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Effects of LMX and External Environmental Factors on Creativity Among Faculty in Higher Education

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EFFECTS OF LMX AND EXTERNAL ENVIRONMENTAL FACTORS ON CREATIVITY AMONG FACULTY IN HIGHER EDUCATION

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by
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ABSTRACT

Recent articles in the news clearly indicate that changes are occurring in American higher education requiring universities to rely on faculty who can initiate change through creativity and innovation (Zhou & George, 2001). Creativity is generally defined as the generation of products or ideas that are both novel and appropriate (Hennessey & Amabile, 2010).

Institutional theory, leader-member exchange theory (LMX), and the componential theory of creativity provide the theoretical framework for this study. This study explores the effects of faculty perceptions of external environmental pressures in higher education on faculty perceptions of their creativity. This study also examines: (a) the effects of perceived external environmental factors on the faculty perceived LMX relationship, (b) the effects of the faculty perceived LMX relationship on faculty perceptions of their creativity, (c) the mediating effects of the faculty perceived leader-member relationship on the perceived external environmental pressures to perceived creativity relationship and (d) the moderating effect of a requirement to publish on the external pressure to creativity relationship.

The primary research question for this study is: Do perceived external environmental pressures and leader-member exchange (LMX) relationships affect faculty creativity in higher education? This primary question is supported by five secondary questions examining the multiple dimensions of the study. This study uses an online survey, derived from an initial pilot study, to measure faculty perceptions of external

environmental pressures, faculty creativity, and the LMX relationship. Participants are faculty members from one public liberal arts university and from one public research university, both located in the southwestern United States. The data and path model for the study is analyzed using the partial least squares structural equation modeling (PLS-SEM) technique provided through the SmartPLS software program.

The results of this study indicate a positive relationship exists between faculty perceptions of external environmental pressures and their creativity, and an inverse relationship exists between faculty perceptions of external environmental pressures and the LMX relationship. No significant relationship was found between faculty perceptions of their LMX relationship and their creativity. There is no evidence of a mediating effect by LMX on the external pressure to creativity path, nor is there evidence of a moderating effect from a requirement to publish on this path.

The results of this study provide implications for practice including recommendations for faculty, leaders, and policy. Also provided are recommendations for future research. This study is unique in that no investigations into the effects of external environmental pressures on higher education using the mechanisms of isomorphism as outlined by institutional theory (coercive, mimetic, and normative pressures) were found during the literature review. This study therefore, provides a basis for future investigations into the effects of external environmental pressures on higher education.

DEDICATION

This dissertation is dedicated to my wife, Barb, and to my son, Matt. Their sacrifices, support, encouragement, and patience made the completion of this doctoral program possible.

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I also wish to acknowledge the contributions of my fellow classmates who blazed the trail and provided many examples of excellence. Dr. Tony Franklin continually

encouraged and supported me with his friendship, periodic phone calls, and text messages. Dr. Lorraine Angelino encouraged me to enter the program and, along with Drs. Susan Shurden and Abidimi Olalere, provided consistent encouragement, support, resources, and assistance.

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CHAPTER ONE

NATURE OF THE PROBLEM

Recent articles in the news include (a) “Outlook for Higher Ed in 2018 is Bleak, Ratings Agency Says” (Harris, 2018), (b) “Two Massachusetts Colleges Say They May Merge; Small Black College Will Close” (Jaschik, 2018), and (c) “Spate of Recent College Closures has Some Seeing Long Predicted Consolidation Taking Off” (Seltzer, 2017). In 1997, when commenting about uncontrollable expenditures in higher education without improvements in content or quality, Peter Drucker stated that “Thirty years from now the big university campuses will be relics. Universities won’t survive.” (Lenzner & Johnson, 1997). Changes are occurring in American higher education requiring our attention. This call to action requires that universities use creativity to weather such changes.

Creativity, the origination of new ideas for changing products, services, and processes to better achieve the organization’s goals, has been heralded as a key to enduring advantage (Amabile, Barsade, Mueller & Staw, 2005). Creativity in higher education stems from the minds of the individual faculty who, alone or with others, carry out the work of the university (Amabile, Schatzel, Moneta, & Kramer, 2004). The extent to which faculty are creative depends, in part, on the environment that they perceive around them (Amabile, Conti, Coon, Lazenby, & Herron, 1996).

Statement of the Problem

Volatility facing today’s universities require employees who can initiate change through creativity and innovation (Zhou & George, 2001, p. 682). Scholars are eager to

learn about this distinctively human ability (Hennessey & Amabile, 2010), but, little is known about how environmental factors in the daily work lives of faculty relate to their creativity (Amabile et al., 2005). Colleges and universities must learn what environmental factors enable faculty to thrive, achieve, and be creative in their roles (Campbell & O'Meara, 2014), as the success of these institutions, even survival, depends upon it (Frohman, 1997). The purpose of this study is to identify the effects of faculty perceptions of environmental factors on faculty perceptions of their creativity. Wood (2012) indicates that perception is the process of creating meaning by selecting, organizing, and interpreting information (Otter et al., 2013). Initial perception (first information) influences the processing of new information and is not easily changed without strong conviction and in many cases 'perception is reality' (Otter et al., 2013).

Olalere (2013) found that LMX relationships, from an individual or dyadic-level perception, mediate effects on creativity. Mediation occurs when a third variable intervenes between the relationship of two other related variables (Hair, Hult, Ringle, & Marstedt, 2017). A change in the independent variable causes a change in the mediation variable which results in a change in the dependent variable (Hair et al., 2017). Building heavily from social exchange theory (Liden & Maslyn, 1998), LMX focuses on the different ''relationships'' that develop between a leader and each subordinate, a leader and groups of subordinates, and between subordinates themselves (Bess & Goldman, 2001). In this study, I examine the relationship between a leader and a faculty member as perceived by the faculty member and the mediating effects of this relationship on the

effects of faculty perceptions of environmental factors on faculty perceptions of their creativity.

The leader-member exchange (LMX) relationship is the extent to which a relationship between a leader and subordinate is marked by trust, mutual liking, and respect (Amabile et al., 2004). High quality LMX exchanges have been shown to be positively related to organizational commitment and autonomy (Liden & Maslyn, 1998), engagement in more relevant and challenging tasks (Liden & Graen, 1980), and job-related risk taking (Graen & Cashman, 1975; Tierney, Farmer, & Graen, 1999). Low quality LMX exchanges may lead to a subordinate feeling out of favor and lacking support from the leader which in turn leads to a lack of trust, low self-esteem, lack of communication, and ultimately a disconnect from the leader (Shurden, 2014). Graen and Scandura (1987) indicated that LMX theory also suggested that the quality of the relationship between a supervisor and a subordinate is related to innovativeness and therefore creativity as well (Scott & Bruce, 1994). Because this relationship is of significant importance, and following Olalere (2013), I propose that LMX influence relationships between external environment pressures and creativity.

Institutional theory was developed to explain the pressures faced by organizations from other organizations it interacts with and how these pressures constrain organizational change (Hanson, 2001). Pressures may be highly visible, formal and forceful, or relatively informal, invisible, or subtle (Hanson, 2001). DiMaggio and Powell (1983) identified three pressures that may be faced by organizations as coercive pressures, normative pressures and mimetic pressures. Coercive pressures are formal and

informal pressures to gain compliance and are primarily used by regulatory agencies such as governmental agencies, laws, courts, and professions (Scott, 1987). Coercive pressures may also be applied by special interest groups and from public opinion (Oliver, 1991). Normative pressures are manifest in the values, codes, and standards that are imposed by organizations such as professional certification and accrediting agencies (Hanson, 2001). Mimetic pressures are those that force an organization to adopt the actions of another because these actions may be viewed as being of a higher level, quality, or achievement in the public eye (Hanson, 2001). Organizational change is defined as that occurring to formal structure, organizational culture and goals, program, or mission (DiMaggio & Powell, 1983).

Although institutional theory focuses on the relationships and connections among social actors rather than on individual behavior (Marion, 2002), organizations are inhabited by people who are more than "carriers" of institutions and their interactions and the ways in which they do things are fundamental components of institutions (Hallet & Ventresca, 2006). The term actors may include individuals, associations of individuals, populations of individuals, organizations, association of organizations, and populations of organizations, but in this study, it refers to specific faculty members in a university (Scott, 2014).

Purpose

The major purpose of this study is to identify and explore the effects of faculty perceptions of external environmental pressures in higher education on faculty perceptions of their creativity and also to identify the mediating effects of the leader-

member relationship on faculty perceptions of their creativity based upon the faculty member's perception of the LMX relationship (Shurden, 2014). I hypothesized that faculty perceptions of external environmental pressures exert a direct effect on faculty creativity, but that leader-member exchange relationships (LMX) exert mediating effects on faculty creativity.

A secondary purpose of this study is to bring awareness to higher education administrators of the impact that external environmental pressure has on their faculty with regards to creativity which may have a detrimental effect on the future of their organizations. A third purpose of this study is to alert faculty that they may be consciously or subconsciously affected by factors occurring around them which may be preventing them from achieving their full potential. Finally, this study should also add to the current body of knowledge that exists concerning pressures from outside the immediate work environment that either promote or impede individual creativity (Amabile, 1996).

Research Questions

The primary research question for this study is: Do perceived external environmental pressures and leader-member exchange (LMX) relationships affect faculty creativity in higher education?

Supporting questions for this study are:

1. Do perceived external environmental pressures affect faculty perceptions of their creativity in higher education?

2. Do LMX relationships affect faculty perceptions of their creativity in higher education?
3. Does LMX mediate the relationship between perceived external pressures and faculty perceptions of their creativity in higher education?
4. Does pressure to publish moderate the relationship between perceived external pressures and faculty perceptions of their creativity in higher education?
5. Do perceived external environmental pressures affect a high level LMX relationship in higher education?

Research Method

This study uses the Partial Least Squares – Structural Equation Modeling (PLS-SEM) software package applied through the SmartPLS3 computer program, to evaluate the path model illustrating the effects of external environmental pressures felt by faculty on faculty creativity. It also examines the effects of the leader-member relationship in mediating the effects of this pressure-creativity link. An online survey is used to acquire data from a non-random convenience sample of university faculty with the intention of making generalizations about the population of all university faculty members in the United States only as the institutional characteristics being studied are reflective of the US national environment including cultural norms, social knowledge, rules and regulations and others (Creswell, 2003; Shurden, 2014; Kostova, 1997).

The online survey consists of four sections to gather data measuring two independent variables, namely perceived external environmental pressures (Pressure) and the faculty perceived relationship with their leader (LMX), and one dependent variable to

measure faculty perceptions of their creativity (Creativity). This study is primarily concerned with the effect of perceived external environmental pressures on faculty perceptions of their creativity and secondly with the mediating effect of the faculty perceived leader-member exchange relationship on those effects. A fourth section of the instrument is to collect demographic data from respondents. Data was collected from university faculty members at one small public university located in the southeastern United States and from the faculty members of one college within a large public university also located in the southeastern United States. The data is analyzed using Structural Equation Model Partial Least Square software known as SmartPLS (Olalere, 2013; Ringle, Wende, & Becker, 2015).

Theoretical Framework

Ronald Coase (1983) indicated that "Without a theory they had nothing to pass on except a mass of descriptive material waiting for a theory, or a fire" (Scott, 1995, p. 5). Three theories serve as a roadmap for this research: (a) institutional theory, (b) leader-member exchange (LMX) theory, and (c) componential theory of creativity.

Institutional Theory

The primary explanatory theory for this investigation, institutional theory, "allows us to look beyond economic forces to understand more completely the evolution of systems and their enabling and constraining influences on actors within these systems" (Tuttle & Dillard, 2007, p. 388). DiMaggio (1988) reported that the theory addresses the ‘‘circumstances that cause the actors who recognize and try to act on their interests to be

unable to do so effectively" (Tuttle & Dillard, 2007). For this study, the term actor refers to individual faculty members.

In the attempt to gain and retain legitimacy within their field, organizations grow to look and operate like others in the same organizational field, which is a collection of diverse, interdependent organizations that share a common meaning system. The pressures on schools from organizations and agencies in their organizational fields (e.g., accreditation, court decisions, teacher training programs, state regulations), are quite similar across the country, and in consequence, schools in one region of the country tend to act like schools in other regions (Rowan & Miskel, 1999). This ongoing transformation process is called isomorphism (DiMaggio & Powell, 1983; Scott & Meyer, 1983; Scott, 2014). Hawley (1968) described isomorphism as "a constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions" (DiMaggio & Powell, 1983, p. 66). The greater the constraining pressures from the environment, the fewer options there are for educational change (Hanson, 2001).

DiMaggio and Powell (1983) identified three primary mechanisms of isomorphism (pressures) that may be faced by organizations as coercive pressures, mimetic pressures and normative pressures, and these pressures may intermingle but generally result from different conditions (Frumkin & Galaskiewicz, 2004). Coercive pressures, both formal and informal, generally stem from political influences of governments and other organizations outside the organizational field, from other

organizations within the organizational field that they are dependent upon, and from societal expectations (DiMaggio & Powell, 1983).

Mimetic and normative pressures may be either rational or irrational (Frumkin & Galaskiewicz, 2004) and are generally from within the organization or organizational field and are seen as standard responses to uncertainty and professionalization respectively (DiMaggio & Powell, 1983). Mimetic pressures are those that sway an organization to copy success rather than "reinvent the wheel" (Marion, 2002). These actions may be either good or bad for the organization and may or may not be the most efficient or economical responses to perceived problems, but by performing these actions, the organization appears to be legitimate to others within the field (Marion, 2002).

Normative pressures are commonalities of a shared culture and essentially "the way things have always been done" (Marion, 2002). They may also result from accrediting agencies of a profession defining the conditions and methods of work and attempts to regulate their members in an effort to legitimize the organization (DiMaggio & Powell, 1983). Ultimately, organizations that "successfully navigate their institutional environments are left alone to their own devices" as long as "external groups are satisfied with the organizations visible structures" (Sellers, Fogarty & Parker, 2012).

Organizations experience external pressures to change and, in the process, these external pressures filter down to the individual members throughout the organization. Tuttle and Dillard (2007) indicated that institutional theory has been used to explain the forces that influence individuals within organizations as well as organizational actions (Dacin, Goodstein, & Scott, 2002). Institutional theory describes more than conditions

for change. As noted earlier, institutionalism, according to DiMaggio (1988) also addressed the ‘‘circumstances that cause the actors who recognize and try to act on their interests to be unable to do so effectively” (Tuttle & Dillard, 2007). That is, institutional theory may be a constraint that limits the choices that individuals can make. I propose to use institutional theory as a source of identifying external environmental factors which produce perceived pressures on individual faculty members in higher education and thus negatively affect their perceptions of their capacity to be creative.

Leader-Member Exchange Theory

The second theory used in this study is the leader-member exchange (LMX) theory of leadership. Olsson, Hemlin, and Pousette (2012) state that “the fundamental premise of LMX theory is that a leader and a follower develop a relationship through social and professional exchanges, forming a unique dyad.” Borrowing from social exchange theory (Liden, Sparrowe, & Wayne, 1997), LMX is ideally suited for studies of educational organizations because it examines relationships between leaders and subordinates differentiated by talents, attitudes, and personality rather than just job titles (Bess & Goldman, 2001).

An examination of LMX and its effect on faculty perceptions of their creativity is important because the university environment is dynamic and ever changing (Yukl & Lepsinger, 2004). Adaptation to changes from the external environment is essential if a university is to grow and remain competitive; the ability to respond in a timely manner is crucial to any organization’s ability to thrive (Yukl & Lepsinger, 2004). It is vitally important for university leaders to continuously scan the environment and reevaluate

their programs, planning processes, and initiatives to carry out the mission of the university (Settoon & Wyld, 2004). Leaders in higher education are charged with satisfying the conflicting expectations and desires of internal and external constituencies such as students, faculty, administration, alumni, accrediting agencies, and government agencies (Low, 2010). Department leaders are responsible for working with faculty to develop departmental strategies to create, revise, and support the mission, goals and objectives of the department (Settoon & Wyld, 2004).

In early studies by researchers such as Dansereau, Graen, and Hage (1975), Graen and Cashman (1975), and Graen (1976), LMX focused on "vertical dyad linkage (VDL)," which is an examination of the reciprocal relationships formed between a leader and each of their followers (Northouse, 2007). The ability of a leader to form strong bonds with followers was based upon the leaders own VDL relationship with their superordinate (Figure 1.1) (Bess & Goldman, 2001). Individuals are nested in dyads, groups, and organizations (Olsson et al., 2012) and over time, the focus of LMX rapidly evolved into a multi-level, multi-domain examination of leader relationships with multiple followers and on intragroup subordinate relationships (Bess & Goldman, 2001). Most recently, LMX research has expanded to studies on differences within groups (group-level effect), a focus on dyads regardless of groups (dyad-level), and a focus on the combination of dyads into groups and networks (dyads within groups effect) (Graen & Uhl-Bien, 1995).

Olsson et al. (2012) investigated the LMX dyadic effect between leaders and followers working in groups in both the academic and commercial settings and found that from a leader's perspective high quality relationships had a positive effect on creativity

for individuals working in groups in academic settings. This research examines the dyadic effect of the LMX relationship from the follower perspective and its effect on the follower's perception of their individual creativity. I hypothesized that a faculty member with a positively perceived LMX relationship with their leader will also have a positive perception of their individual creativity.

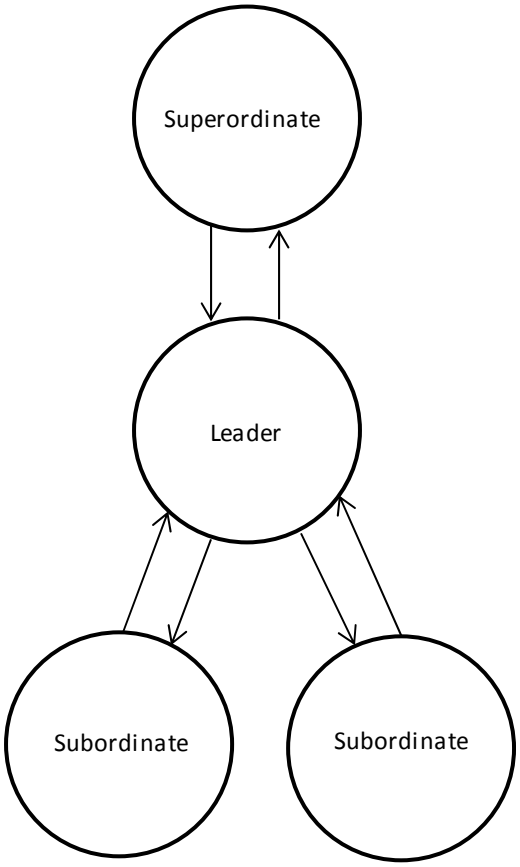

Figure 1.1 . Vertical dyad linkage in leader-member exchange theory. Linkages between a leader and followers in the "in group" are reciprocal. The ability of a leader to form strong bonds with followers is based upon the relationship that they share with their leader (Bess & Goldman, 2001; Graen, Cashman, Ginsburg, & Schiemann, 1977).

Componential Theory of Creativity

The third theory used in this study is the componential theory of creativity. In 1983, Amabile expanded upon previous work to identify the necessary components of individual creative performance that became known as the componential model of creativity. The componential model of creativity highlighted the importance of talents, education, cognitive skills, interest patterns, and personality dispositions that interact to influence creative behavior (Amabile, 1988). The model outlines three primary components necessary for individual creativity as domain-relevant skills, creativity-relevant skills, and intrinsic task motivation (Amabile, 1988). The component creativity-relevant skills were later refined to become creativity/problem-solving skills and the social environment was also later added to this theory (Hennessey, 2015).

Domain-relevant skills include factual knowledge, technical skills, and innate cognitive skills (special talents) that are necessary for any intellectual endeavor (Amabile, 1988). This component contains the basic tools that individuals use to solve a problem or task and judge the resulting response (Amabile, 1988). The greater the domain-relevant skill set possessed by an individual, the greater the number of alternatives that the individual may develop to produce novel, useful ideas, or problem solutions (Amabile, 1988; Hennessey, 2015). Domain-relevant skills are most readily seen in use by product designers and engineers among others (Amabile, 2011). I assumed that all faculty members who participate in this study have proven that they have sufficient knowledge, technical skills, and talents in their respective areas of expertise.

The possession of domain-relevant skills is an important part of the creativity process, but they alone will not lead to the production of novel, useful ideas or problem solutions. Individuals with creativity/problem solving skills possess an innate ability to generate novel ideas, learn cognitive skills, and work style conducive to creativity. These individuals have an ability to analyze a complex problem and break it down into simplistic forms. They apply their cognitive knowledge to the individual problem components and synthesize a response (Amabile, 1988). Individuals with creativity/problem solving skills are quick to learn from mistakes and unlikely to repeat the mistake. These individuals are intrinsically motivated and have a work style that enables them to concentrate for long periods of time as they analyze a problem and work toward a solution (Amabile, 1988). They are independent and self-disciplined with an ability to delay gratification and persevere when faced with frustration and often have an aversion to conformity thinking and social approval (Amabile, 1988).

Intrinsic task motivation may be the most important component in componential creativity theory, but may also be the most neglected by researchers (Amabile, 1988). Oftentimes, a highly motivated individual can succeed with a deficiency in domain-relevant skills or creativity/problem solving skills as intrinsic motivation determines the amount of engagement of the other two skill sets (Amabile, 1988). Simply stated, intrinsic task motivation is a good attitude toward tasks and ability for self-motivation. Intrinsic task motivation is composed of two elements, the individual's baseline attitude and the individual's perceived reasons for undertaking a task (Amabile, 1988). Baseline attitude is the natural attraction toward or repulsion from an activity. An individual's

perceived reason for accepting or rejecting a task are largely dependent on external social and environmental factors that support or constrain the individual with respect to the task under consideration called extrinsic or salient extrinsic constraints (Amabile, 2011). Relatively subtle changes in the work environment can have substantial effects on individual creativity (Amabile, 1988).

The social environment is that component outside the immediate work environment and includes all of the factors that may stimulate or undermine intrinsic motivation and creativity (Amabile, 2011). Extrinsic constraints are controlling factors that are unseen by the individual as they perform a particular task while salient extrinsic constraints are those controlling factors that are clearly seen by the individual as they perform a task (Amabile, 1988). Examples of extrinsic constraints are "political problems within the organization; an emphasis on the status quo; a conservative, low-risk attitude among top management; and excessive time pressure" (Amabile, 2011). I propose that perceived external environmental pressures, brought about by the factors identified by DiMaggio and Powell in their institutional theory, will have a direct effect on faculty and thus negatively affect their perceptions of their capacity to be creative.

Social environment factors may also stimulate intrinsic motivation and creativity in faculty members. Examples of these factors include "freedom in carrying out the work, supervisors who encourage the development of new ideas, top management that supports innovation through a clearly articulated creativity-encouraging vision and through appropriate recognition for creative work" (Amabile, 2011). I propose that a

faculty member with a positively perceived LMX relationship with their leader will also have a positive perception of their individual capacity to be creative.

Conceptual Framework

A conceptual framework for this research study is provided in Figure 1.2. The major components of the study include external environmental pressures, creativity, and the leader-membership exchange relationship.

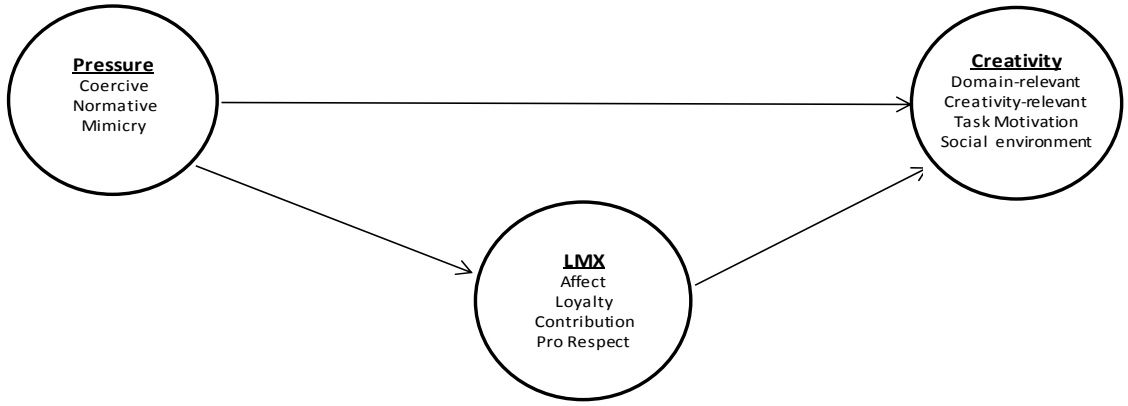

Figure 1.2. Conceptual framework for the study.

The conceptual framework for this study illustrates how external environmental pressure is expected to have a direct relationship with faculty creativity. It also illustrates how the leader-member exchange relationship between the faculty member and their leader mediates the effect between external environmental pressure and faculty creativity. External environmental pressures are identified as coercive, normative, or mimetic in nature. Creativity is promoted by domain-relevant skills, creativity-relevant skills, intrinsic task motivation, and social environment. The leader-member exchange relationship is comprised of the level of affect, loyalty, contribution, and professional respect between the leader and faculty member.

Definitions

The following is a list of definitions for terms that were used in this study:

- *Actors* may include individuals such as a specific faculty member, associations of individuals such as a department of faculty members, populations of individuals (faculty, students, administrators), organizations such as a university, association of organizations such as the state higher education system, and populations of organizations such as universities (Scott, 2014). As used in this paper, it refers to specific faculty members in a university.
- *Creativity* is generally defined as the production of novel, useful ideas or problem solutions and it refers to both the process of idea generation or problem solving and the actual idea or solution (Amabile, 1983).
- *External* refers to areas outside the immediate work environment (Amabile, 1996).
- *Faculty* refers to the union of the regular faculty, the special faculty and the administrative faculty (Clemson, 2017).
- *Innovation* is the successful implementation of ideas at the organizational or unit level (Shalley, Zhou, & Oldham, 2004).
- *Institutional theory* is a body of thought that identifies, emphasizes, and explores the forces that constrain organizations from changing (Hanson, 2001). This theory explains the transformation of organizations over time as they work to obtain legitimacy from external parties while organizing internal parties according to changing criteria (Sellers et al., 2014).

- *KEYS: Assessing the Climate for Creativity model (KEYS)* is a tool designed to help leaders see a clear picture of the climate for innovation within a work group or organization (Amabile, 2010). KEYS is comprised of a set of factors that fosters and promotes an environment of creativity. These factors include autonomy, work group support resources, challenging work, organizational encouragement, and employee support (Amabile et al., 1996; Olalere, 2013).
- *Leader-Member Exchange (LMX)* is a theory that describes the role-making processes between a leader and each individual subordinate and the exchange relationship that develops over time (Damsereau, Graen, & Haga, 1975; Graen & Cashman, 1975; Yukl, 2006).
- *Partial Least Square Structural Equation Modeling (PLS-SEM)* is a composite based method to estimate structural equation models with the goal of maximizing the explained variation of the endogenous latent variables (Hair, Sarstedt, Ringle, & Gudergan, 2018).
- *SmartPLS* is the software package which facilitates the use of Partial Least Square Structural Equation Modeling (PLS-SEM).

Assumptions

There are multiple assumptions made in this study. I assumed that respondents answered each survey question honestly. Some respondents may have answered some survey questions in a manner that they thought would make them look much better than other respondents. I also assumed that participants worked independently and that each response is their own. Some participants may have worked in groups with mobile

devices and collaborated on one or more question responses. I assumed that participants worked in a quiet location free of outside distractions and have given their full attention to survey responses. Finally, I assumed that participants worked at a time in which they were stress-free. Some participants may have entered the survey at a time at which they were stressed and may have rushed through the survey or failed to give each question proper consideration.

Limitations

This study was limited in several ways. First, the sample of respondents was drawn from two universities within a single region of the United States and therefore, the results may or may not be fully applicable to all universities in all countries (Scott, 2002). Second, respondents were drawn from the entire faculty pool at one small liberal arts state university and from a single department within a large state research university in an effort to exceed the minimal number of responses needed for analysis in SmartPLS. Faculty from the two universities may be affected by external environmental factors in different ways and therefore respond dissimilarly to the survey questions. Responses from faculty in the single department could impact results. Third, the environmental factors considered in the study are based upon the culture, laws, and morals within the United States and therefore, the results may not be applicable to faculty in other countries (Scott, 2014). Fourth, the identification and choice of "leader" was assigned to the individual participants. This choice may be someone other than a department chair or a dean. Lastly, many variables outside the control of the researcher could impact the data such as multiple faculty taking the survey together on multiple devices, discussion of the

survey items among faculty, faculty becoming bored with the survey, and leaving questions unanswered.

Significance of the Study

The findings of this study are significant in a number of ways. First, the findings may fill a gap in the current knowledge base regarding how perceived external environmental factors in the daily work lives of faculty might affect their perceptions of their individual creativity. Second, the findings may augment the empirical literature regarding the mediating effects of the LMX relationship between leaders and faculty on faculty perceptions of their creativity in higher education based upon the faculty member's rating of the LMX relationship. Third, the study may provide university administrators with an understanding of which external environmental factors enable faculty to thrive, achieve, and be creative in their roles at the university. Lastly, the study may enlighten faculty to the effects of perceived external environmental pressures and the effects that they play on their perceptions of their creativity.

Organization of the Study

There are five chapters within this study. Chapter One introduced the problem, namely the lack of knowledge about how perceptions of external environmental factors in the daily work lives of faculty might relate to their perceptions of their creativity. Chapter One also introduced the componential theory of creativity, institutional theory, and leader-member exchange theory as lenses by which I may better understand and solve the problem. Finally, Chapter One provides research questions, research methods, definitions of terms, assumptions, limitations, and significance of the study. Chapter

Two provides a review of the existing literature pertaining to the evolution of our knowledge of creativity and the two theories that are incorporated in this study. Chapter Three provides a discussion of the study's methodology, variables, pilot study and survey creation, participants, and single-rater bias issues. Chapter Four highlights the analysis of the data collected using SmartPLS while Chapter Five provides an overview and discussion of findings, the implications for higher education, and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

Introduction

> *"To know where we are going with leadership research, we must know where we are, and where we have been—we must look backward and forward at the same time" (Hunt & Dodge, 2000, p. 453).*

The primary purpose of this chapter is to present and examine the extant literature associated with institutional theory and the resulting pressures experienced by faculty in higher education and to investigate the effect of these pressures on leader-member exchange (LMX) and faculty creativity. The importance of this review is to highlight the gaps in the existing empirical literature regarding the impact of environmental effects on individual creativity.

Initially, this review will examine the context of higher education and accountability, and the role of faculty in higher education. This review will then investigate the historical literature associated with the study of environmental pressures on organizations as described through institutional theory and how these pressures filter down to faculty in higher education. The focus will then turn to an in-depth examination of LMX as the relationship relates to faculty creativity. This review will also examine the evolution of the study of organizational and individual creativity including Amabile's (1988) componential theory of creativity as they relate to this study. The final section of this review will summarize the findings of this literature review, highlight the direction of

this study, and provide an overview of the model and methodology to be used in this study.

This overview is the culmination of an extensive review of literature from printed books and textbooks, academic news sources such as the Chronicle of Higher Education and Inside Higher Ed, online journal articles from database sources such as Academic Search Complete, Business Source Complete, EBSCO, Education Research Complete, PsychInfo, and Web of Science, and dissertations from the ProQuest Dissertations & Theses Global database. Every effort has been made to give the order of priority/importance to information gained from peer-reviewed academic journals, books, recent conference papers, dissertations, and then website articles and research studies as recommended by Creswell (2003). Articles from top tier journal as indicated by the InCites Journal Citation Reports (JCR) Database were always given priority in this research.

The Context of Higher Education and Accountability

The United States federal and state governments take an interest in all levels of education with higher education receiving a more decentralized control at state, campus, and classroom levels (Gumport & Chun, 2005). Although providing various mechanisms of financial support and legislating policies, there are few constraints on the academic processes (curriculum, teaching, learning, and classroom practices), and universities and colleges are deemed legitimate providers of postsecondary education (Gumport & Chun, 2005). Institutions of higher education are well secured in the marketplace although they are vulnerable to challenges from new providers given the rapid advancement of

technology (Gumport & Chun, 2005). As a rating mechanism, performance measures have become a part of daily life for faculty of universities and colleges in an attempt to rank the quality of educational services provided.

Performance measurement has been an increasing part of higher education since the passage of the Government Performance Results Act in 1993. Further pressure for performance measurement and accountability was applied by the No Child Left Behind Act in 2001. Increasingly over time, performance measurement has become a component in accountability for budgeting, pay increases and promotions, and individual productivity in primary, secondary, and postsecondary education (Munro, 2008).

Quantifiable measures of accountability such as profits, processes, structures, and other systems for accountability commonly used in other organizational fields are not always sensible for institutions of higher education (Birnbaum, 1988). The characteristics of the higher education environment are unique. These characteristics include: (a) ambiguous and diverse goals, (b) provision of knowledge services to clients rather than manufacturing products, (c) key employees are highly educated and professionalized, and (d) they have outside decision makers who wander in and out of the decision process (Birnbaum, 1988).

The business of higher education is instruction and is one of the most complicated business endeavors in the marketplace (Lenington, 1996). As organizations, higher education produces intangible knowledge services through "highly social, interactional, and tacit processes of teaching and learning" (Gonzales & Núñez, 2014). In the world of state non-profit universities, prestige and legitimacy are of utmost importance (Tomas,

2012). Gonzales and Núñez (2014) suggested that higher education utilizes rankings to measure the individual faculty members and the individual universities against other faculty and universities. Rankings are achieved through three mechanisms: (a) individualism, (b) standardization, and (c) commodification. A fourth mechanism, homogenization, implies that over time, organizations award recognition to particular forms of faculty work, especially publishing (Gonzales & Núñez, 2014).

Accountability applies to areas within the university as well as external to the university (Schmidtlein & Berdahl, 2005). Faculty members are accountable for the integrity of their work to their peers both within and outside the institution where they work. These include peers within their disciplines and professional fields, both nationally and internationally (Schmidtlein & Berdahl, 2005).

In terms of value, this accountability to peers creates a sense of competition or individualism. Individualism "pits individuals and institutions against one another" (Gonzales & Núñez, 2014) resulting in faculty members distancing themselves from other faculty and the university to focus on their own productivity (Gonzales, 2012). Tenure and promotion decisions are often based upon individual achievement such as original research and publications which are easily quantified (González, 2008).

At one time, institutions of higher education were viewed as freewheeling and unrestrained with respect to accountability in the name of societal good (Zumeta, 2001). Today, higher education is faced with a multitude of external demands in the name of societal value (Zumeta, 2001). Standardization is now the primary method of achieving accountability throughout higher education and is used to compare the quality and value

of faculty and universities on a large scale such as regionally, nationally, or internationally (Gonzales & Núñez, 2014). Individual faculty members are evaluated based upon the number of grant awards they receive, the number of publications they produce, and the quality of the journals within which their names appear (Safón, 2013). Heavy emphasis is placed upon original research and publications of faculty members (Gonzales, 2013).

Commodification is the process of placing a market value on creative outputs and research from faculty and universities, (Canaan & Shumar, 2011). Faculty work may be commodified through grants that are secured which place a value on their time and output (Slaughter & Rhoades, 2004). The larger the amounts of grant money attracted by faculty, the more legitimate the university becomes amongst other universities within the field (Gonzales & Martinez, 2014). Other attempts to commodify output is through the sales and price of books produced by faculty, the value of patents obtained, and the market value of new inventions created within the university environment.

One downside of commodification is that it is not all-inclusive. The creation of new teaching methodologies, training students to think rationally, the open exchanges of thoughts and ideas, the production of new knowledge in classroom settings, and outputs from faculty service efforts many times go largely unrewarded (Gonzales & Núñez, 2014). Currently, there is no accurate method of placing a value on all the educational outputs from teaching and service which has shifted the focus of faculty from teaching and service to research (Altbach, 2005). Another downside of commodification is the basic economic laws of supply and demand. In higher education, the push to increase

research productivity in the name of earning tenure and promotions many times lead to a decline in the value of this work (Gonzales & Núñez, 2014). As the quantity of published research increases, the less this work is valued by consumers (Register & Grimes, 2015).

The Role of Faculty in Higher Education

Faculty member work is performed on relatively closed campuses and without much publicity and their work is not widely observed, understood, or appreciated by the general public (Bowen & Schuster, 1999). Faculty in higher education face significant strain from governmental cutbacks, enrollment uncertainties, pressures for accountability, and confusion about academic goals (Altbach, 2005). Faculty exercise considerable control over their working conditions, although this is slowly weakening in the name of accountability (Altbach, 2005). There are three overlapping roles of faculty in higher education are teaching, research, and public service; which includes institutional governance and operation (Bowen & Schuster, 1999). A role is an expected, rather than actual, behavior (Marion, 2002).

Teaching is the primary role of faculty and the aspect upon which, as a whole, faculty spend most of their time (Bowen & Schuster, 1999). Beside classroom and laboratory instruction, teaching includes: (a) keeping current with literature in the field, (b) attending and presenting at conferences, (c) preparing for classroom presentations, (d) advising students about program coursework and career planning, (e) evaluating the work of students, (f) writing letters of recommendation, and (g) serving as role models for students (Bowen & Schuster, 1999).

The teaching role of faculty today is much different than in decades past. Instead of multitasking, universities are separating tasks and using specialized teams and professionals (Paulson, 2002). This action allows universities to use more non-tenure track and adjunct staff thereby eliminating the need for higher paid tenure track and tenured faculty (Howell Saba, Lindsay, & Williams, 2004). Regarding the recent movement toward distance education, tenured faculty members are becoming course managers, responsible for "teaching, organizing, grading, coaching, problem solving, and even facilitating" (Howell et al., 2004). Additionally, these faculty members continue to maintain their roles as mentors, role models, counsellors, supervisors, and liaisons (Howell et al., 2004).

Research involves the discovery of new knowledge or the creation of original work, which is usually distributed through some form of publication such as academic journals, books, and online articles (Bowen & Schuster, 1999). Faculty members are more likely to assume the role of content expert or researcher alongside the academic staff who are providing classroom instruction in research institutions (Weerts & Sandmann, 2008). This division of labor illustrates the strength of traditional faculty cultures primarily at research institutions, regardless of mission, location, or brand identity (Weerts & Sandman, 2008).

Public service is an extension of teaching and probably the least understood by society. Public service may include educational and consulting services to the public, health care services by faculty at university hospitals, operating farms, dairies, and other ventures related to research and instruction (Bowen & Schuster, 1999).

One form of university service is institutional governance and operation. The case of the National Labor Relations Board v. Yeshiva University (444 U.S. 672, 1980) ruled that faculty were members of management (Bowen & Schuster, 1999). As such, institutional governance and operation is the faculty duty and opportunity to apply their discipline-specific expertise to the policies, decisions, and ongoing activities of the university (Bowen & Schuster, 1999). This shared governance provides faculty opportunities to offer opinions, insight, and expertise to university administrators (Bowen & Schuster, 1999). Large amounts of faculty time are expended on institutional governance as it is an essential part of managing institutions, appointing administrative officers, increasing faculty morale, and providing faculty pride through the successes of the university (Bowen & Schuster, 1999).

Institutional Theory and Pressure on Organizations

Institutional theory explains the transformation of individual organizations within systems of organizations, called organizational fields, as they work to obtain legitimacy from external parties while organizing internal parties according to changing criteria (DiMaggio & Powell, 1991; Sellers, Fogarty & Parker, 2014). Organizational fields are groups of institutions that, combined, constitute a recognized area of institutional life such as the grouping of suppliers, consumers, regulatory agencies, and other organizations that produce similar services or products (DiMaggio & Powell, 1991; Hanson, 2001). The organization field surrounding universities includes accreditation agencies, state boards, state legislatures and courts at all levels, other universities, parent groups, students, and textbook publishers (Hanson, 2001). Organizational fields have the

ability to influence or control the functioning of individual organizations (Marion, 2002; Oakes, Townley, & Cooper, 1998).

Institutional theory suggests that organizations are continually changed by the impact of their environments on organizational preferences, decisions, and behaviors (Battilana, Leca, & Boxenbaum, 2009: DiMaggio & Powell, 1983, Meyer & Rowan, 1977). This theory also "explores how assumptions become beliefs that influence individual choices;" assumptions become beliefs that translate into actions that become repeated and accepted as the norm (Scott, 1987; Tuttle & Dillard, 2007, p. 389). Institutional theory has been used to examine the forces that influence individuals within organizations, to understand the evolution of organizations, and the enabling and constraining influences on individuals within these systems (Tuttle & Dillard, 2007).

There have been several variations of institutional theory that have evolved over time in the analysis of institutionalization including that which is a process of instilling value to an organization, that which is a process of creating reality within an organization, and that which recognizes a class of elements responsible for organizational structure (Scott, 1987). Institutionalization is a process that happens to an organization over time, reflecting the organizations distinctive history, the people who are and have been in it, the groups it embodies, and the vested interests they have created, and the way it has adapted to its environment…to institutionalize is to infuse with value beyond the technical requirements of the task at hand (Selznick, 1957; Scott, 2014). The infusion of values provides an organization with a unique character, structure, and a distinctive identity and possibly being recognized as "legitimate" by others within the organizational

field (Aharonson & Bort, 2015; DiMaggio & Powell, 1983; Scott, 2001). Suchman (1995) defines legitimacy as a "generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Aharonson & Bort, 2015, p. 310).

One of the first versions of institutional theory is credited to Philip Selznick and his students (Scott, 1987). Selznick identified organizational structure as being shaped by characteristics and commitments of participants in response to influences and constraints from the external environment. He emphasized the importance of history in relation to the analysis of structural change of organizations over time (Scott, 1987). Selznick defined institutionalization as a continual process which infuses an organization with value beyond that required by the tasks at hand (Scott, 1987). As organizations become infused with value, they develop a distinctive identity and maintaining the organization becomes a struggle for leaders to define, defend, and preserve these unique values (Selznick, 1957; Scott, 2014).

Berger & Luckmann (1967) built upon the work of Selznick and defined reality within an organization as a human construction that is created in social interaction amongst actors. They associated institutionalization with the creation of common meaning systems: those actions that become repeated over time and are assigned similar meanings by all within the organization (Scott, 1987). Berger & Luckmann identified three "moments" of institutionalization. Externalization is an action taken in response to a previously unseen stimulus. Objectivation is a group interpretation of the action taken and internalization is the group acceptance of the action taken in response to the stimulus

(Scott, 1987). The term "actor" may include individuals, associations of individuals, populations of individuals, organizations, and associations of organizations (Scott, 2014). For this study, the term actor will generally apply to faculty of colleges and universities.

Zucker (1977) emphasized that institutionalization is a process whereby individuals transmit what is socially defined as real and actions to stimuli are seen as taken for granted. Institutionalized acts are seen as being both objective and external (Scott, 1987; Zucker, 1977). Objective means that the acts are repeatable by actors without changing the common understanding of the act while external means that there is a common understanding of acts by all actors and this common understanding dictates reality (Scott, 1987; Zucker, 1977).

Meyer & Rowan (1977) indicated that organizational forms are attributed to "relational networks" and exchange processes and "rational myths" or shared belief systems. Organizations conform because they are rewarded through increased legitimacy, resources, and survival capabilities (Meyer & Rowan, 1977; Scott, 1987). The prime benefit of this institutionalization approach is that it shows the importance of myths and ceremony within organizations and fields, while the negative is that it fails to show how they arise and whose interests they initially serve (DiMaggio & Powell, 1983). An organization's efficiency may suffer as a result of conforming to the pressures from relational networks as the organization is more concerned with gaining increased legitimacy from dominant constituencies and thereby securing access to vital resources and ultimately long-term survival (Meyer & Zucker, 1989; Brignall & Modell, 2000).

Institutional theory focuses on the pressures and constraints of the institutional environment and the way that organizations try to adapt to these pressures and constraints (Oliver, 1991). Institutions are defined as regulatory structures such as governmental agencies, laws, courts, and organizations that regulate professions (Oliver, 1991; Scott, 1987). Institutions support and empower activities and actors by providing stimulus, guidelines and resources (Scott, 2014). DiMaggio and Powell (1983) have argued that the two primary institutional actors in contemporary society are the state and various professions. Pressures may also be exerted on an organization from special interest groups and public opinion (Oliver, 1991).

DiMaggio and Powell noted that over time organizations within a field begin to look similar or isomorphic. Isomorphism is a term that is used to define "the constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions'" (DiMaggio and Powell 1983, p. 49: Slack & Hinings, 1994, p. 803). DiMaggio & Powell identified two types of isomorphism: competitive isomorphism and institutional isomorphism. Competitive isomorphism results from a free and open market selecting the optimal organizational forms from a given population "that emphasizes market competition, niche changes, and fitness measures" (Slack & Hinings, 1994). Institutional isomorphism involves organizational forms that evolve from organizations that do not necessarily compete in a competitive free and open markets but do compete for "political power and institutional legitimacy as well as for social and economic fitness" such as state universities (Slack & Hinings, 1994).

DiMaggio & Powell are also credited with identifying and distinguishing the three mechanisms that lead to isomorphism, namely coercive pressure, normative pressure, and mimetic pressure (DiMaggio & Powell, 1983; Scott, 1987). These three processes may overlap and intermingle but generally each is derived from different conditions and may lead to different outcomes (DiMaggio & Powell, 1983; Frumkin, 2004). These three processes are the basis for the sources of the perceived pressures felt by faculty in this study.

Coercive pressure arises from formal and informal pressures such as rules, laws, regulations, and organizational rules that are exerted on an organization from an outside organization upon which it depends, but may also arise from cultural change expectations within the organizational field (Marion, 2002; Slack & Hinings, 1994). Coercive pressures are the only forces attributed to sources outside the organizational field and may result in a defensive response but inevitably lead to isomorphic transformation (DiMaggio & Powell, 1983; Frumkin, 2004).

Normative pressure results from accepted commonalities of culture; the way things have always been done (Marion, 2002). This pressure arises from "the collective struggle of members of an occupation to define the conditions and methods of their work," which has been referred to as "professionalization" (DiMaggio & Powell, 1983, p. 152). Universities are important centers for the definition, development, and promulgation of normative rules, institutional values, and professional behavior (DiMaggio & Powell, 1983). Continuing education requirements, conferences and conventions, and other socialization mechanisms are sources of institutional values in

higher education. Among faculty, the normal progression through the ranks from completing a Ph.D. program to becoming a full professor provides a vehicle for normative isomorphism as the generally accepted practices are passed along and the faculty members become almost indistinguishable (Tuttle & Dillard, 2007). In higher education, normative pressure may also arise from the influences of accrediting agencies and professional organizations as they try to define the roles and structures of member organizations and individual member actions (Frumkin, 2004).

Mimetic pressure is an organizations response to extreme uncertainty and the organization chooses to model themselves on other organizations that they view as more successful or legitimate rather than "reinvent the wheel" (DiMaggio & Powell, 1983; Marion, 2002; Slack & Hinings, 1994). This modeling, or benchmarking, is a cost-effective response to uncertainty when organizational technologies are poorly understood, goals are ambiguous, or when the environment creates uncertainty (DiMaggio & Powell, 1983). Often, the wider the population of customers served by an organization the greater the pressure to provide the programs and services offered by other organizations within the field (DiMaggio & Powell, 1983). This mimicry is seen frequently in higher education. Examples include the adaption of new programs or courses and the adoption of new technologies and practices such as the implementation and expansion of online and hybrid courses which may have been "guided by a vision that is based upon unsubstantiated beliefs and assumptions" (Gaytan, 2009, p. 67).

Overall, institutional theory focuses on the pressures and constraints of the institutional environment and the way that organizations try to adapt to these pressures

and constraints (Oliver, 1991). Organizations are continually changed by the impact of their environments on organizational preferences, decisions, and behaviors (Battilana, Leca, & Boxenbaum, 2009: DiMaggio & Powell, 1983, Meyer & Rowan, 1977). Institutional theory has been used to understand the evolution of organizations to examine the forces that enable or constrain individuals within these organizations (Tuttle & Dillard, 2007).

Leader-Member Exchange Relationships

Leader-member exchange theory in same-unit work environments, which borrows heavily from role theory and social exchange theory, first appeared in the works of Graen, Orris, & Johnson (1973) and Johnson & Graen (1973) as an investigation into the differentiated dyadic relationships between a leader and each of their followers in what Graen & Cashman (1975) coined the vertical dyad linkage (VLD) (Bess & Goldman, 2001; Graen & Uhl-Bien, 1995: Lindler, Sparrowe, & Wayne, 1997; Liden & Maslyn, 1998; Northouse, 2007; Somech, 2006). It was believed that because of the large amount of time that is required to form high quality VLD relationships, managers would only have a very limited number of high quality relationships with followers, labeled the in-group, with group members being treated more favorably and in exchange being motivated to engage in numerous activities to enhance the leader's role while the remainder of relationships were lower quality, labeled the out-group, which resulted in minimal compliance to requirements by the followers (Graen & Uhl-Bien, 1995; Northouse, 2007).

Later works by Dansereau, Graen, and Haga (1975), Graen & Cashman (1975), Cashman, Dansereau, Graen, & Raga (1975), Graen, Cashman, Ginsburgh, & Schiemann (1977), Vecchio (1982), and Rosse & Kraut (1983) advanced the theory by further examining the characteristics of the dyadic relationship between a leader and each of their followers individually within the same unit and assessing the implications of these relationships for the organization (Graen & Uhl-Bien, 1995). The vertical dyad linkage relationship was later labeled leader-member exchange (LMX) by Graen, Novak, & Sommerkamp (1982) (Graen & Uhl-Bien, 1995; Somech, 2006). It was determined in this LMX research that the development of high quality social exchange relationships is a process dependent upon characteristics and behaviors of both leaders and followers that is developed over time with in-group relationships being very positive for not only the leader and follower but also for the unit within they work and the organization as a whole (Graen & Uhl-Bien, 1995; Somech, 2006; Yukl, 2006).

Building upon previous research, later work in LMX further investigated the process by which relationships are initiated and developed over the lifetime of the relationship. Leaders are encouraged to initiate and continually encourage a one-on-one relationship with each follower (Graen & Uhl-Bien, 1995). Graen and Uhl-Bien (1995) stressed that the leadership role should become a partnership between leader and follower with approval, trust, esteem, support, and consideration flowing in both directions on a continual basis throughout the lifetime of the relationship. This evolution was seen in the business world when employees became relabeled as "partners" or "associates."

The measurement of LMX evolved over the years beginning with a two-item instrument discussed by Dansereau, Graen, and Haga (1975) to a 14-item LMX scale used by Wakabayashi, Graen, & Uhl-Bien (1990), with a seven-item LMX scale developed by Graen, Novak, & Sommerkamp (1982) being found to be the most appropriate and reliable measure at the time (Graen & Uhl-Bien, 1995). This LMX 7 scale measures three dimensions of leader-follower relationships, namely, respect, trust, and obligation (Northouse, 2007). Dienesch and Liden (1986) were the first to question whether LMX was unidimensional or multidimensional and investigations into the dimensionality of LMX continued (Graen & Uhl-Bien, 1995).

Liden and Maslyn (1998) continued the investigation into the multidimensionality of LMX leading to the development and verification of an 11-item multidimensional LMX scale that will be used in this study. This scale is based upon four dimensions of LMX: affect (interpersonal attraction), loyalty (faithfulness), contribution (amount of work-oriented activity), and professional respect (reputation) (Liden & Maslyn, 1998; Olsson, Hemlin, & Pousette, 2012; Shurden, 2014). Affect is defined as "the mutual affection members of the dyad have for each other based primarily on interpersonal attraction rather than work or professional values" (Dienesch & Liden, 1986: 625; Liden & Maslyn, 1998). High affect dyads may form relationships that extend beyond the work environment simply because the parties enjoy each other's company (Bridges & Baxter, 1992; Linden & Maslyn, 1998).

Loyalty is defined as "the extent to which both leader and member publicly support each other's actions and character" (Linden & Maslyn, 1998). Leaders will tend

to protect loyal followers and, in our case, possibly shield them from some of the negative effects from external environmental factors.

Contribution has been defined by Dienesch and Liden (1986) as the perceived amount, direction, and quality of work-oriented activity put forth by both leader and follower toward achieving the mutual goals, whether implicit or explicit, of the dyadic relationship (Linden & Maslyn, 1998). Higher quality relationships will naturally have a greater amount of work activity that goes beyond what is normally expected to achieve the goals of the dyad. Professional respect is the perceived reputation that leader and follower has built inside and outside the organization with respect to his or her quality of work (Linden & Maslyn, 1998).

LMX is a preferable theory to many other leadership theories, especially in education, because it provides a window into individualized relationships that highlights the relational character of leading and differentiates followers not by job title, but by talent, attitude, and personality (Bess, 2001; Olsson, Hemlin, & Pousette, 2012). Olsson et al. found that each dimension of the LMX theory supported creative performance for both leader and follower in academic setting (Olsson, Hemlin, & Pousette, 2012).

Individual Creativity

Early creativity research, beginning in the 1950's through the early 1970's, focused on the identification of individual attributes and qualities that one possessed such as personality facets, cognitive style orientation and level of intrinsic motivation in an attempt to isolate qualities that facilitate or constrain individual creative performance (Amabile, 1988; Amabile & Pillemer, 2012; Ford, 1996; Tierney, Farmer, & Graen,

1999; Woodman, Sawyer, & Griffin, 1993). Early measures of creativity utilized ratings provided by individuals other than the participant, the consensual assessment technique in which two or more expert judges rate the overall creative performance of participants, and multiple judges evaluating the various components of creativity (Amabile, 1996; Shalley, Zhou, & Oldham, 2004). Later measures of creativity include perceptual measures rated by employees themselves, by their leader, by their coworkers, and by expert judges as well as objective measures (Liu, Jiang, Shalley, Keem, & Zhou, 2016). This study incorporates perceptual measures rated by the faculty themselves for all measures of external environmental pressures, LMX relationship with their leader, and creativity. Amabile (1996) suggested that self-report responses on a questionnaire reveal the respondents' perceptions (the psychological meaning they attach) of events, activities, and situations around them and their relation to creativity and "it is the psychological meaning of environmental events that largely influences creative behavior" (Amabile, 1988; Amabile, Conti, Coon, Lazenby, & Herron, 1996, p. 1158; Amabile, Woodman, Sawyer, & Griffin, 1993).

Amabile (1983) identified the three necessary components of individual creative performance to be domain-relevant skills (knowledge, technical skills, and innate cognitive skills), creativity-relevant skills (innate ability to generate novel ideas, learned cognitive skills, and work style conducive to creativity), and task motivation (good attitude toward tasks and ability for self-motivation). The component creativity-relevant skills were later refined to become creativity/problem-solving skills (Hennessey, 2015). All three components, although possibly in varying proportions, were found necessary for

individual creativity and the area of intersection composed of all three constitute "the Creative Intersection," identified by "x's" in Figure 2.1, being the area where maximum individual creativity and organizational innovation occur (Amabile, 1988, Hennessey, 2015).

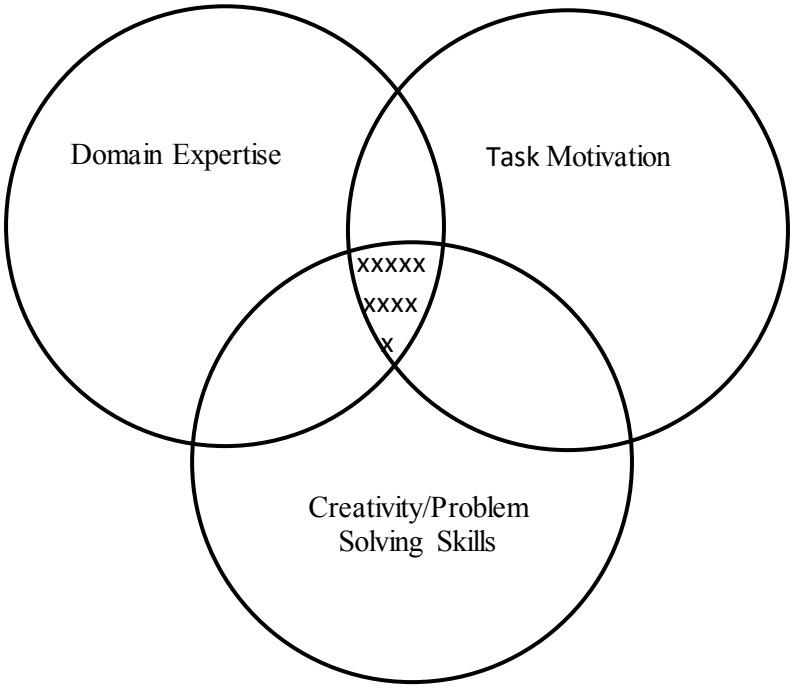

Figure 2.1. "The creative intersection." Adapted from: Amabile, 1988, p. 157 and Henessey, 2015, p. 200.

Amabile extended the componential theory of creativity to include social environment which is all of the factors outside the immediate work area that may stimulate or undermine intrinsic motivation and creativity (Amabile, 2011). Social environment factors may also stimulate intrinsic motivation and creativity in faculty members through freedom in carrying out the work, supervisors who encourage the development of new ideas, top management that supports innovation through a clearly

articulated creativity-encouraging vision and through appropriate recognition for creative work, all closely related to the four dimensions of LMX (Amabile, 2011).

Creativity is generally defined as the production of novel, useful ideas, or problem solutions and it refers to both the process of idea generation or problem solving and the actual idea or solution (Amabile, 1983; Amabile, Barsade, Mueller & Staw, 2005; Sternberg, 1988; Weisberg, 1988). For an organization, the ability to generate "fresh ideas for changing products, services, and processes so as to better achieve the organization's goals has been heralded as a key to enduring advantage." (Amabile, Barsade, Mueller, & Staw, 2005, p. 367).

In contrast, the term innovation is often used interchangeably with the term creativity. Innovation has been defined as the successful implementation of ideas at the organizational level whether initiated from within or from outside the organization and has been mostly studied at the team or organizational level (Scott & Bruce, 1994; Shalley, Zhou, & Oldham, 2004; Zampetakis, 2008). In reality, Fletcher (1990) indicates that creativity embraces both originality and innovation and therefore, creativity may be viewed as the "seed" necessary for all innovation (Amabile et al., 1996; El-Murad & West, 2004; Shalley et al., 2004). Creativity and innovation both originate in the minds of the individual employees and the extent to which they produce creative ideas "depends not only on their individual characteristics, but also on the work environment that they perceive around them" and the perception of the work environment may be the most crucial determinant of an individual's creativity (Amabile, 1988; Amabile, Conti, Coon, Lazenby, & Herron, 1996; Amabile, Schatzel, Moneta, & Kramer, 2004, p. 5). Each

person, regardless of background, is influenced by environmental forces and these forces can influence each of the intra-individual components of the creative intersection (Amabile & Pillemer, 2012; Hennessey, 2015). This study revolves around faculty perceptions in higher education and focuses exclusively on creativity (Shalley, Zhou, & Oldham, 2004). This study is interested in the personal perceptions of the external environmental factors surrounding faculty, their personal perceptions of the relationship they have with their leader, and their personal perceptions of their creativity.

Building from her work with individual creativity, Amabile (1988) investigated the intra-organizational aspects that both promoted and hindered individual creativity and organizational innovation in what has become known as the componential theory of creativity. The componential theory of creativity suggests that intrinsic motivation of the individual drives one to focus their efforts on creative pursuits simply because they are interested in and enjoy their work (Liu, Jiang, Shalley, & Zhou, 2016). Amabile found that in addition to the personal characteristics identified in the creativity intersection, the organizational characteristics of freedom (control over one's work), sufficient resources (facilities, equipment, information, funds, people), encouragement (leader encouraged risk-taking), various organizational characteristics (support for risk-taking across organizational levels), recognition (feedback and reward), sufficient time (realistic deadlines), challenge (intriguing problems or importance to organization), and pressure (sense of urgency) were also instrumental for the promotion of creativity and innovation. The opposite of each of the organization characteristics listed here were noted to be inhibitors of personal creativity and organizational innovation (Amabile, 1988).

Woodman and Schoenfeldt (1989) built upon the previous work of Amabile with respect to individual creativity but also examined the world of creativity from the perspective of the group and the organization as a whole. Woodman, Sawyer, and Griffin argued that a creative outcome (product, service, idea, etc.) is not necessarily the result of individual efforts but rather an interaction between individual and organizational factors (Hui & Liu, 2016). A creative outcome is rather a process that begins with individual creativity activities, followed by group creativity activities, which build upon individual creativity activities, and finally with an interactive effort of all within the organization that builds upon the output of the previous two activities (Woodman, Sawyer, & Griffin, 1993). This Interactionist Model of Creative Behavior uniquely places environmental influences, labeled contextual influences, at the end of each the activities (individual, group, and organizational) and defines these influences as physical environment, task and time constraints, the larger organization, characteristics of group task, organizational culture, reward systems, resource constraints, the larger environment outside the system, and so on (Woodman, Sawyer, & Griffin, 1993). Unlike the beliefs of Woodman et al., this study assumes that environmental influences are present at the beginning of any creative process and play a role in the creative process itself. This study also examines creativity from an individual perspective and leaves the group and organizational analysis for future research opportunities.

Ford (1996) built upon the works of Amabile and Woodman et al. and created the multiple social domains theory of creativity to explain organizational and individual creativity. Ford suggested that his work explains creative behavior based upon the

intentional and evolutionary change processes that occur continually to an organization, explains that individual creative behavior will be neglected if individual habitual actions remain a more attractive option, no matter how favorable the organizational conditions, and examines the multiple domains that represent "the situation" facing organizations as they choose between creative and routine actions (Ford, 1996). These "habitual actions" may be equated to the assumptions that become beliefs that translate into actions that become repeated and accepted as the norm as discussed in the institutional theory section above.

The individual creative behavior of Ford's theory includes the processes of sense-making (capacity to understand the larger issues facing organizations, converting them to actions, and convey understanding to employees), motivation (intent to pursue a creative action), knowledge and ability (individual's capacity for creative activity), and action (creative output) (Ford, 1996). Each of these processes incorporates subgroups containing individual attributes that either contribute to individual creativity or constrain individual creativity and entice an individual to revert to habitual activities. Many of these attributes formed the basis for the creativity questions on the participant survey for this study and will be discussed further in Chapter Three.

Ford also acknowledged that outside influences ("the situation") may affect organizational creativity, group creativity, and individual creativity and identified DiMaggio and Powell's institutional theory as one domain that was a source for these influences which he labeled institutional environments. He also examined the domains of markets, organizations, and subunits and groups as providing outside influences and the

fields that supported these domains, namely, consumers, socialized organizational actors, and work-unit members respectively with the field of functional/professional specialists supporting institutional environments (Ford, 1996). Ford's investigation of institutional theory in relation to individual creativity was a prime motivation for using institutional theory in the current study to identify the external environmental factors that play a role in individual creativity. There is no examination of group or organizational creativity in the current study, therefore, there was no exploration of the other three domains identified by Ford and leaves the group and organizational analysis for future research opportunities.

Building upon the componential theory of creativity (Amabile, 1988) and the interactionist theory of creative behavior (Woodman, Sawyer and Griffin. 1993), Amabile continued her investigation of the intra-organizational innovation/creative work by teams of individuals, specifically examining the work environment perceptions that may influence the creative work within organizations (Amabile, 1996). The culmination of this work is the creation of the KEYS to Assessing the Climate for Creativity, formerly known as the Work Environment Inventory. The KEYS model focuses on individual perceptions of the work environment and the influence of those perceptions on the individual's creativity and organizational innovation (Amabile, 1996). The KEYS model lists five categories of work environment factors that may influence creativity and innovation, namely, Encouragement of Creativity, Autonomy or Freedom, Resources, Pressures, and Organizational Impediments to Creativity.

Encouragement of creativity examines organizational, supervisory, and work group support. Organizational encouragement examines encouragement of risk taking and idea generation, encouragement of innovation throughout the organization and reward for creativity, and encouragement of idea flow throughout the entire organization (Amabile et al., 1996). Supervisory encouragement examines goal clarity, open leader-member interactions and leader support of team work and ideas (Amabile et al., 1996). Work group encouragement examines the dynamics of teams made up of a diverse group of individuals with varying backgrounds, experiences, cultures, ideas, and commitment to the success of the team and the support they collectively give to individual members (Amabile et al., 1996). Autonomy or Freedom examines the perceived ability of a team or an individual within a team to take ownership and control over their work flow and ideas on a daily basis (Amabile, 1996). Research has shown that greater autonomy over the direction and decisions of a group or individual lead to increased creativity (Amabile et al., 1996). The focus of this study is the individual. In this study, I assumed that individual perceptions of pressures and perceptions of their individual creativity may reflect the influence of any peer group or organization that the faculty member may be subjected to in their normal routines.

The category Resources examines the team or an individual's perceptions of the amount and quality of resources provided by an organization to maintain a forward momentum with respect to the completion of tasks and the generation of new ideas, products, services, and processes to better achieve personal and organizational goals (Amabile et al., 1996). This category includes the quality and availability of funds,

materials, facilities, and information (Amabile, 2016). The Pressures category consists of an examination of the perceptions of excessive workloads and challenges. Workload pressure may be in the form of time constraints, the addition of new tasks to accomplish, or expectations that are perceived as unattainable (Amabile et al., 1996; Olalere, 2013). Challenge pressures are perceptions that a group or individual may be asked to achieve outcomes that may be beyond their abilities or experiences and may provide a sense of having to work too hard to achieve their goals, thereby decreasing intrinsic motivation of the individual to attain their personal and organizational goals (Amabile et al., 1996). Organizational impediments to creativity include the perceptions of controlling environments from internal strife among team members, varying political viewpoints, and rigid management styles within the organization which may impede team or individual creativity (Amabile et al., 1996; Olalere, 2013).

Summary

Just as Drucker (1997) suggested, there are continual changes occurring in higher education as a result of pressures being applied from external and internal sources. There have recently been increased questioning by stakeholders about what the university is for in America, who is served by universities, what constitutes an ideal faculty, and what it means to work at a university among others (Apple, 2013). Most previous research regarding creativity has focused on immediate work environments that support creativity, a few have investigated impediments of creativity, and even fewer have investigated pressures outside the immediate work environment that either promote or impede creativity (Amabile et al., 1996). This study is designed to help eliminate that void in the

research by examining the pressures outside of the immediate work environment. Figure 2.2 illustrates the hypothesized relationship between faculty perceptions of external environmental pressures (Pressure) and faculty perceptions of their creativity (Creativity) with LMX providing a mediating effect when introduced between Pressure and Creativity (Shurden, 2014).

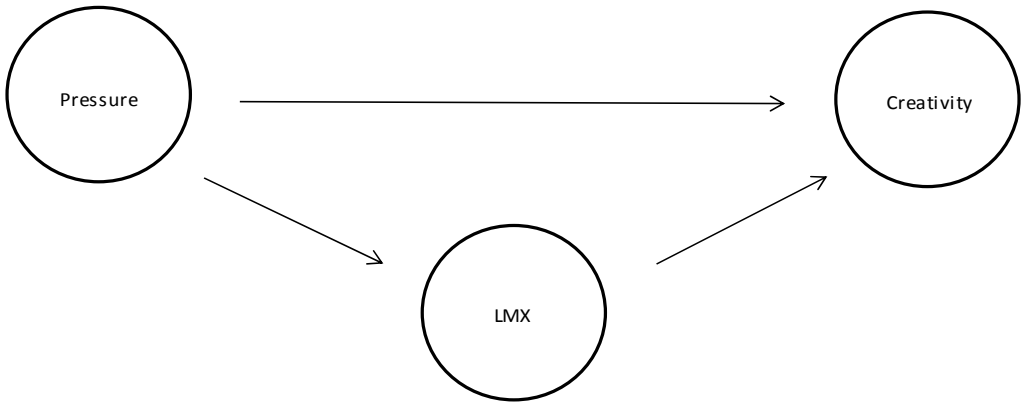

Figure 2.2. Hypothesized relationships between faculty perceptions of external environmental pressures (Pressure) and faculty perceptions of their creativity (Creativity) with LMX providing a mediating effect when introduced between Pressure and Creativity

This study investigates how environmental factors enable or hinder faculty creativity (Greenwood & Suddaby, 2006). .This study is interested in the personal perceptions of the external environmental factors surrounding faculty, the personal perceptions of the relationship that faculty have with their leader, and faculty perceptions of their personal creativity. Faculty creativity may hold the key to the generation of new courses, services, and processes that may help secure an enduring advantage for colleges and universities into the future (Amabile, Barsade, Mueller, & Staw, 2005, p. 367).

CHAPTER THREE

RESEARCH DESIGN

The primary goal of this chapter is to examine the research methodology associated with the effects of environmental pressures on faculty creativity in higher education and the moderating effects of leader-member exchange relationships (LMX) on this association. Also discussed are the participants, the instrumentation, the data collection, and data analysis (Lunenburg & Irby, 2008). I also discuss the survey creation and pilot study as well as bias considerations.

Participants of the Study

The population of this single-stage sampling design study (Creswell, 2003) was comprised of a non-random convenience sample of all faculty at one liberal arts and the faculty within one department of one research university in the southeastern United States (Lunenburg & Irby, 2008). This liberal arts university has a student base of approximately 2800 students and is considered a Baccalaureate: Diverse Fields institution by the Carnegie Classifications of Institutions of Higher Education. This classification "includes institutions where baccalaureate or higher degrees represent at least 50% of all degrees but where fewer than 50 master's degrees or 20 doctoral degrees were awarded during the update year" (Carnegie Classifications, 2017). The total number of full-time faculty at this university is 148 faculty members according to the provost's office. As a liberal arts university, the various colleges and departments have differing creative productivity requirements such as research and publications, film making, and artistic performances; therefore, I leave the interpretation of creativity to the faculty members

themselves. The research university is a research 1 institution with 23,000 students and 1520 faculty (Carnegie Classifications, 2017). The survey drew from 25 faculty members in one department.

Consulting the Barclay, Higgins, and Thompson (1995) 10 times rule, the minimum sample size needed for our methodology is 40 responses (Hair et al., 2017). Historically, mail surveys (with follow-up) generate a 60% response rate while web-based surveys "yield an 11% lower response rate compared to other modes" (Manfreda, Bosnjak, Berzelak, Haas, & Vehovar, 2008). Cobanoglu, Warde, and Moreo (2001) conducted a comparison of three survey types, mail, fax, and web-based, to determine the average response time and the response rates for each type of survey sent out to faculty of hospitality education programs. The average response speed for the web-based survey was 5.97 days and the response rate was 44.21%. Applying the results of the Cobanoglu et al. study, I anticipate achieving 65 responses to our survey of the liberal arts university and another 11 from the select department in the research university.

Instrumentation

Permission to conduct this study was obtained from the Clemson University Institutional Review Board and is presented in Appendix A. The final survey instrument used in this study consists of five distinct sections: (a) an informed consent (Appendix C), (b) questions to measure faculty perceptions of external environmental pressures that were created specifically for this study, (c) questions to measure faculty perceptions of their creativity that were adopted for this study, (d) Liden and Maslyn's (1998) LMX survey, and (e) questions to determine the basic demographics of the participant base (b

through e presented in Appendix D). The first section, the informed consent, contains an introduction to the research team and their contact information along with an overview of the study. It also provides prospective participants with an overview of possible risks and discomforts, possible benefits to participants, and possible privacy and confidentiality issues (the informed consent document).

The second section contains 16 questions designed to measure participant perspectives of environmental factors to which they feel they may be exposed (e.g. I work longer hours because it is expected in my department). The third section contains nine questions designed to measure participant perspectives about their own creativity (e.g. I seek out novel ways to tackle problems). Each of these two sections contains questions that were designed specifically for this study and were pretested in a pilot survey addressed later in this chapter.

The fourth section contains 11 questions designed to measure participant perspectives about their relationship with the individual that they recognize as their leader (e.g. I admire my leader's professional skills). These survey questions are taken from the 11-item questionnaire created by Liden and Maslyn (1998) which examines the four dimensions of leader-member exchange, namely affect, loyalty, contribution, and professional respect that were discussed in previous chapters and illustrated in Figure 3.1 (Shurden, 2014).

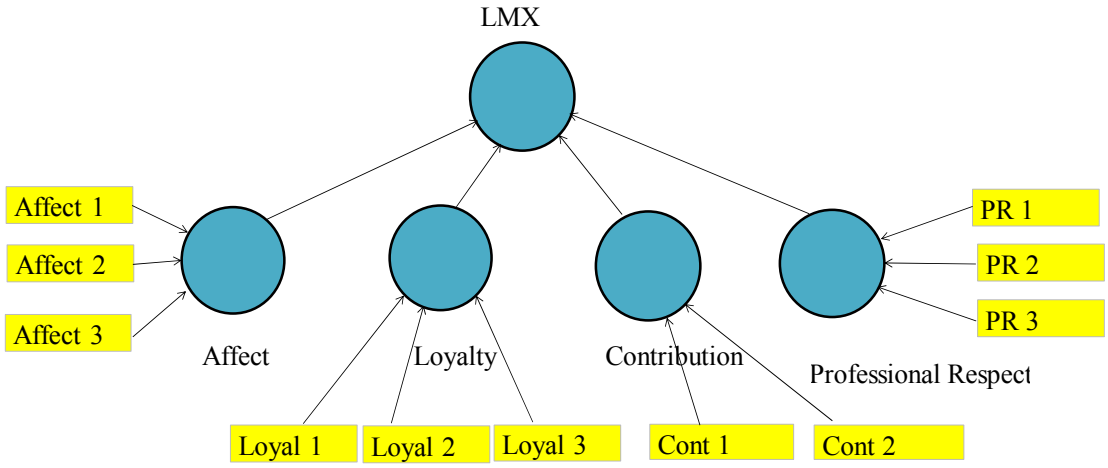

Figure 3.1. Liden and Maslyn's (1998) leader-member exchange path model as used in this study.

Liden and Maslyn (1998) used confirmatory factor analysis (CFA) to determine validity of the model and found strong support for convergent validity of the four sub-dimensions. Validity is the degree to which an instrument measures what it is designed to measure (Lunenburg & Irby, 2008). Reliability is the degree to which an instrument consistently measures what it is designed to measure (Lunenburg & Irby, 2008). Liden and Maslyn (1998) measured composite reliability, or internal consistency of the surveys, using Chronbach's Alpha and found coefficient alphas of 0.90, 0.74, 0.57, and 0.89 respectively for affect, loyalty, contribution, and professional respect. Olsson et al. (2012) also found reliability in the instrument with a global Chronbach's Alpha measure of 0.78 as well as 0.81, 0.69, 0.45, and 0.88 respectively for the sub-dimensions of affect, loyalty, contribution, and professional respect. Cronbach alpha provides one estimate of internal consistency reliability based upon the intercorrelations of the observed indicator variables (Hair et al, 2017). Generally, a satisfactory Chronbach's Alpha measure is between 0.60 and 0.90 (Hair et al., 2014, p. 102). Goodness-of-fit (GFI) statistics

indicated that the 4-factor model provided a good fit with a measure of 0.960, a comparative fit index (CFI) measure of 0.986, and an adjusted goodness-of-fit index measure of 0.930 (Liden & Maslyn, 1998, p. 58). Generally, results greater than 0.90 are considered acceptable for the GFI, CFI, and AGFI (Byrne, 1994). Sections two through four were measured using a 7-point Likert scale that offered selections ranging from "Strongly Disagree" to "Strongly Agree" and included divisions for the responses "Moderately Disagree," "Disagree," "Neutral," "Agree," and "Moderately Agree."

The fifth section contains six brief demographic questions designed to better understand the participants. The responses to the demographic questions were simple multiple-choice selections.

Pilot Study

Instrument

This study proposes using institutional theory to identify external environmental factors that may affect the creativity of faculty within higher education. There are very few institutional theory studies in the empirical research that contain established quantitative surveys that have been tested for validity and reliability. The only test instrument that came close was the institutional profile designed and first used by Kostova (1997), and Kostova and Roth (2002) to measure country-level characteristics that affect international organizations as they relate to quality management and to analyze the implementation of an organizational practice by subsidiaries of a multinational company in foreign countries respectively. Unfortunately, this methodology was not

appropriate for use in this study as they were country and company specific. For these reasons, I was forced to create a survey specific for our use in this study.

Empirical research articles in established journals and books and news articles from the Chronicle of Higher Education and Inside Higher Education were used to create a total of 31 questions to identify external environmental factors that may produce pressures felt by faculty in higher education. The pilot survey is presented in Appendix E at the end of this study. These questions fit one of DiMaggio and Powell (1983) classification of the three pressures that may be faced by organizations, namely, coercive pressures, normative pressures and mimetic pressures. Responses were measured using a 7-point Likert scale that was discussed above.

A similar situation exists for evaluating faculty perceptions of their creativity. Creswell (2003) indicated that researchers sometimes will assemble an instrument from components of several instruments. As a result, 16 questions were adopted from two recent doctoral studies for use in this pilot survey to determine suitability for use in the final survey. Olalere (2013) investigated the motivators and inhibitors of creativity of faculty members in a research university in the southeastern United States and Blackwell (2014) investigated the spread of innovations among high school teachers in the southeastern United States. Four of these questions were from Olalere's (2013) study and loosely based upon the Amabile's KEYS instrument discussed in previous chapters. Twelve questions were adopted from Blackwell's (2014) study based upon a previous study of innovation capability in a professional service firm by Hogan, Soutar, McColl-

Kennedy, and Sweeney's (2011) known as the innovation capability survey (Blackwell, 2014).

Both the creativity and the institutionalism studies had confirmed validity and reliability measures, but I decided it was prudent to test reliability and validity within the context of the current study. Consequently, a pilot survey was created, administered online using the data collection instrument, Qualtrics.

Data Collection

An introductory and solicitation email was sent to each prospective participant, and a link to the Qualtrics survey was provided. Periodic reminder emails were sent providing an update of the total number of surveys completed, thanking those who participated, and asking those who did not to consider doing so before the predetermined closing date of the survey opportunity. When the survey was closed, a final email was sent with an update on the total surveys collected and thanking all for participating or considering participation in the survey.

The pilot survey link was distributed to 47 doctoral students and faculty in the department of education at a large research university in the southeastern United States. It was also distributed to 29 faculty members at public liberal arts and research universities across the United States. Fifty-six responses were collected over a period of 24 days for a response rate of 74%.

Data Analysis

The data collected displayed intermittent missing data values in six different lines of data. Although the number of missing data values were less than 5% for any one

indicator and could have been adjusted using the mean value replacement method, JMP software was used to impute the missing data to give a total of 54 complete lines of data (Hair et al., 2014). JMP software was created by SAS Institute for advanced analytics in 1989 to empower scientists and engineers to explore data visually and interactively (https://www.jmp.com/en_us/software.html). Attempts were made to use both JMP and the IBM Statistical Package for Social Sciences (SPSS) to conduct factor analyses, and AMOS to run a confirmatory factor analysis. Unfortunately, the sample size was too small to conduct a proper analysis and gain accurate results using either JMP or AMOS. I then turned to the Partial Least Squares Structural Equation Modeling (PLS_SEM) software package to conduct single variable analyses for both the Pressure and Creativity constructs.

Structural equation modeling (SEM) is a class of advanced statistical multivariate analysis techniques that combines "aspects of factor analysis and regression, enabling the researcher to simultaneously examine relationships among measured variables and latent variables as well as between latent variables" (Hair et al., 2014; Shurden, 2014). Latent variables, or constructs, are variables that are used to "measure concepts that are abstract, complex, and cannot be directly observed by means of (multiple) items" and "are represented in the path model as circles" (Hair et al., 2014). Partial least squares structural equation modeling (PLS-SEM) is a variance based alternative approach to SEM that compares to the more well-known LISREL and AMOS and is quickly becoming a key research method (Hair et al., 2014). PLS-SEM is capable of providing accurate measurements using extremely non-normally distributed data, using complex

data, using models with multiple indicators and relationships, and using small sample sizes (Hair et al., 2014).

Two constructs (factors) were isolated for the pressure construct with 11 indicator variables representing the first construct and four indicator variables representing the second. The common theme for the eleven indicators in the first construct (or latent variable) was coercive, normative, and mimicry pressures related to administration issues and the common theme for the four indicators in the second latent variable was pressures related to research issues. Therefore, in the final path diagram for this study, Factor 1 is renamed "Administration" and Factor 2 is renamed "Research." Nine indicator variables were isolated into a single latent variable for use as a Creativity construct. The path model used to show these relationships is shown in Figure 3.2.

Reliability and validity measures for our pilot survey included Cronbach's alpha and composite reliability to determine internal consistency, individual indicator reliability and average variance extracted (AVE) to evaluate convergent validity, and the Fornell-Larcker criterion and cross loadings to assess discriminant validity. Cronbach alpha, which was explained earlier in this chapter and presented in Table 3.1, were 0.906 for the pressure Factor 1 construct, 0.816 for the pressure Factor 2 construct, and 0.904 for the Creativity construct.

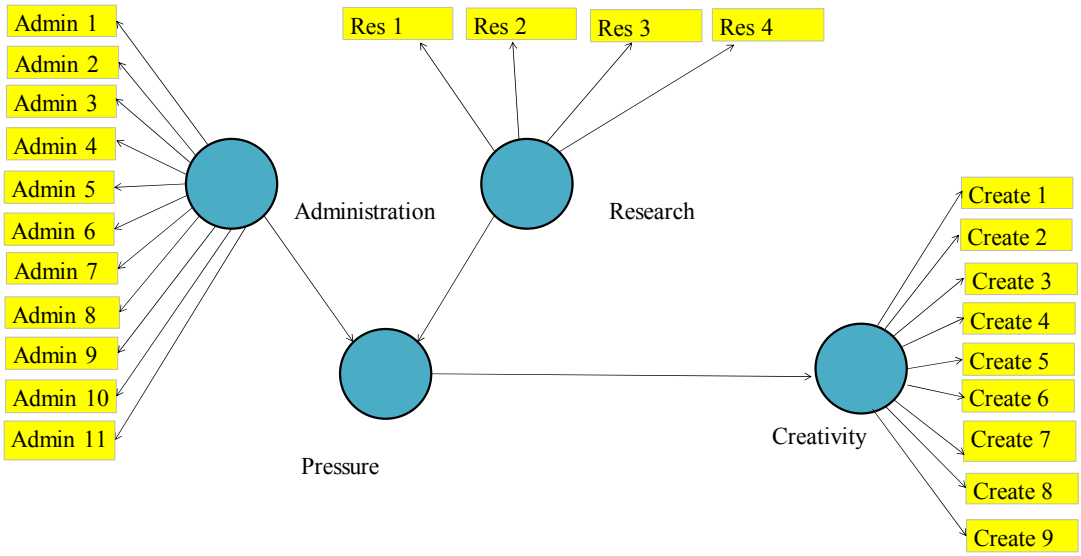

Figure 3.2. The path model showing indicator variables, constructs, and their relationships for the study based upon findings from the pilot survey.

Cronbach's alpha, which is sensitive to the number of items in the scale being measured, generally tends to underestimate the internal consistency reliability and therefore, Hair et al. (2014) recommend examining the composite reliability value to determine internal consistency. Composite reliability examines participant responses using regression analyses to determine the effect of each indicator variable on their corresponding construct.

The resulting effects are adjusted for the measurement error of the indicator variable and for the variance of the measurement errors (Hair et al., 2014). Outer loading measurements were used to examine reflective indicator variables; that is, they were treated as representative samples of the construct. Outer weight measurements were used to examine formative indicator variables; that is, they were treated as predictive of the construct. Each of these measurements will be discussed later in this chapter. Composite

reliability values were 0.917 for the pressure Factor 1 construct, 0.861 for the pressure Factor 2 construct, and 0.921 for the Creativity construct. Composite reliability values should be greater than 0.708 (Hair et al, 2017).

Table 3.1
Composite Reliability Results

	Construct		
Measure	Creativity	Factor 1	Factor 2
Cronbach's Alpha	0.904	0.906	0.816
Composite Reliability	0.921	0.917	0.861
Average Variance Extracted	0.572	0.503	0.613

Hair et al. (2014) defined convergent validity as "the extent to which a measure correlates positively with alternative measures of the same construct." Outer loadings (respondent measures, indicated as rectangles in Figure 3.3) of the indicator variables (indicator reliability), presented in Table 3.2, and AVE are examined to determine convergent validity. Average variance extracted (AVE), as seen in Table 3.1, is defined as "the grand mean value of the squared outer loadings of the indicators associated with the construct" or "how much of the variation in an item is explained by the construct" (Hair et al., 2017). Average variance extracted (AVE) values should be greater than 0.50, meaning 50% or more of an indicator variable's variance is explained by the corresponding construct (Hair et al., 2014).

Outer loading values should be greater than 0.708 for each indicator while indicators with outer loadings between 0.40 and 0.70 should be considered for removal only if the deletion leads to an increase in composite reliability and AVE above the suggested threshold value (Shurden, 2014).

Table 3.2

Convergent Validity: Outer Loading Results

Indicator Variable	Construct	Outer Loading
C1	Factor 2	0.760
C11	Factor 1	0.591
C15	Factor 1	0.731
C21	Factor 2	0.597
C22	Factor 1	0.652
C24	Factor 1	0.732
C28	Factor 1	0.830
C5	Factor 1	0.613
C8	Factor 1	0.755
CR1	Creativity	0.548
CR11	Creativity	0.663
CR12	Creativity	0.871
CR13	Creativity	0.852
CR14	Creativity	0.860
CR15	Creativity	0.871
CR16	Creativity	0.753
CR3	Creativity	0.652
CR5	Creativity	0.655
M16	Factor 1	0.657
M30	Factor 1	0.804
N13	Factor 1	0.602
N17	Factor 2	0.890
N23	Factor 1	0.782
N3	Factor 2	0.853

Note. The letters C, M, and N denote DiMaggio & Powell's pressures of Coercive, Mimetic, Normative, and CR denotes Creativity. The numbers beside the letter designations indicate the question number in the pilot survey. Pressure and Creativity were measured in separate sections of the survey, so the numbers may be repeated.

The indicator outer loading values had five Pressure indicator variables and three Creativity indicator variables with outer loadings between 0.548 and 0.657. When removed and the model retested, there was no increase in either the composite reliability or AVE values so the indicator variables were left in place. Average variance extracted

(AVE) values were 0.503 for the pressure Factor 1 construct, 0.613 for the pressure Factor 2 construct, and 0.572 for the Creativity construct.

Discriminant validity is the "extent to which a construct is truly distinct from other constructs" and is measured using the Fornell-Larcker criterion method and examining the cross loadings of the indicators (Hair et al., 2014, p. 105). The Fornell-Larcker criterion, presented in Table 3.3, compares the square root of a constructs AVE value with the construct's correlation values with other constructs in the model.

Table 3.3
Discriminant Validity: Fornell-Larcker Criterion Results

Construct	Creativity	Factor 1	Factor 2
Creativity	0.756		
Factor 1	0.291	0.709	
Factor 2	0.346	0.446	0.783

The square root of a construct's AVE value should be greater than the squared correlation with any other construct "since a construct shares more variance with its associated indicators than it does with any other construct" (Hair et al., 2017, p. 105). Each constructs square roots of their AVE values were indeed greater than the squared correlation with any other construct. Table 3.4,the cross loadings for analysis

The examination of cross loadings, presented in Table 3.4, consists of comparing an indicator variable's outer loading (outer loadings are used in the analysis of reflective indicator variables while outer weights are used to analyze formative indicator variables) on the corresponding construct with its loadings on other constructs (cross loading).

Table 3.4

Discriminant Validity: Cross Loading vs Outer Loading Results

Indicator Variable	Construct			Outer Loading
	Creativity	Factor 1	Factor 2	
C1	0.209	0.388	0.760	0.760
C11	0.154	0.591	0.212	0.591
C15	0.057	0.731	0.167	0.731
C21	0.009	0.481	0.597	0.597
C22	0.178	0.652	0.247	0.652
C24	-0.001	0.732	0.362	0.732
C28	0.195	0.830	0.441	0.830
C5	0.028	0.613	0.076	0.613
C8	0.324	0.755	0.313	0.755
CR1	0.548	0.111	0.116	0.548
CR11	0.663	0.125	0.283	0.663
CR12	0.871	0.289	0.392	0.871
CR13	0.852	0.310	0.292	0.852
CR14	0.860	0.257	0.294	0.860
CR15	0.871	0.289	0.276	0.871
CR16	0.753	0.072	0.119	0.753
CR3	0.652	0.224	0.109	0.652
CR5	0.655	0.131	0.257	0.655
M16	0.151	0.657	0.250	0.657
M30	0.276	0.804	0.488	0.804
N13	0.182	0.602	0.177	0.602
N17	0.364	0.345	0.890	0.890
N23	0.110	0.782	0.451	0.782
N3	0.269	0.405	0.853	0.853

Note. The letters C, M, and N denote DiMaggio & Powell's pressures of Coercive, Mimetic, Normative, and CR denotes Creativity. The numbers beside the letter designations indicate the question number in the pilot survey. Pressure and Creativity were measured in separate sections of the survey, so the numbers may be repeated.

The outer loading value for each indicator variable should be greater than its cross loading with any other construct in the model. For example, the outer laoding for indicator variable C1 is 0.760. C1 is an indicator variable for the construct Factor 2. The outer loadings values of C1 for the constructs Factor 1 and Creativity should be less than 0.760. They are considerably lower, indicating that the indicator variable C1 measures a unique aspect of the construct Factor 1. Each indicator variable's outer loading on the corresponding construct was indeed greater than its cross loadings on other constructs. This verifies that discriminant validity has been established for the reflective constructs. In keeping with the expectations of quantitative research, the values that I obtained through my pilot study and analyzed using the PLS-SEM software package shows that our survey questions are reliable and valid for use in our final study survey instrument.

Data Collection

The final study survey was created in Qualtrics using the results of the pilot study for the Pressure and Creativity constructs, the Liden and Maslyn (1998) LMX questionnaire, and a demographics section. It also contained an informed consent document that was very similar to that used in the pilot survey, but was amended slightly to meet Internal Review Board (IRB) requirements. The informed consent document provided an overview of the study, risks and discomforts, possible benefits, protection of privacy details, contact information for the researchers and IRB, and an icon to verify the participant is older than 18 years of age and provides their informed consent to continue on to the survey.

Internal Review Board (IRB) authorization was secured from both institutions providing participants for the study prior to sending to prospective participants. As with the pilot study, an introductory email was sent to each of the173 prospective participants that identified the researchers, the purpose of the research, and asked for their future participation in the survey. A link to the Qualtrics survey was sent to prospective participants in an email invitation. Periodic emails were sent thanking those who participated and asking those who did not to consider doing so before the preset closing date. When the survey was closed, a final email was sent thanking all for participating or considering participation in the survey.

No personal identifiers were collected at any point during this study, and all responses were anonymous. Responses collected were downloaded from the Qualtrics site and were stored on one password protected personal laptop computer of one researcher that was kept in a secured room. Encrypted backup files were kept on an external hard drive that was kept in a locked safe. Only members of the research team had access to the data. Data collected will be maintained after five years per APA requirements and then destroyed.

Data Analysis

This study uses a second-generation causal modeling technique known as path analysis using partial least squares structural equation modeling (PLS-SEM) methods to test the hypothesized model to determine if the model is consistent with the empirical data (Shurden, 2014). Partial least squares structural equation modeling is an advanced multivariate analysis technique that combines aspects of factor analysis and regression to

enable a simultaneous examination of relationships "among measured variables and latent variables as well as between latent variables" (Hair et al., 2014). This approach is useful to analyze small sample sizes such as those collected in this study, to analyze non-normal data distributions, and to analyze complex path models with multiple indicators and relationships (Hair et al., 2014).

SmartPLS3, a computer program, was used to analyze the data and to make final determinations about the hypothesized model. Smart PLS3 analyzes relationships in the path model using three primary evaluation tools: algorithm, bootstrapping, and blindfolding methods (Olalere, 2014). The algorithm method calculates construct scores, weights, and loadings and maximizes the explained variance of the dependent construct to estimate path coefficients and other model parameters (Hair et al., 2014). Bootstrapping is a resampling approach that re-samples and calculates large numbers (typically 5000) of subsamples (with replacement) from the original data to test coefficients for their significance and make estimates of the path model (Hair et al., 2014).

Blindfolding is a sample reuse (reiterative) technique for testing endogenous constructs with reflective indicators. Blindfolding omits every d^{th} data point in an endogenous construct's indicators, replaces it with a mean value replacement data point, estimates the parameters with these data points and continues to do so until every data point in the original sample has been eliminated and the model re-estimated (Hair et al., 2014; Shurden, 2014).

The result of blindfolding is the Stone-Geisser Q^2 value which is an indicator of the model's predictive relevance; values greater than zero indicate that the exogenous construct has predictive relevance of the endogenous construct under consideration (Hair et al., 2014). Hair et al. (2014) indicate that "values of 0.02, 0.15 and 0.35 respectively indicate that an exogenous construct has a small, medium or large predictive relevance for a certain endogenous construct." This study uses the algorithm, bootstrapping, and blindfolding approaches to make estimations of the path model.

Path Model

The path model consists of latent variables, indicator (or measured) variables, and arrows linking them to show relationships. Latent variables, or constructs, are variables that are used to "measure concepts that are abstract, complex, and cannot be directly observed by means of (multiple) items" and "are represented in the path model as circles" (Hair et al., 2014). Constructs may be either exogenous or endogenous. Exogenous constructs are independent variables that have no arrows pointing into them from another construct in the model. In our model, Pressure is the only exogenous construct. Endogenous constructs are dependent on one or more other constructs; they can be identified by arrows pointing into them from another construct. In our path model, LMX and Creativity are endogenous constructs.

Many path models are comprised of first-order components consisting of a single layer of constructs such as illustrated in Figure 3.1. (Hair et al., 2017). Our path model, however, is more complex and is considered to be a higher-order model or a hierarchical component model (HCM) as shown in Figure 3.3. Hierarchical component models must

be operationalized at a higher level of abstraction and tend to increase parsimony and reduce model complexity, such as that for the independent construct of LMX (Hair et al., 2017). LMX may be represented by several first-order components that capture separate attributes of LMX (affect, loyalty, contribution, and professional respect), thereby making LMX a second-order construct in our higher order path model (Hair et al., 2017). This holds true for the independent variable Pressure which is represented by the first order variables administration and research.

Mediating Effect

It is hypothesized in our model that leader member exchange has a mediating, or intervening, effect between Pressure and Creativity. More precisely, a direct effect in which felt pressure leads to decreased perceptions of creativity will be reversed or lessened by a positive LMX relationship between the faculty member and the individual they identify as their leader. SmartPLS3 aids in testing this hypothesis by bootstrapping the indirect effect of the LMX construct. First, the model is tested to ensure the direct path between Pressure and Creativity is significant. If so, the model will be tested to determine the significance of the indirect path between Pressure, LMX, and Creativity constructs. If significant, the variance accounted for (VAF) will be examined to determine the amount of mediation, if any, that is attributable to LMX. Variance accounted for determines the size of the indirect effect in relation to the total effect (Hair et al., 2014). A VAF greater than 80% indicates full mediation, a VAF between 20% and 80% indicates partial mediation, and a VAF less than 20% indicates that no mediation is occurring ((Hair et al., 2014).

Moderating Effect

The target population for this study is from two universities with different Carnegie Classifications and their different research requirements demanded that the model include an independent moderator construct (variable) between the Pressure and Creativity path. Moderation is a situation in which the relationship between two constructs is not consistent and relies on the values of a third construct (moderator) which influences the strength of the relationship or may even change the direction of the relationship (Hair et al., 2017).

The moderator construct (Publish), as seen in Figure 3.3, links directly to the exogenous construct, that variable that explains other constructs in the model (Pressure) and also links directly to the endogenous construct, that variable being explained in the model (Creativity) (Hair et al., 2017). The link between Publish and Creativity is important as it controls for the direct impact of the moderator variable and the endogenous construct (Creativity) and without this link, the effect of Publish would inflate the effect between Pressure and Creativity (Hair et al., 2017). The moderator construct does not depend on the exogenous construct but does affect the strength of the exogenous construct influence on the endogenous construct (Hair et al., 2017). Data for the moderator construct is collected using a single question (indicator variable) in the pressure section of the survey.

This moderator construct Publish, has one reflective indicator variable (pressure to publish) that was taken from the indicator variables in Factor 1 discussed earlier. I hypothesized through the moderator variable (Publish) in the model that the requirement

to publish will change the intensity of the relationship between the Pressure and Creativity constructs. A requirement to publish by the department and university accrediting agencies, such as those in Carnegie Classification R1 Doctoral Universities with the highest research activity requirements may increase the strength of this relationship more than a Baccalaureate College or an Associate College.

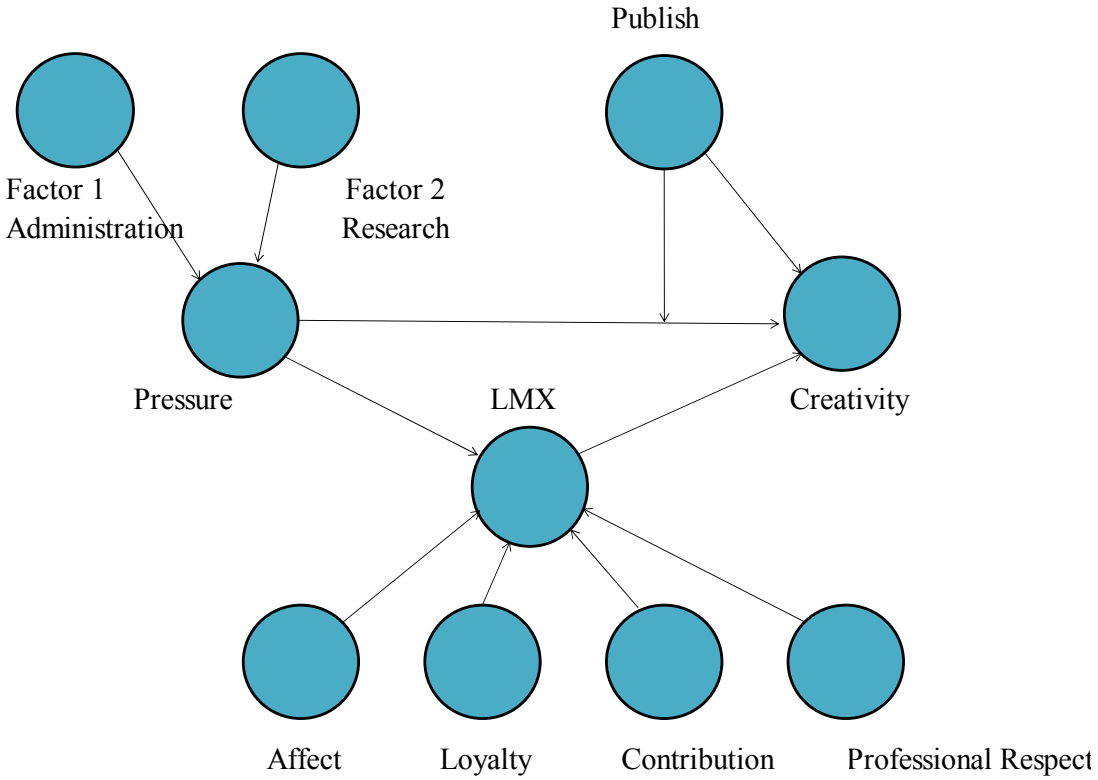

Figure 3.3. The inner hierarchical component model (HCM) for this study.

Therefore, "Publish" as a moderator variable (construct) may account for the heterogeneity in the data gathered from universities that have little or no publishing requirements on faculty and those that have heavy requirements to publish. In our case, it was determined in the pilot study that the reflexive indicator "Publish" was a significant pressure felt by university faculty. This is not an attempt to say that "Publish" is the sole

indicator that fully describes the moderating construct or the only indicator that may have a moderating effect on the relationship between these two constructs.

When the objective is to determine whether or not the moderator exerts a significant effect on the relationship, the two-stage approach is preferred for the creation of the interaction term regardless of whether the indicator variables are formative or reflective (Hair et al., 2017). The two-stage approach is also the best choice for hypothesis testing. The first stage is to estimate the main effects model without the interaction term to obtain scores of the latent variables and save these for further analysis in the second stage (Hair et al., 2014). The second stage uses the latent variable scores of the exogenous latent variable and moderator variable from stage 1 and multiplies them to create a single-item measure used to measure the interaction term while using the previous scores from stage 1 as measures for all other latent variables (Hair et al., 2014).

To assess the moderating effect, a PLS-SEM algorithm model was run and attention will be given to indicator loadings (since I have reflective measures for Pressure, Publish, and Creativity) Cronbach's alpha, AVE, and composite reliability for verification of reliability and validity (Hair et al., 2017). The bootstrapping procedure will also be run to verify the findings from the algorithm method and to test whether the interaction term of the moderating variable is significant ($p<0.05$). To gauge the size of the moderating effect, an examination of the f^2 value will indicate whether there is no moderating effect or whether a small (0.02), medium (0.15), or large (0.35) moderating effect exists (Hair et al., 2014).

The outer model, or measurement model, contains the indicator variables (yellow rectangles in Figure 3.3) that are used to measure the constructs. An indicator variable is a "directly measured proxy variable that contains the raw data" (response to survey question) about a construct and are represented by rectangles on the path model connected to the construct by a single headed arrow (Hair et al., 2014, p. 11). The direction of this arrow may point toward the construct being measured (formative) or away from the construct (reflective). Formative measurement indicates a causal (predictive) relationship with the construct. This means that formative indicators define a unique aspect of the construct's domain and, in combination with the other indicators, determine the overall meaning of the construct such that omitting any one indicator may mean altering the nature of the entire construct (Hair et al., 2014). Formative indicators, therefore, are considered to be error free. Reflective measurement indicates that the construct causes the measurement (covariation) of the indicator variable (Hair et al., 2014; Shurden, 2014). Reflective indicators may be viewed as an inconclusive representative set of all the possible items associated with a construct's domain and as such are highly correlated (Hair et al., 2017). The construct is unlikely to be changed by eliminating any specific indicator variable. Reflective indicator variables have an error term associated with each which is seldom shown in path models. The decision between formative and reflective measure is an important consideration in developing path models (Hair et al., 2014, p. 13).

All indicator variables for Pressure and Creativity in our model were reflective measures meaning that they, collectively, do not fully describe the construct. No attempt

was made to fully define our constructs, whereas Amabile's KEYS may be considered an attempt to define the construct Creativity in totality.

Other traits of reflective indicators include (Hair et al., 2018):

1. Direction of causality is from construct to item
2. Indicators are manifestations of the construct
3. Changes in the indicators should not cause changes in the construct
4. Changes in the construct do cause changes in the indicators
5. Indicators should be interchangeable
6. Indicators should have the same or similar content and should share a common theme
7. Dropping an indicator should not alter the conceptual domain of the construct
8. Indicators are expected to covary with each other
9. A change in one of the indicator should be associated with changes in the other indicators.

Confirmatory tetrad analysis (CTA-PLS) was used to verify that the indicator variables for Pressure and Creativity should be reflective of the constructs. Introduced by Bollen and Ting (1993, 2000) and adapted to PLS-SEM by Gudergan, Ringle, Wende, and Will (2008), confirmatory tetrad analysis is a method of empirically evaluating whether the choice of a reflective measurement model is supported by the data collected (Hair et al., 2018).

A tetrad (τ) is the difference of the product of one pair of covariances and the product of another pair of covariances and, in reflective measurement models, each tetrad

is expected to have a value of zero and therefore, since reflective indicators represent the construct in a similar manner, vanish (Hair et al., 2018, p. 91). Confirmatory tetrad analysis essentially tests the null hypothesis H_0: $\tau = 0$ (the tetrad equals zero and vanishes) indicating the reflective measurement is correct and the alternative H_1: $\tau \neq 0$ (the tetrad does not equal zero) indicating a formative measurement should be used (Hair et al., 2018).

The analysis of CTA-PLS involves the following steps:

1. Form and compute all tetrads for each construct in the model (four indicator variables are required for each construct).
2. Identify and eliminate redundant tetrads by inspecting the correlations of indicators per construct.
3. Perform a statistical significance test whether each tetrad vanishes.
4. Evaluate whether a measurement model's non-redundant tetrads vanish.

Steps 1 and 2 deal with the generation and selection of the non-redundant tetrads from each construct measurement model while steps 3 and 4 address the significance testing (Hair et al., 2018). Step 1, form and compute all tetrads for each construct in the model, is done by the program as soon as the testing begins. Step 2, inspection of indicator correlations is shown in Figure 3.4. In it, I am looking for minimum value for each construct to see if they are all sufficiently different from zero.

Step 4, evaluate whether a measurement model's non-redundant tetrads vanish, relies on bootstrapping, or running a large number of tests on the same data.

Factor 1

	C5	C8	C11	C15	C22	C24	C28	M16	M30	N13	N23
C5	1										
C8	0.477	1									
C11	0.282	0.276	1								
C15	0.690	0.522	0.391	1							
C22	0.360	0.388	0.433	0.552	1						
C24	0.474	0.495	0.393	0.680	0.452	1					
C28	0.538	0.518	0.438	0.596	0.417	0.674	1				
M16	0.449	0.449	0.509	0.384	0.261	0.381	0.419	1			
M30	0.363	0.476	0.366	0.565	0.439	0.621	0.746	0.438	1		
N13	0.397	0.302	0.256	0.322	0.335	0.392	0.505	0.460	0.372	1	
N23	0.495	0.585	0.379	0.698	0.556	0.780	0.656	0.353	0.638	0.342	1

Factor 2

	C1	C21	N3	N17
C1	1			
C21	0.445	1		
N3	0.552	0.549	1	
N17	0.506	0.490	0.612	1

Creativity

	CR1	CR11	CR12	CR13	CR14	CR15	CR16	CR3	CR5
CR1	1								
CR11	0.438	1							
CR12	0.516	0.583	1						
CR13	0.377	0.432	0.694	1					
CR14	0.265	0.449	0.670	0.717	1				
CR15	0.404	0.458	0.706	0.738	0.757	1			
CR16	0.288	0.476	0.624	0.622	0.781	0.599	1		
CR3	0.404	0.277	0.543	0.477	0.553	0.580	0.506	1	
CR5	0.365	0.430	0.415	0.531	0.542	0.519	0.346	0.289	1

Figure 3.4. Confirmatory tetrad analysis from pilot study: indicator correlations. Authors: Ringle, Christian M., Wende, Sven, and Becker, Jan-Michael Title: SmartPLS Release: 3 Organization: SmartPLS GmbH City: Boenningstedt, Germany URL: www.smartpls.com Year: 2015

This process leads to a problem called alpha inflation (multiple testing problem) which means that the likelihood of obtaining a significant result when this is not true increases as the number of tests increases (Type I error) (Hair et al., 2018). CTA-PLS applies a Bonferroni correction to adjust for this alpha inflation. The Bonferroni correction applies a significance level of alpha (typically 10%) divided by the number of non-redundant tetrads and the CTA-PLS calculated bias-corrected Bonferroni-adjusted confidence intervals as shown in Figure 3.5 are examined (Hair et al., 2018).

Creativity	P Values	CI Low adj.	CI Up adj.
1: CR1,CR11,CR12,CR13	0.245	-0.185	0.398
2: CR1,CR11,CR13,CR12	0.219	-0.180	0.393
4: CR1,CR11,CR12,CR14	0.448	-0.256	0.417
6: CR1,CR12,CR14,CR11	0.276	-0.205	0.374
9: CR1,CR12,CR15,CR11	0.982	-0.186	0.179
10: CR1,CR11,CR12,CR16	0.716	-0.299	0.387
13: CR1,CR11,CR12,CR3	0.245	-0.231	0.465
17: CR1,CR11,CR5,CR12	0.574	-0.310	0.233
20: CR1,CR11,CR14,CR13	0.023	-0.118	0.647
26: CR1,CR11,CR16,CR13	0.098	-0.203	0.633
29: CR1,CR11,CR3,CR13	0.666	-0.302	0.416
33: CR1,CR13,CR5,CR11	0.945	-0.318	0.338
41: CR1,CR11,CR3,CR14	0.522	-0.328	0.518
47: CR1,CR11,CR16,CR15	0.117	-0.180	0.524
49: CR1,CR11,CR15,CR3	0.115	-0.192	0.543
51: CR1,CR15,CR3,CR11	0.237	-0.332	0.172
57: CR1,CR16,CR3,CR11	0.099	-0.472	0.173
109: CR1,CR13,CR14,CR15	0.246	-0.149	0.299
113: CR1,CR13,CR16,CR14	0.276	-0.182	0.364
133: CR1,CR13,CR16,CR5	0.692	-0.250	0.204
137: CR1,CR13,CR5,CR3	0.364	-0.358	0.203
149: CR1,CR14,CR3,CR16	0.111	-0.566	0.210
151: CR1,CR14,CR16,CR5	0.153	-0.253	0.104
161: CR1,CR15,CR5,CR16	0.369	-0.406	0.239
165: CR1,CR3,CR5,CR15	0.979	-0.310	0.299
174: CR11,CR13,CR15,CR12	0.851	-0.263	0.233

Factor 2	P Values	CI Low adj.	CI Up adj.
1: C1,C21,N17,N3	0.927	-0.583	0.515
2: C1,C21,N3,N17	0.984	-0.760	0.729

Factor 1	P Values	CI Low adj.	CI Up adj.
1: C11,C15,C22,C24	0.070	-1.447	0.400
2: C11,C15,C24,C22	0.347	-0.781	0.443
4: C11,C15,C22,C28	0.266	-1.718	0.838
6: C11,C22,C28,C15	0.868	-1.318	1.507
7: C11,C15,C22,C5	0.092	-1.948	0.629
10: C11,C15,C22,C8	0.491	-1.465	0.931
13: C11,C15,C22,M16	0.222	-1.004	0.467
17: C11,C15,M30,C22	0.599	-0.932	0.688
20: C11,C15,N13,C22	0.888	-0.892	0.843
24: C11,C22,N23,C15	0.242	-0.673	1.475
32: C11,C15,C8,C24	0.922	-0.786	0.821
34: C11,C15,C24,M16	0.958	-0.689	0.665
38: C11,C15,M30,C24	0.946	-1.601	1.526
44: C11,C15,N23,C24	0.530	-1.048	1.486
51: C11,C28,C8,C15	0.366	-0.749	1.320
59: C11,C15,N13,C28	0.610	-1.128	1.525
65: C11,C15,C8,C5	0.950	-0.944	0.925
68: C11,C15,M16,C5	0.213	-3.234	1.504
70: C11,C15,C5,M30	0.742	-0.981	0.787
71: C11,C15,M30,C5	0.203	-1.992	0.911
78: C11,C5,N23,C15	0.384	-1.514	0.909
89: C11,C15,N23,C8	0.616	-0.694	0.922
108: C11,N13,N23,C15	0.541	-1.030	1.498
131: C11,C22,C5,C28	0.156	-0.695	1.703
140: C11,C22,M30,C28	0.063	-0.610	2.146
160: C11,C22,C5,N23	0.506	-0.921	1.386
165: C11,C8,M16,C22	0.091	-1.228	0.432
178: C11,C22,M16,N13	0.755	-0.960	1.172
201: C11,C28,M16,C24	0.116	-3.049	1.155
222: C11,C5,N13,C24	0.890	-1.125	1.072
224: C11,C24,N23,C5	0.726	-0.611	0.774
227: C11,C24,M16,C8	0.496	-1.838	1.246
248: C11,C24,N13,M30	0.879	-1.265	1.152
281: C11,C28,N23,C8	0.361	-0.701	1.165
289: C11,C28,M16,N23	0.097	-2.852	0.995
312: C11,C8,N23,C5	0.437	-0.917	0.555
333: C11,M16,M30,C8	0.390	-0.901	1.561
428: C15,C22,M30,M16	0.270	-0.824	1.578
485: C15,C24,N13,C8	0.639	-0.945	1.306
505: C15,C24,N13,N23	0.764	-0.915	0.790
536: C15,C28,M30,M16	0.639	-0.820	1.084
581: C15,C5,N23,N13	0.711	-1.630	1.343
745: C22,C5,M30,N23	0.862	-0.887	0.986
795: C24,C5,N23,C28	0.192	-2.046	0.924

Figure 3.5. Confirmatory tetrad analysis from pilot study: Bonferroni correction confidence intervals.

Authors: Ringle, Christian M., Wende, Sven, and Becker, Jan-Michael Title: SmartPLS Release: 3 Organization: SmartPLS GmbH City: Boenningstedt, Germany URL: www.smartpls.com Year: 2015

The 90% bias-corrected Bonferroni-adjusted confidence intervals indicate whether the non-redundant tetrads are significantly different from zero by examining the CI (confidence interval) Low adj. and CI Up adj. measures shown in Figure 3.5 (Hair et al., 2018). If zero falls into the confidence interval, the tetrad is not significantly different from zero and the tetrad is considered a vanishing tetrad indicating the reflective indicator measure is appropriate for the construct (Hair et al., 2018). Based upon the CTA-PLS, all of the indicators identified for use in our model may be considered reflective to the Pressure and Creativity constructs being measured.

Common Method Bias

The researchers realize that several issues may cause problems with estimations derived from the survey questions, answers, and analysis due to common method biases and have taken steps to address each. Kept unchecked, common method biases may lead to variances that are attributable to the survey instrument affecting the variances of the construct being measured which is a potential problem in behavioral research (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). Method bias may also lead to incorrect perceptions about the reliability and validity of a survey as well as leading to underestimates of corrected correlations in meta-analyses (Podsakoff, MacKenzie, & Podsakoff, 2012). Another problem with method biases is that they may inflate, deflate, or have no effect on the estimates of the relationships between two constructs. Common method biases may take many forms including (a) item characteristic effects such as common scale formats and negative item wording, (b) item context effects such as survey length and intermixing

(grouping) of items on the survey, and (c) common source (same-source) bias issues such as transient mood states, consistency effect, and social desirability.

Item Characteristic Effect Bias

Item characteristic effect refers to any covariance attributable to the influence or interpretation that a participant might assign to an item simply because of the properties or characteristics the item possesses (Podsakoff et al., 2003). One such effect is the common scale format encountered when a researcher uses the same measurement scale throughout the survey (Podsakoff et al., 2012). In addition to the Likert scale, alternate scales were considered including the Guilford (Self-rating) scale which builds upon the specific interests of participants, the Thurstone Method of equal appearing intervals or Successive-interval technique) scale primarily designed for participants with impairments, and the Guttman (Scalogram analysis) scale which builds on the participants previous answers. Neither scale was an acceptable fit with this study as they require a considerable amount of time to establish, are not conducive to the Qualtrics format, and participant fatigue would become a greater concern.

The scale used throughout this study's survey is the 7-point Likert scale with alternating methods of choice selections, namely radio buttons and sliding scale. This scale was chosen because it met our purpose for a rating scale which is to allow participants to express both the direction and strength of their opinion about each question, was relatively quick to complete, and minimized participant fatigue (Garland, 1991). The selections ranged from "Strongly Disagree" to "Strongly Agree" and

included divisions for the responses “Moderately Disagree,” “Disagree,” “Neutral,” “Agree,” and “Moderately Agree.

Seven points were selected as the optimal number because as the number of scale options increases, participant selection of the midpoint (Neutral) decreases and if denied a midpoint, participants were more inclined to select a negative range option (Garland, 1991; Matell & Jacoby, 1972). Matell and Jacoby (1972) also found that there was little difference between seven, eight, nine…19- point option Likert scale results in their study (Garland, 1991). “Many authors have concluded that the optimal number of scale categories is content specific and a function of the conditions of measurement,” so, in the interest of minimizing participant test time and the risk of fatigue seven points was selected as optimum (Garland, 1991, p. 1).

Negatively worded (reverse-coded) items may produce artefactual relationships on the survey that may be confusing to some participants (Podsakoff et al., 2012). The idea is that by mingling positively and negatively worded items on a survey the participant is forced to pay closer attention rather than automatically answering questions (Podsakoff et al., 2003). Unfortunately, research has shown that participants establish a pattern when responding to questions on a survey and fail to recognize the changes in the questions (Podsakoff et al., 2003). Every effort has been made in this survey to ensure all questions are positively worded so that this bias may be avoided.

Item Context Effect Bias

Item context effects “refer to any influence or interpretation that a subject might ascribe to an item solely because of its relation to the other items making up an

instrument" (Wainer & Keily, 1987, p. 187). Survey length is one such item context effect. If a survey is too long, there is a risk that the participant will not complete the entire survey or skip responses. Participants taking surveys with fewer items are more likely to remember their previous answers and recall them when answering other items later in the survey and thereby influencing their responses (Harrison, McLaughlin, & Coalter, 1996). The survey length was minimized by eliminating many questions through the pilot survey analysis discussed earlier in this chapter. The final survey length was reduced from 31 pilot questions to 14 in the final survey in the factors section, 16 pilot questions to nine final questions in the creativity section; the final survey will include Liden and Maslyn's 11 original questions in the LMX section plus five demographic questions. The number of total potential questions in the final survey went from 53 to 39 which equates to a 36% decrease.

Intermixing of items or constructs on the survey may lead to decreases in intra-construct correlations and increased inter-construct correlations during analysis (Podsakoff et al., 2003). Mixing items from different constructs together may increase the possibility of encountering this bias. Although there are questions among researchers whether this is a real danger, the final survey for this study separates the questions by construct and randomly scrambled the questions within each construct section in an attempt to avoid this bias (Podsakoff et al., 2003).

Common Source Bias

Common source (Same-source or Common Rater) bias refers to "any artifactual covariance between the predictor and criterion variable produced by the fact that the

participant providing the measure of these variables is the same" (Podsakoff et al., 2003). In this study, the same participant is responding to questions about each construct and therefore, common source bias may be a true threat, but, "given that one's behavior does not always correlate strongly with one's attitudes (Fishbein & Ajzen, 1975), it is doubtful whether the supervisors' (or anyone else's) perceptions of employees' attitudes is as good a measure as the employees' own self-reports." (Podsakoff et al., 2003, p. 899)

Some of the various sources of common source bias are transient mood states, consistency motif, and social desirability. A transient mood state, or context induced mood state, is the mental preparedness of participants to take a survey. Ideally, I would like my participants to be well rested and positively prepared before sitting down to take the survey but events such as a bad day at work, interactions with a disgruntled peer or student, word of a promotion, or death in the family may also produce artifactual covariance in self-report measures (Podsakoff et al., 2003). In this study, the survey was emailed a link to the Qualtrics survey tool and the participants were free to choose the time, instrument (desktop, laptop, cell phone, etc.), and location prior to accessing the survey and therefore, these aspects were not controllable by the researchers (Shurden, 2014). I assumed that participants were in an adequate mental state, at a convenient point in time, at a convenient instrument, and at a comfortable location, before beginning and remained so throughout the time it took to complete the survey.

Consistency effect, or consistency motif, refers to the desire for participants to maintain consistency in their responses to questions (Podsakoff et al., 2003). Consistency effect may be particularly problematic in situations in which participants are

asked to provide evaluations of their attitudes, perceptions, and/or their behaviors, such as in this study (Podsakoff et al., 2003). The decision to separate the various constructs and switch between radio button and sliding scale for option selection may reduce or eliminate the consistency effect bias.

Social desirability refers to the tendency of some participants to respond to items based upon their ideas of the social acceptability of the issues rather than their true feelings about the issues in question (Podsakoff et al., 2012). Social desirability is an attempt by participants to present themselves in a positive light and in doing so, may mask the true relationship between two or more variables. Since no personal identifiers are being recorded, this tendency should not be an issue. There is a risk, however slight, for two or more participants to complete the survey together as the researchers have no control over when or where the survey is completed.

There are many recommended procedural remedies to these biases, many of which were addressed earlier, that include obtaining measures for Pressure, Creativity, and LMX from various raters and improving survey questions. Regarding obtaining measures from various raters, since I am an outsider to the survey sites and because of the nature of this study, it is not feasible to try to match each faculty member with the individual they identify as their leader without collecting identifiers. There is also the problem of asking each leader to rate all the faculty members which probably isn't feasible without some sort of compensation. As an outsider, it is also impossible to gain access to past performance reports as a means of gaining the information needed for this study.

Recommendations for improving survey questions include "(a) define ambiguous or unfamiliar terms; (b) avoid vague concepts and provide examples when such concepts must be used; (c) keep questions simple, specific, and concise; (d) avoid double-barreled questions; (e) decompose questions relating to more than one possibility into simpler, more focused questions; and (f) avoid complicated syntax" (Podsakoff, 2003, p. 888). Every attempt was made by researchers to avoid the use of ambiguous or unfamiliar terms as suggested by item (a) and keeping each question simple as in item (c). Item (b) was addressed by changing instructions in the survey to ask faculty to describe the individual they consider being "their leader. The pilot survey was given to 10 individuals from various academic areas who were asked to provide comments, questions, and suggestions regarding survey questions in order to eliminate ambiguity and misinterpretations about survey questions. Changes were made to the survey questions to address each concern presented by these individuals. Issues and suggestions presented by IRB reviewers were addressed and implemented as well to clarify any possible misunderstandings.

Podsakoff, MacKenzie, Lee, and Podsakoff (2003) suggested that after making procedural corrections to account for bias that statistical remedies are available. After careful examination of the requirements and applicability of each, the single-common-method factor approach was adapted for use in our model to account for the remaining common source bias issues. The advantage of this procedure is that this method does not require the researcher to identify the precise source of method bias and it does not require a valid measure of the biasing factor (Podsakoff et al., 2003). The disadvantage of this

method is that it only controls for a single source of method bias at a time, in this case common method variance.

The single-common-method factor approach as shown in Figure 3.6 is a method of creating a single indicator construct that will be used to verify the results from our path analysis on the original path model. "Items (indicator variables) are allowed to load on their theoretical constructs, as well as on a latent common methods variance factor, and the significance of the structural parameters is examined both with and without the latent common methods variance factor in the model. In this way, the variance of the responses to a specific measure is partitioned into three components: (a) trait, (b) method, and (c) random error" (Podsakoff et al., 2003, p. 891). The potential problems with this method is that the specific cause of the method variance (if one exists) remains unknown, problems may be encountered with identification of the model, and the single-common-method factor approach assumes that the method factor does not interact with the predictor and criterion constructs (Podsakoff et al., 2003).

Summary

The primary purpose of this chapter was to examine the research methodology associated with testing environmental pressures that may affect faculty creativity in higher education, the role of leader-member exchange in that relationship, and testing of the research questions and hypotheses discussed in previous chapters. Also discussed in this chapter were the participants of the study and the data collection procedure, the pilot study that was conducted to create the final survey that provided the data for analysis

with reliability and validity testing, the methodology that was used for analysis of the data collected, and bias issues and limitations of the study (Lunenburg & Irby, 2008).

Chapter Four will provide a detailed look at the data collection and analysis procedures for the final survey, the results of the analysis of outer measurement models and the structural model shown in Figure 3.7, results of the analysis for common method bias, and an initial impression of the results. Chapter Five will provide a summary of the study, discussion of the findings as they relate to the research questions, implications for practice, recommendations for future research, and conclusions.

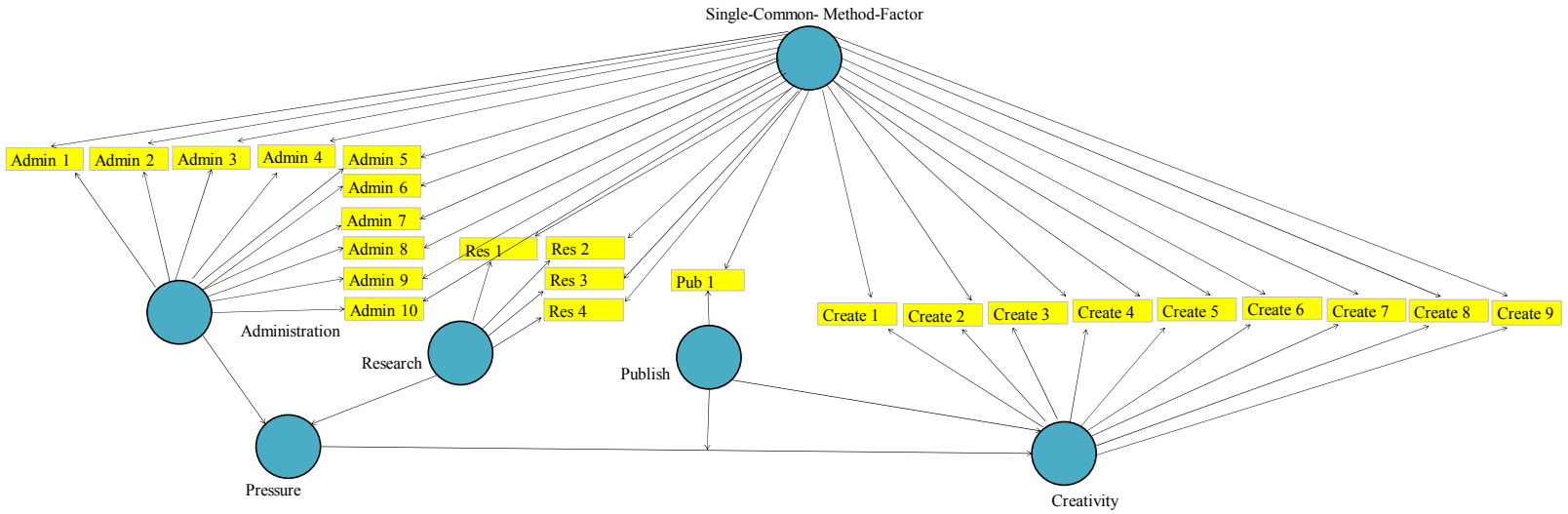

Figure 3.6. Path model of the single-common-method-factor approach to analyze the effects of common method bias on the path analysis results.

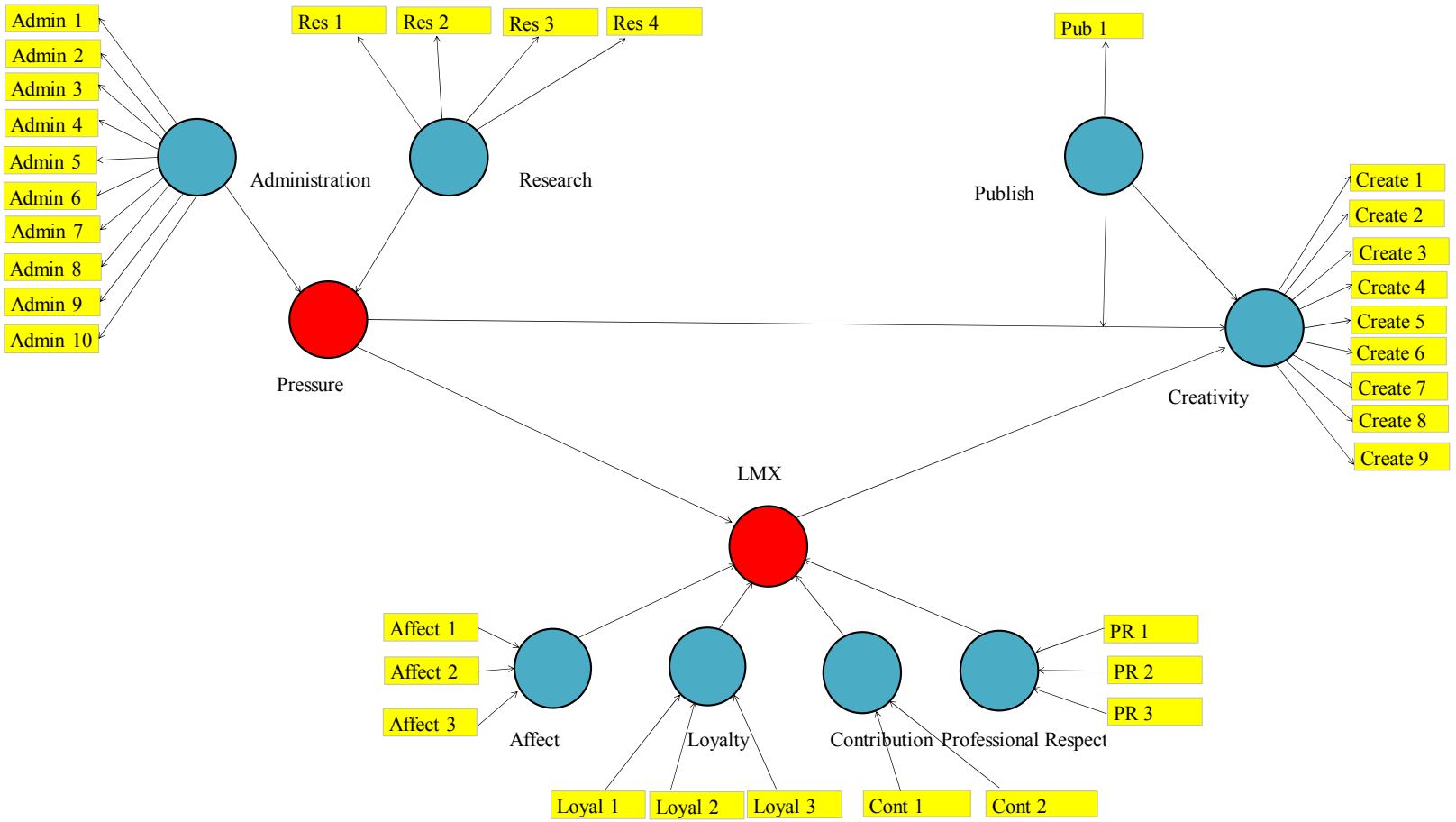

Figure 3.7. Path model for this study excluding the path model component for examining the effects of common method bias.

CHAPTER FOUR

RESULTS

This chapter presents an analysis of the results of a research study that was conducted using a convenience sample of 173 faculty members from two universities in the southeast region of the United States. The major purpose of this study was to identify and explore the effects of faculty perceptions of external environmental pressures in higher education on faculty perceptions of their creativity. The effects of faculty perceived external environmental pressures on faculty perceptions of the LMX relationship and the mediating effects of the faculty perceived leader-member exchange (LMX) relationship on the Pressure-Creativity relationship was also investigated. Lastly, an analysis of the moderating effects of the requirement of faculty to publish on the Pressure-Creativity relationship was conducted.

The results in this chapter include a detailed examination of the outer reflective measurement model tests for: (a) internal consistency reliability, (b) convergent reliability, (c) convergent validity, and (d) discriminant validity. The outer formative measurement model is evaluated using collinearity testing, significance testing, and relevance testing. The inner structural model is examined for: (a) collinearity, (b) path coefficient assessment and significance, (c) coefficient of determination (R^2), and (d) moderation. An analysis to rule out common method bias is also conducted. Finally, the findings are applied to the hypotheses.

Research Hypotheses

The following hypotheses guided this analysis:

Hypothesis 1: Perceived external environmental pressures negatively affect perceived faculty creativity.

Hypothesis 2: A high quality LMX relationship will positively affect faculty perceptions of their creativity.

Hypothesis 3: A high quality LMX relationship will mediate the negative relationship between Pressure and Creativity and positively influence perceived faculty creativity.

Hypothesis 4: Perceived external environmental pressures negatively affect a perceived high quality LMX relationship.

Hypothesis 5: The moderator variable Publish will change the intensity of the relationship between the Pressure and Creativity constructs.

Data Collection

The survey used in this study (Appendix D) is composed of five sections, an informed consent (Appendix C) that was required to enter the survey, three sections which measure the individual variables being studied, and a demographics section. The variables studied in the survey are faculty perception of external environmental pressure, faculty perception of their personal creativity, and faculty perception of their relationship with the individual they identify as their leader. If a respondent declined to participate in the survey, they were provided a message that thanked them for their consideration, ending the survey.

The study was conducted with a convenience sample of 173 faculty members. The 173 requests to participate resulted in 87 responses. From those 87 responses, three chose not to participate, 59 surveys were completed, and 25 surveys were discarded as incomplete. The overall response rate based on 59 completed surveys was 34% of the total sample surveyed (Shurden, 2014). Table 4.1 provides additional demographic data for our sample.

The majority of respondents to the survey were predominantly: (a) male, (b) between 31 and 60 years of age, (c) possessing PhD degrees, (d) Caucasian, (e) full-time tenured faculty, and (f) with 30 or fewer years of teaching experience.

This sample size meets the 10 times rule for PLS-SEM which states that samples should be at least "10 times the largest number of formative indicators used to measure a single construct" assuming a model effect of 0.25 (Hair, et al., 2017, p. 24). The largest number of formative indicators used to measure a single construct (LMX) in our path model is 4 and therefore the minimum sample size for our analysis using the 10 times rule is 40. Hair et al. (2017) also recommend considering Cohen's (1992) minimum sample size recommendation for multiple regression analysis when determining the minimum sample size needed for analysis.

To detect a minimum R^2 value of 0.25 assuming a significance level (alpha) of 5% and a statistical power of 80%, the minimum sample size recommended by Cohen is 45 (Hair et al., 2017). The number of respondents for this study is 59, which exceeds Cohen's recommendation. Interpolating, one can roughly estimate that this study will produce sufficient power if R^2 exceeds about 0.18.

Table 4.1
Demographic Statistics (N = 59)

Characteristic	n	%
Gender		
Male	34	58
Female	25	42
Age		
18-30	0	0
31-40	10	17
41-50	16	27
51-60	19	32
> 60	12	20
No response	2	3
Highest degree attained		
Master	9	15
PhD	48	81
JD	0	0
MD	0	0
No response	2	3
Ethnicity		
Caucasian	46	78
Black	3	5
Hispanic	1	2
Asian	1	2
Other	1	2
Prefer no ans.	7	12
Employment status		
Adjunct	2	3
FT non-tenure	16	27
FT tenure	41	69
Teaching experience		
< 10 years	19	32
11-20 years	23	39
21-30 years	11	19
>30 years	3	5
No response	3	5

Data Analysis

The software package SmartPLS3 provides the analytical platform for the Partial Least Squares Structural Equation Modeling (PLS_SEM) of our path model (Figure 4.1). Partial least squares structural equation modeling (PLS-SEM) is a variance based alternative approach to structural equation modeling that is quickly becoming a key research method (Hair et al., 2014). PLS-SEM is capable of providing accurate measurements for the following: (a) extremely non-normally distributed data, (b) complex data, (c) models with multiple indicators and relationships, and (d) small sample sizes (Hair et al., 2014). Structural equation modeling (SEM) is a class of advanced statistical multivariate analysis techniques that combines "aspects of factor analysis and regression, enabling a simultaneous examination of relationships among measured variables and latent variables as well as between latent variables" (Hair et al., 2014).

As discussed in detail in Chapter Three, our path model consists of three primary higher order variables (constructs) shown as blue and red circles. Two higher order variables are the independent variables of Pressure and leader-member exchange (LMX), and the third is the dependent variable Creativity. Pressure is partially defined by the two lower level constructs of Administration and Research, also shown as blue circles on the path model. Leader-member exchange is defined by the four lower order constructs of Affect, Loyalty, Contribution, and Professional Respect.

Each construct is measured by indicator variables identified as yellow rectangles in our path model. Each indicator variable represents one survey question used to measure participant's perception of the concept under investigation.

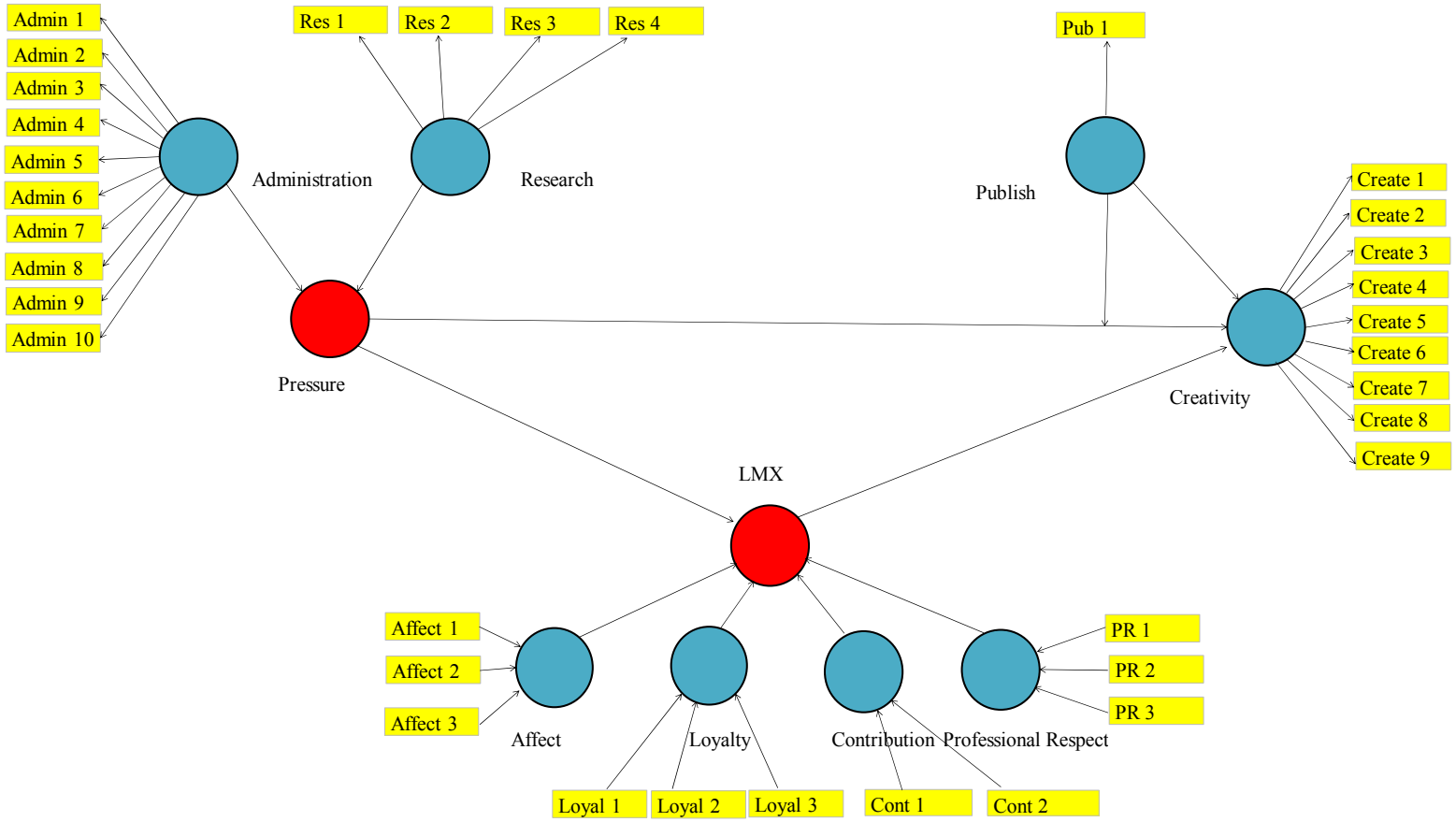

Figure 4.1. Initial path model for this study.

Listed in Appendix F through Appendix H are (a) the indicator variables being measured, (b) the survey questions asked, (c) the constructs being measured, (d) the relationships of the indicator variables to the constructs, and in Appendix G, (e) the mechanisms of isomorphism (pressures) identified by DiMaggio and Powell (1983).

The terminology, explanations for the path model, and analysis results are presented during the analysis of the pilot study in Chapter Three and therefore will not be addressed again in this chapter. The analysis of our model begins with a check for common source bias by examining correlations between original survey responses. Once completed, the moderating variable Publish is removed from the path model, an analysis of the path model is conducted, and the moderating variable Publish is reinserted for an analysis of the moderating effect on the final path model.

Testing for Common Source Bias

Consideration of common source bias is recommended since the same participant answered all questions, at the same time, in the same location, and on the same survey (Podsakoff et al., 2003). Bias will also be investigated during our path model analysis through an examination of the variance inflation factor (VIF).

A question "I enjoy team sports," labeled Single Common Method Factor in Appendix H (marker variable), was randomly inserted into the survey to be used for analysis of common source bias. This variable was randomly inserted into the pressure section of the survey and was measured using the same 7-point Likert scale. A correlation of the original data to the marker variable was conducted. High correlations (above 0.90) between the marker variable and the other indicator variables in the path

model indicated that common method bias likely exists (Lowry & Gaskin, 2014; Podsakoff et al., 2003). Correlation values of 0.67 or less would indicate that the values are sufficiently different from zero and that common source bias is unlikely (Hair et al, 2018).

Analysis Overview

The analysis of our model is conducted in two stages. The first stage calculates an estimation of latent variable scores for the lower order latent variables (latent variables that link to higher order latent variables such as Administration, Research, Affect, etc. in Figure 4.1) through a repeated indicator approach illustrated in Figure 4.2. The repeated indicator approach assigns the indicator variables (Affect 1, Affect 2, etc.) from the lower order constructs (Affect, Loyalty, Contribution, etc.) directly to the measurement model of the higher order constructs (LMX) and the resulting analysis of this procedure provides latent variable scores (Hair et al., 2018). These latent variable scores are used to calculate measures for the higher order constructs in the second stage of our analysis (Hair et al., 2017). In other words, the lower order constructs are converted to indicator (manifest) variables representing the aggregate of the lower order construct; at that point, they are displayed as yellow rectangles, or manifest variables (Affect, Loyalty, etc. in Figure 4.3). The advantage of the repeated indicator approach is to: (a) reduce the number of relationships in the model and make it easier to understand, (b) reduce possible bias issues among highly correlated first order constructs, and (c) reduce possible bias issues among highly correlated formative indicator variables (Hair et al., 2017).

In the second stage, the latent variable scores acquired in the first stage are used as manifest variables in the higher order component measurement model (see Figure 4.3). The model is then analyzed for significant path relationships. The initial analysis evaluates the reflective measurement model which includes the Pressure and Creativity constructs. Next, the formative measurement model of the LMX construct is evaluated followed by the remaining structural model.

Stage 1 Analysis

The hierarchical component path model (HCM) shown in Figure 4.1 indicates that there are three higher order components (HOC) in the inner model, the red circles representing Pressure and LMX, and the blue circle representing Creativity. The outer model is comprised of the two blue lower order components (LOC) labeled Administration and Research which help define the latent variable (construct) Pressure, and the blue lower order components, Affect, Loyalty, Contribution, and Professional Respect, which define the latent variable (construct) LMX. The measurement model is defined by the yellow rectangles which represent the indicator variables from the survey questions.

The lower order component Affect has three yellow indicator variables, Contribution has two yellow indicator variables, Loyalty has three yellow indicator variables, and Professional Respect has three yellow indicator variables. Each of these indicator variables and lower order components is formative; the arrow points from the indicator variable to the construct LMX (Shurden, 2014). Formative indicator variables are not interchangeable, they capture a specific aspect of the constructs domain, and in

aggregate they fully define their construct. The removal of any one indicator variable will alter the nature of the construct.

The number of indicator variables for each lower order component is similar and therefore conducive to stage one analysis. Also, the higher order component for LMX is well established by theory as outlined by Liden and Maslyn (1998) and is thus defined by existing theory in this path model (Hair et al., 2017). LMX will undergo the repeated indicator approach in the stage one analysis to calculate the latent variable scores for LMX's LOC's which will then be converted to manifest variables for subsequent analyses.

It was earlier determined through exploratory factor analysis that the latent variable Pressure was defined by two factors, Administration and Research. Hair et al. (2017) indicate that use of the repeated indicator approach requires that the number of indicator variables must be similar between lower order components and, if not, then the relationships between the lower order components and the higher order component may be biased. Administration has 11 indicator variables (Admin 1 through Admin 11) and Research has four (Res 1 through Res 4). Given this dissimilarity, proceeding with the repeated indicator approach for the higher order construct Pressure may result in a stronger relationship between Administration and Pressure because of the larger number of indicator variables.

The indicator variables and latent variables measuring the effects of Pressure are reflective; the arrows point from the construct to the indicator variable. This means that the constructs that define Pressure (i.e., Administration and Research) are representative

samples of all the possible constructs that may describe Pressure. That is, Pressure can be related to constructs other than, and in addition to, Administration and Research. Administration and Research, then, should be interchangeable, meaning that the removal of any one indicator variable from one of the constructs will not alter the nature of the construct as long as the remaining construct has sufficient reliability (Hair et al., 2014). The number of indicator variables for each lower order component is dissimilar and therefore not conducive to the repeated indicator approach. Since they were interchangeable and since the repeated indicator approach could not be used, the lower order constructs, Administration and Research, are merged; the 14 indicator variables now define the higher order construct, Pressure (see Figure 4.2).

The higher order construct Creativity has indicator variables labeled Create 1 through Create 9. These indicator variables are also reflective as shown by the arrows pointing from the construct Creativity to the indicator variables. Hair et al. (2017) indicate that the actual final decision regarding the formative or reflective nature of indicator variables and latent variables is based upon logic and theory. As is the case with Pressure and Creativity, no claim is being made that the indicators fully describe the Pressure or Creativity constructs. In our case, Pressure and Creativity, instead define the indicators.

During our investigation, the path model is analyzed for significant path relationships using the three primary PLS-SEM evaluation tools: Algorithm, bootstrapping, and blindfolding, which were discussed in Chapter Three. The steps in this analysis consist of evaluating the reflective measurement model that includes the

Pressure and Creativity constructs. Next, the formative measurement model, the LMX construct, is evaluated followed by the inner structural model. Once the final significant path model is identified, the moderator variable "Publish" is inserted, its effect analyzed and the findings interpreted. Figure 4.2 illustrates the updated model with the reflective indicator approach prepared for LMX.

The stage one analysis is accomplished by creating the path model shown in Figure 4.2 in a SmartPLS worksheet and then running an algorithm analysis to determine the latent variable scores (standardized scores) for the lower order constructs of Affect, Contribution, Loyalty, and Professional Respect. The acquired latent variable scores are used to represent each of the lower order components as one aggregate manifest variable and are shown as yellow rectangles with arrows pointing into LMX. The resulting path model showing these manifest variables of Affect, Contribution, Loyalty, and Professional Respect used for the remainder of the stage two path analyses is shown in Figure 4.3.

Stage 2 Analysis

Outer Reflective Measurement Model Evaluation

The focus of this step in the evaluation is to examine the latent variables Pressure and Creativity as well as their associated indicator variables. Algorithm and bootstrap testing are conducted to determine the internal consistency reliability, the convergent validity, and the discriminate validity of the latent variables. LMX is not evaluated in this section since LMX is a formative measurement model and will be evaluated separately later in the analysis.

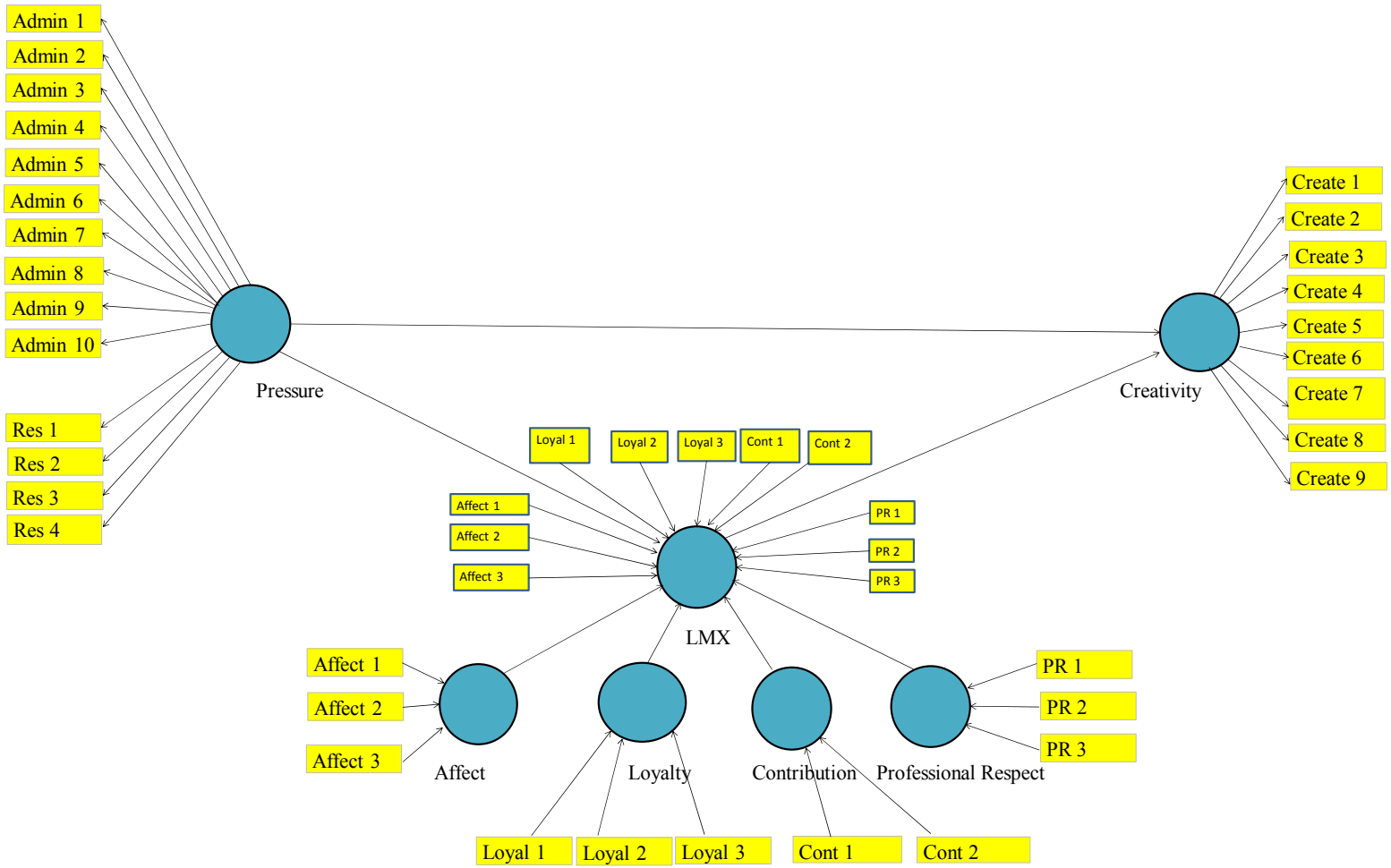

Figure 4.2. Revised stage 1 path model. This model illustrates the repeated indicator approach for LMX.

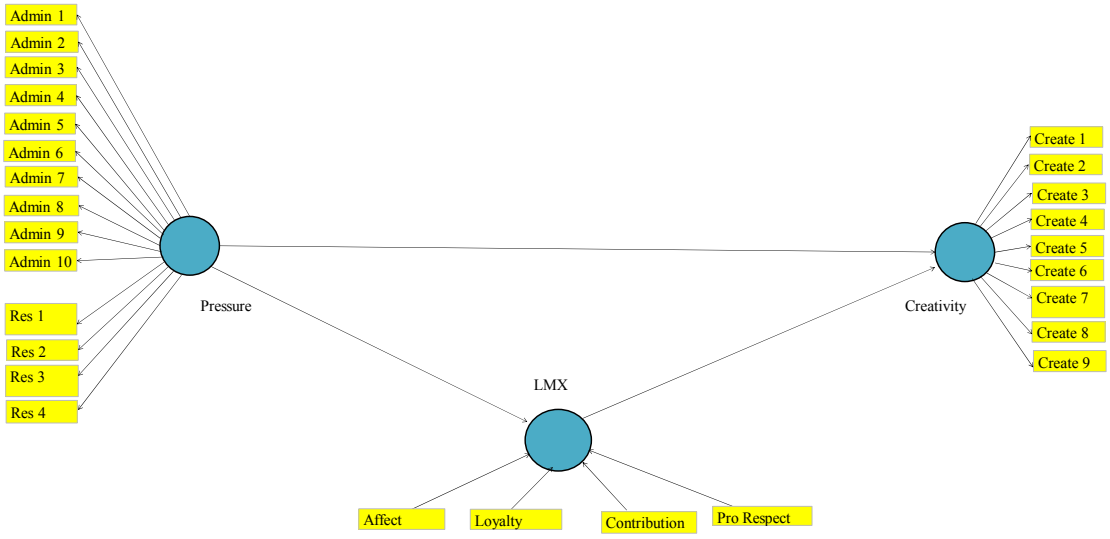

Figure 4.3. Stage 2 path model. This model will be used for the remainder of the analyses.

Internal Consistency Reliability

Internal consistency reliability is a measure of the similarity of results across the indicator variables used to measure the construct (Hair et al., 2017). Internal consistency reliability is an indication of the ability of the indicator variable to measure unique aspects of the construct; to gauge the correlations between the indictor variable scores. Cronbach's alpha and composite reliability are the measures used to determine these results. Both are measured on a scale ranging from 0 to 1. Cronbach's alpha scores should be greater than 0.708 and composite reliability of 0.60 and above is acceptable for exploratory research such as this.

Convergent Validity

Convergent validity is the "extent to which a measure correlates positively with alternative measures of the same construct" (Hair et al., 2014). Convergent validity is the

amount of variance between the indicators used to measure the same construct. A high variance indicates that each indicator is measuring a unique aspect of the construct. Two measures used to determine convergent validity are indicator reliability (outer loadings) and average variance extracted (AVE). Indicator reliability is the square of an indicator's outer loading and explains how much variation in an item is explained by the associated construct (Hair et al., 2017). Average variance extracted (AVE) is defined as "the grand mean value of the squared outer loadings of the indicators associated with the construct" or "how much of the variation in an item is explained by the construct" (Hair et al., 2017). Average variance extracted (AVE) values should be greater than 0.50, meaning 50% or more of an indicator variable's variance is explained by the corresponding construct (Hair et al., 2014). Table 4.2 provides our initial findings for Cronbach's alpha, composite reliability, and average variance extracted (AVE).

Cronbach's alpha scores for Pressure (0.796) and Creativity (0.885) are acceptable as each are above the 0.708 lower threshold. Composite reliability for Pressure (0.828) and Creativity (0.893) are acceptable as each are above the 0.60 lower threshold.

Table 4.2.
Initial Construct Reliability and Validity Measures

	Construct	
Measure	Creativity	Pressure
Cronbach's Alpha	0.885	0.796
Composite Reliability	0.893	0.828
Average Variance Extracted (AVE)	0.487	0.303

Average variance extracted (AVE) values for Pressure (0.303) and Creativity (0.487) are both well below the 0.50 threshold. Each indicator variable for Pressure and Creativity

must be evaluated to determine which must be removed from our model to increase the AVE values of each construct.

Outer loadings are estimated relationships in reflective measurement models that determine an indicator variable's absolute contribution to its construct (Hair et al., 2014). Outer loadings are determined through simple regressions of each indicator on its corresponding construct without consideration of any other indicator variable (Hair et al., 2017). Outer loading values should be greater than 0.708 for each indicator, but indicator variables with outer loadings between 0.60 and 0.70 are acceptable in exploratory research such as this study. Indicator variables having outer loadings less than 0.40 should automatically be eliminated from the measurement model as they contribute very little to the construct. Indicator variables with outer loadings between 0.40 and 0.70 should be removed only if the deletion results in an increase in composite reliability and AVE above the suggested values of 0.708 and 0.50 respectively (Hair et al, 2017).

The elimination of reflective indicator variables is methodical. The indicator variables for the Pressure construct will be examined followed by those for the Creativity construct. The common rule of thumb for reflective indicator variables is that the outer loadings should be 0.708 or higher and should at least be significant ($p < 0.05$) (Hair et al., 2017). Recall that indicator reliability is the square of an indicators outer loading and explains how much variation in an item is explained by the associated construct. At least 50% of an indicator variable should be explained by the associated construct ($0.708^2 = 0.50$ or 50%). Table 4.3 provides the beginning outer loading values.

A p-value, or probability value, is the probability of obtaining a similar empirical t-statistic as the result observed simply by chance (Hair et al., 2017). A p-value is the probability of falsely rejecting a true null hypothesis. A significance level of 5% (0.05) or less, as recommended by Hair et al. (2017), is chosen in this study to render a result statistically significant.

Table 4.3.
Convergent Validity: Initial Outer Loading Results

Indicator	Construct	Outer Loading	p-value
Admin 1	Pressure	0.714	0.000
Admin 10	Pressure	0.506	0.014
Admin 2	Pressure	0.627	0.001
Admin 3	Pressure	0.234	0.459
Admin 4	Pressure	0.816	0.000
Admin 5	Pressure	0.759	0.000
Admin 6	Pressure	0.840	0.000
Admin 7	Pressure	0.199	0.416
Admin 8	Pressure	0.261	0.292
Admin 9	Pressure	-0.005	0.984
Create 1	Creativity	0.761	0.004
Create 2	Creativity	0.651	0.055
Create 3	Creativity	0.774	0.012
Create 4	Creativity	0.638	0.032
Create 5	Creativity	0.771	0.007
Create 6	Creativity	0.764	0.010
Create 7	Creativity	0.446	0.157
Create 8	Creativity	0.760	0.008
Create 9	Creativity	0.647	0.040
Res 1	Pressure	0.606	0.015
Res 2	Pressure	0.608	0.028
Res 3	Pressure	0.352	0.225
Res 4	Pressure	0.329	0.379

Note. All coefficients are significant at $p < 0.05$

For exploratory studies such as this, reflective indicator variables having outer loadings of 0.60 or greater and significant p-values (< 0.05) are acceptable. Indicator variables with outer loadings less than 0.40 should automatically be eliminated from the model. Indicator variables with scores between 0.40 and 070 should be eliminated if their elimination increases AVE. Given this, Admin 3, Admin 7, Admin 8, Admin 9, Res 3, and Res 4 were removed from the model automatically. The indicator variable Admin 10 has an outer loading that is low (0.506) but it is significant (p = 0.014) and will be retained for further analysis.

Algorithm and bootstrap tests were run on the path model after the indicator variables identified above were removed. Composite reliability scores, including AVE were examined. AVE for both Pressure (0.486) and Creativity (0.472) continued to be low (< 0.50). Admin 10 was significant (p = 0.008) but its contribution to the Pressure construct (outer loading) was still low with an outer loading of 0.514. Create 7 was insignificant (p = 0.192) and its outer loading (0.422) were below the acceptable lower threshold of 0.60. Both Admin 10 and Create 7 were eliminated. Algorithm and bootstrap tests were again run on the path model after Admin 10 and Create 7 were eliminated. Table 4.4 presents the construct reliability and validity measures from these analyses.

Table 4.4.
Composite Reliability Results after Indicator Variable Elimination

	Construct	
Measure	Creativity	Pressure
Cronbach's Alpha	0.884	0.846
Composite Reliability	0.891	0.883
Average Variance Extracted (AVE)	0.506	0.523

Average Variance Extracted (AVE) for both Creativity (0.506) and Pressure (0.523) satisfy the criteria of being greater than 0.50. Composite reliability for Creativity (0.891) and Pressure (0.883) and Cronbach's alpha values for Creativity (0.884) and Pressure (0.846) also meet the criteria of being greater than 0.708. The outer loadings of all reflective indicator variables meet the established criteria. Analysis of the outer reflective indicator model may continue for discriminant validity testing.

Discriminant Validity

Discriminant validity is the "extent to which a construct is truly distinct from other constructs" and is measured first by examining the cross loadings of the indicators, then the Fornell-Larcker criterion method, and finally with the Heterotrait-Monotrait Ratio (HTMT) (Hair et al., 2014). An indicator's outer loading on its construct should be greater than the value of its cross loadings (correlations) on other constructs. Table 4.5 provides the cross-loading results from the bootstrap test.

Admin 1, 2, 4, 5, 6, Res 1, and Res 2 are all indicator variables of the Pressure construct. The intersection of the Pressure column and the Admin 1 row shows a cross loading absolute value of 0.722. I expect this value to be greater than the values of any other cross loading for Admin 1 in the Creativity or LMX columns. Comparing 0.722 with Creativity (0.336) and LMX (-0.372), 0.722 is indeed greater. Comparing Create 1 (0.759) with LMX (-0.256) and Pressure (0.299) Create 1 does share a greater correlation with its own construct (Creativity) than with any other construct in the path model. Examining the remaining cross loading values in this manner for the remainder of the indicator variables, discriminant validity is indeed supported.

Table 4.5
Discriminant Validity: Cross Loading Results after Reflective Indicator Variable Elimination

Indicator Variable	Construct		
	Creativity	LMX	Pressure
Admin1	0.336	-0.372	0.722
Admin2	0.146	-0.433	0.661
Admin4	0.296	-0.554	0.826
Admin5	0.219	-0.302	0.769
Admin6	0.334	-0.508	0.844
Res1	0.316	-0.185	0.613
Res2	0.159	-0.249	0.586
Create1	0.759	-0.256	0.299
Create2	0.683	-0.457	0.326
Create3	0.745	-0.027	0.019
Create4	0.617	-0.001	0.154
Create5	0.748	-0.038	0.209
Create6	0.740	-0.070	0.087
Create8	0.733	-0.076	0.170
Create9	0.654	-0.183	0.290

The Fornell-Larcker criterion method compares the square root of the AVE for each reflective construct, Pressure and Creativity, against the correlations with all of the other constructs in the path model. The idea is that a reflective construct will have a greater correlation with its own indicator variables than with other constructs in the path model. Table 4.6 provides the Fornell-Larcker results.

Table 4.6
Discriminant Validity: Fornell-Larcker Criterion Results

Construct	Creativity	LMX	Pressure
Creativity	0.712		
LMX	-0.321	-	
Pressure	0.364	-0.546	0.723

Examining the Fornell-Larker Criterion results, the square-root of the AVE for Creativity (0.712) is compared against the correlation value between Creativity and LMX (-0.321), and Creativity and Pressure (0.364). The expectation is that 0.712 will be greater than the other two values. Likewise, the square-root of the AVE for Pressure (0.723) is compared against the correlation value between Pressure and LMX (-0.546), and Pressure and Creativity (0.364). LMX is not a reflective construct and is not evaluated with an AVE value; therefore, no value lies at the intersection of column LMX and row LMX. The square-root of the AVE values for Creativity and Pressure is indeed greater than the correlation values with the other constructs in the path model which supports discriminant validity.

The final test of discriminant validity for the reflective measurement model is new test known as the Heterotrait-Monotrait Ratio (HTMT). The Heterotrait-Monotrait Ratio "is an estimate of what the true correlation between two constructs would be if they were perfectly measured (i.e., perfectly reliable)" (Hair et al., 2017, p. 118). A correlation of two reflective constructs close to 1 indicates a lack of discriminant validity and for empirical research an upper threshold of 0.85 is the accepted norm (Hair et al., 2017). Table 4.7 provides the HTMT results from the algorithm test.

Table 4.7

Heterotrait-Monotrait Ratio Results with Bias Corrected Values

Constructs	Original Sample	p -value
Pressure -> Creativity	0.308	0.001

Note. $\alpha = 0.05$

The result of the HTMT testing is 0.308 which is well below the threshold of 0.85 and it is also significant with a p-value of 0.001. The Heterotrait-Monotrait Ratio, Fornell-Larcker Criterion and cross loading analysis all support discriminant validity for our reflective path model constructs. The next step in the analysis of the path model is to examine the outer formative measurement model which is isolated to the LMX construct. Figure 4.4 presents the path model after evaluation of the outer reflective model and prior to evaluation of the outer formative measurement model.

Outer Formative Measurement Model Evaluation

Analysis of the outer formative measurement model is the next segment of our path model analysis. This analysis focuses on the LMX construct and its associated standardized formative indicator variables, Affect, Loyalty, Contribution, and Professional Respect. The test procedures for the reflective measurement model are not transferrable to the formative measurement model because reflective indicators are assumed to have an associated error factor whereas the formative measurement model does not have this associated error factor.

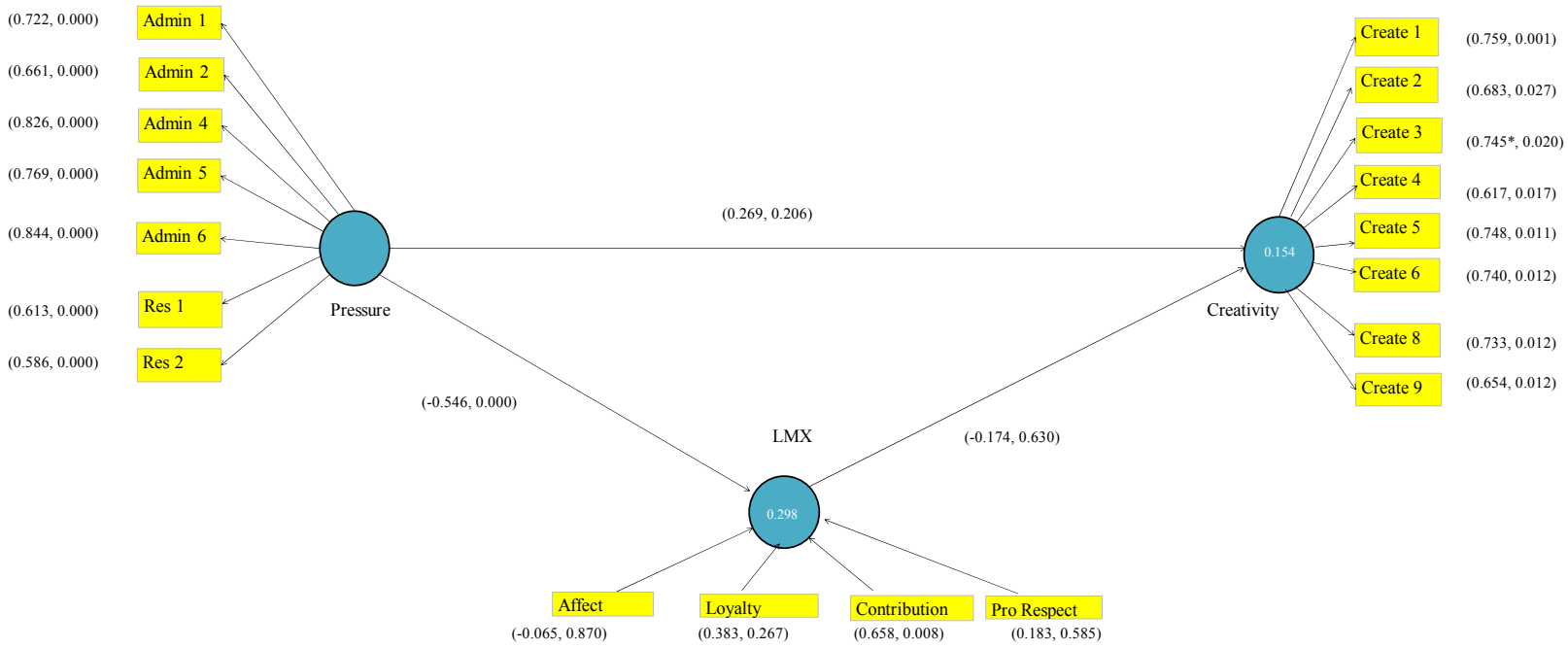

Figure 4.4. Path model after the evaluation of the outer reflective measurement model. The outer loadings for Pressure and Creativity, outer weights for LMX, R^2 values for LMX and Creativity, path coefficients and significance values before beginning the outer formative measurement analysis are shown. Error factors for reflective indicator variables are omitted per APA guidelines.

Formative indicators are assumed to be error free meaning that the internal consistency reliability concept associated with the evaluation of reflective indicators is not appropriate for use in the evaluation of formative indicators as the results would be meaningless (Hair et al., 2017). Algorithm and bootstrap tests are conducted to assess the model for collinearity issues and to assess the significance and relevance of the formative indicators.

Collinearity Testing of Formative Indicator Variables

Unlike reflective variables, formative indicator variables are not interchangeable and therefore, are not expected to highly correlate (Hair et al., 2017). A high correlation between variables indicates collinearity and if three or more indicator variables are involved, it is referred to as multicollinearity. High levels of collinearity impact the estimation of outer weights and their statistical significance. Outer weights are "the results of a multiple regression of a construct on its set of indicators and are the primary criterion in evaluating an indicator's relative importance in formative measurement models" (Hair et al., 2014, p. 92). High levels of collinearity may also result in an indicator variables' signs being reversed (the effects may be misinterpreted as being negative when they are in fact positive).

To assess collinearity in this model, the variance inflation factor (VIF) is computed and analyzed. The VIF is the degree to which the standard error has been increased due to the presence of collinearity (Hair et al., 2017). A VIF value of 5.000 or higher may indicate a collinearity problem as 80% or more of an indicators variance is accounted for by the remaining indicator variables of the same construct (Hair et al.,

2017). The variance inflation factor measures for the formative indicators are provided in Table 4.8.

Table 4.8
Variance Inflation Factors (VIF) for Formative LMX Standardized Indicator Variables.

Indicator	VIF
Affect	3.242
Loyalty	2.724
Contribution	1.551
Professional Respect	2.205

All VIF measures are clearly less than 5.000 indicating there is no significant correlation between the formative indicator variables associated with the LMX construct (Shurden, 2014). I am now free to examine the significance and relevance of the formative indicator variables.

Significance and Relevance of the Formative Indicator Variables

The testing for significance and relevance of the formative indicator variables is accomplished by using the bootstrap process to analyze the outer weights of each indicator variable and their statistical significance. Outer weights are "the result of multiple regressions with the latent variable scores as the dependent variables and the formative indicators as the independent variables" (Hair et al., 2017, p. 145). This process yields an R^2 of 1.0 meaning that 100% of the construct is explained by the formative indicator variables and that as standardized outer weights, they may be compared (Hair et al., 2017).

The outer weights, outer loadings, and statistical significance for each formative indicator variable (Affect, Loyalty, Contribution, and Professional Respect) are provided

in Table 4.9. Each outer weight must be significant for the indicator to remain in the model or further testing of outer loadings must follow. Only one outer weight, Contribution, is significant (0.008) at $p < 0.05$ and will be kept in the model. Affect, Loyalty, and Professional Respect may or may not be kept; I need to analyze their outer loading to determine what they contribute to the construct.

Table 4.9

Outer Weights, Outer Loadings and Statistical Significance of Formative Indicator Variables for LMX Construct

	Outer Weight			Outer Loading		
Indicator	Score	t-statistic	p-values	Score	t-statistic	p-values
Affect	-0.065	0.164	0.870	0.650	2.837	0.005
Loyalty	0.383	1.112	0.267	0.796	4.286	0.000
Contribution	0.658	2.650	0.008	0.929	6.951	0.000
Professional Respect	0.183	0.546	0.585	0.691	3.840	0.000

Note. $\alpha = 0.05$

If the outer weight of a formative indicator variable is not significant, the indicators outer loading must be examined to determine the absolute contribution made to the corresponding construct. As noted in our analysis of the outer reflective measurement model, outer loadings are estimated relationships that determine an indicator variables absolute contribution to its construct (Hair et al., 2014). When a formative indicator variables outer weight is insignificant but its outer loading value is greater than 0.500 it should be retained in the model regardless of statistical significance since it is absolutely important rather than relatively important (Hair et al., 2017).

Bootstrap testing was conducted using a two-tailed t-test with 58 (n-1) degrees of freedom and a significance level (alpha) of 0.05. Examining the outer loadings for absolute relevance values (outer loading scores) greater than 0.500, Affect (0.650),

Loyalty (0.796), and Professional Respect (0.691) are shown to be absolutely relevant to the LMX construct; each are also statistically significant with $p < 0.05$. Meeting the established criteria, all formative indicator variables are retained in the path model for continued analysis of the inner structural model.

Inner Structural Model Evaluation

Attention is now turned to evaluation of the inner structural model consisting of the latent variables (constructs), Pressure, LMX, and Creativity. The initial path model for this analysis is presented in Figure 4.4 and the associated data is provided in Table 4.11. The goal of this evaluation is to determine how well the path model predicts the endogenous construct, Creativity. Currently, the path, Pressure to Creativity, is statistically insignificant ($p = 0.206$) with a path coefficient of 0.269 (Table 4.11). The path, Pressure to LMX, is statistically significant ($p = 0.000$) with a path coefficient of -0.546. The path, LMX to Creativity, is statistically insignificant ($p = 0.630$) with a path coefficient of -0.174.

The key criteria for evaluating the inner structural model is: (a) assessing for collinearity, (b) assessing the significance of the path coefficients, (c) assessing the coefficient of determination (R^2), (d) assessing the f^2 effect size, (e) assessing the predictive relevance Q^2 value, and (f) assessing the q^2 effect size.

Assessment for Collinearity

The assessment for collinearity between constructs is determined with variance inflation factor (VIF) for the constructs. An algorithm test was conducted and the inner model VIF values for our construct relationships are shown in Table 4.10.

Table 4.10

Variance Inflation Factor Values for the Inner Structural Model Relationships

	Relationship	
Latent Variable	Creativity	LMX
Creativity		
LMX	1.425	
Pressure	1.425	1.000

The relationships for the LMX to Creativity and Pressure to Creativity paths each have a VIF value of 1.425 and the Pressure to LMX path ha a VIF value of 1.000. These results are well below the 5.000 threshold and provide evidence that no collinearity issues exist within the inner structural model. The analysis of the significant path coefficients may continue.

Assessing the Significance of the Path Coefficients

Path coefficients have standardized values which usually range from -1.000 to +1.000 with values close to +1.000 indicating strong positive relationships (or negative relationships for -1.000) that are usually statistically significant (different from zero in the population) (Hair et al., 2017). A bootstrap test was conducted to determine whether any structural relationships (paths) were statistically significant ($p < 0.05$). Table 4.11 and Figure 4.4 provide the initial results of bootstrap testing for path coefficients and statistical significance.

Table 4.11
Initial Results for Path Coefficients and Statistical Significance

	Results		
Path	Coefficient	t-statistic	p-value
LMX -> Creativity	-0.174	0.483	0.630
Pressure -> Creativity	0.269	1.265	0.206
Pressure -> LMX	-0.546	6.153	0.000

Note. All coefficients are significant at $p < 0.05$

The path, Pressure to LMX, is significant ($p = 0.000$). The paths Pressure to Creativity ($p = 0.206$) and LMX to Creativity ($p = 0.630$) are clearly insignificant ($p > 0.05$). The path, LMX to Creativity, was removed because it was highly insignificant and the primary goal of this study is to determine the effects of faculty perceptions of external environmental pressures on faculty perceptions of their creativity.

A second bootstrap test was conducted to determine if the remaining paths improved. Table 4.12 provides the results of this bootstrap testing for path coefficients and statistical significance.

Table 4.12
Final Results Showing Path Coefficients and Statistical Significance: Path Model Without the LMX to Creativity Path.

Path	Coefficient	t-statistic	p-value
Pressure -> Creativity	0.350	1.939	0.024
Pressure -> LMX	-0.548	4.744	0.000

Note. All coefficients are significant at $p < 0.05$

The paths Pressure to LMX remained significant ($p = 0.000$) and the relationship became slightly stronger with a path coefficient increasing from -0.546 to -0.568. The path Pressure to Creativity became significant ($p = 0.024$) and the relationship also became stronger with a path coefficient increasing from 0.269 to 0.350. Now that our

path model contains all significant paths, I may examine the Coefficient of Determination (R^2).

Assessing the Coefficient of Determination (R^2)

The coefficient of determination (R^2) is a measure of the model's predictive power. R^2 the amount of variance in the endogenous (dependent) latent variables in the structural model explained by the exogenous (independent) constructs connected to it (Hair et al., 2017). R^2 values range from 0 to 1. The higher the R^2 values, the better the construct is explained by the latent variables in the structural model whose arrows point to it (Hair et al., 2014). High R^2 values also indicate that the values of the construct can be well predicted by the PLS path model (Hair et al., 2014). Pressure is the only exogenous construct in our current path model while Creativity and LMX are endogenous constructs. Using the bootstrap results obtained previously the results of testing for the coefficient of determination are presented in Table 4.13.

The R^2 value for Creativity (0.122) indicates that the 12% of the total variation of the endogenous construct Creativity may be explained by the exogenous construct, Pressure. The R^2 value for LMX (0.300) indicates that 30% of the total variation of the endogenous construct LMX may be explained by the exogenous construct Pressure.

Table 4.13
Coefficient of Determination (R^2) Results with Statistical Significance and Bias Corrected Values

Construct	Score
Creativity	0.122
LMX	0.300

Cohen (1992) suggested that R^2 values and the effect for endogenous latent variables in behavioral sciences be assessed as 0.26 (large), 0.13 (moderate), and 0.02 (weak).

The analysis of f^2 effect size, Q^2 value, and q^2 effect size are tests that require evaluation of the path model with and without exogenous constructs to determine the strength of the model. The only truly exogenous construct in the path model is Pressure after I eliminated the LMX to Creativity path relationship. Eliminating Pressure simply leaves two separate constructs and therefore, the tests for f^2 effect size, Q^2 value, and q^2 effect size were not conducted for our analysis.

Assessing the Moderator Variable Publish

We now add the moderator variable Publish to analyze its moderating effect on the path model. Earlier, the moderator variable, Publish, was introduced and hypothesized to influence the relationship between Pressure and Creativity such that as Pressure to Publish increased, so too would the strength of the relationship between Pressure and Creativity. I measured the construct Publish with the single indictor variable Pub 1 which asked "I experience pressures from policies and guidelines established by the department and university accrediting agencies to publish." As a single indicator, Pub 1 is neither reflective nor formative.

This indicator variable was measured using the same 7-point Likert scale used to measure the other questions in the survey. As a single-item construct, the relationship between the single indicator variable and the latent variable (construct) is always 1, meaning that they have identical values. Therefore, the criteria for assessment of the

measurement models (indicator variables) are neither applicable to the single-item construct Publish nor its moderating effect (Hair et al., 2017).

Once the moderator variable is added to the path model, SmartPLS3 automatically inserts an interaction term labeled "Moderating Effect" into the model. This auxiliary measurement term provides a gauge of the moderating effect of the relationship between the exogenous construct Pressure and the endogenous construct Creativity. This effect was shown in the path model in Figure 4.1 as an arrow pointing from Publish to the arrow linking Pressure and Creativity. The moderator variable Publish provides a direct relationship on the endogenous construct Creativity and is shown as an arrow pointing from Publish to Creativity. The path model with the moderating variable Publish and its moderating effect is shown in Figure 4.5.

All standard criteria for structural model measurement are met with the moderating variable Publish included in the path model. These measures include internal consistency reliability, convergent validity, and discriminant validity. The results of these tests on the path model, both with and without the moderator variable Publish included in the path model, are reported in Table 4.14 for comparison.

Most scores remained the same or changed slightly with the moderator variable Publish in the path model. Neither the moderating effect ($p = 0.187$) nor Publish ($p = 0.150$) are significant. Although insignificant, the moderator variable does have a positive effect as the path Pressure to Creativity became stronger with the coefficient increasing from 0.350 to 0.492 and also became more significant as the p-value decreased from 0.024 to 0.013.

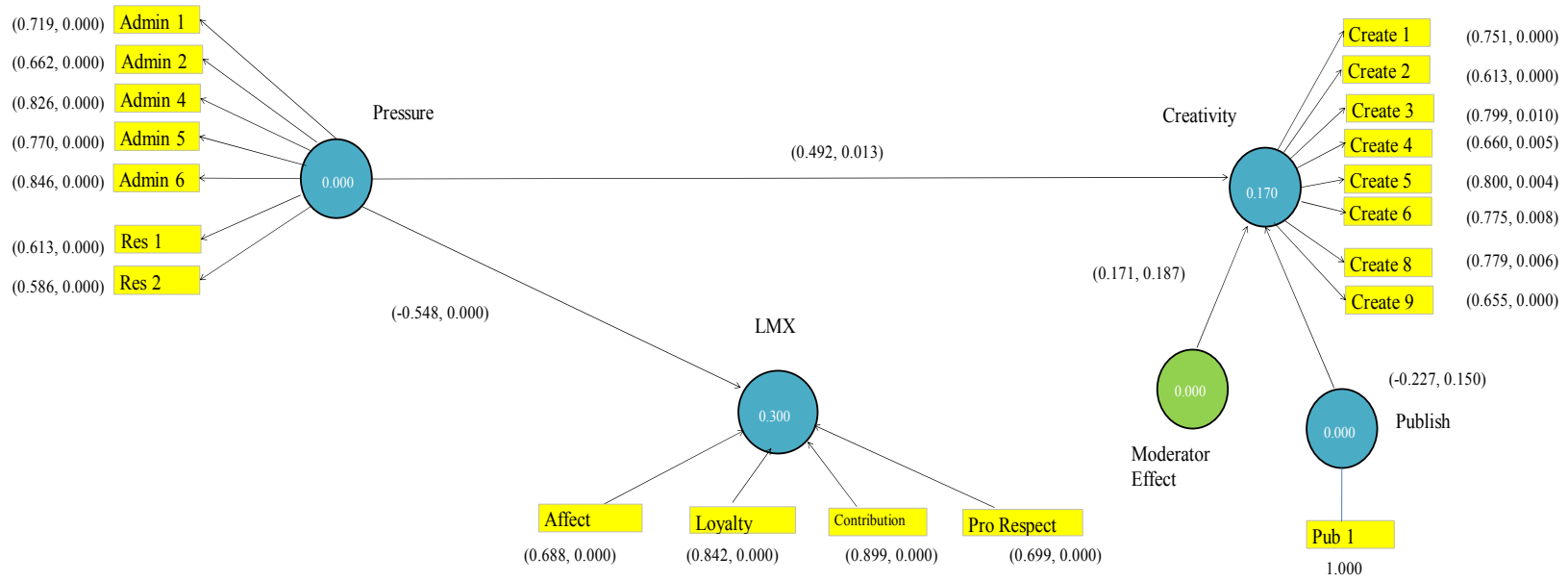

Figure 4.5. Path model with moderator variable. This path model shows path coefficients and p-values for all paths, outer loadings and p-values for all indicator variables, and R^2 values for the creativity and LMX constructs. The green color for Moderator Effect indicates that it is not a separate construct. Error factors for reflective indicator variables are omitted per APA guidelines.

Table 4.14

Structural Model Evaluation Results With and Without the Moderator Variable Publish

Test	With Moderator		Without Moderator	
	Score	p-value	Score	p-value
Inner Model Evaluation				
Path Coefficients				
Pressure -> Creativity	0.492	0.013	0.350	0.024
Pressure -> LMX	-0.548	0.000	-0.0548	0.000
Moderator Effect -> Creativity	0.171	0.187	-	-
Publish -> Creativity	-0.227	0.150	-	-
Coefficient of Determination (R^2)				
Creativity	0.170		0.122	
LMX	0.300		0.300	
Reliability and Validity				
Cronbach Alpha				
Creativity	0.884		0.884	
LMX	-		-	
Pressure	0.846		0.846	
Composite Reliability				
Creativity	0.902		0.891	
LMX	-		-	
Pressure	0.883		0.883	
Average Variance Extracted (AVE)				
Creativity	0.536		0.506	
LMX	-		-	
Pressure	0.523		0.523	

Note. All coefficients are significant at $p < 0.05$

The R^2 value for Creativity, the amount of variance in Creativity explained by the construct Pressure, also increased from 0.122 (12%) to 0.170 (17%) with the moderator variable in the path model. As the data in this table attests, all structural model measurement criteria are met with the moderator variable included in the path model.

Figure 4.6 contains the final path model showing the path coefficients and p-values for Pressure to Creativity (0.350, 0.024) and Pressure to LMX (-0.548, 0.000).

Path coefficients represent the strength of the relationships between the latent variables (constructs) within the path model; higher values indicate stronger relationships. A negative sign on the path coefficient indicate an inverse relationship between the two constructs.

Outer loadings and p-values are also shown for all indicator variables identified by yellow rectangles. This includes the formative indicator variables for LMX because the decision to retain these was based upon the outer loading results for these variables as discussed earlier in this chapter. Outer loadings are estimated relationships that determine the absolute contribution of an indicator variable to its construct and should be greater than 0.600 and statistically significant in exploratory research path models.

The R^2 values (coefficients of determination) for the endogenous constructs of LMX (0.300) and Creativity (0.122) are also shown within the blue circles representing each construct. Essentially, 30% of the variance of LMX is explained by Pressure while 12% of the variance in Creativity is explained by Pressure. The R^2 of Pressure is 0.000 because Pressure is an independent variable.

Findings and Interpretation

Hypotheses Testing

The evaluations of Hypotheses 1 through 4 are referenced to our final path model without the moderator variable Publish that is shown in Figure 4.6. The evaluation of Hypothesis 5 is referenced to the path model including the moderator variable Publish that is shown in Figure 4.5.

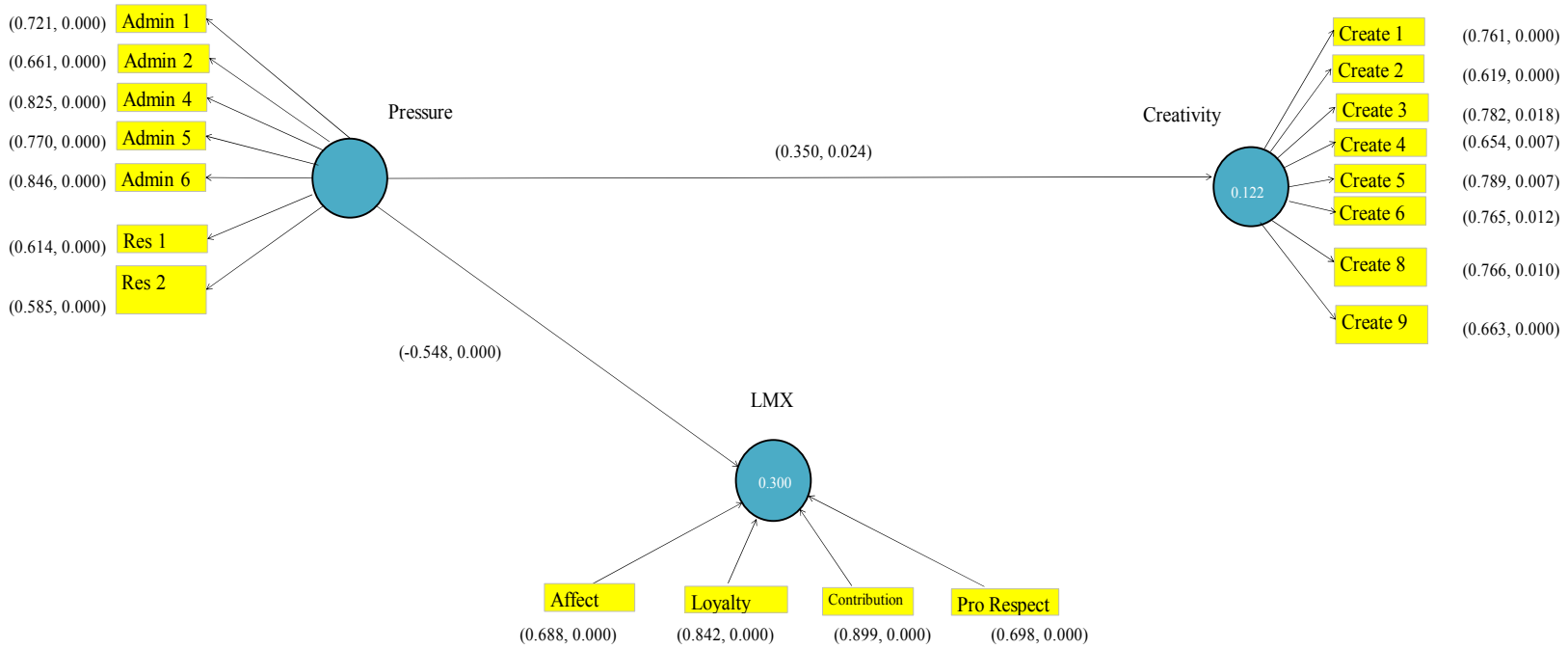

Figure 4.6. Final path model. This final path model shows path coefficients and p-values for all paths, outer loadings and p-values for all indicator variables, and R^2 values for the creativity and LMX constructs. Error factors for reflective indicator variables are omitted per APA guidelines

Hypothesis 1: Perceived external environmental pressures negatively affect perceived faculty creativity.

The path from Pressure to Creativity, as shown in Table 4.14 and Figure 4.5, is statistically significant ($p = 0.024$) and has a positive coefficient value (0.350). This indicates that faculty perceptions of external environmental pressure have a positive impact on faculty perceptions of their creativity. As faculty perceptions of external environmental pressure increases, faculty perceptions of their creativity also increase.

Interestingly, the Pressure to Creativity path is weaker and insignificant with the LMX to Creativity path in place. Referring to Table 4.11 and Figure 4.4, the Pressure to Creativity path has a slightly weaker coefficient value of 0.269 and was statistically insignificant ($p = 0.206$). Given our findings, there is no statistical evidence to support a negative relationship between Pressure and Creativity.

Hypothesis 2: A high quality LMX relationship will positively affect perceptions of respondent's creativity.

Referring to Table 4.11, the path coefficient for the relationship between LMX and Creativity is negative (-0.174) indicating that there is in fact an inverse relationship between faculty perceptions of their LMX relationship and faculty perceptions of their creativity. However, this relationship is statistically insignificant ($p = 0.630$) and the path was removed from the final model that is shown in Figure 4.5.

As indicated in Hypothesis 1, the removal of the LMX to Creativity path resulted in a stronger and statistically significant Pressure to Creativity relationship. As evidenced by our findings, there is no significant positive relationship between a high

quality LMX relationship and faculty perceptions of their creativity. Hypothesis 2 is rejected.

Hypothesis 3: A high quality LMX relationship will mediate the negative relationship between pressure and creativity and positively influence perceived faculty creativity.

As discussed in Hypothesis 1, there is a positive relationship that exists between Pressure and Creativity. The path between LMX and Creativity was removed from the model because it is statistically insignificant. Once the path was removed, so was any mediating effect LMX may have had on the relationship between Pressure and Creativity. Therefore, neither a mediating effect from LMX nor a negative relationship between Pressure and Creativity exists. Hypothesis 3 is rejected.

Hypothesis 4: Perceived external environmental pressures negatively affect a perceived high quality LMX relationship.

Referring to Table 4.14 (without moderator) and Figure 4.5, the statistically significant ($p = 0.000$) path coefficient for the relationship between Pressure and LMX is negative (-0.546), indicating that faculty perceptions of external environmental pressure has a negative impact on a faculty perceived high quality LMX relationship with the individual that they view as their leader. As faculty perceptions of external environmental pressure increases, faculty perceptions of their relationship with the individual they perceive as their leader decreases. Given the evidence of our findings, there is statistical evidence to support Hypothesis 4.

Hypothesis 5: The moderator variable, publish, will change the intensity of the relationship between the pressure and creativity constructs.

It was hypothesized that the greater the pressure on faculty to publish, the greater the faculty perceptions of their creativity. Although the moderator variable Publish and the moderating effect are statistically insignificant, Publish does in fact change the intensity of the relationship between the pressure and creativity constructs as illustrated in Table 4.14.

As previously discussed, the path coefficient provides the direction and strength of the relationship while the p-value provides the statistical significance of the relationship. Examining Table 4.14 without the moderator variable Publish in the path model, the Pressure to Creativity path coefficient is 0.350 and is significant ($p = 0.024$). The coefficient for the Pressure to LMX path is -0.548 and is highly significant ($p = 0.000$). Once the moderator variable Publish is included in the path model, the Pressure to Creativity path coefficient increases to 0.492 and has a greater statistical significance ($p = 0.013$). The strength and statistical significance of the relationship between Pressure and LMX remained unchanged with a path coefficient of -0.548 and a p-value of 0.000.

Although neither the Moderating Effect ($p = 0.187$) nor the moderator variable Publish ($p = 0.150$) are statistically significant, Publish does have an effect on increasing the intensity of the relationship between Pressure and Creativity and it also improves the statistical significance of that relationship. Overall, these results provide clear support, that the moderator variable Publish exerts an insignificant but positive effect on the relationship between Pressure and Creativity. Regardless, Hypothesis 5 is not supported.

The moderator variable Publish is measured using a single indicator variable, Pub 1. Single-item testing such as this, lags behind multi-item testing in terms of predictive validity (Diamantopoulos, Sarstedt, Fuchs, Kaiser, & Wilczynski, 2012; Hair et al., 2017). Given this, the results may prove to be statistically significant in future testing using multi-item moderation variable analysis.

Summary

The discussion in this chapter detailed the analysis of the data obtained from a non-random convenience sample of 59 members from the entire faculty body at one liberal arts university and the faculty members within one department of a research university in the southeastern United States. This chapter detailed the examination of the outer reflective measurement model through internal consistency reliability, convergent reliability, convergent validity, and discriminant validity testing.

The outer formative measurement model was also evaluated through an examination of collinearity, significance, and relevance testing. The inner structural model was examined using collinearity, path coefficient assessment and significance, coefficient of determination (R^2), and moderator variable testing. Common method bias testing was also conducted which found no evidence of common method bias. Finally, the findings from this study were applied to the hypotheses.

Discussions of the findings are applied to the primary and supporting research questions in Chapter Five. Also addressed in Chapter Five are a summary of the study, implications for practice, recommendations for future research, and conclusions.

CHAPTER FIVE

DISCUSSION

This chapter provides: (a) a summary of the study, (b) a discussion of the findings, (c) implications for practice, (d) recommendations for future research, and (e) conclusions. Implications for practice are suggestions of ways the findings of this study may be applied to faculty, leaders, or policy. Recommendations for future research are offered to researchers who may be seeking topics related to the focus of this study. This chapter also provides ways that this study may be improved or expanded. The conclusion section will provide final thoughts based upon the findings of this study.

Summary of the Study

The purpose of this study was: (a) to identify and explore the effects of faculty perceptions of external environmental pressures in higher education on faculty perceptions of their creativity, (b) to identify the mediating effects of the faculty perceived leader-member relationship (LMX) on faculty perceptions of their creativity, and (c) to bring awareness to higher education administrators of the impact that external environmental pressure has on their faculty with regards to creativity. This study should also add to the current body of knowledge that exists concerning institutional pressures and how they either promote or impede individual creativity (Amabile, 1996).

Three theories formed the lens through which our investigation was designed. The theoretical framework demonstrated how institutional theory and leader-member exchange (LMX) affect a componential model of creativity. The three primary pressures identified by institutional theorists DiMaggio and Powell (1983) are coercive pressures,

mimetic pressures, and normative pressures. Tuttle and Dillard (2007) suggest that institutional theory allows us to look at the enabling and constraining forces on faculty members while DiMaggio (1988) indicates that the theory addresses the circumstances that prevent faculty members from effectively acting in their own interests.

Leader-member exchange (LMX) theory of leadership suggests that a leader and a follower develop a unique relationship through social and professional exchanges (Olsson, Hemlin, & Pousette, 2012). LMX is ideally suited for studies of educational organizations because it examines relationships between leaders and subordinates differentiated by talents, attitudes, and personality rather than just job titles (Bess & Goldman, 2001).

The componential theory of creativity, which led to the componential model of creativity, outlines three primary components necessary for individual creativity as domain-relevant skills, problem solving skills, intrinsic task motivation, and the social environment (Amabile, 1988; Hennessey, 2015). The social environment is that component outside the immediate work environment and includes all of the factors that may stimulate or undermine intrinsic motivation and creativity (Amabile, 2011).

A pilot study was conducted to create an online survey that was used to acquire data from a non-random convenience sample of 173 university faculty from two universities with the intention of generalizing about the population of all university faculty members in the United States. The online survey consists of an informed consent, a demographic section, and three sections to gather data measuring two independent variables, namely perceived external environmental pressures (Pressure) and

the faculty perceived relationship with their leader (LMX), and one dependent variable to measure faculty perceptions of faculty creativity (Creativity). The 59 completed lines of data was analyzed using Structural Equation Model Partial Least Square software known as SmartPLS.

Discussion of the Findings

There is one primary research question and five supporting questions which guide this study. This section provides answers to these questions using the results of the data analysis conducted in Chapter Four.

The primary research question for this study is:

> Do perceived external environmental pressures and leader-member exchange (LMX) relationships affect faculty creativity in higher education?

The findings indicate that there is statistical evidence to support the proposition that faculty perceptions of external environmental pressures do positively affect faculty perceptions of their creativity. The findings of this study also indicate that there is no statistical evidence to support the proposal that faculty perceptions of their LMX relationship with the individual they identify as their leader affect faculty perceptions of their creativity. These results will be described in greater detail during the discussions of the supporting questions.

Support Question 1: Do perceived external environmental pressures affect faculty perceptions of their creativity in higher education?

The findings of this study provide statistical evidence to indicate that faculty perceptions of external environmental pressures do affect faculty perceptions of their creativity. The effect of perceived external environmental pressures on faculty perceptions of their creativity is positive. As faculty perceptions of external environmental pressures increase, so to do faculty perceptions of their creativity. It was hypothesized in this study that external environmental pressures would have a negative effect on faculty perceptions of their creativity.

The indicator variables (Figure 4.6 and Appendix G) related to external environmental pressures that remain in the final path model are coercive in nature and have a negative connotation such as pressure to increase teaching loads (Admin 2), pressure to increase the number of advisees (Admin 5), pressure to meet unreasonable deadlines (Admin 4), and pressure to increase documentation of personal productivity (Admin 6). These findings are somewhat contrary to the findings of DiMaggio (1988) that many times, coercive pressures may prevent faculty members from effectively acting in their own interests.

Scott (1987) indicated that coercive pressures are formal and informal pressures to gain compliance and are primarily used by regulatory agencies such as governmental agencies, laws, courts, and professions to force organizational change to meet outside expectations. Oliver (1991) indicated that coercive pressures are also applied by special interest groups and from public opinion to force organizational change to meet outside expectations which may not necessarily be desirable to the organization. These coercive indicator variables are also contrary to the motivators of creativity as identified by

Amabile (2011) such as freedom in carrying out the work, realistic time frames within which to complete tasks, management support, and through appropriate recognition (Amabile, 2011).

Support Question 2: Do LMX relationships affect faculty perceptions of their creativity in higher education?

Although the relationship between LMX and Creativity shown in Figure 4.4 is negative (-0.174), indicating that there is an inverse affect between faculty perceptions of their LMX relationship and faculty perceptions of their creativity, it was also insignificant. Therefore, the path was removed from the final path model shown in Figure 4.6.

This negative and insignificant LMX to Creativity path is puzzling since the participant chose the individual they identify as their leader, which suggests a positive relationship. The findings of this study are contrary to the findings of Liden & Maslyn (1998) that high quality LMX relationships were positively related to organizational commitment and autonomy indicating a greater contribution to organizational goals. Contribution has been defined by Dienesch and Liden (1986) as the perceived amount, direction, and quality of work-oriented activity put forth by both leader and follower toward achieving the mutual goals. Higher quality relationships are expected to have a greater amount of work activity that goes beyond what is normally expected to achieve the goals of the organization and the leader.

Based upon the findings of this study, faculty perceptions of the LMX relationships have no significant effect on faculty perceptions of their creativity in higher education.

Support Question 3: How does LMX mediate the relationship between perceived external pressures and faculty perceptions of their creativity in higher education?

Olalere (2013) found that LMX relationships, from an individual or dyadic-level perception, mediate effects on creativity. Mediation occurs when a third variable intervenes between the relationship of two other related variables (Hair, Hult, Ringle, & Marstedt, 2017). A change in the independent variable causes a change in the mediation variable which results in a change in the dependent variable (Hair et al., 2017).

The findings of this study are contrary to the earlier work of Olalere (2003) as they do not confirm a mediating effect of the Pressure to Creativity relationship by LMX. The path between the LMX and Creativity constructs proved to be statistically insignificant and was removed from the final path model, thereby eliminating any possible mediating effect between faculty perceptions of external environmental pressure and faculty perception of their creativity.

Support Question 4: Does pressure to publish moderate the relationship between perceived external pressures and faculty perceptions of their creativity in higher education?

There is no statistical evidence to support the proposition that pressure to publish moderates the relationship between faculty perceptions of external environmental

pressures and faculty perceptions of their creativity. Our survey was conducted using faculty from a liberal arts college and a research university. While the focus of most faculty members at liberal arts universities is the teaching role, some departments do expect original research from faculty culminating in publications and books. In research universities, tenure and promotion decisions are often based upon individual achievement such as original research and publications which are easily quantified (González, 2008). Faculty members at research universities also tend to distance themselves from other faculty and the university to focus on their own research productivity (Gonzales, 2012).

It was believed that responses from faculty in the liberal arts departments that require publications and faculty in the research university would influence the effects of external pressures on faculty creativity. Therefore, an independent moderator variable Publish was placed between the Pressure and Creativity path. Moderation is a situation in which the relationship between two constructs is not consistent and relies on the values of a third construct (moderator) which influences the strength of the relationship or may even change the direction of the relationship (Hair et al., 2017).

Although pressure to publish has no statistically significant moderating effect on the relationship between perceived external environmental pressures and faculty perceptions of their creativity, a positive effect on both the strength and significance of this relationship was noted in this study. As faculty perception of pressure to publish increases, faculty perceptions of their creativity also increase.

A question then presents: if Publish has a positive effect on the relationship between Pressure and Creativity, why is this moderating effect insignificant? Perhaps the

answer lies in the fact that the moderator variable Publish was measured using a single indicator variable, Pub 1. Single-item testing such as this, lags behind multi-item testing in terms of predictive validity (Diamantopoulos, Sarstedt, Fuchs, Kaiser, & Wilczynski , 2012; Hair et al., 2017). Given this, the results may prove to be statistically significant in future testing using multi-item moderation variable analysis.

Support Question 5: Do perceived external environmental pressures affect a high level LMX relationship in higher education?

There is statistical evidence to support the proposition that faculty perceptions of external environmental pressures negatively impact faculty perceptions of their relationships with those they identify as their leader. As with the connection between Pressure and Creativity, it was postulated that as the external environmental pressures increased, so to would the pressure on the leader. This findings support the work of Hanson (2001), that as outside influences travel through the organization, individuals at all levels are affected. The results of this study show that as perceived external environmental pressure increases, faculty perceptions of the LMX relationship decline.

Implications for Practice

Faculty

The focus of this study was on faculty in higher education and their perceptions of elements in their surroundings. Perceptions are the psychological meaning individuals attach to events, activities, and situations around them and "it is the psychological meaning of environmental events that largely influences creative behavior" (Amabile, Conti, Coon, Lazenby, & Herron, 1996, p. 1158). Elements of faculty surroundings

included: (a) external environmental pressures, (b) relationships with leaders, and (c) personal creativity.

The results of this study should enlighten faculty about the external environmental pressures that they perceive and the effects on their creativity. Faculty perceptions of external environmental factors were shown to have a positive effect on faculty perceptions of their creativity. As faculty perception of external pressure increases, so too do faculty perceptions of their creativity. Referring to Figure 4.6 and Appendix G, the significant external factors identified in the final path model include pressures to: (a) continually improve curriculum, (b) increase assigned teaching loads, (c) meet unreasonable deadlines, (d) increase the number of students advised, (e) increase documentation of personal productivity, (f) gain external research funding, and (g) meet productivity expectations for original research.

Referring to Figure 4.6 and Appendix H, the creative outputs that faculty perceived as significant in the final path mode included: (a) teaching problem solving skills to students in innovative ways, (b) having unique research studies, (c) providing innovative ideas and instruction to students, (d) using novel methods to promote the department and university, (e) seeking novel ways to tackle problems, (f) presenting unique ideas to students, (g) presenting innovative instruction in classes, and (h) being open to unconventional ideas. All LMX indicator variables listed in Appendix F also proved to be significant indicators of the construct, LMX, in the final path model.

Overall, this study supports the findings of Tuttle & Dillard (2007) that external environmental pressures resulting from outside attempts to force organizational change

filter down to faculty in colleges and universities. While many today regard change negatively, the results of this study provide evidence that pressures to change result in increased perceptions of individual creativity and should not be viewed as a negative experience.

Realizing adjunct faculty play a greater instructional role in higher education and the uncertainty of research requirements between departments within the liberal arts university, they were not excluded from this study. There were only two lines of data self-identified as adjunct faculty (3%) and it was clear there were few requirements to research and publish. The results of this study may be of importance for any adjunct faculty member that aspires to secure a tenure track or permanent faculty position in higher education. The results may give them an idea of expectations in those positions.

Leaders

Leaders may be peers, department chairs, deans, or anyone higher up the hierarchy. In this study, the identification of leader was left to the individual participant. The faculty perceived leader-member exchange relationship was found to be negatively affected by faculty perceptions of external environmental pressures. As faculty perceptions of pressures increased, the perception of the LMX relationship decreased.

The perception of the LMX relationship was measured through the eyes of the faculty member. This is an important point for leaders to understand because leaders may perceive the relationship differently under stressful situations. Most previous LMX studies have been conducted from the perception of the leader (Somech & Wenderow, 2006). Based upon the results of this study, leaders during high pressure periods should

follow the advice of Graen and Unl-Bien (1995) and understand that faculty perceptions of their relationship with their leader may be decreasing. Leaders are advised to take the initiative to actively work toward improving relationships with all followers.

Based upon the findings of this study, leaders must understand that as faculty perceptions of external pressures increase, so do their perceptions of their creativity. Therefore, leaders are advised against attempting to overly shield faculty from outside pressures.

Policy

This study provides university administrators with an understanding of the external environmental factors that enable faculty to thrive, achieve, and be creative in their roles at the university. The results of the study indicate that external environmental pressures filter down to faculty in higher education resulting in improved creativity as perceive by individual faculty members. The seven factors identified in recommendations for faculty above clearly proved to be positive motivators for faculty creativity. As a result, policies related to shielding faculty from the effects of outside pressures should be avoided.

The second lesson from this study for administrators is that external environmental pressures negatively impact leader-member exchange relationships as viewed from the perspective of the follower. This effect may impact relationships in upper levels of administration as well as at the department levels. As a result, administrators are advised to work to maintain favorable relationships with individuals at all levels especially during periods of increased pressure upon the college or university.

Recommendations for Future Research

The results of this study provide several suggestions for further study. Continued investigation into the application of institutional theory with regard to higher education is strongly encouraged. Although there are large amounts of empirical research focusing on institutional theory, I was unable to locate empirical literature that used institutional theory as a basis for analyzing external pressures affecting faculty in higher education. Also, there are no studies that were found to provide a test instrument that may be used to gauge the intensity and effects of these pressures on colleges and universities or faculty. This situation forced the pilot study leading to the creation of the test instrument that was used in this investigation. I suggest that the investigation to create a distinct test instrument be continued specifically for use in future investigations into the effects of external pressures on colleges, universities, and faculty.

The insignificance of the LMX to Creativity link in this study was unexpected and not clearly understood. Future research is needed to determine why this occurred. We know from the literature that faculty members distance themselves from other faculty and the university to focus on their own productivity (Gonzales, 2012). Does unwillingness on the part of faculty in higher education to be open and honest about their feelings related to their relationships with their leaders exist? We also know that the development of high quality social exchange relationships is a process dependent upon characteristics and behaviors of both leaders and followers that is developed over time (Yukl, 2006). Does the negative relationship between LMX and Creativity reflect the early stages of LMX relationships in which a matured relationship with full trust and confidence has not

yet developed? Mertens (2005) suggests that samples be drawn from target groups that represent the population to be studied. The major purpose of this study is to identify and explore the effects of faculty perceptions of external environmental pressures in higher education on faculty perceptions of their creativity and also to identify the mediating effects of the leader-member relationship on faculty perceptions of their creativity based upon the faculty member's perception of the LMX relationship. I defined faculty as the union of the regular faculty, the special faculty and the administrative faculty (Clemson, 2017). Did the use of participants from two different universities factor into the results obtained in this study concerning the insignificant LMX to Creativity path? Should new methods of measuring these relationships in higher education be developed for future studies? Investigations into these questions should be conducted.

Adjunct faculty constituted 3% of the participants in this study. The data clearly indicate that there are few requirements on them to research and publish. They are however also influenced by external environmental factors. Many experience pressures in full-time job positions outside of the college or university and also from their position in the higher education setting. Since this group is a growing population in higher education, it is beneficial to learn more about the unique pressures upon them that may affect their teaching effectiveness.

Conclusion

One of the primary goals of this study was to identify and explore the effects of faculty perceptions of external environmental pressures in higher education on faculty perceptions of their creativity. The term external refers to areas outside the immediate

work environment (Amabile, 1996). This study may be unique in using institutional theory as a lens for analyzing external environmental pressures and their effects on faculty creativity and leader-member exchange (LMX) relationships within the higher education setting. Also unique is the creation of a test instrument to measure external environmental pressures faced by faculty in higher education based upon DiMaggio and Powell's (1983) mechanisms of isomorphism, namely coercive pressures, mimetic pressures, and normative pressures.

The findings of this study may fill a gap in the current knowledge base about external environmental pressures in the daily work lives of faculty, especially regarding the effect on perceptions of individual creativity. The findings may also augment the empirical literature concerning the effects of the external environmental pressures on the leader-member exchange relationship. Lastly, the findings of this study may add to existing knowledge bases about pressures, creativity, and LMX relationships since the findings are solely based upon the faculty member's perceptions of these areas.

APPENDICES

Appendix A

Clemson Institutional Review Board Approval

IRB2017-338 | Approval for Effects of LMX...

Dear Dr. Marion,

The Clemson University Institutional Review Board (IRB) reviewed the protocol "Effects of LMX and External Environmental Factors on Creativity Among Faculty in Higher Education" using expedited review procedures and has granted approval. The approval is granted for all sites with a research site letter on file.

Please note that Clemson's IRB determination only covers Clemson affiliated researchers on the project. External collaborators will have to consult with their home institution's IRB office to determine what is required for their role on the project.

Your approval period is October 25, 2017 to October 24, 2018. Your continuing review is scheduled for September 2018. Please notify our office if your study has been terminated or completed before the review period.

No change in this approved research protocol can be initiated without the IRB's approval. This includes any proposed revisions or amendments to the protocol or consent form. Any unanticipated problems involving risk to subjects, complications, and/or adverse events must be reported to the Office of Research Compliance immediately.

All team members are required to complete the CITI human subjects training course, http://www.clemson.edu/research/compliance/irb/training.html, and review the IRB policies on Responsibilities of Principal Investigators and the Responsibilities of Research Team Members available at http://www.clemson.edu/research/compliance/irb/resources.html.

The Clemson University IRB is committed to facilitating ethical research and protecting the rights of human subjects. Please contact us if you have any questions and use the IRB number and title when referencing the study in future correspondence.

Good luck with your study,

Sincerely,

Amy Smitherman

IRB Coordinator
OFFICE OF RESEARCH COMPLIANCE
Clemson University, Division of Research
391 College Avenue, Suite 406K-1., Clemson, SC 29631, USA
P: 864-656-6460
http://www.clemson.edu/research/compliance/irb/

Appendix B

Liberal Arts University Institutional Review Board Approval

IRB 2017-2

[redacted].onmicrosoft.com Wed, Aug 30, 2017, 9:13 AM

to [redacted], me, marion2@clemson.edu, [redacted]

Dear Dr. [redacted], Mr. DuPont, and Dr. Marion,

On behalf of Dr. [redacted] and Dr. [redacted], I am notifying you that your research application "Effect of LMX and External Environmental Factors on Creativity among Faculty in Higher Education" has been approved.

The expiration date is August 30, 2018.

Best wishes for a successful project.

[redacted]

Appendix C

Survey Informed Consent

Informed consent

Information about Being in a Research Study
Clemson University

Effects of LMX and External Environmental Factors on Creativity Among Faculty in Higher Education

Description of the Study and Your Part in It Dr. Russ Marion along with Dr. [redacted] and Mr. Tim DuPont are inviting you to take part in a research study. Dr. Marion is a faculty member at Clemson University. Dr. [redacted] is a faculty member at [redacted] University. Mr. DuPont is a doctoral candidate in Educational Leadership at Clemson University, conducting this study with Dr. Marion as the chair of his dissertation committee and Dr. [redacted] as [redacted]. The purpose of this research is to examine the external environmental factors that may affect creativity among faculty members in higher education. Your part in the study will be to complete a brief survey. It will take you about 15 minutes to be in this study.

Risks and Discomforts There is the possibility for loss of confidential information; however, to minimize this risk, responses will be maintained on password protected personal laptops. Encrypted backup files will be kept on an external hard drive and kept in a locked safe at the investigators residence.

Possible Benefits We do not know of any way you would benefit directly from taking part in this study. However, this research may help us to understand how we can better support faculty in their efforts to produce novel, useful ideas, or problem solutions.

Protection of Privacy and Confidentiality We will do everything we can to protect your privacy and confidentiality. There are no personal identifiers collected in this study. We will not tell anybody outside of the research team that you were in this study or what information we collected about you in particular. The results of this study may be published in scientific journals, professional publications, or educational presentations: however, no individual participant will be identified. Data will be destroyed after five years per APA requirements. A final report will be shared with [redacted] University. Prior to deletion, data may be used in future studies.
We may be required to share the information we collect from you with the Clemson University, [redacted] University, Office of Research Compliance and the Federal Office for Human Research Protections. If this happens, the information would only be used to find out if we ran this study properly and protected your rights in the study. The survey is

administered through the on-line program Qualtrics, and we caution you to not leave your computer unattended while Qualtrics is open and to log out when finished.

Choosing to Be in the Study You do not have to be in this study. You may choose not to take part and you may choose to stop taking part at any time. You will not be penalized in any manner if you decide not to be in the study or to stop taking part in the study. If you choose to stop taking part in this study, the information you have already provided will be used in a confidential manner.

Contact Information If you have any questions or concerns about this study, or if any problems arise, please contact Dr. Russ Marion at Clemson University at marion2@clemson.edu, Dr. [redacted] at [redacted]@[redacted].edu, or Mr. Tim DuPont at tdupont@clemson.edu. If you have any questions or concerns about your rights in this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-0636 or irb@clemson.edu.

Once you have completed all of the questions on a page, please use the **Continue Survey** button at the bottom right to go to the next page.

Clicking on the "I hereby give my informed consent" button indicates that:
• You have read the above information
• You voluntarily agree to participate
• You are at least 18 years of age

O I hereby give my informed consent (1)

O I prefer not to participate (2)

Appendix D

Study Survey

Environmental Factors

The following statements are designed to capture the environmental pressures to which you may be exposed. Using the scale provided, please rate your level of agreement with each statement.

	Strongly Disagree (1)	Moderately Disagree (2)	Disagree (3)	Neutral (4)	Agree (5)	Moderately Agree (6)	Strongly Agree (7)
I experience pressure from administration to gain funding for research from sources external to the university. (1)	O	O	O	O	O	O	O
It is expected in my department that faculty focus on scholarly activities such as publications. (2)	O	O	O	O	O	O	O
I experience pressure from administration to increase the number of students that I advise. (3)	O	O	O	O	O	O	O
I experience pressure from administration to increase documentation of my productivity. (4)	O	O	O	O	O	O	O

I experience pressure from administration to continually improve curriculum. (5)	O	O	O	O	O	O	O
This university conforms to public expectations resulting from media coverage of events at other institutions. (6)	O	O	O	O	O	O	O
I experience pressure from administration to increase my assigned teaching load. (7)	O	O	O	O	O	O	O
On-line, distance education or hybrid classes are taught because everyone else teaches them. (8)	O	O	O	O	O	O	O
The production of original research and publications is at the heart of who we are as academics. (9)	O	O	O	O	O	O	O
I experience pressure from administration to meet professional productivity expectations	O	O	O	O	O	O	O

with respect to original research. (10)							
I enjoy team sports. (11)	O	O	O	O	O	O	O
Frequent formal conference presentations are expected for promotion, tenure, and merit pay increases. (12)	O	O	O	O	O	O	O
I work longer hours because it is expected in my department. (13)	O	O	O	O	O	O	O
I experience pressure from administrators to meet unreasonable deadlines. (14)	O	O	O	O	O	O	O
I experience pressures from policies and guidelines established by the department and university accrediting agencies to publish. (15)	O	O	O	O	O	O	O
This university insists I publish in top tier journals because it is expected at other universities. (16)	O	O	O	O	O	O	O

Creativity

The following statements are used to evaluate creativity. Using the scale provided, please rate your level of agreement with each statement.

	Strongly Disagree	Moderately Disagree	Disagree	Neutral	Agree	Moderately Agree	Strongly Agree
	1	2	3	4	5	6	7
I teach my students to solve problems in innovative ways. (1)							
I present innovative instruction in my classes. (2)							
I am open to unconventional ideas. (3)							
My research has drawn attention from my peers or colleagues because of the uniqueness of the study. (4)							
I provide innovative ideas and instruction to students. (5)							
I suggest novel ways to promote our department and university. (6)							
I seek out novel ways to tackle problems. (7)							
I present my students with unique/innovative ideas. (8)							
I implement new ideas within the university. (9)							

Leadership

The following statements are used to evaluate your relationship with the individual you consider to be your immediate leader. Using the scale provided, please rate your level of agreement with each statement.

	Strongly Disagree (1)	Moderately Disagree (2)	Disagree (3)	Neutral (4)	Agree (5)	Moderately Agree (6)	Strongly Agree (7)
I do work for my leader that goes beyond what is specified in my job description or what is normally expected of me. (1)	O	O	O	O	O	O	O
I feel that my leader would defend my work actions to a superior, even without complete knowledge of the issue in question. (2)	O	O	O	O	O	O	O
My leader is the kind of person one would like to have as a friend. (3)	O	O	O	O	O	O	O
I like my leader very much as a person. (4)	O	O	O	O	O	O	O
My leader would defend me to others in	O	O	O	O	O	O	O

the organization if I made an honest mistake. (5)							
My leader would come to my defense if I were "attacked" by others. (6)	O	O	O	O	O	O	O
My leader is a lot of fun to work with. (7)	O	O	O	O	O	O	O
I admire my leader's professional skills. (8)	O	O	O	O	O	O	O
I am impressed with my leader's knowledge of his/her job. (9)	O	O	O	O	O	O	O
I respect my leader's knowledge of and competence on the job. (10)	O	O	O	O	O	O	O
I am willing to apply extra efforts, beyond those normally required, to further the interests of my leader's work goals. (11)	O	O	O	O	O	O	O

Demographics

The following section is only used to collect some demographic information.

Q8 Gender?

- O Male (1)
- O Female (2)

Q9 Age?

- O 18-30 (1)
- O 31-40 (2)
- O 41-50 (3)
- O 51-60 (4)
- O Over 60 (5)

Q10 Highest degree attained?

- O Master (1)
- O PhD (2)
- O JD (3)
- O MD (4)

Q11 Ethnicity?

- O Caucasian (1)
- O Black (2)
- O Hispanic (3)
- O Asian (4)
- O Other (5)
- O Prefer not to answer (6)

Q12 Instructor status?

- O Adjunct (1)
- O Full time non-tenure (2)
- O Full time tenure (3)

Q13 How long have you taught in higher education?

- O Less than 10 years (1)
- O 11-20 years (2)
- O 21-30 years (3)
- O More than 30 years (4)

Appendix E

Pilot Survey

Q3 The following statements are designed to capture the environmental pressures to which you may be exposed. Using the scale provided, please rate your level of agreement with each statement.

	Strongly Disagree (1)	Moderately Disagree (2)	Disagree (3)	Neutral (4)	Agree (5)	Moderately Agree (6)	Strongly Agree (7)
I experience pressure from administration to gain funding for research from sources external to the university. (1)	O	O	O	O	O	O	O
Quantity over quality with regards to research seems to be the norm in my department. (2)	O	O	O	O	O	O	O
It is expected in my department that faculty focus on scholarly activities such as publications. (3)	O	O	O	O	O	O	O
I am expected to make adjustments to my teaching style to accommodate less prepared students. (4)	O	O	O	O	O	O	O
I experience pressure from administration to increase the	O	O	O	O	O	O	O

number of students that I advise. (5)							
I experience pressure from administration to increase the range of topics that I discuss during student advising. (6)	O	O	O	O	O	O	O
We are expected to excel in multiple roles simultaneously in my department. (7)	O	O	O	O	O	O	O
I experience pressure from administration to increase documentation of my productivity. (8)	O	O	O	O	O	O	O
I experience pressure from administration to gain financial grants and awards from sources within the university. (9)	O	O	O	O	O	O	O
My department relies heavily on student evaluations because other universities value them. (10)	O	O	O	O	O	O	O

I experience pressure from administration to continually improve curriculum. (11)	O	O	O	O	O	O	O
This university supports international students and exchange programs because other universities are supporting them. (12)	O	O	O	O	O	O	O
This university conforms to public expectations resulting from media coverage of events at other institutions. (13)	O	O	O	O	O	O	O
It is a top priority at my university to improve the university's regional and national ranking. (14)	O	O	O	O	O	O	O
I experience pressure from administration to increase my assigned teaching load. (15)	O	O	O	O	O	O	O
On-line, distance education or hybrid classes are taught because everyone else	O	O	O	O	O	O	O

teaches them. (16)							
The production of original research and publications is at the heart of who we are as academics. (17)	O	O	O	O	O	O	O
Our productivity requirements are based upon those of other institutions. (18)	O	O	O	O	O	O	O
Adding value to the university through my work is the norm in my department. (19)	O	O	O	O	O	O	O
People in my university encourage an increasingly diverse student population. (20)	O	O	O	O	O	O	O
I experience pressure from administration to meet professional productivity expectations with respect to original research. (21)	O	O	O	O	O	O	O
Frequent formal conference presentations are expected	O	O	O	O	O	O	O

for promotion, tenure, and merit pay increases. (22)							
I work longer hours because it is expected in my department. (23)	O	O	O	O	O	O	O
I experience pressure from administrators to meet unreasonable deadlines. (24)	O	O	O	O	O	O	O
I experience pressure from administration to increase my class enrollment numbers. (25)	O	O	O	O	O	O	O
I experience pressure from administration to increase my community service efforts. (26)	O	O	O	O	O	O	O
I experience pressure from administrative attempts to micromanage faculty research. (27)	O	O	O	O	O	O	O
I experience pressures from policies and guidelines established by the department and university accrediting agencies to publish. (28)	O	O	O	O	O	O	O

I experience pressure from administration to gain accreditation and/or to help keep it current. (29)	O	O	O	O	O	O	O
This university insists I publish in top tier journals because it is expected at other universities. (30)	O	O	O	O	O	O	O
This university stays current with new technologies because they are being used at other universities. (31)	O	O	O	O	O	O	O

Q6 The following statements are used to evaluate creativity. Using the scale provided, please rate your level of agreement with each statement.

	Strongly Disagree (1)	Moderately Disagree (2)	Disagree (3)	Neutral (4)	Agree (5)	Moderately Agree (6)	Strongly Agree (7)
I teach my students to solve problems in innovative ways. (1)	O	O	O	O	O	O	O
I am first in my department to integrate new technologies in my classes. (2)	O	O	O	O	O	O	O
I present innovative instruction in my classes. (3)	O	O	O	O	O	O	O
The methodology or premise for my publications is so different that journal editors might have difficulty finding knowledgeable reviewers to evaluate my study. (4)	O	O	O	O	O	O	O
I am open to unconventional ideas. (5)	O	O	O	O	O	O	O
I am first in my department to integrate new software in my classes. (6)	O	O	O	O	O	O	O
The research questions in my research are different from anything other researchers in my field have done. (7)	O	O	O	O	O	O	O

I prefer research that is new and unique in the field. (8)	O	O	O	O	O	O	O
I introduce new instructional delivery processes. (9)	O	O	O	O	O	O	O
Some established journals tend to only accept articles that use traditional methodologies. Is your methodology unique so that you have problems getting your articles published by such traditional journals. (10)	O	O	O	O	O	O	O
My research has drawn attention from my peers or colleagues because of the uniqueness of the study. (11)	O	O	O	O	O	O	O
I provide innovative ideas and instruction to students. (12)	O	O	O	O	O	O	O
I suggest novel ways to promote our department and university. (13)	O	O	O	O	O	O	O
I seek out novel ways to tackle problems. (14)	O	O	O	O	O	O	O
I present my students with unique/innovative ideas. (15)	O	O	O	O	O	O	O

I implement new ideas within the university. (16)	O	O	O	O	O	O	O

Appendix F

Indicator Variables, Survey Questions, Constructs, and Relationships for the Leader-Member Exchange Construct

Variable	Survey Question	Construct	Relationship
Affect 1	I like my leader very much as a person	Affect	Formative
Affect 2	My leader is the kind of person one would like to have as a friend	Affect	Formative
Affect 3	My leader is a lot of fun to work with	Affect	Formative
Loyal 1	I feel that my leader would defend my work actions to a superior, even without complete knowledge of the issue in question	Loyalty	Formative
Loyal 2	My leader would come to my defense if I were "attacked" by others	Loyalty	Formative
Loyal 3	My leader would defend me to others in the organization if I made an honest mistake	Loyalty	Formative
Cont 1	I do work for my leader that goes beyond what is specified in my job description or what is normally expected of me	Contribution	Formative
Cont 2	I am willing to apply extra efforts, beyond those normally required, to further the interests of my leader's work goals	Contribution	Formative
PR 1	I am impressed with my leader's knowledge of his/her job	Professional Respect	Formative
PR 2	I respect my leader's knowledge of and competence on the job	Professional Respect	Formative
PR 3	I admire my leader's professional skills	Professional Respect	Formative

Appendix G

Indicator Variables, Survey Questions, Constructs, Relationships, and Mechanisms of Isomorphism for the Pressure Construct

Variable	Survey Question	Construct	Relationship	Mechanism
Admin 1	I experience pressure from administration to continually improve curriculum	Administration	Reflective	Coercive
Admin 2	I experience pressure from administration to increase my assigned teaching load	Administration	Reflective	Coercive
Admin 3	Frequent formal conference presentations are expected for promotion, tenure, and merit pay increases	Administration	Reflective	Coercive
Admin 4	I experience pressure from administrators to meet unreasonable deadlines	Administration	Reflective	Coercive
Admin 5	I experience pressure from administration to increase the number of students that I advise	Administration	Reflective	Coercive
Admin 6	I experience pressure from administration to increase documentation of my productivity	Administration	Reflective	Coercive
Admin 7	Online, distance education or hybrid classes are taught because everyone else teaches them	Administration	Reflective	Mimetic
Admin 8	This university insists I publish in top tier journals because it is expected at other universities	Administration	Reflective	Mimetic
Admin 9	This university conforms to public expectations resulting from media coverage of events at other institutions	Administration	Reflective	Normative
Admin 10	I work longer hours because it is expected in my department	Administration	Reflective	Normative
Res 1	I experience pressure from administration to gain funding for research from sources external to the university	Research	Reflective	Coercive
Res 2	I experience pressure from administration to meet professional productivity expectations with respect to original research	Research	Reflective	Coercive
Res 3	The production of original research and publications is at the heart of who we are as academics	Research	Reflective	Normative
Res 4	It is expected in my department that faculty focus on scholarly activities such as publications	Research	Reflective	Normative

Appendix H

Indicator Variables, Survey Questions, Constructs, and Relationships for the Creativity and Publish Constructs and the Single Common Method Factor Marker Variable

Variable	Survey Question	Construct	Relationship
	Creativity		
Create 1	I teach my students to solve problems in innovative ways	Creativity	Reflective
Create 2	My research has drawn attention from my peers or colleagues because of the uniqueness of the study	Creativity	Reflective
Create 3	I provide innovative ideas and instruction to my students	Creativity	Reflective
Create 4	I suggest novel ways to promote our department and university	Creativity	Reflective
Create 5	I seek out novel ways to tackle problems	Creativity	Reflective
Create 6	I present my students with unique/innovative ideas.	Creativity	Reflective
Create 7	I implement new ideas within the university	Creativity	Reflective
Create 8	I present innovative instruction in my classes	Creativity	Reflective
Create 9	I am open to unconventional ideas	Creativity	Reflective
	Publish		
Pub 1	I experience pressures from policies and guidelines established by the department and university accrediting agencies to publish	Publish	
	Single Common Method Factor		
	I enjoy team sports.	Marker Variable	

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