pi_abs >= 0.40 & !mi(women_pi_abs)

cprplot pct_research_pi_abs
estimates store reg8

estimates tab reg5 reg6, star b(%7.2f) stats(N r2_a)
estimates tab reg7 reg8, star b(%7.2f) stats(N r2_a)

*** Plotting differences in Institutional Pairings by Carnegie Classification ***
tabstat satispay satissal satisben satissec ,stat(mean) by(qrt_fte_pi)

gsort -fte_phd fte_inst
list instnm_phd fte_phd instnm_inst fte_inst if qrt_fte_pi==1 // least satisfied
gsort fte_phd -fte_inst
list instnm_phd fte_phd instnm_inst fte_inst if qrt_fte_pi==6  // most satisfied
```