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UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

AN EXAMINATION OF CAREER LONGEVITY, CAREER ACHIEVEMENT, AND MACHIAVELLIAN ATTITUDES OF ENGINEERS AND ANALYSTS IN AN INTERNATIONAL ENGINEERING AND COMMUNICATIONS ORGANIZATION

A Dissertation

SUBMITTED TO THE GRADUATE FACULTY

In partial fulfillment of the requirement for the

Degree of

Doctor of Philosophy

By

WILLIAM H. SOUTHWELL, JR.
Norman, Oklahoma
2001

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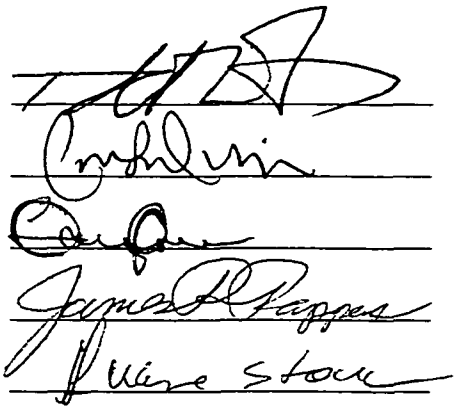
A Dissertation APPROVED FOR THE
DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY STUDIES

BY



DEDICATION

This work is dedicated to my wife Diana, the most unselfish person I have ever known. Any measure of success that I have enjoyed is only an extension of her willingness to put others first. I am fortunate.

ACKNOWLEDGEMENTS

Worthwhile and memorable accomplishments are rarely completed alone. I am indebted to many people who share the credit for the completion of this educational program.

The advisory committee made an educational goal become a reality. Dr. Gray Green, the committee chairperson provided the initial guidance and structure for the program for which I am very appreciative. I am especially grateful to Dr. James Pappas, whose support and encouragement began long before the submission of an application for the doctoral program. Dr. Robert Fox deserves special recognition; he became the committee chairperson and provided superb guidance through the entire research process and dissertation defense. I am fortunate to have completed the work with Dr. Fox, a person worthy of trust; his standard of excellence exemplifies the very best of higher education. I am also indebted to the other members of the committee: Dr. Connie Dillon provided essential insight during the prospectus review to help establish the foundation for a successful defense; Dr. Duane Stock, College of Business, served as the outside committee member, his timely support made the dissertation defense possible.

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ABSTRACT

The purpose of this study was to determine the relationship between the level of Machiavellian attitudes, career longevity, and career achievement of engineers and analysts working in an international engineering and communications organization as measured by the Mach IV Attitude Inventory and a demographic profile of the subjects. The explanation of the relationships between Machiavellian attitudes, career longevity, and career achievement will provide the foundational basis for organization educational and training intervention programs.

An international engineering and communications organization supported the study. Over a six week period, the respondents (N=237) completed and returned a survey containing respondent demographic information and the Mach IV Attitude Inventory. The survey was sent to 388 individuals; 258 surveys were returned resulting in a 66.49% return rate.

Seven hypotheses were tested to investigate the relationship between the dependent variable, Machiavellian attitudes, and the independent variables, career longevity and career achievement. Two of the seven hypotheses were supported suggesting there is a relationship between Machiavellian attitudes and career longevity and there is no relationship between Machiavellian attitudes and career achievement. The relationship between Machiavellian attitudes and career longevity was weak and as such, can not provide the basis for establishing training and educational intervention programs.

The weak findings and lack of findings may be explained in part by the influence of homogenous groups, respondent cohorts, or work environments. Of the explanations offered, respondent cohorts is the most plausible.

There are implications for research and practice related to the explanations. The results of this study provide researchers with important information concerning the Machiavellian construct and the nature of the relationship between Machiavellian attitudes, career longevity, and career achievement.

CHAPTER I

Introduction

The impact of poor interpersonal relationships and the resulting unresolved conflict is substantial to organizations and people. These relationships can dramatically influence morale, motivation, job satisfaction, and stress (Urs Bender, 1996), which may further affect organizational productivity. In addition, poor interpersonal relationships influence the costs of doing business, since the time and effort that should be directed to production is often devoted to interpersonal issues. In extreme cases, employers dismiss employees in order to end the conflict. In other instances employees quit their jobs to avoid the continuation of unresolved problems in the workplace. In either case, the personnel turnover directly affects productivity and operating costs. Recruiting and replacing one managerial employee could cost $108,000 (Fitz-Enz, 1997).

Machiavellian behavior is one source of poor interpersonal relationships. This behavior is related to power, control, and the manipulation of people by an individual for personal or organizational gain. Individuals that use this behavior may resort to a number of undesirable tactics to achieve their goals. While Machiavellian behavior may be seen as goal oriented, it can harm organizations, and it can hurt people.

One way to counter the negative aspects of Machiavellian behavior may be through the application of educational and training programs developed for specific groups of employees and organizations. These programs may not be successful without an understanding of Machiavellian attitudes and how they relate both to individuals as they progress through their careers and to organizations. That is the focus of this study.

Over the past 40 years, researchers have been able to differentiate individuals with a high tendency toward Machiavellian behavior from individuals with a low tendency toward Machiavellian behavior (Christie & Geis, 1970). The division between high and low Machiavellianism is determined by the level of their tendency to control and manipulate others in order to achieve organization goals (Hamilton, 1990).

High Machiavellian personalities are subtle or discreet in their methods, but they act deliberately to manipulate others and situations to enhance their own interests (Christie & Geis, 1970, as reported in Berliner & Calfee, 1996). In specific situations, high Machiavellian individuals possess the potential to deceive, lie, and even compromise morality, in order to achieve their goals. Friendship and the loyalty of others are not always the primary considerations of high Machiavellians. In some instances, the opportunity to achieve some advantage or personal gain may become more important than friendship and loyalty. These characteristics can provide an advantage for the high Machiavellian, depending on the situation and the other people involved (Tosi, Rizzo & Carroll, 1995).

Detachment is another trait of the high Machiavellian personality. They are able to detach themselves from the consequences of their own actions, and they can view others as objects to be manipulated. High Machiavellian people will also attempt to initiate and control situations with low reactive temperament and the absence of hostility even in emotionally tense situations (Berliner & Calfee, 1996).

Persons with low Machiavellian orientation are thought to be susceptible to influence and persuasion by others (Berliner & Calfee, 1996). In contrast to the high Machiavellian, the low Machiavellian usually works well in a structured environment.

They are susceptible to social influence and persuasion, and they are attentive to others and to social conventions (Berliner & Calfee, 1996).

O'Hair and Cody (1997) found that Machiavellianism has received considerable attention over the past twenty years and has been the object of numerous studies; however, a consistent pattern of association between Machiavellianism and other constructs has not been developed. This inconsistency supports the original findings of Christie & Geis (1970) which suggested that high Machiavellians adapt to changing situations by modifying their interpersonal tactics and displaying the behaviors that would help them achieve their goal.

In order to investigate how Machiavellian attitudes relate to individuals and their careers, this study defines careers chronologically in terms of career longevity, specifying the number of years that the subjects have worked. The approach is based, in part, on the work of Donald Super (Super, 1957, as reported in Smart, 1998) who proposed career stage theory, composed of four stages: exploration, establishment, maintenance, and decline.

During the exploration stage, individuals identify and learn how their interests and capabilities fit into occupations. Toward the end of this stage, individuals enter occupations. During the establishment stage, individuals are involved in career advancement and growth. Concurrently, they are concerned with securing a stable work and personal life. The third stage, maintenance, is a period of little change, in which individuals remain on track in their career. Maintaining status is a primary focus of individuals at this stage. Disengagement is the period in which people begin to transition

out of the workforce and develop a self-image independent of their career (Super, 1957, as reported in Smart, 1998).

Theory and research indicate that perceptions change during the course of a career. Smart (1998) examined the relationship between career stage theory and work attitudes and found that a variable of job satisfaction followed a pattern from low, to high, to low again at different career stages. This finding is related to the subject's perceptions of career concerns and age instead of their psychological fit. A chronological approach will allow an examination of the subjects at various points in their careers instead of confining the investigation to a particular age or stage.

This study will also encompass career achievement, which is based on reality and individual perceptions; it contains two sub-variables: occupation and hierarchical position. Occupation refers to the subject's chosen career, e.g., engineering, business. The subject's hierarchical position is in reference to his or her actual position, e.g., manager, director, within the organization. These sub-variables were selected for the study because of their potential to present unique situations over the course of a career and that affect behavior and are likely to be influenced by career longevity.

Statement of the Problem

Many organizations suffer from the effects of Machiavellian behavior. This shrewd, deliberate manipulation of people for personal interest is reliant on situations and interpersonal relationships that occur continuously over the course of a career. The relationship between the level of Machiavellian attitudes, career longevity, and career achievement is unknown and must be examined to provide individual and organizational

profiles that are essential for the development of effective educational and training intervention programs.

Purpose

The purpose of this study is to determine the relationship between the level of Machiavellian attitudes, career longevity, and career achievement of engineers and analysts working in an international engineering and communications organization, as measured through the Mach IV Attitude Inventory and a demographic profile of the subjects. Further, the explanations of the relationship between Machiavellian attitudes, career longevity, and career achievement will provide the foundational basis for organizational educational and training intervention programs.

Research Questions

In order to determine the relationship between Machiavellian orientation, career longevity, and career achievement, the following research questions will be examined concerning engineers and analysts working in an international engineering and communications organization:

1. What is the relationship of career longevity of engineers and analysts and their level of Machiavellianism?
2. Are the Machiavellian attitudes of engineers and analysts employed by the organization over the past 5-10 years significantly different from engineers and analysts employed less than 5 years with the organization?
3. Are Machiavellian attitudes different between engineers and analysts based on longevity?

4. How does career longevity, education, and the career path of engineers and analysts relate to Machiavellian attitudes?
5. Are the Machiavellian attitudes of individuals assigned to leadership and management positions different from other salaried individuals that are not assigned to leadership and management positions?

Significance of the Study

Individuals engaging in deceitful tactics and the overt manipulation of other people are often counterproductive and costly to organizations. Changes to such behavior are not possible without an effective study revealing the information that is necessary for action. Many studies have been conducted over the past 30 years. Unfortunately, many of them fail to provide any evidence of Machiavellianism. Other studies reveal the presence of Machiavellian attitudes, but they are far from generalizable. This study is different in that it examines the relationship between Machiavellian attitudes, career achievement, and career longevity. There are no known previous studies that examine these relationships; therefore, this study is significant for a number of reasons.

First, a study revealing the presence of Machiavellian orientation associated with career achievement and career longevity would provide the essential background for educational and training programs. The overriding goal of training and educational professionals is to help individuals by preparing them with new skills or a new career. Neither is possible without the accurate assessment of organizations and individuals. This study could provide the foundation for new assessment techniques to improve organizations and interpersonal relationships. Progressive assessment techniques could

ultimately lead to intervention programs, eliminating the negative aspects of Machiavellian orientation.

A comprehensive examination of how Machiavellian orientation, career achievement, and career longevity are related will also aid in the development of educational intervention programs targeted to specific groups at the appropriate point in their career. Interventions could be tailored to incorporate specific issues such as career path, work assignment, relationships, and behavior modification.

This research could also provide the foundational basis for identifying and training potential candidates for leadership roles within organizations. Some individuals believe that Machiavellian principles have utility in modern management (Jay, 1967, as reported in Hamilton, 1990). A significant finding could be generalizable to other organizations and could lead to the development of management selection profiles.

Finally, this study is also intended to identify differences in Machiavellian attitudes within the organization by examining groups of individuals at the beginning, midpoint, and end or transition point of their careers. Although the design does not incorporate a longitudinal model, significant differences in career groups based on career longevity may suggest that Machiavellian attitudes change over the course of a career. Such information is valuable for the development of training and other interventions, and it is also important to the understanding of human behavior and continued research related to education programs.

Assumptions

This study will be limited to engineers and analysts working in a high technology engineering and communications organization with business interests primarily focused

in the aviation and communications industry. The findings of the study pertain only to the engineers, analysts, and managers participating in the study. For the purposes of the study, career longevity will be defined chronologically by the number of years a person has worked. The demographic information will also capture the number of years a person has worked in a particular occupation.

Career achievement is composed of two variables: the hierarchical position of the subjects, and their occupational status. Machiavellian attitudes will be determined by the Mach IV Attitude Inventory, developed by Christie & Geis (1970); the necessary demographic information pertaining to the subjects can be obtained by surveying the subjects. The career longevity and career achievement information is factual with little room for interpretation. Extensive research has been conducted on the Mach IV Attitude Inventory; it is a reliable instrument suitable for determining Machiavellian attitudes.

Hypotheses

The interaction between changing situations, perceptions, and adaptive behavior provides the stimulus for the research, in that behavior is a response to a situation. The relationship between career achievement and career longevity is unique, and it presents situations that produce various behaviors. The corresponding behaviors that occur over the span of a career are likely to be associated with the level of Machiavellian attitudes.

In order to determine the relationship between Machiavellian attitudes, career longevity, and career achievement, the following hypotheses will be tested concerning engineers and analysts working in an international engineering and communications organization:

1. The Machiavellian attitude of engineers and analysts at the midpoint of their career will be significantly higher than that of engineers and analysts who have worked more than 30 years.
2. As career longevity increases, the Machiavellian attitude of engineers and analysts will increase from career entry until the midpoint of the career span, then decrease as the career declines.
3. Machiavellian attitudes will be significantly lower for engineers at each career year point than it will be for analysts at the same point.
4. The Machiavellian attitudes of project leaders will be higher at each career year point than those of other engineers and analysts at the same career year point.
5. The Machiavellian attitudes of engineers and analysts who worked primarily for the current employer during the last 5-10 years will be significantly lower than those of other engineers and analysts who have worked less than 5 years in the organization.
6. Machiavellian attitudes will be significantly different among professional staff members depending on occupational field, career path, and longevity.
7. The Machiavellian attitudes of managers and senior staff will be significantly different from those of other salaried individuals in the organization.

Definition of Terms

Analyst: an individual classified as an analyst in the organization, possessing as a minimum, one year of experience and a bachelors degree, or the equivalent of a bachelors degree based on a combination of academic qualifications and experience.

Career: lifetime pursuit of occupations and professions. For the purposes of this study the term career is regarded as an individual's work experience from post-high school until retirement and is not limited to a particular occupation or profession.

Career Achievement: the position and status people attain during a career such as hierarchical position and occupation. The position and status may be either perceived or actual.

Career Longevity: the number of years a person has worked as a full time employee since leaving high school.

Conventional Morality: a view that lying, cheating, and deceit may be common, but that such behavior is reprehensible (Christie & Geis, 1970).

Engineer: an individual classified as an engineer in the organization, possessing as a minimum, one year of experience and a bachelor of science degree in an engineering field.

Engineering Manager: an engineer with the responsibility to manage complex technical projects through subordinate project leaders. Engineering managers have the authority to supervise project leaders as well as other salaried and non-salaried individuals in order to achieve project and corporate goals.

Mach IV Attitude Inventory: the Mach IV Scale developed to scale Machiavellian attitudes (Christie & Geis, 1970). The inventory contains 20 statements that are scored with a Likert scale to indicate the respondent's orientation towards views of human nature, conventional morality, and interpersonal tactics. Overall scores from the inventory range from 40 to 160, with a neutral point of 100. Individuals scoring over 100 are categorized "high Machs;" those scoring under 100 are categorized as "low Machs."

Machiavellian Attitude: the degree to which a person displays Machiavellian characteristics as measured by the Mach IV or V Attitude Inventory.

Machiavellianism: personal style characterized in varying degrees by the deliberate manipulation of others for personal reward or organizational goals. The Machiavel intentionally structures situations in order to control. Individuals with this behavior can remain "cool," low reactive, and detached in order to have a powerful advantage. The strong Machiavellian has little regard for the goals of others (Berliner & Calfee, 1996) and may, in some cases, have little regard for principles, conventional morality, loyalty, and trust (Tosi, Rizzo, & Carrol, 1996).

Machiavellian Tactics: the methods and behaviors of high Machiavellian personalities that are used to manipulate others or situations for their own personal gain. The term is used interchangeably with tactics in the study.

Machiavellian Views: the perceptions of high Machiavellians regarding how other people behave. Used interchangeably with views in the study; Christie & Geis (1970) referred to "views of human nature" as one of the three emerging areas from the "Mach II" instrument used in their early research.

Manager: an individual with the authority to supervise program and engineering managers, project leaders, and other salaried and non-salaried individuals in order to meet corporate and program goals. Managers may also have responsibilities for proposal development, business development, and marketing.

Program Manager: an individual with the responsibility to accomplish the management of multiple projects through subordinate project leaders. Program managers have the

authority to supervise project leaders, as well as other salaried and non-salaried individuals in order to achieve project and corporate goals.

Project Leader: salaried individuals specifically assigned to manage one or more projects with the authority to obligate financial, physical, and human resources. Engineers and analysts grade 10 and above may be assigned as project leaders.

Salaried Individuals: people who receive biweekly compensation based on a standard 40-hour workweek, educational level, and experience.

Senior Managers: individuals with the authority to supervise subordinate managers, program and engineering managers, project leaders, and other salaried and non-salaried individuals in order to meet corporate and program goals. Senior Managers may also have responsibilities for marketing, proposal development, and business development.

Organization of Study

This study is organized in five chapters. Chapter 1 introduces the study, presenting the practical and theoretical problem. It contains the problem statement, research questions, and the hypotheses that will guide the research effort. The first chapter also presents the important implications of the work by establishing the significance of the research. The chapter closes with the assumptions, cites the limitations, and defines key words that explain the constructs and supporting concepts.

Chapter 2 contains the literature review that established the theoretical framework for the study. It also explains the relationship between the dependent and independent variables, and provides an overview of experimental studies in Machiavellian behavior to support this research.

Chapter 3 details the methods used in the study explaining the multivariate analytic approach that is necessary to support the research questions. The Mach IV Attitude Inventory, which is the single instrument used in the study, is also presented in this chapter. Specific information on the sample population is also given.

Chapter 4 contains the results of the study, answers the research questions, and confirms the hypotheses.

Chapter 5 contains the conclusions that can be drawn from the results of the research and the recommendations for further research.

CHAPTER II

Review Of Literature

In the following review, three essential variables are addressed to support this study: Machiavellianism, career achievement, and career longevity.

Machiavellianism

Niccolo Machiavelli was born in Florence, Italy, in 1469, a time described as the "Golden Age" of Florence (Bull, 1975, as cited in Williams, 1995). He was educated by Paola da Ronciglione, a humanist, and later by Marcello Adrinani, who was later appointed to First Chancellor (Skinner, 1981). It is possible he was able to secure his first political appointment through his teacher. In 1498, he became the Second Chancellor of the Florentine Republic. Machavelli was an adequate politician and made a series of diplomatic missions; he lost his position when the Medici came to power in 1512 (Hamilton, 1990). He was subsequently accused of involvement in a conspiracy against the new government and was imprisoned and tortured. After a while, Machavelli was exonerated and released from prison; he then began his writing career (Leeden, 1999).

Machiavelli viewed writing as the means to convince the Medici that he was worthy of reappointment. Thus, his writings reflected a strong political ideology he had formed based on his education and his observations when he was a Chancellor. The Prince and The Discourses were among works he wrote to establish himself and to provide the notoriety he needed to be returned to a position in the government (Calhoon, 1969, as reported in Hamilton, 1990). However, despite his efforts, he was never re-appointed to a position in the government.

The Prince is about power, manipulation, and government. It has been described as repulsive because of the acknowledgement of how things are rather than what they should be in political life. Machiavelli was a noteworthy observer of the political system of the times, and it is speculated that he based much of The Prince on observations of two individuals capable of employing the use of power to accomplish their goals: Casare Borgia and Julius II.

Borgia was a cardinal who supported Cardinal Giuliano della Rovere, who took the name of Julius II. Borgia wanted an alliance with Florence, and Machavelli was sent to him as the Florentine envoy. For a period of about eight months, Machavelli was able to see first hand how Borgia achieved his goals, as he fought, captured, and killed. Machiavelli saw him as a man without scruples, who kept his ideas to himself until he confidently put them into action. He also thought Julius II was noteworthy because of his quick ability to recapture the Papal States. Julius II died in 1513, one year before Machiavelli left government service (Skinner, 1981, as reported in Williams, 1995).

Machiavelli wrote The Discourses primarily to explain his views on republics, since he had already described the principalities; as it turned out, it presented the princely and republican points of view (Williams, 1995). Although there are major differences between the writings, Machiavelli has become identified more with The Prince and the negative view it presented. This is understandable considering some of his observations, which are presented in the following topical examples:

Power:

> Men ought to be well treated or crushed, because they can avenge themselves of lighter injuries, of more serious ones they cannot; therefore the injury that is to be

done to a man ought to be of such a kind that one does not stand in fear of revenge (Jay, 1968, p. 6).

Achievement:

> Every prince must seek to maintain his state and obtain glory for himself, but if the goals are to be obtained, no ruler can possibly possess or fully practise [sic] all the qualities that are usually considered good (Skinner, 1981, p. 37).

Conventional morality:

> A wise prince will be guided above all by the dictates of necessity in order to hold his position, he must acquire the power to be not good, and understand when to use it and when not to use it (Skinner, 1981, p.38).

The moral flexibility of a prince:

> [a prince would] seek to present himself as majestically as possible doing extraordinary things and keeping them always in suspense and wonder, watching for the outcome (Skinner, 1981, p. 41).

It is likely that most people have an unfavorable view of Machiavellianism since the behavior is consistent with deceitful tactics, lying, and a general disregard for others. Many do not embrace the behavior, but like Machiavelli, they accept the reality of the characteristic.

Jay (1968) views this ideology as the basis of a practical methodology to work within organizations. He determined Machiavellian methods were practical, stating: "By a judicious use of the Machiavelli method we can learn to recognize which situation and problems are common to large organizations, and see the different results that tend to be brought about by different courses of action" (p. 28).

According to Leeden (1999), Machiavelli actually scorned tyrants. As a realist, he understood leaders could, at times, react to situations and violate their own principles and perhaps their standards for the common good. However, Machiavelli thought little of tyrants who were merely opportunists, dominating others for their own personal gain. He expected leaders to be virtuous, promoting the common good rather than their personal goals.

Scharfstein (1995) proposes that viewing Machiavellianism as a problem is misconceived. He views it as a human characteristic rather than a human condition; therefore, he proposes that it can not be cured or solved in some other manner.

In other instances, research findings present a dichotomy. Pandey & Singh (1986) conducted an experiment to examine the effects of manipulative behavior on the perceptions of a subject who was neither using manipulation, nor was the target of the behavior. The study revealed non-manipulative people were more attractive than Machiavellian and ingratiating people. Machiavellian people were also rated less on ability than ingratiating people, and non-manipulative people were judged higher on ability than Machiavellian and ingratiating people. However, the study also revealed that the person who is successful was viewed more positively than those who are not successful, even if manipulative tactics were used. Behavior that can be seen as both positive and negative might be a source of conflict in the organization.

Although there is some support for the use or acceptance of the foundational aspects of Machiavellian principles, other researchers have developed profiles that reveal different facets of Machiavellian behavior that should be considered by training and development professionals, researchers, and managers.

Modern research on Machiavellian behavior began with Richard Christie and others when he was a Fellow at the Center for Advanced Studies in the Behavioral Sciences from 1954-1955. The work continued in earnest from 1959 to 1969 and culminated with the publication of Studies in Machiavellianism (Christie & Geis, 1970). This research produced the scaled instruments, studies, and conclusions that are consistently used and referenced in Machiavellian research.

To guide the initial research, Richard Christie, Robert Agger, and Frank Pinner (Christie & Geis, 1970) developed the abstract characteristics they thought an individual would possess to be effective in controlling others. Four characteristics emerged:

1. A relative lack of affect in interpersonal relationships. The researchers concluded that manipulation would be enhanced if people were viewed as objects. This detachment would reduce the potential for empathy and identifying with the person. Forming a relationship or involvement could hinder the process of getting people to do things they do not want to do.
2. A lack of concern with conventional morality. In this instance the researchers understood that conventional morality is difficult to define. He was referring to what most people thought of – lying, cheating, and other forms of deceit - with the idea that they find such things to be wrong. According to Christie, manipulators are not concerned with the morality of interactions with others; they are more interested in the utility of their actions.
3. A lack of gross psychopathology. The researcher thought the manipulator would make errors in evaluating others if any emotional needs affected the manipulator's perceptions.

4. Low ideological commitment. The manipulator was seen as a person that would work on immediate issues rather than on goals that are considered long-range and more ideological.

As part of the research effort, Christie & Geis (1970) developed the Mach IV and Mach V attitude inventories to measure Machiavellian orientation. Two behavior orientations emerged from the application of the instruments and the associated studies: the high Machiavellian, known as a high "Mach," and the low Machiavellian, identified as a low "Mach." There are distinct differences in high and low Mach orientations. The high Mach is resistant to social influence, has an orientation to cognitions, and initiates and controls structure. The low Mach is susceptible to social influence, has an orientation to people, and embraces structure.

From 1959 to 1969, the researchers conducted 38 studies to determine "what high and low Machs do, and how they go about doing it" (p.285). From the research Christie & Geis (1970) concluded that under experimental conditions high Machs, in contrast to low Machs, would produce a greater number and variety of manipulations, originate more manipulations, lie more, and enjoy manipulation to a higher degree. In addition, they also found:

> High Machs manipulate more, win more, are persuaded less, persuade others more, and otherwise differ significantly from low Machs as predicted in situations in which subjects interact face to face with others, when the situation provides latitude for improvisation and the subject must initiate responses as he can or will, and in situations in which affective involvement with details irrelevant to winning distract low Machs (p. 312).

As the studies progressed, Christie & Geis (1970) concluded that the degree of emotional detachment is the overriding determinant for either high or low scores on the Mach inventory. High Machs have greater emotional detachment whereas low Machs are the opposite. These characteristics are related to the behavior differences when the three situational factors, face-to-face interaction, the latitude for improvisation, and arousing irrelevant affect, are present.

The three situational factors are central to the behavior of both high and low Machs. When the situations are present, high Machs tend to assess the situation and remain detached and unaffected, particularly by other people. Further, low Machs can size up the situation, but they are susceptible to becoming involved in the personal interactions. That involvement affects their decisions. Referring to this behavior of low Machs, Christie & Geis propose "it is not so much that the high Machs win, as much as the low Machs lose" (p. 358).

If the presence of the situational parameters is important, then their absence also has a profound effect. Research (Christie & Geis; 1970: Vleeming, 1979) suggests that when the three situations (and in some instances, one or more of the situations) are not present in experimental conditions, the outcomes may be strongly affected.

Christie & Geis analyzed the details of the 38 studies, containing 50 experiments, to determine the influence of the three situational conditions. The experiments were examined to determine the type and number of situations present in the study, and their relationship to the outcome of the experiment. The analysis also recorded how many times the high Machs won or lost, based on the outcome of the study. Figure 1 contains a consolidation of the findings.

Figure 1

Outcomes of High and Low Machs

Outcomes of High and Low Machs by numbers of situational parameters present

	Number of parameters present				
Number of cases which:	0	1	2	3	
High Machs win	0	5	7	13	25
High Machs lose	11	8	5	1	25
Total	11	13	12	14	50

X2 = 22.28, p <.001

Christie & Geis. Table XV-2, 1970, p. 294

The findings are remarkable. In 13 of 14 instances in which all three of the situations were recorded, the behavior of high Machs was significantly different from low Machs. The reverse is also true. There were 11 instances in which the researchers could not detect the presence of any of the situations, and the corresponding outcomes revealed no significant advantage for the high Machs. As the number of situations decrease, so does the ability of the high Machs to "win;" specifically, 12 of the experiments contained two of the situational factors, and high Machs only "won" 7 times. In addition, in 13 other cases in which one situational factor was noted, the high Machs won five times. Christie cautions the reader not to generalize the findings since it is possible to have all the situational factors and not have a significant difference between the behaviors of high and low Machs. Likewise, he also stressed that situations are related to outcomes and should be considered by researchers.

These findings relating situations and behavior are consistent with other studies. Nine years after the publication of Studies in Machiavellianism, some 34 additional

studies had been completed on various constructs and affective behaviors using the inventories and the research results pioneered by Christie & Geis. Vleeming (1979) conducted a review of these studies and concluded, in general, that there were significant differences between high and low Machiavellian adults and children. Only eight of the 34 studies found one or more of the three situational parameters; five supported the findings of Christie & Geis, the findings of the remaining three studies were "obscure." He also noted that the design of many of the studies did not incorporate the three situational parameters. This review underscores the importance of incorporating the three situational factors, face to face interaction, latitude for improvisation, and irrelevant affect, into research designs, since the absence of the factors could affect the outcome of Machiavellian behavior.

Research clearly indicates that Machiavellianism is related to situations and circumstances. Therefore, it is likely that Machiavellian orientation is linked to individual career circumstances and situations.

Career Achievement

Career achievement may be affected by many circumstances during the course of a career, such as an individual's position, career path, and work environment. These factors are unique and may affect individual behavior differently.

Organizations contain various degrees of structure according to personal management styles and organizational design. As noted, one of the original findings was related to perceptions of structure. Christie & Geis (1970) reported that high Machs would tend to work best in unstructured situations in which a certain amount of improvisation was the norm. Low Machs are completely different. They perform best in

structured situations. Based on this premise, any attempt to place either high or low Machs in opposite structures would probably yield poor results; in fact, placing high Machs in structured environments may result in game playing by the high Mach, causing morale problems.

Hollon (1983) also found that work situations were related to Machiavellianism. Specifically, high Machiavellianism could be identified with low job satisfaction, high job tension, high role ambiguity, perceptions of low participation in decision making, and low job involvement. In a later study (1990), he also found that Machiavellianism is related to managers' perceptions of their job environment. Higher scores on Machiavellianism were positively correlated to managerial role conflict and ambiguity in their environment. Higher scores were negatively correlated with low initiation of job structure and usage of consideration by the immediate superior.

Research conducted by Gable, Hollon, & Dangello (1991) was consistent with the findings of Christie & Geis: Machiavellianism is influenced by the structure of the work environment. The researchers found that, overall, the job performance of high Mach managers is not higher than others, but it is more effective when their superior has a loose structure that provides an opportunity for improvisation.

Additional research supports the idea that situations affect the behavior of both high and low Machs. Grams and Rogers (1989) found that high Machs are more flexible and adaptive than other personality types. When the motivation to succeed increased during personal interactions, deceitful, manipulative tactics were replaced with assertive tactics.

Research also suggests a relationship between Machiavellian behavior, the work environment, and perceived level of stress. Fortin (1980) examined school principals' levels of stress and Machiavellian behavior involving four stress factors: role, conflict, task, and management. The results indicated that task and management stress factors do have a relationship with Machiavellian behavior. Principals with a Machiavellian "tendency" could experience stress in the performance of their administrative and management duties more than principals with a lower Machiavellian orientation. There was no relationship between Machiavellian behavior and principals related to role and conflict factors. Consistent with previous research, Fortin suggests the relationship between high Machs and higher stress levels might be related to a highly structured environment. Placing high Machs in situations in which they merely perform defined tasks could account for the higher levels of stress.

In a similar study of an educational environment, Volp and Willower (1977) investigated the relationship between school superintendents' Machiavellian orientation, self-perceptions of influence, and school board members' and other administrators' perceptions of school superintendents' influence. The results of the study suggested there was no correlation between the superintendents' Machiavellian attitude, their self-perceptions of influence, and the perceptions of others regarding the influence of superintendents. School board members attributed less influence to the superintendents than the superintendents assigned to themselves. The superintendents scored low on the Machiavellian scale (M=73.29); the researchers suggested the lower scores might be related to similarities in background, training, and experience. They also proposed that superintendent positions may not provide the latitude for "personal orientations or role

enactments." Citing Carlson (1962) they also address issues of expectation and external locus of control, contending the "superintendent's orientation toward the tasks of the position is governed by mutual expectations about the role which he is expected to play and forces external in respect to the individual" (p. 260).

Mudrack (1989) contends that Machiavellianism may be associated with external locus of control. His research suggests that actions such as manipulation and deception may indicate an individual's approach to having some influence in a hostile environment that hampers positive internal approaches.

Graham (1996) examined the relationship between Machiavellian orientation and project managers performance to determine whether high Machiavellian project managers performed better than low Machiavellian managers. Using the Mach IV instrument on the study, Graham was able to determine there was not a significant difference between line managers and project managers. Using pay as a means to measure effectiveness, Graham did not find a relationship between Machiavellianism and job performance. The research did not clearly determine the subjects' perceptions of whether they worked under conditions of high or low structure. Citing Christie & Geis (1970), the researcher states: "High Mach managers are more suited to detached service where they can wheel and deal to the advantage of themselves and the organisation" [sic] (p. 70). He also concluded the project was in effect detached service, "because the purpose of the project structure is to create a separate organisational entity" (p. 70).

The issue of whether Machiavellianism is affected by the work environment is unsettled. Hollon (1983), in his research, could not determine if managers became

Machiavellian because of stress, role ambiguity, and low participation in decision making, or whether Machiavellian management caused these traits.

The entry of Machiavellianism into the workforce is also related to the issue of cause and effect. McLean and Jones (1992) conducted research to determine whether business students were more Machiavellian than non-business students and also whether there were significant differences in Machiavellianism among business students related to academic business field. The Mach IV inventory was administered to 206 third year university students including 91 business students, 55 science students, and 60 arts students. The study results provided some evidence that business students were more Machiavellian than non-business students: there was a significant difference between business students and science students, but there was not a significant difference between business and arts students. Machiavellianism between business students grouped by academic field was not statistically different. The researchers did not resolve whether the students were reacting to an image they have of business people, or the attitudes were the result of a socialization process within the business school.

Career Longevity

Situations in the work environment have an impact on behavior. Strelau, Farley, & Gale (1985) contend that behavior is related to both the person, the situation, and possibly the person-situation interaction. These situations are present throughout a career and most likely have a different effect on people over the course of a career.

Career development has been defined as "a continuous process involving the individual's participation in her or his own professional growth and development" (McMahon & Merman, 1996). According to Smart (1998), Super's career stage theory

(1957) and Levinson, Darrow, Klein, Levinson, and McKee's (1978) life span theory are popular in career stage research. Interest in the two theories prompted research dedicated to examining the effects of age and career stage on individual performance and attitudes. Super's conceptual model is perhaps the most advanced and highly developed with applications for work and career issues. (Osipow, 1996, as reported in Smart, 1998).

Career stages can be defined either chronologically or psychologically. Super (1957, as reported in Smart & Peterson, 1994) developed a four-stage model of career development: exploration, establishment, maintenance, and decline. The first stage, exploration, is where the individual is focused on mapping out and starting the vocation. The worker then moves on to the second stage, establishment; this is the point or career stage where career goals are achieved. Super used maintenance to describe the third stage. Maintenance is the psychological phase where the worker realizes that he or she has begun to age and experiences pressures from competitive younger workers. This is also the phase where the worker relates more to past achievements and accomplishments rather than forging ahead with new challenges. The worker then transitions into the decline stage; this is the phase where the worker begins to let go of occupational issues, reduces vocational goals, or takes a new interest in external activities

Super's theory is unique in that it bases career stages on the individual's "psychological fit" rather than age. This approach considers the workers circumstances and perceptions, which are related to vocational goals and self-concept (Smart & Peterson 1994).

Super's theories also contain a recycling aspect. Super theorized that career stages did not always occur sequentially in a precise chronological model; his research suggests that people cycle and recycle through the various career stages throughout their lifetimes.

Research indicates some support for Super's model of career development in men (Smart, 1998). In addition, in a study of the career stages of Australian professional women, Smart (1998) found Super's model to be a "useful framework for understanding women's career development" (p. 379). However, operationally defining career stages can be problematic. As noted, Super contended that career stages are best defined by the psychological fit of the individual rather than by chronological age. The psychological approach might be more appropriate operationally than the use of chronological age since the dynamics of the modern workforce contain people entering delayed careers, second careers, and career recycling (Super & Knasel, 1981, as reported in Smart & Peterson, 1996). Conversely, Smart and Peterson (1996) appropriately highlight the difficulty of defining an individual's position in the life cycle in view of non-traditional workers, stating: "Neither organizational tenure nor chronological age are uniform indexes of career state in Super's theory" (p. 244).

The importance of longevity as an independent variable is strengthened by the relationship to career theory. Operationally defining by the workers longevity – how long they have worked, and how long they have worked in the organization - is not intended to empirically test Super's career stage theory. Nevertheless, it is intended to acknowledge career theory, the existence of career stages, career stage recycling, and psychological fit. The modern workforce is dynamic rather than static, therefore, defining the workforce by longevity recognizes the dynamics within a career and removes the problematic

methodology of fitting subjects into a specific career stage or chronological age-career state relationship.

Career longevity would also appear to be a more effective methodology for examining Machiavellian attitudes over time, when one considers the mixed results of previous studies of chronological age and Machiavellian attitudes. Christie & Geis (1968) noticed that age appeared to be a factor in Machiavellian studies. Noting that age might be related to voting patterns and values in other studies, portions of the Mach IV and V attitude inventories were used in a nationwide study of 1,482 adults. Based on the study results, the researchers reported a significant difference between age and Machiavellian scores, the most notable difference being between people over the age of 40 and those who were younger.

Mudrack (1989) also investigated the relationship between age and Mach scores in a sample of 252 adults. The age of the respondents was 17-66 years (M=30.9, SD=10.0). The participants completed the Mach IV Attitude Inventory (M=69.43, SD=12.78) and were divided into five age groups: 17-21 (n=46), 22-24 (n=52), 25-29 (n=48), 30-37(n=52), 38-66(n=54). The analysis revealed a significant difference between the oldest group (m=64.09, SD12.53) and the two youngest groups (M=73.17, SD=12.00)(M=72.46, SD12.77).

In a sharp contrast to these investigations, a study conducted by Vitell, Lumpkin, and Rawwas (1991) suggests that the elderly may have high Machiavellian tendencies. The study examined the ethical beliefs of elderly consumers and involved measures of three constructs: Machiavellianism, predominant ethical perspective, and beliefs regarding specific consumer situations. The Mach IV Attitude Inventory was used to

measure the Machiavellianism of 394 adults, age 60-79 (M=68). The study revealed that the respondents attitude score (M=90.9) was well above the mean of many Machiavellian studies.

The use of longevity in this study is also similar to a study conducted by Christie & Geis (1970) to determine the degree of Machiavellian orientation among preparatory school students in the fifth through twelfth grades. The study examined the change in Machiavellian orientation for each ascending grade level to determine whether children became more Machiavellian as they progressed from 5-6 grade through high school. Grade levels were used in the study instead of age, and the results did produce a profile for the school. In light of all these studies, longevity appears to be the most appropriate method, short of a longitudinal model, to collect relevant information on a group with dissimilar work experience.

Summary

Behavior resulting from situations and circumstances is the central theme forming the basis of the relationship between Machiavellian attitudes, career achievement, and career longevity. Because situations and circumstances are dynamic, it is likely that career achievement and longevity, which change, affect the Machiavellian attitude of people at various points in their career.

Research conducted over the last 40 years clearly supports the presence of what has become known as Machiavellian behavior. Further, the research indicates distinct differences in high and low Machiavellian behavior. Characteristic high Machs, in contrast to low Machs, manipulate situations and others for their own purposes; they are adept, flexible and detached, view people as objects, are able to improvise, and are most

likely amoral. Unfortunately, the high Machiavellian may resort to tactics such as lying, deceit, and other generally unacceptable behaviors in order to achieve success.

The research also suggests that Machiavellian behavior emerges in response to situations and circumstances including those that occur in both experimental and other types of research. Three situational factors, face to face interaction, the latitude for improvisation, and irrelevant affect should be considered in research designs. Failure to incorporate the situational parameters may only produce obscure research results (Vleeming, 1979).

This study acknowledges the reality of Machiavellian orientation but proposes that it is affected by the situations and circumstances and related to career achievement and longevity. This relationship of variables will present organizational attitude patterns that are vital to understanding and constructing an organizational Machiavellian model. Training and development professionals may eventually use such a model to advance the removal of the negative aspects while retaining the positive attributes of Machiavellian behavior.

CHAPTER III

Methods

This study was designed to examine the relationship between Machiavellian orientation, career achievement, and career longevity of engineers and analysts in an international engineering and communications organization. This chapter describes the sample, variables, procedures, and methodology used to collect and analyze the data, and a complete description of the instruments used in the study.

Survey Design

Mail and telephone surveys are acceptable alternatives when face-to-face interviews are not practical for reasons of economy, subject availability, and a large population is required. A mail survey using the Total Design Method was the most effective method to conduct this study (Dillman, 1978). The time and availability of the subjects did not permit face-to-face interviews and the subjects were located at five geographically separated locations across the contiguous United States. In addition, the subjects were not able to complete the survey on company time, so the data collection was in a format that could be completed at the subject's convenience. The mail survey was also the most effective method to include all of the sample required for the study; it most likely reduced the potential for social desirability bias to a higher degree than face-to-face and telephone interviews (Dillman, 1978).

The mail survey also provided the proper format for the Mach IV Attitude Inventory, an essential element of the study. The Mach IV recorded a quantifiable level of Machiavellian attitude in each subject that could not be obtained through observation or other methods. It is a pencil and paper instrument, and it is the only known method to

scale and record the level of an individual's Machiavellian attitude. The Mach IV has been administered successfully in a mail format to support many studies.

Sample

The research sample was obtained from the research division of an international engineering organization. A convenience sample of engineers and analysts was obtained from each of the division's major locations. Including both engineers and analysts was essential to the purpose of the study, which was to understand relationships as the foundational basis for organizational education and training intervention programs. Further, the sample technique included each engineer and salaried analyst at the selected locations to secure a sample of both engineers and analysts that had responsibilities such as project leader, management, and senior management.

Engineers in the organization represented most of the main engineering disciplines including electrical, mechanical, aerospace, software, and to a small degree, chemical engineering. The engineers' longevity ranged from entry level through over 35 years of work experience.

Analysts represented a wide range of fields and disciplines, and although there were rare exceptions, analysts did not have engineering skills or credentials. Many analysts had credentials, experience, and skills that included business administration, logistics, aerospace maintenance engineering, and technical management.

Instruments

The Mach IV Attitude Inventory as well as demographic and career profile information was incorporated into the mail survey to collect the information required to

address the research hypotheses. The Mach IV Attitude Inventory was specifically developed to record and scale Machiavellian orientation.

Robinson and Shaver (1973) recorded that the Mach IV development originated from seventy-one items extracted from two of Machiavelli's works, The Prince and The Discourses. The researchers grouped the items into three categories: interpersonal tactics, views of human nature, and generalized morality. Sixty items correlated at the .05 level with the sum of all items. The final version of the inventory contained 20 items; the top 10 related items worded in the Machiavellian direction, and the 10 most highly related items worded in the opposite direction.

The Mach IV employs a standard Likert scale on each item where a score of 7 equals strongly agree, 4 is neutral, and 1 is scored as strongly disagree. The researchers determined that a constant of 20 would be added to the total score of each subject to establish a neutral point of 100. A score of 140 is the highest possible score that can be produced from the instrument; 40 is the lowest possible score. Individuals scoring over 100 are categorized as high Machs; those scoring under 100 are categorized as low Machs. The inventory has a split-half reliability of .79 (Christie & Geis, 1970). Robertson and Shaver (1973) reported an average item-test correlation of .38, with little difference among the three categories of items.

The design did not incorporate the three situational factors: face-to-face interaction, the latitude for improvisation, and arousing irrelevant affect. It would have been difficult to include the factors in this study since it was not experimental. Christie & Geis (1970) and Vleeming (1979), underscored the importance of incorporating the factors in experimental studies. The three factors are more appropriate for experimental

research, where independent variables can be manipulated and their effect on dependent variables observed.

Considering that the presence of the three situational factors was important, this study included questions to determine if two of the three situational factors were present in the subjects' work environment. Question thirteen was used to determine perceptions of face to face interaction, and question fourteen was intended to identify the subject's latitude for improvisation. These two questions did not provide explicit evidence that the two situational parameters were present. However, they did provide the researcher with an indication of the subjects' perceptions of the existence of the two factors. which could have been important to the outcome of the study.

There were no major threats to either the external or internal validity of this study. The demographic and career profile information was plain, and with the exception of two questions, contained little room for interpretation. The organization was supportive, stable, and conservative, and the subjects were salaried professionals with a high degree of maturity. Based on other studies, the Mach IV was appropriate for the subjects involved in the study.

Study Hypotheses

The survey provided the data that was required to test the following hypotheses:

Hypothesis One: The Machiavellian attitude of engineers and analysts at the midpoint of their career will be significantly higher than that of engineers and analysts that have worked more than 30 years.

Hypothesis Two: As career longevity increases, the Machiavellian attitude of engineers and analysts will increase from career entry until the midpoint of the career span, then decrease as the career declines.

Hypothesis Three: Machiavellian attitudes will be significantly lower for engineers at each career year point than it will be for analysts at the same point.

Hypothesis Four: The Machiavellian attitudes of project leaders will be higher at each career year point than those of other engineers and analysts at the same career year point.

Hypothesis Five: The Machiavellian attitudes of engineers and analysts who worked for the current employer during the last 5-10 years will be significantly lower than those of other engineers and analysts who have worked less than five years in the organization.

Hypothesis Six: Machiavellian attitudes will be significantly different among professional staff members depending on occupational field, career path, and longevity.

Hypothesis Seven: The Machiavellian attitudes of managers and senior staff will be significantly different from those of other salaried individuals in the organization.

Variables

This study contained three variables: Machiavellian Attitude, Career Achievement, and Career Longevity. Machiavellian attitude was the dependent variable. It was expressed as a numerical value for each subject and was obtained from the subjects' score on the Mach IV Attitude Inventory. The score was regarded as the degree to which an individual had or displayed Machiavellian characteristics. Scores from the inventory constituted an ordinal scale, although, for explanation, individual and group

scores could have been artificially categorized as either high or low Machiavellian, based on the mean and dividing score of 100.

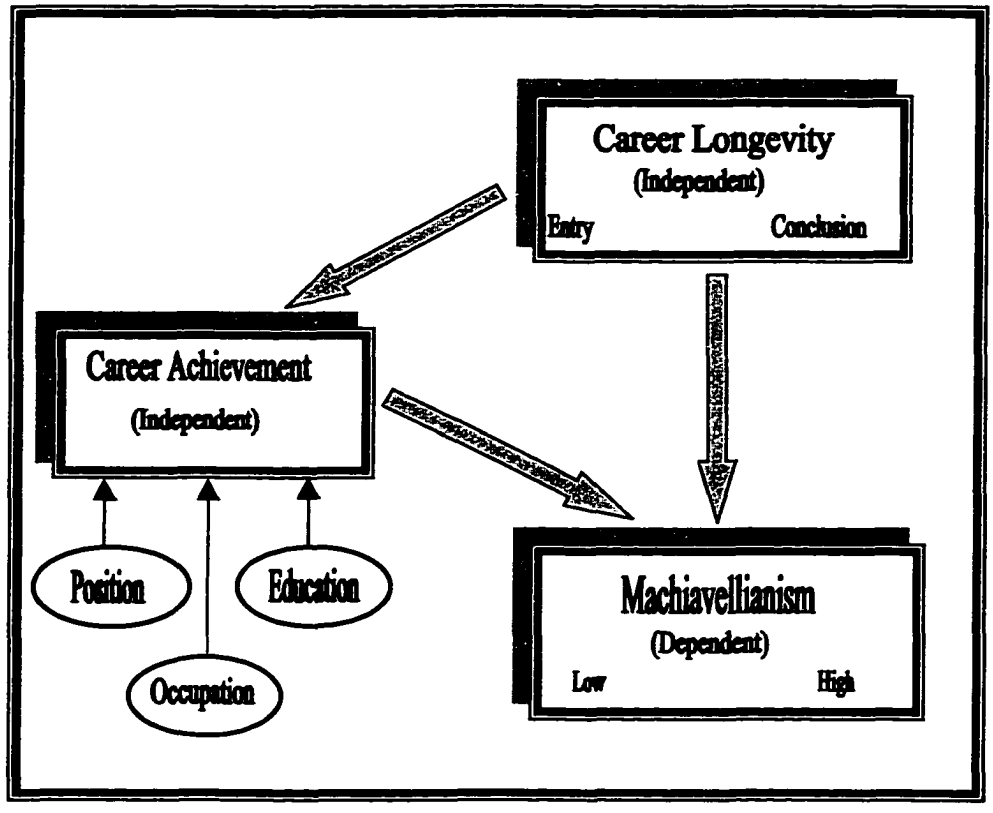
Career achievement was an independent variable. It was directly related to the subjects' position and status and included their hierarchical position, career path, assigned position, and education. This variable contains nominal- and ordinal-scaled information obtained from the survey.

Career longevity was the second independent variable. It profiled the subjects' career chronologically, by specifying the number of adult working years. Career longevity was associated with career development theory developed by Super (Smart & Peterson, 1994). Researchers including Super in 1957, Miller and Form in 1951, and Havighurst in 1964 (as reported in Crites, 1969) presented theories on vocational adjustment that were aligned with the worker's age and linked to an individual's work life. Clearly, although career theory has been revised a number of times, careers or work life have a beginning and end that involve psychological and situational challenges affecting behavior, vocational changes, and other career choices. Therefore, career longevity expressed chronologically was a logical method of depicting the work life at a particular point.

Figure 2 depicts the relationships among the independent and dependent variables in this study.

Figure 2

Relationship of Study Variables



Various statistical techniques were used to complete this study, including descriptive and inferential statistics, and correlational methods. Each hypothesis was tested using a specific method of analysis. Tables 1-7 contain examples as to how the data were examined and the results presented.

Table 1

Elements of Hypothesis One

Hypothesis one:

The Machiavellian attitude of engineers and analysts at the midpoint of their career will be significantly higher than that of engineers and analysts who have worked more than 30 years.

Group	Independent Variable	Dependent Variable
B	X1	Mach IV score
C	X2	Mach IV score

Legend:
B= Engineers and analysts @ mid-career
C= Engineers and analysts @ 30 + work years
X1= Work years @ 20-25 years career longevity
X2= Work years @ 30 + years career longevity

Table 2
Elements of Hypothesis Two

Hypothesis two:

As career longevity increases, the Machiavellian attitude of engineers and analysts will increase from career entry until the midpoint of the career span, then decrease as the career declines.

Group	Independent Variable	Dependent Variable
A	X1	Mach IV score
B	X2	Mach IV score
C	X2	Mach IV score

Legend:
A= engineers and analysts with 0-19 work force years
B= Engineers and analysts with 20-29 work force years
C= Engineers and analysts with 30+ work force years
X1= 0-19 career longevity years
X2= 20-29 career longevity years
X3= 30 + career longevity years

Table 3
Elements of Hypothesis Three

Hypothesis three: Machiavellian attitudes will be significantly lower for engineers at each career year point than it will be for analysts at the same point.		
Group	Independent Variable	Dependent Variable
D	X1	Mach IV score
E	X1	Mach IV score
Legend: D= Engineers E= Analysts X1= Career Longevity		

Table 4
Elements of Hypothesis Four

Hypothesis four: The Machiavellian attitudes of project leaders will be higher at each career year point than those of other engineers and analysts at the same career year point.		
Group	Independent Variable	Dependent Variable
F	X1	Mach IV score
G	X1	Mach IV score
Legend: F= Project leaders G= Non-project leaders, engineers and analysts X1= Career Longevity		

Table 5
Elements of Hypothesis Five

Hypothesis five:

The Machiavellian attitudes of engineers and analysts who worked primarily for the current employer during the last 5 –10 years will be significantly lower than those of other engineers and analysts who have worked less than 5 years in the organization.

Group	Independent Variable	Dependent Variable
H	X1	Mach IV score
I	X2	Mach IV score

Legend:
H= Engineers and Analysts
I= Engineers and Analysts
X1= Career Achievement – 5 or more years with the current employer
X2= Career Achievement – Less than 5 years with current employer

Table 6
Elements of Hypothesis Six

Hypothesis six:

Machiavellian attitudes will be significantly different among professional staff members depending on occupational field, career path, and longevity.

Group	Independent Variable	Dependent Variable
L	X1	Mach IV score
	X2	
	X3	
M	X4	Mach IV score
	X2	
	X3	
N	X5	Mach IV score
	X2	
	X3	
O	X6	Mach IV score
	X2	
	X3	
P	X7	Mach IV score
	X2	
	X3	
Q	X8	Mach IV score
	X2	
	X3	

Legend:
X1, X4 through X8= Occupational field
X2= Career Path
X3= Longevity

Table 7
Elements of Hypothesis Seven

Hypothesis seven: The Machiavellian attitudes of managers and senior staff will be significantly different from other salaried engineers and analysts in the organization.		
Group	Independent Variable	Dependent Variable
R	X1	Mach IV score
S	X2	Mach IV score
Legend: R= Senior staff S= Less than senior staff X1= Career Achievement – senior staff X2= Career Achievement – less than senior staff, engineers and analysts		

The results of the study were not generalizable to other populations outside the organization. Although the study pertains primarily to engineers and analysts working for a small, medium-to high-tech company, any generalization should be restricted to a similar company. In order to maximize the generalization, the sample included a good cross section of the different engineering fields. Any generalization outside the sample will need to be on a case-by-case basis.

Procedures and Ethics

The researcher had written permission and support from the appropriate senior managers in the organization to conduct the study. Participation in the study was voluntary and anonymous; the respondents participating in the study were guaranteed anonymity regarding the results of the study. The organization assisted the researcher in the initial distribution of the research information to the participants. The researcher

works in the organization and had immediate access to managers to ensure help and cooperation.

The research subjects received a package containing the following items: a letter from the researcher explaining the importance of the study, conditions related to the study, a survey approved by the University of Oklahoma Institutional Review Board, detailed information concerning the survey, and instructions concerning the completion and return of all materials.

The subjects also received a letter from a senior manager in the sponsoring organization explaining the organization's position regarding subject anonymity, support for the project, and encouragement for maximum participation in the research. In addition, follow-up contact with the subjects was made to encourage participation in the study.

Timeline

The research took approximately 18 weeks to complete as indicated:

Distribution and collection of the survey	7 weeks
Data entry	3 weeks
Data analysis	4 weeks
Documentation of findings	4 weeks

CHAPTER IV

Results

Introduction

This chapter presents an extensive review and discussion of the research results. It contains an overview of the data collection procedures, respondent demographic data, and information related to the work environment obtained from the mail survey. The demographic and work environment information is displayed in a descriptive statistical format involving frequencies, means, and standard deviations. The results of the Mach IV Attitude Inventory, the basis of the dependent variable used extensively in the study, is also presented.

This chapter also addresses five research questions providing the framework for the study, which lead to seven hypotheses. Analytical techniques including analysis of variance and independent samples t-tests were used to investigate each hypothesis. The analytical results are presented in statements and supporting tables. The chapter concludes with a summary and addresses both hypotheses that were supported and those that were not supported as a result of the data analyses.

A mail survey was developed and used to address the five research questions guiding the study. The survey, composed of 34 questions and statements, had two parts. Part I, Demographic Information, contains 12 demographic categories or questions and two work environment questions. Part II, Worker Perceptions, is the Mach IV Attitude Inventory, which contains 20 statements. The University of Oklahoma Institutional Review Board approved the survey and all associated data collection procedures.

The survey was distributed within the research division of an international engineering and communications organization with the approval of appropriate senior managers. It was sent to 388 individuals at six operational locations in the contiguous United States.

The respondents returned 258 surveys, which resulted in a 66.49% return rate. An initial analysis revealed that 237 surveys were usable. A summary of the primary demographic data is contained in tables 8 and 9.

Demographic Summary

The respondents were 45 females (19.0%) and 192 males (81.0%). The age of the group ranged from 22 to 76, with a mean age of 46.10. The number of years in the workforce since leaving high school also attests to the age of the subjects, ranging from 2 to 52 years with a 27.10 mean and 10.29 standard deviation.

The study involved four personnel classifications: engineers, analysts, managers, and overhead staff. Analysts (n=126) comprised 53.2% of the group, followed by engineers (n=66, 27.8%), managers (n=35, 14.8%), and overhead staff (n=9, 3.8%). In addition to individual personnel classifications, the study also recorded the primary role assigned to each individual to identify the subjects' primary work assignments, which may be different from their classification. For example, any number of people may be assigned as a project leader, but the organization does not have a project leader classification. The responses to role information revealed that assignment as an analyst (n=88, 37.1%) was the primary role of most of the subjects. Project leaders accounted for 50 (21.1%) role assignments, followed by engineers (n=47, 19.8%). Overhead roles

(n=12) accounted for 5.1% of the subjects; the group also contained three categories of managers, totaling 39 individuals, 16.5% of the group.

The subjects have backgrounds in three major career areas, also described as career paths in the study, and twenty-nine minor career paths. Most of the respondents (n=79, 33.3%) selected engineering as their career path. Technical management was the career path of 55 subjects (23.2%), followed by logistics (n=48, 20.3%). The remaining 54 subjects (22.8%) recorded 29 different career paths, which were grouped in an "other" category for the purposes of the study.

A large number of participants (45.1%) indicated that they had previous experience with the current employer as a project leader, a major responsibility within the organization. More than one-half of the respondents (n=129, 54.4%) indicated that they had never been assigned project leader duties. At the time of the study, 70 subjects (29.5%) were working in a project leader position.

The data revealed that the subjects were well educated; 39.2% (n= 93) had bachelor's degrees and 38.8% (n=92) of the group had advanced degrees; one person had a terminal degree. Two-year degrees had been awarded to 14 subjects (5.9%), and 34 individuals (14.3%) indicated that they had some college but no degree.

The subjects' tenure with the current employer was unusually short, ranging from less than one year to 23 years, with a mean of 4.4026 years and a standard deviation of 4.3898. Most of the subjects (n=157, 66.5%) had been with the organization less than 5 years; in addition, one-half (n=118, 50.0%) had been with the organization 2.5 or less years. The data also suggested that many of the subjects (52.7%) have spent a major

portion of their working years in other organizations and had qualified for retirement benefits or similar types of compensation.

Work Environment Summary

The subjects also reported that they had a high degree of interaction with other people. An overwhelming group (n=234, 98.7%) indicated that they had face to face contact with other people in order to do their work. Concerning their work environment, 206 subjects (86.9%) indicated they had the freedom to make their own decisions concerning their work.

Table 8.
Demographic and Work Environment Information Part I

	N	Percent
Female	45	19.0
Male	192	81.0
Engineers	66	27.8
Analysts	126	53.2
Managers	35	14.8
Overhead Staff	9	3.8
Role		
Analysts	88	37.1
Project Leaders	50	21.1
Engineers	47	19.8
Career Path		
Engineering	79	33.3
Technical Management	55	23.2
Logistics	48	20.3
Other	54	22.8
Project Leader Experience		
Yes	107	45.1
No	129	54.4
Current Project Leader		
Yes	70	29.5
No	167	70.5
Education		
AAS	14	5.9
BS	93	39.2
MS	92	38.8
Doctorate	1	.4
Some, No Degree	34	14.3

Table 9.
Demographic and Work Environment Information Part II

	N	Mean	SD
Age	237	46.101	9.93
Workforce Years	229	27.10	10.29
Years Current Employer	236	4.4626	4.3898

Mach IV Attitude Inventory Summary

The second part of the survey encompassed the Mach IV Attitude Inventory containing 20 statements, survey items 15-34. It is the source for each subject's Machiavellian score, the dependent variable in the study. The inventory, described in chapter three, is a 20-statement instrument employing a Likert scale. The scale contains six categories from strongly agree to strongly disagree. Ten of the questions are worded so that positive responses indicate a positive tendency towards Machiavellian attitudes; and, the other ten questions are worded so that positive responses indicate a negative orientation towards Machiavellian tendencies. The scoring is reversed on the non-Machiavellian questions so that disagreement with questions in the Machiavellian direction and agreement in the opposite direction produces a low score. Agreement with questions in the Machiavellian direction and disagreement with questions in the opposite direction produces a high score.

The Likert scale for the Mach IV inventory ranged from 1, strongly agree to 6, strongly disagree, which were entered into the survey data file. The 1-6 scores were recoded into Mach IV scoring format, taking into account the 10 questions with descending scores 7-1, and the 10 questions with ascending 1-7 scores. A constant score of 20 was added to each raw score, consistent with the design of the instrument, to establish a neutral or mean of 100. As administered, the Mach IV tabulated scores can range from a low of 40 to a high of 160 with a mean of 100.

From a group of 237 subjects, the Machiavellian scores ranged from 48.00 to 116.00 with a mean of 78.6540 and a standard deviation of 12.6326. Only ten respondents, 4.2 % of the group, attained scores higher than the Mach IV mean of 100.

Data Analysis Results

To begin an examination of the relationship between career longevity and Machiavellianism, a Pearson R correlation was completed to determine the presence and strength of a relationship. The correlation statistic -.198 indicated the presence of a negative relationship between the variables, although the results were weak and may not be meaningful.

With some evidence of a relationship between workforce years and Mach IV scores, the analysis of data was directed to the relationship of Machiavellianism between engineers and analysts, a major emphasis of the study. An independent samples t-test was employed to compare the Mach IV scores of engineers and analysts, which produced the results depicted in table 10.

When one looks at the means the two groups are almost identical: engineers have a mean of 79.9242 and a SD of 11.9542 standard deviation, while the mean for analysts is 79.1032 with a 13.2778 standard deviation, which is not significant t(190)=.421ns. The presence of Machiavellianism revealed in the Pearson R correlation is not readily apparent from the comparison of analysts and engineers.

Table 10

Mach IV Comparison Engineers & Analysts

Group Statistics					t test for Equality of Means		
Class 2		N	Mean	Std. Deviation	T	df	Sig. (2 tailed)
Mach Score	Engineers	66	79.9242	11.9542	.421	190	.674
	Analysts	126	79.1032	13.2778			

In order to adequately address the research questions further and test the associated hypotheses, several statistical techniques were used to examined the dependent

variable, Machiavellian attitude, and the main independent variables, career longevity and career achievement. The first series of techniques examined the relationship of Machiavellian attitudes and career longevity among engineers and analysts to address research question one, and hypotheses one, two, and four.

Research question one:

What is the relationship of career longevity of engineers and analysts and their level of Machiavellianism?

Hypothesis one

The Machiavellian attitude of engineers and analysts at the midpoint of their career will be significantly higher than that of engineers and analysts who have worked more than 30 years.

Hypothesis two

As career longevity increases, the Machiavellian attitudes of engineers and analysts will increase from career entry until the midpoint of the career span, then decrease at the career declines.

Hypothesis four

The Machiavellian attitudes of project leaders will be higher at each career year point than those of other engineers and analysts at the same career year point.

An independent samples t-test was used to test hypothesis one, and examine the effects of career longevity at mid-career (20-25 years) and late career, which was established as 30 + years.

In this case, the Machiavellian attitudes of engineers and analysts was higher at the mid-career point (M=80.5106) than during the later years of a career (M=76.3143),

but the difference was not significant t(115)=1.666, ns. Therefore, hypothesis one is not supported. Table 11 contains the statistical results.

Table 11

Hypothesis One, Mid-Career & Late Career

Group Statistics					t-test for Equality of Means		
	Workforce Yr 6	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Mach Score	20-25 yr. mid	47	80.5106	13.4809	1.666	115	.098
	30-52 yr. late	70	76.3143	13.2769			

Hypothesis two was investigated through a one-way analysis of variance (ANOVA) to determine the changes in Machiavellian attitudes over the course of a career, based on three career points: entry, mid-career, and late career. The details of the one-way ANOVA are depicted in tables 12-14.

The ANOVA revealed a significant difference between group means, $F(2,183)=3.815, p<.05$. Tukey post-hoc tests were used to evaluate the differences in means. The significant difference was between the entry group (M=83.0513) and the late group M=73.3143), a -6.7370 mean difference, p=.021. The results suggest that although the Machiavellian attitudes of employees may decline somewhat from entry until mid-career, the difference is not significant. However, Machiavellian attitudes were lower during late career, and the difference was significant in comparison to entry career employees. Based on the results, hypothesis two is supported.

Table 12

Descriptives, Hypothesis Two, Career Points-Machscore

	N	Mean	Std Deviation
2-19 Years	39	83.0513	12.5655
20-29 Years	77	80.1299	12.1594
30-52 Years	70	76.3143	13.2769
Total	186	79.3065	12.8664

Table 13

ANOVA, Hypothesis Two, Career Yrs & Machiavellian Score

			Df	F	Sig.
Between Groups	(Combined)		2	3.815	.024
	Linear Term	Unweighted	1	7.076	.009
		Weighted	1	7.576	.007
		Deviation	1	.054	.816
Within Groups			183		
Total			185		

Table 14.
Multiple Comparisons, Hypothesis Two
Dependent variable: mach score
Tukey HSD

(I) workyear2	(J) workyear2	Mean Difference (I-J)	Std. Error	Sig.
2-19 entry	20-29 mid	2.9214	2.4911	.470
	30-52 late	6.7370*	2.5327	.021
20-29 mid	2-19 mid	-2.9214	2.4911	.470
	30-52 late	3.8156	2.0932	.162
30-52 late	2-19 entry	-6.7370*	2.5327	.021
	20-29 mid	-3.8156	2.0932	.162

Hypothesis four, the final hypothesis related to research question one, investigates the relationship between engineers and analysts, and project leaders by comparing the Machiavellian attitudes of engineers and analysts to the Machiavellian attitudes of project leaders. This analysis was concerned with changes in Machiavellianism that may be influenced by organizational roles, in this case, project leaders. Accordingly, the Machiavellian scores of project leaders who were also classified as engineers and analysts, were compared to the Machiavellian scores of engineers and analysts who are not assigned as project leaders.

Four independent t-tests were used to analyze the differences between project leaders and engineers/analysts using four ten-year intervals. As a matter of practicality,

ten-year intervals were used instead of each career point, which would have encompassed 40 or more tests representing each career year. In addition, the intervals did not include career years 1-10 since the sample did not contain any project leaders with less than ten years of work experience. The results of the four tests were as follows:

Group 1, 11-20 career years, engineers and analysts (M=80.6667), project leaders (M=86.5556), t(31)= -1.213,ns.

Group 2, 21-30 career years, engineers and analysts (M=79.4286), project leaders (M=82.7619), t(68)= -1.086,ns.

Group 3, 31-40 career years, engineers and analysts (M=75.3226), project leaders (M=77.9286), t(43)= -.679,ns.

Group 4, 41-52 career years, engineers and analysts (M=72.5455), project leaders (M=75.0000), t(14)= -.333,ns.

The differences between engineers-analysts and project leaders were not significant. consequently, hypothesis four is not supported. Table 15 contains the results.

Table 15.
Hypothesis Four, Project Leaders-Engineers & Analysts

Project Leaders			Engineers and Analysts		
Career year Group	N	Mean	Career year Group	N	Mean
11-20 Career Years	9	86.5556	11-20 Career Years	24	80.6667
21-30 Career Years	21	82.7619	21-30 Career years	49	79.4286
31-40 Career Years	14	77.9286	31-40 Career years	31	75.3226
41-52 Career Years	5	75.6000	41-52 Career Years	11	72.5455

The second part of the series regarding engineers and analysts addressed research question two and hypothesis five by investigating differences in Machiavellian attitudes based on organizational longevity as stated:

Research Question Two:

Are the Machiavellian attitudes of engineers and analysts employed by the organization over the past 5-10 years significantly different from those of engineers and analysts employed less than 5 years with the organization?

Hypothesis five:

The Machiavellian attitudes of engineers and analysts who worked primarily for the current employer during the last 5-10 years will be significantly lower than those of other engineers and analysts who have worked less than 5 years with the organization.

This analysis was concerned with the potential of changes in Machiavellian attitudes that may be characteristic of organizational longevity, specifically among individuals with less than five years with the organization and those with more than five years of organizational longevity. An independent samples t-test was conducted with engineers and analysts employed less than five years with the organization (n=137) and those with more than five years (n=54) with the current organization. In order to make the analysis more robust, all of the respondents with more than five years with the organization were included. According to the results of the t-test, engineers and analysts with less than five years organizational longevity have a mean of 78.4526 and a SD of 12.7221 and those with more than five years longevity possess an mean of 81.7593 with a SD of 12.9730 t(189)=-1.609, ns. The findings were not significant, therefore hypothesis five is not supported. The results of the analysis are depicted in table 16.

Table 16

Hypothesis Five

Group Statistics				t-test for Equality of Means		
Employed yr. 3	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Mach Score Less five yr.	137	78.4526	12.7221	-1.609	189	.109
More than five yrs.	54	81.7593	12.9730			

The final series of analyses concerned with engineers and analysts was related to research question three and hypothesis three as presented:

Research question three:

Are Machiavellian attitudes different between engineers and analysts based on longevity?

Hypothesis three:

Machiavellian attitudes will be significantly lower for engineers at each career year point than it will be for analysts at the same point.

This analysis examined Machiavellian differences between engineers and analysts related to longevity and to organizational role. Five independent samples t-tests were used to examine the differences at specific ten-year intervals. Again, as a matter of practicality, ten-year career intervals were used to classify the data instead of each career point as described by the exact years, which would have required 40 or more tests to represent each career year. The results of the tests were as follows:

Group 1, 1-10 career years, engineers (M=83.00), analysts (M=81.00)

t(13)=.267,ns.

Group 2, 11-20 career years, engineers (M=84.0667), analysts (M=80.1000)

t(33)=.934,ns.

Group 3, 21-30 career years, engineers (M=83.2727), analysts (M=79.7347) t(69)=.1.124,ns.

Group 4, 31-40 career years, engineers (M=64.4444), analysts (M=78.5789) t(45)=-3.575,p<.01

Group 5, 41-52 career years, engineers (M=76.0000), analysts (M=74.1818) t(16)=.228,ns.

The results of the t-tests suggest that with one exception there is no difference in the Machiavellian tendencies of engineers and analysts. However, the analysis of group 4, 31-40 career years, revealed that engineers have a lower level of Machiavellianism than analysts, t(45)=-3.575,p<.01. Therefore, hypothesis three is supported. Table 17 contains the results.

Table 17

Hypothesis Three

Group Statistics				t-test for Equality of Means		
Class 2 1-10 yr. Interval	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Mach Score Engineers	10	83.00	11.4310	.267	13	.794
Analysts	5	81.00	17.7764			
Class 2, 11-20 yr. Interval	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Mach Score Engineers	15	84.0667	13.6720	.934	33	.357
Analysts	20	80.1000	11.4336			
Class 2, 21-30 yr. Interval	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Mach Score Engineers	22	83.2727	8.5923	1.124	69	.265
Analysts	49	79.7347	13.5597			
Class 2, 31-40 yr. Interval	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Mach Score Engineers	9	64.4444	6.4248	-3.575	45	.001
Analysts	38	78.5789	11.3772			
Class 2, 41-52 yr. Interval	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Mach Score Engineers	7	76.0000	9.1652	.228	16	.823
Analysts	11	74.1818	19.6307			

The third part of the study engaged the entire sample to examine the relationship between Machiavellian attitudes and professional career path, addressing research question four and hypothesis six as stated:

Research Question Four:

How does career longevity, education, and the career path of engineers and analysts relate to Machiavellian attitudes?

Hypothesis Six:

Machiavellian attitudes will be significantly different among professional staff members depending on occupational field, career path, and longevity.

This analysis was concerned with career achievement, examining the relationship between an individual's career path and Machiavellian attitudes; occupational field and longevity had already been examined extensively in previous analyses. The survey produced four career path categories: engineering, technical management, logistics and other. The "other" category encompassed 29 career paths, which, examined alone, would not support a comprehensive analysis; therefore, they were grouped into one category. Two one-way analysis of variance procedures were completed; the first procedure contained the "other" category and the second did not contain the category. The results of the analysis are contained in tables 18-21.

The first ANOVA procedure examined engineers and analysts (n=191)using four career path categories: engineering (n=70), logistics (n=36), technical management (n=46), and other (n=39). The ANOVA indicates that there is no significant difference between the groups $F(3,187)=1.386$,ns.

The second ANOVA procedure also examined engineers and analysts (n=152) and the same relationship between their career paths and Machiavellian attitudes. However, this procedure contained only three career paths: engineering (n=70), logistics (n=36), and technical management (n=46). The ANOVA revealed no significant difference between the groups $F(2,149)=.901$,ns.

The results of the two ANOVA procedures did not reveal a relationship between professional career paths and Machiavellian attitudes; therefore, hypothesis six is not supported.

First procedure containing the "other" category

Table 18.

Descriptives Hypothesis Six

	N	Mean	Std Deviation
Engineering	70	81.2286	12.4797
Logistics	36	80.6944	13.8375
Technical Mgt.	46	78.0000	13.1183
Other	39	76.6410	11.9791
Total	191	79.4136	12.8404

Table 19.

ANOVA Hypothesis Six

			Df	F	Sig.
Between Groups	(Combined)		3	1.386	.248
	Linear Term	Unweighted	1	4.042	.046
		Weighted	1	3.963	.048
		Deviation	2	.097	.907
Within Groups			187		
Total			190		

Second procedure without the "other" category

Table 20.

Descriptives, Hypothesis Six

	N	Mean	Std Deviation
Engineering	70	81.2286	12.4797
Logistics	36	80.6944	13.8375
Technical Mgt.	46	78.0000	13.1183
Total	152	80.1250	12.9943

Table 21.
ANOVA, Hypothesis Six

			Df	F	Sig.
Between Groups	(Combined)		2	.901	.408
	Linear Term	Unweighted	1	1.711	.193
		Weighted	1	1.614	.206
		Deviation	1	.188	.666
Within Groups			149		
Total			151		

The last analysis was directed to Machiavellian attitude and career achievement and was tested by investigating the differences in Machiavellian attitudes among individuals assigned to leadership and management positions and other salaried individuals. All individuals in the study had experienced some aspect of career achievement. The statistical analysis answered research question five and hypothesis seven as stated:

Research Question Five:

Are the Machiavellian attitudes of individuals assigned to leadership and management positions different from those of other salaried individuals who are not assigned to leadership positions?

Hypothesis Seven:

The Machiavellian attitudes of mangers and senior staff will be significantly different from those of other salaried engineers and analysts in the organization.

An independent samples t-test procedure involving engineers and analysts (n=192), and managers and senior overhead staff (n=44) was used to determine differences in Machiavellian attitudes. The results contained in Table 22, suggest that there is no significant difference in Machiavellian attitudes between the two groups that

may be attributed to the leadership or managerial role of the individuals, t(234)=1.868,ns. Hypothesis seven is not supported.

Table 22.

Hypothesis Seven

Group Statistics				t-test for Equality of Means		
Class 3	N	Mean	Std. Deviation	t	df	Sig. (2 tailed)
Mach Score Engineers & Analysts	192	79.3854	12.8127	1.868	234	.063
Mgrs. & Overhead Staff	44	75.4545	11.5667			

Statement of Findings

The purpose of the study was to examine relationships between career longevity, career achievement, and Machiavellian attitudes. Further, the outcome of this, and most likely other studies, could provide the foundation for training and education intervention programs.

The results of the study suggest a relationship between Machiavellian attitudes and longevity. The Pearson R correlation completed early in the analyses indicated the presence of a weak -.198 correlation. However, a t-test used to isolate any differences in Machiavellian attitudes between engineers and analysts was not significant. The study proceeded with additional tests to examine the relationship between Machiavellian orientation, career longevity, and career achievement in order to address the seven study hypotheses as presented in the following paragraphs.

Hypothesis one: The Machiavellian attitude of engineers and analysts at the midpoint of their career will be significantly higher than that of engineers and analysts who have worked more than 30 years. This hypothesis is not supported according to the t-test results, t(115)=1.666,ns.

Hypothesis two: As career longevity increases, the Machiavellian attitudes of engineers and analysts will increase from career entry until the midpoint of the career span, then decrease during the latter part of the career. This hypothesis is supported. The ANOVA indicated a significant difference between group means $F(2,183)=3.815, p<.05$; Tukey post-hoc tests revealed a 6.7370 mean difference between the entry group and the late group $p=.021$.

Hypothesis three: Machiavellian attitudes will be significantly lower for engineers at each career year point than it will be for analysts at the same point. This hypothesis is supported. Five independent samples t-tests were used to examine Machiavellian attitude differences at ten-year career intervals (table 17). Four of the tests revealed no significant difference in group means; however, group four was significant, $t(45)=-3.575, p<.01$.

Hypothesis four: The Machiavellian attitudes of project leaders will be higher at each career year point than those of other engineers and analysts at the same career year point. This hypothesis is not supported. Four independent samples t-tests were completed (Table 15) to examine differences at ten-year career intervals among engineers and analysts, and project leaders that may be attributed to organizational roles. The results of the t-test indicated no significant difference among the groups.

Hypothesis five: The Machiavellian attitudes of engineers and analysts who worked primarily for the current employer more than five years will be significantly lower than those of other engineers and analysts who have worked less than five years with the organization. Hypothesis five is not supported. A t-test comparing individuals

with less than five years of organizational longevity with those with more than five years indicated no significant difference between the groups, t(189)=-1.609,ns.

Hypothesis Six: Machiavellian attitudes will be significantly different among professional staff members depending on occupational field, career path, and longevity. The hypothesis is not supported. Two ANOVA procedures were used to examine groups, based on career paths. One ANOVA involved engineering, technical management, logistics, and "other" career paths; the second ANOVA only investigated the engineering, technical management, and logistics career paths. The results revealed no significant differences related to career path and Machiavellianism.

Hypothesis Seven: The Machiavellian attitudes of mangers and senior staff will be significantly different from those of other salaried engineers and analysts in the organization. Hypothesis seven is not supported. The t-test associated with the hypothesis indicated no significant difference between the Machiavellian attitudes of managers and senior staff, and those of other engineers and analysts t(234)=1.868, ns.

CHAPTER V

Conclusions

This study centered on the premise that organizations have different levels of Machiavellianism based on the Machiavellian attitudes of the people working in them. The results of the study have an impact on the direction of training and educational programs designed to eliminate the negative effects of Machiavellian behavior.

The study findings are meaningful and important because they provide new information for researchers investigating the Machiavellian construct. Further, they permit researchers to form conclusions about the relationship between Machiavellian attitudes, career longevity, and career achievement.

One of the objectives of the study was to determine whether organizations have Machiavellian attitude profiles that could be established from respondents' Mach IV Attitude Inventory scores. These profiles, shown in a statistical graph, could highlight specific career periods where training could be used to counter negative Machiavellian behavior. This organizational profile was associated with a second major objective, namely, to determine whether Machiavellian attitudes change over the course of a career. The findings suggest that organizations may have Machiavellian attitude profiles, and that Machiavellian attitudes may change over time.

The findings also suggest that there is no relationship between Machiavellian attitudes and career achievement in the organization studied. Although these particular findings are not generalizable to all organizations, the study results suggest that the Machiavellian attitudes of managers and other supervisors are not significantly different

from those of other people. In addition, the findings also suggest that career paths and occupations do not have a relationship to Machiavellian attitudes.

These initial conclusions are based on in-depth data analyses, which revealed a weak relationship between Machiavellian attitudes and career longevity but no relationship between Machiavellian attitudes and career achievement. The weak relationship between attitudes and longevity did support two of the seven hypotheses. However, they were related to the Machiavellian attitudes between respondent groups having different periods of career longevity. As a result, the respondents' Machiavellian scores did not produce a meaningful statistical graph representative of specific career periods that would indicate a need for intervention programs.

Explanations

The weak relationship, and in some cases, the lack of a positive relationship between the study variables, may be explained several ways. These reasons for the shape and directions of the relationships examined in this study are summarized below and discussed in the following sections.

- First, the construct of Machiavellianism may have little merit, and the findings are meaningless.
- Furthermore, it is possible that the sample is similar or homogenous with little difference between respondents, due to a number of additional factors.
- Another explanation could be the overall effect of a respondent cohort.
- Additionally, the findings may be associated with the effect of the work environment, an issue that has likely troubled behavior research.

- Finally, the Mach IV instrument may not have measured what it purports to measure

Machiavellian Construct

In regard to the first explanation--namely that the Machiavellian construct is neither meaningful nor representative of reality--one must observe that years of research have supported the Machiavellian construct. Among others, the work of Christie and Geis (1970) over a ten-year period involved reporting the details of 38 studies with over 50 experiments. They found that definite differences existed between high and low Machs, depending on situational parameters. Ten years later, Vleeming (1979) reviewed 34 additional Machiavellian studies, which in general, support the construct. Although an argument can be advanced proposing that some researchers find little evidence of Machiavellianism, far too many other studies have produced substantial results, particularly under experimental research conditions. In spite of years of study, this study does not add validity or support for the Mach IV instrument or the construct.

Group Homogeneity

In regard to the second possible explanation, it is feasible that the lack of notable findings may be explained, in part, by group homogeneity. Volp and Willower (1977) cited the issue of homogeneous groups in their study of school superintendents and Machiavellianism. The respondents recorded a mean of 73.29 and a standard deviation of just under 11.00. The researchers determined that the results were "decidedly different" from experimental studies conducted with college students by Christie and Geis (M=90.65, SD 14.33). The contention was that school superintendents were similar in background, training, and experience, which accounted for their homogeneity. Further,

the researchers thought that these commonalties may "contribute to constricted orientations and role enactments" (p. 260).

The data of this study also contained what could be considered homogeneous traits. The overall mean for the entire sample (N=237) was 78.654 with a standard deviation of 12.6325. There were only 10 high Machs (4.2%) in the sample who scored over the 100 mean of the Mach IV Attitude Inventory. As reported earlier, there was little difference between the engineers (M=79.9242, SD=11.9542) and analysts (M=79.1032, SD=13.2778). This could suggest that the background, experience, and training of participants in the sample are very similar and not likely to produce wide variations in attitudes.

Homogenous traits can also be explained by the findings from the investigation of hypothesis six, which investigated Machiavellian attitudes related to individual career paths. The hypothesis proposed that Machiavellian attitudes would be different based on the career paths of the respondents. The expectation was reasonable; the study conducted by McLean and Jones (1992) investigated whether business students were more Machiavellian than non-business students. Their study suggested that business students were more Machiavellian than science students, but were not significantly different from arts students.

Hypothesis six examined the four career paths emerging from the survey results: technical management, logistics, engineering, and "other", which encompassed 29 career paths. The findings revealed that only 39 respondents were in the "other" category, leaving the remaining 79.58% (N=152) in the first three categories. Technical management, engineering, and logistics are closely related fields associated with

technical people, materials, science, and management. Therefore, it may be likely that the sample is homogenous, with little difference between the people working in the organization.

The findings related to hypothesis five also support the idea of an industry with different career paths that are closely related. The hypothesis compared Machiavellian attitudes of individuals with less than five years in the organization with the attitudes of those with more than five years. The data did not support the hypothesis. Respondents with less than five years (N=137, M=78.4526) were no different from those with more than five years (N=54, M=81.7593). This might suggest that those entering the organization are similar across the Machiavellian scale and possibly other behavior traits.

This is important when one examines the labor source to fill positions within the organization. According to the data obtained from survey question 12, 52.7% (N=125) of the respondents qualify for retirement compensation from another organization. Although the source of the compensation was not part of the survey, most of these respondents had retired from the Federal Government, including both civilian and military organizations. . It may be that the culture of government service attracts individuals with character traits that are similar and, upon retirement, they transition to comparable work in the private sector.

Respondent Cohort

The third explanation, that the results were influenced by the overall effect of different Machiavellian attitudes among those in a particular cohort, must also be considered, given the positive findings on hypotheses two and four. . An analysis of hypothesis two revealed a significant difference between the Machiavellian orientation of

engineers and analysts with 2-19 workforce years and engineers and analysts with 30-52 workforce years. Hypothesis three investigated differences in Machiavellian behavior between engineers and analysts based on career longevity groups. There was a significant difference between engineers and analysts in the 31-40 career year group. This difference may be attributed to the influence of a cohort grouping rather than a career grouping.

The idea of cohorts, individuals defined by a common experience or significant demographic event during a specific time such as the Vietnam War, has some merit in Machiavellian study. Although the term cohort was not specifically used, Christie and Geis (1968) described the influence of what amounts to cohorts in a study of age- related Machiavellianism. They noted that some Machiavellian research indicated that age appeared to be a factor affecting the differences in Machiavellian scales between college students and other groups. Other researchers (Lazarsfeld, Berelson, & Gaudet, 1944, as reported in Christie & Geis, 1968) noted generational differences in voting; first time voters in the 1920s were likely to continue voting for Republican candidates, and first time voters in the 1930s were more likely to continue to vote Democratic. In addition, Newcomb (1963, as reported in Christie & Geis, 1968) found respondent attitudinal consistency in a 25-year follow-up of college students. From this information, they concluded that values internalized around the time of "majority," in most cases, were the most persistent.

In addition to the research, Christie and Geis (1968) theorized that changes in role sets within an adult sample would cause a different level of Machiavellianism between one generation and another. They based their position on the idea of a societal shift that allowed a younger generation to be more engaged in interactions with other people in a

formal set of roles than the previous generation. The researchers already had sufficient evidence supporting the relationship between formal roles, interaction, and Machiavellianism.

Based on the idea that individual values tend to be established around the age of 20, and an assumption that the younger generation was more Machiavellian than an older generation, they predicted a negative correlation between age and Mach scores in a representative sample of adults in the United States. At the time, they considered that the greatest impact on societal roles occurred at the beginning of World War II. Consequently, they expected a negative relationship between age and Mach scores, with a sharp break between people who were 40 and younger (in 1963) and those who were over 40, who were in their twenties at the beginning of WWII.

The assumptions were investigated; a combination of ten items from the Mach IV, Mach V, and an Anomia were included in an interview-based nationwide study of 1,482 adults. The data analysis technique grouped the respondents in 10-year age categories: 21-30, 31-40, 41-50, 51-60, and those 60 and over. A one-way analysis of variance revealed a significant negative difference between age and Mach scores. The researchers also reported that the most significant difference between age groups was, as speculated, between people 40 and younger and those over the age of 40.

The findings of these researchers provide some basis that may explain the positive findings of hypotheses two and three of this study. This explanation is more plausible because of the lack of a pronounced negative relationship between Mach scores and career longevity, and the lack of evidence to suggest any differences in Machiavellian tendencies between engineers and analysts.

Influence of Work Environments

In regard to the last explanation, it may be possible that work environments influence Machiavellian attitudes. The work environment, the primary location where an individual works and the conditions under which the work is performed, is unique. Little is known about the effect of work environments on the Machiavellian attitudes of individuals and groups. The effect of organizational influence on Machiavellian attitudes is likely unknown and could be issue with this study and studies conducted by other researchers.

The issue of environment was an element in the study of Machiavellianism conducted by McLean and Jones (1992) among business and non-business students. They found notable differences between business students and science students. The subjects' environment was at issue since the researchers were unable to determine whether Machiavellianism was related to socialization within the business school or to students' reactions to their perception of business people.

Graham (1996) experienced the effect of the work environment when investigating Machiavellian tendencies among project managers. The researcher found no difference in Mach scores of line managers and project managers. Graham could not "imply causation," suggesting that the two positions did not influence the shaping of the beliefs of the job holder (p.72).

The preceding paragraphs offer plausible explanations of the research findings. It is always possible that the actual reason for the lack of major findings may be an unidentified variable outside the study. However, these explanations should be

considered, based on the findings. It is likely that all four of them played some role and that the cohort effect offers the most plausible explanation for the relationship between age and attitude.

Recommendations

This study should be of interest to other researchers. Investigations of Machiavellian attitudes and organizations should continue, since work relationships, productivity, and positive influence affect many people in the workforce. Changes in the workplace and improved interpersonal skills may not occur without the additional research. Therefore, a number of worthwhile studies may advance the study of Machiavellian attitudes.

Implications for Research and Practice

Implications for Research

This study should be replicated in different industries to determine whether a relationship exists between Machiavellian attitudes and work longevity. Noteworthy findings in other industries could provide the stepping-stones to make a difference in the field of human resource development.

If this type of research is to continue, a longitudinal model should be developed. One sample over many years of a career may not provide sufficient data to understand the complexities of individual behavior. The approach used in this study, as stated earlier, was similar to a previous research method and used in lieu of a longitudinal model. However, this model does not provide the researcher with enough information to learn how, and if, attitudes change over the course of a career.

This study produced questions about the effect of a specific organization on Machiavellian attitudes. Since that effect on Machiavellian attitudes is unknown, the relationship should be examined. There is sufficient evidence to indicate that structure and face-to-face interaction are situational parameters having an effect on Machiavellian behavior. What is not as clear is the effect these variables have on Machiavellian attitudes, as measured by the Mach IV Attitude Inventory. It is important to know more about the organizational-attitude relationship. Although such studies could be difficult to organize, positive findings might provide insight to develop organizations with the appropriate structure to be effective and to reduce the potential for manipulative behaviors.

The influence of cohorts should be considered by researchers. As explained earlier, the presence of Machiavellian orientation in many studies appears to be elusive; it is present in some studies, whereas there is a lack of findings in other studies. Perhaps the lack of findings or minimal findings could be associated with the effects of cohorts. Therefore, researchers may want to use cohorts to investigate Machiavellian attitudes instead of other variables, such as career longevity and career achievement. As an alternate approach, researchers might use cohorts as well as other variables to account for the possibility of cohort influence. The inclusion of cohorts in new studies could be challenging; however, if the approach is successful, it could improve Machiavellian research.

Another research implication is related to the effect of homogenous groups. As in the issue of cohorts, understanding the effect of homogenous groups may also help explain the elusiveness of evidence of Machiavellian attitudes. It may be that both high

and low Machiavellian groups have some notable degree of homogeneity; however, at this time, the relationship between homogeneity and Machiavellian attitudes may not be readily apparent. Therefore, researchers may want to consider how group homogeneity may influence Machiavellian research. Additional studies could provide insight as to how other variables such as personnel recruiting, selection, and placement may possibly affect group homogeneity, and the associated effects of homogeneity on Machiavellian attitudes.

Finally, the entire approach to Machiavellian studies may need a different perspective. It seems on the surface that the construct of Machiavellianism is often one of an evil-against-good proposition where high Machs are portrayed as evil and low Machs as good. It is clear that deliberate manipulation of other people for selfish reasons or intrinsic rewards is viewed as wrong in this culture. However, it is possible that people with high Machiavellian tendencies make worthwhile contributions. Therefore, perhaps methods should be developed to separate the "positive" qualities of Machiavellian attitudes from the aspects that may be harmful to individuals and organizations. While most of the attention given to the negative aspects of Machiavellianism may be deserved, the energy, drive, ambition, and enthusiasm of high Machs for "winning" cannot be disputed and should not be ignored. These positive aspects of the behavior should be identified and captured for leadership training applications. The goal of such programs should not be to strip individuals of ambitious traits but rather to accentuate their positive qualities to develop more of what Niccolo Machiavelli describe as the "virtuous leader."

Implications for Practice

One purpose of the study was to examine the relationship between Machiavellian attitudes, career longevity, and career achievement. This study contains four implications for training professionals to consider, based on three conclusions. First, the absence of a significant relationship between Machiavellian attitude and management role may not warrant the provision of training intervention programs to counter the effects of these attitudes. It may be likely that organizations do not exhibit a range of individual attitudes that would justify establishing training intervention programs. The study did not support a relationship among the variables. Therefore, training professionals should consider accepted training assessment techniques to determine the need for Machiavellian training and when this type of training should be applied.

The second implication for practice is that organizational roles may not be associated with Machiavellian attitudes. The study assumed that the Machiavellian tendencies of managers and project leaders would be higher than those of other people, and that they would attain roles with the potential for face-to-face interaction and less structure. The study did not support this contention: Managers and project leaders were no different from others in the organization, and it may be possible that they do not seek positions in order to act upon Machiavellian tendencies. The findings may suggest that special or additional training for manages and leaders to counter Machiavellian attitudes may not be the best use of valuable training resources.

The third implication for practice is that the Machiavellian attitudes of individuals entering an organization may be no different from people already established in the organization. The study revealed no significant difference between the two groups. This

finding may suggest that special training for new employees related to Machiavellian attitudes or behavior may not be necessary for either the employee or the organization. It is always possible that special programs are appropriate to address specific interpersonal issues, but this type of training would likely be an exception rather than the standard.

The final implication for training-- the effect of cohorts-- should be considered by trainers during the assessment, development, delivery, and evaluation of training programs. Currently, trainers can only be aware that a relationship may exist between Machiavellianism and some cohorts. The parameters of the relationship is unknown and, trainers should not assume that any particular cohort is more or less Machiavellian than another. Trainers may need to stay abreast of research in this area.

Summary

The study produced findings that were important and meaningful, providing researchers and educators with more information about Machiavellian attitudes and with additional information regarding the relationship between Machiavellian attitudes, career longevity, and career achievement. The findings indicate that there is no relationship between Machiavellian attitudes and career achievement. This suggests that the Machiavellian attitudes of managers and other leaders may be no different from other professionals, and that career paths and occupations may not be related to Machiavellian attitudes. The findings also suggest the presence of a weak relationship between Machiavellian attitudes and career longevity. The attitude difference between specific longevity groups did not produce a meaningful organizational profile representative of career periods that would necessitate intervention programs.

Two of the seven hypotheses were supported, based on a weak relationship between Machiavellian attitudes and career longevity. These findings were explained in a number of ways, including the merit of the Machiavellian construct, the effect of homogenous and cohort groups, and the influence of the work environment. Based on the findings, it is likely that all of these had some effect, however, the cohort is the most plausible of the explanations.

Based on the findings, a number of recommendations for research and practice were proposed. The recommendations for research include a replication of the study, the development of a longitudinal Machiavellian model, studies examining the effect of organizations on Machiavellianism, and conducting Machiavellian studies with a perspective for positive leadership qualities. The implications for research also identified cohorts and homogenous groups as variables that should be considered by researchers.

Implications for practice were also cited. The findings did not depict any specific career periods that required training intervention programs; therefore, training professionals should consider traditional assessment techniques to determine the need for intervention programs. Trainers should also consider the explanation regarding cohorts, which may have some influence on Machiavellian attitudes. The findings also suggest that the Machiavellian attitudes of the people entering this organization are no different than those already in the organization and that the Machiavellian attitudes of managers and leaders are no different from those of other salaried individuals. Trainers should consider these findings when they proceed with the development and delivery of training programs.

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APPENDIX A

RESEARCH MATERIAL

The University of Oklahoma

OFFICE OF RESEARCH ADMINISTRATION

May 10, 2000

Mr. William H. Southwell, Jr.
704 Crestmoore Drive
Moore OK 73160

Dear Mr. Southwell, Jr.:

Your research application, "An Examination of Career Longevity, Career Achievement, and Machiavellian Attitudes of Engineers and Analysts in an International Engineering and Communications Organization," has been reviewed according to the policies of the Institutional Review Board chaired by Dr. E. Laurette Taylor and found to be exempt from the requirements for full board review. Your project is approved under the regulations of the University of Oklahoma - Norman Campus Policies and Procedures for the Protection of Human Subjects in Research Activities.

Should you wish to deviate from the described protocol, you must notify me and obtain prior approval from the Board for the changes. If the research is to extend beyond 12 months, you must contact this office, in writing, noting any changes or revisions in the protocol and/or informed consent forms, and request an extension of this ruling.

If you have any questions, please contact me.

Sincerely yours,

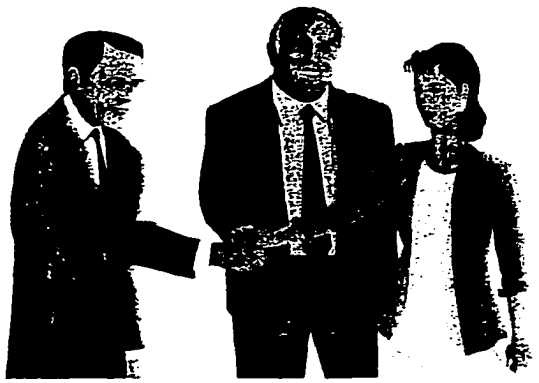
Susan Wyatt Sedwick

Susan Wyatt Sedwick, Ph.D.
Administrative Officer
Institutional Review Board

SWS:pw
FY00-282

cc: Dr. E. Laurette Taylor, Chair, Institutional Review Board
Dr. Robert Fox, ELPS

1000 Asp Avenue, Suite 314, Norman, Oklahoma 73019-0430 PHONE: (405) 325-4757 FAX: (405) 325-6029



Worker Perceptions Questionnaire

This questionnaire is part of a research study that includes worker perceptions. The results of the study will provide important information to answer research questions related to organizational training profiles that may eventually lead to improving working relationships and unit production. Please answer all of the questions. If you need to qualify any of your answers, please use the margins. Your comments will be read and considered.

Thank you for participating in this project.

INSTRUCTIONS

This questionnaire contains two parts and it should only take a few minutes to complete. The first part contains questions and a few statements to obtain the background on the individuals participating in the survey. Part two contains statements with commonly held opinions for you to consider.

When you have completed the questionnaire please follow the directions on the back cover. Thank you

Bill Southwell

Please turn the page and begin

Part 1 Demographic Information and workplace perceptions
Please record your response by placing a check (✓) in the space next to your answer. Some items require a written response.

1. Your sex MALE____ FEMALE_____

2. Your present age _____ (specify)

3. Number of years in the workforce since leaving high school including part time work _____(specify)

4. What is your general labor category (GLC)? GLC 9___ GLC 10___ GLC 11 ____ GLC 12___ GLC 13___
GLC 14___ GLC 15___ GLC 16____ Above GLC 16____

5. Engineers, analysts, overhead staff, and managers were selected to participate in this study; what is your classification?

Manager____ Analyst_____ Overhead Staff____ Engineer____.....
(if manager) specify type engineer_____
What was your classification prior to becoming a manager?

Engineer____.... Analyst____ Overhead staff____ Direct assignment to manager____ Other____
specify type_____ specify_____

6. In what major career area (sometimes referred to as career path) have you spent the major portion of your career?

Engineering___ Accounting____ Contracting/Human Resources____ Technical Management____

Logistics____ Aviation Crewmember_____ Other....(specify)_____

7. Primary position-the primary role assigned by your present employer

Senior manager and above_____ Program manager or engineering manager_____ Overhead staff_____

Manager____ Project leader____ Line engineer working on projects____ Line analyst working on projects____

8. Have you ever been assigned as a project leader by your present employer? YES____ NO____

9. Are you presently assigned as a project leader? YES____ NO____

10. Education: indicate the highest level of education completed

Some college, no degree____ Associate or two year degree____ Bachelors degree____

Masters degree____ Doctorate___

11. Years employed by your current employer_____(specify)

12. Are you currently receiving long-term financial compensation, or a retirement earned from another employer or career?

YES___ NO____

13. During your work routine, do you have face-to-face contact with other people in order to do your work? YES___ NO____

14. Do you think you have the freedom to make your own decisions concerning your work? YES____ NO____

Part II Worker Perceptions

Listed below are a number of statements. Each represents a commonly held opinion and there are no right or wrong answers. You will probably disagree with some items and agree with others. We are interested in the extent to which you agree or disagree with such matters of opinion.

Read each statement carefully. Then indicate the extent to which you agree or disagree by circling the number to the right of each statement. The numbers and their meanings are indicated below:

If you agree strongly, circle 1
If you agree somewhat, circle 2
If you agree slightly, circle 3
If you disagree slightly, circle 4
If you disagree somewhat, circle 5
If you disagree strongly, circle 6

First impressions are usually best in such matters. Read each statement, decide if you agree or disagree and the strength of your opinion, and then circle the appropriate level of agreement or disagreement. Give your opinion on each statement.

If you find that the agreement/disagreement levels to be used in answering do not adequately indicate your own opinion, use the one which is closest to the way you feel.

		Agree Strongly	Agree Somewhat	Agree Slightly	Disagree Slightly	Disagree Somewhat	Disagree Strongly
15	Never tell anyone the real reason you did something unless it is useful to do so.	1	2	3	4	5	6
16	The best way to handle people is to tell them what they want to hear.	1	2	3	4	5	6
17	One should take action only when sure it is morally right.	1	2	3	4	5	6
18	Most people are basically good and kind.	1	2	3	4	5	6
19	It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.	1	2	3	4	5	6
20	Honesty is the best policy in all cases.	1	2	3	4	5	6
21	There is no excuse for lying to someone else.	1	2	3	4	5	6
22	Generally speaking, men won't work hard unless they are forced to do so.	1	2	3	4	5	6
23	All in all, it is better to be humble and honest than be important and dishonest.	1	2	3	4	5	6
24	When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons which might carry more weight.	1	2	3	4	5	6
25	Most people who get ahead in the world lead clean, moral lives.	1	2	3	4	5	6
26	Anyone who completely trusts anyone else is asking for trouble.	1	2	3	4	5	6
27	The biggest difference between most criminals and other people is that the criminals are stupid enough to get caught.	1	2	3	4	5	6
28	Most men are brave.	1	2	3	4	5	6
29	It is wise to flatter important people.	1	2	3	4	5	6
30	It is possible to be good in all respects.	1	2	3	4	5	6
31	Barnum was wrong when he said that there's a sucker born every minute.	1	2	3	4	5	6
32	It is hard to get ahead without cutting corners here and there.	1	2	3	4	5	6
33	People suffering from incurable diseases should have the choice of being put painlessly to death.	1	2	3	4	5	6
34	Most men forget more easily the death of their father than the loss of their property.	1	2	3	4	5	6

Please turn the page and Follow the Mailing Directions

Mailing Directions

After you have answered and marked all questions, please fold the questionnaire and place it in the addressed and stamped envelope that has been provided. Please ensure the envelope is sealed and place it in the U.S. Mail. If you have any problems with the questionnaire, procedures or instructions, please contact me at 405-739-0939.