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Factors affecting university STEM faculty job satisfaction

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FACTORS AFFECTING UNIVERSITY STEM FACULTY JOB SATISFACTION

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The School of Human Resource Education and Workforce Development

by

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May, 2012

DEDICATIONS

This dissertation is dedicated to two very special people in my life, my late great aunt, Lena Giambrone, and my husband, Travis Verret. Aunt Lena, thank you for instilling a love of learning in me at a very young age. Your encouragement and support, both emotional and financial, has been the impetus for this culminating accomplishment.

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ABSTRACT

Many job satisfaction studies have been done on faculty in higher education, but very little research has focused on science, technology, engineering, and mathematics (STEM) faculty. Through these studies, very little consensus has been reached on the satisfaction levels of male and female faculty. The purpose of this quantitative study was to examine the job satisfaction of tenured and tenure-track male and female STEM faculty at research institutions in six states. Moreover, the study sought to examine the relationship between STEM faculty job satisfaction and potential explanatory factors: gender, rank, tenure, salary, family status, whether or not there are children living in the home, number of children living in the home, and work-family conflict. The instruments used in the study were the *Job Satisfaction Survey* and the *Work-family Conflict Scale*, both of which are six item Likert-type scales. A negative statistically significant relationship existed between work-family conflict and job satisfaction. Faculty who reported lower work-family conflict reported significantly higher job satisfaction than faculty with high work-family conflict. In addition, a negative statistically significant relationship existed between work interference with family (WIF) and job satisfaction. The correlation between WIF and job satisfaction shows that as work interference with family increases, job satisfaction decreases. Multiple regression analysis revealed that two factors, work interference with family and family status (married or not married), accounted for 13.6% of the variance, which indicates that there are other factors that affect university STEM faculty job satisfaction than the ones that were identified in this study. The results of this study can be used by administrators to aid in making organizational decisions that may lead to increased STEM faculty job satisfaction. Some of these decisions might include implementing family-friendly policies and programs to increase the supportiveness of the work-family culture.

CHAPTER 1: INTRODUCTION

“If low job satisfaction and dissatisfaction exists among academics, then the goals of higher education cannot be accomplished” (Eyupoglu & Saner, 2009, p. 609).

Job satisfaction has been a heavily researched topic in human resource management for the past 60 years and continues to be highly important. However, it remains a nebulous concept with many definitions. Cranny, Smith, and Stone (1992) define job satisfaction as “Satisfaction with specific aspects of a job situation cause satisfaction with facets of the job in general, and eventually with life” (p. 5). According to Brayfield and Rothe (1951), job satisfaction was concerned with a person’s general feelings about a job. Davis and Newstrom (1989) found that job satisfaction could be regarded as one aspect of life satisfaction while Kalleberg’s (1977) definition of job satisfaction was “. . . an overall affective orientation on the part of individuals toward work roles which they are currently occupying” (p. 126).

Background of the Study

Many reasons exist for studying job satisfaction, as research findings suggest that dissatisfaction has an effect on many aspects of worklife such as productivity, morale, quality of work, retention, absenteeism, turnover, and tardiness (Brayfield & Crockett, 1955; Griffeth, Hom, & Gaertner, 2000; Herzberg, Maunser, & Snyderman, 1959; Spector, 1997; Tack & Patitu, 1992). Job dissatisfaction can be costly to institutions in regards to recruiting, training, and length of learning curves (Brown & Mitchell, 1993). On the other hand, evidence suggests that job satisfaction improves productivity, reduces turnover, increases retention, improves morale, and enhances creativity (Brown & Mitchell, 1993). Even with the overwhelming amount of research done on this topic, unanswered questions remain about the effects of certain factors (specifically, gender, rank, tenure status, salary, family status, and work-family conflict) on the job satisfaction of science, technology, engineering and mathematics (STEM) faculty who are

the target population for this study (Brayfield & Crockett, 1955; Griffeth, Hom, & Gaertner, 2000; Herzberg, Maunser, & Snyderman, 1959; Spector, 1997; Tack & Patitu, 1992).

The Importance of Studying STEM Faculty

Studying STEM faculty is important to help diversity the faculty pool which can increase creativity, innovation, competitiveness (AAUW, 2010). The need for diversity presumes that diversity broadens the available resources needed to enhance organizational performance (Barinaga, 2007). The specific problem is that, despite the attention given to diversity initiatives, only 34% of organizations have achieved workforce diversity (Manchester, 2008). This is particularly true when one examines the literature on the disparity of STEM faculty.

There is an apparent difference in the number of male and female STEM faculty. According to the American Association of University Professors, (AAUP) (2011), the make-up of STEM faculty in the United States is 57% male and 43% female. The difference in the number of male and female STEM faculty is sometimes blamed on perceived biological differences in abilities and interests between males and females. Awareness of this assumed bias is the first step in breaking these stereotypes and creating equality in STEM faculty positions.

According to NSF (2007), two-thirds of both boys and girls report science as appealing, but a difference in attitudes and interests start to appear between the genders in middle school. By eighth grade, boys are twice as likely to be interested in a STEM career as girls. This attrition in female's interest in STEM continues throughout high school, college, and carries over into the workforce (NSF, 2007).

Research has found no difference between males and females in the overall aptitude for science or math at any point during development (Halpern, Wai, & Saw, 2005; Pinker, 2002). Spelke's (2005) research on cognitive abilities does not support the claim that men are more apt

to be successful in math and science. Spelke (2005) found no difference exists in the cognitive abilities of male and female infants in regard to the foundation for mathematics and science. Spelke (2005) also found that both sexes had an equal capacity to learn about objects, numbers, and space. Male and female children acquire these abilities in the same manner, at the same stage in development, and can master the rudimentary concepts and operations of mathematics (Spelke, 2005). The differences that are apparent between males and females are not as clear as simply saying women are verbal and men are spatial; they are more complex and subtle, often coming from a different strategy choice in regard to problem solving (Spelke). According to Spelke (2005), men and women both have the equal aptitude for math and science and the equal cognitive capacity to be successful in math and science careers.

The National Science Foundation (NSF) believes the study of female STEM faculty is important. NSF also recognizes that institutional barriers exist for women scientists that prohibit women from being equal players in the fields of science and technology. Some of these barriers include lower salaries, insufficient lab space, and fewer professional opportunities (Rosser, 2004a). In response to these barriers, NSF launched ADVANCE: Increasing the Participation and Advancement of Women in Science and Engineering Careers awards program in 2001 that provides support funds to institutions and individuals to empower women to fully participate in science and technology. According to NSF (2011), the goal of the AVANCE grants is to “increase the representation and advancement of women in academic science and engineering careers, thereby contributing to the development of a more diverse science and engineering workforce,” (para. 1.)

Female faculty report less job satisfaction than male faculty (AAUW, 2010; Callister, 2006; Hagedorn, 1996; Olsen, Maple, & Stage, 1995; Perna, 2001; Rosser, 2004; Rosser, 2005;

Seifert & Umbach, 2008; Tack & Patitu, 1992). Females are also leaving academia at higher rates than men, both pre- and post-tenure (Menges & Exum, 1983; Preston, 1994; Rausch, Ortiz, Douthitt, & Reed, 1989; Rothblum, 1988). Low satisfaction leads to high turnover, low retention rates, and a loss of talented, well-qualified STEM faculty which can lead to a slow-down in research, a loss of faculty to teach particular courses, fewer faculty to chair committees, and fewer faculty to mentor graduate students. All of these issues point to the importance of studying STEM faculty job satisfaction.

Factors Affecting Job Satisfaction

Gender

In some studies of faculty, men reported a greater level of overall job satisfaction than women (Callister, 2006; Hagedorn, 2000; Olsen, Maple, & Stage, 1995; Ropers-Huilman, 2000; Sabharwal & Corley, 2009; Sax, Hagedorn, Arrendondo, Dicrisi, 2002; Tack & Patitu, 1992). Ward and Sloane (2000) found that "...good working relationships with colleagues, the importance of research and teaching ..., the opportunity to undertake interesting work in a relaxing work environment, and the opportunity to travel," (p. 288) were important determinants of satisfaction. This research leaves the question of the relationship between gender and job satisfaction unanswered.

Gender has been noted as an explanatory variable in many studies. Although many studies have been conducted investigating the connection between gender and job satisfaction, the results remain inconclusive. Most studies have found that women have lower job satisfaction than men do (Callister, 2006; Hagedorn, 2000; Perna, 2001; Rosser, 2004b; Rosser, 2005; Seifert & Umbach, 2008; Tack & Patitu, 1992). Bender and Heywood (2006) found that female academics reported lower levels of job satisfaction than male academics, but that females expressed higher job satisfaction than males in nonacademic careers. Sloane and Ward (2001)

found that women over 35 reported notably higher level of job satisfaction than younger women. Although these studies have been influential in understanding job satisfaction among female faculty, few of these studies have taken into account the effect of other factors including family status, tenure, salary, and the faculty member's perception of work-family balance on job satisfaction.

Some researchers attempt to explain the low number of women in the higher-prestige colleges and universities through a theory of biological predisposition (Kimura, 1999). This research posits that women choose careers outside of academia because of a self-imposed belief that women are naturally inclined to prefer child-rearing and family roles over professional roles. According to this theory, women innately accept the feminine role of being the primary caregiver to children and find this role ill-suited for the long hours often worked by many female faculty. Women may also believe they are not suited for the rigors of the academic profession (Kimura, 1999). Additionally, this belief about innate, biological differences between the sexes and its effect on the success of women in science and math careers has been supported by at least one prominent person in higher education, Former Harvard President Larry Summers.

On January 14, 2005, then-President of Harvard University Larry Summers addressed members attending the "Diversifying the Science and Engineering (SE) Workforce: Women, Underrepresented Minorities, and Their S&E Careers" luncheon. In his comments, Summers indicated that the natural biological differences between men and women might cause men to be more successful than women are in math and science careers. Specifically, he stated “. . . that women with children are reluctant to work the long hours required to succeed in those fields and also the possibility that men and women may have different innate abilities, which were previously attributed mostly to socialization” (Fogg, 2005, A12). Summers was President of

Harvard from 2001-2006. These comments marked the beginning of the end for Summers' tenure as President of Harvard. Summers resigned in June 2006.

These comments have fueled a debate over gender disparities in academic science. When the president of Harvard University finds it appropriate to address a conference dedicated to increasing diversity in the scientific fields with a remark stating that the reason for the low number of women in top positions in science and engineering is due to innate, genetic differences between the sexes and that women are not willing to work as hard as men to be competitive, his remarks need to be taken seriously. Many people hold the same view as Summers and believe that gender differences cause the underrepresentation of women in STEM disciplines, even though empirical evidence shows that there are many other reasons for the low numbers, including inequities in salaries, promotion, and support, in addition to dissatisfaction with the job (Sonnert & Holton, 1996). The effects of gender on job satisfaction cannot be understood without consideration of the effects of rank, tenure status, salary, family status and work-family conflict.

Rank

Rank has been used a determinant of job satisfaction in many studies which found full professors as more satisfied than junior faculty members (Adkins, Werbel, & Fahr, 2001; Oshagbemi, 1997; Tack & Patitu, 1992). Okpara, Squillace, and Erondy (2005) found that higher ranked female faculty members experienced higher level of job satisfaction than their male peers. In addition, Eyupoglu and Saner (2009) found that faculty job satisfaction is dependent on rank. A positive relationship between rank and job satisfaction has been documented in many studies (Adkins, Werbel, & Fahr, 2001; Eyupoglu & Saner, 2009; Okpara, Squillace, & Erondy, 2005; Oshagbemi, 1997; Tack & Patitu, 1992). Additionally, further research is still needed to explore the effect of rank on STEM faculty job satisfaction.

Tenure Status

A disparity exists between the number of male and female faculty who achieve tenure (Wolfinger, Mason, & Goulden, 2008), which may account for gender differences in satisfaction. Women take 2 to 10 years longer than men to achieve tenure (Hensel, 1991). Although the number of women in academia and in the sciences has increased, they still fall behind in achieving tenure according to the American Association of University Professors' (AAUP) *Annual Report on the Economic Status of the Profession 2005-2006*. According to AAUP (2006), women comprise 33% of full-time tenured faculties across all disciplines compared to 67% of men. While 33% of tenured faculty is female, only 25% of women hold full professorships, compared to 75% of male faculty. In addition, 46% of women are Assistant Professors compared to 54% of men and 38% of women are Associate Professors as compared to 62% of men. In the life sciences, 37% of men are Full Professors, 21% are Associate Professors, 19% are Assistant Professors, and 23% are Instructors. In contrast, only 15% of female faculty members are Full Professors, 18% are Associate Professors, 23% are Assistant Professors, and 44% are Instructors (AAUP, 2006). According to AAUP (2006), in some fields such as engineering, women only make up 11% full-time tenured or tenure-track faculty.

Tenured faculty tend to report higher levels of job satisfaction than untenured faculty (Bender & Heywood, 2006; Nestor & Leary, 2000; Schuster & Finkelstein, 2006). Finkelstein and Schuster (2001) report that nontenured faculty were more satisfied than tenured faculty. There is an obvious need for further research in this area since no clear conclusion has been drawn from previous studies on the effect of tenure on job satisfaction.

Salary

Faculty salary in regard to job satisfaction has been the focus of many studies (August & Waltman, 2004; Davis, 2001; Ehrenberg, Kasper, & Rees, 1991; Grace and Khalsa, 2003;

Hagedorn, 1996; Tang & Talpade, 1999; Zhou & Volkwein, 2003). A positive relationship between salary and faculty job satisfaction has been well documented through many studies (Ehrenberg, Kasper, & Rees, 1991; Zhou & Volkwein, 2003). Grace and Khalsa (2003) found that salary packages were the most important job satisfaction factor for faculty at a Massachusetts university. Davis (2001) found that noncompetitive salaries were reported as the most common reason for faculty dissatisfaction. Zhou and Volkwein (2003) found strong evidence that salary is a factor that affects faculty satisfaction and attitude toward their job. In addition, Zhou and Volkwein (2003) found that a faculty member's salary when compared to their peers also affects their attitude and satisfaction. These salary discrepancies were found to cause increasing job dissatisfaction among faculty members who make less than their peers (Zhou & Volkwein, 2003).

Family Status

No clear consensus has been reached regarding the effect of family status on faculty satisfaction and the effect appears to vary by gender. Research has shown that men who are married or in a relationship have higher publication and satisfaction rates than single men (Sax et al., 2002). Campbell, Converse and Rodgers (1976) found that single men were more job satisfied than married men, but no difference was evident for females. Some studies found that marriage increased satisfaction for faculty members of all levels (Cetin, 2006; Hagedorn, 2000); however, other studies found that marriage can negatively impact faculty job satisfaction (Aisenberg & Harrington, 1988). Marriage has been found to positively impact male faculty satisfaction (Zuckerman, 1991), and in some cases, has no effect (Sonnert & Holton, 1995) on career attainment and satisfaction. Bersoff and Crosby (1984) found that the effect of family status has more of an impact on male faculty job satisfaction than female faculty job satisfaction. These studies show that there is no consensus on the effect of family status on satisfaction.

No consensus has been reached on the effect of parental status on job satisfaction. Some studies have found that parents report higher levels of job satisfaction than people who are not parents (Bersoff & Crosby, 1984; Crosby, 1983; Martin & Hanson, 1985). In addition, parental status effects job satisfaction differently for men and women (Roxburgh, 1999). According to Roxburgh (1999), fathers report less job satisfaction than men who are not fathers. The reverse is true for mothers who reported more job satisfaction than women who are not mothers. Some studies have found that working women with children report lower levels of job satisfaction than working men with children (Warren & Johnson, 1995). Research has found that many married women experience work-family conflict, leading to job dissatisfaction (Greenglass, Patony, & Burke, 1989). Even though research has been done in this area, the effect of parental status on job satisfaction still remains unclear.

Work-Family Conflict

Work-family conflict occurs when the demands of one role (work) are incompatible with the demands of another role (family) (Greenhaus & Beutell, 1985). A number of studies have been aimed at explaining the relationship between work-family conflict and job satisfaction (Bedeian, Burke, & Moffett, 1988; Bruck, Allen, & Spector, 2002; Calvo-Salguero, Carrasco-Gonzalez, Salinas-Martinez de Lecea, 2010; Kossek & Ozeki, 1998; Lapierre, Spector, Allen, Poelmans, Cooper, O'Driscoll, Sanchez; Brough, & Kinnunen, 2008). Kossek and Ozeki (1998) reported that work-family conflict caused lower levels of job satisfaction. Bedeian, Burke, and Moffett (1988) reported that work-family conflict had a direct effect on life satisfaction. In addition, the study found that job satisfaction was affected by the interaction between work role stress and parent role demands. Many studies have found that work-family conflict can cause job dissatisfaction (Boles, Howard, & Donofrio, 2001; Gordon, Whelan-Berry, & Hamilton,

2007; Hill, Yang, Hawkins, & Ferris, 2004; Howard, Donofrio, & Boles, 2004; and O'Driscoll, Brough, & Kalliath, 2004).

Balancing work and family is a prevalent problem in academia and major concern for faculty of all disciplines (Mason & Goulden, 2002; O'Laughlin & Bishcoff, 2005; Rosser & Daniels, 2004). According to Rosser and Daniels (2004), balancing work and family continues to be a major challenge and concern for female academics. Balancing work and family is a more serious concern for STEM faculty because of the nature of the field such as competitiveness, long work hours, and frequent travel (Mason & Ekman, 2007; Monroe, Ozyurt, Wrigley, & Alexander, 2008). Rosser and Daniels (2004) state, "The issue of balancing work with family responsibilities is the most pervasive and persistent challenge facing female science and engineering faculty members, spanning the variables of time, type of institution, and discipline" (p. 144).

Finkel and Oslwang (1996) found that pregnancy, childbirth, and caring for young children pose a threat to tenure because these responsibilities are likely to reduce the amount of time a woman has to devote to research. Female faculty report facing difficulties with challenges such as tenure clock deadlines and raising children, low numbers of female colleagues, no formal mentoring process, being viewed as credible with colleagues and administrators, lack of funding, job location, and salary restrictions. All of these factors suggest that work-family balance and work-family conflict have an effect on faculty job satisfaction.

Statement of the Problem

Very little consensus exists as to the satisfaction levels of male and female faculty. Even less research has been done on STEM faculty in particular. This study explored the commonly held belief that male faculty are often more satisfied than female faculty. The study also examined the effect of rank, tenure status, salary, family status, and work-family conflict on job satisfaction.

Further exploration allowed for a better understanding of the extent to which gender, rank, tenure status, salary, family status and work-family conflict are associated with faculty satisfaction and by using these factors to predict job satisfaction of tenured and tenure-track STEM faculty at research universities.

Purpose and Research Questions

The purpose of this study was to examine the job satisfaction of STEM faculty members at research universities. Moreover, the study sought to examine the relationship between STEM faculty job satisfaction and selected factors: gender, rank, salary, tenure status, salary, family status, whether or not there are children living in the home, number of children living in the home, and work-family conflict. The research questions for the study are:

1. What are selected characteristics of STEM faculty, namely, gender, rank, salary, family status (single, married, widowed, divorced, separated), whether or not there are children living in the home, the number of children living in the home, and tenure status (tenure-track or tenured)?
2. Does a difference exist in the job satisfaction of STEM faculty by:
 - a. Gender
 - b. Rank (Assistant Professor, Associate Professor, Professor)
 - c. Tenure status (tenure-track or tenured)
 - d. Salary
 - e. family status (single, married, widowed, divorced, separated)
 - f. Work-family conflict (high vs. low)
 - g. Children living in the home (yes or no)
 - h. Number of children living in the home

3. Do selected factors explain the variance in the overall job satisfaction of STEM faculty?

The factors that will be used as the potential explanatory variables in this analysis are gender, rank, salary, tenure status, salary, family status, whether or not there are children living in the home, number of children living in the home, and work-family conflict.

4. Does a relationship exist between job satisfaction and family interference with work (FIW) or work interference with family (WIF) means.

Significance of the Study

Many studies have been done on faculty job satisfaction in higher education, but very little research has focused on STEM faculty. This study adds to current faculty job satisfaction literature by investigating the effect of gender, rank, tenure status, salary, family status, and work-family conflict on satisfaction levels of STEM faculty. The results of this study may help administrators make organizational or administrative changes that may lead to increased STEM faculty job satisfaction. The results may also aid universities in their efforts to recruit, promote and retain STEM faculty by creating more family-friendly policies and programs to increase the supportiveness of a family-friendly culture.

Limitations

This study was limited by the willingness of tenured and tenure-track faculty to accurately report their perceptions regarding their job satisfaction and their experiences with work-family conflict. An additional limitation is that federal laws prohibit the implementation of employment policies based on gender, relationship/family status, work-family conflict, and other nonperformance based factors; therefore, it may be difficult for administrators to adequately address issues identified in this study.

Delimitations

This study was delimited to STEM faculty at six research universities in the United States during the 2011-2012 academic year. The study was further delimited to addressing the effects

of gender, rank, tenure status, salary, family status, and work-family conflict on job satisfaction even though there may be other factors that may further explain STEM faculty job satisfaction.

CHAPTER 2: REVIEW OF THE LITERATURE

“Institutional officials and current faculty in higher education must recognize the factors that lead to job dissatisfaction among faculty and eliminate them; conversely, they must recognize the factors that increase job satisfaction and increase them” (Tack & Patitu, 1992, p. iii).

Introduction

The following chapter is a presentation of research previously conducted regarding the nature of gender, rank, salary, tenure status, family status and work-family conflict on faculty job satisfaction. The impact of these factors on both male and female faculty satisfaction will be discussed through existing literature. The review of literature for this study focused on gender, rank, tenure, work-family conflict, and job satisfaction. Many studies have examined job satisfaction in the university setting, although few have focused on science, technology, engineering, and mathematics (STEM) faculty. This literature review begins with an overview of job satisfaction in general, and then moves into the specific areas of gender, tenure status, salary, family status, and work-family conflict. The literature presented will provide a context for the proposed study on the effect of gender, rank, tenure, salary, family status and work-family conflict on STEM faculty job satisfaction.

Job Satisfaction

Job satisfaction continues to be the most widely researched topics in organizational behavior and human resource management (Spector, 1997). Brief (1998) found that as of 1976, over 3,300 research articles and dissertations had been published on job satisfaction. Brief also stated that by 1994, 12,400 articles and dissertations had been written on the topic. Understanding job satisfaction is important to the health of an organization because organizations with a degree of satisfaction are considered healthy, which leads to greater productivity and eagerness to take on new responsibilities (Robbins, 1998). According to Wood

(1976), “The health of an educational institution depends on the job satisfaction of its employees,” (p. 58). Employee dissatisfaction can lead to turnover, absenteeism, poor employee attitudes, lack of organizational commitment, decreased employee morale, and low productivity (Herzberg et al., 1959; Smart, 1990).

Faculty Job Satisfaction

Even though many studies have been done on job satisfaction, very little research has focused on faculty, and even less on STEM faculty in particular (Okpara et al. 2005). Research on typical workplace environments is not generalizable to the academic profession. The academic profession is different from a typical “office job” in that the requirements of a professor are very different from other professional positions. A professor must take on the roles of mentor, friend, consultant, editor, advisor, and peer. Because of this, more research needs to be done on faculty, especially STEM faculty as there are no job satisfaction studies available that focus on this subgroup of faculty. There is some speculation that the lack of research relating to faculty is due to a presumption that faculty are generally satisfied. According to Pearson and Seiler (1983), “This area has not received attention because a high level of job satisfaction has been presumed to exist in a university setting” (p. 36). However, the job aspects that are usually related to low satisfaction include pay (Oshagbemi, 1997; Oshagbemi, 2000), university policies, resource availability, work environment (August & Waltman, 2004; Kelly, 1989, Rosser, 2004b; Rosser, 2005), and tenure and promotion processes (Bender & Heywood, 2006; Oshagbemi, 1997; Tack & Patitu, 1992). The study of university STEM faculty job satisfaction is important because these faculty play an important role in higher education which includes researching new theories and ideas, as well as bringing in grant dollars for the university.

Faculty Shortage

In 1992, Tack and Patitu predicted a shortage of qualified faculty to fill vacant positions beginning in 2000. On January 1, 2011, the very first baby boomers turned 65 (Lockwood, 2003). This means that 78 million baby boomer Americans who make up 46% of the nation's workforce are getting ready to enter their retirement years. Also, beginning January 1, 2011, more than 10,000 Baby Boomers will reach the age of 65 every day; an occurrence that is going to continue every single day for the next 19 years. In the next 10 years, an astounding number of senior faculty members are expected to retire. Cohen (2008) stated that in 2005 over 54% of full-time faculty on American campuses were older than 50 as compared to just 22.5% in 1969. The retirement of the baby boomers will create a situation that requires university administrators to deal with a unique dilemma related to diversity. These administrators will be faced with the reality that there is an increasing possibility that these positions will need to be filled by women or minorities, although there continues to be a shortage of women available for faculty positions in STEM disciplines (Okpara, et al., 2005). Issues of satisfaction and equity need to be addressed in order to attract qualified female candidates to these vacant positions and to retain current faculty.

Theoretical Framework

Hagedorn's (2000) Conceptual Framework of Faculty Job Satisfaction will serve as the basis for this study. Hagedorn's used National Survey of Post-Secondary Faculty:93 (NSOPF) data to create this framework, which was adapted from Herzberg's Motivation-Hygiene Theory to specifically study university faculty. Hagedorn's framework includes two types of concepts that work together to affect job satisfaction: triggers and mediators. Hagedorn (2000) defines a trigger as "A significant life event that may be either related or unrelated to the job" (p. 6).

Hagedorn defines a mediator as “A variable or situations that influence the relationships between other variables or situations producing an interaction effect” (p. 6). The framework contains six triggers: (1) change in life state; (2) change in family-related or personal circumstances (e.g. birth, death, divorce, illness of self or significant other); (3) change in rank or tenure; (4) transfer to a new institution; (5) change in perceived justice; and (6) change in mood or emotional state (Hagedorn, 2000, p. 7). There are three types of mediators: (1) motivators and hygienes such as salary or work itself; (2) demographics such as gender or academic discipline; and (3) environmental conditions such as institutional climate/culture and collegial relationships. The mediators of salary and demographics such as gender, family status, whether or not there are children living in the home, and number of children living in the home will be examined in this study, in addition to the variables of rank and tenure status.

Hagedorn’s Conceptual Framework of Faculty Job Satisfaction is based on Herzberg’s (1959) Motivation-Hygiene Theory, which divided the work into two factors: motivators and hygienes. Motivators are issues that increase satisfaction and hygienes as issues that decrease dissatisfaction or result in de-motivation. Herzberg, Maunser, and Snyderman (1959) found that intrinsic factors, such as achievement, recognition, work itself, responsibility, advancement, and salary, lead to satisfaction; hence, these factors are named motivators and labeled as job satisfiers. Herzberg et al. also found that extrinsic factors, such as company policy, supervision, relationship with boss, work conditions, salary, and relationships with peers, lead to dissatisfaction; hence, these factors are named hygienes and labeled as job dissatisfiers. Herzberg et al.’s research has been verified through numerous studies and has served as the basis for many job satisfaction assessments.

Hagedorn's (2000) adaptation of Herzberg's Motivation-Hygiene Theory has been used in many studies over the last 10 years (August & Waltman, 2004; Grunwald & Peterson, 2003; Corley & Sabharwal, 2007; Castillo & Cano, 2004). This framework has also been used in numerous dissertations. The main purpose of this study is to add to the literature regarding job satisfaction among STEM faculty. As such, Hagedorn's research is a useful tool to frame this study.

Herzberg's Motivation-Hygiene Theory

Herzberg's Motivation-Hygiene Theory pertains to the relationship between job satisfaction and job dissatisfaction as affected by motivators and/or hygiene factors. Herzberg et al. (1959) states that motivation factors can either create high levels of job satisfaction, although the lack of these factors does not guarantee job dissatisfaction. In addition, hygiene factors can lead to dissatisfaction, but their absence does not guarantee satisfaction. As such, job satisfaction and job dissatisfaction are independent of each other. Herzberg states that the opposite of job satisfaction is not dissatisfaction, but a lack of satisfaction or no job satisfaction. This would mean that the opposite of dissatisfaction is not satisfaction, but a lack of dissatisfaction or no job dissatisfaction. With this in mind, it is important to note that this study used the *Job Satisfaction Survey* (JSS) to measure job satisfaction although the JSS measures job satisfaction on a continuum. The JSS interprets scores on the instrument to indicate job satisfaction (144-216), ambivalence (108-144), or job dissatisfaction (36-108).

Motivation and Hygiene Factors

Herzberg's theory is based on two factors: motivations and hygienes. The theory states that six intrinsic factors (motivations) impact job satisfaction: achievement, recognition, work itself, advancement, responsibility, and salary. Intrinsic factors have been found to have a direct impact on job satisfaction (Gruenberg, 1980). Extrinsic factors (hygienes) impact job

dissatisfaction: salary, supervision, company policy, working conditions, This study focused on the extrinsic factors of advancement (rank) and recognition (tenure) and the intrinsic factor of salary to STEM faculty explore job satisfaction in addition to the personal factors of gender, family status, whether or not there are children living in the home, the number of children living in the home, and work-family conflict.

Achievement

Herzberg et al.'s (1959) definition of achievement includes "...its opposite, failure, and the absence of achievement" (p. 45). Achievement can be identified by successfully completing a task, finding a solution to problems, showing proof of work, and seeing the results of one's work (Herzberg et al., 1959). Achievement was the most frequently appearing factor that related to what makes people happy in their jobs according to Herzberg's study.

Achievement in academia has been measured by faculty productivity, or the number of publications including journal articles, books, and presentations (August & Waltman, 2004; Hagedorn, 2000). There are many differences between male and female faculty productivity. August and Waltman (2004) found that achievement, measured by faculty productivity, was not significantly related to job satisfaction among female faculty. Female faculty members spend their time publishing books and articles, participating in public service, and taking on greater administrative responsibilities than their male counterparts (Tuckman, 1979, Sax et al., 2002). Men spend more time on research than teaching, which produces higher salaries (Bellas, 1993). Female professors often have lower research productivity, more interest in teaching, and more involvement in institutional service than do their male counterparts. Women also often tend to work part-time or teach in fields unlike the ones in which they were trained (Sax et al., 2002).

Recognition

Herzberg et al. (1959) identified recognition as an intrinsic factor that can positively affect job satisfaction. The types of recognition seen in academia include salary, tenure, rank, and support for scholarly activities such as research, teaching, and service (August & Waltman, 2004; Rosser, 2004b, Rosser, 2005). Olsen, Maple, and Stage (1995) found that female faculty members view recognition and institutional support as having a positive impact on job satisfaction.

Work Itself

Herzberg et al. (1959) also identified work itself as a factor that can positively impact job satisfaction. Herzberg et al. defined work itself as “The actual doing of the job or the tasks of the job as a source of good or bad feelings about it” (p. 48). Academics live by a motto: *research, teaching, and service*. Faculty have a wide variety of job responsibilities, encompassing those of teacher, advisor, researcher, committee member, editor, consultant, colleague, counselor, and friend, for which they may feel unprepared (O’Laughlin & Bischoff, 2001). O’Laughlin and Bischoff (2001) state that the nature of academic work often causes new faculty to feel overwhelmed and stretched beyond their physical and mental capacity which can lead to dissatisfaction. Malik (2011) found that work itself accounted for 63% of the variance in overall job satisfaction of university faculty members at one university.

Advancement

Herzberg et al. (1959) defines advancement as a change in the status or position of a faculty member. Herzberg et al. (1959) found that employees with higher rank jobs had higher levels of satisfaction. Hagedorn (2000) stated that advancement in academia relates to promotion of rank and achievement of tenure. Tack and Patitu (1992) identified rank and tenure as explanatory variables in faculty job satisfaction. Oshagbemi (1997) found that rank was a

significant factor of job satisfaction as compared to age and gender. Oshagbemi (1997) also reported that faculty with the rank of full professor reported greater job satisfaction than lower ranked faculty. In other research, tenured faculty reported higher job satisfaction than did faculty who were not tenured (Adkins et al., 2001; Bender & Heywood, 2006). Women also report being less satisfied than men with their promotions (Okpara et al., 2005).

Women tend to experience more stress about the tenure process relative to men. There are higher rates of women leaving academia than men, both pre- and post-tenure (Menges & Exum, 1983; Preston, 1994; Rausch, Ortiz, Douthitt, & Reed, 1989; Rothblum, 1988). Rausch, Ortiz, Douthitt, and Reed (1989) found that the voluntary departure before tenure review is two times greater for women than it is for men, with reasons cited for leaving that were related to fairness of the tenure process and clarity of tenure guidelines. In other studies, women reported relations with the personnel committee, unclear tenure criteria, and unclear information about the tenure review process (Austin & Rice, 1998; Johnsrud & Atwater, 1993) as barriers to success during the tenure process. These findings reveal that tenure status and the tenure process can affect satisfaction of faculty, especially women.

Merton (1968) has a theory of cumulative disadvantage in which he posits that relative to their male colleagues, female academic scientists are not as productive, are less likely to be mentored by highly regarded academics, have fewer resources of time and funds to conduct research, and have greater difficulty being involved in collegial networks. Other disadvantages include lower salaries, insufficient lab space, and fewer professional opportunities (Rosser, 2004b). All of these issues are likely to affect faculty satisfaction.

Valian (1998) also supports the theory of cumulative disadvantage. According to Valian (1998), "Like interest on capital, advantages accrue, and ... like interest on debt, disadvantages

also accumulate” (p. 3). Valian (2005) states that men have an easier time accumulating advantages than women when progressing through the research, tenure and promotion process. For example, men are more likely to teach small specialty courses than large introductory sections. Women are also expected to participate in more service projects and take on more student advisement responsibilities than are men. Valian’s (1998) research also supports the premise that cumulative disadvantage impedes women’s progress toward full participation in academia.

Many studies have found that tenured faculty report much higher job satisfaction than untenured faculty (Adkins et al., 2001; Bender & Heywood, 2006; Oshagbemi, 1997; Tack & Patitu, 1992). A huge disparity exists between the number of male and female faculty who achieve tenure. According to Wolfinger et al. (2008), being married and having young children both lessen the probability of women achieving tenure (Wolfinger et al., 2008). Although faculty are eligible for tenure review after six years of service, women typically seek tenure two to 10 years later (after earning the PhD) than men do (Hensel, 1991). This finding means that women are often seeking tenure during childbearing years, which increases stress and may decrease satisfaction. Many women believe that they must delay childbearing until they have reached tenure. Doing so puts them trying to conceive after the height of their fertility, which can cause problems such as birth defects, difficulty getting pregnant, or infertility (Armenti, 2004).

Responsibility

Responsibility is noted by Herzberg et al. (1959) as events that a person derives satisfaction from such as being given responsibility for his or her own work or the work of others, being given a new responsibility without any formal advancement, or being allowed to

work without supervision. Many studies have shown that responsibility and job satisfaction have a positive effect on each other (Bowen, 1980; Bowen & Radhakrishna, 1990; Herzberg et al., 1959; Padilla-Velez, 1993). However, Moxley (1977) reported that responsibility was related to job dissatisfaction. Conversely, other studies found that responsibility and job satisfaction have no effect on each other (Cano & Miller, 1992; Castillo, Conklin & Cano, 1998).

Salary

The salary differences between male and female faculty have been well documented (Bellas, 1993; Bellas, 1994; Korenman, & Neumark, 1992; Loh, 1996; Toutkoushian, 1998; Toutkoushian, Bellas, & Moore, 2007; Toutkoushian & Conley, 2005). Numerous studies have found that female faculty members earn less than male faculty members at the same levels of experience, education, and research productivity. According to Mooney, Knox, and Schacht (2010), women continue to fall behind men in wages, regardless of occupation or education level. The literature shows an unexplained wage difference in favor of men in both the general labor market (19.2%) and academia (6-8%), depending on institution type (Toutkoushian et al., 2007). The wage gap is even larger for mothers (Crittenden, 2001). The National Academy of Sciences found that women's salaries reached a plateau after 20 years, whereas men's salaries continued to increase during the entire course of their career making the disparity in salaries evident throughout a woman's career (Long, 2001). Although a consensus of a gender wage penalty exists in academia, no clear cut reason for the discrepancy has been proven.

Herzberg et al. (1959) noted salary as a determinant of satisfaction. Hagedorn (2000) found salary to be a very significant factor in regard to job satisfaction. Disparities between male and female salaries are evident in higher education and women continue to be dissatisfied with their pay. AAUP (2006) reported that women at the rank of full professor earns on average about 88% of what a man earns at the same rank. Female faculty at the rank of assistant or

associate professor makes about 93% of what her male counterpart earns (AAUP, 2006).

Overall, when all ranks and institutional types are pooled, women earn an average of 90% of what men earn (AAUP, 2006).

Factors Affecting Faculty Job Satisfaction

Job satisfaction can be measured by various factors. Personal factors such as gender, rank, tenure status, salary, family status, and work-family conflict can affect job satisfaction (Locke, 1976; Spector, 1997). This study will use the personal factors of gender, tenure status, family status and work-family conflict to view faculty job satisfaction. These factors have been identified in the literature as having an effect on job satisfaction.

No consensus has been reached as to the relationship between gender and job satisfaction, although many studies have been done on this topic (August & Waltman, 2004; Callister, 2006; Hagedorn, 2000; Okpara et al., 2005; Olsen, Maple, & Stage, 1995; Perna, 2001; Rosser, 2004b; Rosser, 2005; Seifert & Umbach, 2008; Tack & Patitu, 1992). Judge and Watanabe (1993) found that life satisfaction had an effect on job satisfaction, both positive and negative. Another study showed that mothers are more satisfied than fathers or nonmothers (Roxburgh, 1999). Rank has been shown to effect faculty job satisfaction positively (Eyupoglu & Saner, 2009; Holden & Black, 1996; Oshagbemi, 1997). Tenure status has been directly related to job satisfaction (Bender & Heywood, 2006; Oshagbemi, 1997). Tenured faculty tend to report higher job satisfaction than do untenured faculty. However, no consensus has been reached on the effect of family status on job satisfaction (Cetin, 2006; Crosby, 1983; Martin & Hanson, 1985). Work-family conflict can often lead to various negative outcomes such as job dissatisfaction (Howard, Donofrio, & Boles, 2004; O'Driscoll, Brough, & Kalliath, 2004;

Gordon, Whelan-Berry, & Hamilton, 2007; Boles, Howard, & Donofrio, 2001; Hill, Yang, Hawkins, & Ferris, 2004). This study will involve examination the relationship of these six factors in regards to STEM faculty job satisfaction.

Gender

Even though much research has been done on gender and job satisfaction, no clear cut consensus has been found (August & Waltman, 2004; Callister, 2006; Hagedorn, 2000; Perna, 2001; Rosser, 2004b; Rosser, 2005; Seifert & Umbach, 2008; Tack & Patitu, 1992). Three possible situations have been identified from previous research in regards to gender and job satisfaction. First, females have been found to be more satisfied than males (Clark, 1997; Hoppock, 1935;; Malik, 2011; Oshagbemi, 2000; Sloane & Williams, 2000). Second, males are more satisfied than females (Callister, 2006; Hagedorn, 1996; Olsen, Maple, & Stage, 1995; Perna, 2001; Rosser, 2004b; Rosser, 2005; Seifert & Umbach, 2008; Tack & Patitu, 1992). Third, no difference has been found between the level of satisfaction of male and females (Bedeian, Burke, & Moffett, 1988; Bedeian, Ferris, & Kacmar, 1992; Crosby, 1983; Smith & Plant, 1982; Warren & Johnson, 1995). This pattern of mixed findings is also true for research on higher education faculty. Even though some studies show that female faculty are more satisfied than male faculty (Clark, 1997; Okpara et al., 2005; Oshagbemi, 1997), most studies on job satisfaction among faculty have found that male faculty report higher overall job satisfaction (Callister, 2006; Olsen, et al. 1995; Tack & Patitu, 1992). Conversely, no significant differences were found by Ward and Sloane (2000) in overall satisfaction of male and female faculty.

According to Valian (1988), gender is not the simple classification of people into male or female sex, but rather is a system that segregates individuals into the social categories of

masculine and feminine. Valian (1998) explained that our gender schemas, what is understood to be masculine and feminine, guide us to expect different behaviors or roles for men and women. These expectations or stereotypes define “average” members of a group with the belief that men are instrumental, task-oriented, and competent while believing that women are nurturing, emotional, and care about relationships (Valian, 1998). Gender schemas also help explain how fathers and mothers negotiate their behavior and emotions, which results in women doing most of the housework and childcare in most cases (Hochschild & Machung, 1989). Previous studies show that women, regardless of employment status, are more involved in the childrearing and housework than are men (Robinson, 1988; Thompson & Walker, 1989). Most women take on the role of primary caregiver and nurturer in the family.

According to Valian (1998), gender schemas are, “hypotheses that we all share, men and women alike, about what it means to be male or female,” (p. 52). Gender schemas are instinctive gender-based beliefs and stereotypes rooted in the thoughts of both men and women. These schemas distort perceptions and evaluations, causing women to receive lower ratings than men. Valian (2005) posited that gender schemas are responsible for women’s slow progress in academia because of the way in which both male and female perceive and evaluate women. Women are undervalued in the professional world, which results in women earning less and being promoted slower than their male peers.

Valian (2005) noted that gender schemas are evident in the workplace when women are encouraged to take on additional unrecognized labor such as service or volunteer work. Gender schemas and other ingrained beliefs about race, class, and sexual orientation lead to unconscious and undetected bias against excluded groups, including women. This feminine culture creates a sense of obligation associated with volunteering; therefore, women faculties are often asked to take on more service projects than men, which can have an effect on job satisfaction.

A study headed by Nancy Hopkins reported that the low quantity of women in the sciences is due to gender discrimination (Massachusetts Institute of Technology [MIT], 1999). Evidence of this discrimination can be seen in the lower salaries, negligible decision opportunities, inferior resources, and general anonymity women face in comparison to men at the same stage of their careers. The study echoed Valian's findings that women are undervalued and overlooked for promotions despite their accomplishments.

Valian (1998) contended that cumulative disadvantage retards the advancement of women (regardless of their field or profession) and results in their underrepresentation in high-ranking positions. Cumulative advantage is the idea that many small advantages accumulate over time and add up to a larger advantage. Cumulative disadvantages work the same way. According to Grant, Kennelly, and Ward (2000),

The clockwork of the [academic] career is distinctly male. That is, it is built upon men's normative paths and assumes freedom from competing responsibilities, such as family, that generally affect women more than men. In such a system, women with families are cumulatively disadvantaged (p. 66).

The idea of cumulative disadvantage explains why even small disadvantages are important because they can grow into large disparities in salary, promotion, status, and rank over time which can have large impacts on career success and satisfaction (Valian, 1998).

Hochschild (1975) posited a theory that women base their career choices on familial obligations; consequently, it is the workplace structure rather than institutionalized discrimination is what bars women from professional advancement. This research finds organizational expectations (i.e., the requirement and/or expectation to travel or work late hours) as well as an inflexible workplace structure (rigid work hours/no on-site daycare), are what

impose barriers to women's advancement. A quote from the University of Miami President Donna Shalala illustrates this point (Committee on Science, Engineering, and Public Policy (COSEPUP), 2007):

When I started graduate school... in the late sixties, the chair of my department informed me that I would not be eligible for fellowships because I was a woman. ...he pointed to the data indicating that women didn't finish Ph. D. programs, and if they did, they interrupted their academic careers for marriage and children therefore didn't go back to catch up with their peers (p. xi).

When Shalala was later employed at a university where she was, "an excellent teacher and had published more than all of the other professors in the department put together," (COSEPUP, 2007, p. xi), her chair stated, "We have never tenured a women, and never will; a bad investment" (COSEPUP, 2007, p. xii). This type of overt discrimination may not be as evident today, but it still exists and has a definite impact on faculty satisfaction.

A sense of community is important to faculty satisfaction, although the organizational structure of the academy still seems to favor men. The opportunities and constraints facing male and female academic scientists are not the same (Fox, 1991). Female faculty tend to have heavier advising loads, serve on more committees, have different socialization/mentoring patterns, and have to cope with unequal research support and financial resources than male counterparts. They must also cope with lack of child care and work environments that are often chilly or hostile (Aisenberg & Harrington, 1988; Christman, 2003; Caplan, 1994; Collins, Chrisler, & Quina, 1998; Simeone, 1987). Women remain in the "outer circle" of science (Zuckerman, 1991) because science remains dominated by men, not only in numbers, but also in power, and influence. All of these factors can affect job satisfaction.

Rank

Many studies have found a positive relationship between rank and job satisfaction. Near, Rice and Hunt (1978) found rank to be one of the most powerful predictors of job satisfaction.

According to Oshagbemi (2003), rank is a reliable predictor of job satisfaction since employees at higher ranks tend to be more satisfied. Specifically, academics with higher ranks are more satisfied than those with a lower rank. Eyupoglu and Saner (2009) found that the facets of advancement, compensation, co-workers, and variety were found to be statistically significant with academic rank suggesting that extrinsic satisfaction is dependent on rank. Holden and Black (1996) found apparent differences in the job satisfaction of medical school faculty according to rank. Oshagbemi (1997) found that job satisfaction of university faculty was significantly dependent on rank and that overall job satisfaction increased as faculty progressed through academic ranks. However, Oshagbemi (1997) found that an interaction between rank and gender and that the effects of gender on job satisfaction are dependent on rank. Springfield-Scott (2000) showed that rank was positively associated with job satisfaction. In addition, Ssensanga and Garrett (2005) found that rank significantly predicted academic job satisfaction. According to Oshagbemi (1997), in comparison to age and gender, rank seems to be the most significant predictor of job satisfaction in academia.

Tenure Status

Tenure has been shown to play a role in faculty satisfaction, although no consensus has been reached on its effect. Some studies have shown that there is no relationship between tenure and faculty job satisfaction stating that nontenured faculty report the same level of satisfaction as tenured faculty (McKee, 1991; O'Reilly & Roberts, 1975). Springfield-Scott (2000) found that tenured faculty did not have greater job satisfaction than non tenured faculty. However, Bedeian, Ferris, and Kacmar (1992) found tenure to be a stable predictor of job satisfaction. Other studies have found that tenure has a positive effect on job satisfaction and that job satisfaction has been found to increase with tenure (Adkins et al., 2001; Bender & Heywood, 2006; Bertz & Judge, 1994; Oshagbemi, 1997; Oshagbemi, 2000; Tack & Patitu, 1992). Studies

have shown that tenured faculty report higher levels of satisfaction than untenured or pretenure faculty (Bender & Heywood, 2006; Nestor & Leary, 2000; Schuster & Finkelstein, 2006). The relationship between tenure and job satisfaction is different for males and females. For females, there is a significantly stronger negative correlation between job satisfaction and tenure than for males (Bedeian et al., 1992). Bozeman and Gaughan (2011) found that men faculty that who are tenured had higher job satisfaction than women and the untenured. There is a belief that tenured faculty have more freedom to teach what they want and a certain sense of job security which can lead to higher job satisfaction.

Historically, the workplace was designed in the nineteenth century as a male career model that forced women to choose between work and family and created a system governed by men (Crittenden, 2001; Hochschild, 1997; Williams, 2000). The realm of higher education is no different. The male-dominated governance of universities and colleges included the development of policies and practices associated with promotion and tenure, and the substantial number of women today who have chosen an academic career must seek tenure following procedures designed for men by men (Hochschild, 1975; Williams, 2000).

Salary

The relationship between salary and job satisfaction has been the focus of many studies (August & Waltman, 2004; Davis, 2001; Ehrenberg, Kasper, & Rees, 1991; Grace and Khalsa, 2003; Hagedorn, 1996; Tang & Talpade, 1999; Zhou & Volkwein, 2003). Many of these studies have found a positive relationship between salary and faculty job satisfaction (Ehrenberg, Kasper, & Rees, 1991; Zhou & Volkwein, 2003). However, Hagedorn (1996) found a negative correlation between salary determination based on gender and job satisfaction. Hagedorn (1996) also found that the size of wage differentials was a good predictor of job dissatisfaction in female faculty and that non-discriminatory salary compensation enhanced faculty satisfaction. Tang and

Talpade (2003) found that men were more satisfied with their pay and women were more satisfied with their co-workers, both of which affect job satisfaction. Tang and Talpade (2003) found no difference between faculty and staff in pay satisfaction, but did find differences between males and females.

In a study of academic scientists, Bender and Heywood (2006) found that the more highly educated are often more dissatisfied with their job because the highly educated tend to have higher pay expectations. Bender and Heywood (2006) also found a relationship of pay to job satisfaction was statistically significant in that job satisfaction increases when income is greater than predicted income. According to Bender and Heywood (2006), faculty report greater satisfaction when their own earnings are above the comparison earnings of other academics. Zhou and Volkwein (2003) found that faculty member's salary who is lower than their peers can affect their attitude and satisfaction.

Family Status

There has been no common conclusion on the relationship between family status and job satisfaction. Research has shown that for men having a partner was associated with higher publication rates (Sax et al., 2002). In regard to male faculty, marriage was found to have a positive effect (Zuckerman, 1991), and in some cases, no effect (Sonnert & Holton, 1995) on career attainment and satisfaction. A recent study of STEM faculty by Bozeman and Gaughan (2011) found that marriage has a positive effect on job satisfaction for both men and women. Some studies have shown marriage to have a positive effect on faculty job satisfaction (Cetin, 2006; Hagedorn, 2000; Leung, Siu, & Spector, 2000, Zuckerman, 1991). Hagedorn (2000) found that married faculty report higher job satisfaction than unmarried faculty. Yet, other

studies have shown that marriage has a negative effect on job satisfaction resulting in lower levels of satisfaction (Bryson, Bryson, and Johnson, 1978).

Some studies have found that job satisfaction of parents is higher than job satisfaction of people who are not parents (Bersoff & Crosby, 1984; Crosby, 1983; Martin & Hanson, 1985). Roxburgh (1999) found that the relationship between parental status and job satisfaction is different for men and women. For men, fathers report lower job satisfaction than mothers or men without children. For women, mothers tend to be more satisfied with their jobs than fathers or women without children. Other studies have documented balancing work and family as a significant source of stress which has a negative effect on job satisfaction (Finkel, Olswang, & She, 1994; Sorcinelli & Near, 1989). This leaves the question unanswered about the effect of family status on faculty job satisfaction. Because of the contradictions in the previously discussed literature, no consensus is evident on what effect family status has on STEM faculty satisfaction. This study sought to address these conflicting views and determine the effect of family status on the job satisfaction of STEM faculty.

Work-Family Conflict

Greenhaus and Beutell (1985) describes work/family conflict as, “a form of interrole conflict in which the role pressures from work and family domains are mutually incompatible in some respect” (p. 77). This can occur when the pressures of being a parent conflict with professional responsibilities. Many authors state that work-family conflict is related to job satisfaction (Bedeian, 1988; Bruck et al., 2002; Kossek & Ozeki, 1998; Netemeyer, Boles, & McMurrian, 1996). Ozeki (1998) state that work-family conflict and job satisfaction is one of

today's most widely researched topics. Grandey, Cordeiro, and Crouter (2005) found work-family conflict to be a significant predictor of job satisfaction. Many studies have found work-family conflict has a significantly negative effect on job satisfaction (Allen, Herst, Bruck, & Sutton, 2000; Bedeian, 1988; Casper, Martin, Buffardi, & Erdwins, 2002; Greenhaus & Beutell, 1985; Kossek and Ozeki, 1998; Netemeyer et al., 1996; Yildirim & Aycan, 2008). These studies found that as work-family conflict increases, job satisfaction decreases. Stress related to work-family conflict can cause health problems along with depression as well as poor morale, decreased productivity, and higher absenteeism and turnover (Duxbury & Higgins, 1994).

Work-family conflict is viewed as bi-directional, meaning work can interfere with family (WIF) and family can interfere with work (FIW). WIF is where the work domain affects the family realm and FIW is where the family domain affects the work realm. According to Frone (2003), more people tend to report FIW than WIF. In addition, various results have been found between the two dimensions of work-family conflict (WIF, FIW) and job satisfaction. Kossek and Ozeki (1998) found that WIF had a stronger correlation with job satisfaction than FIW. Bedeian et al. (1988) reported that WIF is positively correlated with job satisfaction. Many studies have found a negative relationship between WIF and job satisfaction (de Janasz & Behson, 2007; Kossek & Ozeki, 1998). Conversely, O'Driscoll, Illgen, and Hildreth (1992) found a weak positive correlation between FIW and job satisfaction, but yet also found that neither FIW or WIF accurately gauge work outcomes.

Three types of conflict between work and family roles exist (Greenhaus & Beutell, 1985). These conflicts can cause role strain. One type of work-family conflict is time-based conflict, which occurs when time pressures from one responsibility make it nearly impossible to meet the expectations of another responsibility. Time-based conflict is very much like Goode's (1960)

theory of role-strain, which states that an individual faces many role demands but cannot meet all of them. Another type of conflict is strain-based conflict, which occurs when the stress from one responsibility affects the person's performance in another responsibility. Strain-based conflict can be caused by ambiguity within the work role and poor leadership. The third is behavior-based conflict, which occurs when behaviors expected in one responsibility are incompatible with behaviors expected in another responsibility. Bruck, Allen, and Spector (2002) found that behavior-based conflict was significantly related to job satisfaction.

Many examples of work-family conflict are evident in academia and these forms of work-family conflict have implications for academicians (Greenhaus & Beutell, 1985). Time-based conflict is the most common because the average professor works approximately 55 hours per week (Hensel, 1991). When added to home duties, the hours of work-related (whether personal or professional) responsibilities can grow to 70 hours per week for a faculty member (Hensel, 1991). Mothers often bear the majority of family and household duties, which are in direct conflict with the responsibilities of being an academic (Bellas, 1997; Cole & Zuckerman, 1987; Sonnert & Holton, 1995; Williams, 2000). Academic women have an additional burden, because they are disproportionately more likely than nonacademic women to have highly educated spouses with demanding careers; consequently, the majority of the household duties and child rearing fall to the women (Hochschild & Machung, 1989; Press & Townley, 1998; Shelton & John, 1996).

Winslow (2005) states that even if both men and women participate in paid work, "...society's roles and expectations for women and men continue to differ" (p. 730). Lease (1999) found that female faculty members face more childrearing responsibilities than do male faculty and that female faculty members report they are responsible for more than 50% of the

household duties and tasks. Furthermore, a lack of fit exists between the responsibilities of motherhood and the responsibilities of being an academic (Williams, 2000). Previous research suggests that family obligations are incompatible with the pressures of being an academic such as long hours without interruptions throughout one's career (Williams, 2000; Drago, 2001; Grant, Kennelly, and Ward, 2000; Zuckerman, 1991).

Measurement of Job Satisfaction

There are many instruments available for measuring facets of job satisfaction. Five instruments were considered for this study: *Job Satisfaction/Dissatisfaction Scale (JS/DS)* (Wood, 1973); *Job Descriptive Index (JDI)* (Smith, Kendall, & Hulin, 1969); *Minnesota Satisfaction Questionnaire (MSQ)* (Weiss, Dawis, Lofquist, & England, 1966); *Global Job Satisfaction (GJS)* (Pond & Geyer, 1991); and *Job Satisfaction Survey (JSS)* (Spector, 1985).

Wood (1973) created the *Job Satisfaction/Dissatisfaction Scale (JS/DS)* designed to be used in an educational setting, specifically to study community college. The *JD/DS* has 10 facets that are assessed through 76 questions that ask about job satisfaction/dissatisfaction in an educational setting. The 76 questions are grouped according to Herzberg et al. (1959) motivators and hygienes. A five point Likert scale is used to score the *JS/DS* where 1 = "Very Dissatisfied" and 5 = "Very Satisfied." The scale was not chosen to be used in this study because it was considerably long (76 questions). A price for administering the instrument could not be found.

The *Job Descriptive Index (JDI)* was produced by Smith, Kendall, and Hulin (1969) for non-education workers. The *JDI* measures the level of satisfaction based on work, pay, promotion, supervision, and co-workers. The index is comprised of 72 items that assess five facets of job satisfaction: work itself, pay, promotions, supervisors, and co-workers. Subjects

are presented with questions under different headings and are asked to indicate with a Y if the item describes the feature in the question, N if the item does not describe the feature in the question, or ? if the cannot decide. The Y responses are scored +1 and the N responses are scored -1. The ? responses are scored 0. This instrument was not chosen because it considerably long (72 questions). The instrument is free of charge to researchers.

Minnesota Satisfaction Questionnaire was created by Weiss, Dawis, Lofquist, and England (1966) to be used in all types of work settings. The *MSQ* long form consists of 100 questions on 20 subscales facets measuring satisfaction: ability utilization; achievement; activity; advancement; authority; company policies and practices; compensation; co-workers; creativity; independence; moral values; recognition; responsibility; security; social service; social status; supervision-human relations; supervision-technical; variety; and working conditions. The short form is made up of 20 questions related to the 20 subscale facets and takes about five minutes to complete, but administering the long form is preferred if possible because it provides much more information. The *MSQ* is scored on a five point Likert scale with 1 being very dissatisfied and 5 being very satisfied. The *MSQ* costs \$1.65 per subject to administer the long form and \$1.10 per subject for the short form. This instrument was not chosen because the researcher thought the long form was too long and did not think the facets matched the dimensions that were to be measured in the study.

Global Job Satisfaction was created by Quinn and Shepard (1974) which was modified by Pond and Geyer (1991). The scale uses six items to measure an employee's general feelings in regard to his or her job without reference to any specific facets. The researcher did not choose this study because it was very short and did not address the objectives of the study. This

instrument also does not have the same technical quality as Spector's (1985) *Job Satisfaction Survey*. The instrument is free of charge.

Spector (1985) wrote the *Job Satisfaction Survey* which provides an overall satisfaction score based on nine subscale facets: pay; promotion; supervision; benefits; rewards; operating conditions; co-workers; work itself; and communication. The scale is scored on a six point Likert-type scale where 1 = "Disagree Very Much and 6 = "Agree Very Much". This scale was chosen for use in this study because it was fairly short, assessed areas that matched the focus of the study, and was free to administer. This instrument was found to have superior technical quality with an internal consistency of .91.

Measurement of Work-Family Conflict

There are many instruments available for measuring facets of job satisfaction, three of which were considered for this study: *Work-Family Conflict Scale* (Kopelman, Greenhaus, & Connolly, 1983); *Work-Family Conflict and Family-Work-Conflict Scale* (Netemeyer & Boles, 1996); and *Work-Family Conflict Scale* (Carlson, Kacmar, & Williams, 2000).

Kopelman, Greenhaus, and Connolly (1983) developed the *Work-Family Conflict Scale* uses 10 items to assess the extent of interrole conflict that occurs between work and family roles. Responses are obtained using a five point Likert-type scale where 1 = "Strongly Disagree" and 6 = "Strongly Agree." This instrument was not chosen because it was considered too short to ascertain the information necessary to answer the research questions and only measures general work to family conflict. This instrument does not measure family to work conflict, nor does it measure the three forms of work-family conflict (time-based, strain-based, and behavior-based).

Netemeyer, Boles, and McMurrian (1996) developed the *Work-Family Conflict and Family-Work Conflict Scale*, is an instrument that measures the bidirectional occurrence of work-family conflict and family-work conflict. This instrument uses two subscales to measure work-

family conflict and family-work conflict using five items for each subscale. The scale is scored on a seven point Likert-type scales where 1 = “Strongly Disagree” and 7 = “Strongly Agree.”

This instrument was not used in the current study because it does not measure the three forms of work-family conflict.

Carlson, Cacmar, and Williams (2000) developed the *Work-Family Conflict Scale* using different subscales for both work-family conflict and family-work conflict. This 18-item scale is scored on a six point Likert-type scale where 1 = “Disagree Very Much” and 6 = “Agree Very Much.” The subscales are separated into three distinct scales which measure the three forms of work-family conflict: time-based, strain-based, and behavior-based interference. This instrument has been considered the most in-depth multi-dimensional measure to date for work-family conflict. This instrument was chosen because it is bidirectional, had an acceptable length for a web-based survey, was applicable to the research questions, and measures the three forms of work-family conflict.

Summary

Little research has been done on the job satisfaction of university faculty because it is presumed by many researchers that there is a high level of satisfaction in the university setting (Pearson & Seiler, 1985). Even less research has been done on the satisfaction of STEM faculty. In addition, no conclusion has been drawn regarding the effect of gender, tenure status, rank, salary, family status, or work-family conflict on faculty job satisfaction. Faculty job satisfaction is important to a university because satisfied faculty produce more, have fewer turnovers, have higher retention rates, and less absenteeism. This study compared the job satisfaction of tenured and pre-tenure male and female faculty having the rank of Assistant Professor or higher in STEM disciplines. By examining job satisfaction of both male and female STEM faculty, this study is unique as compared to previous studies, many of which have only focused on female

faculty. The data in Table 1 summarizes the relationships that exist between job satisfaction and the potential explanatory variables in this study as reported in previous studies.

Table 1. Summary Table of References Addressing the Relationship to Job Satisfaction of the Potential Explanatory Variables Selected for this Study

Reference	Relationship of Potential Explanatory Variables to Job Satisfaction					
	Gender	Tenure	Family status	Work-family conflict	Rank	Salary
Adkins, Werbel, & Fahr, 2001	—	P	—	—	P	—
Aisenberg & Harrington, 1998	—	—	C-	—	—	—
August & Waltman, 2004	—	P	—	—	—	P
Bedeian, Burke, & Moffett, 1988	NR	—	NR	N	—	—
Bedeian, Ferris, & Kacmar, 1992	NR	N	—	—	—	—
Bender & Heywood, 2006	M	P	—	—	—	P
Bersoff & Crosby, 1984	M	—	R/C	—	—	—
Bertz & Judge, 1994	—	P	—	—	—	—
Bozeman & Gaughan, 2011	NR	P	R	—	—	—
Boles, Howard, & Donofrio, 2001	—	—	—	N	—	—
Bruck, Allen, & Spector, 2002	—	—	—	N	—	—
Bryson, Bryson, & Johnson, 1978	—	—	R-	—	—	—
Callister, 2006	M	—	—	—	—	—
Campbell, Converse, & Rodgers, 1976	M	—	R	—	—	—
Casper, Martin, Buffardi, & Erdwins, 2002	—	—	—	N	—	—
Cetin, 2006	—	—	R	—	—	—
Clark, 1997	F	—	—	—	—	—
Crosby, 1983	NR	—	R/C	—	—	—
Davis, 2001	—	—	—	—	—	P

(Table 1 continued)

Reference	Relationship of Potential Explanatory Variables to Job Satisfaction					
	Gender	Tenure	Family status	Work-family conflict	Rank	Salary
Duxbury & Higgins, 1994	—	—	—	N	—	—
Ehrenberg, Kasper, & Rees, 1991	—	—	—	—	—	P
Eyupoglu & Saner, 2009	—	—	—	—	P	—
Finkel, Olswang, & She, 1994	—	—	C-	—	—	—
Finkelstein & Schuster, 2001	—	N	—	—	—	—
Gordon, Whelan-Berry, & Hamilton, 2007	—	—	—	N	—	—
Grace & Khalsa, 2003	—	—	—	—	—	P
Greenglass, Pantony, & Burke, 1989	—	—	C-	—	—	—
Greenhaus & Beutell, 1985	—	—	—	N	—	—
Hagedorn, 1996	M	—	—	—	—	N
Hagedorn, 2000	M	—	R	—	—	—
Hill, Yang, Hawkins, & Ferris, 2004	—	—	R	N	—	—
Holden & Black, 1996	—	—	—	—	P	—
Hoppock, 1935	F	—	—	—	—	—
Howard, Donofrio, & Boles, 2004	—	—	—	N	—	—
Johnsrud & Atwater, 1993	—	N	—	—	—	—
Kossek & Ozeki, 1998	—	—	—	N	—	—
Leung, Siu, & Spector, 2000	—	—	R	—	—	—
Malik, 2011	F	—	—	—	—	—
Martin & Hanson, 1985	—	—	R/C	—	—	—
McKee, 1991	—	NR	—	—	—	—
Near, Rice, & Hunt, 1978	—	—	—	—	P	—
Nestor & Leary, 2000	—	P	—	—	—	—

(Table 1 continued)

Reference	Relationship of Potential Explanatory Variables to Job Satisfaction					
	Gender	Tenure	Family status	Work-family conflict	Rank	Salary
Netemeyer, Boles & McMurrian, 1996	—	—	—	N	—	—
O'Driscoll, Brough, & Kalliath, 2004	—	—	—	N	—	—
O'Reilly & Roberts, 1975	—	NR	—	—	—	—
Okapra, Squillace, & Erondy, 2005	F	P	—	—	P	—
Olsen, Maple, & Stage, 1995	M	—	—	—	—	—
Oshagbemi, 1997	F	P	—	—	P	P
Oshagbemi, 2000	F	P	—	—	P	—
Perna, 2001	M	—	—	—	—	—
Ropers-Huilman, 2000	M	—	—	—	—	—
Rosser, 2004	M	—	—	—	—	—
Rosser, 2005	M	—	—	—	—	—
Roxburgh, 1999	—	—	C-/C	—	—	—
Sabharwal & Corley, 2009	M	P	R	—	P	—
Sax, Hagedorn, Arredondo, & Dicrisi, 2002	M	—	R	—	—	—
Schuster & Finkelstein, 2006		P	—	—	—	—
Seifert & Umbach, 2008	M	—	—	—	—	—
Sloane & Ward, 2001	M	—	—	—	—	—
Sloane & Williams, 2000	F	—	—	—	—	—
Smith & Plant, 1982	NR	—	—	—	—	—
Sonnert & Holton, 1996	—	—	NR	—	—	—
Sorcinelli & Near, 1989	—	—	C-	—	—	—
Springfield-Scott, 2000	—	N	—	—	P	—
Ssensanga & Garrett, 2005	—	—	—	—	P	—

(Table 1 continued)

Reference	Relationship of Potential Explanatory Variables to Job Satisfaction					
	Gender	Tenure	Family status	Work-family conflict	Rank	Salary
Tack & Patitu, 1992	M	P	–	–	P	–
Tang & Talpade, 1999	–	–	–	–	–	P
Ward & Sloane, 2000	NR	–	–	–	–	–
Warren & Johnson, 1995		–	C-	–	–	–
Yildirim & Aycan, 2008	–	–	–	N	–	–
Zhou & Volkwein, 2003	N	P	–	–	P	P
Zuckerman, 1991	–	–	R	–	–	–

Note. “P” indicates a positive relationship with the dependent variable (job satisfaction). “N” indicates a negative relationship with the dependent variable (job satisfaction). “NR” indicates no relationship with the dependent variable (job satisfaction). “M” indicates males had higher job satisfaction. “F” indicates females had higher job satisfaction. “C” indicates having children in the home resulted in higher job satisfaction. “C-” indicates having children in the home resulted in lower job satisfaction. “R” indicates being in a relationship (married or otherwise) resulted in higher job satisfaction. “R-” indicates being in a relationship (married or otherwise) resulted in lower job satisfaction. A dash “–” indicates that the variable was not mentioned as being related to the dependent variable in the article.

CHAPTER 3: METHOD

This study explored the relationship between science, technology, engineering, and mathematics (STEM) faculty job satisfaction and six faculty variables, namely, gender, rank, tenure, salary, family status, and work-family conflict. The quantitative descriptive-correlational study was conducted with STEM faculty who were teaching at research universities in six states. The following sections describe the population, sample selection, instrumentation, data collection, data analysis, and human subject's research approval.

Population

The accessible population for this study was defined as all tenured and tenure-track STEM professorial rank faculty in STEM discipline departments at universities classified by Carnegie Classification of Institutions of Higher Education as RU/VH: Research University – very high research activity institutions in six states in the United States. To be classified as research very high, these institutions must grant doctorates and must have awarded at least 20 research doctoral degrees during the current year. The departments were chosen according to the National Science Foundation definition of STEM disciplines. These departments included Biological Sciences (molecular, cellular, organismal biology, and environmental science); Computer and Information Science and Engineering (fundamental computer science, computer and networking systems, and artificial intelligence); Engineering (agricultural, bioengineering, environmental systems, civil and mechanical systems, chemical and transport systems, industrial, electrical and communications systems, and design and manufacturing); Geosciences (geological, atmospheric and ocean sciences); and Mathematical and Physical Sciences (mathematics, astronomy, physics, statistics, chemistry and materials science).

The target population was defined as all tenured and tenure-track Assistant, Associate, and Full Professor rank STEM faculty at six public universities with Carnegie Classification

RU/VH: Research University –very high research activity institutions in the United States during the Fall, 2011. The frame of the accessible population was identified by university and department websites. The total number of faculty in the accessible population was approximately 2,210.

Sample Size

The sampling plan used in the study was a simple random sample from the established frame of the accessible population. The sample size was determined using Cochran's (1977) sample size determination formula for continuous data. The information included in the formula was a six point Likert-type response scale (in Spector's (1985) *Job Satisfaction Survey*), a 3% acceptable margin of error, a .05 *alpha* level, and an estimated standard deviation for the population of 1.00. According to the formula, the minimum required returned usable sample size was 118. The adjusted sample size required for a 40% response rate was 281. A simple random sample was drawn from the population frame using Urbaniak and Plous's (2008) random number generator, *Research Randomizer*.

According to Hair, Black, Babin, Anderson, and Tatham (2006), the desired number of observations for each independent variable is 15-20 with a minimum of five. This study had eight independent variables: gender, tenure, rank, salary, work-family conflict overall score, WIF, FIW and family status. It was decided *a priori* to include only those variables in the regression analysis that were significantly correlated with the dependent variable (job satisfaction) since there was minimal chance that variables that were not significantly correlated with the dependent variable would have a practically significant effect on the dependent variable. Although the literature review indicated that all independent variables had the potential to explain a portion of the variance in the dependent variables, it was determined that the minimum returned sample size of 118 was large enough to conduct a robust regression analysis since it was

likely that some of the independent variables would not be significantly correlated with the dependent variable, job satisfaction. The final sample size selected was 300 which was based on the anticipated response rate of approximately 40% which was considered to be realistic for this population. A 40% response would result in a returned sample size of 120 which slightly exceeds the minimum required sample size of 118, but would have allowed a big enough sample to ensure an adequate number of observations for the regression analysis.

Instrumentation

The instrumentation for this study consisted of an online three-part survey hosted by SurveyMonkey[®] (<http://www.surveymonkey.com>). The first part of the survey consisted of Spector's (1985) 36-item *Job Satisfaction Survey*. The second part of the survey consisted of Carlson et al.'s (2000) 18-item *Work-Family Conflict Scale*. The third part of the survey was comprised of six questions related to personal and demographic information. The research instrument can be found in Appendix B.

Job Satisfaction Survey

Spector's (1985) *Job Satisfaction Survey (JSS)* was used in this study to collect data about faculty job satisfaction. This survey uses 36 items to measure an employee's general reaction to their job. The nine subscales in the instrument measure the following sub-constructs: satisfaction with pay, promotion, supervision, benefits, rewards, operating procedures, co-workers, work itself, and communication. Faculty responded to the items using a six point summated Likert-type scale ranging from 1 for "Disagree Very Much" to 6 for "Agree Very Much." The ratings for the items in each sub-scale are summed to determine the sub-scale score. According to Spector (1985), sub-scale scores of 4 to 12 are dissatisfied, 12 to 16 are ambivalent, and 16 to 24 are satisfied. For the purpose of interpretation of this study, the researcher has operationally defined a score of 12 to be ambivalent and a score of 16 to be interpreted as

satisfied. The nine subscale scores are then summed to determine the overall job satisfaction score. Scores can range from 36 to 216. Higher scores indicate a higher degree of job satisfaction where score ranges of 36 to 108 indicate dissatisfaction, 108-144 indicate ambivalence, and 144 to 216 indicate satisfaction. For the purpose of interpretation of this study, the researcher has operationally defined a score of 108 as ambivalence and a score of 144 as satisfaction.

Spector's (1985) *Job Satisfaction Survey* was chosen as the instrument to be used to measure job satisfaction because it was considered to have an acceptable length (36 questions), it ascertained the information necessary to answer the research questions, and it was free to administer. The decision on the acceptable length of the scale for use in a web survey was based on the likelihood that a substantial number of faculty would terminate their response to the research survey if they perceived it would take too long to complete. The *Job Satisfaction Survey* was chosen over four other job satisfaction scales: *Job Satisfaction/Dissatisfaction Scale* (Wood, 1973) ; *Job Descriptive Index* (Smith, Kendall, & Hulin, 1969); *Minnesota Satisfaction Questionnaire* (Weiss, Dawis, Lofquist,& England, 1966); and *Global Job Satisfaction Scale* (Quinn & Shepard, . Wood's (1973) *Job Satisfaction/Dissatisfaction Scale* (76 questions), Smith, Kendall, and Hulin's (1969) *Job Descriptive Index* (72 questions), and Weiss, Dawis, Lofquist, and England's (1966) *Minnesota Satisfaction Scale* (100 questions) were not selected because they were too long, a factor that could have substantially reduced response rates. Although a short form exists for the *Minnesota Satisfaction Questionnaire* (Weiss, Dawis, Lofquist, & England, 1966) (20 items), it only measures extrinsic and intrinsic satisfaction in addition to overall job satisfaction. Pond and Geyer's (1991) *Global Job Satisfaction Scale* was

also considered, but minimal technical quality information could be found on this scale and there was a concern that it may be too short (eleven questions) to elicit a valid measure of job satisfaction. Another concern was that the *Global Job Satisfaction Scale* (Pond & Geyer, 1991) did not have sub-scales that measured job satisfaction sub-constructs.

Reliability of Job Satisfaction Survey

According to Spector (1985), all nine subscales of the *JSS* are positively interrelated. The internal consistencies for each subscale are: pay = .75, promotion = .73, supervision = .82, benefits = .73, contingent rewards = .76, operating procedures = .62, co-workers = .60, nature of work = .78, and communication = .71. Only two of the dimensions were below .70. The internal consistency of the *JSS* was reported at .91, which exceeds the widely accepted minimum standard of internal consistency of .70 (Nunnally, 1978). Test-retest reliability reflects the stability of the scale over time. Spector (1985) reports the test-retest reliability of .71 was due to a small sample and an 18 month time span, along with many intervening organizational changes and events including layoffs, reorganization, and new top administration. Spector speculates that the test-retest reliability would have been higher if these mitigating circumstances had not been present.

Validity of Job Satisfaction Survey

Concurrent validity is a measurement of how well a scale compares with another well regarded scale or evidence that it accurately measures the constructs of interest. When compared to the *Job Description Index (JDI)* (Smith, Kendall, & Hulin, 1969), the *JSS* has five scales (pay, promotion, supervisors, co-workers, nature of work) that correlate well with the corresponding scales of the *JDI*. Convergent validity was reported as .61 to .80 with the *JDI*, which is acceptable according to Hair et al. (2006) who suggest that .70 or higher suggests good reliability

and reliability between .60 and .70 is acceptable. The discriminant validity for the nine subscales was reported as moderate to low at .11 to .59 with a median of .35 (Spector, 1985). These small to moderate correlations among subscales shows that the *JSS* measures conceptually distinct facets of job satisfaction.

Work-Family Conflict Scale

This study used Carlson et al.'s (2000) *Work-Family Conflict Scale*. This survey uses 18 items to assess the interrole conflict that occurs between work and family. The 18 items are broken into 6 subscales to measure an individual's work-family conflict in two main areas: work interference with family (WIF) and family interference with work (FIW). The dimensions measured by the scale include time-based WIF and FIW, strain-based WIF and FIW, and behavior-based WIF and FIW. Responses are rated on a six point summated Likert-type scale ranging from 1 for "Disagree Very Much" to 6 for "Agree Very Much." Subscale scores are calculated using the mean of the items for each subscale. The six factor scores are then summed to calculate the overall score, with scores ranging from 6 to 36. Higher scores indicate a higher degree of work-family conflict. Scores can also be calculated in both directions to measure FIW and WIF. These scores are averaged to give a measurement for each direction.

Carlson et al.'s (2000) *Work-Family Conflict Scale* was chosen as the instrument to be used to measure work-family conflict because it is multi-dimensional, measures both work-family conflict and family-work conflict, was considered to be an acceptable length for a web survey (18 questions), it ascertained the information necessary to answer the research questions, measures the three forms of work-family conflict, and it was free to administer. The decision on the acceptable length of the scale for use in a web survey was based on the likelihood that a substantial number of faculty would terminate their response to the research survey if they perceived it would take too long to complete. Carlson et al.'s (2000) *Work-Family Conflict*

Scale was chosen over two other work-family conflict scales: Kopelman et al.'s (1983) *Work-Family Conflict Scale* and Netemeyer et al.'s (1996) *Work-Family Conflict and Family-Work Conflict Scale*. The *Work-Family Conflict Scale* (Kopelman et al., 1983) and the *Work-Family Conflict and Family-Work Conflict Scale* (Netemeyer et al., 1996) were considered too short to ascertain the information necessary to answer the research questions and only considers two of the three forms of work-family conflict (time-based, strain-based, and behavior-based) and only measures WIF. This instrument does not measure FIW. In addition, The *Work-Family Conflict Scale* (Kopelman et al., 1983) measures the extent of interrole conflict that occurs between work and family roles but does not measure the three forms of work-family conflict.

Reliability of Work-Family Conflict Scale

The coefficient alpha for this scale is .90, which exceeds the widely accepted minimum standard of internal consistency of .70 (Nunnally, 1978). The internal consistencies of each of the six dimensions exceeded the accepted minimum standard of .70: time-based WIF = .87; time-based FIW = .79; strain-based WIF = .85; strain-based FIW = .87; behavior-based WIF = .78; and behavior-based FIW = .85 (Carlson et al., 2000).

Validity of Work-Family Conflict Scale

Discriminant validity of the Work-Family Conflict Scale was established by examining the factor correlations from a confirmatory factor analysis. The discriminant validity of the items on the scale are: time-based WIF = .54; time-based FIW = .31; strain-based WIF = .24; behavior-based WIF = .54. Only two of the correlations (strain-based FIW = .76 and behavior-based FIW = .83) were above .60 indicating different constructs for the six factors of work-family conflict (Carlson et al., 2000). Convergent validity was shown by factor loadings that

ranged from .69 to .91, which is acceptable according to Hair, Black, Babin, Anderson, and Tatham (2006) who suggest that .70 or higher suggests good reliability and reliability between .60 and .70 is acceptable.

Reliability Procedures for the Study

Cronbach's *alpha* will be calculated for the *Job Satisfaction Survey* and the *Work-Family Conflict Scale* and the subscales in these instruments to assess the reliability (internal consistency) of the instruments. Cronbach's *alpha* assesses the mean correlation between each pair of items in the scale (Brace, Kemp & Snelgar, 2006). The *alpha* coefficients range between 0 and 1 and will be evaluated according to the guidelines established by Robinson, Shaver, and Wrightsman (1991), where “.80 or better = Exemplary, .70-.79 = Extensive, .60-.69 = Moderate, < .60 = Minimal”.

Procedures

Pilot Study Data Collection

Data collection for the pilot study consisted of an online survey hosted by SurveyMonkey. The instrument was comprised of 60 items: 36 items from Spector's (1985) *Job Satisfaction Survey*, 18 items from Carlson et al.'s (2000) *Work-Family Conflict Scale*, and 6 demographic items. The demographic items consisted of gender, family status (single, married, widowed, divorced, separated), whether or not there were children living in the home, the number of children living in the home, rank, and annual income range. A pre-screening question about tenure was at the beginning of the survey. In order to participate in the study and move forward in the survey, the participant had to state that they were tenured or tenure-track faculty. Participants who stated they were not tenure-track were not allowed to complete the survey.

For the pilot test, three rounds of emails were sent to a random sample of 80 faculty from one research university in the United States. The first round of emails was sent to the pilot

sample starting in the last week of July 2011. The second and third rounds were sent one week apart. The three rounds of emails resulted in 25 returned surveys after three weeks for a response rate of 31%. A low response rate was anticipated since most STEM faculty are on nine month contracts and were not working in the summer. An analysis of the data from this pilot test revealed that some revisions were needed in the on-line survey instrument and in the e-mail correspondence. Since the changes were substantial, it was also determined that a second pilot test was necessary.

The next round of emails was sent to a random pilot sample of 300 faculty at five randomly selected Carnegie Classification RU/VH: Research University –very high research activity institutions starting the second week in September 2011. This resulted in 39 returned surveys after three weeks for a response rate of 13%. The analyses of the data from the second pilot test revealed that several additional revisions were needed in the on-line survey instrument and in the e-mail correspondence. After the changes were made, it was determined that additional pilot testing was not necessary.

Data Collection

Data was collected during the months of October and November 2011. A pre-message email (Appendix F) was sent to the research sample two days before the first email survey request notifying them of the study. Three email survey requests (Appendices G, H, I) were sent one week apart and a telephone follow-up of a random sample of non-respondents was used to collect the data for this study. The three email survey requests explained the purpose of the study; explained why each professor was selected; informed the faculty members that their participation was voluntary; informed the faculty members that their information will remain confidential; contained the information needed for the faculty member to contact Louisiana State University's

Institutional Review Board if they have questions or concerns; and asked the professor to complete the survey on the web. The email messages contained a link to the survey.

The data collection for the study included a random sample of 300 faculty from six randomly selected universities from the Carnegie Classification RU/VH: Research University –very high research activity institutions. This round of data collection resulted in 90 returned surveys after three weeks which was a 76.2% response rate. Follow-up phone calls were made to a random sample of 35 faculty, of which 29 people responded, but only 28 completed the survey entirely. The usable response rate was 39.3% (118 out of 300).

Scoring of the *JSS*

The *Job Satisfaction Scale* (JSS) uses a Likert scale response system: 1 = Disagree very much, 2 = Disagree moderately, 3 = Disagree slightly, 4 = Agree slightly, 5 = Agree moderately, and 6 = Agree very much. There are 36 individual items. Of the 36 total items, 16 items are written in a positive direction and 20 items are written in a negative direction. Responses to items written in the positive direction are numbered 1 for the strongest disagreement and 6 for the strongest agreement. Items written in the negative direction are reverse scored. Negatively worded items use 1 for the strongest agreement and 6 for the strongest disagreement. The following items are negatively worded and therefore reverse scored: 2, 3, 5, 10, 11, 13, 15, 16, 18, 19, 20, 21, 23, 24, 26, 28, 29, 34, 35, 36. The individual item means are used to determine the item job satisfaction scores.

Individual item job satisfaction scores are interpreted as follows: 6.00-4.00 satisfied, 3.00-3.99 = ambivalent, and 1.00-2.99 = dissatisfied. Individual item means are summed to determine the subscale score. Spector (1985) interprets the sub-scale scores of 4 to 12 as dissatisfied, 12 to 16 as ambivalent, and 16 to 24 as satisfied. For the purpose of interpretation

of this study, the researcher has operationally defined a score of 12 to be dissatisfied and a score of 16 to be interpreted as ambivalent. The nine subscale scores are then summed to determine the overall job satisfaction score. Overall job satisfaction scores range from 36 to 216. Higher scores indicate a higher degree of job satisfaction where score ranges of 36 to 108 indicate dissatisfaction, 108-144 indicate ambivalence, and 144 to 216 indicate satisfaction. For the purpose of interpretation of this study, the researcher has operationally defined a score of 108 as ambivalence and a score of 144 as satisfied.

Data Analysis

Data was entered into IBM SPSS Statistics 19 for analysis. The *alpha* level for all statistical tests was set *a priori* at .05.

For research question 1, descriptive statistics were analyzed and reported to describe the sample characteristics and the research variables (job satisfaction, gender, rank, tenure, salary, family status, whether or not there are children living in the home, the number of children living in the home, and work-family conflict). Frequencies and percentages were calculated for categorical or nominal data (gender, rank, tenure, salary, family status, whether or not there were children living in the home, and number of children living in the home) and means and standard deviations were calculated for interval/ratio data (job satisfaction and work-family conflict).

For research question 2, inferential *t*-tests were conducted to determine if statistically significant differences existed in STEM faculty job satisfaction by selected variables (gender, tenure, and work-family conflict). One-way analysis of variance (ANOVA) was conducted to determine if statistically significant differences existed in STEM faculty job satisfaction by selected variables (rank, salary, and family status, whether or not there are children living in the home, and the number of children living in the home). Effect size for any statistically significant *t*-tests were interpreted using Cohen's *d* as recommended by Kotrlik, Williams and Jabor (2010).

Cohen's *d* effect size was interpreted using the following scale: .20 is a small effect size; .50 is a medium effect size; .80 is a large effect size. Effect size for any statistically significant ANOVAs was interpreted using Cohen's *f* as recommended by Kotrlik, Williams and Jabor (2010). Cohen's *f* effect size was interpreted using the following scale: .10 is a small effect size; .25 is a medium effect size; .40 is a large effect size.

Forward multiple regression analysis was used for research question 3 to determine if the potential explanatory variables (gender, rank, tenure, salary, family status, and work-family conflict) explained a substantial proportion of the variance in overall faculty job satisfaction. Effect size as indicated by the R^2 value was interpreted for any statistically significant explanatory variables using Cohen's (1988) effect size descriptors as recommended by Kotrlik, Williams and Jabor (2010). Cohen's (1988) effect size descriptors are as follows: .0196 is a small effect size; .1300 is a moderate effect size; and .2600 is a large effect size.

The Pearson product-moment correlation coefficient was used to for research question 4 to determine if a relationship existed between job satisfaction and FIW or WIF. The results were interpreted using Davis (1971) effect size descriptors. The Davis (1971) descriptors are as follows: .70 or higher coefficients indicate a very strong association; .50 to .69 coefficient indicate a substantial association; .30 to .49 coefficient indicate a moderate association; .10 to .29 coefficient indicate a low association; and .01 to .09 coefficient indicate a negligible association.

Informed Consent and Confidentiality

Confidentiality of the data and the participants' identify will be maintained indefinitely. All participants were assured of confidentiality in each of the email messages sent to the faculty members. Approval to conduct this study was obtained from the Louisiana State University Institutional Review Board for Human Subject Protection (LSU IRB) before the study was conducted. The study was granted exempt status approval #E5573 (Appendix A). The design of

the study presented minimal risk to participants and involved no experimental treatment of the subjects, either physically or mentally.

The LSU Institutional Review Board (IRB) procedure for the protection of human participants was followed. Although data may be sensitive regarding employment in the respective educational institution from which survey respondents were drawn, participant responses will be kept confidential in perpetuity. A numeric identifier was assigned to participants to ensure the confidentiality of responses throughout the research process. After all data was, the list that matched the numeric identifier with each faculty member's name and e-mail address was destroyed. Care was taken to ensure that all participants fully understood the nature of the study and that participation was voluntary. No sanctions were applied if participants declined or withdrew from the study. No information regarding participation of any individual was communicated to anyone where participants work.

Summary

The present study was an examination of job satisfaction of STEM faculty at six research universities in the United States. The information provided data about the effect of WIF and family status on job satisfaction. Chapter 3 defined the methods and procedures used to accomplish the goal of the proposed study, which was to explore factors that contribute to the job satisfaction of STEM faculty. A review of the population sample, data collection and analysis procedures, instrumentation and reliability and validity were described. Chapter 4 will present the data derived from the research study.

CHAPTER 4: FINDINGS

The purpose of this study was to assess the job satisfaction of STEM faculty at six research universities in the United States. In addition, the study sought to determine what factors may be related to job satisfaction of STEM faculty at six research universities in the United States. Out of the 300 faculty sampled, 118 agreed to participate in the study. Data collection took place in the Fall of 2011.

Preliminary Analyses

Prior to analysis, Cronbach's alpha was calculated for the Job Satisfaction Scale and subscales and for the Work-Family Conflict Scale and subscales to assess reliability (Table 2). The alpha coefficient of .91 indicates exemplary reliability according to the guidelines provided by Robinson, Shaver, and Wrightsman (1991), where “.80 or better = Exemplary, .70-.79 =

Table 2. Cronbach's *alpha* for the Job Satisfaction Scale and Subscales and for the Work-Family Conflict Scale and Subscales

Scale/Subscale	Number of items in scale	Cronbach's α
Job Satisfaction Scale	36	.91
Pay	4	.75
Promotion	4	.81
Supervision	4	.87
Benefits	4	.83
Rewards	4	.88
Operating Procedures	4	.62
Co-workers	4	.80
Work itself	4	.82
Communications	4	.86
Work-Family Conflict Scale	36	---
Time-based interference w/ family	3	.84
Time-based interference w/work	3	.92
Strain-based interference w/family	3	.92
Strain-based interference w/work	3	.96
Behavior-based interference w/family	3	.91
Behavior-interference w/work	3	.95
Work interference with family (WIF)	9	.85
Family interference with work (FIW)	9	.86

Extensive, .60-.69 = Moderate, < .60 = Minimal”. All *alpha* coefficients ranged from exemplary to extensive with the exception of the *alpha* coefficient for operating procedures which was found to be moderate. These data are presented in Table 2.

Inferential *t*-tests were used to compare the grand means of the Job Satisfaction Survey by wave (email vs. telephone follow-up) to determine if they came from the same population. These results are presented in Table 3. The results of the *t*-test for job satisfaction was not statistically significant, $t(55.65) = 0.63, p = .535$, which indicates there were no differences in

Table 3. Independent Samples *t*-Test of Job Satisfaction and Work Interference with Family Scale Means by Wave (Wave One (email) versus Wave Two (telephone follow-up of non-respondents))

Variable	Wave one (email)		Wave two (telephone follow-up)		$t(55.65)$	p
	m	sd	m	sd		
Job Satisfaction Scale mean	149.71	23.71	146.96	19.06	0.63	.535
Work Interference With Family	3.64	0.91	3.52	0.82	0.63	.531
Family Interference With Work	3.13	0.99	2.94	0.80	1.05	.298

Note. Equal variances were assumed for the Job Satisfaction and Work Interference with Family Scales. Equal variances were not assumed for the Family Interference with Work Scale.

job satisfaction by wave. The results of the *t*-test for work interference with family (WIF) was not statistically significant, $t(115) = 0.63, p = .531$, indicating there were no differences in work interference with family (WIF) by wave. The results of the *t*-test for family interference with work (FIW) was not statistically significant, $t(55.53) = 1.05, p = .298$, which indicates there were no differences in family interference with work by wave. Since there were not significant differences on these key variables, the researcher concluded that the respondents from the three emailing collections did not differ from those who responded during the follow-up phase;

therefore, it was also concluded that the respondents are representative of STEM faculty from RU/VH: Research University –very high research activity institutions in the United States.

Research Question One: Selected Characteristics of STEM Faculty

RQ1: What are selected characteristics of STEM faculty, namely, gender, rank, salary, family status (single, married, widowed, divorced, separated), whether or not there are children living in the home, the number of children living in the home, and tenure status (tenure-track or tenured)?

To assess research question 1, descriptive statistics were calculated for the following demographic variables: gender, rank, salary, family status (single, married, widowed, divorced, separated), whether or not there are children living in the home, the number of children living in the home, and tenure status (tenure-track or tenured). These data are presented in Table 4.

Slightly over half of the faculty were male (63, 53.8%) and over three-fourths were married (98, 83.8%). Over one-third of the respondents reported that they were an assistant professor (45, 38.5%) while slightly less than one-third indicated they were an associate professor or professor. The largest group of faculty reported salaries in the \$80,000 - \$100,000 range (40, 34.8%) while the second largest faculty salary grouping was the \$100,001-\$120,000 range (28, 24.3%). Over two-thirds of participants reported that they did have children living at home (81, 69.2%) and of those with children at home, the most frequently reported number of children living in the home was three (43, 36.8%). Over half of the respondents reported that they were tenured (71, 60.2%).

Table 4. Descriptive Statistics for the Demographic and Personal Characteristics of Science, Technology, Engineering and Math Faculty in the United States

Research variable	<i>n</i>	%
Gender		
Male	63	53.8
Female	<u>54</u>	<u>46.2</u>
Total	117	100.0
Academic rank		
Professor	38	32.5
Associate Professor	34	29.1
Assistant Professor	<u>45</u>	<u>38.4</u>
Total	117	100.0
Annual income		
\$40,000-60,000	4	3.5
\$60,001-80,000	23	20.0
\$80,001-100,000	40	34.9
\$100,001-120,000	28	24.3
\$120,001-140,000	15	13.0
\$140,001-160,000	2	1.7
\$180,001 or more	<u>3</u>	<u>2.6</u>
Total	115	100.0
Current family status		
Single	8	6.8
Married	98	83.8
Widowed	2	1.7
Divorced	6	5.1
Separated	<u>3</u>	<u>2.6</u>
Total	117	100.0
Children living in the faculty member's home		
Yes	81	69.2
No	<u>36</u>	<u>30.8</u>
Total	117	100.0
Number of children living in the faculty member's home		
0	36	30.8
1	27	23.1
2	43	36.7
3	<u>11</u>	<u>9.4</u>
Total	117	100.0

(Table 4 continued)

Research variable	<i>n</i>	%
Tenure status		
Tenured	71	60.2
Tenure-track	47	39.8
Total	118	100.0

Note. *N* = 118.

Research Question Two: Difference in Job Satisfaction of STEM Faculty by Selected Variables

RQ2: Does a difference exist in the job satisfaction of STEM faculty by gender, rank, tenure status, salary, family status, work-family conflict, children living in the home, and number of children living in the home?

Job Satisfaction of STEM Faculty

The job satisfaction of the STEM faculty was measured using the *Job Satisfaction Scale* (JSS). The faculty responded to 36 items using a Likert scale response system: 1 = Disagree very much, 2 = Disagree moderately, 3 = Disagree slightly, 4 = Agree slightly, 5 = Agree moderately, and 6 = Agree very much. Individual item job satisfaction scores are interpreted as follows: 6.00-4.00 satisfied, 3.00-3.99 = ambivalent, and 1.00-2.99 = dissatisfied. The ratings for the items in the subscales are summed to determine the subscale score. Spector (1985) interprets the sub-scale scores of 4 to 12 as dissatisfied, 12 to 16 as ambivalent, and 16 to 24 as satisfied. For the purpose of interpretation of this study, the researcher has operationally defined a score of 12 to be dissatisfied and a score of 16 to be interpreted as ambivalent. The nine subscale scores are then summed to determine the overall job satisfaction score. Means, standard deviations, and number of participants and the number of participants who responded to the items in the JSS are presented in Table 5. The mean subscale scores rather than the summated subscale scores are reported in Table 5 to make it easier for the reader to interpret the data. The summated means are presented in Table 6 and the summated means will be used in the statistical analysis.

Table 5. Means and Standard Deviations of the items in the Job Satisfaction Survey for STEM Faculty

Subscale^a/Statement	<i>N</i>	<i>M^c</i>	<i>SD</i>	<i>Satisfaction</i>
Pay	118	4.35	1.35	Satisfied
Raises are too few and far between. (R) ^b	118	5.06	1.13	Satisfied
I feel satisfied with my chances for salary increases.	118	4.31	1.51	Satisfied
I feel I am being paid a fair amount for the work I do.	118	4.27	1.49	Satisfied
I feel unappreciated by the organization when I think about what they pay me. (R) ^b	118	3.78	1.29	Ambivalent
Promotion	118	3.76	1.42	Ambivalent
Those who do well on the job stand a fair chance of being promoted.	118	4.58	1.45	Satisfied
People get ahead as fast here as they do in other places.	118	3.90	1.46	Ambivalent
I am satisfied with my chances for promotion.	118	3.68	1.27	Ambivalent
There really is too little chance for promotion on my job. (R) ^b	118	2.89	1.50	Dissatisfied
Supervision	118	4.22	1.24	Satisfied
I like my supervisor.	118	5.14	.87	Satisfied
My supervisor is unfair to me. (R) ^b	118	4.79	1.20	Satisfied
My supervisor is quite competent in doing his/her job.	118	3.88	1.50	Ambivalent
My supervisor shows too little interest in the feelings of subordinates. (R) ^b	118	3.08	1.41	Ambivalent
Benefits	118	4.08	1.33	Satisfied
There are benefits we do not have that we should have. (R) ^b	118	4.92	1.22	Satisfied
The benefits we receive are as good as most other organizations offer.	118	4.71	1.35	Satisfied
I am not satisfied with the benefits I receive. (R) ^b	118	3.55	1.42	Ambivalent
The benefit package we have is equitable. (R) ^b	118	3.15	1.35	Ambivalent
Reward	118	4.02	1.14	Satisfied
I don't feel my efforts are rewarded the way they should be. (R) ^b	118	5.08	.87	Satisfied
I do not feel that the work I do is appreciated. (R) ^b	118	4.77	1.25	Satisfied
When I do a good job, I receive the recognition for that I should receive.	118	4.19	1.34	Satisfied
There are few rewards for those who work here. (R) ^b	118	2.06	1.12	Dissatisfied

(Table 5 continued)

Subscale ^a /Statement	<i>N</i>	<i>M</i> ^c	<i>SD</i>	<i>Satisfaction</i>
Operating Procedures	118	4.29	1.06	Satisfied
I have too much paperwork. (R) ^b	118	5.33	.83	Satisfied
My efforts to do a good job are seldom blocked by red tape.	118	4.76	1.18	Satisfied
Many of the rules and procedures make doing a good job difficult. (R) ^b	118	4.61	1.18	Satisfied
I have too much to do at work. (R) ^b	118	2.47	1.07	Dissatisfied
Co-Worker	118	4.21	1.27	Satisfied
I enjoy my co-workers.	118	5.01	1.05	Satisfied
I like the people I work with.	118	4.12	1.34	Satisfied
I find I have to work harder at my job than I should because of the incompetence of other people. (R) ^b	118	3.90	1.36	Ambivalent
There is too much bickering and fighting at work. (R) ^b	118	3.81	1.33	Ambivalent
Work Itself	118	4.36	1.25	Satisfied
I feel a sense of pride in doing my work.	118	4.90	1.05	Satisfied
I sometimes feel my job is meaningless. (R) ^b	118	4.32	1.29	Satisfied
My job is enjoyable.	118	4.30	1.29	Satisfied
I like the things I do at work.	118	3.95	1.38	Ambivalent
Communication	118	4.16	1.36	Satisfied
Communication seems good within this organization.	118	4.39	1.45	Satisfied
Work assignments are often not fully explained. (R) ^b	118	4.30	1.29	Satisfied
I often do not know what is going on in with this organization. (R) ^b	118	4.01	1.30	Satisfied
The goals of the organization are not clear to me. (R) ^b	118	3.96	1.43	Ambivalent
Overall Job Satisfaction Scale:	118	4.14	.63	Satisfied

Note. For items in the *Job Satisfaction Scale* and for the total scale (scale interpretation ranges in parentheses): 1 = Disagree very much (1.00-1.49), 2 = Disagree moderately (1.50-2.49), 3 = Disagree slightly (2.50-3.49), 4 = Agree slightly (3.50-4.49), 5 = Agree moderately (4.50-5.49), and 6 = Agree very much (5.50-6.00). Individual subscale satisfaction scores are interpreted as follows: 6.00-4.00 satisfied, 3.00-3.99 = ambivalent, and 1.00-2.99 = dissatisfied.

^aSubscale names along with the subscale *N/M/SD/Satisfaction* are in bold font. ^b(R) means reversed scored item. ^cThe sub-scale means in this scale are averaged rather than summated to make it easier for the reader to interpret the data. The summated means are presented in Table 6 and the summated means will be used in the statistical analysis.

Job Satisfaction Subscales

The *JSS* consists of 9 subscales: Pay Satisfaction; Promotion Satisfaction; Supervision Satisfaction; Benefits Satisfaction; Reward Satisfaction; Operating Procedures; Co-Worker Satisfaction; Work Itself; and Communication Satisfaction. According to Spector (1985), summated overall subscale scores can be translated into: 4-12 = dissatisfied; 12-16 = ambivalent;

16-24 = satisfied. For the purpose of interpretation of this study, the researcher has operationally defined a score of 12 to be dissatisfied and a score of 16 to be interpreted as ambivalent. Faculty were satisfied with 8 of the 9 subscales (Table 5). The subscale that was rated the highest is “Work Itself,” ($M = 4.16$, $SD = 1.36$), meaning that faculty were satisfied with Work Itself. The only subscales that was in the “ambivalent” range: “Promotion Satisfaction,” ($M = 3.76$, $SD = 1.42$). The data for the *JSS* subscales is presented in Table 5.

The highest rated item was “I have too much paperwork,” which faculty indicated was ‘Agree moderately’ ($M = 5.33$, $SD = 0.83$) followed by the second highest rated item, “I like my supervisor,” to which they also indicated ‘Agree moderately’ ($M = 5.14$, $SD = 0.87$). The lowest rated item was “There are few rewards for those who work here,” to which faculty indicated ‘Disagree moderately’ ($M = 2.06$, $SD = 1.12$).

Pay Satisfaction

Scores on the pay satisfaction subscale could range from 4 – 24. The highest rated item on the pay satisfaction subscale was “Raises are too few and far between,” to which faculty indicated ‘Agree moderately’ ($M = 5.06$, $SD = 1.13$). The lowest rated item on the pay satisfaction subscale was “I feel unappreciated by the organization when I think about what they pay me,” to which they indicated ‘Agree slightly’ ($M = 3.78$, $SD = 1.29$). The mean for the subscale was 3.64 ($SD = 1.35$).

Promotion Satisfaction

Scores on the promotion satisfaction subscale could range from 4 – 24. The highest rated item on the promotion satisfaction subscale was “Those who do well on the job stand a fair chance of being promoted,” to which faculty indicated ‘Agree moderately’ ($M = 4.58$, $SD = 1.45$). The lowest rated item on the promotion satisfaction subscale was “There really is too little

chance for promotion on my job,” to which they indicated ‘Disagree slightly’ ($M = 2.89$, $SD = 1.50$). The mean for the subscale was 4.31 ($SD = 1.42$).

Supervision Satisfaction

Scores on the supervision satisfaction subscale could range from 4 – 24. The highest rated item on the supervision satisfaction subscale was “I like my supervisor,” to which faculty indicated ‘Agree moderately’ ($M = 5.14$, $SD = 0.87$). The lowest rated item on the supervision satisfaction subscale was “My supervisor shows too little interest in the feelings of subordinates,” to which they indicated ‘Disagree slightly’ ($M = 3.08$, $SD = 1.41$). The mean for the subscale was 4.70 ($SD = 1.24$).

Benefits Satisfaction

Scores on the benefits satisfaction subscale could range from 4 – 24. The highest rated item on the benefits satisfaction subscale was “There are benefits we do not have that we should have,” to which faculty indicated ‘Agree moderately’ ($M = 4.92$, $SD = 1.22$). The lowest rated item on the benefits satisfaction subscale was “The benefit package we have is equitable,” to which they indicated ‘Disagree slightly’ ($M = 3.15$, $SD = 1.35$). The mean for the subscale was 4.53 ($SD = 1.33$).

Reward Satisfaction

Scores on the reward satisfaction subscale could range from 4 – 24. The highest rated item on the reward satisfaction subscale was “I don’t feel my efforts are rewarded the way they should be,” to which faculty indicated ‘Agree moderately’ ($M = 5.08$, $SD = 0.87$). The lowest rated item on the reward satisfaction subscale was “There are few rewards for those who work here,” to which they indicated ‘Disagree moderately’ ($M = 2.06$, $SD = 1.12$). The mean for the subscale was 3.89 ($SD = 1.14$).

Operating Procedures

Scores on the operating procedures subscale could range from 4 – 24. The highest rated item on the operating procedures subscale was “I have too much paperwork,” to which faculty indicated ‘Agree moderately’ ($M = 5.33$, $SD = 0.83$). The lowest rated item on the operating procedures subscale was “I have too much to do at work,” to which they indicated ‘Disagree moderately’ ($M = 2.47$, $SD = 1.07$). The mean for the subscale was 2.69 ($SD = 1.06$).

Co-worker Satisfaction

Scores on the co-worker satisfaction subscale could range from 4 – 24. The highest rated item on the co-worker satisfaction subscale was “I enjoy my co-workers,” to which faculty indicated ‘Agree moderately’ ($M = 5.01$, $SD = 1.05$). The lowest rated item on the co-worker satisfaction subscale was “There is too much bickering and fighting at work,” to which they indicated ‘Disagree moderately’ ($M = 3.81$, $SD = 1.33$). The mean for the subscale was 4.55 ($SD = 1.27$).

Work Itself

Scores on the work itself subscale could range from 4 – 24. The highest rated item on the work itself subscale was “I feel a sense of pride in doing my work,” to which faculty indicated ‘Agree moderately’ ($M = 4.90$, $SD = 1.05$). The lowest rated item on the work itself subscale was “I like the things I do at work,” to which they indicated ‘Disagree moderately’ ($M = 3.95$, $SD = 1.38$). The mean for the subscale was 5.11 ($SD = 1.25$).

Communication Satisfaction

Scores on the communication satisfaction subscale could range from 4 – 24. The highest rated item on the communication satisfaction subscale was “Communication seems good within this organization,” to which faculty indicated ‘Agree slightly’ ($M = 4.39$, $SD = 1.45$). The lowest rated item on the communication satisfaction subscale was “The goals of the organization are not

clear to me,” to which they indicated ‘Disagree moderately’ ($M = 3.96$, $SD = 1.43$). The mean for the subscale was 3.81 ($SD = 1.36$).

Overall job Satisfaction

Overall job satisfaction scores range from 36 to 216. Higher scores indicate a higher degree of job satisfaction where score ranges of 36 to 108 indicate dissatisfaction, 108-144 indicate ambivalence, and 144 to 216 indicate satisfaction. For the purpose of interpretation of this study, the researcher has operationally defined a score of 108 as ambivalence and a score of 144 as satisfied. The sum of the overall job satisfaction score was 150.03 indicating “Satisfied.”

Results of job satisfaction subscale scores, overall score, and satisfaction level are presented in Table 6.

Table 6. Job Satisfaction Subscale Scores, Overall Score, and Satisfaction Level of STEM Faculty

Subscale	Summated Subscale Score	Satisfaction
Pay Satisfaction	17.49	Satisfied
Promotion Satisfaction	15.05	Ambivalent
Supervision Satisfaction	16.89	Satisfied
Benefits Satisfaction	16.33	Satisfied
Reward Satisfaction	16.10	Satisfied
Operating Procedures	17.17	Satisfied
Co-Worker Satisfaction	16.84	Satisfied
Work Itself	17.47	Satisfied
Communication Satisfaction	16.66	Satisfied
Overall Job Satisfaction Score	150.03	Satisfied

Note. Summated subscale satisfaction scores are interpreted as follows: 4.00-11.99 = dissatisfied, 12-15.99 = ambivalent, and 16-24 = satisfied. Overall job satisfaction scores are interpreted as follows: 36-107.99 = dissatisfaction; 108-143.99 = ambivalent; 144-216 = satisfied.

Analysis of Differences in STEM Faculty Job Satisfaction by Selected Variables

To assess research question two, five *t*-tests and three ANOVAs were conducted to determine if there were statistically significant differences in the job satisfaction of STEM faculty by demographic variables. For gender, tenure status, family status, work-family conflict,

and children living in the home, independent samples *t*-tests were conducted. For rank, salary, and the number of children living in the home, ANOVAs were conducted.

Prior to analysis, the assumptions of the independent sample *t*-test and the ANOVA were assessed. The assumptions of an independent sample *t*-test and an ANOVA are normality and homogeneity of variance. Homogeneity of variance was assessed with Levene's test and was found to be significant only for gender; therefore, equal variances were not assumed for gender.

Five inferential *t*-tests were used to compare the dependent variable, job satisfaction, with five independent variables: gender, tenure, family status, work-family conflict, and children living in the home. The *t*-test for differences on job satisfaction by gender indicated no differences on job satisfaction by gender and was not statistically significant, $t(109.98) = -0.11$, $p = .913$ (See Table 7). The *t*-test for differences on job satisfaction by tenure indicated no differences and was not statistically significant, $t(116) = -0.22$, $p = .820$ (see Table 8). The *t*-test for differences on job satisfaction by family status indicated no differences and was not statistically significant, $t(115) = -0.17$, $p = .863$ (see Table 9). The *t*-test for differences on job satisfaction by work-family conflict, was statistically significant, $t(106) = 2.46$, $p = .015$, indicating there were statistically significant differences on job satisfaction by work-family conflict (see Table 10). Participants with a low work family conflict reported statistically higher job satisfaction ($M = 153.86$, $SD = 21.77$) than participants with high work family conflict ($M = 143.08$, $SD = 23.72$). Effect size was interpreted using Cohen's *d* which is interpreted using the following scale: .20 is a small effect size; .50 is a medium effect size; .80 is a large effect size. An effect size of .47 indicates a small effect size for the relationship between the variables. The *t*-test for differences on job satisfaction by children living in the home (yes, no) indicated no differences and was not statistically significant, $t(115) = -1.22$, $p = .226$ (see Table 11).

Three ANOVAs were conducted using the dependent variable, job satisfaction, with three independent variables: rank, salary, and number of children living in the home. Salary was measured in ranges with \$20,000 increments from \$40,000 – 180,000. Some of these ranges had very few participants in them so some of them were collapsed into four final ranges: \$40,000 – 80,000; \$80,001 – 100,000; \$100,001 – 120,000; and \$120,001 – 180,000 or more. Children

Table 7. Independent Samples *t*-test of Job Satisfaction by Gender (Male vs. Female)

Variable	Male		Female		<i>t</i> (100.98)	<i>p</i>
	<i>m</i>	<i>sd</i>	<i>m</i>	<i>sd</i>		
Job satisfaction	149.03	20.21	149.50	25.31	-0.11	.913

Note. Equal variances not assumed are reported.

Table 8. Independent Samples *t*-test of Job Satisfaction by Tenure (Tenured vs. Tenure Track)

Variable	Tenured		Tenure track		<i>t</i> (116)	<i>p</i>
	<i>m</i>	<i>sd</i>	<i>m</i>	<i>sd</i>		
Job satisfaction	148.73	24.02	149.70	20.38	-0.23	.820

Table 9. Independent Samples *t*-test of Job Satisfaction by Family Status (Married vs. Not Married)

Variable	Married		Not married		<i>t</i> (115)	<i>p</i>
	<i>m</i>	<i>sd</i>	<i>m</i>	<i>sd</i>		
Job satisfaction	149.41	23.41	148.42	18.39	-0.17	.863

Table 10. Independent Samples *t*-Test of Job Satisfaction by Work-family Conflict (Low vs. High)

Variable	Low		High		<i>t</i> (106)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>sd</i>	<i>m</i>	<i>sd</i>			
Job satisfaction	153.86	21.77	143.08	23.72	2.46	.015	0.47

Note: Low = score 6 – 20.49, High = score of 20.50 – 36 on the Work-Family Conflict Scale

Table 11. Independent Samples *t*-Test of Job Satisfaction by Children in the Home (Yes vs. No)

Variable	Yes		No		<i>t</i> (106)	<i>p</i>
	<i>m</i>	<i>sd</i>	<i>m</i>	<i>sd</i>		
Job satisfaction	147.56	22.95	153.06	21.65	-1.22	.226

were measured from 0-7 or more, but none of the participants had more than 3 children. None of the ANOVAs were statistically significant. The ANOVA on job satisfaction by rank was not statistically significant, $F(2, 114) = 0.99, p = .375$, indicating there is no difference on job satisfaction by rank (see Table 12). The ANOVA on job satisfaction by salary was not statistically significant, $F(3, 111) = 0.87, p = .460$, indicating there is no difference on job satisfaction by salary (see Table 13). The ANOVA on job satisfaction by number of children in the household was not statistically significant, $F(3, 113) = 0.58, p = .629$, indicating there is no difference in job satisfaction by number of children living in the household (see Table 12).

Table 12. Analysis of Variance of Job Satisfaction by Rank

Source	<i>SS</i>	<i>MS</i>	<i>F</i> (2 _{df} , 114)	<i>p</i>
Rank				
Between	1009.89	504.95	0.99	.375
Error	58263.92	511.09		

Note. Rank = Faculty rank of Assistant, Associate, and Full Professor.

Table 13. Analysis of Variance of Job Satisfaction by Salary

Source	<i>SS</i>	<i>MS</i>	<i>F</i> (2 _{df} , 114)	<i>p</i>
Salary				
Between	1333.89	444.63	0.87	.460
Error	56907.11	512.68		

Note. Income was measured in four collapsed ranges: \$40,000 – 80,000, \$80,001 – 100,000; \$100,001 – 120,000; \$120,001 – 180,001 or more.

Table 14. ANOVA on Job Satisfaction by Number of Children

Source	<i>SS</i>	<i>MS</i>	<i>F</i> (2 _{df} , 114)	<i>p</i>
Number of children				
Between	900.16	300.05	0.58	.629
Error	58373.65	516.58		

Note. Number of children was measured by 0, 1, 2, 3. None of the faculty that responded had more than 3 children.

Research Question Three: Regression Analysis of Factors That May Explain Variance in Job Satisfaction of STEM Faculty

RQ3: Do selected factors explain the variance in the overall job satisfaction of STEM faculty?

To assess research question 3, one forward regression was conducted to determine if selected factors explain the variance in the overall job satisfaction of STEM faculty. The predictor variables included: gender, rank, salary, tenure status, salary, family status, whether or not there are children living in the home, how many children are living in the home, and work-family conflict. The outcome variable was job satisfaction.

In preliminary analysis, the assumptions of regression were assessed. Linearity was assessed with the Normal P-P Plot and the assumption was met. Homoscedasticity was assessed with a residuals plot, and the assumption was met. Normality was assessed with a histogram and residuals did not suggest a deviation from normality. The absence of multicollinearity was assessed through examination of the Variance Inflation Factors (VIF) for each independent variable; VIF values over 10.0 will suggest the presence of multicollinearity (Stevens, 2009). All of the VIF values were below 2.0 and the assumption was met.

The *Job Satisfaction Survey* mean was the dependent variable in this analysis. The possible independent variables were gender, rank, tenure, income, work-family conflict, family interference with work, work interference with family, and family status. The correlations between the possible independent variables and the dependent variable are presented in Table 15. The correlations of the demographic and personal variables with the *Job Satisfaction Survey* are shown in Table 15. Due to the large number of potential predictor variables, it had been determined a priori that only the variables that are significantly correlated with the job

Table 15. Correlations of Selected Variables with Job Satisfaction

Variable	<i>r</i>	<i>p</i>	<i>N</i>
Gender	.00^a	.495	115
Rank	.00^a	.498	115
Tenure	.03^a	.393	115
Income	.13^a	.080	115
Work-family conflict	-.20 ^b	.019	115
Family interference with work	-.23 ^b	.007	115
Work interference with family	-.30 ^c	.001	115
Family status	-.18 ^b	.025	115

Note. The effect sizes for the correlations were interpreted according to Cohen (1988).

^aSmall effect size. ^bModerate effect size. ^cLarge effect size. Those variables in bold font were not included in the multiple regression analysis since they were not significantly correlated with job satisfaction.

satisfaction score will be utilized in the regression analysis. The variables selected for use in the forward regression analysis are indicated by the ^b or ^c after the correlation coefficient.

The job satisfaction score had a low significant correlation with three variables: work-family conflict ($r = -.22$), family interference with work ($r = -.25$), and family status ($r = -.19$). The job satisfaction variable was moderately correlated with work interference with family ($r = -.30$). Therefore, these 4 variables were entered into the forward regression analysis. Additionally, no variable was included in the final regression model unless it explained at least 2.0% additional variance beyond the variance explained by other variables in the model. The additional guideline was imposed based on Cohen's (1988) rules for interpreting effect sizes for multiple regressions in which any R^2 below .0196 would have a small effect size. Although some variables were found to be significantly correlated with the dependent variable, they were removed from the final analysis because they explained less than 2.0 % of the variance in the dependent variable (Table 15).

A sample size of 115 is adequate for this regression analysis. According to Hair, Anderson, Tatham, and Black (2006), a minimum of 5 observations per variable is required, however 15-20 observations for each potential explanatory variable are desirable in a forward selection regression analysis. Based on the recommendations by Hair et al., a minimum of 40

observations was required (2 variables x 20 observations per variable). A sample size of 115 faculty members is adequate for the analysis.

The two variables entered into the forward multiple regression analysis combined to explain 13.6% of the variance in job satisfaction ($F = 8.03, p = .001$) (see Table 16). The variables in the final equation and amount of variance accounted for by each variable, by order of entry, were: work interference with family (9.2%, $R^2 = .09, p = .002$), and family status (additional 4.4%, cumulative $R^2 = .14, p = .025$). According to Cohen (1988), a regression model that explains 13.6% of the variance represents a medium effect size. The variables listed in the “Excluded variables” section of the Table 16 did not explain additional variance in job satisfaction.

Table 16. Forward Regression Analysis Model Explaining Variance in Job Satisfaction

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	7674.42	2	3837.21	8.03	.001
Residual	48751.64	102	477.96		
Total	56426.06	104			

Explanatory Variables in Model	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	<i>SE</i>	Change Statistics		
					<i>R</i> ² Change	<i>F</i> Change	<i>P</i> of <i>F</i> Change
Work interference with family	.30	.09	.08	22.30	.09	10.46	.002
Family status	.37	.14	.12	21.86	.04	5.17	.025

Excluded variables				
Variable	Beta In	<i>t</i>	<i>p</i>	Partial <i>r</i>
Gender	0.05	0.58	.561	0.06
Rank	0.02	0.26	.794	0.03
Tenure	0.08	0.81	.422	0.08
Income	0.13	1.45	.149	0.14
Work-family conflict	-0.06	-0.48	.635	-0.05
Family interference with work	-0.13	-1.20	.232	-0.12

Note. $N = 115$. Dependent variable: job satisfaction. *Job Satisfaction Survey*: 1 = Disagree very much, 2 = Disagree moderately, 3 = Disagree slightly, 4 = Agree slightly, 5 = Agree moderately, and 6 = Agree very much.

Research Question Four: Relationships Between Job Satisfaction and Two Variables - Family Interference With Work, and Work Interference with Family

RQ4: Does a relationship exist between job satisfaction and family interference with work (FIW) or work interference with family (WIF) means?

To assess research question 4, two Pearson product moment correlations were conducted to determine if there was a statistically significant relationship between job satisfaction and family interference with work (FIW) or work interference with family (WIF). Prior to analysis the assumptions of a Pearson product moment correlation, linearity and homoscedasticity, were assessed with the examination of scatter plots (Stevens, 2009). The assumptions were met.

The correlation between job satisfaction and work interference with family was statistically significant, $r = -.31, p = .001$, indicating that as work interference with family increases, job satisfaction decreases and vice versa. A correlation coefficient of $-.31$ indicated a moderate association between the two variables. The correlation between job satisfaction and family interference with work was statistically significant, $r = -.24, p = .009$, indicating that as family interference with work increases, job satisfaction decreases and vice versa. A correlation coefficient of $-.24$ indicates a low association between the two variables. The Davis (1971) descriptors were used to interpret effect size. The Davis (1971) descriptors are as follows: $.70$ or higher coefficients indicate a very strong association; $.50$ to $.69$ coefficient indicate a substantial association; $.30$ to $.49$ coefficient indicate a moderate association; $.10$ to $.29$ coefficient indicate a low association; and $.01$ to $.09$ coefficient indicate a negligible association. The results of the correlations are presented in Table 17.

Table 17. Pearson Product Moment Correlations between Job Satisfaction and Work Interference with Family and Family Interference with Work

Variables	r	p	Effect Size
Work interference with family	$-.31$	$.001$	Moderate association
Family interference with work	$-.24$	$.009$	Low association

CHAPTER 5: SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Summary

Purpose and Research Questions

The purpose of this study was to examine the job satisfaction of STEM faculty members at six research universities. Moreover, the study sought to examine the relationship between STEM faculty job satisfaction and selected factors: gender, rank, tenure, salary, family status, and work-family conflict. The research questions for the study are:

1. What are selected characteristics of STEM faculty, namely, gender, rank, salary, family status (single, married, widowed, divorced, separated), whether or not there are children living in the home, the number of children living in the home, and tenure status (tenure-track or tenured)?
2. Does a difference exist in the job satisfaction of STEM faculty by:
 - a. Gender
 - b. Rank (Assistant Professor, Associate Professor, Professor)
 - c. Tenure status (tenure-track or tenured)
 - d. Salary
 - e. family status (single, married, widowed, divorced, separated)
 - f. Work-family conflict (high vs. low)
 - g. Children living in the home (yes or no)
 - h. Number of children living in the home
3. Do selected factors explain the variance in the overall job satisfaction of STEM faculty?

The factors that will be used as the potential explanatory variables in this analysis are

gender, rank, salary, tenure status, salary, family status, whether or not there are children living in the home, number of children living in the home, and work-family conflict.

4. Does a relationship exist between job satisfaction and family interference with work (FIW) or work interference with family (WIF) means.

Procedures

The target population for this research study was all tenured and tenure-track STEM professorial rank faculty in STEM discipline departments at six RU/VH: very high research activity institutions in the United States. This was a population of 2,210 so a sample size of 281 was drawn with 118 being the required return sample size. The sample size was increased to 300 with an expected return of 120 to account for the correct number of participants to meet the minimum number of 15 observations according to Hair et al. (2006) for each of the 8 possible variables in the regression analysis.

Data collection took place during the months of October and November 2011. Three emails surveys were sent to the research sample which yielded 90 completed returned surveys. Follow-up phone calls were made to random sample of 35 non-respondents which yielded 29 additional completed returned surveys.

Participants were asked to complete a 60-item instrument which consisted of the 36 item *Job Satisfaction Survey* (Spector, 1985), the 18 item *Work-Family Conflict Scale* (Carlson et al., 2000) and 6 demographic questions. The survey was administered through SurveyMonkey and took about 10-15 minutes to complete.

Two pilot studies were conducted, both of which yielded poor return rates. One of the pilot studies found multiple errors in the instrument and messages sent to participants. These

errors and messages were corrected and edited before they were sent to the research sample. A pre-message was sent to the research sample two days before the survey opened.

This was a quantitative descriptive-correlational study which used SPSS to analyze data. Descriptive statistics, *t*-tests, ANOVA, multiple regression, correlations were used to analyze data. Effect size was interpreted for all statistical tests.

Findings

Research Question 1: Selected Characteristics of Respondents. Research Question 1 sought to answer the question: What are the characteristics of STEM faculty, namely, gender, rank, salary, family status (single, married, widowed, divorced, separated), whether or not there are children living in the home, the number of children living in the home, and tenure status (tenure-track or tenured)? Findings indicate that the majority of STEM faculty are male, married with three children living at home. The majority of these faculty are tenured at the rank of Professor with an annual income range of \$80,001 – 100,000.

Research Question 2: Difference in Job Satisfaction by selected demographic characteristics. Research Question 2 sought to answer the question: Does a difference exist in the job satisfaction of STEM faculty by: gender (male vs. female), rank (Assistant Professor, Associate Professor, Professor), Tenure status (tenure-track or tenured), Salary (40000 – 80000, 80001 – 100000, 100001 – 120000, 120001 – or more), family status (not married vs. married), Work-family conflict (high vs. low), Children living in the home (yes or no), and number of children living in the home (1, 2, 3, or 4)? The *t*-tests conducted on gender, tenure, family status, children living in the home found no differences in job satisfaction. However, the *t*-test conducted on work-family conflict was statistically significant. The ANOVAs conducted on rank, salary, and number of children living in the home found no differences in job satisfaction.

The *t*-test on differences on job satisfaction by gender was not statistically significant indicating no differences in job satisfaction by gender. The *t*-test on tenure was not statistically significant by tenure indicating no difference in job satisfaction by tenure. The *t*-test on family status was not statistically significant indicating no difference in job satisfaction by family status. The *t*-test on children living in the home was not statistically significant indicating no difference in job satisfaction by children living in the home. However, the *t*-test on work-family conflict was statistically significant indicating that there were statistically significant differences in job satisfaction by the level of work-family conflict. Participants with low work-family conflict reported statistically higher job satisfaction than participants with high work-family conflict.

None of the AVOVAs were statistically significant. The ANOVA on job satisfaction by rank was not statistically significant indicating no difference in job satisfaction by rank. The ANOVA on job satisfaction by salary was not statistically significant indicating no difference in job satisfaction by rank. The ANOVA on job satisfaction by the number of children living in the home was not statistically significant indicating no difference in job satisfaction by the number of children living in the home.

Research Question 3: Factors explaining overall variance. Research Question 3 sought to answer the question: Do selected factors explain the variance in the overall job satisfaction of STEM faculty? Forward regression was conducted to determine if selected factors (gender, rank, salary, tenure status, family status, whether or not there are children living in the home, number of children living in the home, and work-family conflict) explain the variance in overall job satisfaction of STEM faculty. WIF was entered in the first step, indicating that this is the strongest predictor of job satisfaction. Family status was entered into the second step, indicating it was the second strongest predictor of job satisfaction.

Research Question 4: Relationship between job satisfaction and FIW or WIF.

Research Question 4 sought to answer the question: Does a relationship exist between job satisfaction and family interference with work (FIW) or work interference with family (WIF) means? Two Pearson product moment correlations were conducted to determine if there was a statistically significant relationship between job satisfaction and FIW or WIF. The correlation between job satisfaction and WIF was statistically significant indicating that as WIF increases, job satisfaction decreases and vice versa. There was a medium strength relationship between these WIF and job satisfaction.

Conclusions

Conclusion One

The typical STEM faculty member in Carnegie Classification RU/VH: Research University –very high research activity institutions in the United States is male, married with 2-3 children living at home, and is tenured with an annual income range of \$80,001 – \$120,000. Just over one-third of the STEM faculty are assistant professors while slightly less than one-third of the STEM faculty are associate or full professors. According to AAUP (2011), STEM faculty in the United States is made up of 57% males and 43% females, which mirrors the findings of this study (53.8% males and 46.2% females). About 27% of male STEM faculty are full professors, 16% are Associate Professors, and 12.3% are Assistant Professors (AAUP, 2011).

Conclusion Two

Work-family conflict is negatively related to the job satisfaction of STEM faculty members in Carnegie Classification very high research activity institutions in the United States. Participants with low work-family conflict reported statistically significantly higher job satisfaction than participants with high work-family conflict. This conclusion for STEM faculty

is supported by Kossek and Ozeki who stated, “The relationship between job satisfaction and various work-family conflict measures is strong and negative across all samples: people with high levels of conflict tend to be less satisfied with their jobs” (pp. 141-144). Work-family conflict is negatively related to job satisfaction – as work-family conflict increases, STEM faculty job satisfaction decreases. Likewise, as work-family conflict decreases, job satisfaction increases.

Conclusion Three

Work interference with family (WIF) and family status explain a moderate amount of variance in the job satisfaction of STEM faculty member in Carnegie Classification RU/VH: Research University –very high research activity institutions in the United States.

WIF is the most significant predictor of job satisfaction of STEM faculty, accounting for 9.2% of the variance in STEM faculty job satisfaction. There is a negative relationship between WIF and job satisfaction shows that as WIF increases, job satisfaction decreases. There have been many studies that have also found a negative relationship between WIF and job satisfaction (de Janasz & Behson, 2007; Kossek & Ozeki, 1998). However, Bedeian et al. (1988) found that WIF is positively correlated with job satisfaction. In addition, Kossek and Ozeki (1998) found that WIF had a stronger correlation with job satisfaction than FIW.

Family status is the second strongest predictor of job satisfaction accounting for 4.4% of the variance in STEM faculty job satisfaction. No clear consensus has been reached as to the effect of family status on job satisfaction. Hagedorn (2002) found that married faculty had higher job satisfaction than unmarried faculty. Bozeman and Gaughan (2011) found that marriage had similar positive effects on job satisfaction for both males and females. Yet, other studies have shown that marriage has a negative effect on job satisfaction resulting in lower

levels of satisfaction (Bryson et al.,1978). Balancing work and family continues to be documented as a significant source of stress which has a negative effect on job satisfaction (Finkel, Olswang, & She, 1994; Sorcinelli & Near, 1989).

Although WIF and family status explain a moderate amount of the variance in job satisfaction of STEM faculty, there are obviously other factors that contribute to a large amount of variance that still need to be explored. **However, it is also concluded that much of the variance in STEM faculty job satisfaction remains unexplained.**

Conclusion Four

Gender, tenure, rank, salary, whether or not there were children living in the home, and the number of children living in the home do not explain the variance in job satisfaction of STEM faculty members in Carnegie Classification RU/VH: Research University –very high research activity institutions. As such, no differences were found in the job satisfaction of STEM faculty by gender, tenure, rank, salary, or children.

Gender

Although numerous studies have been done on gender and job satisfaction, no agreement has been reached as to the effect of gender on job satisfaction (August & Waltman, 2004; Callister, 2006; Hagedorn, 2000; Perna, 2001; Rosser, 2004; Rosser, 2005; Seifert & Umbach, 2008; Tack & Patitu, 1992). Bozeman and Gaughan (2010) found that gender explains only 1% of the variance in job satisfaction of STEM faculty.

Tenure

Some studies report that tenured faculty tend to experience higher levels of job satisfaction than untenured faculty (Bender & Heywood, 2006; Nestor & Leary, 2000; Schuster & Finkelstein, 2006). Another study by Finkelstein and Schuster (2001) report that nontenured

faculty were more satisfied than tenured faculty. Neither of these variables were significant in this study.

Rank

Many studies have reported full professors are more satisfied than junior faculty members where rank has been used to determine job satisfaction (Adkins, Werbel, & Fahr, 2001; Oshagbemi, 1997; Tack & Patitu, 1992). Higher ranked female faculty members experienced higher level of job satisfaction than their male peers (Okpara, Squillace, and Erondy, 2005). Another study found that faculty job satisfaction is dependent on rank (Eyupoglu and Saner, 2009). A positive relationship between rank and job satisfaction has been documented in many studies, but was not found to be significant in this study.

Salary

Many studies have focused on the relationship of salary and job satisfaction (August & Waltman, 2004; Davis, 2001; Ehrenberg, Kasper, & Rees, 1991; Grace and Khalsa, 2003; Hagedorn, 1996; Tang & Talpade, 1999; Zhou & Volkwein, 2003). Even with all the research that has been done, no clear cut agreement has been reached on this subject. Some studies state that salary has a positive effect on job satisfaction while others have found it has a negative effect Salary was not significant in the study (Ehrenberg, Kasper, & Rees, 1991; Hagedorn, 1996; Zhou & Volkwein, 2003). However, salary was not significant in this study.

Children

Whether or not the faculty have children living in the home nor the number of children living the home was significant in this study, although some studies have found that parents have higher job satisfaction than people who are not parents (Bersoff & Crosby, 1984; Crosby, 1983; Martin & Hanson, 1985). Other studies have documented balancing work and family as a

significant source of stress which has a negative effect on job satisfaction (Finkel, Olswang, & She, 1994; Sorcinelli & Near, 1989). Yet this was not evident in this study.

Implications and Recommendations

Implications

This study examined the job satisfaction of male and female faculty members at six research universities in STEM disciplines: science, technology, engineering, and/or mathematics. The study explored job satisfaction in regard to selected factors such as: gender, rank, salary, tenure, family status, whether or not there are children living in the home, the number of the children living in the home, and work-family conflict. One of the findings of this study was that participants that reported lower work-family conflict reported significantly higher job satisfaction than participants with high work-family conflict. This finding supports previous research by Kossek and Ozeki (1998) which found that high levels of work-family conflict caused lower levels of job satisfaction. This finding is also supported by another study by Bedeian, Burke, and Moffett (1988) which found that the interaction between work role stress and parent role demands affected job satisfaction.

The evidence of this study suggest that WIF is the strongest predictor of job satisfaction of STEM faculty. WIF is when the work domain interferes with the family realm and FIW is when the family domain interferes with the work realm. According to Frone (2003), more people experience FIW than WIF, but inconclusive results have been found between these two dimensions of work-family conflict and job satisfaction. The evidence from this study suggests a negative correlation of WIF and job satisfaction which supports the findings of other previous studies (de Janasz & Behson, 2007; Kossek & Ozeki, 1998). This is in direct opposition to the findings of Bedeian et al. (1988) which found that WIF is positively correlated with job

satisfaction. This results of this study also support research by Kossek and Ozeki (1998) which found that WIF had a stronger correlation with job satisfaction than FIW.

The results of this study suggest that family status is the second strongest predictor of job satisfaction among STEM faculty. This supports research that states that marriage has a positive effect on faculty job satisfaction (Cetin, 2006; Hagedorn, 2000; Leung, Siu, & Spector, 2000, Zuckerman, 1991). In addition, this finding supports research by Hagedorn (2000) which found married faculty to be experience higher job satisfaction than unmarried faculty.

Policy Recommendations

Based on this study, it can be recommended that institutions create policies that would be able to support faculty members in balancing their familial and professional obligations. Universities should implement family-friendly policies and programs to increase the supportiveness of the work-family culture which can actually reduce employees' work-family role conflict and have significant impact on a number of work, family and personal outcomes (Tang & Wadsworth, 2008). Some specific solutions include institutions providing daycare or preschool on campus so that faculty could be close to their children while at work with limited access to people outside the university should be limited to these facilities so that faculty could take advantage of this benefit (AAUP, 2001). Paid dependent leave is crucial for parents, both male and female, and should be available to faculty for the birth or adoption of a child, or to care for ailing parents (AAUP, 2001). This leave would help faculty during difficult or challenging times and would make the faculty feel valued by the institution.

Several suggestions can be made to help reduce the effect of family status and WIF on job satisfaction. Institutions should be make raising children and the tenure-track more compatible by being supportive of faculty members with families (The Collaborative on

Academic Careers in Higher Education, 2010). According to AAUP (2001), more institutions should also implement a policy that allows faculty to stop the tenure clock for one year which would provide an extension to the time required to achieve tenure. This one-year extension would not be counted as part of the tenure-probationary period. Faculty could be allowed to have a reduced appointment resulting in part-time employment or job-sharing with another faculty. This would allow faculty more time with children or could be used as a transition period from maternity leave. In addition, faculty could be allowed to modify duties which would result in a reduction of responsibilities for one semester without any reduction in pay (AAUP, 2001). Institutions should implement more flexible schedules which would allow faculty greater freedom in caring for children such as being able to attend school functions or to bring the child to medical appointments (AAUP, 2001). Faculty should be granted extended unpaid leave on top of the 12 weeks mandated by the Family Medical Leave Act (AAUP, 2001). This extra time could be used to care for children or other family members. Faculty could also use this time to seek personal medical care. Faculty should not be afraid to take advantage of family-oriented policies for fear of retaliation or discrimination for colleagues or administration (Gappa & Austin, 2010).

Institutions should be supportive of faculty members with families. Faculty should not be afraid to take advantage of family-oriented policies for fear of retaliation or discrimination by colleagues or administrators. It can also be suggested that the faculty members learn how to use balance in order to cope with stress induced by work or by familial obligations. In-house training on how to balance work and family would be an added benefit to faculty and all staff.

Recommendations for Future Research

In this study, WIF and family status only explained 13.6% of the variance in STEM faculty job satisfaction. Future studies could explore other factors that may explain more variance in STEM faculty job satisfaction such as ethnicity, age, number of years in position, organizational climate, institutional type, institutional policies, and the experiences of pre-tenure faculty. Future research might investigate other jobs satisfaction instruments along with other work-family conflict measures. Future research might include addressing specific policies that would help faculty members in the STEM disciplines experience less WIF. Future research might also explore other family statuses based on today's lifestyles such as same-sex couples.

Summary

This chapter wove together the various parts of the study into a discussion about job satisfaction of the participants. The research questions established a context for the incorporation of the data into four conclusions. An explanation of the possible implications of the study followed. Then, a series of possible recommendations for further study and policy recommendations were listed.

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APPENDIX A: LOUISIANA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD FOR PROTECTION OF HUMAN SUBJECTS APPROVAL LETTER

Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/ projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

-- Applicant, Please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at <http://www.lsu.edu/screeningmembers.shtml>

-- A Complete Application Includes All of the Following:

(A) Two copies of this completed form and two copies of part B thru E.

(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)

(C) Copies of all instruments to be used.

*If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.

(D) The consent form that you will use in the study (see part 3 for more information.)

(E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB. Training link: (<http://phrp.nihtraining.com/users/login.php>)

(F) IRB Security of Data Agreement: (<http://www.lsu.edu/irb/IRB%20Security%20of%20Data.pdf>)



Institutional Review Board
Dr. Robert Mathews, Chair
131 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu
lsu.edu/irb

1) Principal Investigator: Lisa Babin Verret

Rank: student

Dept: SHREWD

Ph: 225-335-2278

E-mail: lbabin2@lsu.edu

2) Co Investigator(s): please include department, rank, phone and e-mail for each

Dr. Joe Kotrlík, Professor
SHREWD
225-578-5753
kotrlík@lsu.edu

IRB# E5573 LSU Proposal #

☒ Complete Application

☒ Human Subjects Training

3) Project Title: Factors Affecting University STEM Faculty Job Satisfaction

Study Exempted By:

Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb
Exemption Expires: 7-27-2014

4) Proposal? (yes or no) No

If Yes, LSU Proposal Number

Also, if YES, either

☐ This application completely matches the scope of work in the grant

OR

☐ More IRB Applications will be filed later

5) Subject pool (e.g. Psychology students) STEM faculty

*Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the aged, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature

Lisa Babin Verret

Date

7/5/11

(no per signatures)

** I certify my responses are accurate and complete. If the project scope or design is later changes, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted ☒ Not Exempted ☐ Category/Paragraph 2

Reviewer Mathews

Signature

Robert Mathews

Date 7/28/11

APPENDIX B: RESEARCH INSTRUMENT

University STEM Faculty Job Satisfaction Survey

The respondents will select their responses from drop-down boxes for all items in the survey.

Please respond to the 62 items in this survey. You will be asked to respond to 36 statements about job satisfaction, 18 statements about work-family conflict, and 8 statements about personal demographic items. Please be sure to answer ALL items.

The focus of this study is to gain a better understanding of the factors that affect faculty job satisfaction. Your response should take 10-15 minutes and will in no way be associated with your name or institution. Completion of the survey is your indication of consent to voluntarily participate in this research. All responses will remain anonymous.

You were selected to represent STEM faculty at Research Universities. The identity of participants will remain confidential. The results of the study will be published, but no names or identifying information will be included in the publication. There are no known risks.

You may contact me at (225) 335-2278 or via email at lbabin2@lsu.edu if additional information is needed or you have problems with the instrument. If you have questions about subjects' rights or other concerns, you may contact Robert C. Mathews, LSU Institutional Review Board, at (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb.

1. By clicking this box I understand that my participation is completely voluntary and confidential.

☐

I agree

☐

I do not agree

2. Are you tenured?

☐

Yes

☐

No, but I am tenure-track

☐

No, but I am not tenure-track

Job Satisfaction Survey

The Job Satisfaction Survey (JSS) is a 36 item, nine facet scale to assess employee attitudes about the job and aspects of the job.

Please respond to ALL items.

Please respond to each of the following statements using this scale:

- 1 = Disagree very much
- 2 = Disagree moderately
- 3 = Disagree slightly
- 4 = Agree slightly
- 5 = Agree moderately
- 6 = Agree very much

Pay Satisfaction Items

The next 4 questions relate to your satisfaction with pay in regard to your current position.

3. I feel I am being paid a fair amount for the work I do.
4. Raises are too few and far between.
5. I feel unappreciated by the organization when I think about what they pay me.
6. I feel satisfied with my chances for salary increases.

Promotion Satisfaction Items

The next 4 questions relate to your satisfaction with promotion at your current job.

7. There is really too little chance for promotion on my job.
8. Those who do well on the job stand a fair chance of being promoted.
9. People get ahead as fast here as they do in other places.
10. I am satisfied with my chances for promotion.

Supervision Satisfaction Items

The next 4 items relate to satisfaction with supervision at your current position.

11. My supervisor is quite competent in doing his/her job.
12. My supervisor is unfair to me.
13. My supervisor shows too little interest in the feelings of subordinates.
14. I like my supervisor.

Benefits Satisfaction Items

The next 4 questions relate to your satisfaction with benefits at your current position.

15. I am not satisfied with the benefits I receive.
16. The benefits we receive are as good as most other organizations offer.
17. The benefit package we have is equitable.
18. There are benefits we do not have which we should have.

Reward Satisfaction Items

The next 4 questions relate the reward satisfaction at your current position.

- 19. When I do a good job, I receive the recognition for it that I should receive.
- 20. I do not feel that the work I do is appreciated.
- 21. There are few rewards for those who work here.
- 22. I don't feel my efforts are rewarded the way they should be.

Operating Procedure Items

The next 4 questions relate to your satisfaction with operating procedures at your current position.

- 23. Many of our rules and procedures make doing a good job difficult.
- 24. My efforts to do a good job are seldom blocked by red tape.
- 25. I have too much to do at work.
- 26. I have too much paperwork

Co-Worker Satisfaction Items

The next 4 questions relate to your satisfaction with your coworkers at your current position.

- 27. I like the people I work with.
- 28. I find I have to work harder at my job than I should because of the incompetence of other people.
- 29. I enjoy my co-workers.
- 30. There is too much bickering and fighting at work.

Work Itself Items

The next 4 questions relate to the work that you do in your current position.

- 31. I sometimes feel my job is meaningless.
- 32. I like doing the things I do at work.
- 33. I feel a sense of pride in doing my job.
- 34. My job is enjoyable.

Communication Satisfaction Items

The next 4 questions relate to your satisfaction with communication at your current position.

- 35. Communications seem good within this organization.
- 36. The goals of this organization are not clear to me.
- 37. I often feel that I do not know what is going on with the organization.
- 38. Work assignments are often not fully explained.

Work-Family Conflict Scale

The Work-Family Conflict Scale is a multidimensional scale of work-family conflict containing 18 items. These items measure time, strain, and behavior-based conflict in both directions (i.e., work-family and family-work conflict).

Please respond to ALL items.

Please respond to each of the following statements using this scale:

- 1 = Disagree very much
- 2 = Disagree moderately
- 3 = Disagree slightly
- 4 = Agree slightly
- 5 = Agree moderately
- 6 = Agree very much

Time-Based Conflict

Time-based conflict may occur when time devoted to one role makes it difficult to participate in another role.

39. Time-based work interference with family

My work keeps me from my family activities more than I would like,

The time I must devote to my job keeps me from participating equally in household responsibilities and activities.

I have to miss family activities due to the amount of time I must spend on work responsibilities.

40. Time-based family interference with work

The time I spend on family responsibilities often interferes with my work responsibilities.

The time I spend with my family often causes me not to spend time in activities at work that could be helpful to my career.

I have to miss work activities due to the amount of time I must spend on family responsibilities.

Strain-based Conflict

Strain-based conflict suggest that strain experienced in one role intrudes onto and interferes in participation in another role.

41. Strain-based work interference with family

When I get home from work I am often too frazzled to participate in family activities/responsibilities.

I am often so emotionally drained when I get home from work that it prevents me from contributing to my family.

Due to all the pressures at work, sometimes when I come home I am too stressed to do the things I enjoy.

42. Strain-based family interference with work

Due to stress at home, I am often preoccupied with family matters at work.

Because I am often stressed about family responsibilities, I have a hard time concentrating on my work.

Tension and anxiety from my family life often weaken my ability to do my job.

Behavior-based Interference

Behavior-based interference occurs when specific behaviors required in one role are incompatible with behavioral expectations in another role.

43. Behavior-based work interference with family

The problem-solving behaviors I use in my job are not effective in resolving problems at home.

Behavior that is effective and necessary for me at work would be counterproductive at home.

The behaviors I perform that make me effective at work do not help me to be a better parent or spouse.

44. Behavior-based family interference with work

The behaviors that work for me at home do not seem to be effective at work.

Behavior that is effective and necessary for me at home would be counterproductive at work.

The problem-solving behaviors that work for me at home do not seem to be as useful at my work.

Almost done! You are 90% done! Thank you for your participation. Please answer the following 6 demographic questions.

Demographics

45. Gender

☐ Male ☐ Female

46. What is your current family status?

- ☐ Single
- ☐ Married
- ☐ Widowed
- ☐ Divorced
- ☐ Separated

47. Do you have children living at home?

☐ Yes ☐ No

48. How many children do you have living at home?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7 or more

49. What is your rank?

- ☐ Professor
- ☐ Associate Professor
- ☐ Assistant Professor

50. What is your annual income?

- ☐ \$40,000 – 60,000
- ☐ \$60,001 – 80,000
- ☐ \$80,001 – 100,000
- ☐ \$100,001 – 120,000
- ☐ \$120,001 – 140, 000
- ☐ \$140,001 – 160,000
- ☐ \$160,001 – 180,000
- ☐ \$180,001 or more

Thank you! Your participation and input are greatly appreciated.

51. Please enter your email here if you would like to receive a copy of the final report.

APPENDIX C: FIRST EMAIL MESSAGE TO PILOT SAMPLE - EMAIL NOTIFICATION, INTRODUCTION AND INFORMED CONSENT

I am writing to request your participation in a study of factors affecting STEM faculty job satisfaction. Your response should take 15-20 minutes and will in no way be associated with your name or institution. Completion of the survey is your indication of consent to voluntarily participate in this research.

You were selected from STEM faculty at land-grant universities in six southern states to participate in this study. The list matching your name with your data will be destroyed as soon as data collection is complete. The identity of all participants will remain confidential unless disclosure is required by law. Results of the study may be published, but no names or identifying information will be included in the publication. There are no known risks.

You may contact me at (225) 335-2278 or via email at lbabin2@lsu.edu if additional information is needed or you have problems with the instrument. If you have questions about subjects' rights or other concerns, you may contact Robert C. Mathews, LSU Institutional Review Board, at (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb.

Here is a link to the survey:

<https://www.surveymonkey.com/s.aspx>

This link is uniquely tied to this survey and your email address. Please do not forward this message.

Thanks for your participation!

Lisa Babin Verret
School of Human Resource Education and Workforce Development
Louisiana State University
lbabin2@lsu.edu

APPENDIX D: SECOND EMAIL MESSAGE TO PILOT SAMPLE

A little over one week ago, I sent you an invitation to participate in an important research study concerning STEM faculty job satisfaction. Thank you so much if you have already completed the survey: Factors Affecting STEM Faculty Job Satisfaction. Please click on the link below to add your ideas to this faculty job satisfaction research study. It should only take 10-15 minutes of your time. I hope to add your voice to my results.

Thank you very much. Your participation is important to me and very much appreciated!

If you have any questions, I can be reached at 225-335-2278 or lbabin2@lsu.edu

Insert survey link here**

Lisa Babin Verret
School of Human Resource Education and Workforce Development
Louisiana State University
lbabin2@lsu.edu
(225) 335-2278

APPENDIX E: THIRD EMAIL MESSAGE TO PILOT SAMPLE

I have sent you two requests asking you to participate in a study of factors that affect Science, Technology, Engineering and Mathematics (STEM) faculty job satisfaction at research universities. As of today, I have not received your response.

Although faculty satisfaction has been studied, little research exists regarding STEM faculty job satisfaction. The results of this study may help faculty and administrators make organizational or other changes that may lead to increased STEM faculty job satisfaction.

I hope you will take 15-20 minutes to complete and return the survey today. If you have questions about the study, please contact me at 225-335-2278 or lbabin2@lsu.edu.

Thank you in advance for completing and returning the survey.

Here is a link to the survey:

<https://www.surveymonkey.com/s.aspx>

This link is uniquely tied to this survey and your email address. Please do not forward this message.

Thanks for your participation!

Lisa Babin Verret
Louisiana State University
lbabin2@lsu.edu
225-335-2278

APPENDIX F: PRE-MESSAGE SENT TO RESEARCH SAMPLE

I am writing to request that you take 12-15 minutes to respond to a survey addressing the relationship between work-family conflict and faculty job satisfaction at research universities.

As the economy has taken a toll on universities nationally, faculty job satisfaction and work-family issues have become more critical concerns for faculty everywhere. We need your perceptions about your job satisfaction and any work-family conflicts you are experiencing.

The survey will consist of 60 items:

36 Job satisfaction items

18 work-family conflict items

6 demographic items

I hope that you will be willing to respond. The survey will be emailed to you on Wednesday. Please let me know if you have questions.

Lisa Verret
Louisiana State University
lbabin2@lsu.edu

APPENDIX G: FIRST EMAIL MESSAGE TO RESEARCH SAMPLE

I am writing to request that you take 12-15 minutes to respond to a survey addressing the relationship between work-family conflict and faculty job satisfaction at research universities. As the economy has taken a toll on universities nationally, faculty job satisfaction and work-family issues have become more critical concerns for faculty everywhere. We need your perceptions about your job satisfaction and any work-family conflicts you are experiencing.

You have been selected to represent research faculty in U.S. universities. This survey includes a total of 60 items:

36 Job satisfaction items
18 work-family conflict items
6 demographic items

Thank you in advance for your assistance with this study. If you would like a summary of the results, please provide your e-mail address on the last page of the web survey.

Here is a link to the survey:

<https://www.surveymonkey.com/s.aspx>

Thanks for your participation!

Lisa Verret
Louisiana State University
lbabin2@lsu.edu

APPENDIX H: SECOND EMAIL MESSAGE TO RESEARCH SAMPLE

I contacted you last week and asked you to participate in a study of STEM faculty job satisfaction. As of today, I have not received your response.

This study is important because of the evidence from previous research that indicates that job satisfaction issues exist for many STEM faculty. This study is designed to probe how the work-family relationship relates to STEM faculty job satisfaction. The results will assist faculty and administrators to make adjustments or changes to improve STEM faculty job satisfaction.

As a fellow faculty member, I know you are busy. I am asking you to take 12-15 minutes of your time to complete this survey. The survey contains 60 questions in 3 areas: job satisfaction, work-family conflict, and demographics information. All faculty who respond and provide their e-mail address on the last page of the e-survey will receive a summary of the results. If you have any questions, please let me know.

Here is a link to the survey:

<https://www.surveymonkey.com/s.aspx>

THANK YOU!!!!

Lisa Verret
Louisiana State University
lbabin2@lsu.edu

Note: The results will not be associated with you or your institution in any way. The identity of participants will remain confidential. The results will be published but neither you nor your institution will be identifiable in any report of the results. Please call me at 225-335-2278 or at lbabin2@lsu.edu if you have questions. If you have questions about subjects' rights or other concerns, you may contact Robert C. Mathews, LSU Institutional Review Board, at (225) 578-8692, irb@lsu.edu, or www.lsu.edu/irb.

APPENDIX I: THIRD EMAIL MESSAGE TO RESEARCH SAMPLE

I have sent you two requests asking you to participate in a study of factors that affect Science, Technology, Engineering and Mathematics (STEM) faculty job satisfaction at research universities. As of today, I have not received your response. Your input is very valuable to my study.

Although faculty satisfaction has been studied, little research exists regarding STEM faculty job satisfaction. The results of this study may help faculty and administrators make organizational or other changes that may lead to increased STEM faculty job satisfaction.

I hope you will take 15-20 minutes to complete and return the survey today. If you have questions about the study, please contact me at 225-335-2278 or lbabin2@lsu.edu.

Thank you in advance for completing and returning the survey. If you would like a copy of the final report, please include your email address at the end of the survey.

Here is a link to the survey:

<https://www.surveymonkey.com/s.aspx>

This link is uniquely tied to this survey and your email address. Please do not forward this message.

Thanks for your participation!

Lisa Verret
Louisiana State University
lbabin2@lsu.edu

Note: The results will not be associated with you or your institution in any way. The identity of participants will remain confidential. The results will be published but neither you nor your institution will be identifiable in any report of the results. Please call me at 225-335-2278 or at lbabin2@lsu.edu if you have questions. If you have questions about subjects' rights or other concerns, you may contact Robert C. Mathews, LSU Institutional Review Board, at (225) 578-8692, irb@lsu.edu, or www.lsu.edu/irb.

VITA

Lisa Babin Verret, a native of Baton Rouge, Louisiana, graduated from Redemptorist High School in 1986. She completed her undergraduate education at Louisiana State University with a Bachelor of Arts in psychology and a minor in English literature in 1994. While an undergraduate at LSU, she was a member of Phi Mu sorority, the Pre-Law Club, and served as editor for the Arts & Sciences newsletter. She earned her Master of Public Administration in 1998 and her Education Specialist Certificate in Higher Education from LSU in 2010. She earned her Doctor of Philosophy in human resource education and workforce development from LSU in 2012.

She began her professional career as the Coordinator of Faculty Support at Baton Rouge Community College in 1998. She advanced to the position of Assistant to the Director of Human Resources in 2000. From there she transferred to the Department of Workforce, Corporate and Continuing Education to serve as the Interim Director of Community Education where she coordinated children's programs and senior citizens' programs.

She has also served as the Assistant to the Executive Director at Pennington Biomedical Research Center and the Education and Outreach Coordinator at Louisiana State University's Cain Center and has over 10 years of experience in higher education and service to the state of Louisiana.

She has been teaching at the University of Phoenix since January 2001 and was named Faculty of the Year in 2006, an honor bestowed to her by her students. She teaches incoming students in addition to numerous business management classes including Principles of Management and Strategic Planning. She also is currently serving as the Campus College Chair for the School of Business at the University of Phoenix, Baton Rouge Campus.

Professional memberships include the Baton Rouge chapter of the American Society for Training and Development and Greater Baton Rouge Society for Human Resource Management. She is a member of Gamma Sigma Delta Agriculture Honor Society. She also serves as the Faculty Advisor the Lambda Sigma Co-Chapter of Delta Mu Delta International Business Honor Society and is an Alumni of Alpha Eta Chapter of Phi Mu Sorority.

She has been married 10 years and has two step-children, who live with her and her husband in Baton Rouge. She enjoys spending time with family and friends.