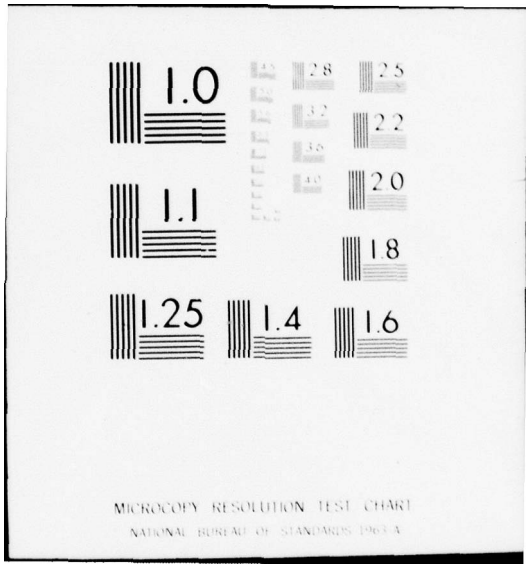
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MODELING JOB MOTIVATION WITH THE MASLOW HIERARCHY OF NEEDS WITHIN THE 3800 AIR BASE WING AT MAXWELL AIR FORCE BASE, ALABAMA

THESIS

AFIT/GSM/SM/77D-24 Jeffery J. Norton
Capt USAF

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MODELING JOB MOTIVATION WITH THE MASLOW HIERARCHY OF NEEDS WITHIN THE 3800 AIR BASE WING AT MAXWELL AIR FORCE BASE, ALABAMA

THESIS

Presented to the Faculty of the School of Engineering
of the Air Force Institute of Technology
Air University
in Partial Fulfillment of the
Requirements for the Degree of
Master of Science

by
Jeffery J. Norton, B.S.
Capt USAF
Graduate Systems Management

December 1977

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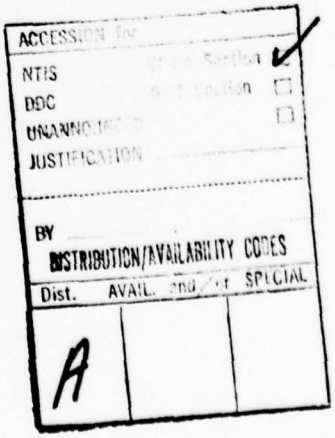


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Abstract

The Maslow theory of human motivation was applied to an Air Force unit at Maxwell Air Force Base, Alabama. A model that combined the need strength measurement technique developed by Mitchell and Moudgill (1976), and mathematical specification of the need hierarchy devised by Young (1976), yielded results that tend to support both the Maslow and the Pendulum theories of motivation.

In general, the survey population at Maxwell Air Force Base followed the Pendulum theory of human motivation proposed by Young. It was found that for the total survey population (including officer, enlisted, civil service, and non-appropriated fund subgroups; and management, clerical, and administrative job types) that adjacent Maslovian needs tend to move together reflecting inverse parabolic relationships among needs.

The underlying structure in the data obtained tended to support a two-way classification of needs (Security and all others) across all subgroups and job types.

Only for the survey sub-population that represented having all "Good" job related factors, did parabolic relationships among needs exist. Although such relationships were not statistically significant, support for the Maslow Hierarchy of Needs Theory was suggested.

CHAPTER I

INTRODUCTION AND BACKGROUND

1. Introduction

Job motivation and its behavioral implications have long been of prime concern throughout almost every facet of the working society. Formal recognition of human behavior as a factor in the work environment was proposed by Fredrick Taylor in 1911. His "scientific management" school acknowledged that behavior and the work environment are interrelated, and that for maximum efficiency and productivity, they should not be treated as independent. This gave birth to numerous other schools of management thought, including the "behavioristic" school (Watson, 1930) which, in its most basic form, implies that all behavior, including job motivation, is a function of environment.

From the "behavioristic" school came several theories that attempted to describe human behavior and motivation. Such researchers as B. F. Skinner (pure behavioralism), McGregor (Theory X and Theory Y), Herzberg (Two-Factor Theory), and Vroom (Expectancy Theory), have all surfaced with various hypotheses of human motivation. All have had limited, and sometimes questionable, success in their theories that attempt to model the motivation of desired performance. Abraham Maslow also proposed "A Theory of Human Motivation" (1943) which has been revised as of 1970. This theory has also followed suit with many of the others mentioned above, in that, it has enjoyed limited success with questionable validity.

The Maslow theory of how motivation relates to human needs has evolved to the point where it is being adopted not only to the singular individual, but to the individual within the organizational setting. Until 1968 (Hall and Nougaim), no attempt had been made to empirically test the Maslow theory within the confines of the work environment. In 1976, the first attempt to mathematically specify and empirically test the Maslow theory was undertaken by Young. This study also met with limited results due to a questionable data set obtained from a survey instrument that possibly did not directly measure need levels of the Maslow theory. It is the research of Young that this study is predicated upon.

a. Scope.

This research effort is based upon a general premise that human behavior, both individual and in the context of the organization, can be modeled mathematically and is directed at man's motivational character within the organizational environment. Specifically, the Maslow theory will be used as the vehicle for this research with consideration being given to many of the external factors present in the work environment that may influence the empirical validity of the model. This effort will concern a unique subset of the total population in a correspondingly unique work setting: modeling job motivation of an Air Force unit in the military work environment. This sub-population is assumed to be a representative sample for the investigation of military job

motivation, and may or may not bear resemblance to the civilian sector. There are many unique aspects of the military society that make it distinct from the rest of the civilian population. At the same time, many factors exist under different names in both systems that may cause similar, if not identical, behavior patterns to emerge. It is not within the scope of this research to address this issue; however, realizing that this sub-population has potential similarities to the whole adds significance to the overall impact of this effort. The intent of this research is to further investigate the validity of the hypothesis of human motivation proposed by Maslow in 1943. The theory will be modeled and measured in such a manner as to mathematically test the validity of his theory within the confines of the organization structure defined above.

b. The Research Problem.

The very basis for this research is that no one, to date, has yet been able to conclusively prove, nor disprove, the Maslow theory as an accurate configuration of human motivational behavior. Numerous research programs and studies to quantifiably test the theory have resulted in inconclusive outcomes. It is questionable that many such efforts have even measured, much less tested, the constructs of the Maslow theory. The research problem is, therefore, two-fold. First, it is necessary to model the Maslow theory in such a manner as to empirically test its validity as a representation of human motivation. Second, it is necessary to accurately measure

the constructs proposed under the original theory. It is not the intent of this effort to prove the validity of the Maslow theory, but to more rigorously test the theory than has been done in past research. The importance of the effort lies in the possibility that the theory can be mathematically modeled and its constructs accurately measured within the realm of the working environment.

c. Importance of the Research.

Questions may be asked as to the necessity of such research. Why attempt to retest a theory that others have found to be unresolveable; a theory possibly without operational merit or usefulness? The very fact that the Maslow theory has not been shown to be an invalid statement of human motivation implies that there may be some underlying truth in its structure. Recent interest by Air Force top management has indicated that such motivational research is considered extremely important. In 1970, former Air Force Vice Chief of Staff, General John C. Meyer, said:

> People not only are our most valuable asset. People vary intellectually and physically, but the simplest man is more complicated than our most sophisticated weapon or machine. Personnel management is potentially the most productive kind of management. (Ref 1:50)

The recent trends in our economy, and that of the Air Force, have required that "more be done with less." This contention was stated officially in November 1972 by the then Air Force Chief of Staff, General John D. Ryan, in his Air Force Policy Letter for Commanders: "Because

of budget and management limitations, our people are being asked to do more with less. How do we do more with less? The answer appears to be that all of us have to work smarter -- not harder." (Ref 2:1). The management ability to "work smarter" in the areas of human behavior is the critical outcome of this research effort. It becomes extremely important to understand human behavior and what motivates people within the work environment to attain and maintain the ability to "do more with less."

In February 1977, another member of Air Force top management, General Lewis Wilson, Jr., Commander in Chief, Pacific Air Forces, reiterated what his contemporaries had earlier said:

> To motivate our people, we must first understand their values and attitudes... we must put greater emphasis on human relations and individual motivation to achieve our objectives. We cannot manage our most important resources in a vacuum. We must therefore know our people. Their potential for development, their capacity for assuming responsibility, and their readiness to direct their actions toward organizational goals are key factors in the motivation process. It is our responsibility to recognize and develop these human characteristics to increase their worth to themselves and to the Air Force. In short, we must ensure that our people can reach out toward their own goals while at the same time directing their efforts toward Air Force objectives. (Ref 3:2)

It is recognized by management that human goals and personal needs must be considered, and that to achieve the goals of the organization, management's objectives must be commensurate with those of its people.

In July 1977, General Robert Dixon, Commander of the Tactical Air Command, in a speech entitled "We Must have Motivated People," said:

> Even with the greatest equipment in the world -- even with the most dynamic, realistic training programs in the world -- we won't get the combat capability we need, if we don't have strong, dedicated, motivated people with us who trust us -- who trust in us, and want to be a part of our way of life. We've got to attract, recruit, train, motivate, earn -- and keep -- their confidence in our way of life. I'm talking about all of our people...new recruits...NCOs...captains... and yes, even generals....I and my counterparts in the other commands are dedicated to championing the cause of our people....(Ref 4:2).

General Dixon, like the others cited previously, recognized the need for the motivated individual within the Air Force organization. It is the individual and his personal job motivation that will allow the Air Force to accomplish more with less. An example of this prevailing management attitude concerning individual job motivation can be observed in the recent adaptation of the Orthodox Job Enrichment Program in the Air Force Logistics Command. Although this program is based on Herzberg's theory of human motivation, it still emphasizes the fact that the need for understanding job motivation is a real life issue and important enough to be acted upon and not just merely talked about. Given that a definite need exists and that there is management interest, the question is now how to motivate the individual within the job environment.

d. Objective and Purpose of the Research.

Performance, both of the individual and of the organization, is the central issue of any discussion on job motivation. The main intent is to motivate "desired" performance which usually takes the form of increased productivity. In the realm of the Air Force, this also holds true. In the age of "doing more with less," it becomes increasingly important for the organization to improve individual job performance and overall productivity through better utilization and understanding of its personnel. The overall objective of this research effort is to give management a better perspective on those factors which influence job performance. Understandably, job motivation is of critical importance in this study. Also, there are many peripheral factors that seem to effect job performance, both directly and indirectly. The main purpose of this effort is, therefore, to address the motivational aspects of job performance with consideration given to other factors that may have influence on the employee's ability to perform in his job. As previously stated, the Maslow theory will be used to model job motivation within the military work environment. This model will also be input with other factors that are supported by past research as influencing job motivation and overall work performance.

An additional outcome of this research may be a managerial aid to design jobs to fit personnel or to fit personnel to existing jobs. As stated by Major D. K. Crooch in the Air University Review:

> As we continually examine managerial strategies hoping to find the answer to cope with challenges presented by increasing requirements in an environment of scarce resources, there is a growing awareness that perhaps the single most important factor in people's performance is the design of the work. (Ref 5:56).

If individual job motivation can be modeled and validated, as per this research effort, it seems to be a logical next step to fit people to specific jobs or, on the other hand, to design jobs to fit specific people and their motivational makeup. Given that an individual's motivational character can be modeled, motivational factors that should be present in the work environment to enhance optimum performance can be predicted. By placing individuals into jobs congruent with their motivational "needs," or by injecting such motivational factors into existing jobs, job motivation, performance, and overall productivity could be sequentially enhanced. The Maslow theory of human motivation seems to lend itself to the above objective of increased performance. By modeling this theory, it may be possible to help Air Force management "do more with less" by understanding the needs of the "less" so that they can do more.

2. Background

a. The Maslow Theory.

The Maslow hierarchy of needs was developed by Abraham Maslow in 1943 as a theory of how basic human needs influence motivation. The model is based on the premise that man has five distinguishable levels of needs arranged in a hierarchy. The five basic levels are: Physiological, Security, Belongingness, Esteem, and Self-Actualization.

The physiological needs have been described as the most basic, the most powerful, the most obvious of all man's needs. These needs are essential for survival and include food, shelter, oxygen, sex and sleep. For a person who is lacking in food and self-esteem, food would obviously be of first priority. Until the hunger for food has become largely satisfied, no other interests would exist except for food (Ref 6:37-38). Once the desire for food and the other elements of the physiological category have been satisfied, new and higher needs emerge.

The next level of needs to dominate the man's interests, according to the Maslow hierarchy, are those of security. In a "healthy" individual, these needs generally emerge in childhood where consistency, fairness, and routine are necessary. This need level may also predominate the insecure or neurotic adult who has a compulsive need for order and stability. A healthy adult also seeks order and stability, but it is not a "life or death" situation. The

mature adolescent or adult is interested in the new and looks forward to some amount of change (Ref 6:38).

After the security needs have become largely satisfied, the belongingness or love needs become predominant, and the individual centers on such things as group acceptance and affectionate relationships with people in general. The strength for these needs becomes increasingly stronger as the previous need level becomes satisfied, until the individual is totally concerned about only this level. Again, only after the needs of this level have become largely satisfied does the individual transcend to the next higher level (Ref 6:39-40).

The next level of needs to emerge are those of esteem. This level includes both self-respect and esteem from others. Elements peculiar to this level will include needs such as desire for confidence, achievement, prestige, recognition, status, reputation, etc. These needs become potent and dominate behavior until they become largely satisfied (Ref 6:41). Once again there is a transition to the next higher order of needs.

The next and final level of need, according to the Maslow theory, is that of self-actualization in which a person becomes "actualized" or becomes everything that he is capable of becoming. According to Maslow, he will continue at this level, never becoming fully satisfied.

One significant deviation from the original Maslow theory was proposed by Lyman W. Porter in 1961. Porter contends that in between the esteem and self-actualization levels there exists another separate and distinct level of need, that of autonomy. The autonomy level would include elements that concern independence and freedom. Porter's addition assumes that the elements of the autonomy level emerge only after the esteem needs are satisfied, and prior to the emergence of the self-actualization level (Ref 7:3). Maslow contends that the autonomy level should be included within the esteem level of the hierarchy. This deviation will be addressed within this research effort.

Throughout all levels of the hierarchy, a "healthy" individual progresses from one level (current) to the next higher level only after he has "largely satisfied" his needs present in the current operating level. The theory states that the operating level of unsatisfied needs is what motivates the individual's actions and not needs from higher or lower levels. The theory also is based on the presumption that needs once satisfied are no longer motivators of an individual's actions.

The theory also hypothesizes that a healthy individual will progress from lower order need levels to higher, being motivated only by those items or needs present in that category. Once a particular level becomes largely gratified, the individual will move on to the next higher category where a

new variety of desires will dominate his behavior. The old needs no longer act as motivators of the individual's actions. This sequence of need prepotency/potency continues until late adulthood when the need level of self-actualization (self-fulfillment or becoming actualized in one's potentiality) emerges. Maslow modified his theory in 1970 by stating that once the individual moves into the self-actualization level, he never becomes largely satisifed with this need, always striving for or desiring more satisfaction (Ref 8:7-24).

b. Related Research.

It is essential to this effort to examine the pertinent research accomplished in the area of Maslow's theory in order to set the stage for this study. The following is a synopsis of the findings obtained by other researchers in this area.

Hall and Nougaim, in an article entitled "An Examination of Maslow's Need Hierarchy in an Organizational Setting" (1968), found that, based on their research of American Telephone and Telegraph personnel, need strength was generally more strongly correlated with satisfaction of their own operating level than with any other level. In addition, they found that both high and low achievers showed a significant decrease in safety needs with a corresponding increase in esteem and self-actualization needs (Ref 9:369-371). This was the first attempt to empirically test the Maslow theory and bears additional importance in that the study is of a continuing nature. It attempts to measure

the needs of specific individuals over a long time period. This seems to be the most valid of any approach, in that, changing need levels of specific individuals can be traced through the hierarchy. To date, the results are in conflict with the Maslow model, in that, current need strength should have strong correlation with satisfaction of the next lower level of needs and not with the current level. Hall and Nougaim explained changing needs in terms of "developing career concerns" rather than lower-need gratification. The researchers have concluded that Maslow was incorrect in his hypothesis that lower-level need gratification allows higher needs to emerge. They went on to hypothesize that the strength of the various needs is related more strongly to the interaction of age and role than to the degree of lower-level need gratification (Ref 9:374-375).

In another article by Wahba and Bridwell, entitled "Maslow Reconsidered: A Review of Research on the Need Hierarchy Theory" (1976), no general support for the Maslow theory was found. Their review of ten studies done on the need levels proposed by Maslow focused on: (1) need categories, (2) independence of the five levels, and (3) independence of unrelated factors. None of the studies showed all of the five levels as totally independent. Both adjacent and non-adjacent categories overlapped. The study had mixed support for the Maslow model, in that, amount of need satisfaction generally decreased from lower order to higher order needs. They also found that the higher the satisfaction with

a given need, the lower the importance of the need and the higher the importance of the next level need. Wahba's and Bridwell's overall conclusion was that the data "does not support Maslow's gratification/activation proposition," and that the independence of five distinct need levels is questionable (Ref 10:233).

Another series of studies, entitled "Three Studies of Measures of Need Satisfaction in Organization," by B. Schneider and Alderfer (1973), again indicated mixed support for the Maslow theory. The first study of 147 nurses showed little correlation between the Maslow categories of need based on fulfillment and satisfaction within the five need levels. One of the possible explanations proposed by the authors was that "the Maslow categories do not adequately conceptualize the phenomena of human needs" (Ref 11:495). The second study, among 217 bank employees, attempted to show that correlation did exist between the level of need strengths (and need satisfaction) and the Maslow categories. It basically duplicated the first study, changing the population and sample size. Of the five categories, all but one (self-actualization) displayed little correlation between the categories and amounts of satisfaction. It was concluded by Schneider and Alderfer that the reason for lack of correlation was attributed to the design of the questionnaire based on the results of Studies I and II (Ref 11: 498-499). In Study III, satisfaction was assumed to be an expression of personal feeling about events and experiences,

rather than a simple description of events. The third study sample consisted of 522 life insurance employees. The questions asked were of the type "Indicate your feelings of satisfaction about ....", rather than the "I do things ....", lead-in to various need levels. The study resulted in relatively strong intercorrelations between both adjacent and non-adjacent need levels. As summarized by these authors:

> Perhaps it was not the measures which have kept the Maslow concepts from receiving empirical validation in the organizational literature (Hall and Nougaim, 1968), ... , but the constructs themselves which were inadequately defined and not specifically designed to be tested with items referring to outcomes from organizational participation. (Ref 11:503).

One of the most recent, and still ongoing, attempts to empirically test the Maslow theory was initiated in 1976 at the University of British Columbia. Professors Vance F. Mitchell and Pravin Moudgill have tested the Maslow hierarchy by factor analyzing data obtained from a survey questionnaire. They have found mixed results that support both a two-way classification (security and all others), and a five-way classification (each of the five need levels, excluding the physiological, and including Porter's autonomy level). The survey instrument used and validated by the Mitchell and Moudgill study forms the basis for the direct measurement of the Maslovian need levels in this current research effort (Ref 12:334-349).

The latest and only documented Air Force research concerning measurement and empirical testing of the Maslow hierarchy was completed at Stanford University by Young (Ref 13:19-65). As mentioned earlier, this study also resulted in mixed conclusions concerning the operationalization of the Maslow theory. The Young study forms the basis for the mathematical modeling of the Maslow theory in this current effort. Combined with the need level measurement techniques derived by Mitchell and Moudgill, it permits a testable model of Maslow hierarchy of needs.

CHAPTER II

THE MODEL AND THE HYPOTHESES

1. The Model

The main intent of this research effort is to develop a survey instrument that adequately measures the Maslovian need strengths and then to analyze the data in such a manner as to properly test what previous studies have seemingly failed to do; that is, to see if higher need levels will emerge only if the adjacent lower need levels have been largely satisfied. An empirical test that proves out the above statement will, in fact, validate the very crux of the Maslow hierarchy of needs theory. It is not the objective of this effort to validate the Maslow theory. Instead, it is to mathematically test the Maslow hypothesis that need level emergence is conditional upon next-lower need level satisfaction. If this hypothesis can be accepted with statistical significance, then the entire Maslow theory may be shown to be an accurate statement of human motivation. Any factors that effect motivation directly (or indirectly through impacting on job performance and/or satisfaction) should be included in such a model. Work-related factors, once identified, should then be measured and tested with respect to their influence on the motivational process.

Although the Maslow theory could be tested without consideration of work-related factors, it is useful to at least consider such factors when the Maslow theory is applied

to motivation in the work environment, in that, such factors are part of that environment. Therefore, to consider the above, a comprehensive model must be formulated that not only includes the motivational process, but also external or peripheral factors that effect motivation within the work setting. For the purpose of this study, the identification and exploitation of human needs toward increased performance must be superseded by the identification and understanding of the physical and psychological constraints on the individual in his work environment. It is not sufficient to test the Maslow theory without consideration of such environmental factors that are always present and that may directly or indirectly effect the individual's job performance or motivation to perform. Motivation does not exist in a vacuum in the real world and, therefore, will not be treated as such in this study.

Job motivation is a dynamic, not a static, process. Any factors that seemingly influence this process should be identified and measured in conjunction with the Maslovian need strengths. A conceptual framework will be developed as a result of the identification of those factors that appear to influence job motivation and, hence, performance. Only through such a framework could a comprehensive and dynamic model be built that allows the specification and measurement of peripheral factors in addition to the specific motivational process proposed by Maslow.

A second area that must be considered within the comprehensive model is the specification and measurement of the specific motivational process. This specific motivational process is the primary concern of this effort. The ability to describe this motivational process by the Maslow hierarchy of needs constitutes the primary hypothesis that this effort is designed to test. Therefore, the approach to be taken in this section is to identify influential work environment factors, and then to build a conceptual framework that includes these factors in addition to the specific motivational processes.

For the purpose of this effort, the relationships between motivation, performance and job satisfaction are assumed to be circular, i.e., that each is a natural outcome of the others in the above sequence. It is beyond the scope of this effort to investigate the accuracy of the above assumption although there is empirical data supporting the contention. Additional comments concerning the motivation-performance-satisfaction assumption are made in paragraph b. "Assumptions", of this chapter.

a. Environmental Factors and Conceptual Framework.

In preparation for building a survey instrument to measure and mathematically test Maslovian theory, past studies of peripheral factors that could possibly effect the workings of the Maslow hierarchy were reviewed. The majority of the research reviewed pertains to work factors relevant to military

(Air Force, Army and Navy) personnel, as this will constitute the population from which the survey was to be taken.

Porter, Lawler and Hackman, in their book entitled, Behavior in Organizations, state that behavior at work is a function of both personality and organizational "environment" (Ref 14:102) in accordance with Kurt Lewin's Field Theory. In other words, the person and his traits, including needs, present job satisfaction and abilities, interact with forces present in the work environment. This interaction is what determines the individual's behavior.

The environment, which may include such things as unions, job structure, supervisor, and work group norms, may also affect the individual's performance by constraining his behavior. Any or all may influence either ability or motivation, or both, and consequently, affect performance. It is important to note that they may ultimately influence the individual's job satisfaction which is the end product of the motivation-performance-reward process. An examination of related literature indicates that the work "environment" and the "personality" do have significant effects on the employee's behavior.

The model of work performance described by Porter, Lawler and Hackman (Ref 14:153), indicates that performance of an individual can be expressed in terms of both motivation and ability (Figure 1). It would be possible to obtain a desired level of performance if the individual had adequate

ability and was motivated to perform. Consideration should be given to the possibility that the person may be operating at the limits of his physical or mental ability, and that the individual may display dysfunctional behavior if pushed beyond this point. Ability and motivation must then be considered as a possible limitation or constraint to increased performance.

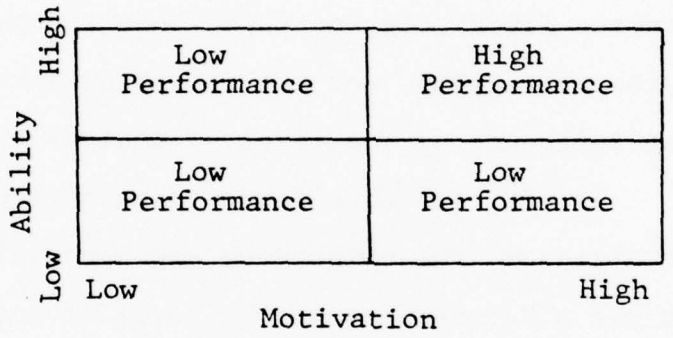


Figure 1. Relationship of Ability and Motivation to Performance

In the technical report by Barrett and Dambrot (1975), entitled, "Field and Laboratory Studies for Increasing the Intrinsic Reward Value in Navy Jobs and Careers," it was found that general and specific ability were positively related to performance but negatively related to job satisfaction in Navy maintenance tasks. In effect, those individuals with the most ability, who would ordinarily be selected by an organization because of their anticipated superior performance, are also the individuals who derive the least satisfaction and,

therefore, will plan to leave the organization (Ref 15:16-17). Motivation will, in turn, decrease as job dissatisfaction decreases the perceived importance of the effort involved Eventually, the individual's performance will also decrease as a function of the over-ability, yielding little if any motivation and job satisfaction (Figure 1).

In another study entitled, "Motivation and Job Satisfaction for Middle Level Career Army Officers," by Colin Halvorson (1975), it was found that the physical job structure, the work group, and the direct supervisor had significant influence on the level of motivation among career officers. Line officers were found to be more highly motivated than staff officers; the competence and approval of the work group also was a determinant of the level of individual motivation; and finally, the immediate supervisor, who in effect controls the work environment, specifically the levels of responsibility, recognition and promotion through performance reports, was considered as a direct influence on motivation (Ref 16:18). All three of these environmental factors act as influences on job motivation and could impact on the Maslow model with respect to need strengths and need levels.

Another study, entitled, "The Development of a Work Environment Questionnaire for the Identification of Organizational Problem Areas in Specific Army Work Settings," by Turney and Cohen (1976), also describes the worker motivation level in terms of the influence of work group, feedback from co-workers and immediate supervisor. The work group influences

the worker performance through norms (informal unions) which could extend or restrict the effort the worker exerts. The feedback the worker receives from superiors, fellow workers, or other work groups, may affect performance by influencing the degree of importance placed on effort expended, and through the perceived degree of satisfaction with the Maslow levels. Again, the immediate supervisor, who makes demands on the worker's time, direction, and level of effort, was also cited as an influence on the amount of satisfaction received from the job. Also noted here is the capability of the supervisor to influence changes in employee ability through training programs and through transmittal of his own experience in the work environment. The supervisor can, therefore, affect employee performance through direct changes in the ability factor described earlier (Ref 17:3-4).

The study done by Price and Harrell, entitled, "Manager Development: A Conceptual Model" (1976), using data gathered in the Stanford Longitudinal Managerial Studies, cites the size of the company, its organization, its growth, and the industry it is in, as structural variables that act as constraints to individual expectations and, hence, effect motivation and performance. Also cited are variables within the work group or between workers that effect performance and motivation. These are the job itself and the supervisor. The job structure and the supervisor limit or constrain the amount of effort exerted by the employee and consequently alter his motivation and performance by influencing both the perceived

level of need satisfaction and the perceived importance of the employee's effort (Ref 18:12-13).

The study by Thomas Thompson entitled, "A Study of Job Satisfaction in the Air Force" (1975), indicated that job-related factors of job challenge, preparation for greater responsibility, and job freedom were the principle determinants of job satisfaction in the Air Force. This held true for both enlisted and officer (rated and non-rated) personnel. If job satisfaction is the end product of the job motivation-performance-reward sequence, then the factors found by Thompson affecting job satisfaction must also directly or indirectly impact on motivation or performance. If these factors are perceived to be the most important determinants of job satisfaction, then they may very well be the most important influences on the motivation to perform (Ref 19:210-212).

In a study entitled, "Attitudes and Career Intentions of Officer Training School Graduates," by Harding and Wong (1968), predominant job-related needs were measured by the Importance-Possibility scale. The results of a sample size of 276 Army officers, with an average age of 25 years, indicated that a sense of worthwhile accomplishment, competent supervision, and recognition for a job well done, were among the most important of twenty-two job attributes. These items reflect characteristics that should be present in a job to enhance motivation, performance, and job satisfaction (Ref 20: 8-9).

The final report considered in this section is the "Path-Goal Theory of Leadership" by Robert House. This study indicates the task, formal authority system, and primary work group help to clarify expectations that efforts will, or will not, lead to rewards or satisfaction. These items may act as constraints, in that, they may produce counterproductivity through restriction of employee initiative. The study suggests that a relationship exists in the work environment between task structure, supervisor directiveness, and degree of job satisfaction. This relationship is depicted in Figure 2.

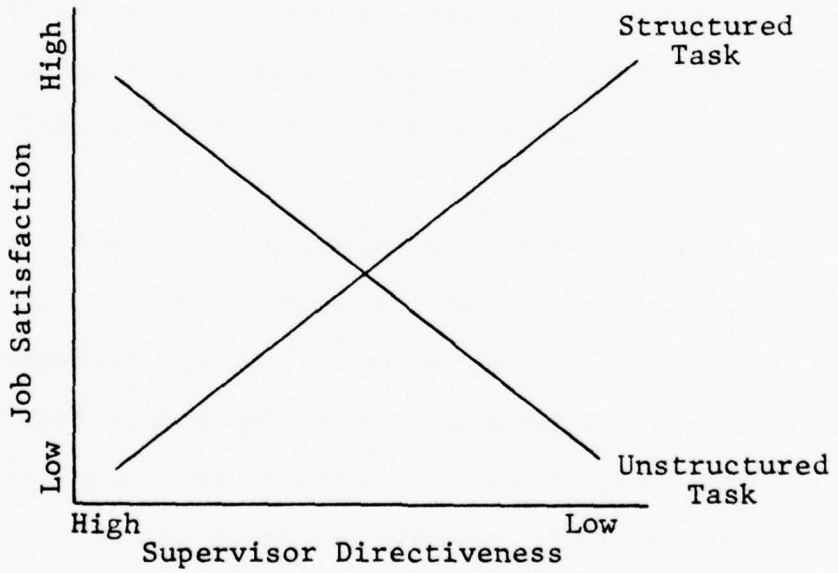


Figure 2. Relationship of Job Satisfaction and Supervisor Directiveness to Job Structure

This tends to indicate that workers' job satisfaction is dependent upon the structure of the task and the supervisor's directiveness. A structured task does not require much leader direction, and if separate directions are issued by the leader, they tend to split the employee's effort between the structured task (e.g., regulation or operating procedure) and the directions of the supervisor. When the task and the supervisor's directions are in conflict, this will reduce the strength or importance of the reward. The same would be true if in an unstructured task the supervisor offered little or no direction, resulting in feelings of "the supervisor does not care about my job." This would, in turn, reduce or eliminate the importance attached to the job, resulting in low satisfaction and reduced motivation, and constrained performance (Ref 21:4, 7-8).

It is not possible to assemble an overall conceptual model that describes the interrelationships cited in the above studies. Influences on motivation and performance will be arranged into a flow diagram that represents total interaction of motivation within the work environment (Figure 3). Extrinsic and intrinsic rewards represent the actual and perceived individual reward outcomes of motivation and performance. How well the actual rewards compare to perceived rewards determines the level of satisfaction, which, in turn, feeds back to the value or importance placed on similar effort. The extrinsic rewards represent to what extent the individual perceives that the effort resulted in the attainment

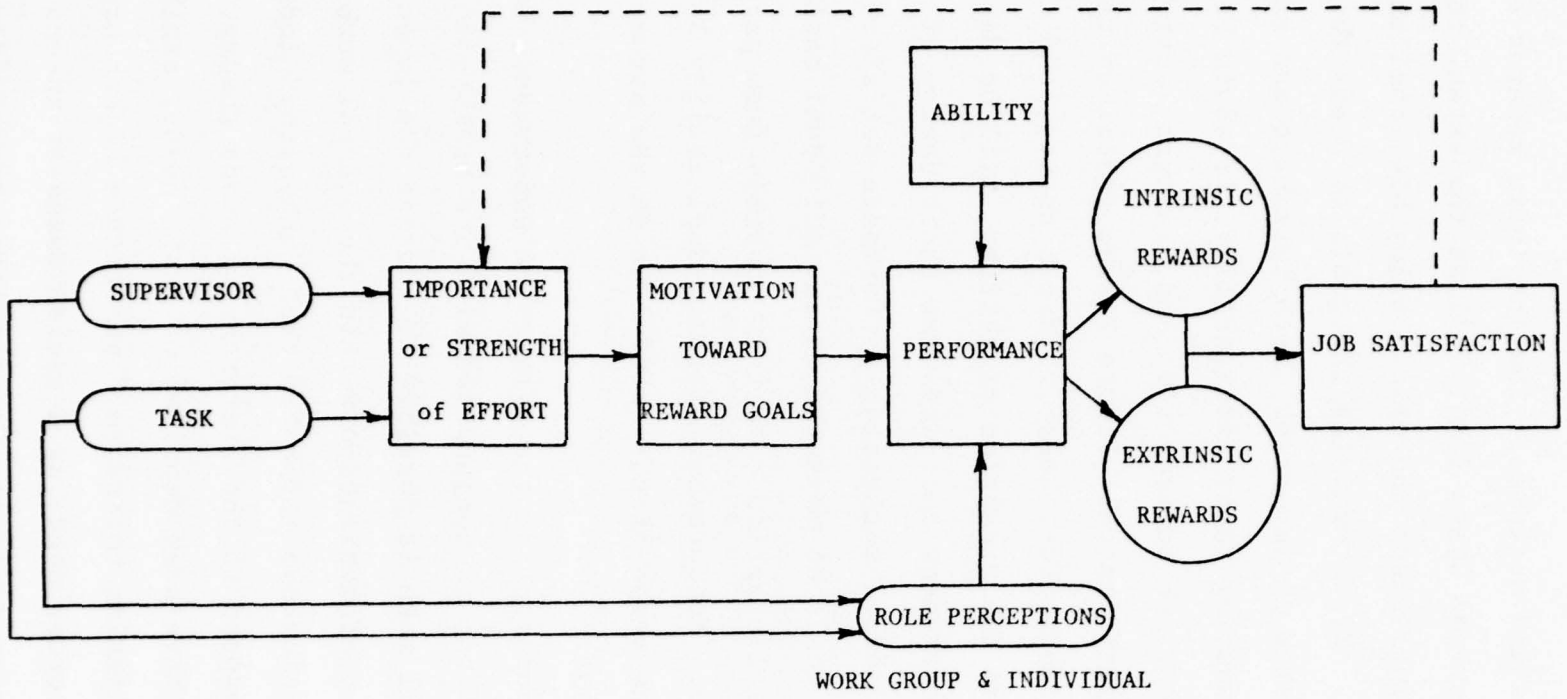


Figure 3. Conceptual Model of the Motivation-Performance-Satisfaction Relationship

of personally valued outcomes. The intrinsic rewards are defined by Turney and Cohen (Ref 17:3) as the extent to which an individual finds the effort enjoyable, challenging, and interesting. By determining the goals or needs that employees perceive as important (both intrinsic and extrinsic), and ensuring their attainability, it would be possible to affect job satisfaction and, in turn, motivation toward desired performance. Figure 3 also describes the effects of the supervisor, task, role perception, and ability. These items, with the exception of ability, will be designed into a survey instrument that measures their degree of influence on the overall motivation-performance-satisfaction model. Ability could be measured on an individual basis by means of a skills-aptitude test or possibly from performance ratings. Measurement of individual ability levels is not within the scope of this study due to the nature of such a measurement.

The measurement of the effects of supervisor, task, and role perception, in conjunction with the measurement of need levels, will make it possible to address the impact of the Maslow theory of motivation within the overall work environment. Maslow has indicated that "unhealthy" individuals may not respond to the hierarchy of needs theory. Individuals who have been deprived of basic needs, exhibit increased "frustration tolerance," substitute higher order needs for lower order needs as a social means-to-an-end, or exhibit what Maslow calls the "psychopathic personality,"

may all display motivational behavior that is not "normal" with respect to the Maslow theory (Ref 22:20-22). The relative term "unhealthy" is used in this sense to identify those individuals who are not likely to follow the hierarchy of needs model of motivation. This study goes one step further and applies "unhealthy" to the work environment. Any environment that deprives the individual of any or all of the job-related factors cited in this section will be considered unhealthy. When such factors are missing from the work setting, they must be considered as detrimental to the motivational health of the individual and, therefore, effect the use of the hierarchy of needs as a model of job motivation.

b. Assumptions.

A major assumption of this model is that the factors described in the related research as important are "universally" important. It is assumed that these important job characteristics are representative of those perceived by the whole population.

It is also assumed, for the purpose of this study, that ability is adequate in all cases. In some instances, where time in the job is short (little job experience) or where level of education (either formal or technical) is inadequate to perform, there could be a corresponding lack of ability. Due to Government standards for employment (Skills Aptitude Test, Professional and Administrative Career

Examination, etc.) all employees are supposedly placed into jobs on the basis of ability. How well the ability matches these standards is an issue that will not be addressed. Therefore, for the purpose of this study, it will be assumed that Government employees have an adequate ability to accomplish their jobs.

An additional assumption of this model is that performance leads to job satisfaction. Porter and Lawler have developed a model that states that performance leads to rewards, and if these are perceived as "equitable," job satisfaction is attained (Ref 23:23). Keith Davis described satisfaction and performance as a circular relationship in which each affects the other (Ref 24:75). The perceptual model will, therefore, include a feedback loop to perceived importance (Figure 3), but will not be assumed to feed directly back to performance. Therefore, performance leads to job satisfaction by way of perceived rewards.

2. The Maslovian Input to the Comprehensive Model

The next step of the approach is to define the specific motivational process that takes place in block 2 of the comprehensive model (Figure 3), in terms of the Maslow hierarchy of needs. This will be addressed in terms of three studies that have been mentioned earlier: the Hall and Nougaim study, the Mitchell and Moudgill study, and the Young study.

a. Hall and Nougaim Study.

The Hall and Nougaim longitudinal study of AT&T management-level employees is probably the most ideal approach to

the analysis of the Maslow theory. Hall and Nougaim tracked 49 such employees for a period of five years from the time they were first hired in 1957. During this period, most of the employees had been promoted to the second (supervisor) and third (district manager) levels of management. The subjects were annually evaluated on the basis of attitudes toward the job; relationships with supervisors, peers, and subordinates; major sources of satisfaction and dissatisfaction; career aspirations and strategies; and major occurrences in the last year. From this information, nine need categories were empirically derived and collapsed into four need levels approximating the upper four of the Maslow theory. Also obtained each year was the global rating of the extent to which the satisfaction of each subject's most important needs occurred on the job. Correlations measuring the relationship between need satisfaction and need strength for the four levels over the five year period were insignificant. With the exception of the belongingness level, all need strengths correlated more highly with their respective levels of satisfaction than with the satisfaction of any other of the need levels. Analysis of correlations between changes of lower-need satisfaction and higher-need strength from year to year yielded similar results. Hall and Nougaim also found that average satisfaction decreased in each of the lower need categories over the five year period. This finding is contrary to the Maslow model which infers that satisfaction should increase in each level until it is "largely satisfied." In addition, little support was given to a two-

level hierarchy (security versus all others). Hall and Nougaim suggested that such an approach to the testing of the Maslow hierarchy is indeed valid. They also suggested that such a long-term longitudinal approach should be taken on subjects of all ages (both physical and job age) in order to increase the variance in strength and satisfaction of needs. Additionally, they proposed that the ideal study of changes in need strength and satisfaction should cover an individual's entire life history (Ref 9:369-375).

Although the Hall and Nougaim study showed little support for the Maslow theory, it was the first to attempt empirical measurement of its constructs. Even though it is an ideal approach to the testing of the Maslow theory, some question exists as to whether Hall and Nougaim really measured what they set out to measure. It is questionable whether their method has the ability to indirectly measure the Maslow constructs. The responsible individual for this research is Dr Bray of AT&T Corporate Headquarters, Baskin Ridge, New Jersey. He was contacted and the Hall and Nougaim data was requested for possible use in this research effort; however, the AT&T study is still on-going and for this reason, all data pertaining to it could not be released.

b. The Mitchell and Moudgill Study.

Mitchell and Moudgill have attempted to operationalize the Maslow theory by direct measurement of need levels and factor analysis. Their measurement techniques are based on

those proposed by Porter in 1961 and offer one of the best methods for obtaining actual perceived need strengths and levels of satisfaction.

Mitchell and Moudgill designed a questionnaire based on the work originally done by Porter and surveyed three distinct groups of individuals: Canadian Certified General Accountants (n = 247), Chartered Accountants (n = 355), and Engineers and Scientists (n = 290). The sample included the full range of job positions (nonsupervisory to top management) in industrial and governmental organizations. The respondents also varied in age and in educational background. Twenty-one questions reflecting the Maslovian constructs were included in the survey instrument, and reflected each of the five need levels. As mentioned earlier, the instrument included the autonomy level proposed by Porter. Mitchell and Moudgill used factor analysis, employing the direct oblimin criterion of rotation with delta equal to -.05 based on the presumption that the data was moderately complex and that the Maslovian need levels were somewhat dependent. The assumption of dependence was based on the statement of the Maslow theory that fulfillment of a particular need is dependent on the fulfillment of the next-lower need (Ref 12:334-349).

The results of their study indicated that for each measure of need strength, the factors clustered in either groups of two or five. This supports both the Maslow five-level theory and a two-level theory with security grouped against all other levels. Their research did give support to

the measurement methods devised by Porter for the ascertainment of need strength and level of satisfaction. In correspondence and conversation with Mitchell, it was learned that identical testing has since been conducted (not yet published) on blue collar, clerical, and graduate student samples. Results similar to the original were obtained, in that, the blue collar and clerical groups clustered in a two-way classification, whereas, the graduate student sample followed the five-way Maslow construct. Mitchell and his colleagues are now speculating that the Maslow theory is group dependent, in that, those subgroups with "natural" and probably constant concerns for job security follow a two-way classification; while, on the other hand, those groups that do not view security as an overriding force will fall into the five-way Maslovian classification.

The Mitchell and Moudgill data sets were also requested for analysis under this effort, but for reasons of the continuing nature of the Mitchell-Moudgill study, they could not be released. A copy of the survey instrument used in the Mitchell-Moudgill study was obtained and is included in Appendix B for reference.

The instrument devised and validated in the Mitchell-Moudgill study has formed the basis for the design of the survey instrument used in this effort (Appendix A). It is questionable whether the Maslow hierarchy can be adequately operationalized by factor analysis. For this reason, an

empirical model that can be mathematically tested was pursued, using the measurement capability advanced by Mitchell and Moudgill as a quantitative input.

c. Young Study.

The work done by Young, entitled "An Empirically Testable Model of Maslow's Hierarchy of Human Motivation: Specification and Analysis," forms the basis for the testing of Maslow constructs with data measured by way of the Mitchell-Moudgill baseline. This study attempted to fully specify the mathematical relationships underlying the hierarchy of needs theory. The Young study rigorously defined such relationships in a manner that had not previously been done, allowing for the formulation and testing of hypotheses that address the very crux of the Maslow hierarchy. Young defined the physical relationships between the need strengths and age by way of a sequence of overlapping curves that were based on the logic of the Maslow theory (Figure 4). For all six need levels, including Porter's autonomy level, need strengths are divided into four succinct ranges: largely satisfied, unemerged or prepotent, potent or emerged, and clearly operating. On a response scale of 1 to 7, the response of 4 becomes the cut-off point between potent and prepotent and potent and largely satisfied need strengths. For example, an individual who is "clearly operating" in the Esteem level would possess a need level strength of approximately 6 or 7 in Figure 4. This same individual is hypothesized to have all lower need levels (Physiological, Security and Belongingness) largely satisfied and,

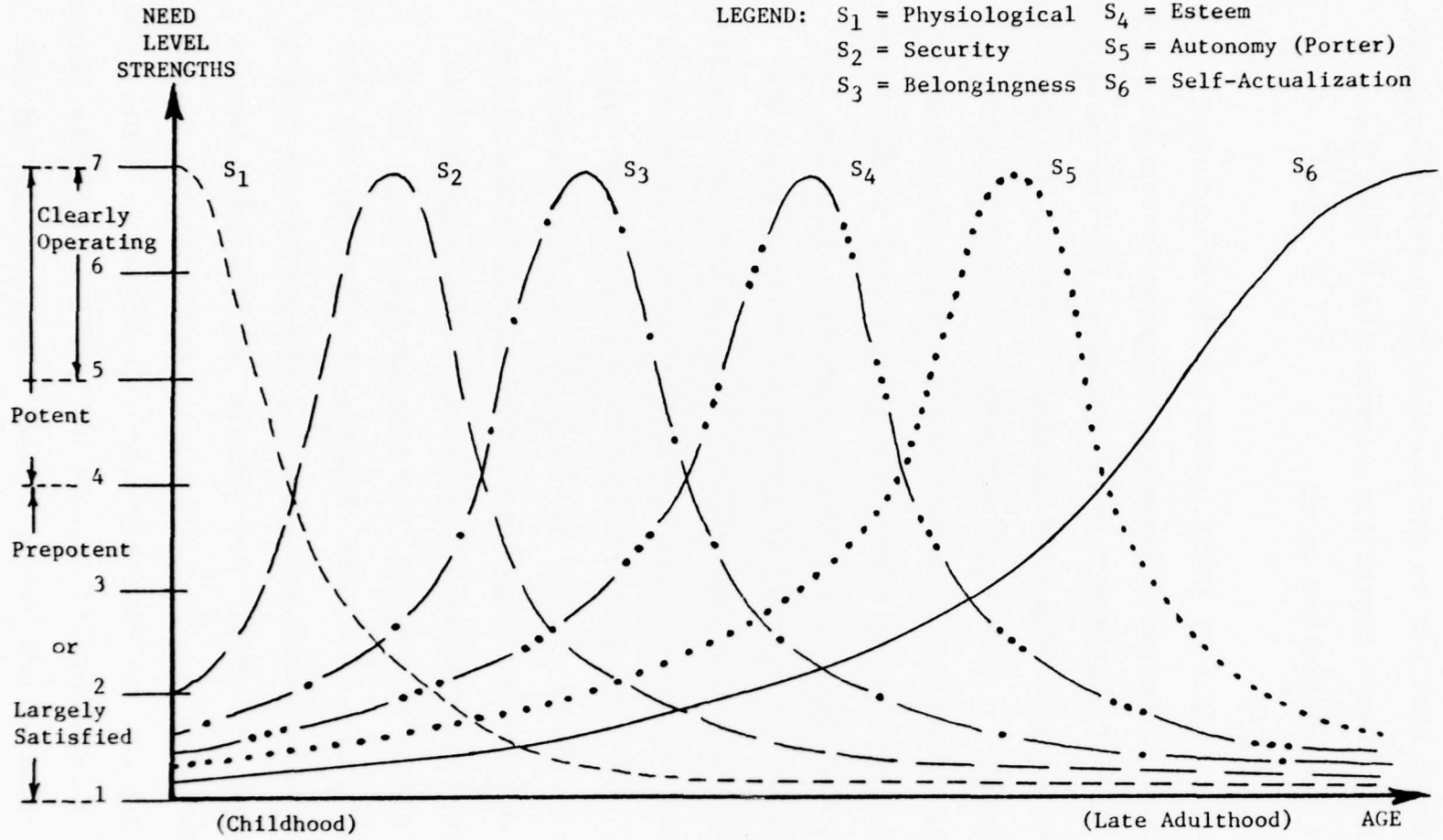


Figure 4. Relationships Among the Strengths of Needs for the Six Need Levels as a Function of Age

therefore, need level strengths should all be less than 4. Higher order needs for the individual who is clearly operating in the Esteem level should all be prepotent, i.e., Autonomy and Self-Actualization need level strengths should be less than 4.

Age was also divided into a spectrum ranging from childhood to late adulthood. Figure 4 forms the basis for the specification of Young's mathematical relationships. By specifying the mathematical expressions that correspond to each of the four ranges of need strength across the five need levels, Young was able to mathematically model the characteristics of the Maslow constructs. Such mathematical modeling lends itself directly to regression analysis, whereby, the coefficients of regression equations can be checked against the sign and value of the specified equations for each portion of the range of need strengths and ages.

Young tested his model using five prior United States Air Force personnel surveys, each having had several thousand respondents. A number of questions that addressed each of the need level categories were chosen from each questionnaire. Seventy-three faculty and students at Stanford University factored specific questions contained in the Air Force surveys into the Maslovian need levels. These individuals were knowledgeable of the Maslow theory but had no vested interest in the results of their efforts.

Young then input his model with responses to the questions identified for each of the need levels, regressing

"clearly operating" levels against next-higher and next-lower need levels. The results of Young's study did not support the Maslow theory as specified by the mathematical parabolic relationships he had derived. Instead, the results consistently supported an inverse parabolic relationship across all of the need levels (hypothesized sign conventions on the regression coefficients were reversed).

Young proposed an alternate hypothesis which he labeled the "Pendulum Theory" which states that an individual "swings" up and down in his strengths of adjacent need levels reflecting an inverse parabolic relationship between need levels. That is, an individual will move from a strong need strength to a largely satisfied need strength and then back to a strong need strength, and so on, for any adjacent pair of needs. This is based on the assumption that an individual attempts to satisfy both adjacent need levels at once, becomes largely satisfied in one, at the expense of the other still "fairly strong" need, and substitutes satisfaction of the first need to attain satisfaction of the second. This altering of satisfaction and strong need strength for the adjacent needs continues, thus, the "swinging" between need strengths of adjacent need levels (Ref 13:181-185).

The above model is assumed to be sound and, therefore, will form the basis for testing the hypotheses addressed by this effort. The Young model will be input with data measured by way of the Mitchell-Moudgill baseline.

5. The Hypotheses

With the above framework and models delineated, it is now possible to formally state the hypotheses that this effort is intended to address:

a. Hypothesis 1.

It is assumed that the individuals with potent need strength for any level will have prepotent need strength for the next-higher level needs. This hypothesis takes the mathematical form (as defined by Young) of:

$$S_i = -\alpha_i S_j^2 + \beta_i S_j + \lambda_i \qquad (1)$$

where S_i = Need Strength of Need Level i,

$j = 2,3,4,5$ (Need Levels)

$i = j - 1$

$S_i \geq X$,

where X is defined as the a posteriori level of potent need strength and will be determined as a result of the data obtained. The parameters α_i and β_i are hypothesized to be positive, and λ_i indeterminant in sign and value. This represents a second order equation for a parabolic relationship describing the next-higher need level given any clearly operating need level i. This equation then describes mathematically the relationship in Figure 4 between any given clearly operating need level and the adjacent higher need level.

b. Hypothesis 2.

It is assumed that individuals with potent need strength for a given level of needs will have largely satisfied need strength for the next-lower level, where the relationship between their potent need strength and their largely satisfied need strength takes the form (as defined by Young) of:

$$S_i = -\Phi_i S_k^2 + \Omega_i S_k + \Psi_i \qquad (2)$$

where, S_i = Need Strength of Level i

$k = 1,2,3,4$ (Need Levels)

$i = k + 1$

$S_i \geq Y$

where Y is defined as the a posteriori level of potent need strength and will be defined as a result of the data obtained. The parameters Φ_i and Ω_i are hypothesized to be positive, and Ψ_i indeterminant in sign and value. This represents a second order equation for a parabolic relationship that describes the next-lower need level given any clearly operating need level i. Again, this represents the mathematical relationship in Figure 4 between any operating need level and the adjacent lower need level.

c. Hypothesis 3.

It is hypothesized that peripheral job-related factors of supervisor, task, and role perception have some unspecified effect on work motivation. Due to the existence of "unhealthy"

or "bad" factors, it is assumed that the Maslow theory will not be applicable (Maslow's "unhealthy personality" statement (1943) extended to include "unhealthy" work environment). Conversely, a "healthy" environment consisting of "good" job factors will tend to promote the applicability of the Maslow hierarchy.

d. Hypothesis 4.

It is hypothesized that the survey sample population will tend to show variable structure indicative of a two-way and/or five-way classification in need levels as did the Mitchell and Moudgill survey populations.

e. Hypothesis 5.

It is hypothesized that the current survey sample is representative of the Air Force population with respect to survey responses.

CHAPTER III

SURVEY INSTRUMENT AND METHODOLOGY

1. Survey Instrument

a. Approach and Design.

To test the hypotheses stated in the previous chapter, it was first necessary to design a survey questionnaire that adequately measured the Maslovian need strengths and peripheral job factors. After such measurement, it was necessary to build a computer program that enabled testing of the Maslow hierarchy and the effects of peripheral job environment factors on the function of the motivational model.

The survey instrument was designed around the instrument tested and validated by Mitchell and Moudgill (1976) as a satisfactory measurement technique of the Maslovian need strengths. The survey instrument used in the current study is listed in Appendix A. Many of the same questions used in the Mitchell and Moudgill questionnaire (Appendix B) were included in this instrument based on the favorable results of their study.

Demographic questions 1 through 10 of the survey developed under the current effort were included in order to test the effects of physical and job age, education, ethnic grouping, sex, and job type. Survey questions 11 through 21 were designed to measure the various peripheral job-related factors described earlier in this study. Referring to the model developed in Chapter II (Figure 3), questions 11, 13,

and 15 were designed to measure the effects of "task" on job motivation within the work setting. Whether the individual initially wanted his present job (or was forced to take it), whether the job promoted good relations (or bad) with fellow employees, or whether the individual felt challenged (or not challenged) by his present job were all representative of the "task" effects on the motivational model. Questions 14 and 16 represent the direct effects of the "supervisor" input to the model. Number 14 represents the demeanor of the supervisor/employee relationship as perceived by the employee. Question number 16 addresses the perceived amount of freedom allowed by the supervisor in the job. This is an implied relationship and may also include the amount of freedom allowed by the type of job or task.

Question number 21 is related to both "supervisor" and "task", in that, it measures the effect of supervisor directiveness in tasks that are assumed to be highly structured due to the military environment. Questions 17 and 20 were designed to measure the effects of the feedback loop between performance and supervisory input to motivation. Number 17 is a direct measure of the amount of feedback given to the employee by the supervisor. Question 20 represents the amount of recognition that is given the employee by the supervisor.

Survey questions 18 and 19 are constructed to measure the degree of perceived rewards obtained from task performance. Preparation for greater responsibility and a feeling of worthwhile contribution to the organization are assumed to be

representative of the "rewards" input to job satisfaction.

Survey questions 22 through 25 are a standard Hoppock job satisfaction battery designed to measure overall job satisfaction. These questions have been validated through past research and were accepted as an adequate measure of work satisfaction in this effort.

As previously stated, the "ability" input to the model is assumed to be adequate to accomplish job requirements. Also, no direct measure of the work group/individual "role perception" was attempted. The effects on job performance of unions (American Federation of Government Employees) or informal groups within the organization would be extremely difficult to ascertain. In light of recent publicity over military unionization, it may also be questionable whether survey questions would measure the true impact of formal or informal unionization on job performance.

"Performance" was not measured as it was considered to be outside the scope of this study. This determination was based on the fact that performance should not be measured simply through querying the individual on his "perceived" performance, but should be measured through performance reports, evaluations, etc., that adequately measure the individual's performance and contribution to the mission of the organization. Therefore, for the purpose of this study, performance will be treated as a dependent variable in the model and will be considered a function of only job satisfaction and job motivation (including peripheral factors).

The last section of the survey instrument (questions 26 through 35) contain five pairs of questions designed to measure the upper four Maslovian need levels and the autonomy level proposed by Porter. Each major question has six subquestions that attempt to measure various aspects of need strength within each level of the hierarchy. This section of the survey parallels the questions used in the Mitchell-Moudgill study and forms the basis for direct measurement of the constructs underlying the Maslow theory.

b. Measures of Maslow Need Strength.

Each pair of questions (26-27, 28-29, 30-31, 32-33, 34-35) represent the security, belongingness, esteem, autonomy, and self-actualization levels, respectively. The subquestions under each pair allow for four separate measures of the need strength construct based on a forced response range of 1 to 7.

The deficiency reflected by "How much do you want," less "How much is there now" represents the first measure. This same approach to the measurement of need strength was first devised by Porter, and subsequently used by Mitchell and Moudgill. The greater the disparity between "want" and "have," the greater is the need for a given level of need, and, consequently, the greater is the need strength for the given need level. Given that man is a "wanting animal," a normal individual would never have more of any need that he would want. Therefore, any negative deficiency (Want - Have = $-\Delta$) would reflect abnormal response.

The second and third measures of need strength are similar, if not identical. The subquestions addressing "How strong is your need for this factor" and "How important is this factor" conceptually measure need strength directly and should have high correlation with one another and with the deficiency measure cited above. Research of past studies has indicated that no such direct approach to need strength measurement has been attempted. This approach has intuitive appeal in that it corresponds directly to the Maslow concept of need strength.

The last measure of need strength is reflected in the subquestion addressing "degree of satisfaction with this factor." When the intent of this question is reversed, i.e., when the forced response from 1 to 7 is subtracted from 8, the resultant is a measure of dissatisfaction. Dissatisfaction connotates unsatisfied needs and corresponds to a disparity between what there should be and what there is. Therefore, the degree of dissatisfaction is also a measure of need strength.

2. Methodology

Using the survey instrument described above as a means to measure the constructs of the Maslow theory, it is possible to use a number of computer programs available under the Statistical Package for the Social Sciences (SPSS) to test the aforementioned hypotheses. A logical and straightforward approach is followed to accomplish this end.

a. Check for Bad Data.

The first step in the analyses is to determine if "bad" data has been interjected, either by programming errors (coding) or by response set. The SPSS program, LIST CASES (Ref 25:137) is used to verify what data is being input into the raw data file versus what was actually obtained by the survey questionnaire. All cases are printed on the LIST CASES output and every tenth case selected and checked against the original instrument to verify correctness. This procedure is merely a check and is used to determine if a coding error problem exists. Another possibility of bad or erroneous data exists because of response set. A certain percentage of respondents to questionnaires of the type used in this study may answer all or groups of questions with the same answer or same sequence of answers. This form of response could be a result of lack of understanding the question(s), laziness, or dsyfunctional behavior (Ref 26:144). There is no protection from such responses other than total deletion of such cases from the sample population. Therefore, all cases are reviewed on a case-by-case basis and deletions made where response set is obvious.

b. Computation of Need Strength Measures and Job Satisfaction Coefficients.

The next step in the analyses is to compute all pertinent variables. The four Maslovian need strength measures for each of the ten survey questions (26 through 35) are computed

in addition to the Hoppock job satisfaction coefficient. The four need strength measures are statically analyzed both horizontally and vertically by used of the SPSS PEARSON correlation program (Ref 25:280-287). The horizontal analysis is used to verify that each pair of measures representing a specific need level is in effect measuring the same need level. High correlation should exist between each need strength measure and its adjacent paired question if they are measuring the same Maslovian need level. Vertical analysis will be used to verify that each of the four need strength measures is in effect measuring the same need strength within each separate question. This analysis will determine if one of the paired questions does not satisfactorily represent the corresponding need level and should be deleted from the analyses. Also, the analysis will indicate if one or more of the four need strength measures are not desirable based on the deficiency measure validated by Mitchell and Moudgill. After any deletions of questions or need strength measures, the five pairs of questions will be collapsed into the five need levels of security, belongingness, esteem, autonomy, and self-actualization.

Each of these combined need levels will also have associated with them combined need strength measures (four each if none are deleted as a result of the horizontal analysis). The Hoppock job satisfaction score is computed by straight addition of questions 21 through 24 (sense of questions 23 and 24 reversed), resulting in a possible overall job satisfaction range of 4 to 28.

c. Establishing A Priori Cut-Offs for Potent or Operating Need Levels.

The next step in the analyses involves using the SPSS FREQUENCIES program (Ref 25:194-200) to establish cut-offs for each "operating" or potent need strength in each of the need levels. This corresponds roughly to a need strength of 4 in Figure 4. The cut-offs will be based on the a priori criterion that the potent segment of the sample for each combined need strength measure should contain 20 to 40 percent of the sample population and/or approximately correspond to the mean of the sample population. This is based on the assumption that the need strength measures will be slightly skewed to the high end of the 1 to 7 range. Once such cut-offs have been established, the SPSS "Select If" statement (Ref 25:128) can be used to segregate those individuals who display potent need strengths prior to regression analysis.

d. Regression Analysis (Hypotheses 1 and 2).

In preparation for regression analysis to test Hypotheses 1 and 2, the squares of the need strength measures must be determined. The next step in the analysis involves the use of the SPSS REGRESSION subroutine (Ref 25:342-356) in conjunction with the cut-offs established in part c., above.

Hypothesis 1 is that potent need levels will have prepotent next-higher need levels. This hypothesis is tested by regressing each need strength measure (starting with the four combined security need strength measures) against the next-higher

level corresponding need measure and need measure squared, after selecting those cases in the first need level that are clearly operating (potent). This procedure is continued until all need strength measures have been regressed against the next-higher level need strength and need strength squared terms. Note that esteem need strength measures will be regressed against the autonomy need strength measures, which, in turn, will be regressed against the self-actualization measures. In addition, the esteem measures will be regressed directly with the self-actualization measures to test the applicability of the Porter autonomy contention. The hypothesis will be validated if the resultant regression coefficients are both positive (constant term indeterminant in value and sign), the F-statistics for the overall regression is significant, and the R^2 (percent of variability explained) value is fairly high.

Hypothesis 2 is that need level potency is conditional upon lower need level satisfaction. It is tested in much the same manner, only that each need strength measure is regressed with the next-lower level of corresponding need strength measure and squared measure. Again, this same type of procedure is continued until all need strength measures have been regressed against the corresponding next-lower level need strength and need strength squared terms. Hypothesis 2 would be tested for validation in the same manner as Hypothesis 1 with respect to regression coefficients, significance, R^2, and applicability of the Porter autonomy level.

e. Effects of the Peripheral, Group Membership Factors (Hypothesis 3).

The process described in part d., above, is repeated to test the impact of the peripheral factors and sample population subgroups on the overall regression models. The peripheral job-related factors identified in Chapter II and specified in part 1 of this chapter are addressed with the "Select If" routine based on a priori cut-offs reflecting the existence of an upper scale or "healthy" work environment. This, in turn, is repeated for a lower scale or "unhealthy" work environment. It is assumed that the uncut data would reflect a mix of healthy and unhealthy work environments and, therefore, would fall short of the best possible representation of the Maslovian model of job motivation. On the other hand, the uncut data should reflect a better representation than a "totally" unhealthy environment. The effects of the peripheral factors are based on a continuum and, therefore, testing the extremes against the uncut regression model should adequately test Hypothesis 3 and reflect impact of job related environmental factors on the Maslow hierarchy. Effects of membership in different subgroups of the sample population will also be tested in order to determine if significant changes in the regression models occur due to specific group membership.

f. Factor Analysis (Hypothesis 4 and the Mitchell-Moudgill Approach).

Hypothesis 4 is the assumed similarity between variable structure in the current survey sample and the Mitchell and

Moudgill data. The need strength measures of the Maslow hierarchy can be factor analyzed to determine the underlying constructs that exist within need strength measures as was done in the Mitchell and Moudgill study referenced earlier in this effort. The constructs can be analyzed with regard to the sample population subgroups to determine if the two-factor and five-factor relationships emerge as occurred in the Mitchell-Moudgill study. Professor Mitchell is currently in the process of publishing the follow-on results to his original effort. Additional confirmation of a dual construct model has been indicated by Mitchell's latest research. Mitchell explains this disparity by the proposition that need strengths tend to follow group-dependence and are type-of-group specific rather than sample specific. Blue collar and clerical workers would tend to be dominated by the security aspects of the job and would, therefore, be likely to reflect a two-way factorial structure that tends to separate the Maslovian need constructs between security and all other levels. The survey sample will allow for the testing of this proposition in that several distinct groups with varying degrees of job security will be included. Based on the horizontal correlation analysis, described in part b. of this chapter, it will be possible to factor analyze the data across the need levels for each need measure to determine the effects of specific group membership on the factor structure.

e. Survey Sample Validity (Hypothesis 5).

Hypothesis 5 is the assumed similarity between the current survey sample and the rest of the Air Force. It is imperative that the validity of the sample as representative of the total population be ascertained in order to make the assumption that current sample findings also apply to the larger total population of which it is a part. The total population in this instance can be considered the United States Air Force. Due to the nature of the military, an outwardly unique work environment exists that may : may not be similar to the civilian sector with respect to the job motivation it promotes. It is possible to statistically show that the survey population of this effort is or is not representative of the total Air Force population. The Quality of Life survey was administered Air Force wide to over 10,000 personnel in 1977. It, therefore, should very closely represent the underlying characteristics of the Air Force population. There are nine questions that measure the same work environment attitudes on both the current and the Quality of Life surveys. These questions are identical on both surveys and should allow for direct comparison of mean response scores of the two survey populations for each pair of questions. Mean response scores of applicable questions will allow for the statistical testing of current survey representation of the total Air Force population, i.e., that no statistical differences exist between the respective questions. Therefore, current survey question

means (questions 15-18, 20, and 22-25) will be tested against the corresponding Quality of Life means using the standard normal "Z" statistic in order to establish Air Force population representability.

CHAPTER IV

THE DATA

1. Survey Target Population

a. Target Selection.

The survey (Appendix A) was administered to members of the 3800 Air Base Wing (3800 ABW) at Maxwell Air Force Base, Alabama in September-October 1977 time frame. The survey instrument and targeted sample population were approved by Headquarters United States Air Force (Hq USAF) in accordance with Air Force Regulation 30-23. Due to the volume of recent survey efforts at Wright-Patterson Air Force Base (where this study was sponsored), survey of Aeronautical Systems Division and/or Air Force Logistics Command units at Wright-Patterson Air Force Base was not approved.

Selection of the 3800 ABW as a target population was based on several factors. The Wing provided a survey population large enough to obtain a favorable number of respondents; it has not been saturated with survey questionnaires, as has been the case with Wright-Patterson Air Force Base units. Further, due to a lesser intensity of survey work, it was considered that the Wing would be more responsive to this survey effort, and on the basis of total surveys distributed, would yield a higher overall response rate. Also, it was considered that since the Wing is within the Air University Command, as is the organization sponsoring this research effort, it would enhance receptiveness to the survey.

Another consideration for the selection of the 3800 ABW was the variety of jobs and work environments present within the organization. Such a cross-section of environments would likely promote a more representative sample of motivational behavior than would the specialized organizations typical of Wright-Patterson Air Force Base, e.g., the System Program Offices (SPOs) and research and development laboratories.

b. Target Description.

The 3800 ABW operates and maintains Maxwell Air Force Base and Gunter Air Force Station, and provides logistic support and services to Air University and tenant organizations. The Wing is composed of nearly a dozen separate organizations that support the above mission. Of these, the Deputy for Personnel, Security Police Squadron, Directorate of Logistics, and Civil Engineering Squadron contain the largest portion of assigned personnel. All Base Non-Appropriated Fund personnel are also assigned to the Morale, Welfare and Recreation Division of the 3800 ABW. Also attached to the Wing is the smaller 3825th Academic Services Group. For administrative purposes, the enlisted personnel of Air University, 3840th Support Squadron, 3842nd Management Engineering Flight, 3843rd Computer Services Squadron, and Air Force ROTC Headquarters are assigned to the Wing.

The Deputy for Personnel (DP) is responsible for the provision of administrative support to all assigned personnel,

including on-the-job training and career motivation programs, and all personnel actions (performance reports and information files). This organization is also responsible for drug and alcohol abuse programs, education in race relations, and equal employment opportunity.

The Security Police Squadron is responsible for the direction of command security programs and operations, direction of command law enforcement programs, wartime information, security planning, and training programs. This Squadron is also responsible for performing security and military law enforcement operations and advisory functions.

The Directorate of Logistics is responsible for overall direction and operation of materiel programs to include maintenance, supply, transportation, and base procurement activities.

The Civil Engineering Squadron manages the real property facilities, including all associated planning, programming, justification, acquisition, design and construction of new facilities and utility systems. This unit also has responsibility for the operation, maintenance, repair, improvement, and disposal of existing facilities; fire protection, crash rescue; and general housekeeping functions throughout the base.

The Morale, Welfare and Recreation (MWR) Division of the 3800 ABW is composed of almost all Non-Appropriated Fund employees. This division plans, organizes, coordinates, and directs functions relating to the open messes, libraries,

and recreation services at Maxwell. The MWR Division is responsible for child care, arts and crafts, bowling alley, officers and enlisted messes (food services), aero club, and billeting (housekeeping services). This segment of the target population was of particular interest in that it encompassed the largest percentage of minority group employees.

c. Organizational Breakout.

In addition to minority Non-Appropriated Fund (NAF) employees, three other subgroups were of concern in this effort. Airman, Officer, and Civil Service employees were also identified as target subpopulations within the 3800 ABW. As part of the analyses, comparisons are made between the above subgroups to test for significant differences in motivational behavior. Table 1 represents the breakout by Wing organization of the four targeted subgroups and the combined subgroup memberships. Note that the Civil Service subgroup is composed of Government Service (GS) and Wage Grade (WG) employees. Also note that the 3800 ABW is a general category that includes members of the Command Section, Deputy for Personnel, Chaplains, etc. In organizations where the Wing exercises administrative control over enlisted personnel, only enlisted are indicated. The entry for MWR employees includes only full-time, non-temporary, NAF employees.

2. Survey Administration

a. Survey Pre-Test.

Prior to distribution of the survey at Maxwell. a test was conducted within the School of Engineering, Air Force

TABLE 1. SURVEY POPULATION BREAKOUT

ORGANIZATION	SUBGROUPS			
	OFFICERS	ENLISTED	GS/WG	NAF
3800 ABW	51	422	351	0
3800 SP	2	95	2	0
3800 LG	13	108	201	0
3800 CE	5	157	296	0
3825 AS	2	1	0	0
AU	*	35	*	0
3840 SS	*	28	*	0
3842 ME	*	14	*	0
3843 CSS	*	61	*	0
AFROTC	*	64	*	0
MWR	*	*	*	331
TOTALS	73	985	850	331

*Not under the administrative control of the 3800 ABW - numbers not ascertained.

Symbols:
- ABW - Air Base Wing (including Deputy for Personnel)
- SP - Security Police Squadron
- LG - Logistics Squadron
- CE - Civil Engineering Squadron
- AS - Academic Services
- AU - Air University
- SS - Support Squadron
- ME - Management Engineering Flight
- CSS - Computer Services Squadron
- AFROTC - Air Force Reserve Officer Training Corps Headquarters
- MWR - Morale, Welfare and Recreation Division

Institute of Technology (AFIT). An initial survey based on the instrument used by Mitchell and Moudgill was pre-tested on Systems Management students in August of 1977. Based on comments furnished by 31 respondents, the survey was modified in areas where ambiguity seemed to exist. An average survey response time of 15 minutes was also obtained for the purpose of the survey cover letter. During this same time period, initial survey approval was obtained from Colonel David Stockman, Commander of the 3800 Air Base Wing, contingent on the deletion of one survey question which requested the individual's office symbol/organization. This could possibly jeopardize anonymity of some individuals due to the fact that some of the targeted organizations had only one or two officers, enlisted, etc. Consequently, the question identified by the Wing Commander was deleted from the survey instrument.

b. Selection of Sample Population.

Based on the need for statistical reliability in the resulting data, a fairly large target sample was required for each of the four subgroups. For 95 percent reliability in the results, with a confidence interval of 90 percent, at least 185 respondents would be required from each subgroup (Ref 27: 201-202). The Air Force Survey Control Branch at the Air Force Military Personnel Center indicated that historic survey response rates averaged approximately 60 percent. To compensate for non-response, a total of almost 310 surveys would be needed to return the required 185 for each of the subgroups, other than officers.

Note that the officer subgroup was limited in population size (Table 1). It was decided, therefore, to survey the officer subgroup in total (100%) and use the survey pretest respondents (all officers) to make up as much of the difference as possible. The pretest respondents were all recently transferred to AFIT from regular Air Force jobs (within two months of taking the pretest). Twenty-four of 31 of the pretest respondents answered the questionnaire with respect to their prior Air Force job. SPSS T-TEST (Ref 25:267-275) is used to compare the two officer samples for statistical difference.

In order to lower the required number of surveys (310 x 3 plus 73, 100% of officers $\approx$ 1000), an indorsement letter was signed by the 3800 Air Base Wing Commander (Appendix A), attempting to increase the survey response rate. It was estimated that a 10 percent increase in response rate could be obtained through such action. The resulting estimated response rate of 70 percent would then require a total survey distribution of approximately 850 to attain the desired return of 185 for the enlisted, GS/WG, and NAF subgroups:

$$(185/.7) \times 3 + 73 \approx (259) \times 3 + 73 = 850 \qquad (3)$$

Therefore, 259 surveys per each subgroup, other than officer, should be distributed, resulting in a total distribution of 850 instruments. Dividing the subgroup population totals (Table 1) by 259 results in a selection percentage that will be applied to each organization within the corresponding subgroup. Eight branches under the MWR Division were sampled

with this same procedure, distributing the selection of MWR personnel between the branches. The distribution of surveys among the applicable organizations and corresponding group selection percentages are listed in Table 2.

c. Random Selection Process.

After the specific number of employees in each subgroup of each organization has been determined, it is now possible to proceed to the actual selection of the survey sample population. Computer listings of all assigned 3800 ABW personnel were obtained from the Maxwell Air Force Base Deputy for Personnel. The listings were segregated by major subgroup. Through the use of a random number table (Ref 27: 520-523) and a skip-select procedure, the calculated number of survey selectees were drawn from each subgroup. This procedure did not apply to the officer subgroup due to 100 percent selection. The resultant sample distribution encompassed the complete range of grade levels in each subgroup category and reflected random sample without selection bias.

A total of 850 individual survey packages were prepared. Each package was individually addressed and included the survey instrument (Appendix A) and a pre-addressed, postage-paid, return envelope. The survey packages were boxed and flown to Maxwell Air Force Base where they were transferred into the base mail distribution system in September of 1977.

TABLE 2. DISTRIBUTION OF SURVEY SAMPLE AMONG RESPECTIVE ORGANIZATIONS

NUMBER SURVEYED/ GROUP MEMBERSHIP	SUBGROUPS			
	OFFICERS	ENLISTED	GS/WG	NAF
3800 ABW	51/51	111/422	107/351	0/0
3800 SP	2/2	25/95	1/2	0/0
3800 LG	13/13	29/108	61/201	0/0
3800 CE	5/5	41/157	90/296	0/0
3825 AS	2/2	/1	0/0	0/0
AU	*	9/35	*	0/0
3840 SS	*	7/28	*	0/0
3842 ME	*	4/14	*	0/0
3843 CSS	*	16/61	*	0/0
AFROTC	*	17/64	*	0/0
MWR	*	*	*	259/331
TOTALS	73/73	259/985	259/850	259/331
(% of Subgroup Surveyed)	(100%)	(26.29%)	(30.47%)	(78.25%)

*Not Surveyed - Not under the administrative control of the 3800 Air Base Wing.

3. Sample Composition

The resultant survey sample fell short of the number anticipated. Only about 450 of the 850 surveys distributed were returned. The breakout of those returned is shown in Table 3. A total response rate of approximately 53 percent was obtained. The poorest response rate came from the NAF subgroup with only 28 percent.

Due to the deletion of the office symbol/organization question, mentioned earlier in this chapter, no direct correspondence between the four subgroups and organizations could be made. Table 3 does show the relationship between type of job and subgroup. Note that, although Personnel, Security Police, Logistics and Civil Engineers were not specific categories on the survey question addressing job type, they were listed by respondents as the type of job they held. These special categories of job type do not reflect true group membership, i.e., a manager or procurement, clerical or administrative specialist could also be a member of one of the special categories. The special categories reflect the perceived group membership of those individuals who so indicated, and therefore, will be treated as separate groups in this study.

The job type of "other" reflects those individuals who could not be classified into the other job types. This group included such personnel as janitors, waitresses, bartenders, maids, chaplains, teachers, building custodians, equal opportunity and treatment (EOT) specialists, package store

TABLE 3. SURVEY RESPONDENT BREAKOUT
(Subgroup and Job Type)

JOB TYPE	SUBGROUP				
	Officer	Enlisted	GS/WG	NAF	Totals
Management	15	22	8	7	52
Procurement	2	0	10	5	17
Clerical	0	10	35	8	53
Administrative	12	56	27	8	103
Personnel*	2	13	7	0	22
Security Police*	2	14	0	0	16
Logistics*	3	23	21	0	47
Civil Engineer*	5	12	21	0	38
Other	17	14	16	45	92
TOTALS (Respondents/ No. Actually Surveyed)	58/73	164/259	145/259	73/259	440/850
Response Rate	79.5%	63.3%	56.0%	28.2%	51.8%

*Indicated by survey respondents as type of job held (other than what was listed on the survey instrument as possibly job type).

NOTE: Nine respondents were not included in the above table because they did not answer one or both of the questions reflecting subgroup membership or job type.

Therefore, the true overall response rate = (440+9)/850 = 52.8%.

attendants, and intelligence and meteorology specialists. Also included are all those individuals who marked the question with the response "other" without specific explanation of job type.

The above job types form the basis for comparison of the four subgroups. The job types also allow for the analysis of type-of-specific jobs cited by Mitchell and Moudgill as the determinants of either the two- or five-way classification of the Maslow hierarchy.

CHAPTER V

RESULTS

1. Initial Considerations

Prior to any in-depth analysis of the hypotheses stated in the preceeding chapters, it is necessary to analyze the data with respect to the following: consistency between the paired questions in each of the need levels; consistency of the four need measures over each of the need levels; and cross-correlation between largely satisfied and prepotent needs for any given "clearly operating" need level.

a. Horizontal Static Analysis of Paired Questions.

The paired survey questions addressing each of the five need levels were analyzed by correlating respective deficiency, need strength, importance, and dissatisfaction measures between each question in the pair. If the paired questions measure the same need level construct, a fairly high correlation could be expected for each of the measures. The results of the SPSS Pearson Correlation (Ref 25:281-287) are shown in Table 4.

There appears to be some disparity in the measurement of the security need strengths. Correlations should be much higher and should definitely not be negative if the pair of security questions were measuring the same construct. Although survey question number 26 (derived from the Porter and Mitchell questionnaires) is reverse sensed, it was reverse coded prior to analysis (Appendix A). Based on the inconsistency

TABLE 4. PEARSON CORRELATION BETWEEN NEED MEASURES OF PAIRED QUESTIONS

NEED LEVELS	NEED MEASURES			
	M1 (Deficiency)	M2 (Need Strength)	M3 (Importance)	M4 (Dissatisfaction)
Security	.0842*	-.0367	-.1671**	-.2664**
Belongingness	.3194**	.5105**	.5048**	.4719**
Esteem	.4034**	.5220**	.4967**	.5686**
Autonomy	.5243**	.5681**	.5739**	.6327**
Self-Actualization	.6968**	.7011**	.7135**	.7966**

*p < .05
**p < .001

noted above and written comments made by survey respondents on the difficulty of understanding question 26, it was decided to delete this question. Therefore, the "combined" measures for security are derived from the responses to a single security question only (question number 27). The correlations for the remaining paired questions are consistently high enough that no changes were made to the other combined security measures.

b. Vertical Static Analysis of Need Strength Measures

An analysis was made between each of the four need measures to determine if they are measuring the same need level constructs. If the measures are measuring the same thing, they should correlate highly with each other. For

example, if an individual is highly satisfied (conversely, has little dissatisfaction) with the belongingness need, he should feel a low degree of importance, a low degree of need, and have little deficiency in the area of belongingness. That is, if one measure is small, the others should also be small or vice versa. The preceeding follows directly from the Maslow theory, in that, as an individual becomes "largely satisfied" (Want less Have approaches zero) in a given need level, the current need becomes less important and operating need strength diminishes, allowing the next high order of need to emerge. The results of the static Pearson Correlation analysis are shown in Table 5.

Note that only two pairs of need measures consistently correlate highly. Deficiency (M1) tends to correlate highly with Dissatisfaction (M4), and Need Strength (M2) tends to correlate highly with Importance (M3). Interestingly, the other measures do not correlate as would be expected. Deficiency correlates in a positive but lesser amount with both Need Strength and Importance. Dissatisfaction correlates negatively and at a low level with Need Strength and Importance. Note that all correlations are significant and, therefore, these results did not occur by chance. In opposition to the Maslow theory, the above could be stated in this manner: along with an individual becoming "largely satisfied" (less dissatisfied) with a given need, his deficiency decreases and both perceived need strength and importance for that given need <u>increase</u>.

TABLE 5. VERTICAL CORRELATION BETWEEN NEED MEASURES FOR EACH NEED LEVEL

NEED LEVELS	M2 (Need Strength)	M3 (Importance)	M4 (Dissatisfaction)
SECURITY			
M1 (Deficiency)	.3226**	.2722**	.3802**
M2 (Need Strength)		.7565**	-.2676**
M3 (Importance)			-.2512**
BELONGINGNESS			
M1	.2245**	.2774**	.5285**
M2		.7738**	-.2496**
M3			-.2519**
ESTEEM			
M1	.2067**	.2515**	.6329**
M2		.8239**	-.2260**
M3			-.2273**
AUTONOMY			
M1	.1240*	.2041**	.6611**
M2		.8145**	-.2152**
M3			-.1854**
SELF-ACTUALIZATION			
M1	.1490**	.1971**	.7559**
M2		.8067**	-.1912**
M3			-.1108*

*p < .05
**p < .001

Several explanations can be proposed for this phenomenon: First, it may be that, although intuitively alike, the measures do not "measure" the same concept, instead they are measuring two distinctly separate ideas. That is, Deficiency and Dissatisfaction are measuring one type of need strength, and Importance and Need Strength are measuring another. Second, they may be measuring the need strengths of individuals who are "chronically deprived," in that, the more dissatisfied or deficient the individual becomes with a given need level, the less he cares about that respective need being satisfied and, therefore, the less important it becomes (and the less need strength it bears). Conversely, an increase in satisfaction (decrease in dissatisfaction) or decrease in deficiency could "cause" the individual to care more about totally satisfying a given need level and would, therefore, likely increase the perceived importance of the need with a corresponding increase in the strength of the need. The small but significant correlations between the Deficiency-Dissatisfaction measures and the Need Strength-Importance measures indicate, although slight, some cause-and-effect relationship exists - and exists not by chance. Lastly, it may be that the measures are adequately measuring need strengths and the static analysis just does not truly represent how things (the need levels) "move together." The dynamic relationships that exist between the need levels and the need measures may be difficult to capture via such a static approach.

Taking this discrepancy one step further, the raw responses to each of the individual questions were analyzed to determine if other anomolies existed. Pearson Correlation was again used to determine the relationship of "raw" answers for each need level question (numbers 26 - 35), including the question number 26 that was to be deleted as mentioned in part a. of this section. Table 6 represents a typical outcome for questions 27-35 (Appendix A). Table 7 represents the results derived from question number 26.

The results displayed in Table 6 are as expected and do not conflict with what has been previously stated. Note the four large correlations which stayed consistently large for all questions (27-35), having a range of .6122 to .8035, and an average correlation of approximately .75. The six other correlations for each of the questions remained relatively small, with an average of approximately .30. Table 6 indicates that the more an individual "has", the more "satisfied" he becomes; the more an individual "wants", the greater his "need strength" becomes; the more "important" a need becomes, the more the need is "wanted"; and finally, the more "important" a need becomes, the greater the resulting "need".

Table 7 presents additional confirmation of the decision made in part a. of this section - to delete question 26 from the analysis prior to listing any of the stated hypotheses. The results of Table 7 are generally inconsistent with those of Table 6, especially with respect to negative correlation between the amount of a need an individual "has" and the "satisfaction" of that need.

TABLE 6. PEARSON CORRELATION OF RAW RESPONSE SCORES TO QUESTION 30 (TYPICAL OF QUESTIONS 27-35)

	"Want"	"Need Strength"	"Satisfaction"	"Importance"
"Have"	.3098**	.3357**	.7376**	.2785**
"Want"		.7326**	.1973**	.7289**
"Need Strength"			.2329**	.7660**
"Satisfaction"				.2152**

**p < .001

TABLE 7. PEARSON CORRELATION OF RAW RESPONSE SCORES TO QUESTION 26

	"Want"	"Need Strength"	"Satisfaction"	"Importance"
"Have"	.3461**	.4307**	-.1549**	.4391**
"Want"		.6211**	.0401	.3099**
"Need Strength"			.0418	.4542**
"Satisfaction"				-.0008

**p < .001

Given the above results, it was decided that, although the vertical static analysis presented a possibility that the need strength measures did not in effect "measure" the same thing, all four measures would be retained for analysis of the aforementioned hypotheses. This decision was due to lack of knowledge of how such measures and need strength levels "move together" in a dynamic relationship.

c. Cross-Correlation Analysis Between Largely Satisfied and Prepotent Needs.

The last of the initial considerations prior to testing the hypotheses formulated in Chapter II is to check statically the relationship between "largely" satisfied needs and prepotent needs, given a "clearly operating" need level. According to Young (1976), given a clearly operating need level, all largely satisfied needs should be positively correlated, as should all prepotent needs. Also, largely satisfied needs and prepotent needs should be negatively correlated, as, according to the Maslovian theory, satisfied needs will have decreasing importance of need strength, whereas, prepotent needs are becoming increasingly important and, therefore, increasing in need strength. Table 8 represents an example of such relationships for the deficiency need measure, where the "clearly operating" need is Esteem, the prepotent needs therefore being Autonomy and Self-Actualization, and the largely satisfied needs being Security and Belongingness.

Identical relationships (sign) were obtained across all four need measures. Again, a disparity from the anticipated

TABLE 8. CROSS-CORRELATIONS BETWEEN LARGELY SATISFIED AND PREPOTENT NEEDS (CLEARLY OPERATING AT THE ESTEEM NEED LEVELS FOR THE DEFICIENCY NEED STRENGTH MEASURE)

	Security	Belongingness	Esteem	Autonomy	Self-Actualization
Belongingness	.2601**				
Esteem	.1573*	.3120**	1.00**	.4850**	.5324**
Autonomy	.1684*	.4623**			
Self-Actualization	.0968	.3500**		.5519**	

*p < .05
**p < .001

Note: Includes total population - all subgroups and job types.

negative correlation between largely satisfied and prepotent needs was found. Although the predicted positive correlation was found between the largely satisfied Security and Belongingness levels (.2601) and between the prepotent Autonomy and Self-Actualization levels (.5519), no predicted negative correlations were found (box in Table 8). This held true even when the a priori selection criteria was changed for the determination of the "clearly operating" criteria. Also, no change in signs of largely satisfied, prepotent, or cross-correlations was noted for all separately addressed subgroups and job types (Table 3) where significance of $p < .05$ was obtained. The Cross-Correlation Analyses again indicate that the "largely satisfied therefore decreased importance" proposition does not hold, at least not for this sample population and its subgroups.

2. Hypothesis 1: The Relationship Between Prepotent and Potent Need Levels

a. Frequencies - Determination of Clearly Operating Need Levels.

Prior to regressing potent and prepotent need strength measures, it was first necessary to determine those individuals who were clearly operating (potent) in each of the separate need levels. Arbitrarily, a cut-off of "4" on the need measure scale of "1" to "7" could have been used if the survey responses and resulting need measures had been evenly distributed about the scale midpoint. Based on previous experience, it was anticipated that the responses would be heavily skewed toward the right in questions 26 through 35. Therefore, the SPSS FREQUENCIES (Ref 25:194-202) was used to establish the true distribution of answers and resultant need strength measure. The a priori decision criterion stated in Chapter 3 was used in conjunction with the SPSS "Select If" procedure to segregate those individuals clearly operating in each need level.

b. Test on Total Population.

Once the above potency cut-offs were established, it was possible to regress potent need levels (S_i) against next-higher adjacent levels (prepotent) by constructing the second order term (S_j^2) and using it along with S_j as independent variables in the regression equation. This procedure duplicates the methodology devised by Young. If the resulting signs for the regression coefficients, R^2, and significance levels are as predicted in Section 5 of Chapter 2, then the Potency-Prepotency hypothesis can be validated.

The results for the parabolic regression of potent and prepotent need levels for each of the four need measures are shown in Table 9. The relationship measured by "Importance" in Table 9 between the potent Security level and the next higher prepotent Belongingness level (S_3 - B_3) resulted in a positive S_j^2 coefficient (α), a negative S_j coefficient (β), and a positive constant (λ). The regression equation accounted for 4.2 percent of the variability in the data (R^2) which was derived from 272 cases. The entering significance levels for the S_j^2 and S_j coefficients were .032 and .010, respectively (both significant at $p < .05$). Note that the signs of the coefficients are all reversed from what is predicted for all need measures over all need levels, except for the measure of "Deficiency." Note also that the R^2 range from low (.042) to fairly reasonable values (.334). Also, the significance levels for entering F values vary quite a bit with the nonsignificant term generally being the first order (S_j) coefficient. Note further that all regression equations for the Esteem-Autonomy relationship contain at least one insignificant term (S_j).

The results shown in Table 9 do not support Hypothesis 1. They do tend to support an alternate theory of a reverse parabolic relationship such as the one cited earlier in Chapter 2 that was proposed by Young (Ref 13:152). The lack of significance in the Esteem-Autonomy relationship may also be indicative of a lack of support for the Porter contention that Esteem and Autonomy are distinct, separate need levels.

TABLE 9. REGRESSION ANALYSIS OF POTENT - PREPOTENT NEEDS

(HYPOTHESIS 1: $S_i = -\alpha_i S_j^2 + \beta_i S_j + \lambda_i$)

Need Level and Need Measure	α_i	β_i	λ_i	R^2	n	F
$S_1 - B_1$	-.02580	.0554	3.9109	.042	178	.022/.812
$S_2 - B_2$	-.05168	-.4794	7.6653	.059	272	.001/.039
$S_3 - B_3$	-.0450	-.4332	7.6314	.042	272	.032/.010
$S_4 - B_4$	-.08551	-.6977	7.1267	.083	66	.680/.028
$B_1 - E_1$	-.03769	.0368	2.8257	.201	99	.000/.881
$B_2 - E_2$	-.1017	-1.0623	9.1640	.089	226	.000/.008
$B_3 - E_3$	-.0556	-.4871	7.4258	.101	224	.000/.204
$B_4 - E_4$	-.1195	-.6603	4.9137	.323	174	.000/.007
$E_1 - A_1$	-.0661	-.1239	2.9020	.285	162	0/.352
$E_2 - A_2$	-.0248	-.2319	7.3392	.055	186	.006/.108
$E_3 - A_3$	-.0270	-.2635	7.4234	.043	199	.019/.075
$E_4 - A_4$	-.0809	-.3801	4.6875	.328	158	.000/.153
$A_1 - W_1$	-.0503	-.0884	3.6994	.318	139	.000/.574
$A_2 - W_2$	-.1317	-1.2946	9.2797	.210	208	.000/.003
$A_3 - W_3$	-.1838	-1.9185	11.1342	.275	212	0/.002
$A_4 - W_4$	-.0794	-.5174	5.9126	.228	149	.000/.017
$E_1 - W_1$	-.0324	.0746	2.5725	.316	161	.000/.653
$E_2 - W_2$	-.0812	-.8643	8.9771	.113	188	.000/.029
$E_3 - W_3$	-.0306	-.2318	7.0145	.111	198	.000/.374
$E_4 - W_4$	-.0912	-.5274	5.0349	.334	156	.000/.016

Where: S = Security [Regression Population: Total Survey Sample]
B = Belongingness
E = Esteem
A = Autonomy
W = Self-Actualization,

where 1 = Need Measure 1 (Deficiency)
2 = Need Measure 2 (Need Strength)
3 = Need Measure 3 (Importance)
4 = Need Measure 4 (Dissatisfaction),

where $S_1 - B_1$, etc. = the relationship between prepotent and potent need levels,

where F = entering significances for the S_j^2 and S_j coefficients (α_i and β_i) in the regression equation, respectively.

c. Sensitivity of Clearly Operating (Potent) Need Level Cut-Offs.

For the mass survey population, another regression analysis was run with the "Select If" criterion for identifying clearly operating individuals changed. The criteria were varied by one full point up and down from the original cut-off for each need level. The resulting regression yielded the following when compared to the original mass population results of paragraph b., above: Without exception, the sign of the regression coefficients did not change; for decreases in the cut-off limit (more cases selected), either no change or a slight increase in R^2 and significance was noted; for increases in the cut-off limit, drastic decreases in R^2 and significances were noted at almost every need level.

Therefore, it is concluded that the original a priori cut-offs adequately result in identifying those individuals who displayed potent need strengths in the survey sample population.

d. Analysis of Subgroups.

As per Table 5, the four major subgroups composing the sample population were separately investigated to determine if significant differences exist when compared to the total survey population. Table 10 shows the results of a typical regression analysis testing Hypothesis 1 with the "enlisted" subgroup. Note that for all cases except for the "Deficiency" measure, the sign reversal remained

TABLE 10. REGRESSION ANALYSIS OF POTENT - PREPOTENT NEEDS:

ENLISTED SUBGROUP

(HYPOTHESIS 1: $S_i = -\alpha_i S_j^2 + \beta_i S_j + \lambda_i$)

Need Level and Need Measure	α_i	β_i	λ_i	R^2	n	F
$S_1 - B_1$	.0107	.3880	3.6900	.120	51	.013/.862
$S_2 - B_2$	-.0296	-.2068	6.8539	.304	102	.002/.520
$S_3 - B_3$	-.0649	-.5905	7.8384	.117	100	.005/.041
$S_4 - B_4$	-.0521	-.4054	6.4756	.034	26	.676/.431
$B_1 - E_1$	-.0376	-.1192	3.5011	.070	33	.143/.816
$B_2 - E_2$	-.1487	-1.6069	10.6900	.122	86	.014/.030
$B_3 - E_3$	-.1439	-1.5815	10.7747	.092	88	.068/.027
$B_4 - E_4$	-.1387	-.7841	5.0690	.392	67	0/.071
$E_1 - A_1$	-.0696	-.1168	2.9420	.343	68	.000/.596
$E_2 - A_2$	-.1063	-.0081	6.5229	.007	67	.557/.749
$E_3 - A_3$	-.0136	-.1401	7.1811	.009	77	.764/.474
$E_4 - A_4$	-.1103	-.6029	5.0715	.454	64	0/.117
$A_1 - W_1$	-.0428	.0433	3.2361	.517	52	.000/.849
$A_2 - W_2$	-.0615	-.5004	7.1105	.113	73	.004/.745
$A_3 - W_3$	-.1990	-2.1650	12.0786	.201	79	.002/.007
$A_4 - W_4$	-.0938	-.5800	5.7251	.377	64	.000/.128
$E_1 - W_1$	-.0298	.1341	2.3853	.408	68	.000/.627
$E_2 - W_2$	-.0908	***	6.2539	.064	69	.037/ ***
$E_3 - W_3$	-.0178	-.8845	6.6293	.089	73	.011/.886
$E_4 - W_4$	-.0688	-.3288	4.6717	.298	64	.000/.444

Where: S = Security
B = Belongingness
E = Esteem
A = Autonomy
W = Self-Actualization,

[*** - Regression Tolerance Level exceeded.]

where 1 = Need Measure 1 (Deficiency)
2 = Need Measure 2 (Need Strength)
3 = Need Measure 3 (Importance)
4 = Need Measure 4 (Dissatisfaction),

where $S_1 - B_1$, etc. = the relationship between prepotent and potent need levels,

where F = entering significances for the S_j^2 and S_j coefficients (α_i and β_i) in the regression equation, respectively.

consistent. Comparison of the R^2 and significance values of this subgroup and the total population (Table 9) indicates similar R^2 values but consistently less significance. Also note the consistent lack of significance in the Esteem-Autonomy relationships across all four need strength measures. Similar analysis was conducted on the other subgroups (officer, GS/WG, NAF, and a combination of all subgroups except NAF) with similar outcomes, i.e., consistent sign reversal and similar R^2 values with varying degrees of significance.

e. Analysis of Job Types.

A comparitive regression analysis was also made for selective "job types" listed in Table 3. Procurement, Personnel, Security Police, and Civil Engineers were not analyzed separately due to the small size of their individual populations. It was found that when the "Management" job type was segregated with the a priori cut-offs for clearly operating needs, the resultant group membership ("n") ranged between 10 and 15 for regressions across the various need levels with the regression tolerence levels often exceeded. The "Special Category" of the combined membership of the Personnel, Security Police, Civil Engineers, and Logistics was included as a separate job type.

The results of the regression analysis on the "Administrative" job type are included in Table 11. Note that the Administrative job type (n = 103) was the second largest group of all job types (Special Category was the largest) and still resulted in a relatively small "potent" group for many

TABLE 11. REGRESSION ANALYSIS OF POTENT - PREPOTENT NEEDS

ADMINISTRATIVE JOB TYPE

(HYPOTHESIS 1: $S_i = -\alpha_i S_j^2 + \beta_i S_j + \lambda_i$)

Need Level and Need Measure	α_i	β_i	λ_i	R^2	n	F
$S_1 - B_1$	***	.3537	3.7794	.115	26	***/.089
$S_2 - B_2$	-.0626	-.5678	7.7919	.107	68	.020/.165
$S_3 - B_3$	-.0728	-.7530	8.5485	.077	69	.385/.035
$S_4 - B_4$	-.1338	-1.2472	8.3364	.163	18	.593/.144
$B_1 - E_1$	-.0114	.4091	2.1892	.392	23	.814/.002
$B_2 - E_2$	-.2122	-2.3007	12.5264	.273	63	.002/.002
$B_3 - E_3$	-.1616	-1.6439	10.4667	.246	63	.000/.070
$B_4 - E_4$	-.1616	-.8886	5.0951	.632	34	.000/.033
$E_1 - A_1$	-.1283	-.4951	3.3221	.430	41	.000/.168
$E_2 - A_2$	-.0168	-.1834	7.3784	.009	49	.863/.540
$E_3 - A_3$	-.0349	-.3581	7.6745	.060	55	.574/.093
$E_4 - A_4$	-.1255	-.6631	4.9409	.521	37	.000/.170
$A_1 - W_1$	-.0726	-.1770	3.7216	.500	33	.000/.649
$A_2 - W_2$	-.0304	***	5.2137	.200	54	.001/ ***
$A_3 - W_3$	-.0276	***	5.3306	.197	57	.001/ ***
$A_4 - W_4$	-.0993	-.6278	5.8422	.384	37	.000/.107
$E_1 - W_1$	-.0586	-.0561	2.5998	.444	41	.000/.883
$E_2 - W_2$	***	.1905	5.6101	.145	50	***/.007
$E_3 - W_3$	-.0142	***	6.1763	.144	56	.012/ ***
$E_4 - W_4$	-.1329	-.7850	5.1723	.573	37	.000/.037

Where: S = Security
B = Belongingness
E = Esteem
A = Autonomy
W = Self-Actualization,

[*** - Regression Tolerance Level exceeded.]

where 1 = Need Measure 1 (Deficiency)
2 = Need Measure 2 (Need Strength)
3 = Need Measure 3 (Importance)
4 = Need Measure 4 (Dissatisfaction),

where $S_1 - B_1$, etc. = the relationship between prepotent and potent need levels

where F = entering significances for the S_j^2 and S_j coefficients (α_i and β_i) in the regression equation, respectively.

of the need levels. This explains the number of measures that did not yield complete regression parameters (tolerance level exceeded) and were relatively insignificant. Note that once again the sign reversal of the independent variables (regression parameters) dominated. The usual exception of the "Deficiency" measure held true again. One additional exception to the sign reversal was noted, i.e., the Esteem-Self-Actualization Need Strength ($E_2 - W_2$) regression yielded only the first-order regression coefficient with the sign not reversed, low R^2 (.145), but very significant ($p = .007$). With these few exceptions, the "job type" regressions were also extremely consistent with that for the total population. Again, the large amount of insignificance across the need measures and need levels is most likely a result of the limited regression sample sizes: although some small samples yielded highly significant results, and conversely, some of the larger samples did not. The most important result of the "job type" regression is that even for limited numbers in the regression sample sizes, the sign reversal phenomenon held whether the parameters were significant or not.

3. Hypothesis 2: The Relationship Between Potent and Largely Satisfied Need Levels

The same frequency cut-offs used in Hypothesis 1 were also used for segregating the clearly operating individuals in each of the need levels. The total survey population was tested in accordance with the regression technique described in

Chapter 3. Results of the mass survey population for Hypothesis 2 are displayed in Table 12.

As shown in this table, the relationship measured by "Dissatisfaction" between the potent Self-Actualization level and the next-lower largely satisfied level (W_4 - E_4) resulted in a positive S_k^2 coefficient (Φ), a negative S_k coefficient (Ω), and a positive constant (Ψ). The regression equation for this need level measure accounted for 26.2 percent of the variability in the data (R^2) which was derived from 132 cases. The entering significance levels for the S_k^2 and S_k coefficients were .000 and .000, respectively (both highly significant at $p < .001$). Note the high degree of similarity between Hypothesis 2 and Hypothesis 1 (Table 9) results. The "Deficiency" need strength measure again surfaced the only exception to the sign reversal phenomenon seen earlier. Hypothesis 2, therefore, supports the inverse parabolic alternate hypothesis and, due to the consistency between the results shown in Tables 9 and 12, indicate that 3800 ABW personnel do not follow the precepts of the Maslow theory. Further support for the consistency of the results of the two hypotheses can be detected by noting the additional consistencies in the R^2 ranges and the number of significant regression parameters. Special note should be taken of the Dissatisfaction measure in Table 12. This measure appears to "best" account for variability while still retaining a high degree of significance. The second tendency can be observed in Table 9 to a somewhat lesser degree.

TABLE 12. REGRESSION ANALYSIS OF LARGELY SATISFIED NEEDS

(HYPOTHESIS 2: $S_i = -\Phi_i S_k^2 + \Omega_i S_k = \Psi_i$)

Need Level and Need Measure	Φ_i	Ω_i	Ψ_i	R^2	n	F
$W_1 - E_1$	-.0409	.2066	3.2426	.306	150	.149/.276
$W_2 - E_2$	-.0116	-.0635	6.8317	.094	248	.146/.479
$W_3 - E_3$	-.0315	-.3087	7.5729	.075	237	.017/.042
$W_4 - E_4$	-.1352	-.9578	7.040	.262	132	.000/.000
$W_1 - A_1$	-.0682	-.0709	3.5874	.296	150	.019/.727
$W_2 - A_2$	-.0088	-.0550	6.9120	.051	245	.243/.497
$W_3 - A_3$	-.0244	-.2209	7.327	.090	236	.077/.180
$W_4 - A_4$	-.0974	-.6083	6.2086	.253	132	.002/.004
$A_1 - E_1$	-.0440	.0198	3.6800	.239	141	.118/.919
$A_2 - E_2$	-.0929	-.9095	8.5086	.141	210	.007/.023
$A_3 - E_3$	-.0604	-.5216	7.3942	.135	216	.062/.167
$A_4 - E_4$	-.0949	-.6251	6.1880	.186	148	.000/.001
$E_1 - B_1$	-.0952	-.2487	3.2201	.157	162	.001/.106
$E_2 - B_2$	-.0217	-.2064	7.2928	.036	190	.088/.143
$E_3 - B_3$	-.0362	-.3798	7.7785	.034	201	.054/.079
$E_4 - B_4$	-.1176	-.7081	5.5437	.286	159	.000/.002
$B_1 - S_1$	-.0268	-.0650	3.2457	.065	100	.115/.555
$B_2 - S_2$	-.0458	-.3927	7.1958	.109	226	.000/.000
$B_3 - S_3$	-.0566	-.4843	7.3649	.164	221	.000/.000
$B_4 - S_4$	-.07826	-.4387	4.8095	.093	175	.001/.010

Where: W = Self-Actualization [Regression Population: Total Survey Sample]
E = Esteem
A = Autonomy
B = Belongingness
S = Security,

where 1 = Need Measure 1 (Deficiency)
2 = Need Measure 2 (Need Strength)
3 = Need Measure 3 (Importance)
4 = Need Measure 4 (Dissatisfaction),

where $W_1 - E_1$, etc. = the relationship between potent (clearly operating) and next-lower largely satisfied need levels,

where F = entering significance for the S_k^2 and S_k coefficients (Φ_i and Ω_i) in the equation, respectively.

One exception to the Hypothesis 1 results can be observed in Table 12. Note that the expected total lack of significance in the Autonomy-Esteem need measures did not hold. Therefore, the Porter Autonomy level cannot conclusively be rejected as not representing a distinct and separate need level.

Sensitivity analysis similar to that done under paragraph 2.c. of this chapter resulted in identical outcomes. Therefore, the a priori cut-offs for clearly operating need levels were accepted as adequate for Hypothesis 2 testing.

Both Subgroup and Job Type analyses were conducted for the same groups as cited in the Hypothesis 1 analysis. Again, strikingly similar results were obtained for all subgroups and job types: consistent sign reversal (with the exception of "Deficiency" need measures), R^2 ranging from .004 to .348, and mixed significances (generally insignificant for both regression parameters at once or else both highly significant).

4. Hypothesis 3: The Effect of Peripheral/Job-Environment Factors on the Maslow Model

a. Maslovian Considerations.

As stated earlier, the main intent of the Job Motivation model constructed in Chapter 2 was to form a base of reference that could be used to describe the relationship and influence of job environment factors peripheral to the formal model of human motivation proposed by Maslow. The formal statement of

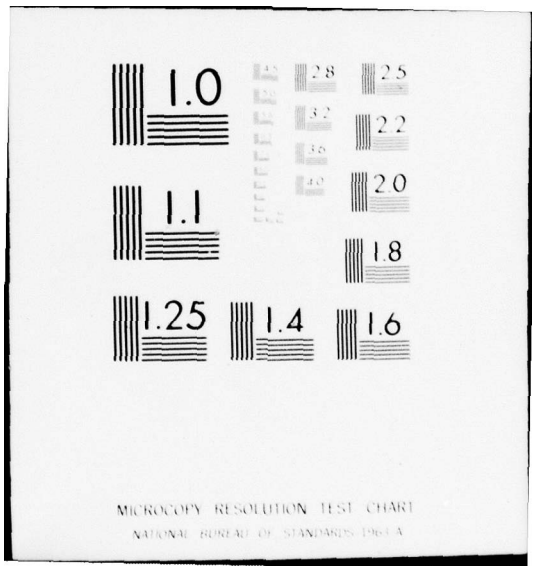
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the Maslow theory of motivation acknowledges that "abnormal" personalities and consequent abnormal behavior may not conform to the hierarchical theory. Hypothesis 3 is a logical follow-on to this same line of reasoning, given that, Lewin's Field Theory, where Behavior = f (Environment), is a valid statement of human behavior. It seems logical to assume that an "abnormal" environment could result in "abnormal" behavior, and therefore, only a work environment that is "healthy" should promote behavior that follows the Maslovian hierarchical principals.

In consideration of the above, the factors cited earlier as possible determinants of "healthy" work environments were included in the survey instrument (questions 11 through 21) and were used to segregate those individuals performing in an individually perceived "healthy" versus "abnormal" work setting. The healthy and abnormal classifications represent the end points of a spectrum of environmental possibilities. It was assumed that the total sample population would represent a mix of both "good" and "bad" environoments and should, therefore, fall somewhere in the middle of the environmental spectrum. By testing (Regression Analysis) the spectrum end points of "all good" and "some bad," a comparison can be made with the intermediate (total population) regression results to determine the effects of peripheral/job-related factors on the Maslow hierarchy. Note that the "all bad" classification was not used for two reasons: First,

there was a limited number of survey respondents who fell into this group which would have restricted any type of regression analysis. Second, there may only have to be one or two "bad" environmental factors to cause an "unhealthy" work setting.

b. The "Some Bad" Category of Peripheral Work Factors.

Survey questions 11 through 21 were cut with the SPSS "Select If" procedure using a mid-scale neutral response as a break point for all questions. The "Select If" statements for each question were tied with "OR" logic to segregate those individuals who responded to at least one question with an answer indicative of a "bad" or less than desirable work factor. The regression program for Hypotheses 1 and 2 was then re-run using only respondents with "unhealthy" work factor(s). The results of this analysis for Hypothesis 1 are shown in Table 13. Again, results almost identical to the total sample population were obtained (Table 9). The sign reversal phenomenon again prevails for all but one need measure across all need levels. The "Deficiency" measure, as in the other previous regressions, did not follow suit with the Need Strength, Importance, and Dissatisfaction measures. R^2 values fell into the same range as before, as did the significance levels for entering regression parameters. Once again, the first-order term's coefficient (β_i) tended to have the least significance.

The regression analysis for Hypothesis 2 yielded very similar results, with one exception. All Need measures, except

TABLE 13. REGRESSION ANALYSIS OF POTENT - PREPOTENT NEEDS:

"SOME BAD" CATEGORY

(HYPOTHESIS 1: $S_i = -\alpha_i S_j^2 + \beta_i S_j + \lambda_i$)

Need Level and Need Measure	α_i	β_i	λ_i	R^2	n	F
$S_1 - B_1$	-.0269	.0476	4.1384	.045	76	.068/.894
$S_2 - B_2$	-.0861	-.9124	9.0144	.057	127	.327/.012
$S_3 - B_3$	-.0475	-.4868	7.8645	.042	128	.509/.029
$S_4 - B_4$	-.1428	-1.2835	8.5560	.158	44	.760/.012
$B_1 - E_1$	-.0403	***	3.0189	.203	64	.000/ ***
$B_2 - E_2$	-.0967	-1.0094	9.0412	.081	98	.027/.075
$B_3 - E_3$	-.0318	-.2086	6.6687	.126	97	.000/.661
$B_4 - E_4$	-.1409	-.8835	5.5147	.338	105	.000/.012
$E_1 - A_1$	-.5510	-.3458	2.8420	.277	96	.000/.868
$E_2 - A_2$	-.0308	-.2853	7.4336	.090	84	.013/.232
$E_3 - A_3$	-.0340	-.3553	7.5529	.133	91	.001/.206
$E_4 - A_4$	-.0630	-.1844	4.2085	.318	105	.000/.697
$A_1 - W_1$	-.0469	-.5850	3.6792	.305	92	0/.770
$A_2 - W_2$	-.0481	-.3722	6.8792	.097	85	.006/.528
$A_3 - W_3$	-.2063	-2.2168	12.1399	.276	95	.000/.003
$A_4 - W_4$	-.1106	-.8333	6.6379	.260	101	.000/.011
$E_1 - W_1$	-.0289	.1205	2.5097	.284	98	.000/.650
$E_2 - W_2$	-.0801	-.8782	9.1209	.078	87	.054/.085
$E_3 - W_3$	-.0252	-.1754	6.8877	.121	92	.001/.543
$E_4 - W_4$	-.0899	-.4872	4.8789	.362	104	0/.076

Where: S = Security
B = Belongingness
E = Esteem
A = Autonomy
W = Self-Actualization

[Regression Population: Total Survey Sample]

[*** - Regression Tolerance Level exceeded.]

where 1 = Need Measure 1 (Deficiency)
2 = Need Measure 2 (Need Strength)
3 = Need Measure 3 (Importance)
4 = Need Measure 4 (Dissatisfaction),

where $S_1 - B_1$, etc. = the relationship between prepotent and potent need levels,

where F = entering significances for the S_j^2 and S_j coefficients (α_i and β_i) in the regression equation, respectively.

for the "Dissatisfaction" measure, resulted in both regression terms being highly insignificant. The Dissatisfaction measure yielded consistently high R^2 values and levels of significance for each need level. The partial results of the Hypothesis 2 regressions are shown in Table 14.

TABLE 14. REGRESSION TRENDS FOR HYPOTHESIS 2: "SOME BAD" CATEGORY WITH DISSATISFACTION NEED MEASURE

(HYPOTHESIS 2: $S_i = -\Phi_i S_k^2 + \Omega_i S_k + \Psi_i$)

Need Level and Need Measure	Φ_i	Ω_i	Ψ_i	R^2	n	F
$W_4 - E_4$	-.1362	-1.0503	7.5785	.235	91	.000/.001
$W_4 - A_4$	-.1278	-1.0009	7.4982	.204	90	.023/.082
$A_4 - E_4$	-.0954	-.6518	6.3363	.202	101	.004/.031
$E_4 - B_4$	-.1372	-.8761	5.9261	.349	106	.000/.005
$B_4 - S_4$	-.0941	-.5649	5.1630	.125	105	.002/.012

Where W = Self-Actualization
E = Esteem
A = Autonomy
B = Belongingness
S = Security,

where 4 = Need Measure 4 (Dissatisfaction),

where $W_4 - E_4$, etc. = the relationship between potent (clearly operating) and next-lower largely satisfied need levels,

where F = entering significance for S_k^2 and S_k coefficients (Φ_i and Ω_i) in the regression equation, respectively.

It seems logical that the largely satisified - prepotent relationships existing in the category of "Some Bad" would be

better described in terms of a "Dissatisfaction" measure than by any other. These results seem to support the use of a "Dissatisfaction" measure to capture the underlying need strength constructs of at least this segment of the total survey population. It is not to say that this measure would not apply to other than the "Some Bad" category.

c. The "All Good" Category of Peripheral Work Factors.

Regression analysis using the "All Good" category of job environment factors yielded some of the most interesting results of this effort. It was realized that this category would be very sensitive to the number of job environment questions used; that is, the more questions, the lower the relative number of respondents left in the "All Good" category. Therefore, Pearson Correlations were made between questions 11 through 21 and Hoppock Job Satisfaction to determine which job environment factors would have the least effect on job satisfaction (the assumed end-product of job motivation). Supervisory position (question 12) and supervisor directiveness (question 21) had correlations with job satisfaction of .1647 and .0233, respectively. These questions, along with question 11 (Want Job?), were deleted from the first "All Good" regression analysis. Deletion of question 11 was based on the belief that whether the individual had originally wanted the job would not impact on present motivation in that job. Question 11 did correlate fairly well with job satisfaction (.4231) and, therefore, was included in the second "All Good" regression analysis described later. The remaining job

environment/satisfaction correlations ranged from .2238 (Feedback) to .6859 (Job Challenge). Contribution to Mission (.5658) and Preparation for Higher Responsibility (.5612) ranked second and third highest, respectively.

Similar "Select If" statements and "AND" logic were used to segregate respondents who answered all of questions 13 through 20 indicative of a "good" or healthy work environment. The neutral midpoint of the question responses was again used as the cut-off for this category selection. Results of the first "All Good" regressions for Hypothesis 1 are shown in Table 15. Note that for the first time in any of the regression analyses, hypothesized sign relationships hold for six of the relationships (S_1 - B_1, S_4 - B_4, B_4 - E_4, A_1 - W_1, A_4 - W_4, and E_1 - W_1). The R^2 values are generally low for all relationships. Also, entering significance levels are greater than .05 for at least one regression parameter of every relationship except for A_2 - W_2 (largely satisified Autonomy to potent Self-Actualization - measured by Need Strength). Note also, that both regression parameters of all six "as hypothesized" relationships are insignificant.

A second "All Good" regression analysis was accomplished including questions 11 (Want Job?) and 21 (Supervisor Directiveness). As was expected, the "N" for each regression dropped but an additional five relationships (all E-A, and E_4 - W_4) surfaced with "as hypothesized" sign conventions. Also, the R^2 for some of the prior "as hypothesized" relationships increased and significance levels varied, e.g., for the B_4 - E_4 relationship, the R^2 rose from .059 to .420 and significance

TABLE 15. REGRESSION ANALYSIS OF POTENT - PREPOTENT NEEDS: "ALL GOOD" CATEGORY

(HYPOTHESIS 1: $S_i = -\alpha_i S_j^2 + \beta_i S_j + \lambda_i$)

Need Level and Need Measure	α_i	β_i	λ_i	R^2	n	F
$S_1 - B_1$	.3127	1.0506	3.0406	.049	25	.557/.395
$S_2 - B_2$	-.0426	-.4301	7.7176	.021	72	.456/.333
$S_3 - B_3$	-.0654	-.6998	8.4926	.039	72	.735/.105
$S_4 - B_4$	.1333	.5187	5.1529	.025	12	.685/.832
$B_1 - E_1$	-.0193	***	2.4638	.086	8	.480/ ***
$B_2 - E_2$	-.0813	-.7678	8.1394	.125	61	.009/.309
$B_3 - E_3$	-.1353	-1.4375	10.1617	.113	64	.025/.128
$B_4 - E_4$	.1073	.8245	2.3621	.059	22	.056/.400
$E_1 - A_1$	-.0211	***	2.8380	.101	37	.160/ ***
$E_2 - A_2$	-.0159	-.1589	7.2452	.014	50	.598/.512
$E_3 - A_3$	-.0115	-.1100	7.0494	.007	59	.582/.787
$E_4 - A_4$	-.0361	-.2441	4.7806	.016	19	.650/.801
$A_1 - W_1$	.0539	.3994	3.119	.031	19	.094/.441
$A_2 - W_2$	-.2727	-3.0489	14.6458	.241	68	.002/.003
$A_3 - W_3$	-.0928	-.7657	7.4753	.221	64	.000/.765
$A_4 - W_4$	.0859	.6473	4.1721	.052	17	.599/.494
$E_1 - W_1$	.1747	1.0919	1.5608	.313	21	.055/.080
$E_2 - W_2$	-.0118	***	6.3307	.057	48	.103/ ***
$E_3 - W_3$	-.0166	***	6.0436	.100	56	.018/ ***
$E_4 - W_4$	***	***			19	***/ ***

Where: S = Security
B = Belongingness
E = Esteem
A = Autonomy
W = Self-Actualization

[*** - Regression Tolerance Level exceeded.]

where 1 = Need Measure 1 (Deficiency)
2 = Need Measure 2 (Need Strength)
3 = Need Measure 3 (Importance)
4 = Need Measure 4 (Dissatisfaction),

where $S_1 - B_1$, etc. = the relationship between prepotent and potent need levels,

where F = entering significances for the S_j^2 and S_j coefficients (α_i and β_i) in the regression equation, respectively.

changed from .056/.400 to .137/.213; and for the E_1 - W_1 relationships, the R^2 rose from .313 to .610 with significance changing from .055/.080 to .025/.322 for the entering regression parameters. The .025 significance level of the S_i^2 coefficient was the only term to show significance of the additional "as hypothesized" relationships.

The same trends of mixed sign reversal and "as hypothesized" sig[illegible] R^2 value, and significance levels developed from the regression analyses of Hypothesis 2 for the "All Good" category. Although entering significance levels were generally greater than .05 for both Hypotheses 1 and 2, there seems to be some indication that "good" work environment factors (including the preconception of "Wanting the Job") lend to the operationalization of the Maslow theory as described in this effort. Due to lack of significance caused by small "N" or a true absence of relationship, the results are not statistically supportive of the above environmental factor influences. Still, there may be reason to pursue this avenue in the future based on intuitive judgement, i.e., "as hypothesized" sign conventions only emerge in the "All Good" category and not in any other.

5. Hypothesis 4: Consistency Between Factors Underlying the Current Sample Population and the Mitchell-Moudgill Data

As was previously stated in Chapter 2, Mitchell-Moudgill factor analysis provided the foundation for deriving the need measurement techniques used in this effort. It was considered

important to duplicate their oblique factor analysis on the current sample population to determine if consistent results could be obtained. SPSS FACTOR analysis (Ref 25:468-507) with oblique (OBLIMIN) rotation was run on the total survey sample plus all four subgroups (Officer, Enlisted, GS/WG, NAF) and Management, Clerical, Administrative, and "Special Category" job types. Five factors were extracted from both the combined need measures and the separate need measures (survey questions 27 through 35). The delta (oblique rotation parameter) was varied from -2.5 to .5 by increments of .5 to determine factor dependence/independence. Tables 16 and 17 represent the factor solutions for "Combined" and "Separate" need level questions, respectively. These tables are based on the Importance need measure and delta equal to -.500, similiar to the approach taken by Mitchell and Moudgill. According to Mitchell and Moudgill, a delta of -.500 is appropriate for the analysis of such "moderately complex" and seemingly intercorrelated data (Ref 12: 340). Similar SPSS FACTOR analyses were performed on the subgroups and job types listed in Table 3, with all results extremely consistent and representative of those shown in Tables 16 and 17.

For both combined and separate need measure cateogries, no more than two factors with eigenvalues greater than one were ever extracted which accounted for between 42.4 and 80.6 percent of the variability in the data depending on subgroup/job type and need measure. Generally, Security emerged as a distinct

TABLE 16. OBLIQUE FACTOR ANALYSIS RESULTS: TOTAL SURVEY POPULATION USING COMBINED "IMPORTANCE" NEED STRENGTH MEASURES

Combined Need Measures for Paired Questions	PRINCIPAL FACTOR MATRIX (PAI)				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Security	.45393	.87873	.12617	.07600	.00956
Belongingness	.77809	-.18867	.47909	-.35469	-.06036
Esteem	.81636	.01072	-.40140	-.29330	.29377
Autonomy	.78959	-.24851	.14279	.49198	.22882
Self-Actualization	.84829	-.07616	-.25358	.10899	-.44545
Eigenvalue	2.82096	.87543	.49126	.47153	.34082
PRT of Variance	56.4	17.5	9.8	9.4	6.8
Cumulative PCT	56.4	73.9	83.8	93.2	100.0

Combined Need Measures for Paired Questions	OBLIQUE FACTOR STRUCTURE MATRIX DELTA = -.5 (Only reported for loadings >.3)			
Security		.99749		
Belongingness	.42947	.98968	.44590	-.43899
Esteem	.98781	.42908	.40727	-.52746
Autonomy	.40664	.44554	.98911	-.50354
Self-Actualization	.52625	.43805	.50228	-.98594

TABLE 17. OBLIQUE FACTOR ANALYSIS RESULTS: TOTAL SURVEY POPULATION USING SEPARATE "IMPORTANCE" NEED STRENGTH MEASURES

Combined Need Measures for Paired Questions	PRINCIPAL FACTOR MATRIX (PAI)				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Security (Q27)	.39196	.82662	.17050	.30845	.13685
Belongingness (Q28)	.66398	-.03581	.59828	.03092	-.27816
(Q29)	.68700	-.27261	.39333	-.23173	.21556
Esteem (Q30)	.72639	.12933	-.27098	-.26471	.26311
(Q31)	.68444	.15828	-.03253	-.43474	.19864
Autonomy (Q32)	.66805	-.29610	-.14582	.48472	.29469
(Q33)	.74883	-.25155	-.02553	.28036	.04467
Self-Actual-(Q34)	.79581	.03529	-.27026	-.10323	-.38744
ization (Q35)	.80459	.05328	-.22816	.06958	-.33074
Eigenvalue	4.35028	.95572	.76322	.73792	.59959
PCT of Variance	48.3	10.6	8.5	8.2	6.7
Cumulative PCT	48.3	59.0	67.4	75.6	82.3

Combined Need Measures for Paired Questions	OBLIQUE FACTOR STRUCTURE MATRIX Delta = -.5 (Only reported for loadings > .3)				
Security (Q27)		.98672			
Belongingness (Q28)	.43204		.90257	.32956	
(Q29)			.74353	.47896	.62283
Esteem (Q30)	.50950			.44235	.81463
(Q31)	.43157		.36100		.82574
Autonomy (Q32)	.36346			.93458	.30862
(Q33)	.52372		.45130	.77796	.36788
Self- (Q34)	.91059		.34919	.40855	.50197
Actualization (Q35)	.87043		.35843	.50773	.43031

Q27 through Q35 represent survey questions 27 through 35, respectively.

factor with mixed factor loadings distributed among the other four need levels (with the highest factor loadings for the other four factors usually coinciding directly with each separate need measure). Varying the oblique delta rotation factor changed the factor loadings slightly, but not significantly enough to dispute Mitchell's selection of a delta equal to -.5.

The Principal Factor Matrix in both Tables 16 and 17 represent the extraction of initial orthogonal factors. The factor matrices indicate one, at most two, factors should be extracted from the data. As previously stated, this held true for all the factor analyses performed. The Factor Structure matrices of Tables 16 and 17 represent the oblique rotation to achieve a "simple and theoretically more meaningful factor solution" (Ref 25:472). Note that the highest coefficient(s) for each factor tend to load on the same combined or separate need level question(s). Factor analysis seems to support a two-way classification of need levels, such as was found by Mitchell with certain job types (Clerical and Blue Collar). Although Mitchell found some groups (architects and engineers) to follow the five-was Maslovian classification, all of this study's factor analyses of both the total survey sample and various subgroups and job-types indicate that a two-way classification is most appropriate.

To further support this contention, each separate subgroup and job-type (Table 3) were factor analyzed with VARIMAX Orthogonal rotation (Ref 25:485) assuming no dependence of

variables. By extracting only two factors, distinct loading on a single security factor occurred, with Belongingness, Esteem, Autonomy and Self-Actualization all loading highly on the second factor. This may be indicative of a survey sample that is extremely motivated by just a single need - Security.

6. Hypothesis 5: Survey Sample Population Representative of Air Force Population

As a final consideration, it would be advantageous to make some type of comparison between the demographic and attitudinal character of the survey sample population to that of the Air Force population. Such a comparison will either permit or prohibit the generalization of such findings/ results to the Air Force population.

Current survey questions 10, 15-18, 20, and 22-25 were also used in the Air Force Quality of Life (AFQOL) Survey responded to by over 10,000 officer and enlisted personnel in 1977. The AFQOL survey was distributed Air Force wide and is, therefore, assumed to be representative of current Air Force officer and enlisted attitudes. Direct comparison of mean responses to demographic question number 10 (time in service), attitudinal questions numbered 15-18 and 20 (job challenge, job freedom, supervisor feedback, etc.), and Hoppock Job Satisfaction scores (question numbers 22 through 25) for the current sample and the AFQOL populations is shown in Table 18. Table 18 represents a statistical test on the observed differences between the two sample means. For a level

TABLE 18. COMPARISON OF MEAN RESPONSES BETWEEN CURRENT SURVEY AND AIR FORCE QUALITY OF LIFE (QOL) POPULATIONS FOR OFFICER AND ENLISTED PERSONNEL

	MEAN RESPONSES:					N:	
	3800ABW	QOL	Z	Response Range	% Range Variation	3800ABW	QOL
TOTAL:							
TIS	11.852	8.59	5.815	0-29	11	210	10634
CHALL	3.398	3.12	3.229	1-5	06	211	10527
PREP	3.507	3.13	3.880	1-5	08	211	10546
FDBK	2.876	3.08	2.437	1-5	04	211	10113
RECOGN	3.537	3.01	5.940	1-5	10	211	10109
FREEDM	3.934	3.61	4.238	1-5	07	211	10071
JOBSAT	18.819	17.78	2.980	4-28	04	210	10471
ENLISTED:							
TIS	10.595	8.01	4.031	0-29	09	153	8869
CHALL	3.286	3.04	2.422	1-5	05	154	8759
PREP	3.448	3.07	3.407	1-5	08	154	8776
FDBK	3.091	2.88	2.143	1-5	04	154	8393
RECOGN	3.545	2.99	5.356	1-5	11	154	8340
FREEDM	3.870	3.58	2.992	1-5	06	154	8356
JOBSAT	18.464	17.61	2.197	4-28	04	153	8912
OFFICER:							
TIS	11.495	15.23	3.636	0-29	13	57	1766
CHALL	3.702	3.50	1.231	1-5	04	57	1768
PREP	3.667	3.42	1.204	1-5	05	57	1770
FDBK	3.047	2.86	1.214	1-5	04	57	1721
RECOGN	3.228	3.16	.301	1-5	02	57	1720
FREEDM	4.105	3.75	3.332	1-5	07	57	1715
JOBSAT	19.772	18.66	1.519	4-28	05	57	1760

Where, TIS = Time in Service (Question 10)
CHALL = Job Challenge (Question 15)
PREP = Preparation for Greater Responsibility (Question 18)
FDBK = Supervisor Feedback (Question 17)
RECOGN = Recognition from Supervisor (Question 20)
FREEDM = Job Freedom (Question 16)
JOBSAT = Hoppock Job Satisfaction Score (Questions 22-25)

of significance of .05, the null hypothesis (current sample mean - AFQOL mean) for each of the questions will be accepted if $-1.96 < Z < 1.96$, where "Z" is defined as:

$$Z = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1^2} + \frac{S_2^2}{n_1^2}}} \qquad (4)$$

where $\bar{X}_1$ and $\bar{X}_2$ are the observed sample means of sample sizes n_1 and n_2, and variances of S_1^2 and S_2^2, respectively (Ref 27: 239).

Note that all observed differences in means for grouped (officer and enlisted) and separate categories are "statistically" significant with the exception of officer job challenge, preparation for greater responsibility, supervisor recognition, and job satisfaction subcategories. Therefore, the null hypothesis should be rejected based on statistical significance. A problem exists in that such a rejection might be due to the size ("n") of the two samples. A large "n" value(s) will tend to make the overall significance (Z value) extremely sensitive to slight differences in the observed mean. This introduces the issue of "practical" significance versus "statistical" significance for such mean comparisons. By analyzing the absolute difference in mean response scores over the range of responses for each of the questions in Table 18, it is possible to conclude that the differences in population means for both

demographic and attitudinal questions are not "practically" significant. The worst case in Table 18 is for the officer "time in service" question with a 13 percent variation in mean responses over a response range of 1 to 5. Even for this case, the difference in means of the two populations appears to be insignificant form a practical standpoint.

CHAPTER VI

CONCLUSIONS

The conclusions drawn from this effort will be based on the results cited in Chapter V for each of the five hypotheses. In addition, some general issues addressed throughout the text of this effort will be commented upon.

1. Conclusions Drawn from Testing of Hypotheses 1 and 2

The general trend of sign reversal for the four need measures over all need levels, gives much validity to the alternate hypothesis of human motivation proposed by Young (76). Young's Pendulum Theory of Motivation and the results (inverse parabolic relationships) are consistent with the equilibrium - disequilibrium school of motivation that hypothesizes that individuals cycle back and forth between a state of disequilibrium (an unsatisfied need) and a state of equilibrium (a satisfied need) throughout the entire spectrum of needs. Those needs that are not currently strong will be set aside or ignored all together, at the expense of satiating needs that are perceived by the individual as strong, e.g., security in lieu of all others. Although R^2 significance levels were not found to be extremely high, the results tend to support the above theory instead of that proposed by Maslow.

2. Conclusions Drawn from the Testing of Hypothesis 3

Although Hypothesis 3 could not be statistically validated, there appears to be enough evidence to conclude that a "Good" work environment could possibly effect the operationalization of the mathematical model stated herein. Additional consideration

should be given to this possibility, in that, it may afford the only means to validate the Maslow theory within the confines of the work environment. Past failures to operationalize and validate the Maslow theory could be based in part on the influence of an "unhealthy" work environment fostered by the "once satisfied no longer motivators of action" principle of Maslow hierarchy. That is, where security, even if once satisfied, is made potent again due to the threat imposed by "unhealthy" factors, e.g., lack of job freedom, job challenge, and preparation for positions of greater responsibility.

3. Conclusions Drawn from the Testing of Hypothesis 4

As a general conclusion, it appears that the sample population at Maxwell Air Force Base can be consistently described in terms of one, or at most, two "factors" with eigenvalues greater than approximately equal to one. For eigenvalues less than one, it becomes questionable whether the variability accounted for is a result of some underlying construct or whether it merely happened by chance. Interpretation of oblique and orthogonal factor analyses for the total survey population, subgroups and job types tends to support the contention that the variable structure existing within the data reflects a two-way classification in lieu of the expected five-way Maslovian classification.

Such a contention is in turn supportive of the Pendulum theory cited earlier. At the present time, the Department of Defense, including the United States Air Force, is going through

many changes. It is a time of austerity where "doing more with less" is the primary objective instilled in all Government workers. The problem arises when the workers focus on the words "with less" instead of on "doing more." It is conceivable that, due to funding cutbacks, reductions in forces, benefit shrinkages, up-or-out, and all the other current "problems," that the main concern of most military members is "swinging" toward job security. Why be concerned about the esteem you get from the other people in your job when tomorrow you may not be around to receive it? This is, in itself, a partial restatement of Maslow theory - an individual is only motivated by unsatisfied (security) needs. It seems logical that those needs that are perceived to be the "most" unsatisfied would therefore be the strongest motivators of human behavior.

4. Conclusions Drawn from the Testing of Hypothesis 5

Based on the idea of "practical" significance, the mean response scores for both demographic and attitudinal questions on the current and Quality of Life surveys are considered to be same. Therefore, it is concluded that the two populations are essentially alike, and that any findings herein would also likely apply to the AFQOL sample which is assumed to be representative of the entire Air Force officer and enlisted population.

5. Other Issues

Due to the results of the regression and factor analyses performed in this effort, it was concluded that the Porter

autonomy construct is a separate and distinct category. This conclusion is based mainly on the separate loading of the Autonomy factor when often mixed loading occurred among other factors of the hierarchy.

The four need measures used in this effort all seem to have some degree of validity as measures of need strength. It appears that for some groups, one may be preferable over the others, e.g., dissatisfaction as a measurement for the need strengths of the "Some Bad" category.

Several of the external job related factors seem to have a great deal of impact on the outcome of the regression analysis for the "All Good" category. It is concluded that Job Challenge, Contribution to Mission and Opportunity for Advancement (preparation for greater responsibility) have the most influence on job satisfaction and, hence, motivation.

No significant differences were determined for any of the subgroups or job-type categories in both regression and factor analyses. The survey population, whether different or not in generic makeup, was homogeneous in its response to the survey from which all the measures were derived.

Lastly, there appear to be a number of motivational aspects to this type of effort. The relationships are extremely complex and seemingly cannot be totally captured by any one model. The relationships appear to "move together," where a change in one factor can influence many others.

6. Future Considerations

Based on the results of this effort, some suggestions are offered herein for future research into the testing of the Maslow hierarchy.

A "possible" explanation of motivational relationships, Figure 5, is proposed based on the findings of this effort. Emphasis is placed on the word "possible". Figure 5 could be essentially substituted for the "Importance or Strength of Effort" and "Motivation toward Reward Goals" blocks in the original conceptual model (Figure 3, Chapter 2).

It is suggested that "Bad" or "Unhealthy" job-related factors would tend to result in a possible two-way need classification (e.g., Security and All Others). This would, in turn, result in possible inverted parabolic relationships between the need levels which could be explained by Young's "Swinging" motivational theory. "Good" or "Healthy" job-related factors would tend to result in a possible five-way need classification that could be modeled with parabolic relationships that could be directly applicable to the constructs of Maslow hierarchy. Performance is thereby influenced or determined by either motivational theory that applies.

Therefore, it is suggested that additional research be conducted to further test Hypothesis 3 (Some Bad versus All Good) using a larger sample size to obtain a sufficient number of cases in the regression analysis. It is also suggested that a survey population other than military be considered for such future analysis in order to discount the effects of hierarchical

bias caused by a possible "security conscious" sample. If the "All Good" environment can be shown to promote a five-way classification, then it seems very possible that the Maslow theory of human motivation could be operationalized with the parabolic relationships described herein.

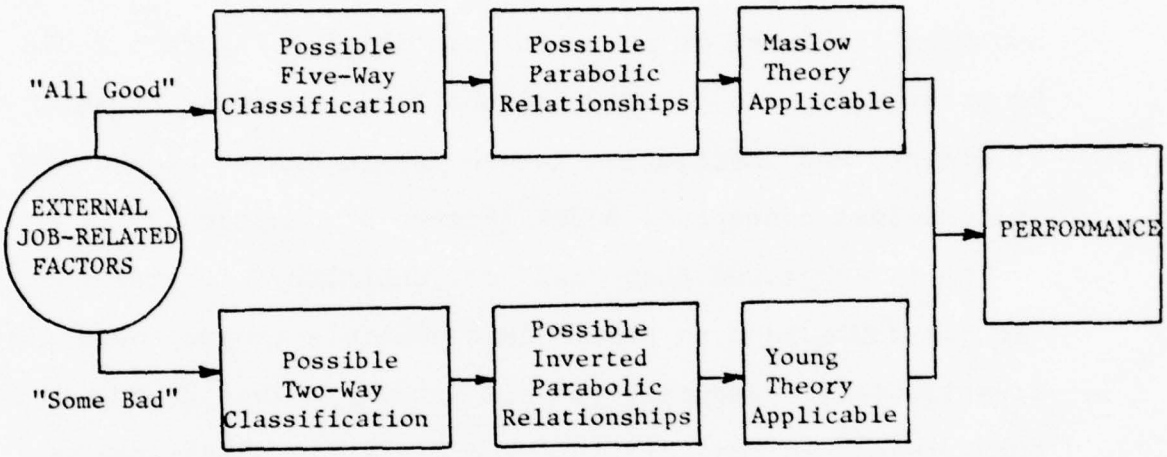


Figure 5. Proposed "Possible" Motivational Relationship

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APPENDIX A

SURVEY QUESTIONNAIRE

USAF SCN 77-155

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 3800TH AIR BASE WING (AU)
MAXWELL AIR FORCE BASE, ALABAMA 36112

20 September 1977

REPLY TO
ATTN OF: CC

SUBJECT: Survey of the 3800 Air Base Wing

TO: All Survey Selectees

1. You are one of approximately 800 Air Base Wing personnel who have been selected to participate in a survey approved by Headquarters USAF. Participation in this effort is voluntary on your part, as per the Privacy Act of 1974.

2. This survey is for the purpose of gathering data on job motivation and bears potential payoffs for the 3800 Air Base Wing and for the United States Air Force as a whole.

3. I encourage you to take the time now to fill out this survey and return it in the pre-addressed envelope. Your time and sincere responses are needed to make this effort worthwhile and beneficial.

DAVID T. STOCKMAN
Colonel, USAF
Commander

1 Atch
Survey Questionnaire
(USAF SCN 77-155)

DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE OF TECHNOLOGY (AU)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

REPLY TO ATTN OF: ENA

12 Sep 1977

SUBJECT: Survey Questionnaire

TO: 3800 ABW Personnel

1. The attached questionnaire, approved by Hq USAF (SCN 77-155), is being distributed to you and approximately 800 other personnel (officer, enlisted, and civilian) at Maxwell AFB through random selection. This questionnaire is an integral part of the work I am doing for completion of my Master's Degree thesis at the Air Force Institute of Technology. It is designed to measure your needs in your work environment. The results will be used to statistically test a particular theory of human motivation.

2. This questionnaire can be easily completed in approximately 15 minutes. It is important that an adequate number of responses are received in order to have statistical reliability in the results. Therefore, would you please take 15 minutes out of your day to complete this questionnaire, put it in the attached envelope, and send it back to me through base mail distribution.

3. Please keep in mind as you answer this questionnaire that your responses should reflect <u>your</u> feelings. Therefore, please answer the questions as <u>you feel</u> they should be answered, and not as you think others would want you to answer. Your responses to this questionnaire will be held in strict confidence and you, as an individual, will remain anonymous.

4. Your cooperation in completing and returning this questionnaire at your earliest opportunity is greatly appreciated.

Jeffery J. Norton

JEFFERY J. NORTON, Capt, USAF
Graduate Student, School of Engineering
Department of Systems Management

1 Atch
Questionnaire

PRIVACY STATEMENT

In accordance with paragraph 30, AFR 12-35, the following information is provided as required by the Privacy Act of 1974:

a. Authority

(1) 5 U.S.C. 301, Departmental Regulations: and/or

(2) 10 U.S.C. 80-12, Secretary of the Air Force, Powers and Duties, Delegation by.

b. Principal Purposes. The survey is being conducted to collect information to be used in research aimed at illuminating and providing inputs to the solution of problems of interest to the Air Force and/or DOD.

c. Routine Uses. The survey data will be converted to information for use in research of management related problems. Results of the research based on the data provided, will be included in written Master's thesis and may also be included in published articles, reports, or texts. Distribution of the results of the research, based on the survey data, whether in written form or orally presented, will be unlimited.

d. Participation in this survey is entirely voluntary.

e. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

1. What is your age in years? _____.

2. What is your sex? Male/Female

3. What is your racial or ethnic grouping?

   a. Black
   b. Spanish or Mexican American
   c. American Indian
   d. Oriental American
   e. White (Other than Spanish or Mexican American)
   f. Other _____.

4. What is your highest level of formal education completed?

   a. Elementary School
   b. Some High School
   c. High School Degree
   d. Some College
   e. Bachelor Degree
   f. Some work beyond a Bachelor Degree
   g. Master Degree
   h. Work beyond a Master Degree.

5. If you are a civilian, what is your pay grade?

   GS- _____

   WG- _____

   NAF- _____

6. If you are an active duty military member, what is your pay grade? _____. (If officer, Regular or Reserve? _____.)

7. What type of job do you presently hold?

   a. Education Management
   b. Procurement
   c. Clerical
   d. Administrative
   e. Other (Please Specify) _____.

8. What amount of time, in months, have you spent in the above job? _____.

9. What amount of time, in months, have you spent in this type of job? _____.

10. How many total years of active Federal Service have you completed? _____.

11. Did you want your present job? Yes/No

12. Do you supervise others as part of your regular job duties (write effectiveness ratings or evaluations)? Yes/No

13. How would you rate the working relations between yourself and your fellow employees (peers and subordinates)?

a. Outstanding
b. Very Good
c. Fair
d. They don't bother me and I don't bother them
e. Poor
f. Very Poor
g. Extremely Bad

14. How would you rate the working relations between yourself and your supervisor?

a. Outstanding
b. Very Good
c. Fair
d. He doesn't bother me and I don't bother him
e. Poor
f. Very Poor
g. Extremely Bad

15. How would you rate your present job?

a. Very challenging
b. Challenging
c. Somewhat challenging
d. Not challenging
e. Boring

16. How often are you given the freedom you need to do your job well?

a. Never
b. Seldom
c. Sometimes
d. Often
e. Always

17. How often are you given feedback from your supervisor about your job performance?

a. All the time
b. Most of the time
c. A good deal of the time
d. About half the time
e. Occasionally
f. Seldom
g. Never

18. Does your present job prepare you for jobs with greater responsibility?

a. Definitely no
b. Probably no
c. Undecided
d. Probably yes
e. Definitely yes

19. How much of the time do you feel you are making a worthwhile contribution to the mission of your organization?

a. All the time
b. Most of the time
c. A good deal of the time
d. About half the time
e. Occasionally
f. Seldom
g. Never

20. How often are you given recognition by your supervisor for a job "well done"?

a. He always gives me credit when credit is due.
b. Most of the time
c. A good deal of the time
d. About half the time
e. Once in awhile
f. Almost never
g. He never gives me credit for anything I do well.

21. How often does your supervisor give you directions on how you should complete your job?

a. Never
b. Seldom
c. Occasionally
d. About half of the time
e. Frequently
f. Most of the time
g. All of the time

22. Choose <u>one</u> of the following statements which best tells how well you like your job:

a. I hate it.
b. I dislike it.
c. I don't like it.
d. I am indifferent to it.
e. I am enthusiastic about it.
f. I love it.

23. Which <u>one</u> of the following shows how you think you compare with other people?

a. No one likes his job better than I like mine.
b. I like my job much better than most people like theirs.
c. I like my job better than most people like theirs.
d. I like my job about as well as most people like theirs.
e. I dislike my job more than most people dislike theirs.
f. I dislike my job much more than most people dislike theirs.
g. No one dislikes his job more than I dislike mine.

24. Which one of the following shows <u>how much of the time</u> you <u>feel satisfied</u> with your job?

a. All of the time
b. Most of the time
c. A good deal of the time
d. About half of the time
e. Occasionally
f. Seldom
g. Never

25. Which <u>one</u> of the following best tells how you feel about changing your job?

a. I would quit this job at once if I could.
b. I would take almost any other job in which I could earn as much as I am earning now.
c. I would like to change both my job and my occupation.
d. I would like to exchange my present job for another one.
e. I am not eager to change my job, but I would do so if I could get a better job.
f. I cannot think of any job for which I would exchange.
g. I would not exchange my job for any other.

The following set of questions address your personal opinions on factors related to your work environment. Please keep in mind that your responses should reflect your true feelings about your present job with respect to each of the areas indicated.

26. The threat of change which could make your present skills or knowledge obsolete.

How much of this negative factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this negative factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this negative factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this negative factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this negative factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this negative factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

27. The overall feeling of security associated with your worklife.

How much of this factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

28. The opportunity to give help to other people.

How much of this factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfcation with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

29. The opportunity for conversation and exchange of ideas with colleagues and co-workers (including job and non-job related opportunities).

How much of this factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

30. The feeling of self-esteem you receive from your worklife. (Confidence and satisfaction in oneself)

How much of this factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

31. The esteem you receive from others within the organization (your prestige and high regard from others).

How much of this factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

32. The opportunity for participating in determining methods and procedures.

How much of this factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

33. The opportunity for participating in setting goals (both personal goals and work group goals).

How much of this factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

34. Feelings of worthwhile accomplishment associated with your job.

How much of this factor is there now in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor do you want in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to change in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

35. The feelings of <u>self-fulfillment</u> you receive from your worklife.

How much of this factor <u>is there now</u> in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How much of this factor <u>do you want</u> in your worklife?

1	2	3	4	5	6	7
none			some			high degree

How strong is your need for this factor in your worklife?

1	2	3	4	5	6	7
very weak			intermediate			very strong

What is your degree of satisfaction or dissatisfaction with this factor in your worklife?

1	2	3	4	5	6	7
highly dissatisfied			neutral			highly satisfied

How important is this factor to you in your worklife?

1	2	3	4	5	6	7
unimportant			somewhat important			highly important

To what degree do you expect this factor to <u>change</u> in your worklife in the near future?

1	2	3	4	5	6	7
decrease significantly			no change			increase significantly

36. The following space is provided for any comments or remarks you wish to make concerning this questionnaire.

APPENDIX B

MITCHELL AND MOUDGILL

SURVEY QUESTIONNAIRE

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Last 5 digits of your registration number

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LIFE SATISFACTION STUDY

PART I

Below is a set of characteristics associated in varying degrees with all of our lives. For each characteristic you are asked to indicate: (1) ____

(2) ____

How much of the characteristic is there now generally in your daily life? (3) ____

In determining your rating, consider the total set of life activities in which you engage such as your university, work (if employed currently), home and family, social, recreational and community activities. (4) ____

(5) ____

Each rating is on a seven-point scale, which looks like this:

(very little) 1 2 3 4 5 6 7 (a great deal)

Please circle the number on the scale that represents the amount of the characteristic being rated. Low numbers represent low or minimum amounts and high numbers represent high or maximum amounts.

PLEASE DO NOT OMIT ANY SCALES

1. Feeling of self-esteem:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (6) ____

2. Prestige (i.e., regard received from others):

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (7) ____

3. Opportunity to participate in the determination of methods and procedures for various group or organizational activities:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (8) ____

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4. Feelings of worthwhile accomplishment:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (9) ____

5. Threat of change that could make my skills or knowledge obsolete:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (10) ____

6. Opportunity for participating in the setting of goals for various group or organizational activities:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (11) ____

7. Opportunity to give help to other people:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (12) ____

8. Feeling of self-fulfillment:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (13) ____

9. Feeling of insecurity:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (14) ____

10. Opportunity for conversation and exchange of ideas with others:

How much is there now?
(very little) 1 2 3 4 5 6 7 (a great deal) (15) ____

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Last 3 digits of your registration number

LIFE SATISFACTION STUDY

PART II

Below is a set of characteristics associated in varying degrees with all of our lives. For each characteristic you are asked to indicate:

How much of the characteristic would you like generally in your daily life?

In determining your rating, consider the total set of life activities in which you engage such as your university, work (if employed currently), home and family, social, recreational and community activities.

Each rating is on a seven-point scale, which looks like this:

(very little) 1 2 3 4 5 6 7 (a great deal)

Please circle the number on the scale that represents the amount of the characteristic being rated. Low numbers represent low or minimum amounts and high numbers represent high or maximum amounts.

PLEASE DO NOT OMIT ANY SCALES

1. Opportunity to participate in the determination of methods and procedures for various group or organizational activities:

   How much would you like?

   (very little) 1 2 3 4 5 6 7 (a great deal) (16) ____

2. Threat of change that could make my skills or knowledge obsolete:

   How much would you like?
   (very little) 1 2 3 4 5 6 7 (a great deal) (17) ____

3. Opportunity to give help to other people:

   How much would you like?
   (very little) 1 2 3 4 5 6 7 (a great deal) (18) ____

4. Feeling of insecurity:

   How much would you like?
   (very little) 1 2 3 4 5 6 7 (a great deal) (19) ____

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5. Feeling of self-esteem:

How much would you like?
(very little) 1 2 3 4 5 6 7 (a great deal) (20) ____

6. Feeling of worthwhile accomplishment:

How much would you like?
(very little) 1 2 3 4 5 6 7 (a great deal) (21) ____

7. Prestige (i.e., regard received from others):

How much would you like?
(very little) 1 2 3 4 5 6 7 (a great deal) (22) ____

8. Opportunity for participating in the setting of goals for various group or organizational activities:

How much would you like?
(very little) 1 2 3 4 5 6 7 (a great deal) (23) ____

9. Feeling of self-fulfillment:

How much would you like?
(very little) 1 2 3 4 5 6 7 (a great deal) (24) ____

10. Opportunity for conversation and exchange of ideas with others:

How much would you like?
(very little) 1 2 3 4 5 6 7 (a great deal) (25) ____

PLEASE DO NOT WRITE IN THIS COLUMN

In answering this questionnaire (and the two preceding versions), to what extent were your answers influenced by (1) university considerations, (2) current job-related considerations, (3) home and family, (4) social or recreational activities, or (5) community activities?

Please indicate below the approximate degree of influence of each in terms of percentages. For example, if you feel that university-related considerations influenced your answers to the questionnaire by 10% - write a 10 opposite university-related considerations. If you feel that social or recreational activities had about 40% influence on your answers, write a 40 opposite social or recreational activities and so on.

Remember, your allocation should add up to 100%.

University related considerations	_____	(36-37) ____
Current job-related considerations (if currently employed)	_____	(38-39) ____
Home and Family	_____	(40-41) ____
Social and recreational activities	_____	(42-43) ____
Community activities	_____	(44-45) ____
	100%	END

LIFE SATISFACTION STUDY

PART III

Below is a set of characteristics associated in varying degrees with all of our lives. For each characteristic you are asked to indicate:

How important is this characteristic to you generally in your daily life?

In determining your rating, consider the total set of life activities in which you engage such as your university, work (if employed currently), home and family, social, recreational and community activites.

Each rating is on a seven-point scale, which looks like this:

(very little) 1 2 3 4 5 6 7 (a great deal)

Please circle the number on the scale that represents the amount of the characteristic being rated. Low numbers represent low or minimum amounts and high numbers represent high or maximum amounts.

PLEASE DO NOT OMIT ANY SCALES

1. Prestige (i.e., regard received from others):

   How important is this to you?
   (very little) 1 2 3 4 5 6 7 (a great deal) (26) ____

2. Feeling of worthwhile accomplishment:

   How important is this to you?
   (very little) 1 2 3 4 5 6 7 (a great deal) (27) ____

3. Opportunity for participating in the setting of goals for various group or organizational activities:

   How important is this to you?
   (very little) 1 2 3 4 5 6 7 (a great deal) (28) ____

4. Feeling of self-fulfillment:

   How important is this to you?
   (very little) 1 2 3 4 5 6 7 (a great deal) (29) ____

PLEASE DO NOT WRITE IN THIS COLUMN

5. Opportunity for conversation and exchange of ideas with others:

How important is this to you?
(very little) 1 2 3 4 5 6 7 (a great deal) (30) ____

6. Threat of change that could make my skills or knowledge obsolete:

How important is this to you?
(very little) 1 2 3 4 5 6 7 (a great deal) (31) ____

7. Opportunity to give help to other people:

How important is this to you?
(very little) 1 2 3 4 5 6 7 (a great deal) (32) ____

8. Feeling of insecurity:

How important is this to you?
(very little) 1 2 3 4 5 6 7 (a great deal) (33) ____

9. Feeling of self-esteem:

How important is this to you?
(very little) 1 2 3 4 5 6 7 (a great deal) (34) ____

10. Opportunity to participate in the determination of methods and procedures for various group or organizational activities:

How important is this to you?
(very little) 1 2 3 4 5 6 7 (a great deal) (35) ____

VITA

Jeffery James Norton was born on 10 April 1950 in New Rockford, North Dakota. He graduated from high school in Wahpeton, North Dakota in 1968 and subsequently attended the United States Air Force Academy from which he received the degree of Bachelor of Science in June 1972. Upon graduation he received a commission in the United States Air Force. He was assigned to Eglin Air Force Base, Florida in 1972, where he was a project engineer and squadron commander for the Air Force Armament Laboratory. In 1975 he served as aide-de-camp for the Commander of the Armament Development and Test Center. In 1976 he was a systems engineer in the GBU-15 Systems Program Office until entering the School of Engineering, Air Force School of Technology, in September 1976.

Permanent Address: 1833 South Oak Park
Tucson, Arizona 85710

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Job Performance	Maslow	Five-Way Analysis
Job Satisfaction		Motivation
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Maslow theory of human motivation was applied to an Air Force unit at Maxwell Air Force Base, Alabama. A model that combined the need strength measurement technique developed by Mitchell and Moudgill (1976), and mathematical specification of the need hierarchy devised by Young (1976), yielded results that tend to support both the Maslow and the Pendulum theories of motivation.

In general, the survey population at Maxwell Air Force Base

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followed the Pendulum theory of human motivation proposed by Young. It was found that for the total survey population (including officer, enlisted, civil service, and non-appropriated fund subgroups; and management, clerical, and administrative job types) that adjacent Maslovian needs tend to move together reflecting inverse parabolic relationships among needs.

The underlying structure in the data obtained tended to support a two-way classification of needs (Security and all others) across all subgroups and job types.

Only for the survey sub-population that represented having all "Good" job related factors, did parabolic relationships among needs exists. Although such relationships were not statistically significant, support for the Maslow Hierarchy of Needs Theory was suggested.