

Full Length Research Paper

Examining motivation theory in higher education among tenured and non-tenured faculty: Scholarly activity and academic rank

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The pursuit of tenure in higher education is arguably the dominant focus of tenure track faculty throughout the United States' higher education environment, if not a world-wide phenomenon. By applying Vroom's Expectancy theory of motivation, this study intends to investigate the relationship between research productivity and motivation to conduct such activities at higher education institutes by examining the academic productions of tenured and not tenured faculty members. This study sought to confirm the need to further investigate the impact that long-term job security, in the form of tenure, has on faculty academic productivity in higher education. The present study used the data from the 2004 National Study of Postsecondary Faculty (NSOPF) survey which suggested that there was a significant difference in the number of academic activities among faculty of different ranks and tenure status, especially among full and associate professors, and associate professors and assistant professors, regardless of their tenure status. However, the difference was not significant among the non-tenured full and assistant rank faculty. This may suggest that overall, among the sample population of this study, tenured faculty members were more actively involved in presenting scholarly products.

Key words: Faculty motivation, Vroom's expectation theory, expectation, valance, National Study of Postsecondary Faculty (NSOPF), tenure, rank, academic production, scholarly activity, faculty activity, higher education, higher education institute.

INTRODUCTION

This study intends to investigate the relationship between research productivity and motivation to conduct such activities at higher education institutes by looking at the scholarly academic activities of tenured and not tenured faculty members, using Vroom's Expectancy theory by considering the motivational value of both external and internal rewards as they relate to increasing the

academic productivity of faculty. Vroom's theory is about mental processing regarding choices made in organizational behavior context and is based on an employee's belief; while the study of faculty motivation is not a new topic in the field of education (Darby and Newman, 2014; Hammond, 1994; Lee, 2014), unlike students' motivation factors, there has not been a

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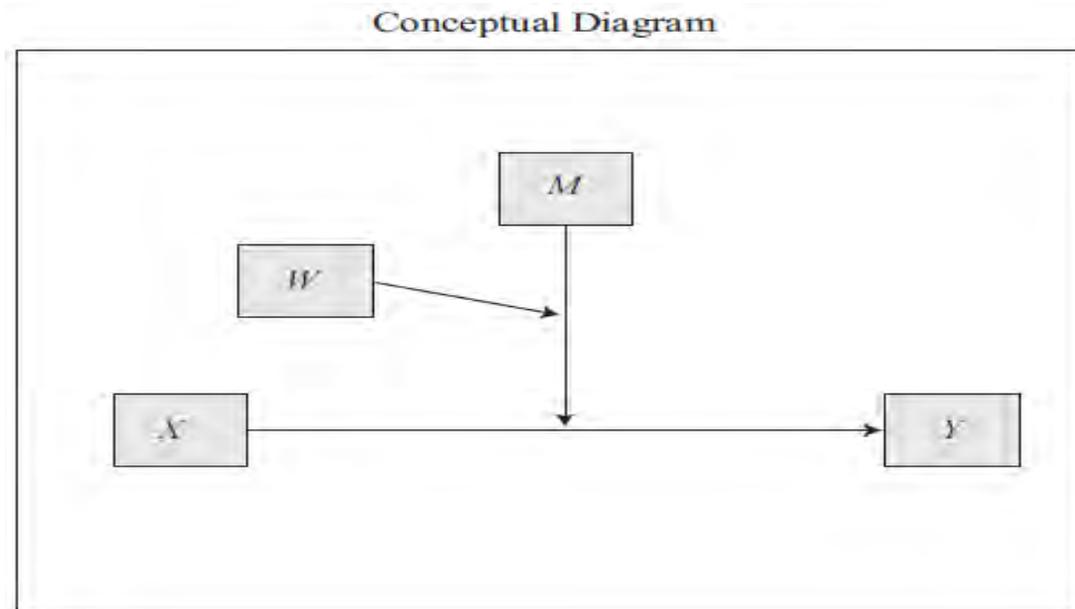


Figure 1. Moderation model of motivation and academic productivity as moderated by tenure and rank.

commensurate focus on the elements which affect faculty motivation at higher education institutes. Considering the above, a few studies have been conducted that have used Expectancy-Value Theory to examine the manner in which faculty engage in professional activities (Hardre et al., 2011; Hardre and Kollmann; 2012; Macdonald et al., 2014). Although these studies examined a wide variety of activities conducted by faculty, they all have illustrated that expectancy theory could be used to explain the actions and attitudes of faculty.

For instance, Hardre et al. (2011) investigated faculty motivational factors to conduct research across disciplines. They studied 781 faculty members at 28 research higher education institutes around the US and found that higher education institutes should promote and encourage faculty members' efforts since the support, which the institute provided was found to be the most significant predictor of productivity. Among the other findings of interest were (a) counting faculty productivity for tenure promotion is one of the strongest motivational factors among faculty, (b) institutions should invest in resources to provide the tools faculty need to conduct research and produce academically, (c) departmental support helped faculty gain self-efficacy and developed a "freedom of inquiry", and (d) that a heavy teaching load was the factor which negatively affected faculty's motivation to engage in research.

Chen et al. (2006) conducted a study using Vroom's 1964 expectancy theory to examine key factors that motivate faculty, using a total of 320 business faculty members at 10 universities. Their study concluded that both extrinsic and intrinsic motivation factors played equally in motivating faculty members to have higher

research productivity. In contrast to tenure track faculty, they found that tenured faculty members are motivated more by intrinsic motivational factors, whereas non-tenured faculty responded better to extrinsic motivators such as rewards and an easier possible path to tenured status. In sum, they state that "research productivity is positively correlated with tenure status and the percentage of work time allocated to research activities and negatively correlated with years in academic employment" (p.185). Consistent with the aforementioned studies this study will look into all these factors (faculty's status, departmental support, and reward systems) to compare results with this study.

Theoretical model

The main purpose of this study is to find out whether or not a correlation exists between faculty status, academic production and motivational level. It is human nature to engage in activities, in order to reach desired outcomes and refrain from actions which result in unwanted outcomes (Bandura, 1986).

Although the motivation behind doing or not doing an action is not an unknown black box to researchers, it does not have a unified answer among different disciplines. It can be said that whether or not responding to individual needs or wants in life (Needs), people engage in certain actions (Behavior), which are pursued to have needs satisfied (Satisfaction); the action is either repeated or will allow moving on to the next action (Feldman and Paulsen, 1999). The theory used to drive this study is shown in Figure 1. This model states

that motivation (X) is hypothesized to predict productivity (Y), instructional rank (W) and tenure status (W) may predict productivity and may moderate motivation's relationship with academic productivity. As alluded to earlier, motivation will be conceptualized as being either intrinsic or extrinsic as defined by Vroom's expectancy model. Based on the Mediation model (Hayes, 2017), this study hypothesizes that faculty will report motivation to engage in academic productivity as a function of either being motivated extrinsically (rank/tenure) or intrinsically (sense of fulfillment) and that having either acquired tenure and/or rank will moderate the effect of these sources of motivation. In other words, academic productivity is a function of how faculty members view motivation and that faculty tenure and rank status moderates the effect of motivation on academic productivity, leaving motivation alone to explain some of the impulses behind the academic production of faculty. Here it is hypothesized that while motivation can explain some of the productivity of faculty, the power motivation has is mediated by whether they have tenure or not. Recent studies have found that there is small correlation between research productivity and faculty self-actualization (Pasupathy and Siwatu, 2014), and other factors such as department ranking, advisors' productivity, and length at the new job will have significant effect on faculty academic production (Runyan et al., 2013). Faculty internal motivation factor is counted as one of the most important intrinsic motivational factors which are also considered to be investigated in this study. Other scholars such as Miller et al. (2013) found that faculty who had been at the higher education institute longer, produced fewer publications. Miller and colleagues also found that factors such as grants and university funding, as well as multi-institutional research collaboration, and number of graduate students advised were incentives that had positive effect on faculty's drive to produce research (p. 526).

Motivation theories

Here, selected motivation theories are examined. Earlier theories, that is, Maslow's hierarchy of needs (Maslow, 1943) and Alderfer's ERG theory (Alderfer, 1969) are examined in detail. Each theory is explained and the limitations on each of the above-mentioned theoretical frameworks are also taken into consideration to justify why Vroom's Expectancy Theory would be the fit theory for the present study. In the next section, Vroom's Expectancy Theory, which is the theoretical framework for this study, is discussed in detail.

Maslow's hierarchy of needs

Maslow's hierarchy of needs is a human motivation

theory in psychology proposed by Abraham Maslow. This theory was first brought up in his 1943 paper "A Theory of Human Motivation". Maslow has extended his idea to humans' innate curiosity; however, researchers and authors have criticized this theory as being irrelevant in most part of the world over the years (Jerome, 2013: 39). Yet Maslow's hierarchy of needs theory remains relevant in every sector of business today (Tischler, 1999; Boyatzis and McKee, 2006; Dailey et al., 2006; Subrahmanyam and Tomas Gomez-Arias, 2008). Maslow proposed a 5-level hierarchy, where the satisfaction of each lower level is a prerequisite to higher levels. According to Maslow's hierarchy of needs, there are the two lower order needs (physiological and safety needs) which in an institute may be linked to organizational culture. Every new organization may undergo this lower order stage to struggle with their basic survival needs. These needs are the strongest needs because if a person were deprived of all other needs, the physiological need would be the first needs a person would pursue in order to acquire satisfaction. On the second level of this hierarchy is the notion of safety, which is satisfied after all the physiological needs are met. The need for love, affection and belongingness is the third level of this hierarchy. This is when people develop a sense of belonging to the organization and are motivated to strive for the best since they are a part of a whole (Jerome, 2013: 42). This level corresponds with the formation of defined roles within an organization, getting it ready for the next level.

Needs for esteem is the fourth factor in Maslow's hierarchy which involve needs for both "self-esteem" and for the "esteem a person gets from others" along with feelings of respect from others as well as self-respect (Jerome, 2013: 41). In an organization, this is the role of human resource management (Botana and Neto, 2014; Jonas, 2016). Positive interaction of human resource management and the organizational culture is a factor which will result in employees' self-esteem and self-actualization. Such actualization can manifest in the employee's performance at work and ultimately the success of the organization. This stage marks or precedes the last level of this hierarchy, which is the need for self-actualization (Jerome, 2013: 42).

According to Maslow, the needs on the lower level must be fulfilled before the other needs are activated (Figure 2). However, here is where this theory encounters its limitations. In an organization, it does not make sense to assume employees would perform at their best during the day if they do not fulfill other needs such as going to the church on Sundays or not having adequate shelter. Thus, the theory is not backed by all researchers, and some even claim it makes the wrong prediction (Asgedom, 2017; Jones, 2014; Razak et al., 2017). Moreover, on other levels, Maslow's theory does not always clearly define what it is that a person wants when there is a need for self-actualization, not to argue the fact that Maslow fails to explain how self-actualization can

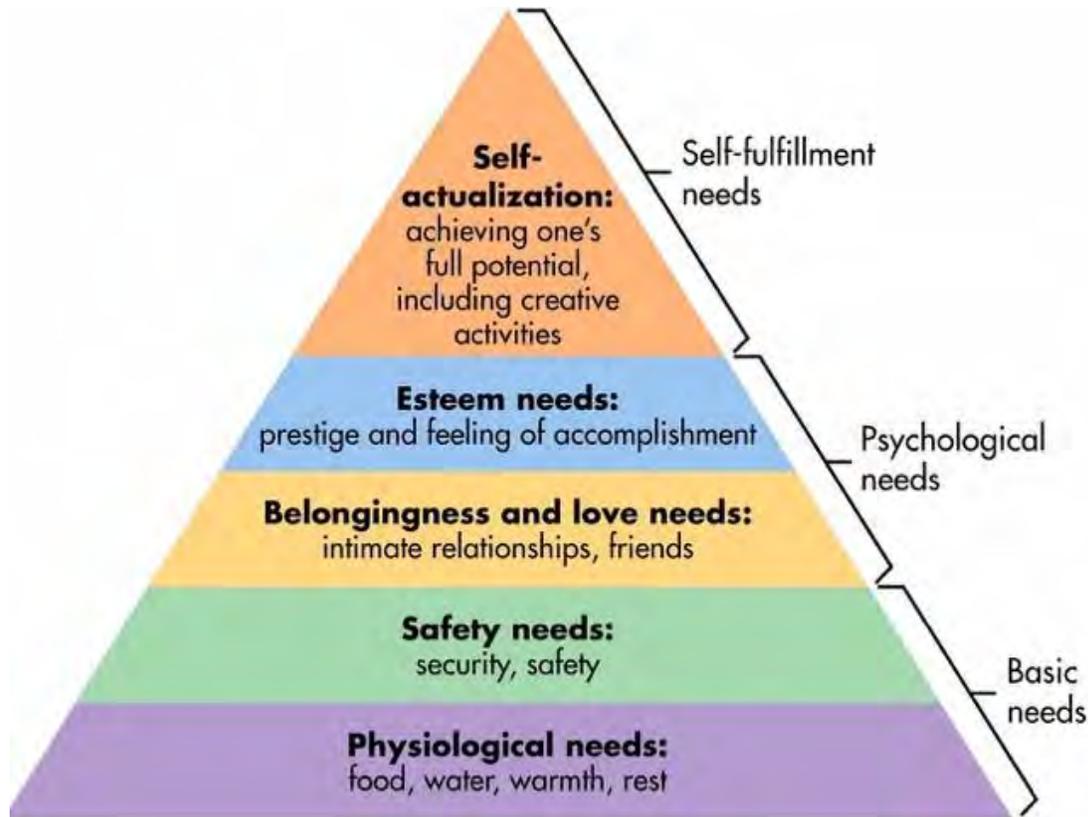


Figure 2. Maslow's hierarchy of needs model.

actually be a fundamental need or just something that can be done if one has the leisure time.

Alderfer's ERG theory

Similar to Maslow, Alderfer (1969) classifies needs into a hierarchy but condensed human needs to only three categories, which he first published in a 1969 article titled "An Empirical Test of a New Theory of Human Need." He believed that the more the needs on the higher levels are satisfied, human beings tend to pursue them more intensely. In this model, physical well-being (existence needs) needs are at the bottom of the hierarch providing basic material existence requirements. These needs cover the two levels of safety and physiological needs suggested in Maslow's model. The second level is relatedness needs, which is the desire people have to maintain important personal relationships.

These needs are satisfied by having social and status interactions, corresponding to Maslow's external component of esteem classification. Finally, the most concrete needs are growth needs, which determine development of competence and realization of one's potentials. Internal esteem and self-actualization impel a person to make creative or productive effects on himself

and the environment (e.g., to progress toward one's ideal self). This includes desires to be creative and productive, and to complete meaningful tasks. However, Alderfer's theory goes further than simplifying the number of needs and broadening what each cover. Alderfer believed that although a general order for pursuing needs should be in place, this order is not as fixed as Maslow's hierarchy and priorities for each individual may change, depending on that person's need and the situation she is in. Therefore, according to Alderfer, motivation can be triggered differently in people and can be from more than one level and different from Maslow, is not linear as it may skip from one level to the other. In addition, Alderfer acknowledged the fact that the importance of needs is different from person to person, that is, for some people growth might have higher value than relationships at certain stages of their lives. One difference Alderfer's theory has from Maslow's hierarchy of needs is that Alderfer's model has a "frustration-regression" element which allows individuals to go back to pursuing lower level needs again if needs remain unsatisfied at one of the higher levels (Figure 3).

Taking into consideration all the factors mentioned above, Alderfer's model suggests that, similar to social choices people make every day, in the workplace not everyone is motivated by the same stimuli and not

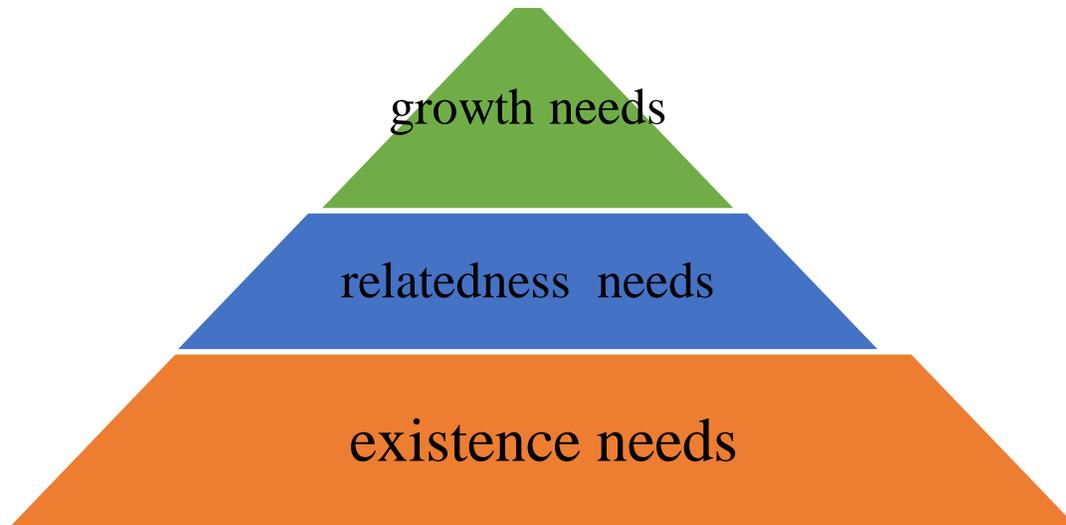


Figure 3. Alderfer's ERG theory.

everyone's hierarchy would look the same. As a result, individuals' needs probably mirror the organizational hierarchy to a certain extent. Meaning, that people who are in management positions or leadership roles would be more likely to be motivated by self-actualization/growth needs than existence needs. It is the role of the managers, administrative, and leaders at any workplace to recognize their employees' multiple simultaneous needs since focusing solely on one need at a time will not motivate people. The frustration-regression principle impacts workplace motivation.

Moreover, in the workplace, if employees are not provided with desirable growth opportunities by their management, they may regress to relatedness needs, and socialize more with co-workers. Therefore, it is again the role of the manager to notice such conditions in their onset, and take the appropriate steps to satisfy the frustrated needs of the employees until they are able to pursue growth again and ultimately contribute to the success of the organization.

Vroom's expectancy theory

Vroom's expectancy theory (1964) is different from other motivation theories such as Maslow's and Alderfer's, in the sense that Vroom's theory provides the cognitive process of variables according to individual differences in the work place rather than mentioning what exactly motivates members of an organization. Moreover, Vroom (1964) was the first scholar who developed an expectancy theory with direct implications in workplace settings based on employees' beliefs. In any work environment, people believe that there is a direct correlation between the effort they put into performing

their best at work, the reward they receive from their hard work, and their final performance. As educational leaders who hold administrative positions, Vroom's expectancy theory can best explain motivating factors affecting employees by taking into account three main factors of "effort-to-performance expectancy, performance-to-reward expectancy, and reward valences" (Lunenburg, 2011a).

This practical viewpoint is based on four assumptions. One assumption describes people's motivation to joining an organization based on how they react to the organization considering their needs, motivations, and past experience. A second assumption focuses on individual conscious choices, which are people's own expectancy calculations. The third assumption is that each individual demand different things from the organization, such as job security and higher monetary compensation. The last assumption of Vroom is that people have the tenancy to pick alternative choices among available options in order to increase their personal outcomes. Vroom believed that motivation is the amount a person will be driven to do or not to do something depending on the situation they find themselves in. To sum up, Vroom's Expectancy Theory has three key factors: Expectancy (individual's estimate of the results of the job-related effort), Instrumentality (the extent an achieved task will lead to expected result(s)), and Valance (the reward of the archived task) (Vroom, 1964) (Figure 4).

Expectancy is the likelihood that a person will succeed on a given task, and it is associated with the risk that is intertwined with carrying out the task. If the task involves higher risk of failure, there will be lower motivation to invest in no chance of accomplishment. Surprisingly, the same will happen if the tasks involve low risk of failure. In

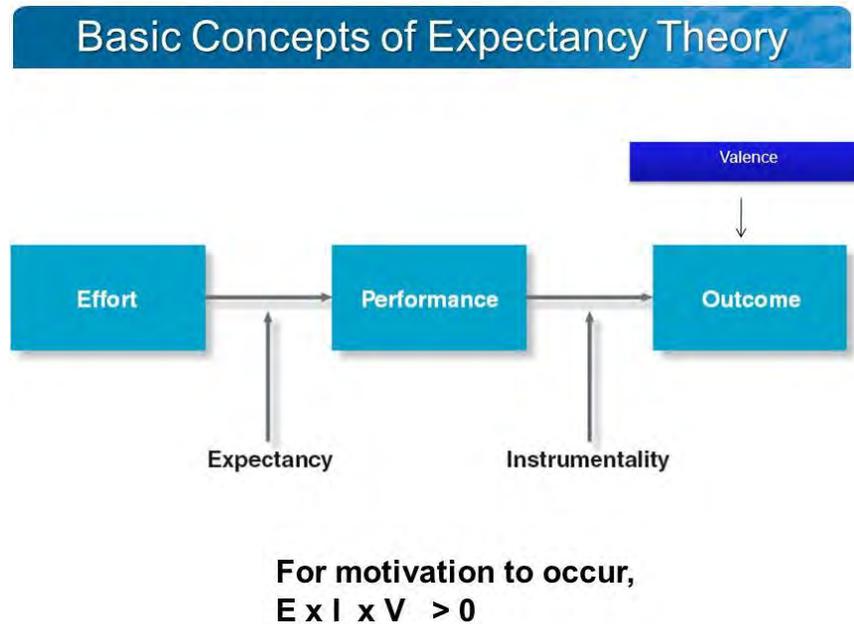


Figure 4. Basic expectancy model.

this instance, no significant result is foreseen and therefore the task would not be worth investing in. On the other hand, if there is only some risk involved with carrying out a task, there will be optimal motivation since success is likely in such task. In the first two scenarios, the doer of the task will experience failure identity associated with apathy, insecurity, and indifference, whereas in the later situation, the doer of the task will experience self-worth along with feelings of confidence, effort, and interest. At any task, the value that comes with accomplishment is the other important entity. The value may trigger intrinsic (personal) or extrinsic (social) factors. One may find a task worthy of accomplishment because of personal likes and dislikes, needs and drives, or to satisfy social approval, acquire status, power, or recognition. All above factors are intricately related and combined to influence the development of a goal.

In other words, according to Vroom's Expectancy Theory, when an individual indicated that he/she can do a task, Ability Beliefs and Expectancy for success will be differentiating factors which determine final achievement of the task (Eccles and Wigfield, 2002). Ability belief refers to "a person's current sense of competence in being able to complete a task" and expectancy for success is "how successful an individual believes he or she can continue to be in the future" (Macdonald et al., 2014: 76) which is the "expectancy" section of Vroom's Expectancy Theory. Furthermore, each task comes with a value, or as Eccles et al. (1998) categorized the factors of an individual's engagement, *intrinsic value*, *utility value*, *attainment value* and *cost*. The first three types of values influence an individual's desire to complete a task

positively and has direct relationship between increases value and motivation, whereas the last factor, *cost*, is the negative aspect of engaging in a task.

There are first and second order outcomes in Vroom's Expectancy Theory. First order outcomes refer to results which are directly related to employees' behaviors, such as performance at work, showing creativity in doing one's job, being punctual and meeting deadlines, and representing oneself as a reliable individual at work. On the other hand, second order outcomes are any positive or negative result of the first order outcomes; e.g. while high performance at work would lead to the boss's praise and would result in salary increase; being tardy and not meeting project deadline may result in demotion and losing one's job security and acceptance by co-workers (Small et al., 2010).

Components of Vroom's expectancy theory

Expectancy

Expectancy is "a person's estimate of the probability that job-related effort will result in a given level of performance" (Lunenburg, 2011b: 127). In other words, in a workplace environment, employees' expectancy is fulfilled when there is probability that their effort will result in their ideal level of performance and, on the contrary, may not be satisfied if employees know that despite their effort, they will not reach the preferred outcome. It is the perception that "effort will result in performance" (Lunenburg, 2011: 127) and has a direct correlation with

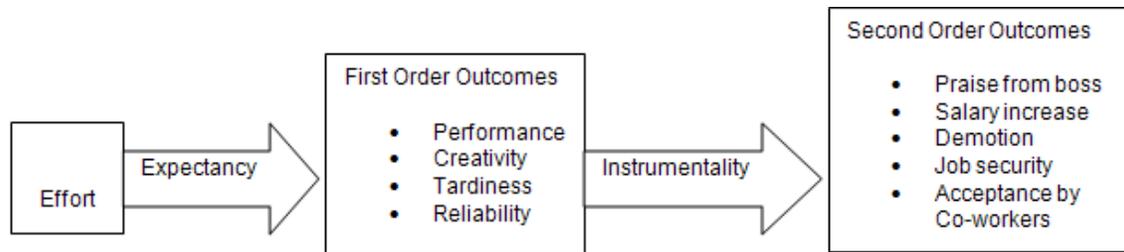


Figure 5. Small et al. (2010) first and second order outcomes.

performance. Hence, the value of expectancy resonates between 0 and 1. In this study the expectancy for non-tenured faculty is to gain tenured status by activity engaged in academic productivity. Efforts in this component will lead to first order outcomes.

Instrumentality

As with expectancy, instrumentality is a determining aspect in Vroom's Expectancy Theory ranging from 0-1. Lunenburg (2011: 127) defines this factor as "an individual's estimate of the probability that a given level of achieved task performance will lead to various work outcomes" (p. 2); if salary increase is always the result of good performance at work, the instrumentality of value is 1, and employees will put more effort to achieve that goal. Instrumentality, if the perception of employees about whether or not they will receive what they expected or desired from their effort. Likewise, in this study, tenured status always comes with the permanency status in the higher education institute setting. Instrumentality is a component of Vroom's theory which is perceived as the link between the first and second order of outcomes.

Valence

Valence is the last factor in Vroom's Expectancy Theory and is the reward employees receive as a result of good performance. It is the emotional orientation that employees have regarding the outcome of their effort at work. Going back to the previous example of instrumentality, the valence is that case is the salary increase. To sum up, "if the reward is small, the motivation will be small, even if expectancy and instrumentality are both perfect (high)" (Lunenburg, 2011, p.128). In the case of this study, job security is the valence, which is the value attached to the first and second order outcome. Vroom suggests that motivation, expectancy, instrumentality, and valence are related to one another by the following equation:

Motivation = Expectancy x Instrumentality x Valence.

Vroom's expectancy theory was later expanded and refined by Porter and Lawler (1968) and others (Pinder, 1987) (Lunenburg, 2011: 127). Figure 5 depicts the first and second order outcomes according to Small et al. (2010).

Academic productivity- factors related to faculty motivation

This study seeks to investigate the correlation between research productivity and motivation to conduct such activities at their higher education institutes by looking at the academic productions of tenured and not tenured faculty members at different academic ranks. Therefore, in this section previous studies on both external and internal factors related to faculty motivation and the relation between pre/post tenure and productivity are summarized in order to reach an in-depth analysis of possible correlation between faculty status and academic production.

Extrinsic factors

It has been found that the extrinsic motivation factors which can affect faculty academic productivity usually come from institutional expectations. Other scholars like Goodall et al. (2014) believe that administration plays a role in faculty academic production. Specifically, they looked at 169 chairpersons in 58 US university departments over 15 years with the hypothesis that chairpersons' research interest, characteristics and their previous research do impact the future of the research done in the departments and can be a predictor of improved research performance of the faculty.

Particularly, Goodall et al. (2014) focus on the fact that research at higher education institutes "involve multi-university collaboration and are ever more geographically dispersed" (p.30). They concluded that since faculty often has broader mission than pure research at their higher education institute, the quality of management by the academic departments and the chairs affect the level of

academic research and teaching performance.

Moreover, the same study points out that other researchers such as McCormack et al. (2013), and Beerkens (2013) looked into the effect of the department chairs and administration and came up with the same conclusions about their role at higher education institutes in the UK and Australia respectively. Specifically, McCormack et al. (2013) found that “incentives for staff recruitment, retention and promotion, are correlated with both teaching and research performance conditional on resources and past performance” and Beerkens (2013) found that “management practices indeed seem to have some positive effect on research productivity” (p. 18).

Longitudinal studies such as Goodall et al. (2014), which looked at higher education institute at the administrative level is a good reference to the present study since it looked at the academic productivity of university leaders and its correlation to faculty productivity. They concluded that “presidents with higher levels of life-time citations were associated with universities that went on to perform the best” (Goodall et al., 2014: 5). The nature of Goodall et al. (2014) study supports the validity of this claim and was cross checked with other longitudinal studies such as Jones and Olken (2005). Goodall (2014) concluded that “...it is the Chairs” citation that seems to matter...” (p. 12), and not their publications per se. In addition, “...the departments which are better managed also demonstrate better performance in both research and teaching” (p. 13). Last but not least, Goodall (2014) found that “scholar-leaders may find it easier to recruit and retain other top scholars” (p. 13), which is one crucial point to consider as a leader in a higher education institute.

Tien (2000) examined faculty motivation to perform research using the expectancy theory and found that among the studied population, faculty members who had higher motivation to gain promotion showed more desire to conduct research. Moreover, the nature of the reward offered to faculty in exchange for higher research performance also determined the degree they were interested in conducting research. Therefore, the bigger the reward offered, that is, the stronger the extrinsic factor, the higher faculty tended to conduct research and endeavor for the best. Tien used Taiwanese faculty survey data and concluded that faculty who wanted to accomplish personal income advancement and seek national grants was more motivated to publish articles and books. She furthered her findings in that different rewards offered by higher education institutes have different effects on faculty research performance. Although both intrinsic and extrinsic rewards motivate faculty research, faculty at different ranks reacts to these factors differently according to the career state they are in. Moreover, she found out that when faculty considers a particular reward significant, and/or that factor plays a role in faculty rating, it will promote faculty to meet the standard regardless of the nature of the reward.

Therefore, if the higher education institute considers academic production as a means to accomplish rank advancement, faculty will be more active in publishing and other academic activities. Lastly, she found that promotion had the highest valence effect on faculty and can best predict faculty productivity.

Bowers and Ryan (2013) studied the tenure and rank advancement standards for University of Alaska at Anchorage and University of Texas at Arlington. In their study, they investigated the standards at these two different university systems by considering value, culture, and philosophical system as their variables. They found that besides the university standards and their academic productions, what the faculty really cared about was their peers’ review.

Intrinsic factors

Unlike extrinsic motivation, intrinsic motivation factors are influenced by the faculty’s personal reasons. Earlier research, such as Fox (1983) took into consideration three major factors (individual-level characteristics, environmental location, and feedback process of cumulative advantage and reinforcement) in faculty productivity and motivation to conduct research. Fox concluded that individual-level characteristics, factors such as psychological characteristics, work habits, and demographic characteristic, that is, intrinsic factors are the strongest determiners of faculty research productivity. Recently, Bland et al. (2005, 2006) has designed a comprehensive theoretical model called the Bland model which explains faculty research productivity in relation to three characteristics and groupings of individual, institutional, and leadership. In this research, the factors influencing faculty research productivity have been studied and it was concluded that all three factors mentioned above are influential in faculty productivity. According to this model, both intrinsic (individual) and extrinsic (institutional and leadership) factors play crucial roles in faculty productivity; however, external factors may be in some cases more powerful.

Another intrinsic factor introduced by Shollen et al. (2014), is the presence of a “mentor” figure during research. They examined the relationship formal and informal mentorship has on faculty and the satisfaction that faculty receive as a result of this relationship. Since productive faculty is not necessarily happy faculty, the goal of their study was to examine the effect of mentor relations and see how satisfied faculty is. For the population of this study, the intrinsic motivation mentorship developed for them, played a key role in higher academic activity. They concluded that among the 615 faculty they studied, both forms of mentoring- formal and informal- did make positive impact on faculty enthusiasm for conducting research.

Cerasoli et al. (2014) presented the results from a

40-year longitudinal study of more than two hundred thousand faculty, hypothesizing that both extrinsic and intrinsic factors can influence faculty academic and non-academic performances. However, through a meta-analytic regression, they concluded that unlike some studied, that intrinsic motivation factors were the strong predictor of faculty performance. The relation between intrinsic motivation and performance, when incentivized, was stronger for indirectly performance-salient incentives than directly performance-salient incentives, that is, individuals who enjoy their job, outperform those who do not, regardless of any external incentives. Although, when present, incentives do play a contingency role in performance, still intrinsic motivation has to exist for the faculty to perform and produce academically and incentives alone have little correlational impact on faculty performance. Therefore, despite the significance of both intrinsic and extrinsic motivation factors, intrinsic factors overall remain a better predictor of faculty performance.

Tenure status

Relationship between pre- and post-tenure status and academic productivity

As it is noted by this point of the research, this study looks into the academic production of faculty members" pre- and post-tenure at higher education institutes. Hence, the tenure process is also considered in the present research. Since this study intends to focus on the leadership aspect of higher education and seeks to explore the concept of tenure among faculty members at higher education institutes, the notion of higher education leaders" decision making and the effect on their institute is also taken into consideration. Although the notion of "publish or perish" has been associated with the pressure in academia and is a determiner of academic success to the extent one's career may suffer as a result of not having regular research outputs. This notion of publish or perish has been in the literature from the 1940's and there have been a lot of studies with this focus. Several researchers (Neumann and Finaly-Neumann, 1991; Parchomovsky, 2000; Gray and Birch, 2001; Lee, 2014) all studied this notion and reached similar outcomes. Their findings support the idea that faculty often believe that if they do not publish their work, they will perish, which has increasingly caused anxiety and induced stress among not only young academics but also more established scholars. Therefore, higher education leadership can respond to faculty's concern by helping faculty increase their scholarly productivity in different ways and recognizing all kinds of academic product other than research, such as presentations at national conferences and smaller publications. Research shows that faculty is more productive if they write daily, use key sentences to organize their writing around, and

periodically receive constructive and broad feedback on their drafts from peers. These solutions can also encourage faculty increase their productivity.

In another study, Von Solms and Von Solms (2016) looked at the tenure process as an assessment to determine whether a faculty member will or will not be granted this status at the higher education institute. Renowned higher education institutes like Oxford, which is second on the world rankings according to Times Higher Education (2016), encourage faculty to promote their work through publishing; therefore, publishing is regarded as a means to secure faculty's reputation in the academic world and give them job security.

In a more recent study, Miller et al. (2011) examined the pressure to publish universities and colleges put on both tenured and tenure-track faculty and found that, although the pressure may seem more on the latter group, both groups feel this pressure. But what is significant about this study is that it is the faculty themselves that add to this pressure, since they see publishing and academic productivity as a means to gain job security, increase salary, and job mobility.

Hardre and Kollmann (2012) similarly noted that the low-quality performance of faculty can be the result of a mismatch between the institution versus faculty's goals and values. They studied faculty motivational factors in 60 academic departments in research universities and found eight key features of employee engagement, effort, persistence, innovation, and organizational commitment to be the strongest elements affecting faculty performance. They suggested that these factors should be taken into consideration in faculty standards from the beginning and at the time of faculty evaluations.

In their study of 104 management departments of the Association to Advance Collegiate Schools of Business International (AACSB) accredited, research-oriented US business schools, Miller et al. (2011) considered the pressure to publish among all faculty. Their results indicated that both tenured and tenure-track faculty were trying hard to publish; however, the non-tenured faculty was more motivated to accomplish their goal in order to enhance "their professional reputation, leaving a permanent mark on their profession, and increasing their salary and job mobility. "On the other hand, the pressure to publish affected the faculty negatively and heightened their stress levels and resulted in "marginalization of teaching" and conducting "research that may lack relevance, creativity, and innovation." Therefore, it is the responsibility of the administration to lower faculties" stress level by heightening satisfaction levels at higher education institutes. The power of leadership to ameliorate the negative consequences of the need to conduct research has been argued as Waltman et al. (2012) looked at faculty members" satisfaction and dissatisfaction factors among 220 non-tenure tracked faculty members (NTTF); it is found that the administration plays a significant role in faculty

satisfaction and can help by “supporting their teaching efforts, enacting policies that promote job security and advancement opportunities, and creating inclusive climates” (p. 431).

The higher education industry has been subject to several fundamental challenges like some other nonprofit and for-profit industries. Pucciarelli and Kaplan (2016) have done a comprehensive research on the matter and conclude that faculty who do not produce research and are not as active in conducting studies may face some uncertainties at their higher education institute.

Previous studies using NSOPF data

The present study used the data from the 2004 National Study of Postsecondary Faculty (NSOPF) survey. The National Center for Education Statics has developed, validated, and piloted the National Statistics of Post-Secondary Faculty (NSOPF) survey first in the 1990s to gather data on faculty and instructors at higher education institutes; it was conducted in response to a continuing need for data on faculty and instructors - persons who directly affect the quality of education in postsecondary institutions. Faculty is the pivotal resource around which the process and outcomes of postsecondary education revolve. They often determine curriculum content, student performance standards, and the quality of students' preparation for careers. Faculty members perform research and development work upon which this nation's technological and economic advancement depends. Through their public service activities, they make valuable contributions to society. For these reasons, it is essential to understand who they are; what they do; and whether, how, and why they are changing. This study was designed to provide data about faculty to postsecondary education researchers, planners, and policymakers. NSOPF is the most comprehensive study of faculty in postsecondary educational institutions ever undertaken. This set of data has been used in a number of studies to determine faculty motivation at different levels and with various variables (Toukoushian and Conley, 2005; Finkelstein et al., 2013; Webber and Tschepikow, 2013; Schimpf and Main, 2014; Kezar and Maxey, 2014; Webber, 2012; Faircloth et al., 2015; Milkman et al., 2015; Warshaw et al., 2017).

In 2002, Conley and Leslie used NSOPF-93 data to find out who part-time faculty is, what are their needs, and what motivates them in their carriers. They had five major findings. They found that part-time faculty are mostly female, have a full-time position somewhere else, believe they received less institutional support, there were more part-time positions in fields such as humanities than other areas. Most importantly part-time faculty members had different motivations for being part-time employees such as personal preference or lack of full-time position availability and the fact that most

part-time faculty were also finishing their degrees (p. 8).

Zhou and Volkwein (2004) examined the NSOPF-99 data to determine the factors influencing tenured versus non-tenured faculty departure from higher education institutes. They concluded that for both groups, “seniority, satisfaction with compensation, satisfaction with job security, compensation, external extrinsic reward, academic rank, minority status and doctoral degree” has the strongest direct effect on departure intention for faculty (p. 153). They also found that faculty who had been with their higher education institute for a long time and are considered senior faculty, are less likely to leave where they work. Moreover, the notion of job security was more important to non-tenured faculty, which can conclude that tenure status comes with the feeling of job security for faculty. However, tenured faculty may leave the institute if they receive higher monetary compensation from elsewhere; but non-tenured faculty tend to stay at the same institute in hope of getting tenured and may often turn down a higher salary job offer from another institute. Among these interesting findings, Zhou and Volkwein (2004) said the most interesting of all was that academic rank has a different impact on non-tenured versus tenured faculty. While non-tenured faculty “with higher academic rank appear to be more mobile and interested in leaving”, for tenured faculty rank advancement meant “job security and indirectly reduces their departure intention” (p. 18).

In a more recent study, Mamiseishvili and Miller (2010) compared the NSOPF-99 and 2004 data to find out which group of faculties (tenured or non-tenured) should be awarded a sabbatical leave opportunity by exploring questions related to faculty participation in sabbatical leave programs. They concluded that sabbaticals are employed more as a reward for past performance, service, and scholarly achievement rather than as a developmental strategy to help faculty improve, which could be interpreted, that full-time, tenured faculty are the only group benefitting from such opportunity (p. 16). Using the same set of data, Mamiseishvili (2010) in a separate study looked at the NSOPF 2004 data on female faculty focusing on their country of birth (foreign-born vs. US-born) and their work roles and productivity; it was found that foreign-born faculty were more engaged in scholarly activities than their American counterparts but were less active in teaching roles (p. 149). The study left the findings there and did not expand on the idea of scholarly productivity of all faculties and their tenure status.

Antony and Hayden (2011) used the NSOPF:2004 data to examine factors correlated with job satisfaction among part-time and full-time faculty members at both two-year and four-year institutions and among male and female employees. They found that part-time faculty members were equally satisfied with all aspects of instructional duties, reward, and their amount of workload, leaving to conclude that there were no apparent significant

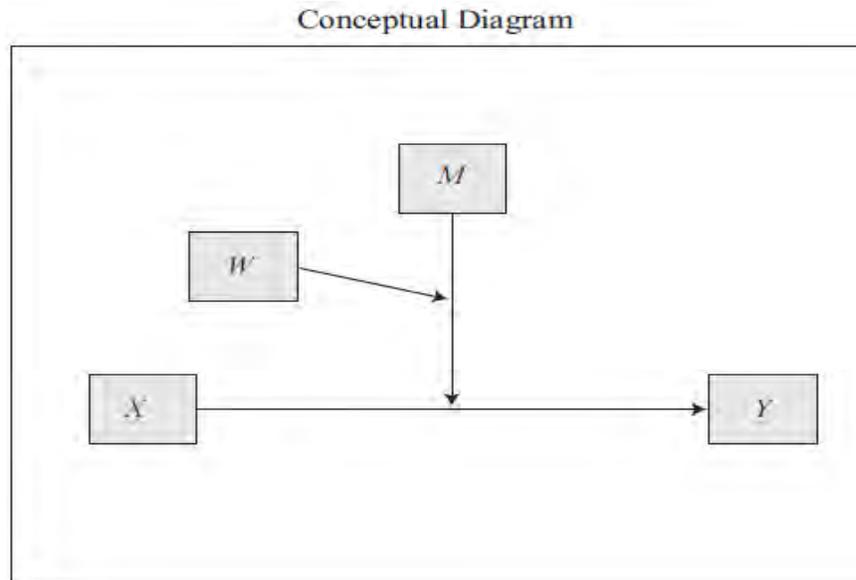


Figure 6. Conceptual path diagram of moderation effect.

differences in job satisfaction among male and female part-time faculty members at both two and four-year institutes. On the other hand, in their study about variables that predict job satisfaction, Akroyd et al. (2011) found that that regardless of gender, the most positive predictors of faculty satisfaction were instructional autonomy and time spent on disciplinary activities, and if there was a prospect of salary increase, faculty members were satisfied with their current income. However, the only difference in gender came when female faculty in education disciplines showed more job satisfaction than their female peers in occupational areas. Lastly, investigating about race revealed that white men had the tendency to be less satisfied with their job than men of color.

In the research done for this study, the researcher did not find a study that directly addresses faculty scholarly activity of tenured and non-tenured faculty using this set of data. Also, none of the studies have used the NSOPF data to interpret this matter in such broad scale. It is hoped that this study, shed light on such pivotal matter and the implementations of the findings of this study guide higher education leaders and administrators in better improving their organizations towards academic excellence.

In short, Vroom's Expectancy theory was selected as the preferred theoretical framework. As mentioned, Vroom's Expectancy Theory can explain why faculty members at higher education institutes engage in academic production when they have a series of alternatives available to them. This theory takes into account extrinsic factors such as salary raise, grant allocation, and the focus of this study, that is, acquiring tenured status, as well as intrinsic factors such as

institute appreciation/recognition/award and acquiring the feeling of self-actualization and self-worth. Promoting faculty belief that an increase in academic production effort will result in an increase of the possibility to accomplish any of the factors (extrinsic and/or intrinsic) above is critical to higher education institutes' leadership.

One of the hypotheses of this study is that pre-tenured faculty members are driven by the strong extrinsic factor of acquiring tenured status to engage in academic activities and more inclined to intrinsic motivators after gaining tenured status. Hence, non-tenured faculty tenured status (expectancy), by engaging in academic productivity (instrumentality) and non-tenured faculty is inclined to have higher academic productivity to gain the job security (valence) through tenure status since it usually comes with a permanency in status at higher education institutes. On the other hand, tenured faculty members are expecting reinforcement of their position (expectancy), to gain leadership acknowledgement and/or self-actualization (valence) through academic productivity (instrumentality). This study looks at the academic production of the faculty members participating in the 2003–04 National Study of Postsecondary Faculty (NSOPF:04). This sample included 1,080 public and private not-for-profit degree granting postsecondary institutions and covered 35,000 faculty and instructional staff.

Model specification

Figure 6 depicts the researcher's conceptual diagram for this study: (1) a relationship exists between motivation factors and academic productivity of faculty, and (2)

tenure and rank status have a moderating effect on the relationship of motivation factors and academic productivity of faculty members. The model depicts the hypothesis of this study that relative to the degree of the perceived effectiveness of tenure and rank advancement, faculty members are motivated to have more academic productivity. Overall, Figure 6 illustrates that being motivated influences academic productivity; however, the presence possibility of achieving tenure status and rank exacerbates this effect.

Design

This study employed a non-experimental, explanatory correlational research design using archival data to examine the association among higher education faculty academic productivity, the motivation factors affecting the number of academic activities, and status as tenured vs. not-tenured faculty. Used frequently in educational research, ex-post facto correlational research incorporates the use of pre-existing data to identify whether, and to what degree, an association exists between two or more quantifiable variables (Gay et al., 2001), by assigning subjects to different groups (tenured vs. non-tenured faculty). In correlational research, variables are related and measured, not manipulated (Creswell, 2002). Correlational studies, more specifically relationship or explanatory studies, often investigate a number of variables hypothesized to be related to a major variable, such as career longevity or career decisions in this study (Gay et al., 2001). This case study did not intend to determine a causal relationship between the variables but rather attempted to find a relationship between motivation, tenure status, and academic production of higher education faculty.

Variables

In the present study, the number of academic production done by faculty by both tenured and on-tenure-track-but-not-tenured-yet is examined, considering rank as the dependent variable and motivation among permanent/tenured higher education faculty as the independent variable or central interest. The variables in this study include motivation factors, tenure status, rank, and academic production of higher education faculty members. Path analysis tends to avoid the use of the terms independent variable (IV) and dependent variable (DV) since a variable can actually act as both an IV and DV depending on the hypothesized causal relationships (Meyers et al., 2013; Norman and Streiner, 2003). Instead, path analysis uses the terms exogenous and endogenous variables. Conceptually, an exogenous variable is the independent or predictor variable that is hypothesized to influence the endogenous variable,

which is the outcome, criterion or dependent variable (Meyers et al., 2013; Norman and Streiner, 2003). An exogenous variable has an arrow pointing from it to the endogenous variable to illustrate its hypothesized influence on the endogenous variable. Furthermore, exogenous variables do not have any arrows pointing to them since their causes are not included in the model, and endogenous variables will have at least one straight arrow pointing to them (Norman and Streiner, 2003; Streiner, 2005). The study seeks to answer the overall hypothesis that when faculty members gain permanent/tenured status, their academic production, which is an indicator of motivation, decreases.

Motivation factors

In this research, both extrinsic and intrinsic factors influencing faculty research productivity determined by the survey questions have been studied. As formerly mentioned, extrinsic motivation factors which can affect faculty academic productivity usually come from institutional expectations, where intrinsic motivation factors are influenced by the faculty's personal reasons.

McCormack et al. (2013) and Beerkens (2013) looked into the effect of the department chairs and administration and came up with the same conclusions about their role at higher education institutes in the UK and Australia respectively. Specifically, they found that "incentives for staff recruitment, retention, and promotion, are correlated with both teaching and research performance conditional on resources and past performance"; Beerkens (2013) found that "management practices indeed seem to have some positive effect on research productivity" (p 18). Therefore, it would be fair to investigate the responses to the questions regarding the role of administrators and chairs in the academic productivity of the faculty members in the 2014 National Study of Postsecondary Faculty (NSOPF) survey.

Although external factors such as monetary incentives, scholarly activities of administrators and chairpersons, as well as workload and time spent on different job-related activities do play a contingency role in performance, intrinsic factors related to the study, that is, time spent on not job-related activities at the workplace, overall job satisfaction, and faculty opinion of the higher education institute has to exist for the faculty to perform and produce academically; incentives alone have little correlational impact on faculty performance. Therefore, despite the significance of both intrinsic and extrinsic motivation factors, one of the hypotheses whether or not the present study is that intrinsic factors overall remain a better predictor of faculty performance.

Tenure status

Tenure status is a binary variable in this study. The study is looking at faculty academic productivity pre- and

post-tenure status. This variable is one determined by the higher education leaders' decision and affects the institute. In the NSOPF 2004 survey, the questions related to tenure status are among one of the first questions. The questions related to tenure status is administrated to all faculty and instructional staff and pertain to whether faculty and instructional staff have tenure status or are on tenure track status, the year tenure was attained, and whether non-tenured faculty and instructional staff would prefer holding a tenure track position.

Rank

Academic rank is the second moderating variable considered in the model. Rank was selected as a potential moderator as research suggests that rank is a factor in the academic productivity of faculty (Carr et al., 1992; Englebrecht et al., 1994; Tien and Blackburn, 1996). Previous research has shown that rank is correlated with productivity, with the Englebrecht et al.'s study showing the associate rank faculty having the highest productivity when the date of the promotion is considered. Gender and other personal characteristics were not considered, as previous research has shown that these attributes were not found to be of consequence relative to academic productivity (Sax et al., 2002).

Academic productivity

In this study, the terms "Academic Production" and "Scholarly Achievements" are interchangeably used to refer to any academic activity done by faculty regardless of their status. These activities are as follows, but not limited to: conducting research (clinical, descriptive, correlational, quasi-experimental, experimental, etc.), writing papers, presenting at local and inter/national conferences, grant proposals, community engagement activities related to the higher education institutes, etc.

In the NSOPF 2004 survey, there is a section administered to all faculty and instructional staff on "scholarly activities". The survey identifies scholarly activities as articles published in refereed professional or trade journals; creative works published in juried media; articles published in non-refereed professional or trade journals; creative works published in non-juried media or in-house newsletters; published reviews of books, articles, or creative works; or chapters in edited volumes, textbooks, other books; monographs; research or technical reports disseminated internally or to clients; presentations at conferences, workshops, etc.; exhibitions or performances in the fine or applied arts; and patents and computer software products related to faculty and instructional job standards and their overall career two years ago.

METHODOLOGY

Population

The NSOPF survey was administered as a web-based instrument targeting faculty and instructional staff holding different ranks, backgrounds, and academic status. The NSOPF 2004 survey was first conducted in 1987-1988 with a sample of 480 institutions (including 2-year, 4-year, doctorate-granting, and other colleges and universities), ranging from more than 3,000 department chairpersons to over 11,000 instructional faculty. The response rates for the three surveys were 88, 80, and 76 percent, respectively. This survey was then replicated in a 1992-93 study with an expanded sample of 974 public and private not-for-profit degree-granting postsecondary institutions and 31,354 faculty and instructional staff. The response rates for the two surveys were 94 and 84 percent, respectively. The 1998-99 National Study of Postsecondary Faculty (NSOPF:99) included 960 degree-granting postsecondary institutions and an initial sample of faculty and instructional staff from those institutions. Approximately, 28,600 faculty and instructional staff were sent a questionnaire. The 2003-04 National Study of Postsecondary Faculty (NSOPF:04) included a sample of 1,080 public and private not-for-profit degree-granting postsecondary institutions and a sample of 35,000 faculty and instructional staff. The weighted response rates for the two surveys were 86 and 76 percent, respectively.

Sampling and procedure

After acquiring the proper IRB approval from Fayetteville State University, the researcher will contact the office of IES Data Security office at the U.S. Department of Education/IES/NCES to acquire the data on the NSOPF 2004 Faculty survey. The data can be accessed online through the National Center for Education Statics (NCES) data lab or the raw data can be released to a full-time employee with a doctorate as a Principal Project Officer (PPO). NCES only accepts restricted-use data license applications and amendments through its Electronic Application System (EAS). Any license application that does not come through this system will be returned to the applicant. The EAS protects individually identifiable information from disclosure and explains the laws and regulations governing the NSOPF data in general.

Upon acquiring confirmation from the of IES Data Security office at the U.S. Department of Education/IES/NCES, the PPO will be provided with a license number and the PPO's email address to generate a link to the license. The EAS is a system to submit a formal request and for the IES Data Security Office to conduct a review of the researcher's request. The researcher is responsible for submitting all completed and signed license documents, security plan form, and affidavits of nondisclosure in hard copy to IES after receiving an initial review of the online formal request. He must abide by all the terms and provisions in the license and the security plan to prevent the restricted-use data from being removed or telecommunicated from the Licensee's secure project office, which will be considered a class E felony and subject to imprisonment for up to five years, and/or a fine of up to \$250,000.

The IES Data Security Office will generate restricted CD's which do necessarily include all of the derived variables that are in the public use or the older Data Analysis System (DAS). However, restricted license holders can obtain selected derived variables in a raw format on request, which can be acquired upon submission of a list of derived variables to the IES Data Security Office, together with the license number and the preferred file format. An IES contractor will then create the file and send it to the IES Data Security Office for dissemination. There are two ways to analyze the acquired data, either through the NCES online tools or to use SPSS. The NSOPF data have been used in several studies

(Toutkoushian and Conley, 2005; Finkelstein et al., 2013; Webber and Tschepikow, 2013; Schimpf, and Main, 2014; Kezar and Maxey, 2014; Webber, 2012; Faircloth et al., 2015; Milkman et al., 2015; Warshaw et al., 2017; Conley and Leslie, 2002; Zhou and Volkwein, 2004; Mamiseishvili and Miller, 2010; Antony and Hayden, 2011; Akroyd et al., 2011); hence, this instrument has high validity and reliability and therefore the researcher did not conduct a pilot test to determine the validity and reliability of the National Study of Postsecondary Faculty (NSOPF:04) survey.

Instrumentation

The National Center for Education Statistics (NCES) has developed, validated, and piloted the National Statistics of Post-Secondary Faculty (NSOPF) survey first in 2004 to gather data on faculty and instructors at higher education institutes. The last two sections of this chapter deal with the threats to validity and the ethical procedures taken in collecting, interpretation and analyzing the data gathered in the process.

Data analysis

To begin to understand the relationship among the variables presented in this model, descriptive statistics for faculty academic productivity, tenure and rank status, and motivation factors were generated. The researcher ran exploratory analyses to understand the nature of the association between variables. The means, standard deviations, and Pearson product-moment correlations for self-efficacy and perceptions of tenure and rank status (predictor variables) were calculated to determine what relationships existed between them. The mean was determined for future scholarly activity involvement.

In order to generate descriptive statistics, the data were transformed from categorical to continuous. To facilitate the analysis, responses from each survey instrument were aggregated by taking all of the scores from all items on each individual scale and developing one score for each participant for each survey. As mentioned previously, external and internal motivation factors and faculty tenure and rank status are considered categorical variables; however, they were analyzed using continuous statistics in this study. Therefore, each participant's score on whether they held tenure status or not was determined by collapsing all scores into one continuous score. Similarly, the continuous score for each participant on the motivation factors was determined by taking an aggregate of the responses for each participant.

Path analysis and moderation

The purpose of path analysis is to generate estimates of the strength and significance of hypothesized causal relationships between variables (Norman and Streiner, 2003). Path analysis techniques explore the effects between variables. In path analysis, the relative sizes of path coefficients will be represented in an output path diagram. A path coefficient is a standardized regression coefficient determined by running regression analyses.

In this case, moderation analysis, a specific model of path analysis, was used. As mentioned previously, moderation analysis examines the relationship between three or more variables where the presence of a specific variable is said to moderate or alter the relationship among two or more variables, depending upon the design, using regression-based analytics (Hayes, 2017). The moderator describes the "strength and direction of the causal effect of the focal independent variable (e.g. treatment) on the dependent variable" (Wu and Zumbo, 2008: 379). Consequently, moderators are referred to as auxiliary variables due to their enhancement of

the hypothesized bivariate causal relationship. Moderation techniques determine how a third variable (Mo) affects the relationship between a predictor variable and an outcome variable.

Regression model

In order to describe the networks of relationships that exist among several variables and to understand how constructs influence one another, multivariate analysis is required (Wu and Zumbo, 2008). Therefore, this study used multivariate analysis based on multiple regression to perform a path analysis, more specifically, moderation. According to Wu and Zumbo (2008), a regression analysis should be used if the moderator is measured on a quantitative scale. This study's moderation analysis used ordinary least squares analysis (OLS) as academic productivity is a continuous outcome. Ordinary least squares attempt to minimize the sum of squares error through the fitting of a regression line that best fits the data. Linear regression estimates the parameters of a model so that the dependent (outcome) variable can be predicted from the estimates of the independent (predictor). Ordinary least square regression develops the best fitting model by making the sum of the squared residuals (Hayes, 2018). The model for this study uses multivariate regression as academic productivity is modeled to be a factor of three independent variables (motivation, tenure status, and rank). Of special interest is the conditional indirect effect of X (motivation) on Y (academic productivity). This indirect effect models how tenure status and rank moderate the effect of motivation (Table 1).

As seen above, the equation claims that academic productivity is a function of three variables and several interactions (moderations). The moderators will take the form of a binary (Tenure/No tenure but on track) and three levels (Assistant/Associate/Full) with interaction among these (Figure 7).

Threats to validity

Internal validity and external validity are two sets of criteria used in research to determine the value or worthiness of an experimental design (Salkind, 2011). The internal validity of an experimental design refers to the confidence that the generated results are actually due to the manipulation of the independent variable, and not due to some other factors. External validity refers to the generalizability of results from the original sample to the population. All empirical research in the field of education has threats to internal and external validity; however, researchers often fail to report the threats due to the fear of revealing the weaknesses of their research (Onwuegbuzie, 2000). Onwuegbuzie outlines the advantages of discussing threats to internal and external validity: 1) when the researcher provides information about the sources of invalidity, the reader can interpret the findings in their proper context; and 2) the identification of internal and external validity guides future research, more specifically replication studies.

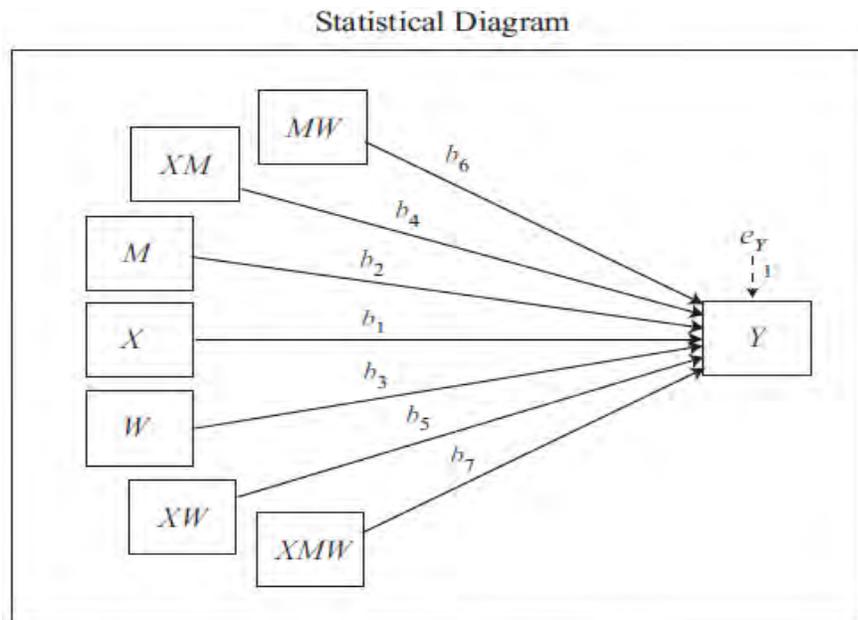
Aligned with the previously mentioned advantages of revealing validity threats to the reader, the researcher reported several possible threats to internal validity in this study including history, instrumentation, and history x treatment interaction (Onwuegbuzie, 2000). Referencing Campbell and Stanley's eight threats to internal validity, this study may have included the threat of history which "refers to the occurrence of events or conditions that are unrelated to the treatment but that occur at some point during the study to produce changes in the outcome measures" (Campbell and Stanley, 2015; Onwuegbuzie, 2000, p. 15). Internal and extraneous events can trigger this threat. A second threat is instrumentation due to the chance that the scores yielded from a measure is inconsistent, (low reliability) or are not valid (Onwuegbuzie, 2000).

In addition to internal threats, it is important for the reader to be

Table 1, NSOPF survey sections.

Section Title	Section description	Variable	Questions included in this study	Justification
Nature of Employment:	Questions on faculty duties, status, rank, and principal	Categorical	Information is considered the present study	Linking the data gathered from this section as a basis of data interpretation to serve the purpose of the study.
Scholarly Activities:	Questions on academic productions such as articles, books, and journals	Scalar	Information is considered as the focal purpose of the present study	Looking at the nature of academic productions of faculty and linking it to sections A and B (tenure vs. non-tenure) and section C to see whether workload has an effect on their academic production and involvement.
Job Satisfaction:	Questions on how satisfied faculty are with the institute, workload, salary, etc.	Scalar	Internal Factors: Qu 61, Qu 62, Qu 63	Addressing external and internal motivation factors
Compensation:	Questions on the amount of faculty income from various sources and their overall household income.	Scalar	External Factors: Qu 66, Qu 67	Addressing external and internal motivation factors in form of the nature of rewards and compensation high redaction institutes provide their faculty.

In particular the model for this study is :Academic Productivity = $b_0 + b_1$ (Motivation) + b_2 (Tenure) + b_3 (Rank), (x) + b_4 (Motivation*Tenure) + b_5 (Motivation*Rank) + b_6 (Tenure*Rank), + b_7 (Motivation*Tenure*Rank).



Conditional effect of X on Y = $b_1 + b_4M + b_5W + b_7MW$

Figure 7. Mediation and Moderation templates for PROCESS macro.
Source: Hayes (2018).

aware of external validity threats in this study, which commonly occur at the research design/data collection stage of a study (Onwuegbuzie, 2000). Onwuegbuzie reports that regardless of being random or non-random, all samples in educational studies

inherently breed population and ecological validity concerns due to sampling errors, which threatens external validity. "Population validity refers to the extent to which findings are generalizable from the sample of individuals on which a study was conducted to the

Table 2. Descriptive statistic of the targeted population (n=10557).

Variable	M	S.E.	S.D.
Faculty rank	1.87	0.008	0.823
Faculty tenure status	1.31	0.004	0.461
Faculty scholarly activity*	0.80	0.004	0.399
Faculty satisfaction index	1.781	0.005	0.493

*Scholarly activity refers to all recent articles and refereed journals the faculty participated in.

Table 3. Descriptive statistic of tenure status by rank (n=10577).

Rank	Frequency		Percent		Cumulative percent	
	Tenured	Tenure track	Tenured	Tenure track	Tenured	Tenure track
Professor	4,221	115	57.66	3.55	57.66	3.55
Associate	2,760	477	37.70	14.74	95.37	18.29
Assistant	339	2,645	4.63	81.71	100	100

Table 4. Descriptive statistic of tenure status by recent academic activity (n=10577).

Rank	Frequency		Mean		S.D.	
	Tenured	Tenure track	Tenured	Tenure track	Tenured	Tenure track
Professor	4,221	115	3.44	2.2	5.247	4.606
Associate	2,761	477	2.247	2.815	3.494	4.13
Assistant	339	2,645	0.475	2.241	1.394	3.065

larger target population of individuals" and ecological validity refers "to the extent to which findings from a study can be generalized across settings, conditions, variables, and contexts" (Onwuegbuzie, 2000: 30).

RESULTS AND DISCUSSION

This study sought to investigate the relationship between research productivity and motivation to conduct such activities at higher education institutes by looking at the academic productions of tenured and not tenured faculty members. Therefore, in this section previous studies on both external and internal factors related to faculty motivation and the relation between pre/post-tenure and productivity are summarized in order to reach an in-depth analysis of the possible correlation between faculty status and academic production. The overall general hypothesis of this study is that when the faculty members gain permanent/tenured status, their academic production, which is an indicator of motivation, decreases, and the number of overall academic production of faculty will decrease after being granted tenure status.

Descriptive statistics

To serve the purpose of this study and address all the research questions, the researcher narrowed down the

sample by eliminating answers from all staff since they were not the target population for this study. Consequently, from the total of 35,000 faculty and staff responses to the NSOPF 2004, 10,557 faculty members' survey responses from 1,080 higher education institutes were investigated for the purpose of this study. Table 2 reports the descriptive statistics of this population, which can answer the first research question in part.

Taking a closer look at the descriptive analysis gave the researcher a better insight into who the studied sample was and a more detailed answer to the first research question. Table 3 shows that out of the total of 10577 faculty, 7,320 (69%) had tenure status at the time of the survey and the rest (~31%) where faculty who held a tenure-track status but were not granted tenure yet. Table 3 reports that there were more faculty who had tenure status and held associate or professor rank, compared to faculty members who were not tenured yet and held mostly assistant professor rank.

Similarly, Table 4 presents the descriptive statistics of the sampled faculty and their academic activities. It is worth mentioning that the survey defined academic activity as articles published in refereed and non-refereed professional or trade journals; creative works published in juried media; published reviews of books, articles, or creative works; chapters in edited volumes; textbooks and other books; monographs; research or technical reports disseminated internally or to clients;

Table 5. Descriptive statistic of tenure status by satisfaction (n=10577).

Rank	Frequency		Mean		S.D.	
	Tenured	Tenure track	Tenured	Tenure track	Tenured	Tenure track
Professor	4,221	115	1.840	1.847	0.546	0.520
Associate	2,761	477	1.985	1.9	0.545	0.555
Assistant	339	2,645	1.931	1.921	0.600	0.540

presentations at conferences, workshops, exhibitions or performances in the fine or applied arts; and even patents and computer software products within the last two years.

Table 4 reports that tenured full professor faculty ($M=3.44$, $SD = 5.247$) produced more academic activities overall in comparison to tenured associate and assistant rank faculty ($M=2.247$, $SD = 3.494$; $M= 0.475$; $SD = 1.394$), respectively. Among non-tenured faculty, associate professors ($M= 2.815$, $SD = 4.13$) had the highest number of academic activities and non-tenured faculty who held the professor rank ($M= 2.2$, $SD = 4.6$) had the least number of academic activities. In fact, when associate professors' recent activity was compared to assistant professors, the difference in means of 0.574 was significant with $t(479.9) = 3.538$, $p<0.001$. As a result of this probe, an ANOVA was run to assess the differences across ranks and academic activity.

According to the ANOVA, that considered tenured faculty resulted in $F(2,7318) = 106.596$, $p<0.001$. A Tukey Post Hoc test revealed the difference between full and associate was significant with the difference = -1.193, $p < 0.001$, 95% CI (-1.453 to -0.933). Similarly, the difference between full and assistant rank professors was shown to be significant as well with the difference of -2.965, $p < 0.001$, 95% CI (-3.565 to -2.3653) as it was when comparing the associate professors and assistant professors with the -1.7720 difference and $p < 0.001$, 95% CI (-2.384 to -1.16).

An ANOVA test for the tenure track faculty resulted in $F(2,3234) = 6.17$, $p=0.002$, where a Tukey Post Hoc test revealed the difference between full professors and associate professors was significant as the difference = 0.615, $p= 0.173$, 95% CI (-0.19 to 1.42). Neither was the difference between full and assistant rank professors which showed no significant difference of 0.0410, $p = 0.9907$, 95% CI (-0.697 to 0.779). When associate professors were compared with assistant professors, there was a significant difference (-0.574, $p<0.001$, 95%CI=-0.959 to -0.188).

In this research, both extrinsic and intrinsic factors influencing faculty research productivity determined by the survey questions have been studied. As formerly mentioned, extrinsic motivation factors which can affect faculty academic productivity usually come from institutional expectations, where intrinsic motivation factors are influenced by the faculty's personal reasons.

Motivation is derived from using the satisfaction related items in the survey. Although external factors such as monetary incentives, scholarly activities of administrators and chairpersons, as well as workload, time spent on different job-related activities do play a contingency role in performance, intrinsic factors related to the study, that is, time spent on not job-related activities at the workplace, overall job satisfaction, and faculty opinion of the higher education institute have to exist for the faculty to perform and produce academically; incentives alone have little correlational impact on faculty performance. Therefore, despite the significance of both intrinsic and extrinsic motivation factors, one of the hypotheses of the present study was that intrinsic factors overall remain a better predictor of faculty performance. Motivation was also identified with its determining factors and indicators. There are just so many factors from different sources that it is hard to differentiate them sometimes. Since this research is looking at higher education, it is focused on only motivation factors affecting tenured faculty members. Therefore, in this study, the survey questions pertaining to satisfaction were treated as an inclusive indicator of faculty intrinsic and extrinsic motivation index.

The data in Table 5 shows the tenure status of faculty according to their job satisfaction. At first glance, the mean between faculty members who hold the same ranks did not appear to be significantly different; that is, job satisfaction among faculty who held assistant professor rank was very close. In fact, from the sample population selected for this study, all reported similar results. However, a simple ANOVA was run, and it was found that for tenured faculty, only the ANOVA resulted in $F(2,7318) = 58.991$, $p<0.001$, where a Tukey Post Hoc test revealed the difference between full and associate was significant = 0.145, $p < 0.001$, 95% CI (0.114, 0.176). Similarly, the difference between full and assistant rank professors was shown to be significantly different at 0.091, $p = 0.009$, 95% CI (0.019, 0.164); however, the difference between associate professors and assistant professors was not significant (Diff=-0.054, 95%CI=-0.128 to 0.019, $p=0.201$).

The same ANOVA test for the tenure track faculty resulted in $F(2,3234) = 1.2515$, $p=0.286$, where a Tukey Post Hoc test revealed that contrary to the results from tenured faculty, the difference between full professors and associate professors was not significant = 0.053, $p=0.614$, 95% CI (0.0789, 0.1849). Similarly, the

Table 6. Linear regression results of moderation model (N=10577).

Variable		Coefficient	SE	t	p	LLCI	ULCI
Constant		3.048	0.236	12.924	0.000	2.585	3.509
Satisfaction	b1	0.2278	0.132	1.7310	0.0835	-0.030	0.486
Tenure Status	b2	-4.778	1.496	-3.193	0.0014	-7.711	-1.845
Associate Professor	b3	-1.34	0.390	-3.431	<0.001	-2.105	-0.574
Assistant Professor	b3	-2.884	0.811	-3.557	<0.001	-4.473	-1.295
Moderators							
Motivation x Tenure Status	b4	2.060	0.840	2.453	0.014	0.414	3.707
Motivation x Rank (Associate Prof.)	b5	0.064	0.209	0.304	0.761	-0.346	0.473
Motivation x Rank (Assistant Prof.)	b5	-0.052	0.438	-0.120	0.905	-0.911	0.806
Rank x Tenure Status (Associate Prof.)	b6	4.915	1.687	2.914	0.004	1.609	8.221
Rank x Tenure Status (Assistant Prof.)	b6	6.265	1.715	3.654	<0.001	2.904	9.626
Motivation x Tenure Status x Rank (Associate Prof.)	b7	-1.806	0.938	-1.924	0.054	-3.646	0.033
Motivation x Tenure Status x Rank	b7	-1.908	0.953	-2.002	0.045	-3.777	-0.040

difference between full and assistant rank professors was not significant as well as that of 0.074, $p = 0.323$, 95% CI (0.0469, 0.1949). The comparison between the tenure-track associate professors and assistant professors, however, showed results similar with the tenured faculty members (Diff=0.0210, 95%CI=-0.0421 to 0.0841, $p=0.7156$).

Regression results

To answer the second and third research questions, a moderation model was run to determine if a faculty member's tenure status, rank, and motivation could predict recent publication activity both unconditionally (no moderation) and conditionally (moderated). The conditional results are the various interactions among the variables to illustrate how tenure, rank, and motivation moderate the effects of each and in combination with onto recent publications. The results from the moderation analysis are presented in Table 6. The data are reported to show the estimated coefficient, the t statistic, associated p-value and the lower and upper confidence intervals. The data are interpreted such that when the t statistic is at least ± 1.96 in value, it is assumed that p will be no larger than 0.05, and the confidence interval will not have zero within the estimated range. The estimated coefficient will be assumed different from zero.

The model was found to be significant with $F(11, 10545) = 28.456$, $p < 0.001$, $r^2 = 0.028$. While the overall model is significant, the very small coefficient of determination implies that approximately 97.2% of the variance in recent scholarly activity is not accounted for by the current model. Reviewing the results in Table 5 suggests that the estimated value of the constant is 3.048, $t = 12.924$, $p < 0.001$. This shows that on average it is estimated that all faculty members in this sample were predicted to have approximately three refereed

articles published in the last two years.

Here we will present the unconditional estimates and simple interactions. Tenure status was coded as a dichotomous variable with professor coded as zero, meaning that an estimated coefficient will be the estimated relationship between faculty who reported that they were "On Tenure Track, Not Tenured" and the number of refereed journal articles within the last two years. Given this, the reported estimated value of -4.77 means that the faculty members who were on the tenure track and not tenured were predicted to have had 4.77 fewer articles over the two-year period as compared to tenured faculty members holding all other variables constant. This is a significant finding since it contradicts one of the hypotheses of this study and counters previous research. As mentioned above, it was originally hypothesized that when the faculty members gain permanent/ tenured status, their academic production, which is an indicator of motivation, decreases and the number of overall academic production of faculty will decrease after being granted tenure status. When considering faculty rank, the estimated coefficient for faculty who reported that they were at the associate professor rank was -1.34, meaning that as compared to full professors, associates had fewer articles published during the two-year time frame. Consistent with the preceding, assistant professors were predicted to have 2.8 less scholarly activities than faculty members who held professor rank. In sum, faculty members at the professor rank in this sample are predicted to have a greater number of referred articles during the most recent two-year period.

The moderation results are reported next in the table with the first moderation of tenure status on motivation. The moderation analysis shows that for faculty without tenure who are on tenure track as compared to tenured faculty, it was estimated that they have approximately 2.06 published articles over the two-year period. This

result is significant ($p = 0.014$), implying that taken together, motivation and tenure status do have positive and significant association with productivity. The results for the next moderation, between rank and motivation, report that a very small increase in referred publications is associated with the lower faculty rank of associate compared to professor; however, caution is warranted as the estimated coefficient here is not assumed to be different from zero ($t = 0.304$, $p = 0.761$). This implies it is risky to interpret this estimation in isolation. Similarly, when considering the rank of assistant compared to professor, the estimated coefficient is again not significant ($t = -0.12$, $p = 0.905$), implying this result must be interpreted cautiously. The remaining four moderation results do provide significant insight into how and for whom recent refereed journal articles are affected when considering how tenure status, rank, and motivation moderate each other.

The results for the moderation of rank and tenure status report that there was a bigger increase in the number of academic activities associated with the lower faculty rank of associates compared to faculty who had assistant and professor rank. The estimated coefficient is assumed to be different from zero, reporting the p-value ($t=2.914$, $p= 0.004$) for this variable less than the significance level. Although the moderation model as a whole is what this study focuses on; when individual coefficients, like in this case, is different from zero, caution should be taken in interpreting this finding in isolation, as it was for the moderation effect between tenure status and rank when motivation is a constant. In other words, tenured associate professors had done more academic activities than faculty members who were assistant professors and full professors. Similarly, the academic activity of faculty with assistant professor rank was reported to be higher ($CE= 6.265$) than the academic activity of both associate professors and full professors. In this case, since the estimated coefficient is assumed to be different from zero ($t=3.654$, $p < 0.001$), this finding can be interpreted in isolation and can tell about the academic activities of assistant professors who were in this sample; that is, not-tenured assistant professors had done more academic activities in the last two years than faculty at the rank of professor and associate. Here the conditional effects are presented. As the model becomes more complex and additional variables are considered, the results begin to show the intricate relationships among the variables. As Table 5 shows, when comparing associate professors with professors and assistants, and considering motivation as well as tenure status of the faculty, the results are marginally significant ($t=-1.924$, $p= 0.054$) and only suggest that associates produce -1.81 scholarly works fewer than the other two ranks and for assistant professors; they produce -1.91 scholarly works fewer than the other two ranks with tenure.

The conditional effect of motivation on scholarly activity is,

$$b_1 + b_4 Tenure + b_5 Rank + b_7 Tenure * Rank \tag{1}$$

So, substituting the estimations from the above we have

$$0.2278 + 2.06(Tenured) + 0.064(Associate) - 1.81(Tenured Associate) \tag{2}$$

Interpreting this it was found out that for tenured associate faculty, the values in the parentheses are all equal to 1, yielding a final estimate of 0.542. This means that for tenured associate faculty, a one unit increase in satisfaction is estimated to increase scholarly activity by 0.542 units. For assistant rank tenured faculty, we substitute the values from the estimation and get

$$0.2278 + 2.06(Tenured) - 0.052(Assistant) - 1.91(Tenured Assistant) \tag{3}$$

So, the results show that the conditional effect of a one-unit increase of satisfaction on scholarly activity for tenured assistants is estimated to be 0.326. In both cases, as motivation increases, scholarly activity is also estimated to increase. Now, if we examine the above for non-tenured faculty at the same ranks, the second and fourth terms drop out, and the conditional effects for associates and assistants are both 0.292. This shows that as motivation increases, both the associate and assistant rank faculty will have increases in productivity as compared to the other ranks. What is also interesting is that tenure is predicted to yield higher increases in scholarly activity as compared to tenure track faculty.

The findings of this study suggest that there is a significant difference in the number of academic activities among faculty of different ranks and tenure status. This difference was significant among full and associate professors, and associate professors and assistant professors, regardless of their tenure status. However, the difference was not significant among the non-tenured full and assistant rank faculty. This may suggest that overall, among the sample population of this study, tenured faculty were more actively involved in presenting scholarly products.

Since this study is focusing on the topic of motivation, both extrinsic and intrinsic factors influencing faculty research productivity was considered and the survey questions pertaining to satisfaction was treated as motivation indicators among the studied population. Findings suggest that there is an active interaction among the three key factors of motivation, rank, and tenure status which affects the academic involvement of faculty. The analysis of the moderation model proved to be significant and indicated that the model used for this study has some utility. The results reported that faculty members who were on tenure track and not tenured had fewer academic articles over the two-year period as compared to tenured faculty holding tenure status as the constant variable. For the same population, the findings

also suggested that tenured faculty who held professor ranks and non-tenure assistant professor faculty produced the most academic articles in their respective groups according to tenured status.

Almost all higher education institutes use faculty scholarly production as one of the most important conditions under which one can achieve and/or maintain a permanent tenure position (Faria and McAdam, 2015; Levine, 2017). Therefore, scholarly products are one of the means for faculty to gain tenure status. Studies such as those by Estes and Polnick (2012) explored this hypothesis for a very small population, concluding that faculty's academic production declined after they gained permanent/ tenured status. This finding suggested that tenured faculty at higher education institutes are unmotivated to engage in active scholarly activities and academic production. This study investigated this idea on a larger scale and examined the number of academic products of approximately 10557 out of 35,000 tenured and not tenured faculty members who participated in the NSOPF 2004 Faculty Satisfaction survey. Given the previous findings in related research, the overall general hypothesis of this study was similar to that of Estes and Polnick (2012). Specifically, the hypothesis presented stated that once tenure was achieved, motivation towards academic productivity would decline for all ranks and levels. Since this research examined higher education faculty, it focused on only motivation factors affecting tenured faculty members; according to Estes and Polnick (2012) "many organizational leaders and behavioral scholars consider the dynamic relationship between motivation and sustained effort as the key to understanding and predicting productivity of human resources" (p. 1). In this study motivation factors were narrowed down to only the number of academic activities among this particular population and hence the factors such as stability and job security were taken into consideration in this survey.

At most higher education institutes, after getting tenure status, there is no immediate requirement for the faculty to conduct studies and research, attend conferences, apply for grants or any other academic achievements and/or scholarly products, or engage in community events. Arguably, talented professors at higher education institutes have used their academic profession as a carrier ladder to advance based on factors such as their performance and quality of research to acquire reasonable guaranteed long-term employment through the tenure-track system. Universities on the other hand also developed rigorous evaluation systems and post-tenure review process in place to measure the productivity of the faculty based on performance and academic contribution (Altbach, 2013).

In other words, when self-satisfaction and a general feeling of achievement are acquired, intrinsic motivation factors are in place, which is also triggered by the higher education requirements. Both motivation factors

combined can affect faculty scholarly production, before and after tenure, for all academic ranks. When tenured faculty with higher academic rank engage in scholarly activity in order to enjoy it and/or to satisfy self-interest without any negative consequence or reward expectation, they produce more and enjoy doing research simultaneously (Kurose, 2013; Estes and Polnick, 2012; Eccles and Wigfield, 2002; Pintrich and De Groot, 1990; Pintrich, 2000, 2004, Pintrich and Zusho, 2007; Barron and Harackiewicz, 2000; Howey, 1999; Altbach et al., 2009; Dunigan and Curry, 2006; Price and Jenkins, 2005).

This study investigated the general hypotheses that the overall academic production of faculty will decrease after being granted tenure status. However, the results could not support this hypothesis among all ranks and employment status. The ultimate goal for a higher education institute is to have more satisfied and motivated faculty and staff, in order to improve the quality of instruction which could consequently affect the rating of the university and the number of grants given to the institute.

Moreover, with the growth of adjunct and part-time faculty positions in higher education, the number of full-time, tenured positions has subsequently declined since 2006 (Jaschik, 2009a). The hiring of more part-time or adjunct faculty is an attempt by universities to reduce costs (Eckel and King, 2007; Bland et al., 2006; Markman et al., 2008). This matter not only affects universities and colleges, but it also affects students' performance. According to Eagan and Jaeger (2008), students who are exposed to part-time faculty members are less likely to transfer from a two-year community college to a four-year institute (p. 179). The findings of the current study contradict the results reported in the studies mentioned above. As indicated previously, the American Federation of Teachers (AFT) has put a great amount of effort into encouraging higher education institutes to have a greater percentage of jobs go to tenure-track faculty members as well as better salaries and benefits for those teachers who are on a tenure track. It has been demonstrated that when faculty members are motivated, they perform better in class, improve instruction, design more practical curriculum, and, therefore, their students also perform better (Jaschik, 2009b; Zeichner, 2014).

This study found that faculty with higher rank and tenure status produced more than faculty who did not hold a permanent status at the higher education institute. This seems to suggest that rank and tenure matter. While this study did not include adjunct or part-time faculty in the sample, it appears that with full-time faculty, higher rank and the awarding of tenure can support academic productivity. Therefore, a possible implication of this finding is that if institutions want to have a bigger presence in the area of knowledge creation or impact on the quality of societies, then rank and tenure status should be awarded to faculty matters.

Limitations of the study

This study was limited to faculty members who participated in the NSOPF 2004 survey. In addition, due to the focus of the study, approximately two-thirds of the overall sample was not used in the analysis. Any implications drawn from the study must be viewed cautiously as it only pertains to faculty at the rank that secured tenure or were currently pursuing it. Second, the sample is old, meaning that much may have changed in higher education; while true, the fact that the tenure and rank system remains the hallmark of higher education means that inferences can be drawn from this system as to the implications it has on academic productivity. Third, the time frame on which these SAA are measured may be a problem, as it may not adequately capture the ebbs and flows of SAA. In addition, there were no data included as to the timing of the awarding of tenure relative to this two-year period. A more sensitive measure that included when and where tenure was awarded could better represent the scholarly work faculty do; however, the way such work was communicated limited model design. Finally, the manner in which motivation was established has limitations. While motivation is a construct and can be defined in numerous ways (Boundless, 2016; Cerasoli et. al., 2014; Hardré and Kollmann, 2012; Heinrich and Oberleitner, 2012; Howey, 1999; Waltman et. al., 2012; Sogunro, 2015), any instance when this is done can present limitations on the implications drawn from this work.

Recommendations

According to the American Association of University Professors (AAUP), the primary reason for tenure status for higher education faculty is to preserve academic freedom and to transmit knowledge without the fear of job loss. AAUP emphasizes the importance of faculty tenure status and stresses on the positive impact it has on the public interest and promotion of research integrity among faculty. The number of tenured faculty has declined to 21% in the past (Levine, 2017). It was not the intent of this study, and the results did not confirm nor deny, the effectiveness of the overall tenure and rank system procedure at universities and colleges nationwide. Research has shown that there are some higher education institutes where tenure and rank system appears to be functioning well; thus, the system should continue the way it is (De Lourdes Machado-Taylor et al., 2016; Alonderiene and Majauskaite, 2016; Tang and Chamberlain, 2010). Tang and Chamberlain (2010) examined not only tenure and rank similar to the current study, but they also considered other factors such as length of service and institutes on the attitude faculty develop towards engaging in research and teaching. They found that among the 233 professors from six

regional state universities in Tennessee who participated in this study, length of service had a significant effect on research and teaching perception, which can be similar to the current study. This study also found that tenured full professors had the most SAA among the target population. Also similar to this study, they found that lower than professor rank faculty members' teaching was influenced by rewards, explicitly acquiring a higher rank. On the contrary, Figlio et al. (2015) conducted a study on the quality of tenured and not tenured faculty and found that tenured faculty had lower instruction quality than their contingent colleagues.

It is recommended that, since the current study accounted for only three percent of the survey population, a different model should be adapted to include more variables such as faculty biographical impact (male, female, head of the household, etc.), U.S. born vs. not U.S. born faculty SAA, and interdisciplinary research vs. in-field studies, as well as the effect of faculty status and rank on the overall higher education institute rank; all of which are questions from the NSOPF 2004 survey. Moreover, just like all great studies, a replicate of the current study with more updated data could give researchers in the field a clearer insight into the more current trends in higher education. Lastly, incorporating interviews with faculty to add a qualitative aspect to the study and conducting a mix-method study with the same/similar theme would be priceless.

Conclusion

The results of this study could not validate all aspects of the Expectancy Theory predictions in a multi-dimensional manner. Although academic productivity was defined not only as research but also teaching and engaging in service to the community, refereed articles, and presentations; there were more factors involved in predicting faculty motivation than their tenure status and academic rank. Further studies should be conducted to help education leaders to review current policies and practices regarding faculty performance assessment, evaluate the effectiveness of such policies specifying possible factors which could contribute to the professional growth of faculty members at higher education institutes, and operationalize tenure policies to include motivational elements.

Currently, with the increased number of universities, improved services and features that almost all universities share, and the variety of fields of study that they offer, the question of the practicality of higher education has narrowed down to the situation of affordability and ranking of the higher education institutes. Both of these are closely attached to the quality of instruction of the faculty members and the creativity of faculty into doing genuine research in order to secure funding through various sources for their higher education

institute. Otherwise, choosing a university or college in this day and age is the comparison between apples and apples. It is the faculty of a higher education institute that brings value, quality, and consequently money to the school and will also increase or raise the rank of the school.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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