

WHICH ACTIVITIES MATTERS IN COLLEGE:
AN ANALYSIS OF CONTINUED LEADERSHIP PARTICIPATION
USING COLORADO COLLEGE ALUMNI RECORDS

A THESIS

Presented to

The Faculty of the Department of Economics and Business

The Colorado College

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Arts

By

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May 2011

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Economics

Abstract

While leadership experts have found compelling evidence to support the argument that the undergraduate years, and the institutions themselves play a pivotal role in developing leadership capabilities, colleges and universities need to question whether or not they fit this profile. Colorado College, one of seven schools in the nation under a block system, has never been the focus of such investigations, and while some parameters may include it by default, the question that remains is: do the results found in these studies on leadership development for non-block institutions still hold when tested against the unconventional elements intrinsic to a block system school like Colorado College? Even though this investigation does not include the alumni records from similar non-block institutions, the results found in this study will hopefully provide enough information to signal if the theories presented in the literature are applicable to and accurately representative of Colorado College's demographic.

KEYWORDS: (Leadership development, higher education, alumni engagement)

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CHAPTER I

INTRODUCTION

Every college and university in the nation has a mission statement. The role that most of these mission statements serve is much like a sales pitch to anyone interested in applying to, looking at, or attending the institution. Essentially, these statements give a brief synopsis of the institutions primary goals with the intent of outlining, however discretely, the types of individuals that they would like to attend. In most of these statements, institutions profess their hopes of not only providing the best education to their students, but also their hopes of preparing them for life after college, positions of leadership, and continued learning from daily interactions. Take the Colorado College mission statement as an example. On the college's website it states:

At Colorado College our goal is to provide the finest liberal arts education in the country. Drawing upon the adventurous spirit of the Rocky Mountain West, we challenge students, one course at a time, to develop those habits of intellect and imagination that will prepare them for learning and leadership throughout their lives.¹

Though Colorado College is unique for its block system its goal of developing leaders matches the aspirations of most other colleges and universities across the nation. While a number of leadership experts have noted this trend, Dugan sums it up best in

¹ Colorado College, "CC Mission & Core Values," About CC, <http://www.coloradocollege.edu/welcome/mission/> (accessed January 29, 2011).

pointing out how “the development of students as leaders remains a central goal for institutions of higher education as evidenced by mission statements and the increased presence of leadership development programs on college campuses.”²

If this is accurate, it begs the question: “are institutions living up to the goals outlined in their mission statement?” Pascarella & Terenzini are among the many researchers that have found that college students seize the opportunity during their college years to develop and practice their leadership skills,³ which confirms Astin’s finding that “increases in leadership skills during the undergraduate years are associated with the college experience.”⁴ In fact, Astin & Astin go so far as saying, “higher education plays a major part in shaping the quality of leadership in modern American society.”⁵ The number of scholars who believe that higher education is a vital part of leadership development is endless.⁶ In actuality, it is likely that no scholar would dismiss this. From this, the question that needs to be addressed is whether students and alumnus share this belief.

² John P. Dugan, “Involvement and Leadership: A Descriptive Analysis of Socially Responsible Leadership,” *Journal of College Student Development* 47, no. 3 (May/June 2006): 335-343.

³ Ernest T. Pascarella and Patrick T. Terenzini, “Studying College Students in the 21st Century: Meeting New Challenges,” *The Review of Higher Education* 20, no. 2 (1998): 151-165.

⁴ Alexander W. Astin. *What Matters in College: Four Critical Years Revisited* (San Francisco: Jossey-Bass Publishers, 1993), 123.

⁵ Alexander W. Astin and Helen S. Astin, *Leadership Reconsidered: Engaging Higher Education in Social Change* (Battle Creek: W.K. Kellogg Foundation, 2000), 2.

⁶ See Astin (1993), Allen and Hartman (2009), Astin and Antonio (2000), Barabuto et al., (2007), Bies (1996), Cooper, Healey, and Simpson (1994), Cox et al., (2010), Dugan (2006), Eich (2008), Grandzol, Perlis, and Draina (2010), Hall, Forrester, and Borsz (2008), Hu (2010), Komives et al., (2005), Komives et al., (2006), Logue, Hutchens, and Hectoer (2005), Mills (2006), Pascarella and Terenzini (1998), Posner (2009), Renn and Bilodeau (2005), Renn (2007), Shepherd and Horner Jr. (2010), Smits (2010), Association of American Colleges and Universities (2007), and Astin and Astin (2000).

A less favorable point of agreement among researchers is that despite the United States' postsecondary education system often being deemed the finest in the world, "there is mounting evidence that the quality of leadership in this country has been eroding in recent years."⁷ The deteriorating quality of leadership can be attributed to many different sources: the expansions and innovations in technology; the shift from a national to a global economy; religious and ethnic conflict; war and terrorism; global warming; displeasure with government; lack of citizen interest in engagement with politics; the growing disparity between the affluent and impoverished and the accessibility of opportunity—the list is endless.⁸ As discouraging and disheartening as this all sounds, Astin and Astin argue that "the problems that plague American society are, in many respects, problems of leadership," and believe that anyone "who serves as a social change agent" has the potential to be a leader.⁹

The argument Astin and Astin put forth is informed by what past theories and models said of leadership. Up until the 1980's, researchers presented theories, such as trait, contingency, behavior, style, and power and influence theory. The literature and studies that come out of these theoretical traditions project leadership as "hierarchical, autocratic, and commanding," and support the idea that leadership develops in this manner.¹⁰ However, Astin and Astin and followers believe that leadership takes an egalitarian approach, which has proven itself as a major contender in the post-1980's

⁷ Astin and Astin (2000), 3.

⁸ Ibid

⁹ Ibid

¹⁰ Adrianna Kezar & Jamie Lester, "Breaking the Barriers of Essentialism in Leadership Research: Positionality as a Promising Approach," *Feminist Formations* 22, no. 1 (2010), 164.

discourse around leadership and how it develops. This is evidenced by the fact that in an increasingly complex, ever-changing, and volatile world, the expectation that only a privileged and select few possess the ability to lead is insufficient and unacceptable. Modern times call not only for new models of leadership, like the one put forth by Astin and Astin, but also innovations in the way leadership develops, is taught, and manifests over the course of an individual's life.

Astin and Astin are not alone in believing that anyone has the potential to be a leader. In fact, most leadership experts in the decade prior to the turn of the century not only began believing in this perspective, but also orienting their work toward proving this fact¹¹. Rost and Smith were able to communicate this phenomenon back in 1992 as the increasing awareness that “a new, radically different paradigm is needed for our postindustrial democratic societies in the 21st century.”¹² This could be fulfilled by transitioning away from the industrial era of leadership and its models concerned with hierarchy and autonomy and towards a postindustrial approach to leadership. Researchers have argued in recent years that the industrial era model does not “reflect today's interactive environment” because leadership is no longer depicted as unidirectional but rather an interdependent relationship between leaders and followers.¹³

As Komives, Owen, Longerbeam, Mainella and Osteen propose, the postindustrial era is distinguished from industrial models because leaders “transform

¹¹ For examples, see the works of Swigert and Boyd (2010), Riggio (2008), and Peterson and Williams (2004).

¹² Joseph C. Rost and Anthony F. Smith, “Leadership: A Postindustrial approach,” *European Management Journal* 10, no. 2 (June 1992): 193-201.

¹³ Rebecca S. Shepherd and Donald H. Horner, Jr., “Indicators of Leadership Development in Undergraduate Military Education,” *Journal of Leadership Studies* 4, no. 2 (August 2010): 18-29.

followers into leaders themselves,” thus creating new postindustrial models such as the leadership identity development model, the relational leadership model, and the social change model.¹⁴ Adopting such an approach changes the investigation of leadership from some innate, trait, or hierarchical model, to measuring developmental and influential factors in terms of leadership. The value of transitioning into a postindustrial era of leadership cannot be understated or undervalued for it exists as one of the few remaining aspects of the modern world where access is completely unrestricted.

With this knowledge that anyone has the capacity to develop leadership skills, that higher education is pivotal to this construction, and that developing these skills cannot be understated to success and even survival in the modern world, one would think that colleges and universities across the nation are finding ways to incorporate leadership development and stressing the importance of this process throughout the course of one’s college experience. Surprisingly, though, studies show that “less than 10 percent of today’s college graduates have the knowledge and experience to make them globally prepared,” and this is illustrated by the fact that less than 25 percent of these recent college graduates are well prepared for the workforce.¹⁵ How does a discrepancy between what institutions declare their mission and what studies reveal about recent graduates as substantial as this occur? One explanation is that despite widespread interest in and knowledge about the importance of leadership in the 21st century, colleges and universities have been operating under a misguided understanding of how to develop

¹⁴ Susan R. Komives et al., “Developing a Leadership Identity: A Grounded Theory,” *Journal of College Student Development* 46, no. 6 (November/ December 2005): 593-611.

¹⁵ Association of American Colleges and Universities, *College Learning for the New Global Century: A Report from the National Leadership Council for Liberal Education & America’s Promise* (Washington DC: The Association of Colleges and Universities, 2007), 7.

leadership. Astin and Astin suggest that this pitfall is the result of “leadership and the educational goals of leadership development” being given “very little attention by most of our institutions of higher learning.”¹⁶ They continue by pointing out that “in the classroom, faculty continue to emphasize the acquisition of knowledge in the traditional disciplinary fields” with minimal focus or attention on “the development of those personal qualities that are most likely to be crucial to effective leadership.”¹⁷

Despite the unfathomable amount of information that has been written on the topic of leadership across varying institutional settings, one area that has yet to be explored is the development characteristics associated with an institution operating on a block system like Colorado College. Among the literature that does exist, there is widespread agreement and evidence to support the argument that colleges and universities need to do more to understand how to create curriculums and environments that encourage and succeed in developing their students’ leadership capabilities. Furthermore, previous studies show that active involvement, experiential learning and engagement in activities outside of the classroom are among the most essential and crucial ingredients needed to develop leadership and prepare students for the world beyond college.

The question that remains and warrants further investigation is what activities and involvements matter most and how sure one can be that those activities contributed successfully to the development of that leader? Scholars have investigated a number of ways students have been involved and understand the need for co-curricular engagement

¹⁶ Alexander W. Astin and Helen S. Astin, *Leadership Reconsidered: Engaging Higher Education in Social Change* (Battle Creek: W.K. Kellogg Foundation, 2000), 9.

¹⁷ *Ibid*, 9.

to supplement learning and have many explanations as to why this is the case. What is lacking is a quantitative analysis of these variables to see if there in fact exists a relationship between the activities students engaged in during college that develop leadership skills, and the level of leadership participation after college.

In a quote that is now famous in the leadership world, Burns ranks leadership as “one of the most observed and least understood phenomena on earth.”¹⁸ This thesis will add to the ocean of observations, though with the intent of contributing meaningfully to the understanding of leadership by investigating the role of extra-curricular activities on leadership development in higher education. To be more specific, the research will be set around finding an answer to the question “is there a correlation between the extra-curricular activities Colorado College alumni engaged in while students and their current job title or position?”

This thesis will qualitatively analyze the data. The data set being used was obtained from the school and includes the responses of 34,812 Colorado College alumni across forty-two different fields. A regression analysis is performed with the hopes of revealing any correlations between undergraduate and post-graduate patterns of behavior. The results from this analysis are compared against a variety of theoretical backgrounds, some of which are included in the theory chapter and some that are newly incorporated.

Chapter two will delve into the past and present literature primarily concerned with leadership development. Chapter three is concerned with the methodology of the study and provides further explanation of the techniques and theories utilized. Chapter four discusses the analysis of the regression performed, provides further insight into the

¹⁸ James M. Burns, *Leadership* (New York: Harper & Row, 1978), 1-2.

findings and communicates the short-term and long-term implications in addition to any directions for future research.

CHAPTER II

LITERATURE REVIEW AND THEORY DEVELOPMENT

In recent years, a number of leadership researchers have become attuned to the fact that, “despite the broad scope of [leadership] literature,” there is limited scholarship regarding the process of leadership development or “how a leadership identity develops over time.”¹ Within this realm, scholars have investigated leadership development in nearly every age range, from cognitive, psychosocial, and phenomenological approaches, through qualitative and quantitative methods, and among different populations and circumstances. It is evident that this is a topic of particular interest to a number of scholars, most notably because it can be examined using a postindustrial lens and is of interest and value to a growing number of audiences around the world. Yet, the problem that seems to present itself repeatedly in the literature is determining a way to quantify the factors contributing most or that are central to leader development in a meaningful way. To state this differently, the problem in discerning which characteristics, circumstances, and influences are important to include for leadership development purposes is that there are an infinite number of variables that could be influential or relevant. This is evident in the literature, as a number of scholars have conducted nearly

¹ Susan R. Komives et al., “Developing a Leadership Identity: A Grounded Theory,” *Journal of College Student Development* 46, no. 6 (November/ December 2005): 593-611.

identical investigations, but come to differing conclusions about which variables are significant or peripheral.

With the vast amount of uncertainty that exists around virtually every corner in today's world, it is unsettling to think that despite the growing emphasis being placed on leadership development in all stages of life, there is still disagreement and confusion about the most efficient, meaningful, and successful actions to take or experiences to acquire to develop leaders. Now, more than ever, people are not only in need of developing their leadership skills, but also having knowledge and understanding behind this process with the assurance that it can be relied upon and trusted. Everyone has their own concept of great leadership, who they believe to be great leaders, and how and why they are deserving of or able to perform this role. Scholars have come to understand this reality, which is why the focus is no longer on discovering a cookie-cutter model of leadership or a pattern of invaluable traits in distinguished leaders.

The ensuing review of the literature on leadership development will examine these issues more in depth, and provide an understanding of the current challenges faced by experts in the field. It is important to note that as a result of the enormous amount of literature that exists in the leadership field, a complete review is not practical. As a result, this literature review specifically focuses on leadership development in two settings: within organizations and within higher education. Being that the primary focus of this thesis is concerned with higher education leadership development (HELD), this is where the largest portion of review exists. More specifically, the main area of review in this section examines the role of action (i.e. co-curricular/extracurricular involvement) and experiential learning in HELD.

Even though HELD receives the most attention, reviewing the literature on organizational leadership development (OLD) is equally important because it emphasizes and gives perspective to the findings in higher education. In addition, it is necessary to devote sections of the review on findings on gender differences in leadership development, and the development of a leadership identity and parallel behaviors. Future implications will be outlined and discussed in brief, with further exploration in subsequent chapters.

2.1 Leadership Development Theories

One of the primary challenges of leadership development is in the theory surrounding it. Many theories have been developed over the past century to define leadership behaviors, roles, and traits, providing specific tools and courses of action to take. In other words, these theories are concerned with hierarchical and peripheral constructs of leadership, and have little to offer in the way of leadership development. This isn't to say that none of these theories have been applied to leadership development, rather that they are insufficient in assessing the behaviors and influences of leadership development processes. What then can be considered an adequate theory to apply to leadership development?

Komives, Longenecker, Owen, and Mainella, developed a model that looks at leadership identity development (LID). The LID model "resulted from a grounded theory study on developing a leadership identity" and is designed to expand on the stages of

developing a leadership identity.² The results of the grounded study discovered a “process of how students situate themselves in the construct of leadership over time,” along with five categories that were most influential in this construction: “broadening view of leadership, developing self, group influences, developmental influence, and the changing view of self with others.”³ Furthermore, the authors suggest that these categories develop along three separate stages, and have key attributes that distinguish the transitions between stages.⁴ The first stage is “awareness,” followed by “exploration” and “engagement,” with the final stage being classified as “leader identified.”⁵

Although all three stages and five categories need to be considered when looking at the process of leadership development, “developmental influence” and “group influences,” most notably in the second stage of “exploration/engagement” deserves further commentary as they speak directly to the argument of co-curricular involvement and learning experiences in higher education leadership development (HELD). Komives et al. found the second stage as the time when leadership is explored and characterized by “intentional involvement” in sports, religious groups, community service, scouts, student government associations, and dance, “experiencing groups for the first time,” and “taking on responsibilities.”⁶ Developmental influences in the second and remaining stages that facilitate a LID include adult influences, peer influences, meaningful involvement, and

² Susan R. Komives et al., “A Leadership Identity Development Model: Applications from a Grounded Theory,” *Journal of College Student Development* 47, no. 4 (July/August 2006): 401-418.

³ Ibid, 401-418.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

reflective learning.⁷ Among the various studies that have been published on HELD, the recurring themes that appear most in facilitating leadership development directly link to the LID model, specifically in reaching a stage of engagement and exploration and being cognizant to the group and developmental influences within that context.

Intentional change theory (ICT) is another model specifically designed to “stimulate sustained leadership development” in terms of “the essential components of behavior, thoughts, feelings, and perceptions related to leadership effectiveness.”⁸ This theory is an extension of complexity theory, which examines complex systems as they relate to leadership development.⁹ This method of assessing leadership development is grounded much more in neurological research and scientific factors. Despite this, Boyatzis makes an interesting point that the desire to change is the driving force in leadership development.¹⁰ To elaborate on this, Boyatzis found that “adults will only develop characteristics of effective leaders if they want to be leaders,” and how “many people engage in developmental activities to satisfy other people’s desires, not their own.”¹¹ A statement as bold as this deserves further investigation, however it is not something tested in this thesis. Even if this paper does not directly test this theory, it helps to explain how leadership develops or why. Furthermore, theories grounded in

⁷ Ibid.

⁸ Richard E. Boyatzis, “Leadership Development From a Complexity Perspective,” *Consulting Psychology Journal* 60, no. 4 (2008): 298-313.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

science, such as Boyatzis', serve as an explanation for the motivations behind leadership, and deserves more attention and consideration outside of this study.

While these aren't necessarily the most widely used theories in leadership development, they illustrate not only the major differences between conventional theories of leadership—which seldom express interest in individual influences on behavior, and interactions within different settings—but also point to the changing face of leadership studies, particularly conceptions of leadership development.

2.2 Leadership Development in Organizations

Leadership development has been a primary concern within organizations before ever sparking the interest of educators, institutions, and American society in general. For years, organizations were interested in finding a “one-size-fits-all” approach to leadership so that training programs could be streamlined, and business people could establish an agreed-upon theory of leadership development.¹² As time progressed and more was learned about leadership development, organizations abandoned this hope of finding that single “best-practice,” and worked to find alternative methods. It might have been easy for organizations to stop caring about leadership development; however, the value of this process in all levels of an organization is indescribable, and organizations know that without perpetual learning, growing, and developing of leadership skills, that they are risking the long-term success of the business.

To put this into perspective, “of the billions of dollars spent worldwide by organizations in all sectors (private, public, nonprofit) to train and develop employees, a

¹² Ronald E. Riggio, “Leadership Development: The Current State and Future Expectations,” *Consulting Psychology Journal* 60 no. 4 (2008): 383-392.

large share of training resources is devoted to management and/or leadership development.”¹³ Furthermore, “approximately 45% of the \$56 billion that organizations spent on organizational learning and development in 2006 was targeted specifically at leadership development.”¹⁴ Riggio argues that the reasons “for spending so much on leadership development include the perception that leaders play an essential role in the operations of organizations and that leadership skills are more abstract...complex, and difficult to learn.”¹⁵

In addition to this, Riggio discovered that even the “most experienced” leaders believe that leadership development produces positive results and lasting impacts that are well “worth the investment of resources and their personal time.”¹⁶ What’s even more surprising is that these seasoned and experienced leaders understand the importance of and continue to engage in developing their own leadership.¹⁷ Some of the methods cited by these leaders include: attending training programs and workshops specifically designed for leadership development, engaging in a “developmental 360-degree feedback program, enlisting the aid of an executive coach,” or through activities that invoke self-awareness and introspection.¹⁸

¹³ Ibid

¹⁴ D. Scott DeRue and Ned Wellman, “Developing Leaders via Experience: The Role of Developmental Challenge, Learning Orientation, and Feedback Availability,” *Journal of Applied Psychology* 94, no. 4 (2009): 859-875.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Ibid.

Regardless of the literature discussing leadership development throughout an organization or in higher education, it is widely believed in both contexts that self-awareness and mentoring relationships are pivotal in the developmental process as it encourages one to recognize personal limitations and strengths and work to overcome those shortcomings. Further explanation of these relationships will appear in the review of the literature pertaining to higher education.

2.3 Leadership Development in Higher Education

In reviewing the literature on leadership development in higher education, there are numerous variables that scholars recognize as fundamental to the process. Cooper, Healy, and Simpson conducted a three-year study using the Student Developmental Task and Lifestyle Inventory (SDTLI) to examine the development of college students and found three factors to be primarily attributable to positive growth and development: involvement in student organizations, leadership roles, and general involvement in campus life.¹⁹

Astin found that in addition to these factors, increases in leadership are positively associated with the amount students interact with faculty, “being a member of a social fraternity or sorority, playing intramural sports, spending time in volunteer work, tutoring other students, participating in a group project for class, and making presentations to class.”²⁰ On top of this, Astin reports three additional variables correlated with self-

¹⁹ Diane L. Cooper, Margaret A. Healy, and Jacqueline Simpson, “Student Development Through Involvement: Specific Changes Over Time,” *Journal of College Student Development* 35, no.2 (1994): 98-102.

²⁰ Alexander W. Astin. *What Matters in College: Four Critical Years Revisited* (San Francisco: Jossey-Bass Publishers, 1993), 125.

reported growth in leadership abilities as “hours per week spent in student clubs or organizations, being elected to a student office, and hours per week spent in exercise or sports.”²¹

This supports the findings of Stacey, Hall, Scott, and Borsz’s study, which looked at the leadership development of undergraduate students in recreational sports. In addition to the previously mentioned findings, these authors found that a number of student leaders felt responsible for mentoring those interested in leadership that were younger or less experienced.²² Exchanging feedback with peers and elders was another reported skill necessary to build for leadership. The author’s note how “through the process of receiving feedback, students also had the opportunity to reflect back on their leadership experience and how they matured as a leader.”²³ As Riggio previously mentioned self-awareness and introspection as critical aspects of leadership development for organizations, Hall, Forester, and Borsz, discovered that the process of reflection was equally important to the development of student leaders not only because it enabled students to “identify their own strengths and weaknesses” but also to “articulate ways their current leadership role prepared them for their future careers.”²⁴

Authors have made it clear that leadership development not only occurs in the context of higher education, but the importance of active involvement and engagement in almost any opportunities available at most colleges and universities. Most of the

²¹ Ibid, 233.

²² Stacey L. Hall, Forrester Scott, and Melissa Borsz, “A Constructivist Case Study Examining the Leadership Development of Undergraduate Student in Campus recreational Sports,” *Journal of College Student Development* 49, no. 2 (March/April 2008): 125-140.

²³ Ibid.

²⁴ Ibid.

literature arguing these points sampled institutions providing a liberal arts education. This is an important observation because the environment, curriculum, activities, and personalities present at most institutions offering a liberal arts education, differ greatly from these variables within vocational institutions and educational settings. By implication, attitudes and beliefs about leadership development and its process are not only different in nature, but in the value placed on them. Whereas colleges and universities have known for many years that a primary goal of acquiring a liberal arts education is developing leadership intelligence among the student population, only recently has this goal been considered among vocational schools and settings.

Evidence for this can be seen from two recent studies with rather different foci. The first pertains to the development of leadership skills of undergraduate engineering students. The purpose of the study is unique as it seeks to determine the engineering faculty's impression about what colleges and universities need to do to develop the leadership skills of engineering students.²⁵ Most of the literature existing on higher education focuses on the opinions of students regarding their leadership development, only mentioning the role of faculty and administration in passing. As interesting as it is that this study diverges so much from the conventional study conducted on leadership development in higher education, the conclusions of this study point to important truths that apply in general to concepts of leadership development.

Before reviewing the findings of faculty perceptions, Cox et al. found it necessary to outline the meanings faculty attribute to leadership. Leadership is defined primarily by

²⁵ Monica F. Cox, Osman Cekic, and Stephanie G. Adams, "Developing Leadership Skills of Undergraduate Engineering Students: Perspectives from engineering faculty," *Journal of STEM Education* 11, no. 2 & 3 (January 2010): 22-33.

adjectives such as “visionary” and “creative” and verbs such as “empower.” Emphasis was placed not only on “action-oriented elements (i.e., having good decision making skills and being proactive)” but also on the characteristics of engineering students.²⁶ It appears from the faculty’s notions of engineering leaders that their understandings of leadership stem from primarily industrial-era models of leadership. When asked about ways leadership activities can be incorporated into engineering programs, faculty were often expressed the immeasurable difficulty of accomplishing such a task. “None of the participating faulty members thought that introducing more courses [on leadership] was a good idea,” specifically noting “that the engineering curriculum was already full” and the only way to “include new elements” is by removing ones that already exist.²⁷ This brings up an important cross-contextual point: Even if colleges and universities across the nation profess the importance and ultimate goal of creating environments and programs that develop leadership, faculty and administration are faced with the issue of finding ways to develop these skills without making sacrifices to the curriculum elsewhere, specifically through adding courses in leadership.

Faculty had other suggestions about ways for leadership development to occur. “Integrating elements of leadership into current courses (i.e. engaging in course redesign instead of adding new curriculum),” particularly through senior capstone projects, were expressed as a reasonable way for leadership to be incorporated in the curriculum.²⁸ Some faculty members believe capstone courses develop communication and

²⁶ Ibid, 22-23.

²⁷ Ibid, 22-23.

²⁸ Ibid.

presentation skill, placing emphasis on the teamwork that is a part of such projects. Though feelings among faculty members about capstone projects developing leadership was not uniform, nearly all faculty members advocate providing “real life experiences during undergraduate education” in helping develop undergraduate students’ leadership skills.²⁹ These real life experiences cover a range of activities extending from study-abroad programs, learning experiences outside of the classroom, to internships and co-op programs.³⁰ One faculty member feels that leadership is “not just transfer of knowledge,” but is more a part of “learning from the experiences of oneself and others.”³¹ Another faculty member considers leadership skills and developmental processes as culturally relative and liable to “change from institution to institution.”³² When interviewed this faculty member explained the value he places on real-life-experiences in developing leadership, and how the cultural setting is inherently a part of that process:

But when you talk about a culture, or how they would work with different company, you can’t teach those—those things they’re gonna’ have to experience. And so when you look at the students after they come back, it’s a life changing experience.³³

Another area faculty members identified as significant to the leadership development process was involvement in extracurricular activities. Extracurricular activities are not only considered a form of integration and hands-on learning expressed by faculty, but also seen as offering critically important opportunities for students to

²⁹ Ibid, 22-23.

³⁰ Ibid.

³¹ Ibid.

³² Ibid.

³³ Ibid

develop their leadership skills. Some of the activities faculty described as extracurricular include student government, student organizations, fraternities and sororities and on and off campus work.³⁴ To generalize this even more, some faculty argue that simply engaging in team activities and teamwork settings provide an optimal context for developing leadership skills.

The second of these studies looks at certain indicators of leadership development from an undergraduate military education. Similar to Fox, Cekic, and Adams, this study is unique as the military population is considered to be rather homogenous and distinct from nearly all other settings.³⁵ Like much of the other literature in the field, Shepherd and Horner advocate a postindustrial approach to leadership and argue that it “pushes military leadership research in a new direction.”³⁶ The direction that these scholars are referring to is the LID model, which they use to investigate the development of the undergraduate military population. Despite the proven successes of using postindustrial models in nonmilitary populations, the authors found that the nature of military populations made it more challenging to take a more modern approach. However, the authors eventually find evidence in support of the LID model’s categories and stages.³⁷ Unlike studies conducted outside of military settings, one of the most striking differences in the leadership development process is that the military curriculum begins with the

³⁴ Ibid.

³⁵ Rebecca S. Shepherd and Donald H. Horner, Jr., “Indicators of Leadership Development in Undergraduate Military Education,” *Journal of Leadership Studies* 4, no. 2 (August 2010): 18-29.

³⁶ Ibid, 18-29.

³⁷ Ibid.

“development of the student’s followership skills” with their primary responsibility being of self.³⁸

Over the course of their undergraduate education, students accrue greater responsibilities. Often times, these responsibilities will extend beyond personal responsibilities wherein military students are held responsible for the actions and development of younger and less experienced military students.³⁹ This reflects the findings of Komives et al. and other experts who found that student leaders underwent a noticeable transition from working on developing their own leadership skills to a feeling of responsibility in developing the leadership skills of their subordinates.⁴⁰ Furthermore, Shepherd and Horner found a number of other variables important to the military world and typical colleges and universities. Grade point average is “an accepted quantitative measure of academic development in higher education.”⁴¹ Students with a higher cumulative grade point average in higher education and in military settings have indicated a higher achievement in leadership rankings and measurements.⁴² Studies involving extracurricular activities and participation in varsity athletics for undergraduate military students “found that participation in team or individual sports had a positive, statistically significant effect on the student’s military performance grade.”⁴³ However,

³⁸ Ibid.

³⁹ Ibid.

⁴⁰ Susan R. Komives et al., “A Leadership Identity Development Model: Applications from a Grounded Theory,” *Journal of College Student Development* 47, no. 4 (July/August 2006): 401-418.

⁴¹ Shepherd and Horner, Jr., (August 2010): 18-29.

⁴² Ibid, 18-29.

⁴³ Ibid.

sufficient evidence was found in support of the industrial-era leadership argument that ranking by one's peers continues to be a "significant indicator of an individual's leadership development."⁴⁴

In terms of the peer-to-peer interactions that occurred within athletics, the impact of leadership development varied based on gender, with females being negatively impacted and males being positively impacted.⁴⁵ Although the study only hinted at reasons for this, such as the possibility of females being perceived as too masculine, no conclusive evidence were given.⁴⁶ This is an area that deserves further investigation and cross-contextual comparison as the findings may give added insight into the leadership development not only of military and nonmilitary undergraduate students, but also of differences between males and females in terms of this process.

It is also important to mention that both of these articles were published in 2010. Perhaps this is due to a greater need researcher feel about studying leadership development outside of the conventional contexts of higher education. Perhaps these undergraduate vocational settings were exposed to the growing awareness that education is incomplete without incorporating leadership development. Whatever the reason, scholars have began honing in on specific settings as a way of outlining the way society and members of higher education envisions leadership development. As these two studies point out though, despite the extreme differences that may exists in the environment and student bodies, sentiments about leadership development and the

⁴⁴ Ibid.

⁴⁵ Ibid, 18-29.

⁴⁶ Ibid.

worthwhile processes behind are rather similar and in accordance with the extant literature on HELD.

The next chapter will present the data and methodology used in the analysis portion of the thesis, and develops a model of leadership development. Both of these will reference the literature base and draw upon examples when appropriate.

CHAPTER III

DATA AND METHODOLOGY

The overwhelming majority of leadership development studies consist of qualitative investigations. Whether the investigation is into the way leaders develop in communities, educational settings, or organizations, the primary means of data collection is through administering a survey or by conducting interviews. Only a handful of investigations look at leadership development quantitatively, but why? Leadership studies, particularly those concerning the way leadership develops over time is rather subjective, making it difficult to conduct an analysis that is qualitative. Many leadership surveys ask participants questions like “how would you define leadership?” or “which characteristics are the most valuable in developing leaders?” With such questions, variance is more than guaranteed, outlining why quantitative contributions to the topic are often deferred. Of course, data coding could be used, but when it comes to studies of leadership, personal testimonies and anecdotes have proven necessary in explaining the various models and theories of leadership. Even if it is true that more subjective results are necessary, they are not sufficient. In order for their to be a more comprehensive understanding of the way leaders develop, more quantitative analyses need to be undertaken so that the body of literature on the subject is more holistic.

This thesis steers away from a traditional qualitative approach to one that is quantitative. The following chapter will describe the research methodology, describe the

alumni dataset, contextualize important variables, and develop a preliminary model of leadership.

3.1 Acquisition, Demographic Features and Organization of the Data

The Colorado College department of Advancement Services supplied the information required for this study. The data is composed of the school's current record on alumnus across 43 designated fields. A total of 34,812 alumni are included in this sample. Alumni are defined as living subjects who were enrolled in the college's bachelors or masters degree program, irrespective of whether or not the alumnus completed the program or graduated with the school.⁴⁷ Table 3.1 includes the list of the field names and descriptions for each provided by Advancement Services.

⁴⁷ Christen Lara, "The Anatomy of a Likely Donor: An Analysis of Philanthropic Giving in Higher Education." (May 2008) Thesis 25.

**Table 3.1
Features of the Alumni Data Provided**

	Field Name	Description		Field Name	Description
1	Alumni	Yes or no (Y-N), graduated from CC	23	Survey	Y-N, responded to any alumni survey
2	Attended	Y-N, attended but did not graduate	24	Committee	Y-N, any service on any CC board of committee
3	Parent	Y-N, parent of a CC student or alum	25	Volunteer	Y-N, has ever volunteered for CC
4	Deceased	Y-N	26	Director	Y-N, member of any external board of directors
5	YOB*	Calendar year of birth	27	Student_Cl	Y-N, member of any student club or org
6	Marital**	Single; Married; Divorced; Widowed; Unknown	28	Scholarship***	Y-N, received a scholarship
7	Title**	Current job title	29	Greek	Y-N, member of a fraternity or sorority
8	Org	Y-N, current employer known	30	Athletics	Y-N, intercollegiate athlete as a student
9	Zip*	Zip of preferred address	31	IntraMural	Y-N, participated in intramurals
10	State**	State of preferred address	32	Abroad	Y-N, studied abroad as a student
11	Address	Y-N, good address vs. none or bad	33	Hockey	Y-N, played competitive hockey at CC
12	Phone	Y-N, good vs. none or bad	34	Soccer	Y-N, played competitive soccer at CC
13	Home	Y-N, do we have a home address vs. business address only	35	Football	Y-N, played competitive football at CC
14	Email	Y-N, do we have an e-mail address	36	Volleyball	Y-N, played competitive volleyball at CC
15	YOG*	Fiscal year of graduation	37	Stu_Act	Y-N, ever participated in any student activity (other than performances & athletics)
16	Major**	Major at CC	38	Performance	Y-N, ever was in a student performance
17	Degrees	Y-N, more than one degree from CC	39	Athletics_1	Y-N, ever was on any CC athletics team, including Div I, Div III, club, & intramural
18	Undergrad	Y-N, holds CC bachelors	40	MAGS_Count	Number activities calendar mailing lists
19	Grad	Y-N, holds CC MAT	41	ATHL_Count	Number athletics mailing list
20	Events*	Number of events attended	42	AFF_SCR***	Affinity score from 2009 model
21	NF_events*	Number of non-fundraising events attended	43	Shove	Married in Shove
22	Awards	Y-N, received any awards from CC			

*Indicates those fields containing numeric values.

**Indicates fields with term-based entries.

*** Indicates fields without any entries, and were therefore dropped.

An initial look at the data revealed that close to 75% of the fields (32 of 43) had already been converted into dummy variables.⁴⁸ A number of variables were dropped at this time⁴⁹ because they did not fit within the parameters of this study, or the cells had no entries. Advancement Services has done a tremendous job of maintaining these records, and it would be unfair to hold the department accountable for absences in data.

Since the majority of the data had been entered as dummy variables, only minor adjustments of the data were necessary. These adjustments mainly consisted of creating two new dummy variables, “Leadership” and “Age_45,” and omitting data that was incorrectly entered or not provided on behalf of the alumnus.

One of the advantages of using dummy variables is that non-respondents take on a value of zero, therefore preventing the number of observations that would otherwise be omitted. When responses are not given for non-dummy variables, the number of observations can lessen significantly, causing one to wonder if the results will be skewed. This question entered into the development of this model on two occasions: the first occurred in realizing that of the 34,812 alumnus, only 12,291 provided their current job title, and second when another 2,237 observations were lost due to alumnus that recorded his or her calendar birth year as having not yet occurred. This was significant seeing as the recorded job titles of alumnus would be used to develop the Leadership variable. Despite the fact that only 28.9% of the initial dataset remained, 10,054 observations were sufficient enough to conduct a proper analysis.

⁴⁸ Nominal variables that can either take on a value of 1 or 0.

⁴⁹ Dropped variables include: parents, deceased, YOB, marital, title, org, attendee, zip, state, address, phone, home, email, YOG, major, events, nf_events, survey, shove, mags_count, and ath_count.

3.2 The Leadership Variable

The Leadership variable was developed from two fields: Job Title and Director. Many of the fields, including Director, were recorded as discrete variables by Advancement Services and therefore could be included in the model without being manipulated. Unlike Director, Job Titles were recorded as categorical variables and only had responses from 12,291 alumni. Since there was no field that measured leadership, one needed to be created. The only field that could adequately capture if alumni continue leadership participation after college was Job Titles.

In order for this to be accomplished, keywords were extracted from the job titles that were indicative of requiring a developed sense of leadership. The data was then converted into a discrete variable by assigning a value of one to job titles containing a leadership keyword, and a zero if no keyword was present. The only way for these keywords to be converted was by deconstructing the job titles so that each word inhabited a single cell. The words in each cell were converted to a one or a zero from a function that used the keywords to scan the entire sample. After scanning the data and converting it, the frequencies consolidated into a single row. Owing to the fact that only one keyword could be scanned for at a time, the process was repeated 48 times until it was felt that a substantial portion of the 12,291 observations assumed the correct leadership frequency. The 49 columns of frequencies were then merged into a single column representing the newly crafted Leadership variable. To ensure that the Leadership variable had been assigned the right value, and ensure that no titles were excluded, each entry was reviewed and altered as needed. Surprisingly, a large number of keywords

were not included, but this was explained by the software's inability to include abbreviations and misspellings of keywords.

After the final version of the Leadership variable was solidified, it was decided that anyone assigned a value of 1 for "Directors," but who simultaneously takes on a value of 0 for Leadership would hereto forth take on a value of 1 for "Leadership" and become part of this demographic.

Upon completing this process, it was evident that the number of alumnus taking on a value of 1 for Leadership far outweighed those taking a value of 0. In other words, 74.2% of the Colorado College alumni pool continues leadership participation after college

3.3 Regression Model

In order to carry out a quantitative analysis of the data, an ordinary-least squares (OLS) regression equation would need to be formed and subsequently run on the statistical software program STATA. With Leadership acting as the only dependent variable, it was crucial that an adequate amount of independent variables were included, but also that the variables were the best fit to the model being tested. For this to be achieved, independent variables were sorted based on three criteria: 1) the variable should be included in the model if it was discussed in the literature as a critical component of leadership development in higher education, 2) variables representing active involvement in group or team settings should be included in the model, and 3) any traits that seem characteristic of a developed or developing leader should be included. As shown in Table 3.2, twenty-one independent variables meet the above criteria, and have

been grouped according to demographic similarities. Equation 3.1 represents the Leadership model that will be used in the analysis.

Table 3.2
Demographic Characteristics of the Leadership Regression Model

LEADERSHIP		
<u>Trait Demographics</u>	<u>Social, Cultural, and Communal Demographics</u>	<u>Sports Demographics</u>
Age_45; Alumni; Awards; Degrees; Grad; Undergrad	Abroad; Committee; Director; Greek; Stu_Act; Student_Cl; Performance; Volunteer	Athletics_1; Athletics; Intramural; Football; Hockey; Soccer; Volleyball

Equation 3.1 represents the Leadership model that will be used in the analysis.

The model assumes that leadership depends on twenty-one separate independent variables: Director, Greek, Volunteer, Student_Cl, Stu_Act, Athletics_1, Intramural, Committee, Hockey, Football, Soccer, Volleyball, Awards, Performance, Abroad, Grad, Undergrad, Alumni, Degrees, and Age_45. A brief description and Summary Statistics for these variables can be found in Table 3.3.

$$\begin{aligned}
 \text{Equation 3.1: } LEADERSHIP = & \beta_0 + \beta_1 DIRECTOR + \beta_2 GREEK + \beta_3 VOLUNTEER + \\
 & \beta_4 STUDENT_CL + \beta_5 STU_ACT + \beta_6 ATHLETICS_1 + \beta_7 ATHLETICS + \beta_8 INTRAMURAL \\
 & + \beta_9 COMMITTEE + \beta_{10} HOCKEY + \beta_{11} FOOTBALL + \beta_{12} SOCCER + \beta_{13} VOLLEYBALL \\
 & + \beta_{14} AWARDS + \beta_{15} PERFORMANCE + \beta_{16} ABROAD + \beta_{17} GRAD + \beta_{18} UNDERGRAD + \\
 & \beta_{19} ALUMNI + \beta_{20} DEGREES + \beta_{21} AGE_45
 \end{aligned}$$

3.4 Independent Variables

Though the model will measure all twenty-one independent variables against Leadership, this following section will provide a description of the variables according to their assigned demographic. Table 3.3 outlines the summary statistics for the dependent variable and independent variables. In addition, Table 3.3 includes the expected influence of each independent variable on Leadership, which can either be positive (+) or unknown (?). The reason certain variables have expected influences that are unknown try to convey the ambiguity of the variable being tied to leadership development.

Trait Demographics

Age_45

A growing belief about leadership among scholars and educators that has developed in recent years is that leadership develops with over time and with age.⁵⁰ Therefore it is expected that age will strongly affect leadership. The concern of including this variable is that it is linked to a problem of collinearity. Appropriate measures will be taken should this occur.

Alumni

None of the literature cites graduating from a specific school as indicative of more or less developed leadership capabilities, but rather gives credit to an institution's environment and demographic in developing such skills.

⁵⁰ Astin (1993), Astin and Astin (2000), Hall and Mansfield (1975), Gardner, Roth, and Brooks-Gunn (2008) all express this sentiment.

Awards, Degrees, Grad, Undergrad

While studies have shown that the undergraduate years positively affect leadership development, it is unknown whether the number of awards a person acquires or the number of degrees a person attains positively contributes to leadership development. One could argue that the more degrees a person has contributes to leadership development by making the individual more knowledgeable on a wide range of subjects, and therefore better able to communicate across borders, which is often considered a leadership trait; however, this seems more like a qualitative analysis and will therefore not be included in this investigation.

The expected influence of acquiring a bachelor's degree from CC is positive, whereas the same influence is not expected for alumnus that holds a CC MAT. Though the literature suggests that the number of degrees a person holds is indicative of greater leadership capabilities, it is believed that holding a CC MAT influence the on continued leadership by alumnus since the program is not highly advertised or represented on campus.

Social, Cultural, and Communal Demographics

Volunteer, Committee, Director, Greek, and Stu_Cl are all expected to be positively associated with Leadership since they are sighted among scholars as significant activities that develop leadership. Abroad, Performance, and Stu_Act are not discussed as likely contributors to the development of leaders and therefore the expected influence is unknown.

Sports Demographics

A large portion of research conducted on leadership development in higher education has found that participation in intercollegiate athletics is strongly believed to develop excellent leadership capabilities, especially for those members that have been labeled the team captains.⁵¹

Table 3.3
Leadership Development Vector Variables (Dummy Variables)

Variable*	Description	Expected Influence	Frequency		Mean	Standard Deviation
			1	0		
Leadership**	Takes on a value of 1 if alumnus are currently in a leadership position and 0 if otherwise.		9119	3172	0.742	0.438
Abroad	Takes on a value of 1 if alumnus studied abroad as a student and a 0 if not.	?	618	11673	0.050	0.219
Age_45****	Takes on a value of 1 if alumnus was 45 years of age or older and a 0 if otherwise.	+	5816	4238	0.579	0.494
Alumni***	Takes on a value of 1 if alumnus graduated from CC and a 0 if otherwise.	?	11009	1282	0.896	0.306
Athletics_1***	Takes on a value of 1 if alumnus was ever on any CC athletics team, including Div I, Div III, club and intramural, and a 0 if not.	+	1457	10834	0.119	0.323
Athletics	Takes on a value of 1 if alumnus was an intercollegiate athlete	+	2940	9351	0.239	0.427

⁵¹ Christian Grandzol, Susan Perlis, and Lois Draina, "Leadership Development of Team Captains in Collegiate Varsity Athletics," *Journal of College Student Development* 51, no. 4 (July/August 2010): 403-418.

	as a student and a 0 if not.					
Awards	Takes on a value of 1 if alumnus received any award from CC and a 0 if not.	?	150	12041	0.012	0.109
Committee	Takes on a value of 1 if alumnus partook in any service on any CC board or committee and a 0 if not.	+	104	12187	0.009	0.092
Degrees	Takes on a value of 1 if alumnus acquired more than one degree from CC and a 0 if not.	?	245	12046	0.019	0.139
Director	Takes on a value of 1 if alumnus is a member of any external board of directors and a 0 if otherwise.	+	139	12152	0.011	0.106
Football	Takes a value of 1 if alumnus played competitive football at CC and a 0 if not.	+	209	12082	0.017	0.129
Greek	Takes a value of 1 if alumnus was a member of a fraternity or sorority and a 0 if not.	+	3918	8373	0.319	0.466
Grad	Takes a value of 1 if alumnus holds a CC MAT (Masters Program) and a 0 if not.	?	489	11802	0.039	0.195
Hockey	Takes a value of 1 if alumnus played competitive hockey at CC and a 0 if not.	+	130	12161	0.011	0.102
Intramural***	Takes a value of 1 if alumnus participated in intramurals at CC and a 0 if not.	+	0	12291	0	0
Performance	Takes a value of 1 if alumnus ever participated in a student performance and a 0 if	?	214	12077	0.017	0.131

	not.					
Soccer	Takes a value of 1 if alumnus played competitive soccer at CC and a 0 if not.	+	222	12069	0.018	0.133
Stu_Act	Takes a value of 1 if alumnus ever participated in any student related activity other than performances and athletics, and a 0 if not.	?	605	11686	0.049	0.216
Student_Cl***	Takes a value of 1 if alumnus was a member of any student club or organization and a 0 if not.	+	6191	6100	0.504	0.500
Undergrad***	Takes a value of 1 if alumnus holds CC bachelors degree and a 0 if otherwise.	+	10693	1598	0.869	0.336
Volleyball	Takes a value of 1 if alumnus played competitive volleyball at CC and a 0 if not.	+	38	12253	0.003	0.056
Volunteer	Takes a value of 1 if alumnus ever volunteered for CC and a 0 if not.	+	4086	8205	0.332	0.471

*The number of observations was initially 34,812, but reduced to 12,291 due to alumni non-response.

**Indicates dependent variable.

***Indicates variables that were dropped in final regression analysis.

****Variable not included in final regression analysis. The number of observations for the age_45 variable is 10,077.

3.5 Summary

Chapter three outlined the research methodology, the methods of data collection and organization, as well as developing a Leadership model and describing the

demographics of the independent and dependent variables. Chapter four will present the results of the analysis and any alterations that were made.

CHAPTER IV

RESULTS

Chapter IV will discuss the manipulations of the data that occurred over the regression process and provide an overview of the results of the regression model outlined in Chapter III. A discussion of the findings presented in this chapter will be deferred to Chapter V.

4.1: Initial Model Alterations

Before running a regression presented in Chapter 3, (Equation 3.1) it was apparent that there would need to be adjustments to the data. The first alteration to occur was dropping the “Alumni,” “Undergrad” and “Degrees” variables since they would did not fit with the parameters of the model set forth in chapter three. The adjusted equation is represented below in Equation 4.1:

$$\begin{aligned}
 LEADERSHIP = & \beta_0 + \beta_1 DIRECTOR + \beta_2 GREEK + \beta_3 VOLUNTEER + \beta_4 STUDENT_CL \\
 & + \beta_5 STU_ACT + \beta_6 ATHLETICS_1 + \beta_7 ATHLETICS + \beta_8 INTRAMURAL + \\
 & \beta_9 COMMITTEE + \beta_{10} HOCKEY + \beta_{11} FOOTBALL + \beta_{12} SOCCER + \beta_{13} VOLLEYBALL + \\
 & \beta_{14} AWARDS + \beta_{15} PERFORMANCE + \beta_{16} ABROAD + \beta_{17} GRAD + \beta_{18} AGE_45
 \end{aligned}$$

The result for the regression conducted on the adjusted equation seemed promising at first, but proved that more adjustments were needed after the data showed a correlation between the Student_Cl variable and the Athletic_1 variable. Furthermore, the

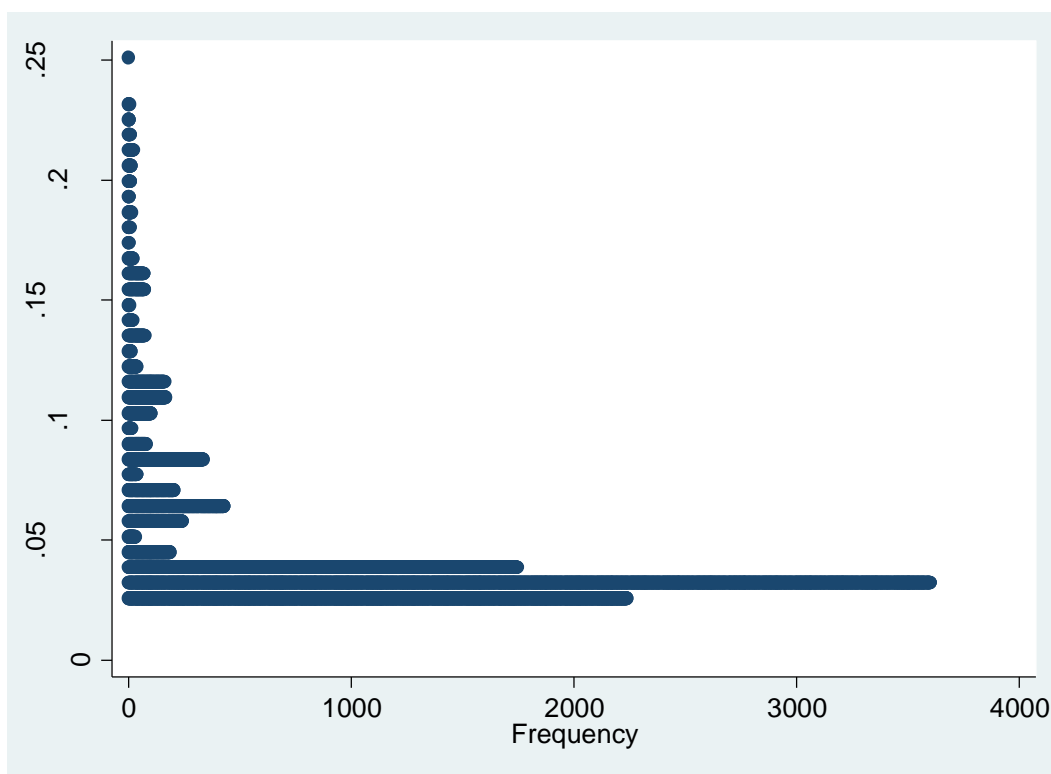
analysis decided to omit the intramural variable and no explanation was provided.

Looking to see if some of the data had been incorrectly entered, it was surprising to find that despite every cell containing a value, each cell took on the identical value of zero. It is unknown whether this is accurate, but it's safe to assume that these values are incorrect seeing as respondents who took on a value of 1 for Student_Cl or Stu_Act should have also taken a value of one for intramurals. All three problematic variables were removed and a regression was run again using Equation 4.2:

$$\begin{aligned} LEADERSHIP = & \beta_0 + \beta_1 DIRECTOR + \beta_2 GREEK + \beta_3 VOLUNTEER + \beta_4 STU_ACT \\ & + \beta_5 ATHLETICS + \beta_6 COMMITTEE + \beta_7 HOCKEY + \beta_8 FOOTBALL + \beta_9 SOCCER + \\ & \beta_{10} VOLLEYBALL + \beta_{11} AWARDS + \beta_{12} PERFORMANCE + \beta_{13} ABROAD + \beta_{14} GRAD + \\ & \beta_{15} AGE_45 \end{aligned}$$

The initial results of the regression using this model seemed to be without errors. However, due to the extremely low R-squared and Adjusted R-squared values, and the t-statistic for Performance recording 0.00, the data would need to be manipulated once more. The only reassurance was that the correlation coefficients were all within a reasonable range (<0.3). The Breusch-Pagan/Cook-Weisberg test for heteroskedasticity revealed a Chi² value of 192.48. This test is used to identify constant variance among the explanatory variables. When there exists a Chi² value as large as the one presented in this model, it assumes that there is a problem of heteroskedasticity and a non-normal distribution of errors. After conducting a number of fixes, it became apparent that the only problem that could not be resolved was the non-normal distribution of errors (Figure 4.1).

Figure 4.1: Standard Error of the Prediction



As Figure 4.1 shows, the errors terms are not normally distributed. To figure out why this existed, the data was sorted on the residual. The data showed that most frequent error terms applied to those alumnus that were involved in very few activities. Even more interesting was that the alumnus in this population took on a value of one for Age_45, signifying that this sample consisted of individuals older than forty five years of age. Furthermore the outlier took on value so of one in nearly every variable, including leadership. This implies that older people are more likely to be representative of a leadership demographic, than those samples that ranked highly in involved in activities and organizations during the college years.

In other words, those individuals who took on a value of zero for Age_45 but took on a value of one in almost every remaining variable, would register as a non-leader or less a of a leader than someone with a few extra years of age and experience. To correct this, two new variables were created, Age and Age², which were derived the difference between the current year and the alumnus reported calendar year of birth. These are the only non-dummy independent variables in the model. The reasoning behind including the same variable but squared is that it should account for and fix issues of multicollinearity. The final adjusted equation is presented below in Equation 4.3, followed by Table 4.3, which shows the descriptive statistics for these new variables.

$$\begin{aligned}
 LEADERSHIP = & \beta_0 + \beta_1 DIRECTOR + \beta_2 GREEK + \beta_3 VOLUNTEER + \beta_4 STU_ACT + \\
 & \beta_5 ATHLETICS + \beta_6 COMMITTEE + \beta_7 HOCKEY + \beta_8 FOOTBALL + \beta_9 SOCCER + \\
 & \beta_{10} VOLLEYBALL + \beta_{11} AWARDS + \beta_{12} PERFORMANCE + \beta_{13} ABROAD + \beta_{14} GRAD + \\
 & \beta_{15} AGE + \beta_{16} AGE^2
 \end{aligned}$$

Table 4.2
Leadership Development Categorical Variables

Variable	Description	Expected Influence	Min.	Max.	Mean	Standard Deviation	Obs.
Age	Age of alumnus derived from the difference between the current year and alumnus year of birth (YOB).	+*	19	115	48.55	13.77	10054**
Age ²	Indicates the alumnus age risen to the second power. The purpose of this variable is to help eliminate collinearity.	-*	361	13225	2546.23	1477.62	10054**

*Expected influence is that the age variable would have such a positive influence on the results that a new variable, age², needed to be created to counterbalance this effect.

**Data for age that was either unrealistic (i.e. negative-years old) or not provided was omitted from sample.

4.2 Model Results

Equation four represents the Leadership Development model employed in the final regression analysis. The model proposes the leadership is dependent upon seven of the eight social, cultural, and communal demographics established in chapter three, five of the seven sports demographics, and two of the six original trait demographics, with Age and Age² replacing the Age_45 demographic. In other words, in this particular model leadership is dependent upon cultural, communal, social, sport, and trait demographic variables.

The results of the Leadership Development model are presented in Table 4.4, revealing that of the sixteen independent variables only eight of them have statistical

significance. These eight include Director, Greek, Volunteer, Athletics, Awards, Grad and Age² and will be discussed in depth within Chapter V.

Table 4.3
Leadership Development Model Results

Variable	Coefficient/ β -Value (t-statistic)	Variable	Coefficient/ β -Value (t-statistic)
<i>Director</i>	0.244 (6.05)***	<i>Volleyball</i>	-0.082 (-1.14)
<i>Greek</i>	0.045 (4.45)***	<i>Awards</i>	0.089 (2.22)**
<i>Volunteer</i>	0.033 (3.41)***	<i>Performance</i>	0.002 (0.07)
<i>Stu_Act</i>	-0.014 (-0.76)	<i>Abroad</i>	0.031 (1.61)
<i>Athletics</i>	0.032 (2.91)***	<i>Grad</i>	0.169 (7.73)***
<i>Committee</i>	0.053 (1.20)	<i>Age</i>	0.016 (8.75)***
<i>Hockey</i>	-0.028 (-0.62)	<i>Age²</i>	-0.001 (-7.74)***
<i>Football</i>	0.033 (0.95)		
<i>Soccer</i>	0.011 (0.31)	<i>Constant</i>	0.247 (5.22)***

*Significance at the 90% confidence level (t-stat > 1.653)

* Significance at the 95% confidence level (t-stat > 1.960)

***Significance at the 99% confidence level (t-stat > 2.576)

Four other statistics were noted from the results as well. The first is the R-squared value 0.032, followed by an Adjusted R-squared value of 0.029. The next two values came from the Breush-Pagan/Cook-Weisberg test for heteroskedasticity, and White's test for homoskedasticity. The value of the Breuch-Pagan Chi² statistic was 192.48, and the value of Chi² for the White test was 489.04. The implications of these values will be discussed in the ensuing chapter.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The final chapter of this thesis will discuss the results outlined in Chapter IV, linking it back to the literature base established in Chapter II, and comparing the actual β -values against the expected influence discussed in Chapter III. The chapter will shift to a discussion of the implications and limitations of the model and research, followed by suggestions for future research.

5.1 Comprehensive Overview of Results

As Table 5.1 shows, seven of the sixteen variables were significant at the 99% confidence level and one variable that is significant at the 95% confidence level.

Table 5.1
Expected versus Observed Beta (β) Coefficients

Variable	Expected Sign of β -value	Actual Coefficient/ β -Value (t-statistic)	Interpretation of the Coefficient
Constant (y-intercept)	?	0.247 (5.22)***	The predicted probability of alumnus continuing leadership after school is 0.247 if alumnus was not on an external board of directors, was not a member of a fraternity or sorority while attending CC, never volunteered for CC, never participated in any student related activity other than performances and athletics, was not an intercollegiate athlete as a student, did not partake in any service on any CC board or committee, did not play competitive hockey, football, soccer, or volleyball at CC, did not receive any awards from CC, never participated in a student performance, did not study abroad as a student, does not hold a CC MAT, is younger than forty-five years of age. ¹
<i>Director</i>	+	0.244 (6.05)***	A member of an external board of directors is 0.244 more likely to continue leadership participation after college than non-members, ceteris paribus.
<i>Greek</i>	+	0.045 (4.45)***	A member of a fraternity or sorority is 0.045 more likely to continue leadership participation after college than non-members, ceteris paribus.
<i>Volunteer</i>	+	0.033 (3.41)***	Alumni who have ever volunteered for CC are 0.033 more likely to continue leadership participation after college than non-recipients, ceteris paribus.
<i>Stu_Act</i>	?	-0.014 (-0.76)	Alumnus that participated in any student related activity other than performance and athletics is 0.014 less likely to continue leadership participation after college than those alumnus that didn't participate in any student related activity other than performance and athletics, ceteris paribus.
<i>Athletics</i>	+	0.032 (2.91)***	Alumnus that were intercollegiate athletes as students are 0.032 more likely to continue leadership participation after college than students who were not intercollegiate athletes, ceteris paribus.
<i>Committee</i>	+	0.053 (1.20)	Alumnus that partook in any service on any CC board or committee is 0.053 more likely to continue leadership participation after college than alumnus that didn't partake in any service on any CC board or committee, ceteris paribus.
<i>Hockey</i>	+	-0.028 (-0.62)	Alumnus that played competitive hockey at CC is 0.028 <u>less</u> likely to continue leadership participation after college than alumnus that didn't play competitive hockey at CC,

¹ The only way this coefficient could be accurately interpreted was by using the Age_45 dummy variable instead of the categorical variables "Age" and "Age²", since the model violates one of the Gauss-Markov assumptions (the specific violation is illustrated at a later time).

			ceteris paribus.
<i>Football</i>	+	0.033 (0.95)	Alumnus that played competitive football at CC is 0.033 more likely to continue leadership participation after college than alumnus that didn't play competitive football at CC, ceteris paribus.
<i>Soccer</i>	+	0.011 (0.31)	Alumnus that played competitive soccer at CC is 0.011 more likely to continue leadership participation after college than alumnus that didn't play competitive soccer at CC, ceteris paribus.
<i>Volleyball</i>	+	-0.082 (-1.14)	Alumnus that played competitive volleyball at CC is 0.082 <i>less</i> likely to continue leadership participation after college than alumnus that didn't play competitive volleyball at CC, ceteris paribus.
<i>Awards</i>	?	0.089 (2.22)**	A recipient of an award from CC is 0.089 more likely to continue leadership participation after college than non-recipients, ceteris paribus.
<i>Performance</i>	?	0.002 (0.07)	If alumnus ever participated in a student performance he or she is 0.002 more likely to continue leadership participation after college than alumnus that never participated in a student performance, ceteris paribus.
<i>Abroad</i>	?	0.031 (1.61)	Alumnus that studies abroad as students are 0.031 more likely to continue leadership participation after college than alumnus who did not study abroad as students, ceteris paribus.
<i>Grad</i>	?	0.169 (7.73)***	Alumnus holding a CC MAT is 0.169 more likely to continue leadership participation after college than those without a CC MAT, ceteris paribus.
<i>Age</i>	+	0.016 (8.75)***	A one-year gain in age increases the probability by 0.016 that alumnus leadership participation continues after college, ceteris paribus.
<i>Age²</i>	-	-0.001 (-7.74)***	The estimated change in the probability is approximated as $0.016 - 2(0.001)Age^2 = 0.016 - 0.002(Age^2)$. The point when age no longer affects the probability of continued leadership participation after college is $0.016/0.002 = 8$, ceteris paribus. ²

*Significance at the 90% confidence level (t-stat > 1.653)

* Significance at the 95% confidence level (t-stat > 1.960)

***Significance at the 99% confidence level (t-stat > 2.576)

5.2 The Linearity Probability Model: Considerations for a Binary Dependent Variable

² Jeffrey M. Wooldridge, *Econometrics* (India: Cengage Learning, 2009), 201-201.

When a dependence variable takes a value of 1 or 0, such as the Leadership variable in this model, it is categorized as a binary dependent variable. These variables are especially unique because it allows for the use of “multiple regression to explain a qualitative event.”³ When a binary dependent variable is part of a multiple linear regression model, it falls into the classification of being a linear probability model (LPM) “because the response probability is linear in the parameters β .”⁴ In this model, β can measure a change in probability of continued leadership participation after college when an independent variable changes, *ceteris paribus*. The benefits of this model is that it allows one to “estimate the effect of various explanatory variables on qualitative events” under the parameters of an ordinary least squares regression.

One of the limitations of a binary dependent variable is that it causes the LPM to “violate one of the Gauss-Markov assumptions,”⁵ specifically that except in the case “where the probability does not depend on any of the independent variables, there must be heteroskedasticity in a linear probability model,” and that this “does not cause bias in the OLS estimators of the [beta-coefficient]”⁶

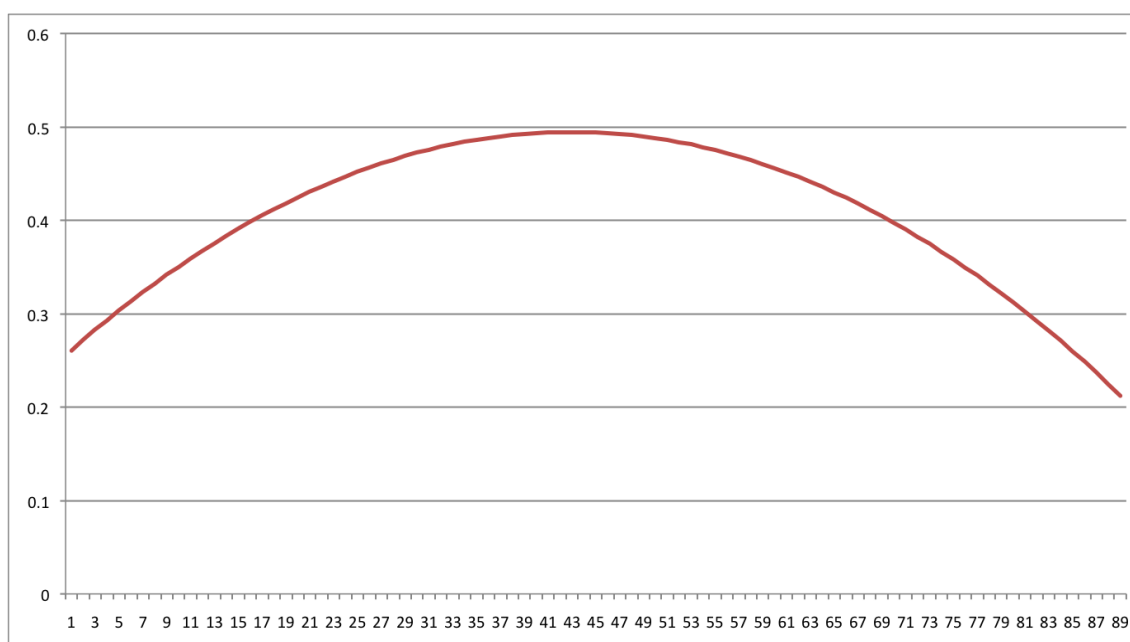
³ Jeffrey M. Wooldridge, *Econometrics* (India: Cengage Learning, 2009), 199.

⁴ Ibid, 200.

⁵ Ibid 202

⁶ Ibid.

Figure 5.1
Leadership Life-Cycle Curve



The estimated change in the probability is approximated as $0.016 - 2(0.001)\text{Age}^2 = 0.016 - 0.002(\text{Age}^2)$. The point when age no longer affects the probability of continued leadership participation after college is $0.016/0.002 = 8$, ceteris paribus.⁷ This is confirmed by the leadership life-cycle curve depicted in Figure 5.1. However, an important implication can be made from the data in this figure, namely that the impact of

⁷ Jeffrey M. Wooldridge, *Econometrics* (India: Cengage Learning, 2009), 201-201.

leadership over the course of a person's life fits a bell shaped curve. The peak whereby leadership is experienced occurs when a person is 43 years of age. After this point, the impact of leadership constantly lessens, until it finally has a negative impact when a person is 83 years of age.

Though Burns may have been right when described leadership as the most widely known and least understood phenomena may in the context of an industrial leadership setting, the growing awareness of a post-industrial era of leadership demand that leadership be studies across larger institutions and diverse populations. Furthermore, The leadership life-cycle and impact of leadership curve adds to the evidence of early adulthood being critical years for leadership development and points out why scholars like Astin and Astin try so hard to educate society about the growing need for competent leaders. The impact of leadership does *not* hold across boundaries of age. While it may be true that age strongly correlates with leadership, if these skills are developed early on in life, it yields more promising results for the future well being of society.

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