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THE RELATIONSHIPS AMONG MANAGERIAL MOTIVATION AND
INFLUENCE STYLES OF USAF PROCUREMENT CONTRACTING
OFFICERS

Daniel M. Brinkmann, et al

Air Force Institute of Technology
Wright-Patterson Air Force Base, Ohio

August 1975

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This research examines the relationships between motivation and the selected influence styles of USAF Procurement Contracting Officers (PCOs). Research instruments designed to measure these relationships were distributed to PCOs at Aeronautical Systems Division of Air Force Systems Command. The influence styles were based on French and Raven's typology and consisted of referent, formal, punishment, reward, and expert sources of power. Motivation responses were coded to provide a motivation index for each PCO. Perceived importance of various influence styles was measured relative to both the PCO's subordinates and his work associates. An analysis of the data using descriptive and nonparametric statistics led the researchers to conclude that no meaningful linear relationship could be demonstrated between the level of motivation and the perceived importance of a particular influence style. However, the data also indicates that the PCOs do not tend to perceive a need to use different influence styles when dealing with subordinates or work associates. Several important areas for future research are identified as a result of these unexpected findings.

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OFFICERS

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William M. Denchy, Captain, USAF

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**THE RELATIONSHIPS AMONG MANAGERIAL MOTIVATION
AND INFLUENCE STYLES OF USAF PROCUREMENT
CONTRACTING OFFICERS**

A Thesis

**Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University**

**In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Logistics Management**

By

**Daniel M. Brinkmann, BS
Captain, USAF**

**William M. Denchy, BS
Captain, USAF**

August 1975

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This thesis, written by

Captain Daniel M. Brinkmann

and

Captain William M. Denchy

**has been accepted by the undersigned on behalf of the
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fulfillment of the requirements for the degree of**

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Chapter 1

STATEMENT OF PROBLEM

The advent of the Industrial Revolution helped to create a situation where affluence and new liberalism brought higher levels of need satisfaction to society. Because man's basic needs were satisfied in a prospering economy, the threat of losing one's job or other types of coercion could no longer be relied on as a consistently effective means of influence. New efforts to develop other patterns and styles to influence others to do as the manager wants them to were studied. These efforts included the research works which investigated motivational factors as well as bases of power.

The focus of this research was to examine the potential relationships among the personal motivation of a manager performing the role of an integrator and the types of influence style he relies on most. The specific variables addressed are:

1. The relationships that exist between the integrator's ability to influence his work associates and subordinates as related to his level of personal motivation.

2. The relationships between the amount of direct organizational support and the influence style selected by

an integrator as tempered by the number of external contacts he has with his associates.

Definition of Terms

Authority. Authority can be defined as ". . . the institutionalized right to employ power . . ." and ". . . is the institutionalized right to limit choice [17:130]."

Expectancy. Expectancy is that ". . . momentary belief concerning the likelihood that a particular act will be followed by a particular outcome [36:17]."

Functional manager. The functional manager has positional "line authority" within a particular function of an organization. However, he is still an integrator.

Functional task. A functional task consists of ". . . those tasks which must be carried out in order to accomplish the goals of the organization [15:117]."

Influence. Influence can be defined as the use of power to gain some desired result or effect from other persons or things (10:271).

Influence style. Influence style is that particular selection or mix of power bases used by a person to exert his desires over another person.

Integration. Integration is ". . . the achievement of unity of effort among the major functional specialists in a business [22:142]."

Integrator. According to Lawrence and Lorsch (22:142), the integrator is that person who handles

. . . the nonroutine, unprogrammed problems that arise among the traditional functions [production, marketing, accounting] as each [traditional function] strives to do its own job.

While the amount of integrating effort required of a manager varies with the specific position, integration is one key aspect of the manager's task.

Motivation. Motivation is ". . . the way in which urges, drives, aspirations or needs direct, control or explain . . . behavior . . . [15:448]."

Organizational power. Organizational power is the basis of power derived from the coercive, legitimate, and reward power bases (15:288).

Personal power. Personal power is the basis of power derived from expert and referent bases of power (15:288).

Power. Power is the relationship that exists between people that gives one person the ". . . capacity to influence another to do something that he otherwise would not do [15:286-287]."

Project. A project is a complex, unique or infrequent effort by the existing management group that involves more resources than for any other infrequent undertaking characterized by a definite end involving a specific stake (30:802-805).

Project director. See project manager.

Project management. A technique designed to draw specialized individuals together to accomplish a major, one-time undertaking.

Project manager. The manager ". . . who has responsibility for the detailed planning, coordination, and ultimate outcome of the project [30:805]."

Project team. Qualified people ". . . drawn from the various functional departments involved in the project [that] report directly to the project manager [30:805]."

Valence. Valence is the individual's preference for an outcome; that is, ". . . the anticipated satisfaction from an outcome. . . [35:15]."

Background and Justification

One stereotype of a manager represents him as an obscure yet omnipotent person who sits in a paneled office making monumental decisions which will affect the organization and its environment. Another view is that

he is a hovering "Big Brother" character who waits for a mistake to occur so he has someone to blame. A manager is really neither of these extremes but rather a person who integrates his efforts and those of his subordinates and associates into the overall organizational effort to achieve a goal. Lawrence and Lorsch (22:142) concentrate on the integrating function and define those managers who perform this function as "integrators." The integrator's role is to resolve ". . . the nonroutine, unprogrammed problems that arise among the traditional functions as each [traditional function] strives to do its own job." Additionally, the integrator resolves conflicts between functional departments and makes small and large decisions which affect the direction of the organization (22:142-143). However, the integrator is not necessarily the general nor the divisional manager. "The increasing dynamic nature of many organizational environments makes integration so difficult that a single general manager cannot handle the job by himself [22:143]." The role of the integrator has therefore been defined under titles similar to "product manager . . . program coordinator, project leader . . . [22:143]" and others. However, the underlying role of all of these job descriptions is ". . . the achievement of unity of effort among the major functional specialists in a business [22:142]." Because this role should be an integral part of a manager's task,

Lawrence and Lorsch (22:143) conclude that all of the titles describe the integration function and in essence describe the same task. In other words, a manager has an integration function regardless of his positional title. However, the importance of this function will vary over a wide range from a low point for those managers filling the traditional "functional manager" positions to a high point for those holding the theoretical "Project Manager" type position.

Managerial Influence

Another important segment of an integrator's task relies on his ability to influence others (35:274). Because this ability is an integral function of the integrator's task, special attention must be placed on defining and categorizing the derivation of this concept. Influence can be defined as the use of power to gain some desired result or effect from other persons or things. Conversely, Gibson indicates that "power" is the inherent ability that one possesses to "influence" another person (15:286-287).

The above definitions illustrate the close relationship of power and influence. Several researchers have categorized several sources of power available to a manager. However, according to French and Raven (10:371-372) ". . . there are undoubtedly many bases of power which may be distinguished . . . [and] five seem especially common and

important." For ease of reading, French and Raven's typology of power as presented by Gemmill and Wilemon (14:16) is presented below:

A. Coercive (punishment) Power--the ability to induce others to meet his requests because they wish to avoid punishments they believe he is capable of administering.

B. Reward Power--the ability to induce others to meet his requests because they value the rewards they believe he is capable of administering.

C. Formal Authority--the ability to induce or influence others to meet his requests because they perceive him as being officially empowered to issue orders.

D. Expert Power--the ability to induce others to meet his requests because of their respect for his technical or managerial expertise.

E. Referent Power--the ability to induce others to meet his requests because of their feelings of identification with him, with the project or with the position of project manager [14:16].

In a later study, Thamhain and Wilemon (31) developed a nine item questionnaire which used a modified version of French and Raven's power typology to measure the influence methods used by project managers to gain support from project personnel. This study incorporated the added factors of "work challenge" and "funds allocation" to the above power bases because these items ". . . were mentioned as important factors . . . and methods of influence [13:218]."

These studies offer "a conceptual distinction between the bases of power [15:288]" which can be recombined into the major categories of organizational powers

(expert, referent) (15:288). Because French and Raven's power bases are easily understood and are considered inclusive of most main power sources, they will be used as modified by Thamhain and Wilemon (31) in this study to determine the influence styles that may be used by the integrator.

Managerial Motivation

Motivation is the sum of a person's thoughts, needs, aspirations, and drives and therefore helps to explain his behavior (15:448). Recent summaries of various motivation theories have resulted in two main categories: Content theories and process theories (15:218).

The main concern of process theories is to try to explain how behavior patterns are started, continued, and ended. The process theories of Vroom and Lawler are outstanding examples of this group (15:218-231). Vroom (35), in expanding the concepts of earlier motivation researchers, developed a model which related the concepts of expectancy to motivational force. Lawler (21) further expanded Vroom's model, stating that motivational force determines the amount of effort an individual puts forth to achieve a specific outcome.

Content theories have as their main concern those personality traits or environmental stimuli that start, sustain, and end a particular behavior (15:218-231). The

theories of Maslow and Herzberg exemplify this group of theories which attempt to explain what causes motivation.

Maslow's theory has as its basis two fundamental premises:

1. Man is a wanting animal whose needs depend on what he already has. Only needs not yet fulfilled can influence behavior; an adequately fulfilled need is not a motivator.

2. Man's needs are arranged in a hierarchy of importance. Once one need is fulfilled, another emerges and demands fulfillment [15:219].

The content theory of Herzberg addressed motivation and its relationship to job effectiveness. Herzberg stated ". . . the only way to motivate the employee is to give him challenging work in which he can assume responsibility [18:53]." Although the relationship of job effectiveness and Herzberg's two-factor theory has been demonstrated many times, the result that continues to surface is that ". . . the factors involved in producing job satisfaction (and motivation) are separate and distinct from the factors that lead to job dissatisfaction [18:56]." Herzberg terms the factors which are intrinsic to the job and cause motivation, "motivator factors" and has identified them as "achievement, recognition, the work itself, responsibility, advancement, and growth [18:57]." Conversely, Herzberg lists those factors extrinsic to the job which provide no job satisfaction as ". . . dissatisfaction--avoidance or hygiene factors . . ." and include: ". . . company policy

and administration, supervision, interpersonal relationships; working conditions, salary, status, and security [18:56]."

These theories of motivation then, provide an insight into the relationship between power and motivation. The manager can use his power to influence employees by increasing or decreasing the valance in the employee. The manager does this by making the performance of a specific act more important to the individual (35). A further examination of this relationship may illustrate that the more motivated integrator makes greater use of the personal power bases ("expert and referent") to result in ". . . greater effectiveness and lasting compliance attempts in formal organizations [15:289]."

Objective, Relevance, and Scope

It would appear possible to relate the type of influence style that an integrator uses in any given situation to the degree of personal motivation which he possesses. This research will analyze managers in existing jobs to determine if a relationship exists between the manager's level of personal motivation and his use of a particular influence style. The analysis will require that the individual's preferred influence style be measured and related with his level of personal motivation.

However, before these relationships can be considered as an applicable indicator of task criteria, it

must be realized that the scope of this study is limited. As Figure 1 illustrates, this study is aimed at a sample of individuals who are one segment of a larger population on a continuum. The emphasis is on the specified subjects and their relative positions within the restricted sample of interest. Therefore, no inferences concerning motivation and influence style relationships should be made to other samples from the continuum.

Additionally, certain assumptions must be made concerning the managers that are being used as a data base. The first assumption to be made is that the incumbent is a reasonable and reliable gauge with which to measure the relationship between motivation and influence styles. This assumption is made because the incumbent possesses the most knowledge of the requirements for his task. It can therefore be assumed that the perceptions, actions, and performance of the position incumbent are indicative of the appropriate influence style for that position. The manager may

. . . for example use several influence bases to gain support. . . . The specific influence bases used most often depends upon the authority he possesses and his knowledge of what motivates various . . . participants [33:4].

Based on these assumptions, it may then be possible to classify influence styles to identify managerial positions on the basis of required motivational characteristics rather than simply job title.

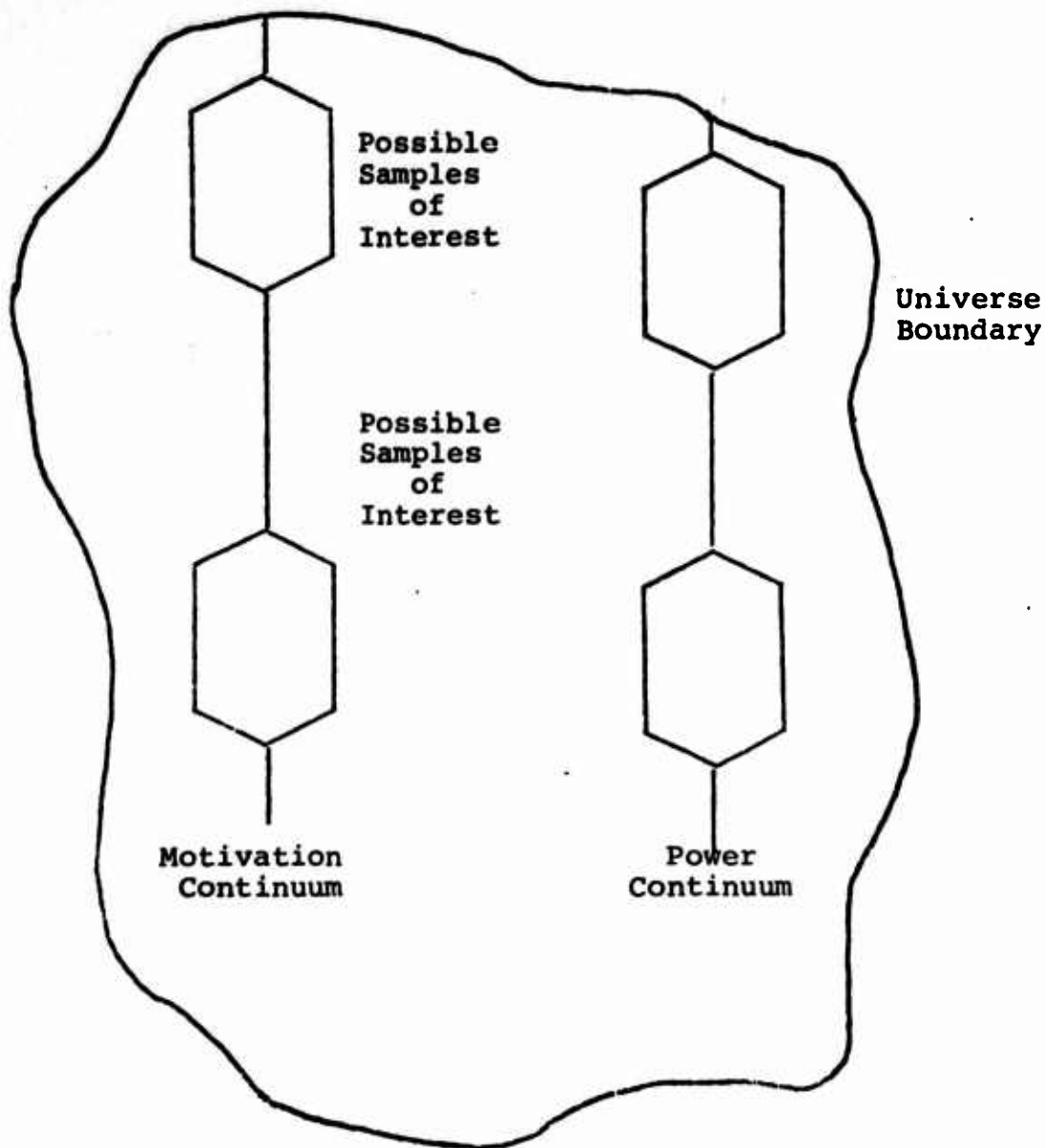


Figure 1. Pictorial Description of Area of Interest. Motivation and power each exist as an infinite continuum in the universe. Therefore, the research must deal with only a small segment of that continuum. The areas of "Possible Samples of Interest" illustrate the "relative" rather than the "absolute" position on the continuum that the research addresses. This "relative" position is examined because no procedure exists to measure the "absolute" position on an infinite continuum.

Design of the Research

The phenomena of power and influence was investigated to determine if a relationship could be established between the motivation of an individual and his selection of an influence style. It was hypothesized that the level of motivation possessed by an individual would show a relationship to the influence style that he perceives as being used most by him.

The motivation and influence variables were collected through the use of instruments that had been used in the past by other researchers. Statistical techniques were used to determine if a relationship exists between the measured variables.

As illustrated in Figure 2, Chapter 2 is devoted to a summation of the pertinent literature that deals with the behavioral characteristics investigated in this research. A derived theory is presented and the resulting hypothesis is stated.

Chapter 3 describes the source of managers that provided the data necessary to investigate the proposed hypothesis and describes the research methodology that was used. It also includes a description of the data gathering instrument.

Chapter 4 presents the data analysis techniques, including a description of the statistical tests employed and an interpretation of the data.

<u>Chapter</u>	<u>Contents</u>
Chapter One	The background and justification containing the objective and relevance of the study.
Chapter Two	A comprehensive summation of the pertinent literature and a derived theory.
Chapter Three	A description of the population, research methodology, and data gathering instrument.
Chapter Four	A presentation of the statistical instrument, assumptions, and data analysis.
Chapter Five	Conclusions and recommendations for further research.

Figure 2. Outline of the Thesis

The last chapter presents conclusions of the research and recommendations for areas of future research interest.

Chapter 2

SUPPORTING CONCEPTS AND RESEARCH

Introduction

New management techniques have been developed to meet and cope with the increasing complexity of a technological undertaking. One of these new techniques is project management (14:15). Although much has been written about the organization of project management, little attention has been given to the problems a project manager faces in gaining the cooperation of the project team members to support the project (13:216; 14:15). This chapter will illustrate the evolution of "power" concepts and their relationships to project management.

Project Management Versus Integration

The term "Project Management" has nearly as many definitions as there are authors who write on the subject. Mee (25), thinks of project management as a procedure to accomplish a task with a minimal amount of pressure from prime contractors and subcontractors of defense products. Wilemon and Cicero (36) believe that project management is a tool to be used for achieving a specific purpose or function. Their definition is:

A fundamental characteristic of project management differentiating it from traditional theory is the structuring of the role relationships within the project organization. A project, for example, is not generally bound by the constraints of a vertical chain of command, functional separation, distinct line and staff activities, and span of control. Instead, a project organization tends to revolve around the fluid interaction of higher skilled personnel at various organizational levels [36:270].

Davis (6:309) defines project management with yet another dimension when he introduces the human element into the definition. He refers to project management as involving a group of specialized individuals--generally experts in a given area--who are gathered together to accomplish one specific job. Relating these three concepts, project management can be thought of as a technique designed to draw specialized individuals together to accomplish a major one-time undertaking. This definition follows the basic definition of the "integrator" as described by Lawrence and Lorsch (22). The role of the integrator and that of the project manager is essentially the same--to achieve a ". . . unity of effort among the major functional specialists in a business [22:142]." Unity of effort is achieved by coordinating managerial functions and personnel efforts and channeling them toward the objective (25:53). Those persons possessing the needed skills and talents for the project may be assigned to it for the specific period during which their skills are needed. In the project, these specialized individuals are

assigned in their specialities and are therefore effectively employed. However, the most important function of the project manager and of the integrator, is to achieve the same unity of managerial action on a project that is achieved by the functional manager in the manufacture of a physical product (6:309).

Unified managerial action permits specialized people throughout the organizational functions to collaborate to provide the concentrated effort that is required when undertaking a new, unfamiliar, and complex task. However, the pre-established goals of the parent organization should not be affected by the project. The organization can continue toward its own previously defined goals, while the project,--under unified managerial control, might proceed on a course very different from that of the parent organization. In fact, many projects undertaken by a company are in areas vastly different from the company's primary emphasis (25:802-804).

Integrator: Authority, Power, and Influence

Authority. Davis (7:287) describes professional employees as having strong task orientation, which means that they want involvement, responsibility, and self-realization. Therefore, since a large percentage of project employees are professionals, ". . . a program [project] manager . . . must use different management techniques

than those used in the simple superior-subordinate relationship [5:82]." The project manager's job is to balance and integrate the project member's professionalism and motivation with the project--an important and difficult task. The task is often made more difficult because project managers are frequently chosen for their technical ability and have limited management experience and training (9:18). The difficulty is further compounded because the integrator normally does not have strict line authority within the formal organization, even though he does have considerable authority over the conduct of the project (26:7).

The authority of the integrator is a dominant influence factor over project matters because of his focal position and close proximity to top management (26:7). Authority can be defined as ". . . the institutionalized right to employ power,. . ." and ". . . is the institutionalized right to limit choice [17:130]." In other words, the institution has the right to employ power, and the power is assigned to the position and not to the individual (17:70). Therefore, power exists within a formal organization. However, power also exists in the absence of a formal organization and is called informal power (24:92). Formal organizations are continuously aware of the demands of their power participants and the informal organization. This fact makes the study of

organizational power structures interesting as well as complex (24:97). Researchers continue to try to describe what human behavior should be within a power structure. Although this is useful, it does not explain how the power is exercised (32:79). Until power becomes formalized it is always informal. When power becomes formalized it is then referred to as authority (17:130). In both the formal and informal organization, power is related to influence. "The more power an individual has in a given situation the more effective his influence attempts will be [20:310]."

Power can exist only when and where it is effective because it is the capability to influence behavior by limiting the choices that are available in a social situation (20:313). A person has power to limit alternatives only to the extent that he has the ability to influence the behavior of others in accordance with his intentions (8:81).

Power theories. Like project management, the term "power" has nearly as many definitions as there are authors who have written on the subject. Etzioni contends that the descriptions of power are exhaustive:

. . . although the only way we can demonstrate this [exhaustiveness] is by pointing out that every type of power we have encountered so far, can be classified as belonging to one of the [other] categories or a combination of them [8:82].

One accepted and widely used classification of power types used in managerial applications is presented by French

and Raven (10). French and Raven's typology of power was presented in Chapter 1.

For a group to effectively achieve its goals, an integrator cannot perform all the influence and maintenance functions in all circumstances at all times (12:67). Since an integrator cannot perform these functions by himself he must deal with other people. In dealing with other people, he may exhibit preferences for specific power bases. The particular mix of power bases used by the individual integrator will determine his influence style.

Influence. Power bases have been used to interpret the type of influence that one individual exerts over another (10:371-372). This close relationship between power and influence has been investigated and reported in several studies which use French and Raven's typology of power (13; 14; 31). These studies demonstrated that the influence methods used by the manager are based on both the personal and organizational power he perceives he possesses. Additionally, Boyatzis points out that the selection of an influence style is based on the manager's confidence in his human capabilities rather than on the preservation of his personal power (4:65). Therefore, the integrator's choice of influence style should be carefully selected with the intent of stimulating and supporting individuals to think and to act--to build their sense of efficacy (4:65).

The individual builds his sense of efficacy . . . from interaction with people who have the ability to influence him. A person is therefore more satisfied with his activities, feels a sense of involvement and has a desire to continue if he feels a high sense of efficacy [4:65-67].

Another concept which may hinge on the selection of influence styles is the personal motivation of the project manager (integrator).

Motivation Theories

"What causes man to act and to perform the intra-personal and interpersonal functions of life has been the focus of study for many years [13:65]." These studies have resulted in several theories of motivation. The more popular motivational theories as they relate to project management have been examined and presented by Adams (1:43). The distinguishing characteristic of motivated behavior is that it is goal directed. Motivational theories have been formed into two groups: content theories and process theories (15:218).

Content theories. The popular content theories of Maslow and Herzberg are founded on the concept that an individual's needs are the starting point for motivation. The theories differ in the way that these needs are classified (1:45). Maslow's hierarchy of needs is based on the theory that man is a wanting animal and his present needs depend upon what he already has. This hierarchy implies that lower category need must be reasonably well satisfied before a higher

need becomes operative. The needs identified in the hierarchy can be divided into high-level and low-level needs:

High level needs

1. Self-actualization--self fulfillment
2. Esteem--self image

Low level needs

3. Love--psychological need
4. Safety--well-being
5. Physiological--physical needs (23)

Practitioners and students of management have applied Maslow's theory in generating need satisfying activities for an organization. Herzberg also addressed need satisfaction.

Herzberg (18:56-58) proposed that two classes of factors exist which affect job satisfaction: hygiene and motivating factors. Hygiene factors are those that are considered necessary to maintain a reasonable level of satisfaction. Although hygiene factors produce dissatisfaction when they are absent, their presence does not produce strong motivation (18:56-58). Motivating factors are those which instill high levels of motivation and job satisfaction when present. However, a high level of dissatisfaction does not occur if they are absent. The relationship between the theories of Maslow and Herzberg is shown in Figure 3 (15:277).

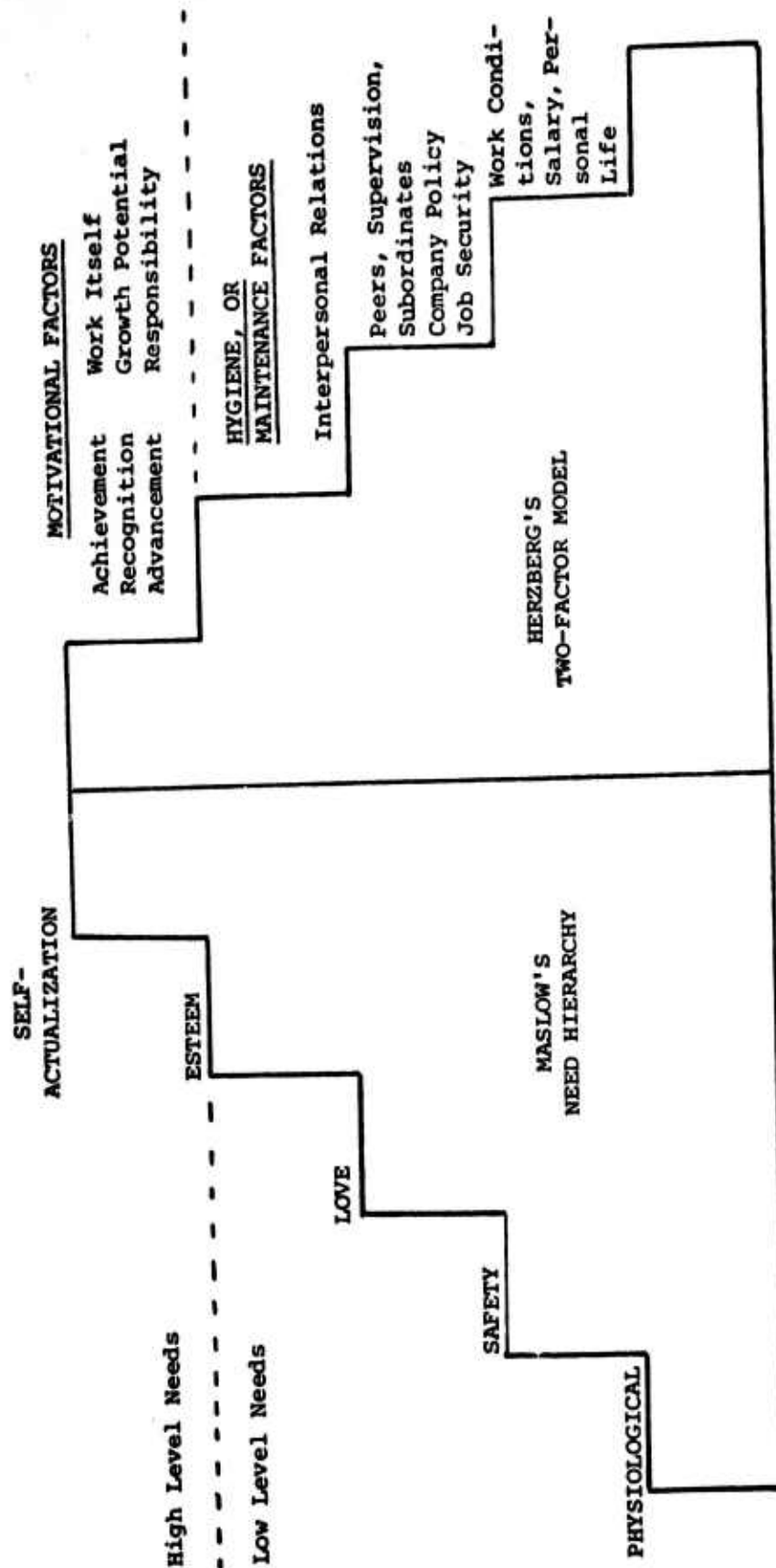


Figure 3. A Comparison of Maslow's and Herzberg's Theories of Motivation in a Work Environment.
 SOURCE: Adopted from James L. Gibson, John M. Ivancevich, and James H. Donnelly, Jr.,
Organizations: Structure, Processes, Behavior (Austin, Texas: Business Publications,
 Inc., 1973), p. 227.

Professional and managerial employees in our society have normally achieved and satisfied the lower level needs. Therefore, it is assumed the higher level needs are the manager's primary motivators.

Process theories. House and Wahba (19:128) explained that Vroom developed a model which enlarged the concepts of Maslow and Herzberg. Although expectancy theories had been applied to areas other than work motivation as early as 1738, Vroom was the first to use "expectancy" as an explanation of motivation in the work environment. Expectancy was defined as the ". . . momentary belief concerning the likelihood that a particular act will be followed by a particular outcome [35:17]." Another Vroom concept is "valence." Valence refers to the individual's preference for an outcome, that is ". . . the anticipated satisfaction from an outcome . . . [35:15]." As illustrated in Figure 4, the total motivating "force" to move a person in a particular direction becomes the algebraic sum of the expectancies times the valences for all outcomes (35:18).

The Vroom model has been used as a base for several motivation theories. Lawler incorporated Vroom's work into a model which related Vroom's "motivational force" or "effort" to an individual's job performance. A modified Lawler model (Figure 4) shows the relationships among motivation, rewards, performance, and satisfaction (21:268-270). The model shows that the individual will try to perform

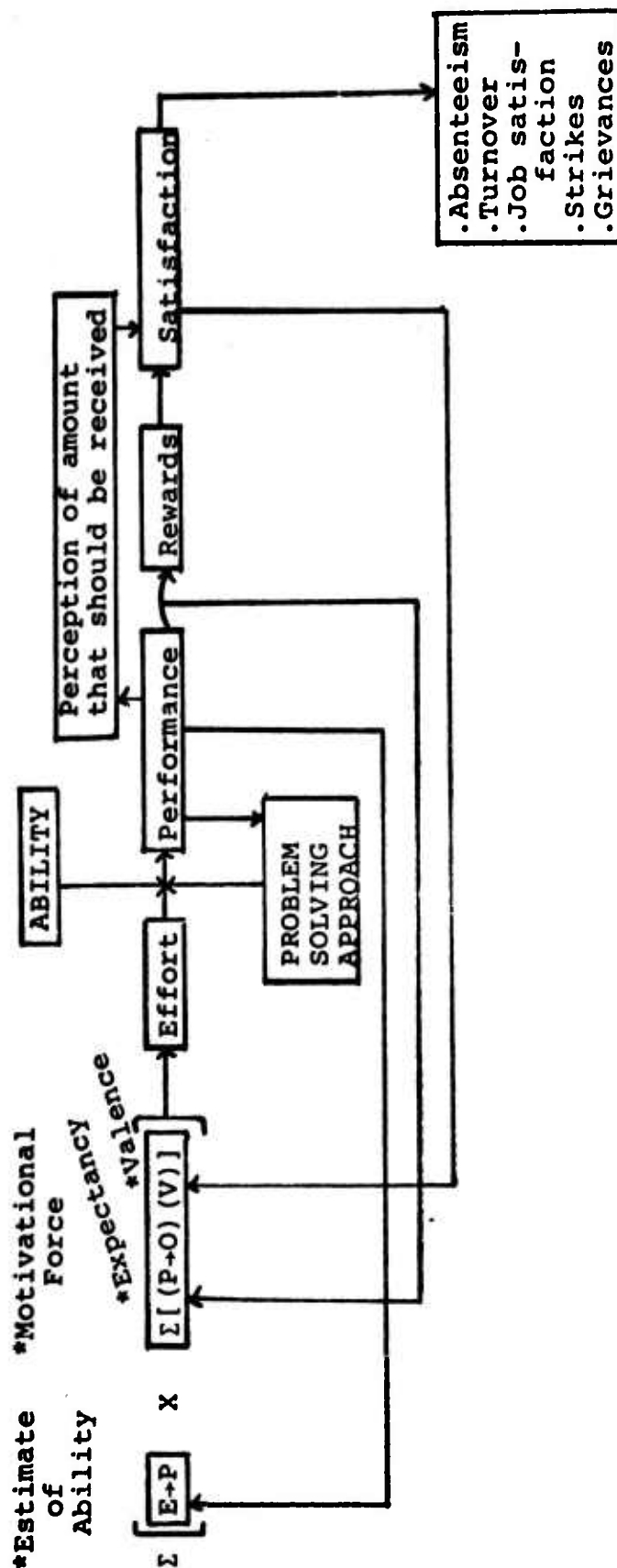


Figure 4. A Model of the Relationships Among Motivation, Performance and Satisfaction.
 SOURCE: Edward E. Lawler III, Pay and Organizational Effectiveness: A Psychological View, (New York: McGraw-Hill Book Company, 1971). The basic model appears on page 270. The modified model here is from John Russell Adams', "The Estimation Process: Network Analysis and the Factors Affecting Accuracy," Unpublished Doctoral dissertation, Syracuse University, Syracuse, New York, February, 1974, p. 53.

*These labels are added to clarify the symbols.

(expend effort) to the extent that he perceives good performance will lead to positive valued outcomes (1:54). Effort is directly affected by the individual's motivation; however, the individual must also have the necessary ability as well as ". . . an accurate perception of how his effort can best be converted into performance (problem-solving approach) [1:54-55]."

The modified Lawler model then, represents an iterative procedure in which it is impossible to say that one factor "causes" another (1:56). Performance may influence satisfaction by providing rewards. However, satisfaction will also influence performance because the reward importance is affected. Therefore, motivation is also affected.

The relationship between the content and process motivational theories is easily demonstrated. Content theories attempt to identify and explain what "causes" motivation. The process theories show how behavioral patterns (actions) impact in the work environment as the individual is engaged in goal directed activity.

Since managers appear to be driven by a high need to achieve, they are concerned with high level factors such as achievement, power, status, and advancement. Therefore, the manager's unsatisfied needs would lie in the higher level needs--the motivating factors.

Research Theory

The modified Lawler model in Figure 4 can also be used as a guide to analyze the "problem-solving approach" of the manager/integrator. The literature review has demonstrated that a relationship exists between levels of motivational force and the amount of "effort" that an individual expends in performing a task. However, of equal importance to performance levels is what the modified Lawler Model calls "Problem Solving Approach." Figure 5 is extracted from the modified Lawler model to illustrate the relationship between motivation, influence styles, and bases of power that this research intends to investigate. Motivation not only dictates the amount of effort an individual expends for performance; it may also be a determinant factor in selecting the power based influence styles used by that person to exert his desires over another person or thing.

An influence style is selected by an individual in response to a problem dependent on the basis of "power" he perceives he possesses. An influence style may be one, or any combination of power bases that he perceives are available to him. ". . . [M]any effective . . . managers 'learn' what motivates or induces support from interfaces and over time adjust their . . . style accordingly [31:4]."

The selection of influence styles then plays a critical role in the manager's approach to solving a problem, and has a direct bearing on his performance. If

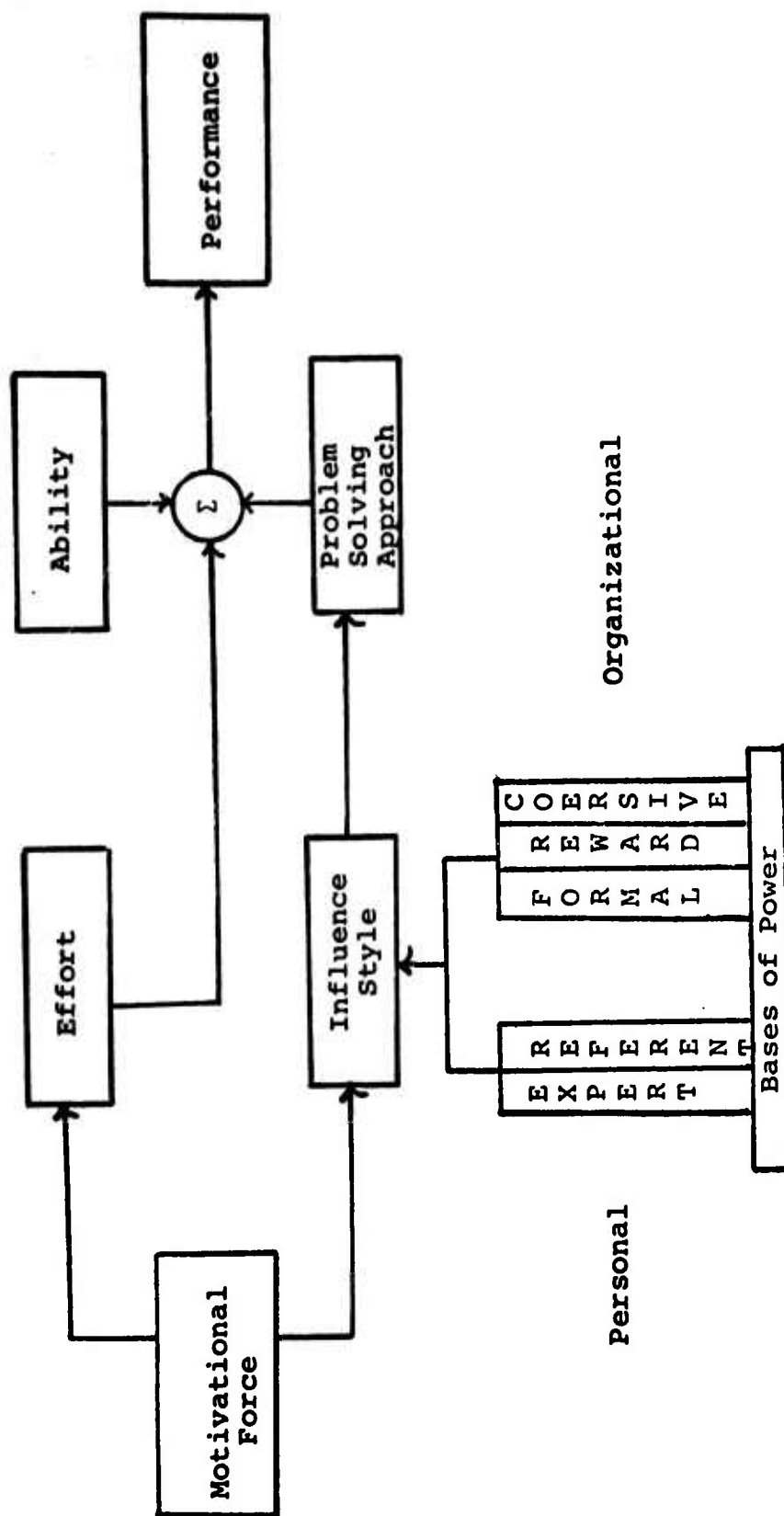


Figure 5. A Model of the Relationships Among Motivation, Influence Style, and Problem Solving Approach. SOURCE: Edward E. Lawler III, Pay and Organizational Effectiveness: A Psychological View, (New York: McGraw-Hill Book Company, 1971). The basic model appears on page 270.

the individual who is faced with a problem selects a particular influence style that is not suited for that particular situation, his problem solving approach may be incorrect for the problem. Therefore, regardless of the amount of "effort" that is expended or the inherent "ability" of the individual to act, his performance may still be inadequate because of a weakened approach to problem solving.

The theory of motivation and influence style interaction serves as the basis for developing a test of the implications of the relationships among power, influence styles, and managerial motivation. Specifically, the following hypothesis will be tested.

Hypothesis

A relationship exists between the personal motivation of an integrator and the influence style he relies on as he gets others to perform for him.

Chapter 3

RESEARCH METHODOLOGY

Introduction

Identifying, selecting, and training replacements for qualified departing managers is a constant iterative process that must occur as managerial vacuums are created. Factors which contribute to managerial vacuum include vertical and horizontal mobility and manager attrition.

Vertical and horizontal mobility implies movement within the organization. Vertical mobility is ". . . a type of transfer involving a reassessment of an employee to a higher-paid position and/or having more privileges, benefits, or potential [11:160]." Horizontal mobility can be considered as the ". . . internal transfers or moves of employees from one job to another, or one shift to another [11:159]."

Manager attrition, however, implies movement beyond the organizational boundaries as a result of retirements, resignations and discharges. Attrition further emphasizes the need to replace departing executives with qualified managers. The search is as critical as that found in civilian industry. The Air Force, other branches of the Department of Defense (DOD), and the private industrial

sector of our society, are all competing with each other for the services of qualified, competent managers. Therefore, attrition of Air Force managers brought about by this competitive environment is of major concern to Air Force planners (34:44).

This concern was recently expressed in the Report of the Commission on Government Procurement which stated that fully one-fourth of the Air Force procurement work force will be eligible for retirement by 1980 (34:44). This fact alone makes it imperative that a usable instrument be developed to identify critical job criteria and make the criteria available to those who must screen, select, and train replacement managers.

Description of Population

The pending need to replace those Air Force managers who are currently performing tasks in the field of procurement prompted the authors to select as the universe, all military or civilian procurement officers in the Air Force who perform the tasks of a Contracting Officer. Because the Air Force Systems Command (AFSC) has the responsibility of contracting for, acquiring, and developing weapons systems for the Air Force, the universe was delimited to provide a population consisting of Contracting Officers in AFSC. The population target of AFSC was constrained as a result of limiting factors of time and money. Therefore, with the assistance of the Air Force Business Research

Management Center (BRMC) the data producing sample was restricted to the Contracting Officers in the Aeronautical Systems Division (ASD) of AFSC who were assigned to System Program Offices (SPOs).

The efforts of this research were directed at the various systems program offices (SPO) within ASD. In addition to dealing with the procurement of weapon systems and subsystems, each SPO has the responsibility to develop a particular system for military use (3:27). As Block and Hadlow explain (3:27-30), each SPO consists of a project director and his project team. The SPO varies in size depending on the particular weapon system that is being developed or managed. The more complex SPOs report directly to the Commander of ASD while the remaining SPOs are grouped under four subdivisions (33:66).

The choice of ASD for use as a data base was based on practicality and convenience because of its co-location with the Air Force Institute of Technology, School of Systems and Logistics at Wright-Patterson Air Force Base, Ohio. Helmstadter (16:327) refers to this type of sample as a "sample of convenience" and is obtained by the researcher because of practical considerations ". . . of whatever subjects are conveniently available to him [16:327]."

The data for this research consisted of information collected from a sample of 109 Contracting Officers

who were assigned to functional tasks as well as those officers who were part of program (project) management teams with ASD. The sample included both military and civilian contracting officers assigned to and employed by the Air Force at ASD. The selection criteria and research methodology for this population is described in the next section.

Data Collection

A roster of assigned contracting officers, obtained from the personnel section of ASD, listed approximately 140 contracting officers. Data was obtained from small groups ranging in size from one to four, as required by the varying schedules and job commitments of the respondents. In a very few cases, where it was not possible for the researchers to personally contact the respondents, the data was obtained using the respondent's supervisor as an intermediary.

Each session was initiated with a short briefing which explained the purpose of the research. The instrument was distributed to the respondents for their examination and questions were answered. Anonymity was stressed, and the respondents were assured that all supplied information would be kept confidential and depersonalized for use in this study. To this end, survey control numbers were assigned. Arrangements were made to collect the instruments two days after distribution, although they

could be completed in approximately fifteen minutes. In this manner, a 92 percent return rate was achieved as indicated in Table 1 below.

Table 1
Summary of Survey Responses

Usable Responses	Responses Incomplete or Unanswered	Not Returned	Personnel on Leave or Transferred	Total Instruments Distributed
109	20	3	8	140

Data Collection Instrument

The data collection instrument (Appendix A) consisted of a three-part questionnaire followed by a demographical data sheet. Part one contained four questions dealing with job motivation. Parts two and three each asked nine questions which were designed and used by Gemmill and Thamhain in a previous study (13) to measure influence styles. Each of these sections are discussed more fully below.

In part one, the data for analysis of job motivation was obtained by measuring the ". . . general devotion of energy to job tasks [27:26]" with a four item questionnaire developed by Patchen et al. (27), in a study of employee motivation and morale. That portion of the Patchen questionnaire dealing with job motivation indices

was used intact to maintain validity. Patchen (27) addresses the validity of the questionnaire in his study, and states that:

. . . in most cases, the conditions that permit easy inference of motivation do not exist. . . . While interest in innovation may often be an indicator of job motivation, we are concerned here with job motivation from a more general standpoint, usually shown by general devotion of energy to job tasks [27:26].

General devotion to job tasks then will become a measure of personal motivation.

Parts two and three of the measurement instrument were designed to measure the manager's perceived influence styles. This part of the survey had been used and validated in previous research efforts (13; 31). In completing this measurement device the respondent was asked to rank/order the responses in terms of how important he felt each response was in job accomplishment. The basic structure of these questions used French and Raven's typology of power ". . . which had been modified by Gemmill and Thamhain and used for various power style studies . . . [31:12]" in similar situations in the past.

To insure continued reliability of the measurement instrument, the instrument used to measure influence style was replicated as prescribed by Thamhain and Wilemon (31) with the only change being a minor alteration to the question stem designed to provide a more neutral question and eliminate potential bias.

The unmodified Thamhain and Wilemon questionnaire is reproduced as Figure 6 and for comparison, the modified version is presented as Figures 7a and 7b. French and Raven's power bases are used as a foundation to categorize influence styles of the manager. The comparison of questionnaire item and power base follows:

<u>Survey Item</u>	<u>Power Base</u>
1	Formal
2	Reward
3	Work challenge
4	Reward
5	Reward
6	Coercive (Fund allocation)
7	Referent
8	Expert
9	Coercive

Item "3" was also used to indicate a manager's feelings of how he may increase motivation by emphasizing professional challenge. Items "6" (fund allocation) and "3" (work challenge) were included because,

. . . in interviews with project managers they were mentioned as important factors and in some of the literature on project management they are mentioned as methods of influences [13:218].

To determine that clarity and understanding of the survey was not affected by the revisions, a pre-test was administered to twenty graduate students in the Air Force Institute of Technology, School of Systems and Logistics. The surveys did not present any interpretive difficulties to these students and were therefore used as designed.

Why, in your opinion, do

- your subordinates (S)
- other personnel who support your project (P)

comply with your orders and recommendations?

(Rank in order of importance those reasons that you feel apply. Use "1" for most important reason, etc.).

	(S) Your Subordinates	(P) Other Project Personnel
They feel you have the formal authority		
They feel you can influence their salary adjustments		
They are interested in this type of work and see it as professionally challenging		
They feel you can influence future work assignments		
They feel you can influence their promotion		
They feel you can influence fund allocation		
You have established personal friendship with them		
Because they respect and place confidence in your special knowledge and advice		
They feel you can do something to penalize or hurt them in some way		

Figure 6. Unmodified Thamhain and Wilemon Questionnaire

Part II--Instructions

Part II of the survey requests you to rank each of the responses in order of importance (from 1-9). Please use "1" for the most important response, etc. Again, please answer each question as candidly as possible in the way you see things or the way you feel about them.

Why, in your opinion, do your subordinates comply with your orders and desired or recommendations?

	Your ranking
1. Your subordinates feel you have the formal authority	_____
2. Your subordinates feel you can influence their salary adjustments	_____
3. Your subordinates are interested in this type of work and see it as professionally challenging	_____
4. Your subordinates feel you can influence future work assignments	_____
5. Your subordinates feel you can influence their promotion	_____
6. Your subordinates feel you can influence fund allocation	_____
7. You have established personal friendship with your subordinates	_____
8. Because your subordinates respect and place confidence in your special knowledge and advice	_____
9. Your subordinates feel you can do something to penalize or hurt them in some way	_____

Figure 7a. Modified Thamhain and Wilemon Questionnaire

Part III--Instructions

Part III of the survey requests you to rank each of the responses in order of importance (from 1-9). Please use "1" for the most important reason, etc. Again please answer each question as candidly as possible in the way you see things or the way you feel about them.

Why, in your opinion, do other personnel who you associate with in your work comply with your orders and desires or recommendations?

	Your ranking
1. Your associates feel you have the formal authority	_____
2. Your associates feel you can influence their salary adjustments	_____
3. Your associates are interested in this type of work and see it as professionally challenging	_____
4. Your associates feel you can influence future work assignments	_____
5. Your associates feel you can influence their promotion	_____
6. Your associates feel you can influence fund allocation	_____
7. You have established personal Friendship with your associates	_____
8. Because your associates respect and place confidence in your special knowledge and advice	_____
9. Your associates feel you can do something to penalize or hurt them in some way	_____

Figure 7b. Modified Thamhain and Wilemon Questionnaire

Assumptions of the Study

As was previously stated, the purpose of this research was to determine if a relationship existed between a manager's level of motivation and his selection of a particular influence style. In examining this potential relationship the following assumptions were made in this study.

1. The sampled population of contracting officers represented a homogenous group performing essentially the same type of job and is a representative cross-section of the population that exists in other SPOs.
2. Each respondent answered each question independently of the other respondents.
3. The data was based on the respondent's individual feelings and perceptions. Therefore, each response is a reflection of his true feelings concerning the question.
4. The respondents accurately rank/ordered their sources of influence on the survey scales.
5. The sources of influence used in the survey instrument included all of the influence sources that are important to the contracting officer.
6. The respondents' various levels of motivation could be differentiated with the use of the survey measurement device.

7. The degree of importance associated with each influence style is indicative of the frequency of use of that style.

Limitations of the Study

1. The contracting officers selected in this study are affected by variances in levels of experience and the type of weapons system they are working with. The degree of public controversy associated with their weapons system may have played a role in determining the responses given by the respondents.

2. This study uses a sample of convenience. Therefore, any inferences made to another population must be drawn with care.

Statistical Techniques

Nonparametric statistical techniques were employed in this research. The population of 109 observations will manifest a "normal distribution" over all of the variables tested because of the Central Limit Theorem which states:

. . . as the sample size, n , increases; the distribution of the mean, $\bar{X}$, of a random sample taken from practically any population approaches a normal distribution. . . [37:125].

In general, when the sample size, N , is larger than 30 observations, "normality" exists (37:125).

Although "normality" is an important factor to be considered when statistically analyzing data, another equally important factor must be addressed--level of

measurement. Helmstadter (16:178,180) lists and defines four levels of measurement: nominal, ordinal, interval, and ratio. According to these definitions the data that was obtained for this study was of the ordinal level; that is, the data from a ". . . measurement operation [which] permits judgements of 'greater than' (>) or its opposite 'less than' (<), . . . are said to be at the ordinal level [16:178]."

Ordinal data however does not limit data analysis. Statistical analysis of the relationship between independent ordinal variables can be determined with correlation studies if nonparametric statistical techniques are used (29:31). "The term correlation refers to the degree of correspondence or relationship between two variables [28:91]." Therefore, the hypothesis of the relationship between motivation and influence style was tested with correlational methods which used nonparametric statistic techniques.

Statistical Assumptions

According to Siegel (29:31) it is extremely difficult to obtain data on a level that would permit the use of parametric testing techniques when dealing in the behavioral areas. Nonparametric testing techniques will allow statistical testing of data when it has been collected at the nominal or ordinal level of measurement. Nonparametric tests do not specify conditions about the

parameters of the population from which the sample was taken (29:31). However,

Certain assumptions are associated with most non-parametric statistical tests, i.e., that the observations are independent and that the variable under study was underlying continuity. . . [29:31].

A further assumption was that the collected data could be based on ranks. Data arranged in ranks as well as data with numerical scores that have the strength of ranks can be analyzed by some nonparametric test techniques. Siegel states:

If data are inherently in ranks, or even if they can only be categorized as plus or minus (more or less, better or worse), they can be treated by nonparametric methods, whereas they cannot be treated by parametric methods unless precarious and perhaps unrealistic assumptions are made about the underlying distributions [29:33].

The assumptions of "underlying continuity," ranking, and independence which are necessary to meet the requirements of nonparametric testing will be adequately fulfilled in this study. Underlying continuity may be assumed because the data base consisted of a relatively homogenous group of managers performing essentially the same task. Each respondent was a warranted contracting officer for the United States and was subject to the same laws and regulations of the United States Code and Armed Services Procurement Regulation (ASPR). The assumption of independence is valid because the respondents completed the surveys independently of one another with no collaboration allowed.

Data Processing

The responses from the completed surveys were translated into numerical data for treatment and analysis. Because the responses contained only ordinal measurements, nonparametric analysis techniques were used to assure that proper evaluation of the collected data occurred. Therefore, the analysis of the variables employed the Kendall Rank correlation method.

The Kendall Tau

The Kendall Tau (T) technique of correlation analysis uses a rank order of the variables to compute the degree of association between the variables. Siegel (29: 215) shows that tau can be expressed as:

$$\text{Tau} = \frac{\text{Actual Total of the Ranked Score}}{\text{Maximum Possible Total Score}}$$

A mathematical formula of the above is:

$$T = \frac{S}{\frac{1}{2}N(N-1)}$$

where:

N = the number of observations, and

S = the summation of the number of ranks beyond the first one that are larger than it minus the number of ranks that are less (29:216).

The significance of tau can be tested using a normal distribution

If a random sample is drawn from some population in which X and Y are unrelated, and the members of the

sample are ranked on X and Y, then for any given order of X ranks, all possible orders of the Y ranks are equally likely [29:220].

Therefore, for each of the many possible rankings of Y there was an associated value of tau which followed an approximate normal distribution (29:220).

When the number samples is larger than 10, the sample may be assumed to follow a normal distribution with the following characteristics:

$$\text{Mean} = \mu_T = 0$$

$$\text{Standard Deviation} = \sigma_T \sqrt{\frac{2(2N+5)}{9N(N-1)}}$$

$$Z = \frac{T - \mu_T}{\sigma_T}$$

The above formulas suggest that if the calculated Z statistic is greater than the Z critical value (found in a table of normal probabilities) at a selected level of significance, the null hypothesis may be rejected. Testing the significance of tau was required to determine whether the results that were received could have been attributed to chance. Calculating tau values for a large number of observations is tedious and time-consuming; therefore, the tau values associated with the observations in this study were calculated with a computer program. A listing of the program used in this study appears as Appendix C.

Coding the Data

The responses collected to analyze the motivation variable had numbers assigned to the possible choices. Those values assigned were summed to provide an index of motivation for that particular respondent. The coded values for each question will have a possible range from one to five, thereby providing a maximum motivation index of twenty and a minimum of four. The inference is that an individual with a high motivation index is more motivated than the individual who has a lower motivation index. Part II of the survey required the respondent to rank/order the listed influence styles in the order that they were important to him in accomplishing his job. These rank ordered raw data responses were used to develop independent correlation coefficients with the motivation variable for analysis.

Support of Hypothesis

When the sample size is greater than or equal to 10, a significance test of the Kendall tau correlation coefficient uses normal distribution tables for Z. High values of correlation coefficients (tau approaching either +1 or -1), are required to indicate support of the study's hypothesis. The statistical hypothesis was stated as follows:

Null hypothesis: $H_0: T = 0$

Alternate hypothesis: $H_1: T \neq 0$

The correlation coefficient was tested at a specified level of significance of $(1-\alpha) = .95$ using a two-tailed test. This criteria test yields a Z critical ≈ 1.95 . Therefore, if a calculated Z sample is greater than the Z critical, for all of the addressed influence styles, then the null hypothesis would be rejected. Rejecting the null hypothesis necessarily implies a failure to reject the alternate hypothesis that there is a correlation between the variables. This test will be applied to each of the influence styles as related to motivation. If the null hypothesis cannot be rejected for all the addressed influence styles, then it will be assumed that there is not enough evidence to support the proposed research hypothesis.

The following chapter is devoted to an analysis of the data followed by a chapter devoted to findings and recommendations.

Chapter 4

DATA PRESENTATION AND ANALYSIS

Motivation is the first variable discussed as it applies to the desired influence style of the data providing sample. Next, descriptive and statistical analyses are performed on the relationships among motivation and perceived influence styles of the procurement contracting officers (PCOs). The analysis of the data culminates with an evaluation of the overall hypothesis:

H_1 : A relationship exists between the personal level of motivation of an integrator and the influence style he relies on as he gets others to perform for him.

H_0 : A relationship does not exist between the personal level of motivation of an integrator and the influence style he relies on as he gets others to perform for him.

For purposes of this study H_0 is the null hypothesis and H_1 is the alternate hypothesis. The basic hypothesis was examined as it applies to two separate work environment situations: the PCO's relationship with his subordinates and the PCO's relationship with his work associates. Work associates, for the purpose of this study was defined as those persons outside of his formal organization who the PCO must contact to perform his job.

Analysis of Motivation Indices

Each survey response for motivation was separately coded. The coded values were averaged by respondent to obtain a motivation index which ranged from 11 to 19 (2:129).

Various occupational groups will demonstrate differences in motivational levels. For example, "A group of high-level salesmen and a group of engineering personnel show much higher 'more motivated' scores than do production workers [27:39]." The motivational index score for the PCO was higher than scores obtained by researchers with other groups. An example is shown in Table 2.

Table 2

A Comparison of the Average Index and Standard Deviation of Motivational Level of the PCO and the Project Managers Surveyed by Gemmil and Wilemon (14)

	<u>Average Index</u>	<u>Standard Deviation</u>
PCO	15.8	2.2
PM	14.8	2.2

This relatively high mean motivation index may be explained by the homogeneity of the PCO population and the fact that the lower level needs of those people are well satisfied. Because the PCOs are professional managers it is assumed that the higher level needs described in Chapters 1 and 2 are their primary motivators. The desire

to satisfy these higher level needs is therefore reflected in a high motivation index (27:39).

Tables 3 and 4 present a correlation matrix which represents the relationships among the four motivation questions contained in the survey instrument.

Table 3

Correlations Among Items Used in Indices of Job

Motivation for the PCO

(Pearson Product-Moment Correlation Coefficient, r)

	<u>Item 2</u>	<u>Item 3</u>	<u>Item 4</u>
Item 1	.40	.22	.26
Item 2		.22	.23
Item 3			.23

Table 4

Correlations Among Items Used in Indices of Job

Motivation as Measured by Patchen (27:29)

(Pearson Product-Moment Correlation Coefficient, r)

	<u>Item 2</u>	<u>Item 3</u>	<u>Item 4</u>
Item 1	.38	.05	.17
Item 2		.22	.30
Item 3			.24

The correlation coefficients were obtained using Pearson product-moment correlation coefficient, r . The figures are similar to and compare favorably with those obtained by Patchen in his study of employee motivation and morale (27:28).

Data Relating to Influence Styles

An analysis of the data relating to influence styles is presented, by question, using two techniques. The first technique provides a descriptive summary of the influence styles ranked by importance as they are perceived by PCOs in gaining support from their subordinates or work associates. The second analysis technique employs a correlation analysis which examines the intensity of the relationship between the perceived influence styles of the PCO and his personal level of motivation. All correlation figures were obtained through the use of Kendall Rank Order correlation techniques described earlier.

Analysis of Influence Style Importance

General analysis. In analyzing the data collected concerning the perceived importance of an influence style, the researchers divided the ranks of the responses into three groups. Questions ranked 1, 2, or 3 were assumed to be important to the respondents, while questions ranked 7, 8, or 9 were assumed to be relatively less important.

Responses with ranks of 4, 5, or 6 were assumed to reflect indifference for the respondents. Figures 8 and 9 consolidate the answers of the respondents by question and indicate the overall perception of the importance attached to each question for subordinates and work associates, respectively.

Figure 10 indicates and compares the relative importance that the PCOs ascribe to each of the nine influence styles. In constructing this table the researchers emphasized the important (ranks 1, 2, or 3) and unimportant (ranks 7, 8, or 9) rank categories while ignoring the indifference area responses (ranks 4, 5, or 6). The researchers assumed that the indifference responses would provide no meaningful comparison data to analyze in the study.

This portion of the study closely supports the findings of Thamhain and Wilemon (31) in that three of the influence styles--formal, expert, and referent (friendship)--along with the factor of the challenge of the work itself seem to have particular importance for the PCOs when obtaining support from their subordinates. Figure 11 illustrates the results reported by Thamhain and Wilemon and are presented for comparison.

Figure 10 also indicates that these factors have the same degree of relative importance in the PCO's relationships with his work associates and that the expert

SURVEY QUESTIONS	RANKS OF IMPORTANCE								
	Important			Indifference			Unimportant		
	1	2	3	4	5	6	7	8	9
Question 1: They feel you have formal authority	32	22	19	18	9	1	4	0	4
Question 2: They feel you can influence salary	1	1	9	9	16	23	15	20	15
Question 3: They feel work challenge is a motivator	17	29	28	16	4	5	4	4	2
Question 4: They feel you can influence work assignments	2	6	8	23	32	13	16	2	7
Question 5: They feel you can influence their promotion	3	6	14	15	19	16	20	7	9
Question 6: They feel you can influence fund allocation	0	1	0	3	1	12	6	25	61
Question 7: They feel they are friends with you	8	13	20	12	13	8	15	14	6
Question 8: They feel you are an expert in your field	37	30	17	5	6	5	3	2	4
Question 9: They feel you can penalize them in some way	0	1	5	3	5	12	19	30	34

Figure 8. Frequency Distribution of the Survey Questions by Ranked Importance as applies to Subordinates

SURVEY QUESTIONS	RANKS OF IMPORTANCE								
	Important			Indifference			Unimportant		
	1	2	3	4	5	6	7	8	9
Question 1: They feel you have formal authority	35	31	21	12	2	2	1	0	5
Question 2: They feel you can influence salary	0	3	2	5	8	12	24	33	22
Question 3: They feel work challenge is a motivator	9	23	33	24	9	4	4	1	1
Question 4: They feel you can influence work assignments	1	1	9	11	30	30	14	6	7
Question 5: They feel you can influence their promotion	1	0	4	7	13	24	27	16	17
Question 6: They feel you can influence fund allocation	1	0	4	4	11	14	8	22	45
Question 7: They feel they are friends with you	10	14	18	30	14	3	3	11	6
Question 8: They feel you are an expert in your field	46	35	15	6	2	2	2	1	0
Question 9: They feel you can penalize them in some way	0	1	10	6	10	9	17	17	39

Figure 9. Frequency Distribution of the Survey Questions by Ranked Importance as applies to Work Associates

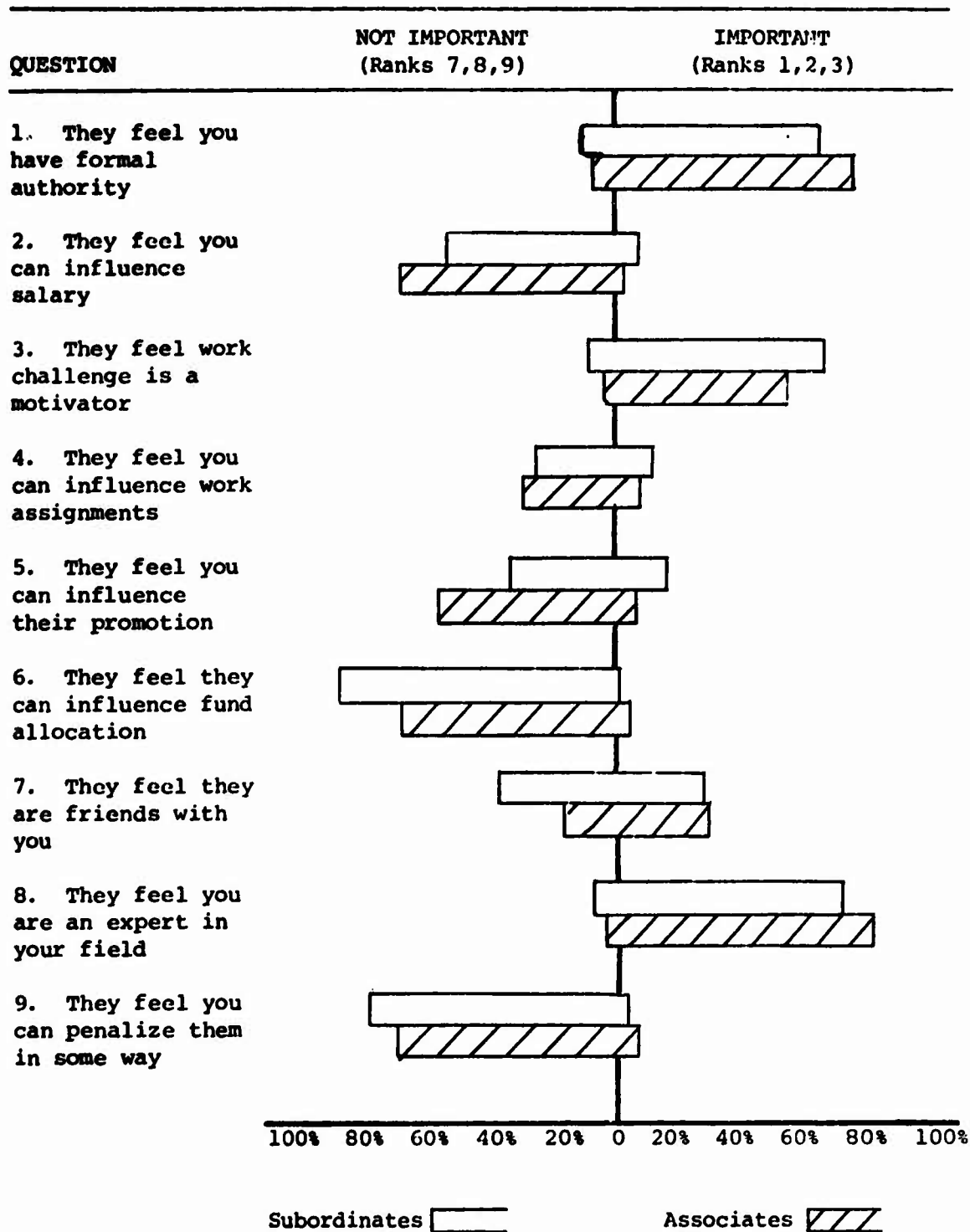


Figure 10. Percentage of the Total Respondent's Ranking a Style as One of the Three Most Important and Three Least Important Influence Styles

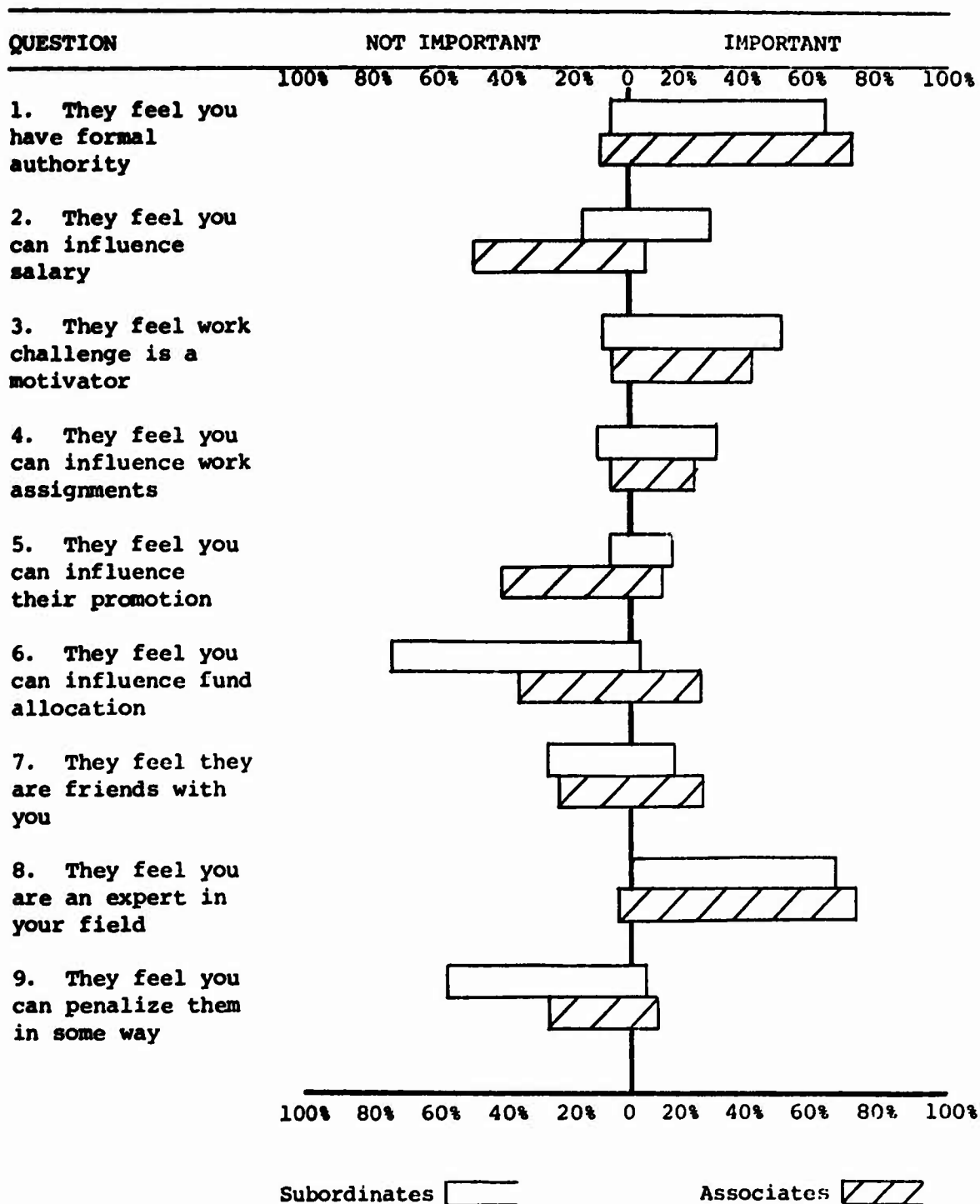


Figure 11. Percentage of the Total Respondent's Ranking a Style as One of Three Most important and Three Least Important Influence Styles as Reported by Thamhain and Wilemon (31). (The original figure appears on page 10.)

influence style seems to be most important in gaining support from work associates and subordinates.

Another interesting observation may be made by noting that "formal authority" appears to be more important to the relationships between the PCOs and their work associates than between the PCO and his subordinates. This may be partly explained by examining the work environment of the PCO.

The formal influence style (authority) of the PCO is couched in public law and Department of Defense regulations. Therefore, the major influence source that is officially available to the PCO is "formal" and is considered important and necessary in his dealings with civilian contractors who recognize this "formal" influence. Without the derived formal influence of laws and regulations the PCO would necessarily have to rely on other sources of influence to obtain support in his job.

In summary, Figure 10 indicates that the PCOs feel they can gain the most support from both their subordinates and work associates if they emphasize the influence derived from providing a challenging work environment and the expert, referent and formal power bases.

Conversely, the PCOs feel that the reward influence styles comprising salary adjustment, future work assignment, and promotion have less affect on eliciting support. Additionally, the influence style of punishment and the

factor of fund allocation were considered least important and the use of these influence styles would have a minimal affect on gaining support. Although the degree of importance attached to the reward (expressed as salary influence, future work assignment, and promotion) punishment, and referent (friendship) influence styles has been rated somewhat lower than the formal and expert styles, these styles are still frequently used by the PCO to gain support. The PCO may use several influence styles and

The specific influence bases used often depends upon the authority he [the PCO] possesses and his knowledge of what motivates various . . . participants [14:4].

In other words, a PCO can learn, over time, to select an influence style to be used for a particular individual in a particular situation (14:4).

Although the choice of an influence style for a particular situation may vary with each PCO, there did not appear to be an appreciable difference in the degree of importance attached to the use of that style relative either to the PCO's subordinates or work associates. The PCOs did not perceive one influence style as being more important in their dealings with subordinates and a contrasting style as being more important in their dealings with work associates. A summary of the correlation coefficients of the PCO's perceived importance of a particular influence style between subordinates and work associates is presented in Table 5.

Table 5
An Intercorrelation of Influence Style Responses
Related to Subordinates versus Work Associates

Perceived Influence Style	Tau*
Formal	.39
Salary	.31
Work Challenge	.45
Future Work Assignments	.35
Promotion	.22
Funds Allocation	.38
Friendship	.50
Expert	.53
Punishment	.26

*All data is significant at the .99 (1- α) level.

The significant correlation coefficients presented in Table 5 indicate that the PCOs consider the same influence style to be important regardless of whom they are dealing with. Therefore a PCO will not be likely to use one influence style with his subordinates and a different influence style with his associates.

A summary of the role of personal motivation in determining the importance or nonimportance of a particular influence style to be used in dealing with subordinates and associates is presented in Table 6. The small correlation coefficients and significance levels seem to indicate that no general linear relationship exists between the level of personal motivation and the perceived importance of a particular style. This nonrelationship is discussed further using descriptive and analytical statistics in Figures 12 through 20. Each table is representative of one of the nine questions contained in the survey instrument and indicates each question's perceived degree of importance relative to a particular level of motivation. Figures 12 through 20 also suggest that the level of motivation has little effect on the importance of a particular influence style. However, Figure 19, dealing with the influence style of expertise, deviates from this trend and seemed to indicate a definite relationship with motivation. Each figure is discussed separately.

Table 6
Kendall's Tau Correlation Coefficients for the Variables
"Level of Motivation" and "Perceived Influence Style"
as Applied to Subordinates and Work Associates,
and (1- α) Level of Significance

Perceived Influence Style	Subordinates		Work Associates	
	Tau	(1- α)	Tau	(1- α)
Formal	.04	(.45)	.10	(.87)
Salary	.02	(.19)	.10	(.88)
Work Challenge	.01	(.06)	.03	(.34)
Future Work Assignments	.08	(.77)	.09	(.84)
Promotion	.00	(.01)	.11	(.92)
Funds Allocation	.05	(.56)	.06	(.66)
Friendship	.02	(.20)	.01	(.11)
Expert	.12	(.93)	.13	(.95)
Punishment	-.03	(.34)	-.19	(.99)

Specific Analysis of Individual Influence Styles

Formal authority. Question 1 states, "Your subordinates/associates feel you have the formal authority." As indicated in Figure 12, the degree of influence derived from the formal power base appears to occur relatively constant throughout the motivation levels. In general, formal influence is seen as less important when dealing with subordinates than with work associates. This indicates that in most instances, the PCO may rely on an influence style other than formal to obtain support from his subordinates. Yet, formal influence may be the dominant style in dealing with his work associates who include civilian contract representatives. The PCO's formal influence is derived from the legal authority he possesses as a representative for the Federal Government. Therefore the type of contract he deals with provides him with this "formal authority."

Conversely, those PCOs with a low motivation index appear to indicate that formal power is more important in dealing with subordinates rather than work associates. This may be partly explained in that an individual with low motivation may have little interest in his own task and therefore is not interested in the feelings of his subordinates. Hence, he may use the "do it by the numbers" technique.

The correlation analysis of these variables indicates that no relationship exists between motivation and

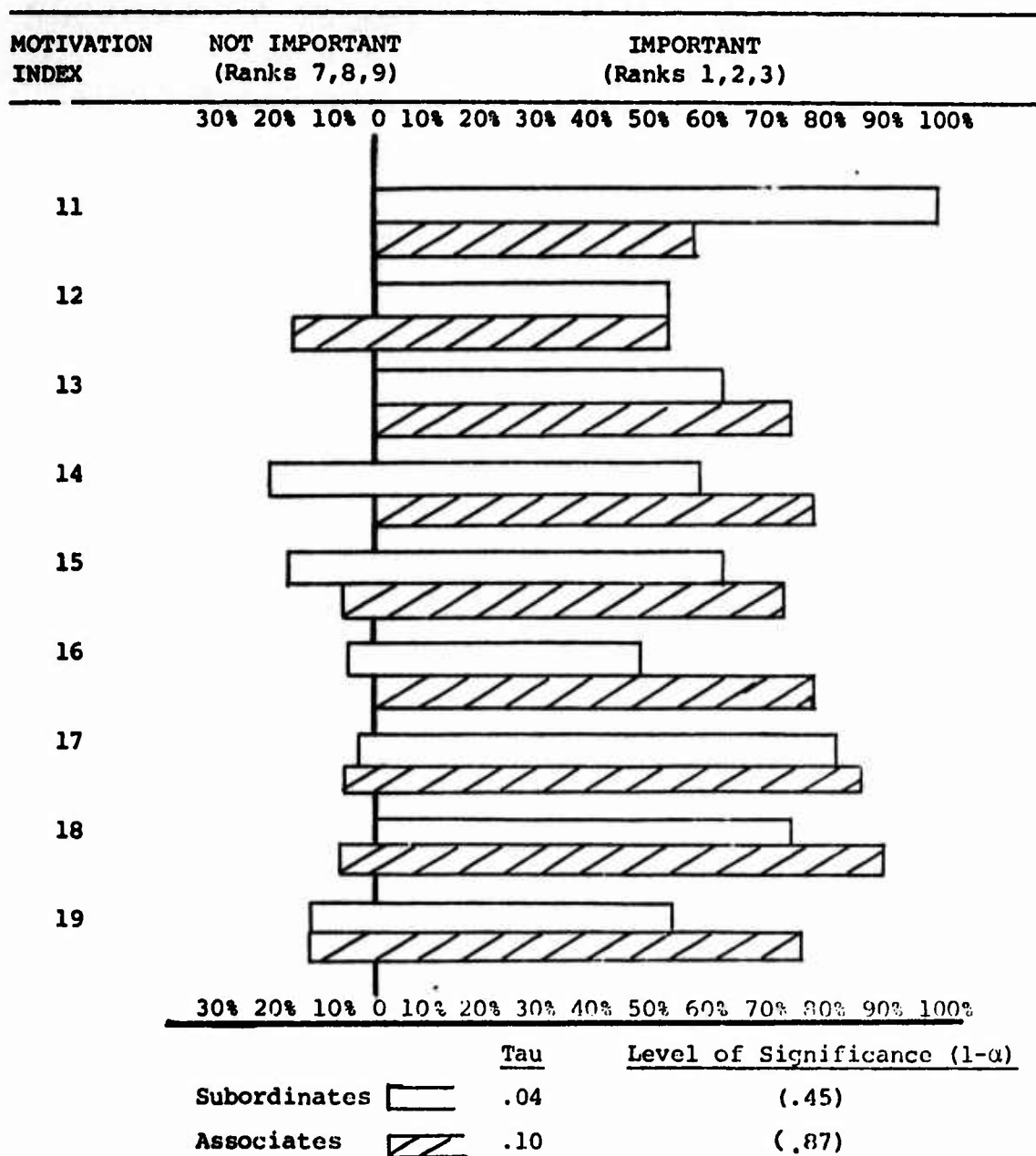


Figure 12. Percentage of Perceived Importance of Responses by Motivation Index, Associated Kendall Correlation Coefficients and Level of Significance Representing Question 1; "Your subordinates/associates feel you have formal authority."

formal influence when dealing with subordinates. As indicated in Figure 12, the calculated tau of .04 and associated level of significance of .45 is supported by the descriptive analysis. However the correlation coefficient between motivation and formal influence exhibits an increase in value to a tau of .10 at a .87 level of significance when work associates are considered.

The difference in tau values may be logical because the PCO interrelates with his subordinates in a controlled environment. However, the fact that the correlation coefficient increases when the PCO is dealing with work associates may be explained by noting that an exchange of information between the PCO and a contractor's representative occurs as the PCO attempts to impose his will on the representative. Therefore, the formal influence possessed by the PCO as a result of his role as a representative of the Federal Government may be important as a "stand-by" influence method. The fact that "formal power" exists, even if not directly exploited, makes it much easier to use other power bases. Therefore, the formal influence style must be recognized by both the PCO and the contractor's representative as an important potential base for influence.

Salary adjustment. Question 2 states, "Your subordinates/associates feel you can influence their salary adjustments." In most of the motivation ranges, as indicated in Figure 13,

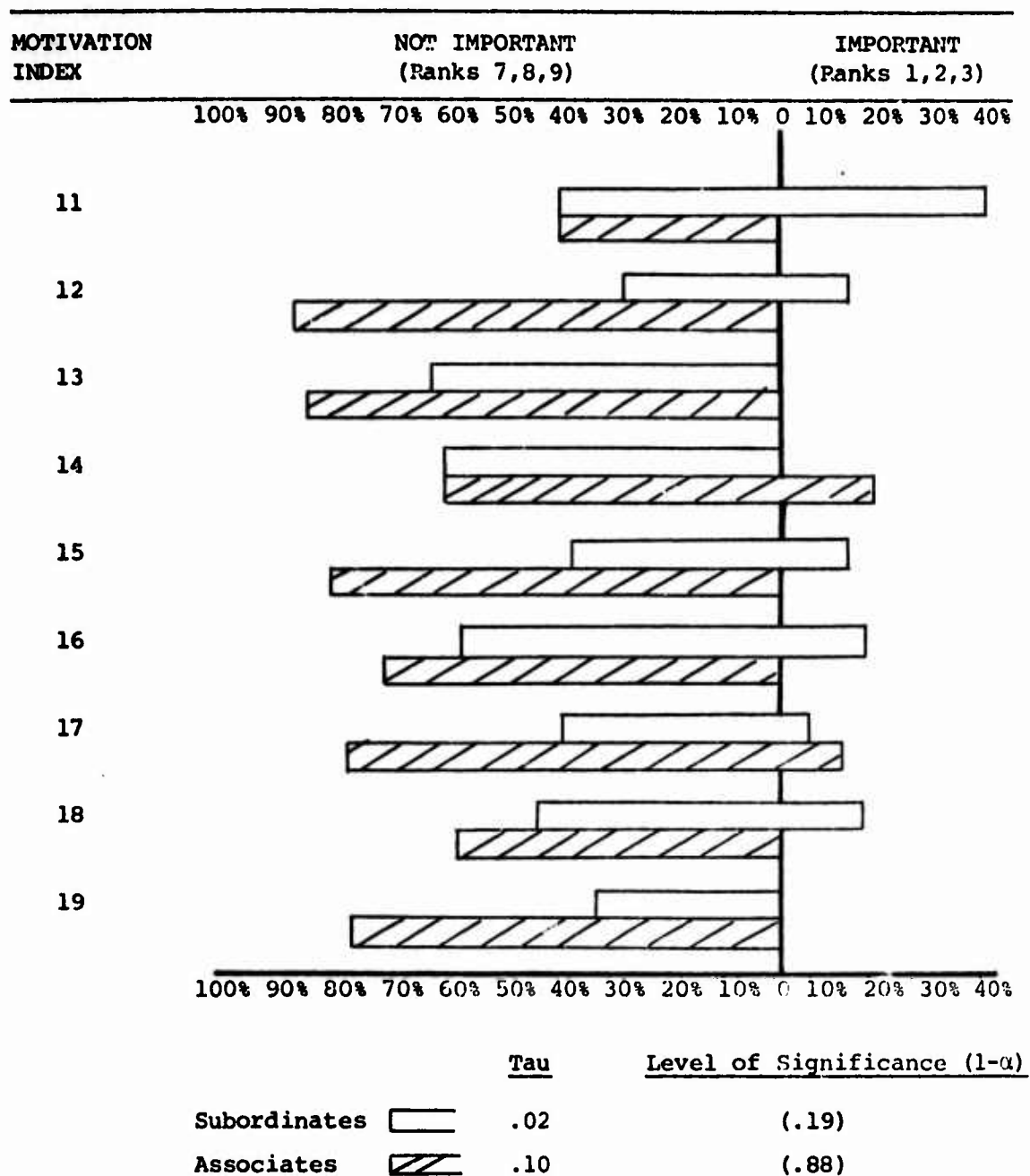


Figure 13. Percentage of Perceived Importance of Responses by Motivation Index, associated Kendall Correlation Coefficients and Level of Significance Representing Question 2; "Your subordinates/associates feel you can influence their salary adjustments."

the availability and use of salary adjustment as an influence style was considered to be unimportant for both subordinates and work associates. The exception however, again occurred with those PCOs who possessed a low motivation index. Although none of the PCOs possessing a low motivation index considered this question as important when related to work associates, fully 40 percent considered salary adjustment as important when applied to subordinates. This finding parallels the results that were reported earlier concerning PCOs with this motivation level. It appears then that the importance attached to salary adjustment as an influence style for this group goes "hand-in-glove" with the respondent's perceived importance of formal influence in dealings with subordinates.

As noted in Figure 13, a correlation coefficient of .02 at a level of significance .19 is realized when motivation is correlated to the influence style of salary adjustment. This calculated relationship seems to agree with the descriptive analysis illustrated by the figure. However, when addressed to work associates, the correlation between salary and motivation shows an increased linear relationship with a resulting tau of .10 significant at the .88 level. It appears then, that the lower motivated PCO may believe salary to be a motivator for his work associates. The less motivated PCO may then make use of money

as an influence style since the use of other styles generally requires more effort on his part. Negotiations resulting in a satisfactory contractual agreement might be considered by these PCOs as a means of influencing the work associate's salary.

Work challenge. Question 3 states, "Your subordinates/associates are interested in this type of work and see it as professionally challenging." As illustrated in Figure 14, the results to this question indicate that, over most motivation levels, work challenge was considered important.

The tau values for the correlations between motivation and work challenge were very small. When applied to subordinates, the correlation coefficient between motivation and work challenge had a value of .01 with a corresponding level of significance of .06. When applied to work associates, the coefficient increased to .03 at a significance level of .34. These tau figures and significance levels support and amplify the descriptive analysis which indicates that there is no meaningful linear relationship between these two variables, even though the work challenge influence style is one of the most important to the PCOs.

Future work assignments: Question 4 states, "Your subordinates/associates feel you can influence future work assignments." Like the influence style factor of salary adjustment, future work assignment is also considered to

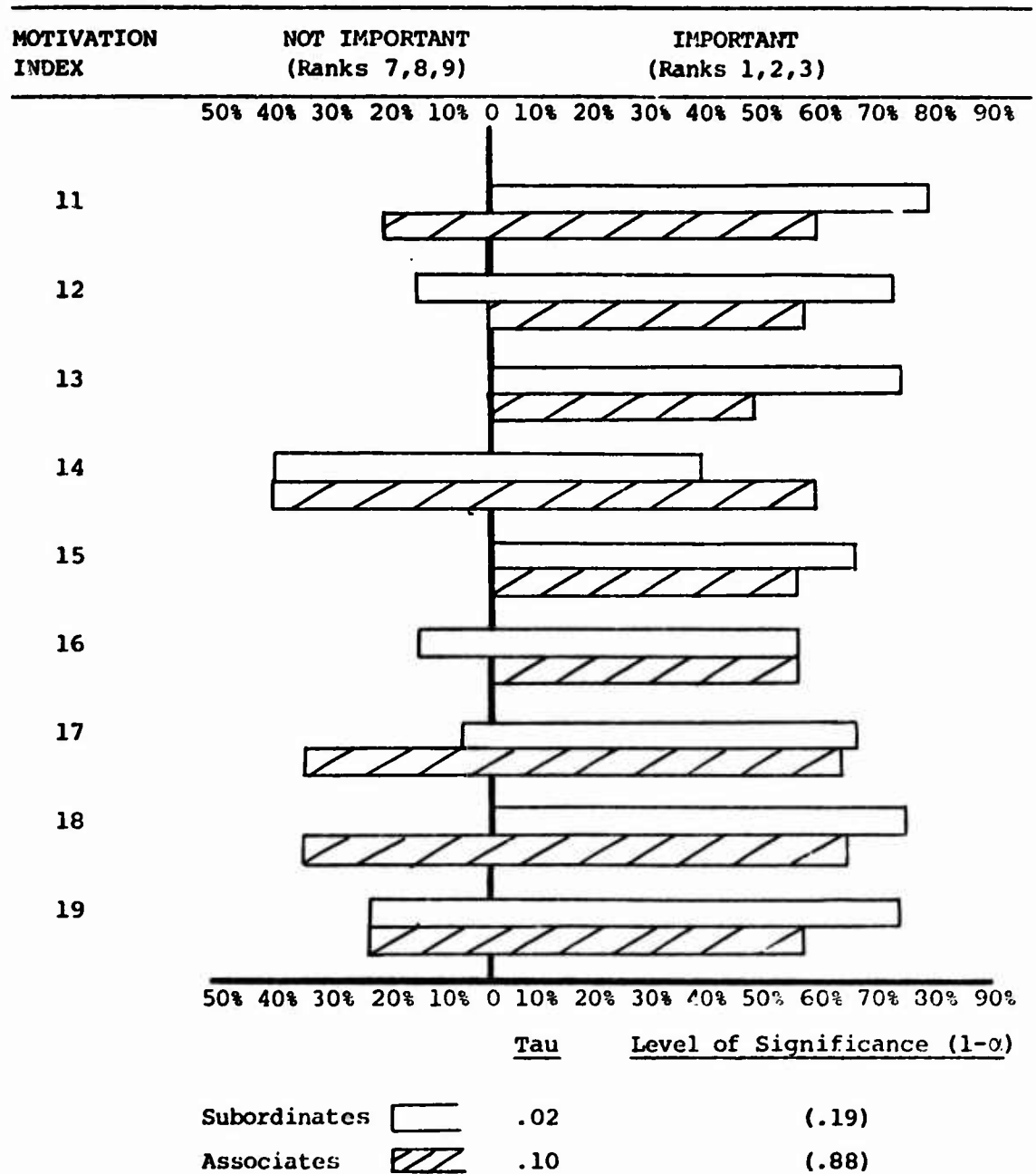


Figure 14. Percentage of Importance of Responses by Motivation Index, Associated Kendall Correlation Coefficients and Level of Significance Representing Question 3; "Your subordinates/associates are interested in this type of work and see it as personally challenging."

belong to the reward power base. However, unlike the responses that were reported concerning salary adjustment, future work assignments, on the whole, produced "indifference" perception responses; i.e., most of the respondents answered this question with the ranks of 4,5, or 6, resulting in a small percentage of important/unimportant responses (see Figure 15). The researchers consider this "indifference" perception as a shift toward importance. It may be assumed that the PCO's consider the emphasis on future work assignment as an influence style as somewhat more important in obtaining support from both subordinates and associates. This would seem to indicate that although the PCO perceived he could use the influence of future work assignments of his work associates he would not rely primarily on this influence method to gain support from them. For his subordinates, however, the PCO is able to formally exercise some control over future work assignments. But open reliance on this influence could be construed as a threat.

Statistical analysis of motivation and future work assignments produced a tau value of .08 at a significance level of .77 when subordinates are addressed. A tau value of .09 with an associated level of significance of .84 is achieved when work associates are analyzed. These statistical results imply that the more motivated PCOs perceive the influence style of future work assignments as

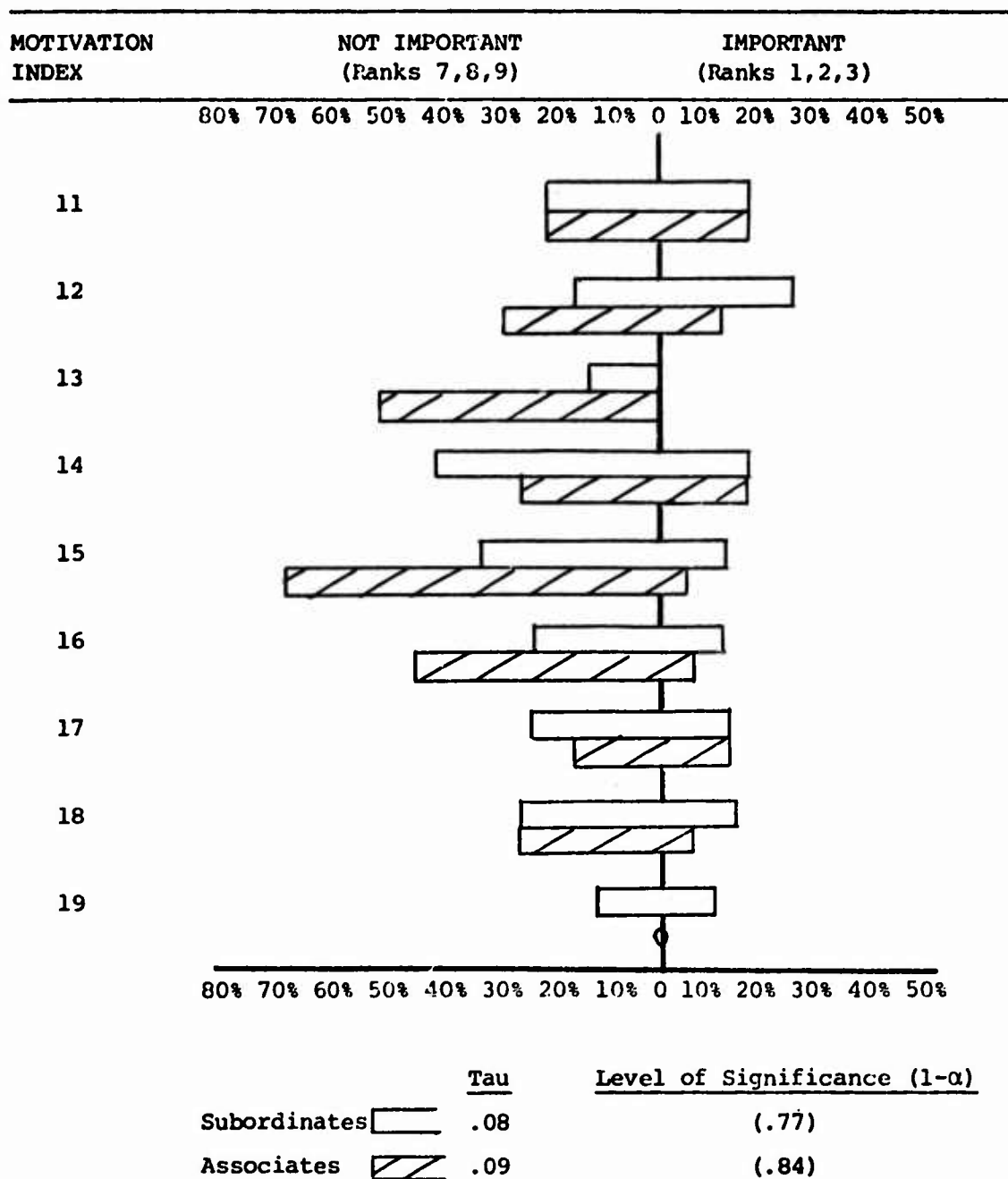


Figure 15. Percentage of Perceived Importance of Responses by Motivation Index, associated Kendall Correlation Coefficients and Level of Significance Representing Question 4; "Your subordinates/associates feel you can influence future work assignments."

more important than the less motivated PCO. These tau values seem to indicate that the PCO perceives little difference in his dealings with subordinates or work associates.

Promotion. Question 5 states, "Your subordinates/associates feel you can influence their promotion." This question is also considered to be a factor of the reward power base. As indicated by Figure 16, most PCOs perceive this influence style to be relatively unimportant. In general, the PCO places more emphasis upon this style when dealing with his subordinates. It appears that there was little or no relationship between the level of motivation and the degree of importance attributed to this influence style. Generally, the overall results of the question appear to support the logic that the PCO can have little influence over his associate's promotion, but can in many instances, influence the promotion prospects of his subordinates.

The tau value calculated for these variables as applied to subordinates is zero, yet when this influence style is applied to work associates tau is calculated to be .11 at a significance level of .92. This situation indicates that although the promotion influence style is unimportant overall, the less motivated PCO places less importance on the style as an influencing agent. Since this PCO is not motivated by promotion, he may perceive others as being not motivated by promotion either.

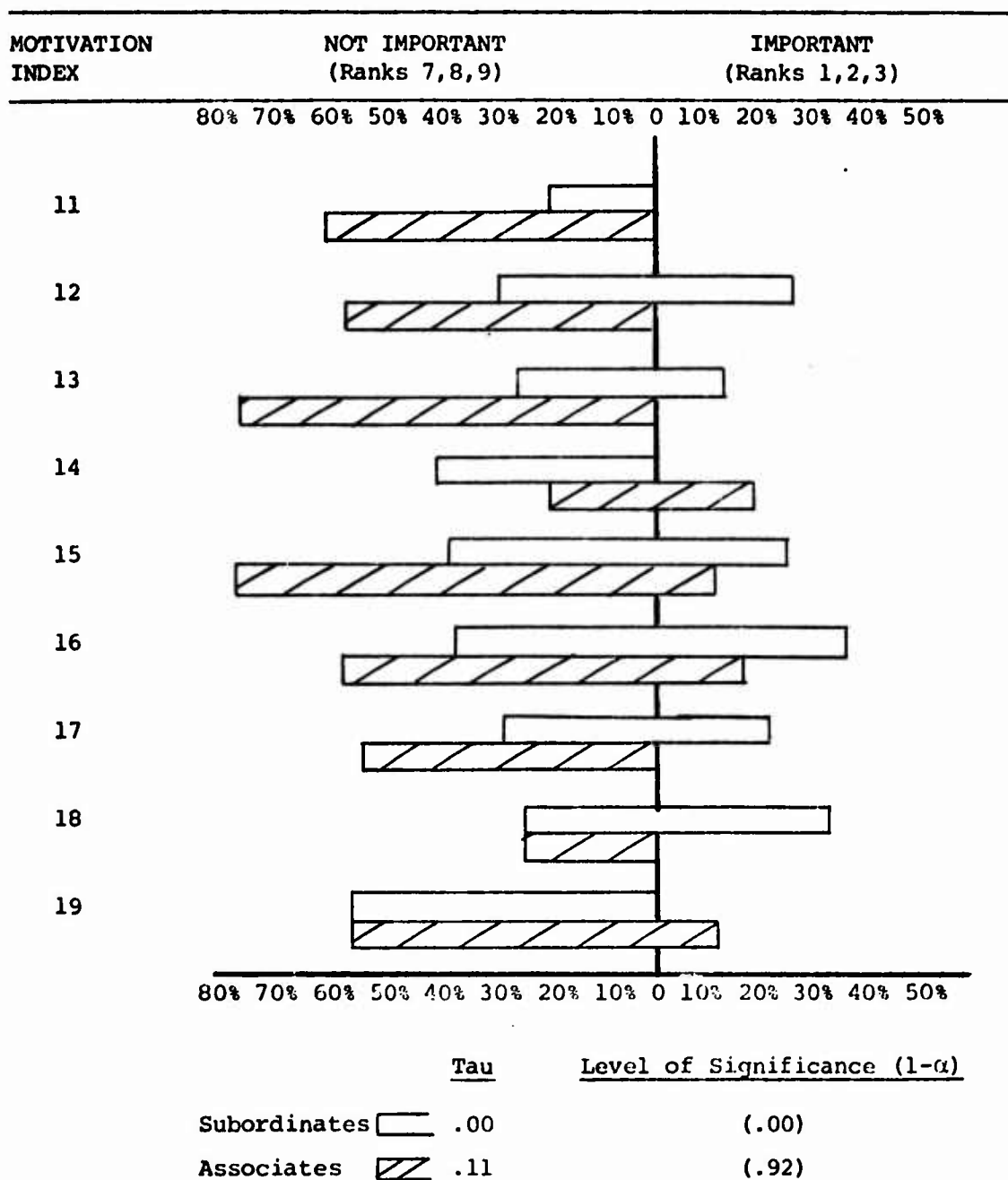


Figure 16. Percentage of Perceived Importance of Responses by Motivation Index, associated Kendall Correlation Coefficient and Level of Significance Representing Question 5; "Your subordinates/associates feel you can influence their promotion."

The strictly formal work of the PCO may be responsible for this conflict. While the PCO's environment generally provides job security and incremental longevity pay increases, actual promotional advancement opportunities to a higher level may be achieved largely through demonstrated performance (work success) rather than through a supervisor's evaluation. In these situations influence styles such as reward and punishment are not thought to be effective. However, dealing with work associates is an entirely different situation, for here the PCO's demonstrated performance will determine whether he "sinks or swims." Therefore, the influence style selected by the PCO should be tempered by his level of motivation, for it is in this glaringly visible environment that the PCO will attempt to achieve success.

Perhaps an assumption can be made that the more motivated PCO perceives his own promotion potential as being linked to the success or promotion of his associates. In other words, the promotion probabilities of both the PCO and his associate may hinge upon contract success. Therefore, this influence style may also be interpreted as being related to the motivational level of the PCO.

Fund allocation. Question 6 states, "Your subordinates/work associates feel you can influence fund allocation." As was stated in an earlier chapter, this question was included in the survey because several researchers in the

past have indicated that the ability to influence funds allocation was important in project management situations (14). However, as Figure 17 illustrates, the PCOs overwhelmingly considered this question unimportant both to subordinates and associates. The researchers felt that this response can be attributed to the regulated environment in which the PCO works. Within the federal sector, the PCO's actions are governed and regulated by public law and the Armed Services Procurement Regulations (3:17-21). Any attempt by the PCO to employ this influence style would immediately bring him under suspicion through conflict of interest laws. This action would jeopardize his position and subject him to fines, penalties, and judicial prosecution under federal statutes. It seems logical then, that the majority of the PCOs consider this influence style as unimportant in gaining support.

When the motivation levels are correlated to importance of funds allocation, a tau of .05 at a significance level of .56 is achieved as it applies to subordinates. A slight increase in tau to .06 at a significance level of .66 is noted when the correlation is performed with work associates. Therefore it appears that while for the most part the PCOs demonstrated that fund allocation was not an important influence style, it becomes still less important to the more motivated persons. The researchers believe that the word "funds" may have been misinterpreted by the

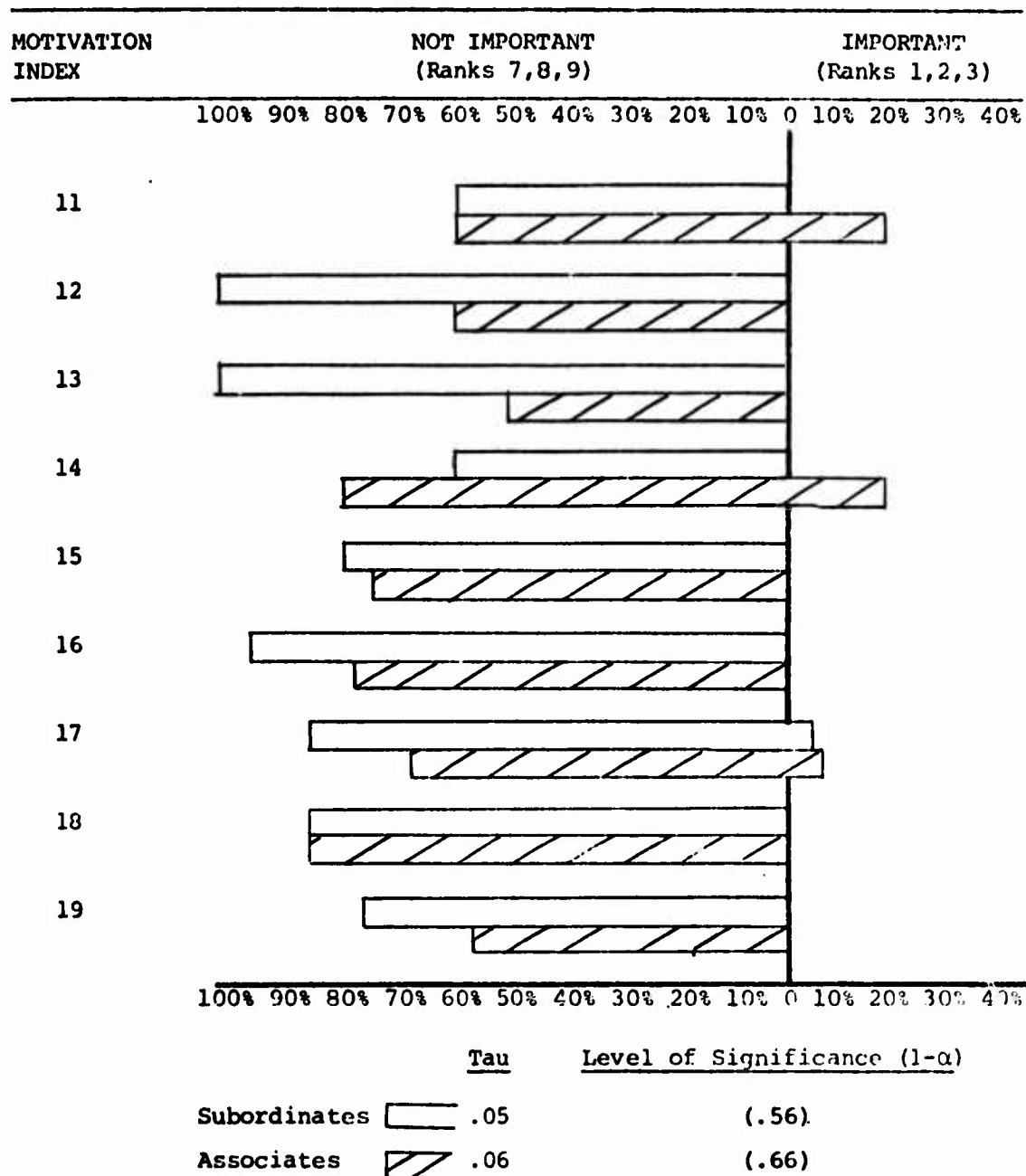


Figure 17. Percentage of Perceived Importance of Responses by Motivation Index, associated Kendall Correlation Coefficients and Level of Significance Representing Question 6; "Your subordinates/associates feel you can influence fund allocation."

respondents. "Funds" in the PCO environment connotes monies that have been allocated to DOD from Congress over which the PCO has little or no control. Perhaps a better word would have been "payment", for this term implies control over money that can be committed by the PCO to a specific contract.

Friendship. Question 7 states, "You have established personal friendship with your subordinates/associates." This question is intended to measure the perceived importance of the referent power base in determining an influence style. As illustrated by Figure 18, most of the PCOs attach a degree of importance to friendship in their dealings with associates. This importance can be explained by noting that the work environment of the PCO requires a great deal of negotiation with civilian contracting representatives to effect a mutually agreeable contract. Therefore, negotiations in an atmosphere of friendship may be perceived by the PCOs as being more fruitful than a negotiating atmosphere of antagonism.

However, a good percentage of PCOs perceive friendship as being unimportant in their relations with subordinates. This anomaly may be explained in that the moderately motivated PCOs perceive that friendship, between supervisors and subordinates, may not have a place in the work environment. It appears that these PCOs may be advocates of the "familiarity breeds contempt" axiom.

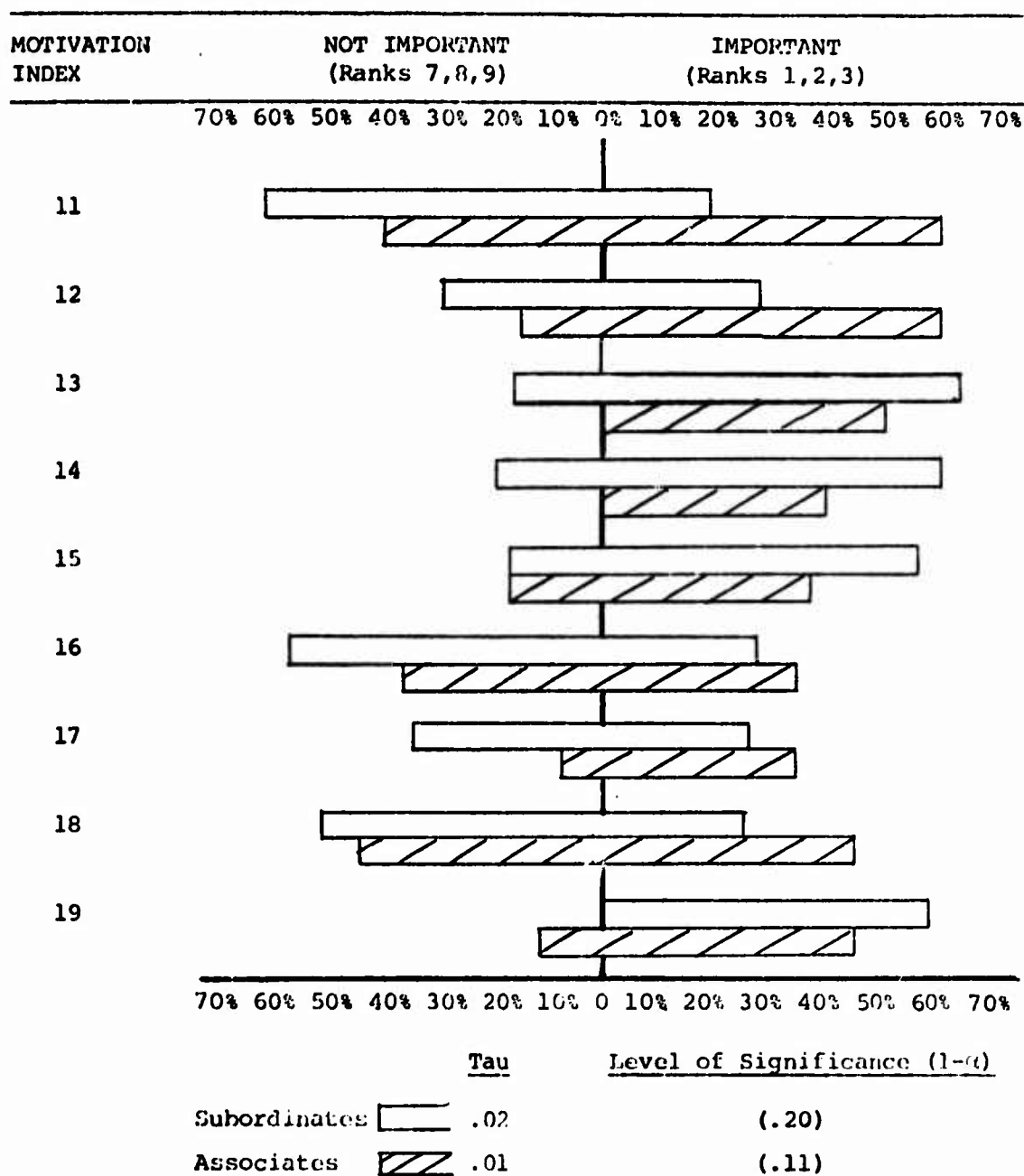


Figure 18. Percentage of Perceived Importance of Responses by Motivation Index, associated Kendall Correlation Coefficient and Significance Level Representing Question 7; "You have established personal friendship with your subordinates/associates."

Conversely, the less motivated PCO may feel that friendship with their subordinates will incur an obligation to their subordinates to which they are unwilling or unable to respond.

For the most part the PCOs selected friendship as being one of the important influence styles that they used in dealing with other people. Although importance in this influence style is stressed, no meaningful linear relationship levels of motivation and friendship can be obtained by the use of correlation analysis.

Expertise. Question 8 states, "Your subordinates/associates respect and place confidence in your special knowledge and advice." The intent of this question was to determine the importance that the PCOs place on expertise power as a basis for an influence style. As indicated by Figure 19, there appears to be a definite relationship between the levels of motivation and the degree of importance attached to the use of expertise as an influence style. Even though all the PCOs indicate that expertise is important, those PCOs with a lower index of motivation perceive this influence style as being less important when contrasted to those PCOs with a higher motivation index. It appears that the higher motivated individual perceives himself as more of an expert in his field and will therefore use this influence style in his relations with subordinates and associates. This importance appears

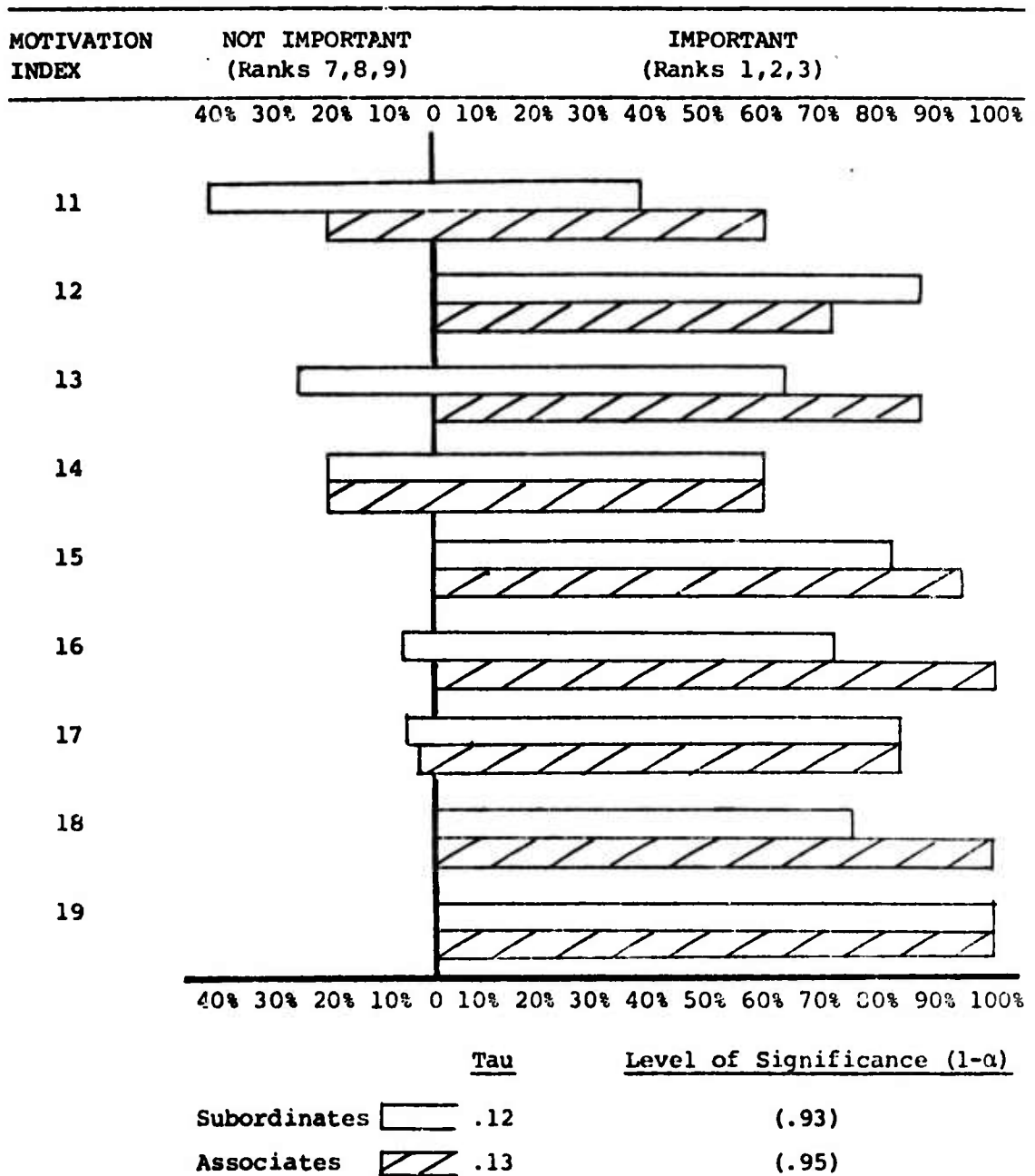


Figure 19. Percentage of Perceived Importance of Responses by Motivation Index, associated Kendall Correlation Coefficients and Level of Significance Representing Question 8; "Your subordinates/associates respect and place confidence in your special knowledge and advice."

especially meaningful in dealings with associates, for the PCO must be able to imply and persuade his civilian contracting counterpart that he knows his job. The PCO must also convey this impression to his subordinates to obtain their support. It is important to note however that the use of expertise power as an influence style must be supported by the PCO's actions. In other words the PCO must appear to be an expert in his field to use expertise power as a source of influence. Any attempt to use expertise when the PCO is obviously a rank amateur may result in the ultimate failure of the negotiations with his associates and/or embarrassment and a loss of influence with his subordinates.

Expertise as an influence style has shown a strong relationship to motivation when dealing with subordinates. It is also an influence style selected as important by most PCOs. The use of expertise in the PCO's environment commands respect for that PCO. A tau value of .12 at a level of significance of .93 is achieved with the correlation analysis. When applied to subordinates the tau achieved with work associates is equally important with a value of .13 at a .95 significance level.

Expertise, like promotion, provides strong positive correlation values when dealing with work associates. When the PCO is crossing the effective influence boundary of his formal environment, the influence styles selected

by the PCO should be tempered by his level of motivation. Unlike most other influence styles, expertise is developed through knowledge, training, and experience. Logically then, the well-trained person should be the more motivated because training implies knowledge--the pursuit of which is controlled by the individual. Professional people, such as most PCOs, are generally constantly striving to fulfill the higher order motivation needs, and it appears that for the PCO the exercise of the expert influence style is an avenue that is effective.

Penalty. Question 9 states, "Your subordinates/associates feel you can do something to penalize or hurt them in some way." This question addresses the perceived importance of punishment power as an influence style to gain support. Figure 20 indicates that most PCOs perceive punishment as an unimportant influence style. However, those PCOs with the lower motivation indices appear to attach some degree of importance to punishment in their relations with associates. This relationship appears to be strong and may be explained by assuming that the less motivated PCO employs punishment as an influence style with his associates because it may be the easiest way to gain support. Although PCOs do possess the capability to punish their associates with the employment of laws and regulations, the more motivated PCO appears to emphasize and use other influence styles to gain support. This may result from

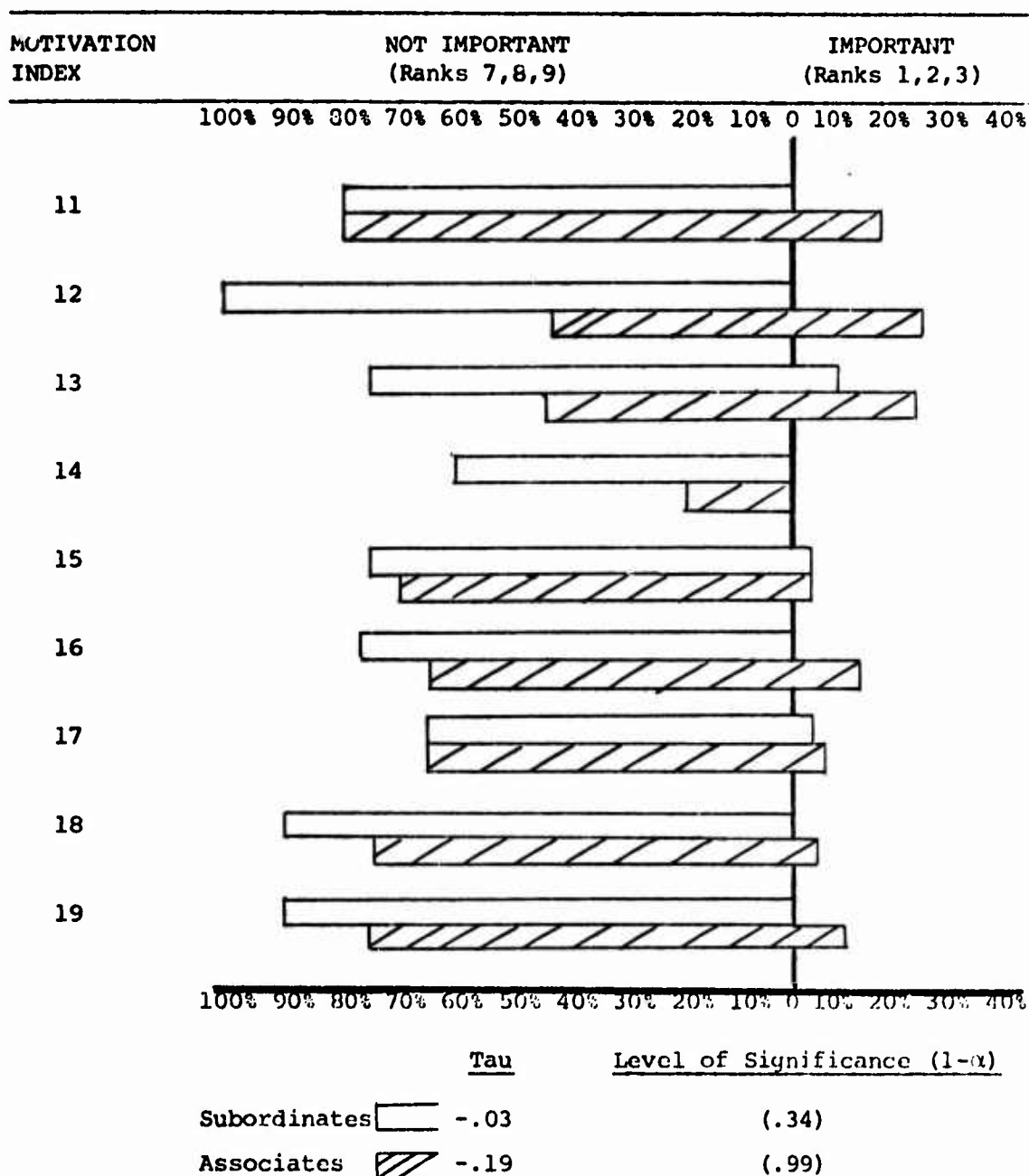


Figure 20. Percentage of Perceived Importance of Responses by Motivation Index, Associated Kendall Correlation Coefficients and Level of Significance Representing Question 9; "Your subordinates/associates feel you can do something to penalize or hurt them in some way."

the mutual admiration and/or respect for his associates and the jobs which they must do to arrive at a satisfactory contract.

The statistical analysis of the variables of punishment and motivation results in a tau of $-.03$ at a significance level of $.34$. These results indicate the relative dislike that PCOs attach to the use of punishment influence when dealing with subordinates in the PCO environment.

Additionally, a tau of $-.19$ at the $.95$ level of significance indicates that a significant negative relationship exists between punishment and motivation when the PCO is dealing with his associates. This negative relationship implies that the perceived importance for selecting the punishment influence style decreases as the level of motivation increases. The use of punishment by the PCO can be the source of antagonism between himself and his subordinates and associates. It may also cause sub-optimal performance by the contractor's representative, resulting in contract negotiation failure. The more motivated person tends to be driven by a need for success and will avoid this antagonism caused by the misuse of punishment influence.

Test of the Research Hypothesis

Relationship with subordinates. The foregoing analysis provided a basis from which to address the research hypothesis:

A relationship exists between the personal level of motivation of an integrator and the influence style he relies on as he gets others to perform for him.

The relationship situation that existed between the PCO and the subordinate was examined first. The tau correlation coefficients that resulted from the analysis of the variables in all nine categories of influence styles were small and did not reach a level of significance compatible with the criteria test of $Z \geq 1.95$ established earlier. Therefore the null hypothesis could not be rejected. These correlations are presented in Table 7. The correlation coefficient addressing motivation and expertise approached the specified level of significance and must be considered as essentially significant.

Relationship with work associates. The situation that existed between the PCOs and their work associates produced results similar to those expressed above. The computed tau correlation coefficients are all relatively small. Although some of the tau values reach a significant level, support of the null hypothesis could not be claimed. Expertise and punishment influence styles provide significant correlation coefficients when correlated

Table 7
 Summary Table of Kendall's Tau Correlation Coefficients
 Between Levels of Motivation and Perceived
 Influence Styles as Applied to Work
 Subordinates and Work Associates

Perceived Influence Style	Work Subordinates	Work Associates
Formal	.04	.10
Salary	.02	.10
Work Itself	.01	.03
Future Work	.08	.09
Promotion	.00	.11
Funds	.05	.06
Friendship	.02	.01
Expertise	.12	.13*
Punishment	-.03	-.19*

*Indicates significant at .95 (1- α) level.

with motivation. However, these tau values were still small. The correlation coefficients for the relationship between the PCO and his work associates is also presented in Table 7.

Based on the calculated tau values for the collected data, the hypothesis cannot be supported. These correlation techniques, however, rely on establishing a linear relationship between the selected variables. The inference to be drawn from the results of this study seem to indicate that the relationships--if they do exist--do not appear to be linear in nature.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE STUDY

Summary

The primary objective of this research effort was to analyze managers to determine if a relationship exists between their level of personal motivation and their use of a particular influence style. The managers selected to provide a data base for this study consisted of Procurement Contracting Officers (PCOs) assigned to the Aeronautical Systems Division of Air Force Systems Command at Wright-Patterson Air Force Base, Ohio.

An extensive search of the literature directed toward motivation, influence, and power bases was performed. The motivation theories of Herzberg, Maslow, Vroom, and Lawler were examined and presented in Chapters 1 and 2 along with the power and influence theories of French and Raven.

Based on these theories, a model was developed depicting the hypothesized relationships among motivation and influence styles. This model was originally presented as Figure 5 on page 29 and is reproduced here for the reader's convenience. The model implies that the selection

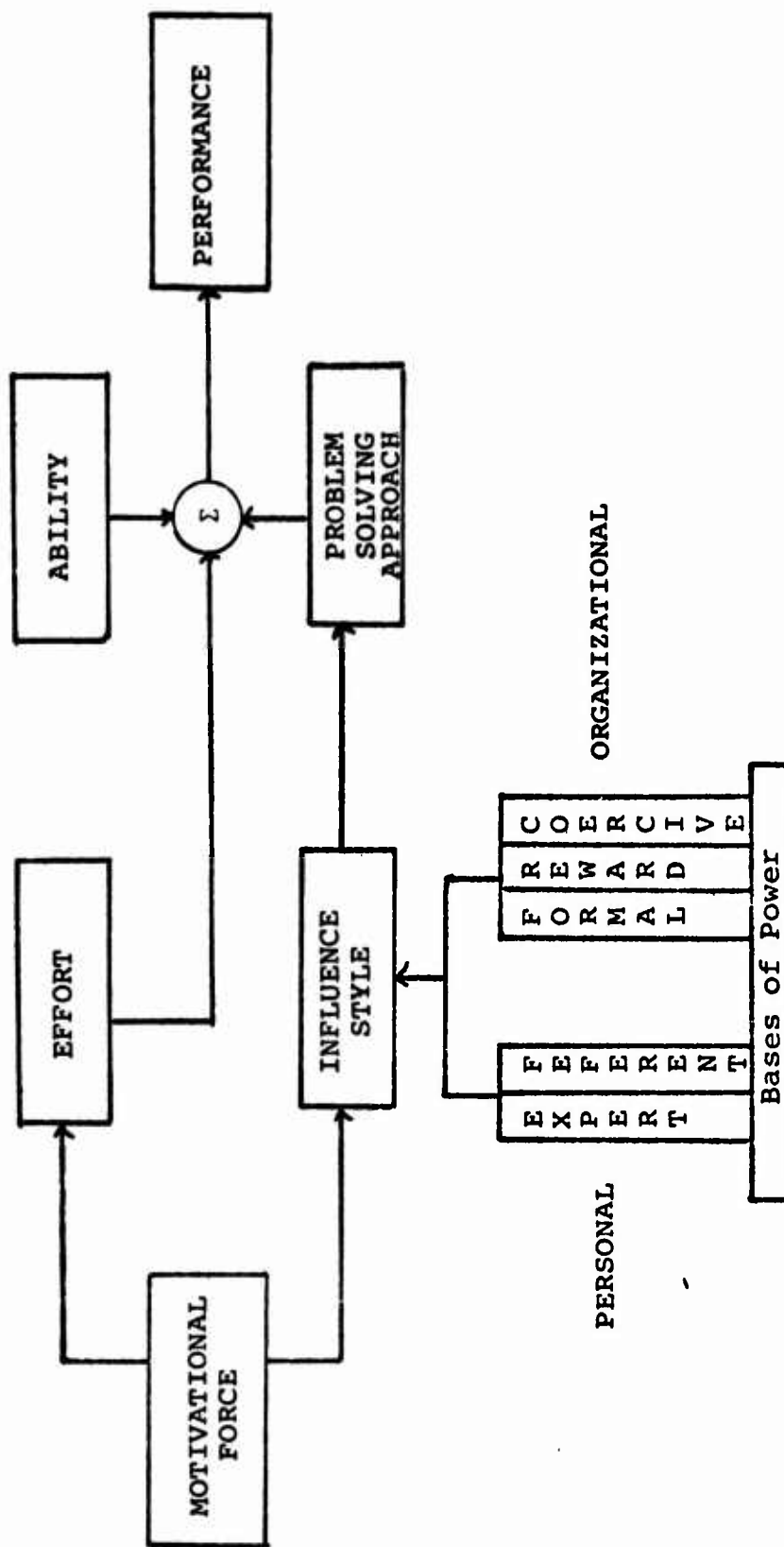


Figure 21. A Model of the Relationships Among Motivation, Influence Style, and Problem Solving Approach. SOURCE: Adapted from: Edward E. Lawler III, Pay and Organizational Effectiveness: A Psychological View (New York: McGraw-Hill Book Company, 1971). The basic model appears on page 270.

of influence style plays a critical role in the manager's approach to solving a problem. If the individual who is faced with a problem selects a particular influence style that is not suited for that particular situation, his problem solving approach may be incorrect for that problem. Therefore, regardless of the amount of "effort" that is expended, or the inherent "ability" of the individual to act, his performance may still be inadequate because of a weakened problem solving approach.

This model and the motivational theories extracted from the literature, provided the basis for a theory that the more motivated manager would perceive a different influence style as important to achieving a "good" or acceptable problem solution than would the less motivated manager. Therefore, each manager's selected influence style would be tempered by his level of motivation. In addition, the literature implied that the more motivated manager would rely more heavily on the personal power bases--referent and expertise sources of power-- according to the French and Raven typology of power (10). Conversely, the earlier studies which examined French and Raven's bases of power seemed to imply that the less motivated manager would rely less on the personal power bases and more on the organizationally based formal, punishment and reward sources of power to exert their influence (13; 14; 31).

To accomplish the objective the following hypothesis was formulated:

A relationship exists between the personal motivation of an integrator and the influence style he relies on as he gets others to perform for him.

A research instrument was developed to gather the perceptions of operating managers. The first part of the instrument dealt with the level of motivation. Each respondent was required to select a response to each of four questions which used "general devotion of energy to job task" as an indicator of motivation (27:26). Each response was coded to provide a motivation index for each respondent. The second part of the instrument was concerned with determining the perceived importance of the sources of influence. In completing this section of the instrument, the respondents were asked to rank/order two sets of nine statements dealing with various types of influence styles based on French and Raven's typology of power. One set of statements dealt with the manager's subordinates and the other set related to his work associates. Both portions of the instrument had been used in previous studies, and their validities are discussed in the original sources (13; 31).

The research instrument was distributed to 117 PCOs whose names were provided by the Chief of the Procurement Committee of Aeronautical Systems Division. Of those surveys distributed, 109 or 92 percent were returned

providing a usable and reliable data base. In most cases, the researchers who distributed the surveys described the purpose of the research, answered questions, and then returned within two days to collect the responses.

The collected data were analyzed using descriptive and nonparametric statistical techniques to test the hypothesis. The results basically showed that no meaningful linear relationship could be established between the PCO's level of motivation and their selection of a particular influence style. Another very important result of the research was that the PCOs perceived the same sources of influence to be important whether they were dealing with their subordinates or their work associates.

Conclusions

A meaningful linear relationship between levels of motivation and the importance of a selected influence style could not be demonstrated with nonparametric statistical techniques in the PCO environment. Although the PCOs perceived expertise, work challenge and formal authority to be the most important sources of influence, this importance was not associated with levels of motivation.

The expected linear relationships between selected influence styles--such as referent and expertise--that were suggested by the earlier studies of Gemill, Wilemon, and Thamhain (13; 14; 31) could not be supported with this sample.

No difference was found in the degree of importance of PCOs associated with particular influence styles in their dealings with their subordinates as opposed to their work associates. This conclusion supports an earlier study by Thamhain and Wilemon (31:3).

Expertise--which was perceived as the most important influence style--along with work challenge and formal authority, were considered to be the main sources of influence. Funds allocation, promotion, and punishment (coercive) comprised the least preferred sources of influence. These findings closely support the results of previous studies (13; 14; 31).

The PCOs responding to this research effort were professional managers. They displayed a level of motivation somewhat higher than that reported in a similar, earlier study (13:220) when measurement was based on "devotion of energy to job tasks." The unique, dynamic and sometimes publicly controversial work environment of the PCO may be assumed to be partly responsible for this high level of motivation. The PCOs are subject to public view and criticism and belong to that group of professional individuals who Patchen indicates are ". . . strongly concerned with doing just as good a job as they possibly can [27:29]."

Recommendations

The findings of this study indicate that further research should be conducted to examine these items:

1. Effectiveness ratings of the respondents might be accumulated to provide another variable for analysis. It may then be possible to test the theory that the more effective PCO is also the more motivated manager. This additional variable in the study would provide further insight into the selection of an influence style.

2. During the meetings with the respondents, several PCOs voiced a common complaint; in essence, they said, "Why doesn't somebody gather information for a study that would tell the situation the way it is and not just to obtain answers that are, in effect, what you want to hear?" This is a reasonable remark for in many instances the survey instruments are little more than "pre-answered" forms which gain responses to support preconceived results. Therefore, one fruitful area of research might be to query the PCOs to determine what they perceive to be troublesome or conflict-producing areas for future study. This approach would create interest in research among the PCOs and possibly provide several workable topics for future study. For example, one research topic might deal with the PCO's personality makeup. The reaction of the PCO when dealing with conflict within the organization could be segregated into categories as the appeaser (pussy-cat) or the

antagonist (tiger). This examination of the status and stature of the PCO might reveal that the tempo of the organization (climate) is in fact set by the project director and the other subordinates just follow suit. Therefore, future research involving the PCO should allow the PCO the opportunity to input his suggestions into the design of the instrument and study.

3. An analysis of the PCO environment and their responses related to the selection of an influence style should be conducted in order to evaluate why a difference in correlation coefficients exists between those that other researchers have cited and those obtained in this study. A study of this nature could provide valuable information about the effect of the environment, the specific job, and personality factors on the mix of influence styles used by operating managers.

4. Motivation, measured by time devotion to job task, assumes that there is sufficient work to keep a manager busy. The amount of work available to a PCO may be a function of the phase of the procurement process life cycle for a weapons system in which the PCO finds himself. Therefore, a study to determine the relationship between levels of motivation and the acquisition phases of a weapons system would prove interesting. One respondent who works with a weapons system which has, in essence, completed its procurement cycle, stated that he and the other

PCOs had a difficult time being motivated. In fact "The most exciting part of the day is when the mail arrives and we fight to see who opens it."

5. Motivation may also be related to the number of contacts a PCO makes with people outside of his immediate organization. It may be possible to theorize that the more motivated PCO would be more active in his job environment and therefore make more contacts. It may also be possible to discover a relationship between motivation and the prospective magnitude and importance of the weapons system or subsystem on which the PCO is working. Conceivably, although all PCOs are engaged in essentially the same task, it may be that the PCO who perceives his weapons system as more important or larger will be more motivated.

In summary, this study attempted to examine operating managers to determine if a relationship exists between their level of personal motivation and their use of a particular influence style. While the results of this study did not support the research hypothesis, it is hoped that it will stimulate further study into the roles and relationships of the USAF Procurement Contracting Officer.

APPENDIX A

A RESEARCH SURVEY

Research Project by: Captain Daniel M. Brinkmann
Captain William M. Denchy
Graduate Students, AFIT,
Graduate School of Systems and
Logistics

Survey: The attached instrument supports a research effort sponsored by the Air Force Business Research Management Center, Directorate of Procurement Policy, Headquarters USAF. This instrument is designed to determine the relationships which may exist among influence style and motivation levels of managers in critical Air Force careers such as Procurement Contracting.

Your response to the items in this survey is vitally important to provide a solid base of data for this research effort. Please complete all the questions.

Since there are no "right" or "wrong" answers, your first impression will usually provide the best response. Therefore, it should take only about fifteen minutes to complete the instrument.

Note: All information received will be kept in strict confidence. The analysis results will be depersonalized in the summary.

Control Number: Headquarters USAF Survey Control Number 75-98 has been assigned to this survey. Your participation in this research is voluntary.

Part I--Instructions

Please choose only one response to each question in Part I. Answer each question as candidly as possible and in the way you see things, or the way you feel about them.

1. On most days on your job, how often does time seem to drag for you?

☐ About half the day or more
☐ About one-third of the day
☐ About one-quarter of the day
☐ About one-eighth of the day
☐ Time never seems to drag

2. Some people are completely involved in their job-- they are absorbed in it night and day. For other people, their job is simply one of several interests. How involved do you feel in your job?

☐ Very little involved; my other interests are more absorbing
☐ Slightly involved
☐ Moderately involved; my job and my other interests are equally absorbing to me
☐ Strongly involved
☐ Very strongly involved; my work is the most absorbing interest in my life.

3. How often do you do some extra work for your job which isn't really required of you?

☐ Almost every day
☐ Several times a week
☐ About once a week
☐ Once every few weeks
☐ About once a month or less

4. Would you say you work harder, less hard, or about the same as other people doing your type of work at (name of organization)?

☐ Much harder than most others
☐ A little harder than most others
☐ About the same as most others
☐ A little less hard than most others
☐ Much less hard than most others

Part II of the survey requests you to rank each of the responses in order of importance (from 1-9). Please use "1" for the most important response, etc. Again, please answer each question as candidly as possible in the way you see things or the way you feel about them.

Why, in your opinion, do your subordinates comply with your orders and desires or recommendations?

	Your ranking
1. Your subordinates feel you have the formal authority	_____
2. Your subordinates feel you can influence their salary adjustments	_____
3. Your subordinates are interested in this type of work and see it as professionally challenging	_____
4. Your subordinates feel you can influence future work assignments	_____
5. Your subordinates feel you can influence their promotion	_____
6. Your subordinates feel you can influence fund allocation	_____
7. You have established personal friendship with your subordinates	_____
8. Because your subordinates respect and place confidence in your special knowledge and advice	_____
9. Your subordinates feel you can do something to penalize or hurt them in some way	_____

Part III of the survey requests you to rank each of the responses in order of importance (from 1-9). Please use "1" for the most important reason, etc. Again please answer each question as candidly as possible in the way you see things or the way you feel about them.

Why, in your opinion, do other personnel who you associate with in your work comply with your orders and desires or recommendations?

	Your ranking
1. Your associates feel you have the formal authority	_____
2. Your associates feel you can influence their salary adjustments	_____
3. Your associates are interested in this type of work and see it as professionally challenging	_____
4. Your associates feel you can influence future work assignments	_____
5. Your associates feel you can influence their promotion	_____
6. Your associates feel you can influence fund allocation	_____
7. You have established personal friendship with your associates	_____
8. Because your associates respect and place confidence in your special knowledge and advice	_____
9. Your associates feel you can do something to penalize or hurt them in some way	_____

The following general information will aid the researchers to analyze the data which you have provided.

NOTE: ALL information received from this survey will be kept in strict confidence. The analysis results will be depersonalized in the summary.

1. How many people do you directly supervise? _____
2. During an average workday, approximately how many people other than your subordinates must you contact to accomplish your job? _____
3. For the purpose of this survey:

A project manager is considered to be one whose work environment involves managing a unique activity to a specifically defined objective, whereupon he must seek or be given a new assignment (job or position) involving a new objective.

A functional manager is considered to be one whose work environment involves managing on-going activities to accomplish open-ended objectives, with no foreseeable end to the assignment (job or position).

- a. Do you consider yourself primarily a

Project manager _____
 Functional manager _____

- b. What percent of your time do you spend managing

Project-type activities _____
 Functional-type activities _____
 Total 100%

4. Grade (G.S. level or military rank) _____

This completes the research survey. We would like to take this opportunity to thank you for your cooperation.

APPENDIX B

COMPUTER PROGRAM TO COMPUTE TAU WHEN THE DATA CONTAINS MANY TIED OBSERVATIONS

This FORTRAN language based program computes the Kendall Rank Correlation Coefficient or the Kendall Partial Rank Correlation Coefficient. The Kendall Rank Correlation Coefficient is a measure of the association between two sets of ordered data with N elements in each set. The Kendall Partial Correlation Coefficient is a measure of the association between two sets of ordered data with N elements in each set while a third set of ordered data containing N elements is held constant.

This program contains an N of 109 but may be adapted for a data file containing any N by changing line number 140 to reflect the change in N .

Instructions

After compilation the program requests:

MORE?

If the response is YES (or a carriage return), the program requests:

PARTIAL?

If the response is NO (or a carriage return), the program requests:

WHAT ARE THE X,Y COLUMNS

The response to this request is to input the X column number followed by the Y column number. The output will consist of the Kendall Rank Correlation Coefficient, $T_{x,y}$, and its corresponding Z value from the normal distribution tables. The Z value is calculated as follows:

$$Z = \sqrt{\frac{T}{2(2N+5)}} \sqrt{\frac{9N(N-1)}{9N(N-1)}}$$

If the response to the request PARTIAL is YES, the program requests:

MORE?

If the response is YES (or a carriage return), the program requests:

WHAT ARE THE X,Y,Z COLUMNS?

The response to this request is to input the X and Y column numbers whose relation is to be determined followed by the Z column which is the variable held constant. The output consists of the Kendall Partial Rank Correlation Coefficient $T_{xy.z}$.

APPENDIX C
PROGRAM FOR COMPUTING KENDALL'S TAU

PROGRAM FOR COMPUTING KENDALL'S TAU

```
05C*****THIS PROGRAM WAS CREATED BY GOSS, LOCKWOOD, DENCHY,  
06C*****AND BRINKMAN TO COMPUTE KENDALL'S TAU WITH DATA  
07C*****CONTAINING MANY TIES.*****  
10C*****THIS MODIFICATION HAS A CONSTANT "N" OF 109*****  
20C PROGRAM FOR KENDALL'S TAU CORRELATION  
30*#RUN *=(CORE=18)  
50 COMMON XXX(2,110),YYY(2,110),ZZZ(2,110),FINAL(110)  
60 DIMENSION XT(500),YT(500),ZT(500),TEMP(29)  
80 CHARACTER ITT*4  
90 CHARACTER IY*4  
95C*****ON THE FOLLOWING LINE, INPUT YOUR DATA FILE*****  
100 CALL ATTACH(11,"75305/KDATA;",1,0,,)  
110 999 PRINT,"          MORE?"  
120 READ,ITT  
130 IF(ITT.EQ."NO")GO TO 100  
140 N=109  
150 111 CONTINUE  
160 PRINT 10  
170 10 FORMAT("PARTIAL?")  
180 READ,IY  
190 IF(IY.EQ."YES")GO TO 30  
200 PRINT 15  
210 15 FORMAT("/"ROWS=109")  
220 PRINT 16  
230 16 FORMAT("/"WHAT ARE THE X,Y COLUMNS?")  
240 READ,IV1,IV2  
250 DO 2000 I=1,N  
260 READ(11,2001)LN,(TEMP(LL),LL=1,29)  
270 2001 FORMAT(V)  
280 XXX(2,I)=TEMP(IV1)  
290 XXX(1,I)=I  
300 YYY(2,I)=TEMP(IV2)  
310 YYY(1,I)=I  
320 2000 CONTINUE  
330 ANS=TAU(N)  
360C***** CALCULATE A Z STATISTIC*****  
370 TOP=2*(5+(2*N))  
380 BOT=(N-1)*9*N  
390 BAD=SQRT(TOP/BOT)  
392 ZZ=ANS/BAD  
395 PRINT 275  
397 275 FORMAT(10X,4H TAU,10X,2H Z)  
399 PRINT 276, ANS,ZZ  
401 276 FORMAT(5X,F10.4,5X,F10.4)  
405 IF(ABS(ZZ).GE.1.65)PRINT,"DATA IS SIGNIFICANT !!!"  
430 REWIND 11  
440 GO TO 999  
450C**THIS PART OF THE PROGRAM DOES PARTIAL CORRELATIONS**  
460 30 PRINT,15
```

```

470 N=109
480 810 PRINT,"ANOTHER PARTIAL CORRELATION?"
490 READ,ITT
500 IF(ITT.EQ."NO")GO TO 999
510 PRINT 35
520 35 FORMAT(// "WHAT ARE THE X,Y,X,COLUMNS?"//)
530 READ,IV1,IV2,IV3
540 DO 2010 I=1,N
550 READ(11,2001)LN,(TEMP(LL),LL=1,29)
560 XXX(2,I)=TEMP(IV1)
570 XXX(1,I)=I
580 YYY(2,I)=TEMP(IV2)
590 YYY(1,I)=I
600 ZZZ(2,I)=TEMP(IV3)
610 ZZZ(1,I)=I
620 2010 CONTINUE
630 DO 32 I=1,N
640 XT(I)=XXX(2,I)
650 YT(I)=YYY(2,I)
660 ZT(I)=ZZZ(2,I)
670 32 CONTINUE
680 TAU1=TAU(N)
690 NI=N+1
700 DO 40 I=1,N
710 XXX(2,I)=XT(I)
720 XXX(1,I)=I
730 ZZZ(2,I)=YT(I)
740 ZZZ(1,I)=I
750 YYY(1,I)=I
760 40 YYY(2,I)=ZT(I)
770 TAU2=TAU(N)
780 DO 50 I=1,N
790 ZZZ(2,I)=XT(I)
800 ZZZ(1,I)=I
810 XXX(2,I)=YT(I)
820 XXX(1,I)=I
830 YYY(2,I)=ZT(I)
840 YYY(1,I)=I
850 50 CONTINUE
860 TAU3=TAU(N)
870 ANS=(TAU1-TAU2*TAU3)/(SQRT((1.-TAU3**2)*(1.-TAU2**2)))
880 PRINT 60,ANS
890 60 FORMAT(// "TAU(XY,Z)=",F10.5/)
900 REWIND 11
910 GO TO 810
920 100 STOP "THAT'S IT"
930 END
940 FUNCTION TAU(N)
950 COMMON XXX(2,110),YYY(2,110),ZZZ(2,110),FINAL(110)
960 C*****THE FOLLOWING LINES SORT "X"*****
965 355 I=1.
970 DO 40 J=2,N
980 IF(XXX(2,I).LE.XXX(2,J)) GO TO 40

```

```

990 SWT=SWT+1.
1000 XSP1=XXX(1,I)
1010 XSP2=XXX(2,I)
1020 XXX(1,I)=XXX(1,J)
1030 XXX(2,I)=XXX(2,J)
1040 XXX(1,J)=XSP1
1050 XXX(2,J)=XSP2
1060 40 I=I+1
1070 IF(SWT-0) 60,70,60
1080 60 SWT=0
1090 GO TO 355
1100 70 I=1
1110C*****THE FOLLOWING LINES ORDER "Y" SAME AS "X"*****
1120 DO 90 I=1,N
1130 IDX=XXX(1,I)
1140 FINAL(I)=YYY(2,IDX)
1150 90 CONTINUE
1160C*****THE FOLLOWING LINES COMPUTE "S"*****
1170 S=0
1180 SMAX=0
1190 W=N-1
1200 DO 96 I=1,W
1210 K=I+1
1220 DO 96 J=K,N
1230 SMAX=SMAX+1.
1240 IF(FINAL(I)-FINAL(J)) 94,95,97
1250 94 BSIGN=1.
1260 GO TO 95
1270 97 BSIGN=-1.
1280 95 IF(XXX(2,I)-XXX(2,J)) 98,99,100
1290 98 ASIGN=1.
1300 GO TO 99
1310 100 ASIGN=-1.
1320 99 S=S+(ASIGN*BSIGN)
1330 ASIGN=0
1340 BSIGN=0
1350 96 CONTINUE
1360C*****THE FOLLOWING LINES SORT "Y"*****
1370 SWT=0
1380 135 I=1
1390 DO 140 J=2,N
1400 IF(YYY(2,I).LE.YYY(2,J)) GO TO 140
1410 SWT=SWT+1.
1420 XAF1=YYY(1,I)
1430 XAF2=YYY(2,I)
1440 YYY(1,I)=YYY(1,J)
1450 YYY(2,I)=YYY(2,J)
1460 YYY(1,J)=XAF1
1470 YYY(2,J)=XAF2
1480 140 I=I+1
1490 IF(SWT-0) 160,170,160
1500 160 SWT=0
1510 GO TO 135

```

```

1560C*****THE FOLLOWING LINES COMPUTE THE DENOMINATOR*****
1570 170 TS=0
1580 TA=0
1590 TIES=1.
1600 I=1
1610 J=2
1620 193 IF(XXX(2,I)-XXX(2,J)) 194,195,194
1630 194 TS=TS+TIES*(TIES-1.)
1640 TIES=1.
1650 GO TO 196
1660 195 TIES=TIES+1.
1670 196 I=I+1
1680 J=J+1
1690 IF(J-N)193,193,197
1700 197 IF(TIES-1.) 199,199,198
1710 198 TS=TS+TIES*(TIES-1.)
1720 199 TIES=1.
1730 I=1
1740 J=2
1750 293 IF(YYY(2,I)-YYY(2,J)) 294,295,294
1760 294 TA=TA+TIES*(TIES-1.)
1770 TIES=1.
1780 GO TO 296
1790 295 TIES=TIES+1.
1800 296 I=I+1
1810 J=J+1
1820 IF(J-N)293,293,297
1830 297 IF(TIES-1.) 299,299,298
1840 298 TA=TA+TIES*(TIES-1.)
1850 299 TS=TS/2.
1860 TA=TA/2.
1870C *****TAU IS COMPUTED*****
1880 TAU=S/(((SMAX-TS)**.5)*(SMAX-TA)**.5)
1890 RETURN
1900 END

```

APPENDIX D

INFLUENCE STYLE INTERCORRELATIONS

The questions relating to the particular influence styles are presented for the reader's convenience at this time.

Influence Style Questions

Your subordinates/associates feel you have the formal authority.

Your subordinates/associates feel you can influence their salary adjustments.

Your subordinates/associates are interested in this type of work and see it as professionally challenging.

Your subordinates/associates feel you can influence future work assignments.

Your subordinates/associates feel you can influence their promotion.

Your subordinates/associates feel you can influence fund allocation.

You have established personal friendship with your subordinates/associates.

Because your subordinates/associates respect and place confidence in your special knowledge and advice.

Your subordinates/associates feel you can do something to penalize or hurt them in some way.

Kendall Tau Correlation Coefficients for Inter-
correlations Between Perceived Importance of
Styles as Related to Subordinates

	Salary	Work Itself	Future Work	Promotion	Funds	Friendship	Expertise	Punishment
Formal	.16	-.09	-.15	.13	.04	-.17	-.07	.14
Salary		.04	.13	.41	.03	-.21	-.11	.00
Work Itself			.11	.07	.03	.01	-.01	-.08
Future Work				.19	.00	.00	.06	.18
Promotion					-.02	-.30	-.30	.03
Funds						.05	.05	-.19
Friendship							.20	.07
Expertise								-.12

Kendall Tau Correlation Coefficients for Inter-
correlations Between Perceived Importance of
Styles as Related to Associates

	Salary	Work Itself	Future Work	Ptotion	Funds	Friendship	Expertise	Punishment
Formal	.05	.15	.00	-.02	-.03	-.26	-.23	.07
Salary		.00	.20	.35	.09	-.13	-.01	-.04
Wirk Itself			.00	-.14	-.09	-.14	.15	-.19
Future Work				.28	.01	-.15	.10	-.05
Promotion					.00	-.12	-.07	-.02
Funds						.08	-.02	-.07
Friendship							.05	-.18
Expertise								-.23

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