



A STUDY OF THE RELATIONSHIP BETWEEN
OCCUPATIONAL STRESS AND PERCEIVED
ORGANIZATIONAL EFFECTIVENESS FOR
FORMAL ORGANIZATION GROUPS WITH
A THRESHOLD VALUE FOR
STRESS CONSIDERED

Thesis Approved:

Michael A. Witt

Thesis Adviser

Charles R. Heer

W. M. ...

W. M. ...

Norman D. Buchanan

Dean of the Graduate College

PREFACE

This study is concerned with the relationship between occupational stress and perceived organizational effectiveness for formal organization groups. Included in the examination of this relationship is the notion of a group threshold level of stress. Levels of occupational stress both above and below this value result in levels of perceived organizational effectiveness less than what is theorized as the maximum attainable. With occupational stress considered as the independent variable and perceived organizational effectiveness as the dependent variable, the study hypothesizes that a curvilinear relationship, in the form of an inverted U-function, exists between the two variables.

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CHAPTER I

INTRODUCTION

Every individual has his own stress point. If he goes a little over, he is irritable, unhappy, and in the end inefficient. If he goes far over, he breaks. If he is below his stress point, he does not realize his true potential and have the great therapeutic satisfaction of accomplishment. If he goes far under, he vegetates. The individual who, through intuitive understanding and guidance, if necessary, finds his own specific stress point, finds his life is a happy and productive one.¹

An examination of the literature on occupational stress reveals that there are, in general, two basic schools of thought. One group of researchers, as represented by Kahn et al. and House and Rizzo, views occupational stress as inherently bad and thus dysfunctional for the organization and its members in general. The results of their research indicate that stress can result in

¹Robert Turfboer, "The Difference Between a State of Tension and a Feeling of Tension," Tensions, ed. Theodore Irwin (New York, 1967), p. 35.

²Robert L. Kahn et al., Organizational Stress: Studies in Role Conflict and Ambiguity (New York, 1964); and R. J. House and J. R. Rizzo, "Role Conflict and Ambiguity as Critical Variables in a Model of Organizational Behavior," Organizational Behavior and Human Performance, 7 (1972), pp. 467-505.

decreased job satisfaction and low levels of performance and effectiveness.

More recently, a second school of thought on occupational stress has evolved. The contention of this school of thought, as represented by Burke, Selye, and Shontz, is that occupational stress is not always bad.³ The results from their research, both field and experimental, have indicated that very low levels of stress may be as detrimental to the individual and the organization as are very high levels of stress. The implication of this research is that, within this range of extreme stress values, there exists a threshold value of stress. This value is unique for each individual and represents that level of stress at which a person's performance effectiveness is maximized. Values of stress above or below this value result in levels of performance below the individual's innate potential. Thus, the organization can derive maximum benefit by achieving appropriate operative goals when the individual functions at his or her unique threshold level of stress.

The existence of such a threshold value of stress was confirmed by several investigators, including Janis et al. Janis examined the relationship between stress and performance effectiveness for numerous individuals in a

³Ronald J. Burke, "Occupational Stresses and Job Satisfaction," The Journal of Social Psychology, 100 (1976), pp. 235-244; Hans Selye, The Stress of Life (New York, 1967); and Franklin C. Shontz, The Psychological Aspects of Physical Illness and Disability (New York, 1975).

variety of experimental settings.⁴ The results of Janis' and others' investigations have led to the establishment of what was termed an inverted U-curve as a valid representation of the relationship between stress and performance effectiveness for an individual. Stress is defined along the abscissa and performance effectiveness along the ordinate.

While research has established the above-mentioned relationship between stress and performance effectiveness for individuals, as well as the existence of a stress threshold value, there has been no attempt to extend the application of the theory to groups. More specifically, there has been no effort to determine the relationship between occupational stress and perceived organizational effectiveness for formal organization groups.

These group variables may be considered closely analogous to the stress/performance effectiveness variables for individuals. Assuming the relation between occupational stress and organizational effectiveness can be best represented by an inverted U-curve, it should be theoretically possible to establish a group threshold value of stress. This value would be the one associated with the maximum level of perceived organizational effectiveness.

⁴Irving L. Janis et al., Personality: Dynamics, Development and Assessment (New York, 1969), pp. 124-155.

If the stress/effectiveness relationship for individuals could be successfully extended to determine a similar relationship for formal organization groups, the results may provide management with a practical and useful tool of analysis. For example, it should be possible for a manager, through viewing a graph of the inverted U-shaped curve representing his organizational group, to determine which and how many of the group members were experiencing occupational stress above or below the group's threshold level. Based on the desirability of the situation he discovers, the manager can then decide what, if any, managerial action should be taken with regard to lessening or increasing the stress parameters or factors over which he has some control. The purpose of these actions would be to improve the overall group level of organizational effectiveness.

The pertinent stress parameters or factors may be categorized in two separate groups or types of occupational stress.⁵ One category has been labeled functional stress and is made up of four factors, while the other is labeled dysfunctional stress and is comprised of nine factors.

One prime consideration management should take into account is the potential impact a decision to increase stress intensity could have from a human resource standpoint. That is, if management takes action to push group

⁵Burke, pp. 235-244.

members below the group threshold level of stress up to that level, this action has the potential to mentally or emotionally injure group members if they are psychologically unable to tolerate such a stress increase. In such a case management would, in effect, be destroying its human resources.

The following paragraphs will provide a brief outline of the chapters to follow, previewing the major elements contained within each chapter.

The Review of Literature, Chapter II, will provide a survey of the available literature concerning the two key variables in this study: occupational stress and organizational effectiveness. From this survey, certain specific research studies and findings will be used to construct the theory upon which the study as a whole and the hypotheses in particular are based. These will be presented in Chapter III, Theory and Hypotheses.

There are two hypotheses to be examined in this study. The specific conditions under which each hypothesis is to be tested are set forth in Chapter IV, Research Methodology. Also included is a discussion of the statistical models and analytical methods applied to the data. The results of the analyses are provided in Chapter V, Analysis and Results. Based on the results and analyses, an evaluation of the study's two hypotheses is presented.

Finally, a discussion of the study's results, together with a presentation of several conclusions based on these

results, is provided in Chapter VI, Discussions and Conclusions. In addition, several implications for practicing managers and possible directions for future research are noted.

CHAPTER II

REVIEW OF LITERATURE

This chapter provides a review and discussion of the literature concerning the two focal variables investigated in this study. The two variables are occupational stress and organizational effectiveness.

Occupational Stress

A review of the literature reveals that while a number of researchers¹ view human stress² as primarily dysfunctional to organizations, there are some whose research indicates that certain types and amounts of stress can be

¹Robert L. Kahn et al., Organizational Stress: Studies in Role Conflict and Ambiguity (New York, 1964); Vernon E. Buck, Working Under Pressure (New York, 1972); R. J. House and J. R. Rizzo, "Role Conflict and Ambiguity as Critical Variables in a Model of Organizational Behavior," Organizational Behavior and Human Performance, 7 (1972), pp. 467-505; and S. M. Sales, "Some Effects of Role Overload and Role Underload," Organizational Behavior and Human Performance, 5 (1970), pp. 592-608.

²Selye's definition of human stress as the "nonspecific response of the body to any demand made upon it" will be utilized throughout the study. Hans Selye, The Stress of Life (New York, 1967).

of benefit to an organization.³ Kahn et al., in landmark research conducted in the early 1960's, and recent research conducted by Buck (1972) and House and Rizzo (1972) are representative of the literature arguing that occupational stress or job tension is, in general, inherently bad. That is, it can result in both decreased job satisfaction and low levels of organizational performance. On the other hand, arguments for stress having functional as well as dysfunctional effects are represented in research conducted by Burke, Selye, Shontz, Lazarus, and Hall and Lawler.⁴ The applicable research by both groups of authors will be discussed in the following paragraphs.

Kahn et al, in research on organizational stress, defined role conflict and role ambiguity as two types of stress and strongly implied that occupational stress should be viewed primarily as a cost or detriment to both the individual and the organization. For example, while the authors concede that some amount of role conflict may be beneficial to the organization because of its stimulating effect(s), they show detailed statistical support for the argument that stress is generally dysfunctional for the

³Ronald J. Burke, "Occupational Stresses and Job Satisfaction," The Journal of Social Psychology, 100 (1976), pp. 235-244; Franklin C. Shontz, The Psychological Aspects of Physical Illness and Disability (New York, 1975); Richard S. Lazarus, Psychological Stress and the Coping Process (New York, 1966); Douglas T. Hall and Edward E. Lawler III, "Job Pressures and Research Performance," American Scientist, 59 (1971), pp. 64-73; and Selye (1967).

⁴Ibid.

organization. The results of the Kahn et al. study showed that trust in, respect for, and liking for role senders decreased significantly as stress generated from role conflict varied from low to high.⁵ Also, it was found that persons experiencing high stress due to role conflict tended to communicate less frequently with their role senders (e.g., one's superior) than when low stress conditions existed.⁶ In addition, Kahn et al. discovered that persons under high stress attributed less power to their role senders than those under low stress.⁷ This seeming paradox is explained as an absorption in fantasy by the focal person in order to escape the reality of the situation. By attributing less power to their role senders, the focal person is, in effect, assuming a defensive psychological posture by utilizing a form of withdrawal.

Stress generated from role ambiguity also has dysfunctional consequences. Research suggests that task ambiguity, a type of role ambiguity, tends to create dissatisfaction with the job and feelings of futility while ambiguity about how others evaluate a person can create problems in relations as well as lower a person's self-confidence.⁸

⁵Kahn et al., p. 68.

⁶Ibid.

⁷Ibid., p. 69.

⁸Ibid., pp. 94-95.

In general, the effects of role ambiguity are similar to those of role conflict. However, in contrast to role conflict, there are no suggestions, explicit or implicit, regarding an amount or degree of role ambiguity that might provide positive benefits to the individual or the organization. In spite of similar effects associated with both role conflict and role ambiguity, it was found that these two types of stress occur independently of each other.⁹

Buck's view of occupational stress basically agrees with that of Kahn et al. He also concedes that some amount of stress may be of benefit to the individual employee and the organization. He argues that this is in keeping with the contention of "many managers and social scientists . . . that some tension is necessary to keep people from vegetating."¹⁰ However, he notes that his own work experience and that of other employees has shown that most people "could have experienced substantially less pressure without withering on the vine."¹¹

Buck notes that the word "stress" could have been used instead of "pressure" as the variable of investigation in his study. He chose to use "pressure" because the employees who were the subjects of his study used this term spontaneously in discussing their work experiences with him,

⁹Ibid., p. 89.

¹⁰Buck, pp. 16-17.

¹¹Ibid., pp. 9-10.

and because their perceptions provided the data base for his study.¹²

Buck specifically looked at the relation between job pressure (stress) and job satisfaction and mental health. The results of his research showed that job pressure and job satisfaction were negatively related.¹³ The relation between job pressure and mental health, however, was not as clear because there was a significant negative relationship for workers, but not for managers. Nonetheless, both managers and workers reported that working under pressure sometimes made them feel like they were going to have a nervous breakdown.¹⁴ Buck concluded that "those who advocate cultivating tension as a managerial strategy are oversimplifying behavior and its motivation."¹⁵

By way of summary, Buck states that:

. . . the only clear benefit to the organization . . . would be if the employees who worked under pressure produced more and performed better at their tasks. This could not be shown . . . [thus] there is little to recommend having employees working under pressure.¹⁶

House and Rizzo's concept of occupational stress is congruent with that of Kahn et al. and Buck. This is to

¹²Ibid., p. 10.

¹³Ibid., p. 160.

¹⁴Ibid., p. 166.

¹⁵Ibid., pp. 168-169.

¹⁶Ibid., p. 169.

be expected, since they based their study on occupational stress and its relation to role conflict and ambiguity¹⁷ on the research work of Kahn et al. They basically extended the findings of Kahn et al.

Research conducted by Burke on the relationship between occupational stress and job satisfaction suggests that stress may be appropriately divided into two categories: functional or dysfunctional.¹⁸

For the functional category, three occupational stresses were identified by Burke that were associated with a demanding, challenging job or high organizational expectations of the employee. These three stresses included having an excess of responsibility, perceiving oneself as not qualified, and lastly, having an excessively large workload. In addition, making decisions that affect the lives of others was the last occupational stress comprising the functional category. Burke found these four occupational stresses to be positively related to job satisfaction and thus were functional.

The dysfunctional category contained nine occupational stresses that were positively related to job dissatisfaction. Stresses such as lack of information about job duties, promotional opportunities, standing with one's boss, and lack of information needed to do the job properly

¹⁷House and Rizzo (1972), pp. 467-505.

¹⁸Burke, pp. 235-244.

were characterized by Burke as representing a lack of organizational support to an individual on the job. Other stresses, such as too little job authority and little influence with one's boss, were representative of a sense of powerlessness or lack of control over the work situation. The three remaining factors were: concern that someone else may get the job the individual wants, slow job progress, and feeling unreasonable pressure for improved job performance.

Hall and Lawler's research relating job pressures to the performance of research scientists and engineers is fundamentally supportive of Burke's work. They argue that:

. . . pressure (stress), though bad under certain conditions, can be useful, both to the organization and to the individual, under other conditions. The important thing is to determine when pressure is helpful and when it is dysfunctional
¹⁹

In their research, Hall and Lawler note that humans have a need to experience internal pressure (stress). If the necessary stimuli is lacking in the external environment, a person will expend significant mental effort in an attempt to create the needed internal pressure (stress). They cite experiments with conscientious objectors during World War II in which the objectors were deprived, as much as possible, of all external stimuli. To accomplish this, the subjects were blindfolded, their ears plugged, they

¹⁹Hall and Lawler, pp. 64-73.

wore long, cone-shaped cuffs which prevented their hands from touching objects, and they were able to do nothing but lie down on cots. As a result of this deprivation, over time the subjects began to hallucinate and also tended to create mental tasks for themselves in an effort to create internal pressure and stimulation. Hall and Lawler point out that several researchers have discussed in great detail the elaborate interpersonal games and competition that hourly workers in industrial settings create to combat the boredom of their jobs.²⁰

Three primary types of job pressure were examined in Hall and Lawler's research. They included time, quality, and financial responsibility. Their relationship to individual satisfaction, involvement, and organizational performance was as follows. First, quality pressure was related positively to both job involvement of each subject and to the technical effectiveness of research laboratories. Second, financial responsibility pressure was significantly correlated with both lab effectiveness and the satisfaction of the subject's need for autonomy.

Finally, time pressure was the only one of three variables found to be unrelated to the effectiveness and attitudinal measures. That is, in some labs where time

²⁰W. F. Whyte, Money and Motivation (New York, 1955); and Donald Roy, "Banana Time," in W. Bennis et al., Interpersonal Dynamics (Homewood, 1964).

pressure existed, effectiveness, satisfaction, and involvement were high, while in others they were low.

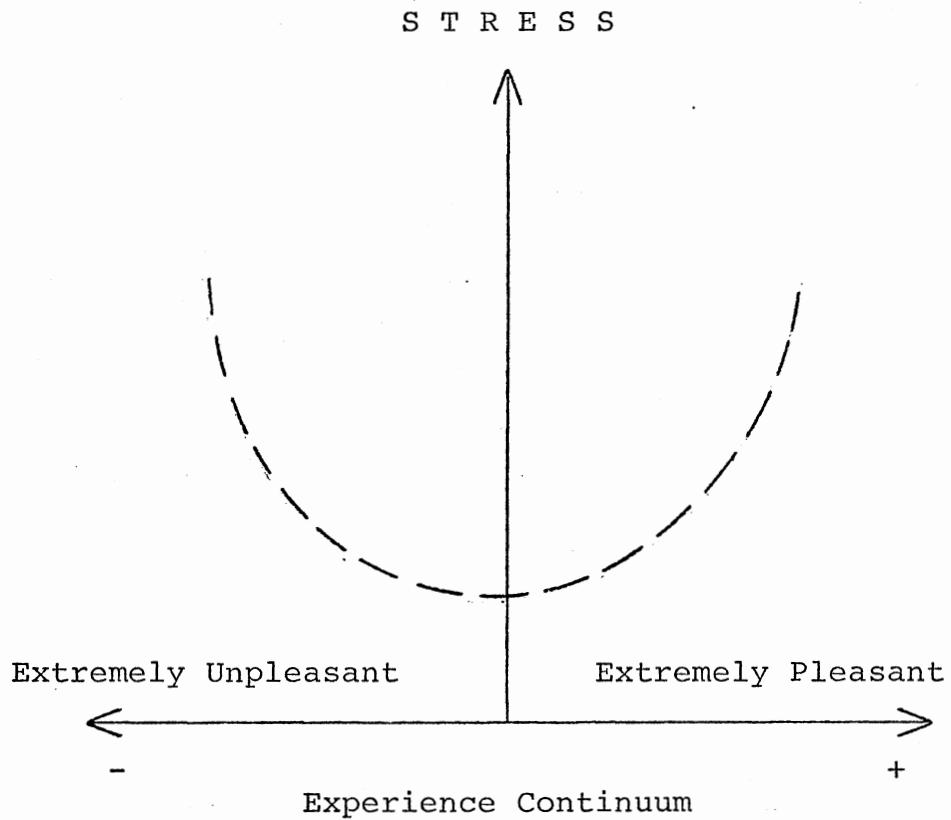
The following conditions were found to cause job pressures (stresses) to be functional for the organization and the individual:

1. When the individual is internally committed to the goals reflected in the particular pressures (e.g., quality).
2. When the individual experiences a sense of personally being able to reduce the pressure he feels.
3. When the pressures emanate directly from the task demands of the job so that the individual is aware of the origins of the pressure.
4. When the individual has a history of success in dealing with similar pressure situations.
5. When the individual receives organizational support in coping with the pressure.²¹

Selye's research findings are basically compatible with those of Burke and Hall and Lawler.²² Through physiological experiments, Selye concluded that a person's life experiences can be classified as either pleasant and healthy or unpleasant and damaging. However, according to Selye, an extremely pleasant experience can produce as much stress, in terms of biochemical changes in the body, as an extremely unpleasant experience. Figure 1 provides a theoretical illustration of these relationships. However, the stress generated from a pleasant experience can occur

²¹Hall and Lawler, p. 70.

²²Burke, pp. 235-244; and Hall and Lawler, pp. 64-73.



Source: Lennart Levi, Stress: Sources, Management and Prevention (New York, 1967).

Figure 1. Theoretical Model of Relationship
Between Stress and Various Types of
Life Experiences

without producing harmful effects whereas the opposite is true for stress ("distress") generated from an unpleasant experience.²³ This categorization of life experiences and their associated levels of stress corresponds closely with the functional and dysfunctional categories mentioned previously. Selye also argues for the notion of a threshold level of stress. An individual, he states:

. . . would suffer just as much from the boredom of purposeless subsistence as from the inevitable fatigue created by the constant compulsive pursuit of perfection; in other words, the majority equally dislike a lack of stress and an excess of it. [One must] try to find the particular stress level at which he feels most comfortable, whatever occupation he selects.²⁴

This suggests that it is not adequate merely to classify a stress as either functional or dysfunctional in nature (according to Burke's scheme²⁵), but that one should also consider the amount or level at which the stress is occurring, since this level can also be functional or dysfunctional.

Shontz's²⁶ work in the area of psychological stress draws heavily upon previous research conducted by Lazarus.²⁷ A primary contribution by Lazarus was to

²³Selye (1967).

²⁴Hans Selye, Stress Without Distress (New York, 1974), p. 68.

²⁵Burke, pp. 235-244.

²⁶Shontz.

²⁷Lazarus.

integrate stress research findings from a large body of the literature into a comprehensible and cohesive theory.

According to both Shontz and Lazarus, no two people respond to stress in exactly the same manner. A person may be behaviorally calm, while internally he is extremely upset. The opposite may also be true; i.e., a person may exhibit a type of behavior that would suggest he is quite upset, while on the inside he may, in fact, be quite calm. Confronted with a stressful situation, one person may show an improved ability to concentrate, whereas another becomes distracted and unable to organize his thoughts. One person may show stress by changes in heart rate while another shows it by changes in galvanic skin response, and still another through changes in respiration.²⁸

Utilizing this knowledge of individual differences in response to stress, Janis et al., McDaniel, and McGrath conducted research which found a curvilinear relationship between the level of threat or stress a person experiences and his or her level of task performance or adaptive effectiveness.²⁹ This relationship is illustrated in Figure 2. The curve is described as an "inverted U-function," but

²⁸Shontz; and Lazarus.

²⁹Irving L. Janis et al., Personality: Dynamics, Development and Assessment (New York, 1969), pp. 124-155; James W. McDaniel, Physical Disability and Human Behavior (New York, 1969); and Joseph E. McGrath, "Stress and Behavior in Organizations," Handbook of Industrial and Organizational Psychology, ed. M. Dunnette (Chicago, 1976), pp. 1351-1395.

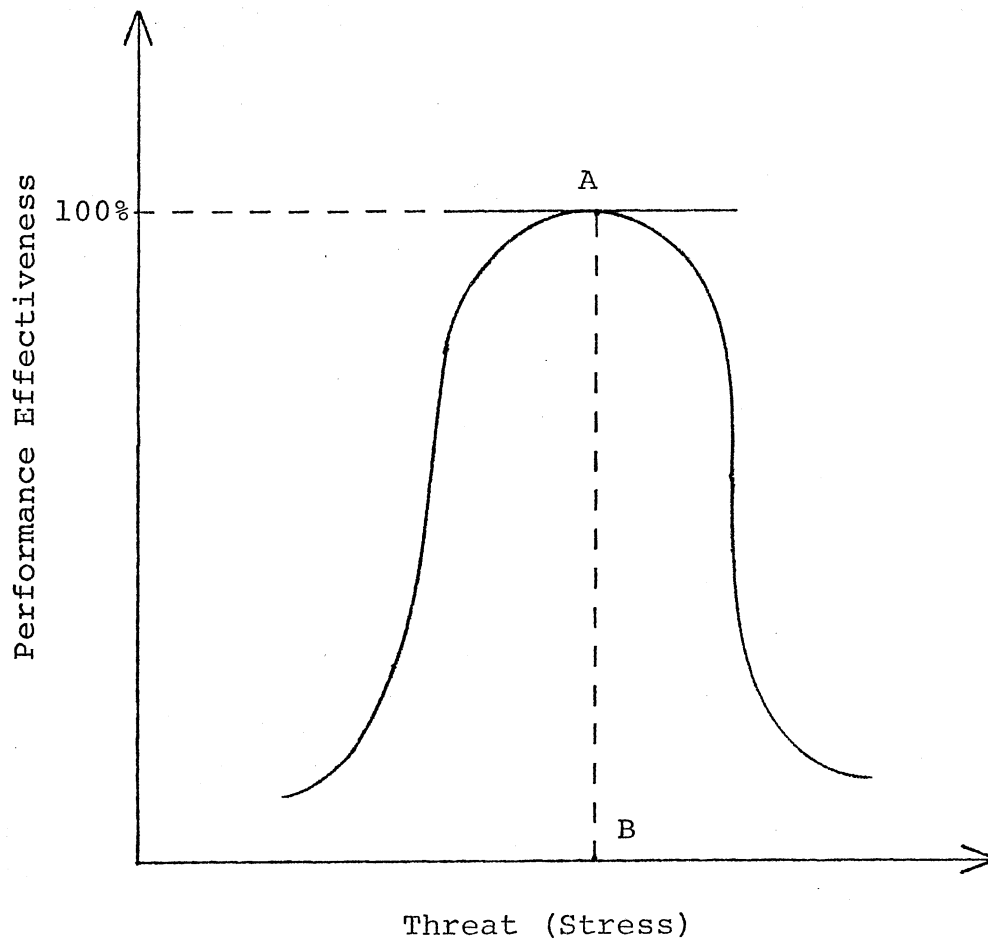


Figure 2. Relationship Between Level of Threat (Stress) and Performance Effectiveness

hereafter in this study will be referred to as simply the "curve." Point A on the curve represents that point where the slope of a line drawn tangent to the curve at that point would be zero. All points on the curve to the left of point A represent levels of stress with which an individual can effectively cope. However, only as one approaches point A moving from the origin to the right can the full performance potential of the individual be realized. The left side of the curve can thus be considered as representing functional relationships between amount of stress and performance effectiveness. All points to the right of point A indicate levels of stress with which a person is unable to cope effectively. Hence, his or her performance effectiveness is correspondingly diminished. This side of the curve can be said to represent dysfunctional relationships between amount of stress and performance effectiveness.

Taken collectively, the work of Shontz, Lazarus, Janis et al., McDaniel, and McGrath seems to support the argument that the level of stress can be classified as being either functional or dysfunctional in nature, and that there exists some unique threshold level of stress for each person. This optimal or threshold stress level can be defined as point B on the curve in Figure 2. It is the level of stress corresponding to the highest level of performance effectiveness attainable (i.e., 100 percent), considering all other levels of stress represented by the curve.

The following section will provide a detailed discussion of the literature relevant to the second focal variable in the study, organizational effectiveness.

Organizational Effectiveness

The literature on organizational effectiveness ("OE") reveals that the concept is ambiguous and controversial. Coulter notes that even though the literature on OE is large and growing, there still seems to be very little consensus on how to conceptualize, measure, and explain OE.³⁰ Many other researchers over time have echoed this statement.³¹

OE is not a new concept. It is traceable in the organization theory literature at least as far back as the

³⁰Philip B. Coulter, "Organizational Effectiveness in the Public Sector: The Example of Municipal Fire Protection," Administrative Science Quarterly, 24 (1979), pp. 65-81.

³¹Richard M. Steers, Organizational Effectiveness: A Behavioral View (Santa Monica, 1977); Paul S. Goodman and Johannes M. Pennings, New Perspectives on Organizational Effectiveness (San Francisco, 1977); Kim Cameron, "Measuring Organizational Effectiveness in Institutions of Higher Education," Administrative Science Quarterly, 23 (1978), pp. 604-629; Bernard C. Reimann, "Organizational Effectiveness and Management's Public Values: A Canonical Analysis," Academy of Management Journal, 18, 2 (1975), pp. 224-241; Ronald J. Webb, "Organizational Effectiveness and the Voluntary Organization," Academy of Management Journal, 17, 4 (1974), pp. 663-677; Richard N. Osborn and James G. Hunt, "Environmental and Organizational Effectiveness," Administrative Science Quarterly, 19 (1974), pp. 231-246; and Lawrence G. Hrebiniak, Complex Organizations (St. Paul, 1978), pp. 295-326.

writings of Barnard.³² Barnard's concept of effectiveness was only related to goal attainment. According to Barnard, when a specific desired end (goal) is attained, the action can be considered as effective.

Until about 1960, a large part of the research on OE viewed it in terms of a goal attainment or a goalistic model.³³ The basic contention of this model is that the degree of OE achieved is a function of the degree of attainment of the established goals of the organization.

Over the years a great variety of approaches to conceptualization or measurement of OE have appeared. A significant number of those that appear quite frequently in the literature are in recent OE studies described below.

Systems Model

An alternative to the previously mentioned goal model is one termed the systemic model.³⁴ In this model, the organization is perceived as a "functionally differentiated subsystem of a larger social system."³⁵ An important

³²Chester I. Barnard, The Functions of the Executive (Cambridge, 1938).

³³Amitai Etzioni, "Two Approaches to Organizational Analysis; a Critique and a Suggestion," Administrative Science Quarterly, 5 (1960), pp. 257-278.

³⁴Ibid.

³⁵Talcott Parsons, "A Sociological Approach to the Theory of Organizations," Administrative Science Quarterly, 1 (1956), pp. 63-85.

concept associated with this model is that the goals of the organization are viewed only as functions to be performed for the benefit of some larger system (e.g., society).

The organization in systems terminology is conceived as an entity that receives inputs of needed resources (i.e., matter, energy, information) from its environment, transforms these inputs as deemed necessary, and produces outputs that are merely altered forms of the original inputs.

As noted by Webb,³⁶ the systemic model has several criticisms to overcome, most significantly those levied by Price.³⁷ Price states the following three major criticisms: (1) advocates of the systemic model argue for the idea of "optimization" as an important part of the effectiveness concept, and yet these same scholars show little concern for trying to measure optimization; (2) the systems researchers also argue for a general measure of effectiveness, but none have made inroads toward developing these measures they apparently believe are so important; and (3) the frame of reference used by the systems researchers appears to be somewhat confused in that most of them seem to be using a multidimensional approach to effectiveness

³⁶Webb, pp. 663-677.

³⁷James L. Price, "The Study of Organizational Effectiveness," Sociological Quarterly, 13 (1972), pp. 3-15.

with multiple measures of a series of different analytical concepts.

Webb suggests that if organizational goals or outputs are viewed from the organization's frame of reference, they emerge as one of the functional requirements which the organization has to meet in order to assure its own survival, stability, and growth. With this in mind, the seeming conflict between the goal model and the systemic model may disappear in that the goal model may be a logical extension of the systemic model.³⁸

In a recent study, Rushing³⁹ used the Yuchtman and Seashore⁴⁰ model of OE. The Yuchtman and Seashore model is a system resource approach to OE in which OE is conceptualized in terms of an organization's ability to exploit resources in the environment. In more specific terms, the more an organization can realize in the way of positive inputs from the environment, the greater its effectiveness. This statement seems to suggest that a highly effective organization will also be highly efficient in the

³⁸Jaisingh Ghorpade, Assessment of Organizational Effectiveness: Issues, Analysis and Readings (Pacific Palisades, 1971).

³⁹William Rushing, "Differences in Profit and Non-profit Organizations: A Study of Effectiveness and Efficiency in General Short Stay Hospitals," Administrative Science Quarterly, 19 (1974), pp. 474-484.

⁴⁰Ephraim Yuchtman and Stanley E. Seashore, "A System Resource Approach to Organizational Effectiveness," American Sociological Review, 32 (1967), pp. 891-903.

transformation stage of processing its inputs, and thus very few resources will be wasted. It can be conceived of as being a near optimal process. Rushing used average daily cost per patient as an index of the economic resources a hospital obtains from the community and thus as a measure of OE.

The above studies and commentaries represent that portion of the OE literature devoted to the systems approach to conceptualization of the OE construct. The following section provides arguments against the goal model as a viable means of conceptualizing OE by citing several alleged deficiencies.

Goal Model

In his analysis on the relation between organizational effectiveness and management's public values, Reimann attacks the goal model. He contends that it is a major contributor to the controversy surrounding OE in that many view OE as synonymous with goal attainment.⁴¹ Price's propositions on OE, based on some 50 empirical studies, are cited as evidence to illustrate the popularity of the goal model.⁴² In Price's research, OE was defined as "the

⁴¹Reimann, pp. 224-241.

⁴²James L. Price, Organizational Effectiveness: An Inventory of Propositions (Homewood, 1968).

degree of goal-achievement."⁴³ Reimann goes on to suggest that the indicators of effectiveness summarized by Price can all be interpreted in terms of the accomplishment of goals such as high productivity, morale, conformity, adaptiveness, and institutionalization. And if accomplishment of one of these goals inhibits or prevents the accomplishment of one or more other goals, it would contradict the goal model's suggestion that for an organization to be effective it must accomplish all or at least most of its goals. This is based on the assumption that, in general, organizations are attempting to accomplish more than one goal at a time.

Reimann also argues that the benefit of using the model is somewhat limited if a comparison is to be made between the effectiveness of several organizations. This is because their goals may be quite different. Also, because the goals to be compared would need to be operative as opposed to official goals, it might be an almost impossible task to identify these goals. Operative goals are distinguishable from officially-stated goals in that operative goals are those goals that the organization is actually trying to accomplish.

⁴³Ibid., p. 3.

Other Models

As a counter to the goal model, Georgiou⁴⁴ argues for a model based on the part of Barnard's⁴⁵ writings which stress the individual participants in an organization who are seeking to achieve a diversity of goals and are exchanging a variety of incentives. In this model, OE is conceived to be a function of the organization's ability to satisfy the needs of its members by providing incentives which are perceived by the various organizational members to exceed their contribution(s) to the organization.

Hirsch, in a study on the relationship between OE and the institutional environment, compared the pharmaceutical and phonograph record industries over a 15-year period (1950-1965).⁴⁶ The primary index of OE used in the study was univariate in nature. More specifically, percent rate of return was used as a measure of OE. In his study, Hirsch looked at the following three aspects of the institutional environment: (1) pricing and distribution, (2) patent and copyright laws, and (3) external opinion leaders. The results of Hirsch's study showed the record

⁴⁴Petro Georgiou, "The Goal Paradigm and Notes Towards a Computer Paradigm," Administrative Science Quarterly, 18 (1973), pp. 291-310.

⁴⁵Barnard.

⁴⁶Paul M. Hirsch, "Organizational Effectiveness and the Institutional Environment," Administrative Science Quarterly, 20 (1975), pp. 327-344.

industry to have the lowest rate of return (organizational effectiveness) of the two industries studied. The reason for this finding was explained in terms of the above aspects of the institutional environment.

As part of a study by Pennings, a test was made of the assumption that OE is a function of the goodness of fit or consistency between environmental and structural variables.⁴⁷ Environment, as defined by Pennings, has a systems orientation in that it is defined as "the organization's source of inputs and sink [repository] of outputs."⁴⁸ Structure, as used in the study, embraces the mechanistic/organic classification scheme developed by Burns and Stalker,⁴⁹ as well as the typologies developed by Hickson⁵⁰ that can be included in the Burns and Stalker classification. The structural variables included lateral communication, vertical communication, participativeness, meetings, power, specialization, and social interdependence.

⁴⁷Johannes M. Pennings, "The Relevance of the Structural-Contingency Model for Organizational Effectiveness," Administrative Science Quarterly, 20 (1975), pp. 393-410.

⁴⁸Ibid., p. 393.

⁴⁹Tom Burns and G. M. Stalker, The Management of Innovation (London, 1961).

⁵⁰D. J. Hickson, "A Convergence in Organization Theory," Administrative Science Quarterly, 11 (1966), pp. 224-237.

With regard to OE, Pennings argues that a multivariate criterion set is best. That is, one should not rely on a composite or single effectiveness criterion in research on OE, but rather should adopt a multidimensional approach. Pennings believes the following five criteria represent "reasonably well" the pool of all possible criteria available: (1) morale, (2) anxiety, (3) loss due to errors, (4) total production, and (5) decline in production.⁵¹

The results of Pennings' study suggested that the goodness of fit between environmental and structural variables had little impact on the effectiveness of the subject organization. The structural variables explained most of the variance in OE. In particular, the structural variable of power seemed to be the strongest predictor of OE. Pennings later replicated the first study and again argued for the adoption of a multidimensional approach to the study of OE. He states:

Organizations or their units may be effective according to some criteria and ineffective according to others. Some criteria of OE are concerned with the degree the organization accomplishes its intended impact on its environment (e.g., market share, sales, prestige), while other criteria have an internal focus towards the integration and survival of the organization (e.g., turnover, satisfaction, and the balance between inducements and contributions).⁵²

⁵¹Pennings (1975), pp. 393-410.

⁵²Johannes M. Pennings, "Dimensions of Organizational Influences and Their Effectiveness Correlates," Administrative Science Quarterly, 21 (1976), pp. 688-699.

As a contrast to the previous studies, Macy and Mirvis conducted a study in which they developed and implemented a standardized set of definitions, measures, and costing methods for behavioral outcomes.⁵³ More specifically, the study identified and quantified the elements of cost for certain behaviors. From this, a dollar amount for each behavioral event and a total cost over a three-year period of study were determined.

It is apparent that Macy and Mirvis viewed OE primarily from an economic standpoint. Their definition of OE is solely in terms of (1) absenteeism, (2) turnover, (3) tardiness, (4) accidents, and (5) grievances.

Cameron, in a study of OE in institutions of higher education, comments that criteria problems are the major limitation to be overcome in the empirical determination of OE.⁵⁴ There are two primary types of criteria problems according to Cameron. One involves the type of criterion that is used to indicate effectiveness, while the other involves the source of the criteria. Problems involving the type of criteria are those usually associated with four areas of concern: (1) the aspect of the organization being considered, e.g., goal accomplishment, resource

⁵³Barry A. Macy and Philip H. Mirvis, "A Methodology for Assessment of Quality of Work Life and Organizational Effectiveness in Behavioral-Economic Terms," Administrative Science Quarterly, 21 (1976), pp. 212-226.

⁵⁴Cameron, pp. 604-629.

acquisition, internal processes; (2) the universality of criteria; (3) the normative or descriptive character of criteria; and (4) the static or dynamic quality of criteria. Each of the examples given in item (1) above refers to models that are currently being used in research involving OE. They are also quite different in the conceptualization of OE, and thus create significant problems when comparative studies of OE are attempted. That is, if the criteria used to measure OE are not the same for the organizations to be compared, the results of such a comparison would have to be highly suspect.

The source problem of OE criteria revolves around the issue of who should decide what the effectiveness criteria should be (e.g., chief executives, directors, or an organization's dominant coalition), and who should provide the data for their measurement. A related question is whether the criteria should be derived from personal perceptions (e.g., by questionnaires, interviews, or direct observation) or through the use of organizational records. There are strong arguments for both sources of criteria. For example, Campbell argues that criteria obtained from organizational records are most appropriately called "objective criteria," but are not valid measures of OE.⁵⁵

⁵⁵John P. Campbell, "On the Nature of Organizational Effectiveness," New Perspectives on Organizational Effectiveness, ed. Paul S. Goodman and Johannes M. Pennings (San Francisco, 1977), pp. 13-55.

He argues that valid effectiveness criteria should always be subjective (i.e., based on personal perceptions).

Seashore and Yuchtman⁵⁶ oppose Campbell's position. They contend that organizational records are the most appropriate sources and based their resource acquisition model of OE on this contention. In general, economists use objective sources for criteria while industrial and organizational psychologists have utilized subjective criteria. There are, however, some studies in which both types of criteria were used. Hitt and Middlemist's study to develop OE criteria and weights for these criteria in various subunits of a state health department is one example.⁵⁷ In their study, Hitt and Middlemist, through personal interviews with some 50 key managers, generated a total of 25 effectiveness criteria. These criteria were specified by the managers as variables that would reflect effectiveness or ineffectiveness in the achievement of organizational objectives. Out of the 25 criteria, 10 can be classified as basically objective-type criteria, that is, those which can be derived from organizational records. Examples include: operating budget dollars, number of regular

⁵⁶Stanley E. Seashore and Ephraim Yuchtman, "Factorial Analysis of Organizational Performance," Administrative Science Quarterly, 12 (1967), pp. 377-395.

⁵⁷Michael A. Hitt and R. Dennis Middlemist, "A Methodology to Develop the Criteria and Criteria Weightings for Assessing Subunit Effectiveness in Organizations," Academy of Management Journal, 22, 2 (1979), pp. 356-374.

full-time employees, number of citizens to which service is rendered, and number of complaints received. The remaining 15 criteria can be categorized as basically subjective criteria. That is, they are derived primarily from personal perceptions. Examples of these criteria include: program staff's ability to deal with the public, degree of compliance with the applicable statutes and/or regulations, degree of emphasis on problem prevention, use of good judgment by program staff, and program staff's efficiency in use of time. Pennings also conducted OE studies that utilized both types of criteria.⁵⁸

Examining 20 recent empirical studies of OE, Cameron found that most of the studies used sources and types of effectiveness criteria that are not comparable with other studies.

In studying effectiveness of institutions of higher education, Cameron chose to use both objective and perceptual criteria, many of which were initially generated from a survey of the literature. A dominant coalition composed of formal position holders such as deans, department heads, and various administrators was utilized to decide what the effectiveness criteria should be. The criteria were limited to those institutional characteristics relating to acquisition of resources, the vitality and viability of

⁵⁸Pennings (1975), pp. 393-410; and Pennings (1976), pp. 688-699.

internal processes and practices, and organizational outcomes and emphases. Out of some 130 items generated from the literature, the dominant coalition passed value judgments on which should be accepted as valid effectiveness items for their school. Clusters of the items were generated from this procedure and on an a priori, intuitive basis, the following nine separate groupings of criteria were formed:

1. Student educational satisfaction - criteria indicated the degree of satisfaction of students with their educational experiences at the institution.
2. Student academic development - criteria indicated the extent of academic attainment, growth, and progress of students at the institution.
3. Student career development - criteria indicated the extent of occupational development of students, and the emphasis on career development and the opportunities for career development provided by the institution.
4. Student personal development - criteria indicated student development in nonacademic, noncareer oriented areas, e.g., socially, emotionally, or culturally, and the emphasis on personal development and opportunities provided by the institution for personal development.
5. Faculty and administrator employment satisfaction - criteria indicated satisfaction of faculty members and administrators with jobs and employment at the institution.
6. Professional development and quality of the faculty - criteria indicated the extent of professional attainment and development of the faculty, and the amount of stimulation toward professional development provided by the institution.

7. Systems openness and community interaction - criteria indicated the emphasis placed on interaction with, adaptation to, and service in the external environment.
8. Ability to acquire resources - criteria indicated the ability of the institution to acquire resources from the external environment, such as good students and faculty, financial support, etc.
9. Organizational health - criteria indicated benevolence, vitality, and viability in the internal processes and practices at the institution.⁵⁹

These nine dimensions, Cameron argues, represent conceptually different constructs, but they were not assumed to be independent. The reliability and validity of these nine dimensions were tested and evidence of certain patterns of effectiveness was discovered across the dimensions.

In a very recent study by Coulter, the attributes of three of the more popular models of OE were evaluated: (1) behavioral-attitudinal, (2) processual, and (3) goal attainment.⁶⁰

Looking at each model in turn, the advocates of the behavioral-attitudinal model would argue that certain behavioral and attitudinal characteristics of individuals or groups would provide the best measure of an organization's effectiveness. Such criteria as employee satisfaction, morale, and turnover are included in this model.

⁵⁹Cameron, p. 614.

⁶⁰Coulter, pp. 65-81.

Others, however, would argue that a processual model, in which the organization's internal operations and the interaction between the organization and its environment are emphasized, would be the best. Examples of criteria commonly associated with this model include flexibility, adaptability, and openness of communications.

Advocates of the last model considered, the goal attainment model, define OE primarily in terms of the extent or degree to which an organization achieves its goals or objectives. However, researchers disagree on the definition of the organization's goals and objectives. One contingent argues for a "prescribed" goal approach in which the formal character of the organization, as represented by top management, defines the goals to be achieved. Another group advocates a "derived" goal approach in which a researcher may, using his own judgment and functional theory, determine an organization's goals without the assistance or awareness of the organization's members. The last contingent argues that organization goals should be differentiated from the private goals of organization members and actual or operational goals differentiated from officially-stated goals. One other area of disagreement with regard to the goal model involves the question of how to measure the degree of goal achievement once goals have been satisfactorily defined. At least three possibilities exist: (1) use employee ratings, (2) use supervisory

ratings, or (3) use archival records. It is extremely difficult to ascertain which would be the best.

To Coulter, OE should be defined as "achieving goals that have been defined externally by, for example, community, society or a specific clientele."⁶¹ Also, he theorizes that the degree to which an organization accomplishes its goals is probably dependent upon "the behavior and attitudes of its members, its interaction with its environment, and its internal processes."⁶² This suggests that the criteria embraced by the behavioral-attitudinal and processual models should be viewed as independent variables in the goal model.

Coulter's study specifically looks at the OE of public fire services using goal achievement as the criteria for measuring OE. Within the context of the study, Coulter defines effectiveness as "the extent to which the fire service avoids or reduces property loss, death, and injury due to fire."⁶³ Four measures of goal attainment were used to determine the level of effectiveness in some 324 municipalities with a population of 25,000 or greater. The four measures included: (1) fire prevention, (2) fire suppression, (3) budgetary expenditures, and (4) productivity. With regard to the levels of effectiveness found, it was

⁶¹Ibid., p. 67.

⁶²Ibid.

⁶³Ibid.

discovered that there were significant environmental and organizational differences for the cities.

For each of the four measures of goal attainment, the results indicated the following. It was found that the most effective cities in fire prevention were composed of more upper-middle and middle class people, and they also required higher training standards for their building inspectors. For fire suppression, the most effective cities had fewer paid fire fighters, were smaller in population, and had a quicker average response time. For budgetary expenditures, it was found that the cities that had the lowest expenditures per capita discouraged unionization, had fewer paid fire fighters, were located in a colder climate, and experienced a larger number of fires. The discouragement of unionization apparently is viewed as a benefit within the context of this study, since it can result in lower per capita expenditures due to wage differentials between union and nonunion fire service personnel.

With regard to productivity, the last measure discussed, it was found that cities with a high degree of fire service productivity had fire departments that were less versatile, had a smaller administrative staff size, a quicker response time, and a part-time, paid fire chief.

Based on the results of this study, Coulter contends that the "goal attainment model seems clearly superior" to the other two models discussed with regard to defining and

measuring OE.⁶⁴ Coulter's notion of the superiority of the goal attainment model over the behavioral-attitudinal and processual models quite possibly is based on his view that the goal attainment model theoretically encompasses the elements indicated in the definition of the other two models. That is, the goal attainment model embraces the behavior and attitudes of organizational members as well as the interaction of the organization with its environment and its internal processes. In particular, Coulter believes:

. . . productivity ought to comprise the goal sought, for productivity takes into account the efficiency with which the organization achieves its level of effectiveness.⁶⁵

Steers, in a relatively recent study on the problems of measuring OE, reviewed some 17 multivariate models of OE in terms of the following four aspects: (1) their primary evaluation criteria, (2) their normative or descriptive nature, (3) their generalizability, and (4) their derivation.⁶⁶

One major finding that emerged from this study is that the primary evaluation criteria differ as a group from model to model. This points out once again the problem of

⁶⁴Ibid.

⁶⁵Ibid.

⁶⁶Richard M. Steers, "Problems in the Measurement of Organizational Effectiveness," Administrative Science Quarterly, 20 (1975), pp. 546-558.

making sound comparative studies of OE when the criteria used to evaluate the subject firms differ. A count of the evaluation criteria contained in all 17 models shows that there were 14 specific criteria labels with one label devoted to "all other criteria." The five criteria mentioned most often by the models included (in decreasing number of times mentioned): (1) adaptability-flexibility, (2) productivity, (3) satisfaction, (4) profitability, and (5) resource acquisition. It is of special note that the criterion "adaptability-flexibility" was the only criterion, of all 14 listed, that was mentioned in more than half the models. Steers concludes that this lack of agreement over criteria in the models is more than likely caused by the complexity of the OE construct,⁶⁷ and that the models take too simplistic an approach to the study of OE. What is needed, according to Steers, are models that are more flexible and comprehensive.

By actual count, 13 of the 17 models reviewed by Steers were classified as being normative models. The four models that were classified as descriptive included Lawrence and Lorsch, Price, Mahoney and Weitzel, and Webb.⁶⁸

⁶⁷Ibid.

⁶⁸Paul R. Lawrence and Jay Lorsch, Organization and Environment (Boston, 1967); Price (1968); Thomas Mahoney and William Weitzel, "Managerial Models of Organizational Effectiveness," Administrative Science Quarterly, 14 (1969), pp. 357-365; and Webb, pp. 663-677.

The following four categories were used by Steers to classify the models according to their generalizability: (1) all organizations, (2) business organizations, (3) religious organizations, and (4) research and development laboratories. Ten of the 17 models were classified as being generalizable to all types of organizations, five to business organizations only, one to religious organizations, and one to both business and research and development laboratories.

The last aspect of the models reviewed pertained to the derivation or development of the criteria comprising the models. Two categories of classification were used. One was labeled "deductive" while the other category was "inductive."

Of the numerous multivariate models reviewed by Steers, the model developed by Mott appears to be one of the more viable normative models. This is, in part, a subjective judgment; however, it is of some significance to note that the model's evaluative criteria appeared more frequently in the other OE models. The evaluative criteria of Mott's model include: (1) production with quality, quantity and efficiency considered; (2) adaptation, with the following aspects considered: (a) anticipating problems and solving them satisfactorily, (b) awareness of potential solutions, (c) promptness of adjustment, and (d) prevalence of adjustment; and (3) flexibility. Mott's measuring instrument contains eight questions overall with

three being devoted to the criterion of production, four to adaptation, and the remaining one to flexibility. The reason for Mott's emphasis in his model on the criteria of production and adaptation is most likely based on his conception of how OE should be defined. According to Mott, OE is "the ability of an organization to mobilize its centers of power for action--production and adaptation."⁶⁹

Mott derived his model by examining five organizations, all of which can be classified as public institutions. They included: (1) a state mental hospital located in Pennsylvania; (2) an anonymous federal agency called Alpha Agency; (3) the Department of Health, Education and Welfare's Financial Management Office; (4) 12 divisions of the National Aeronautics and Space Administration; and (5) a portion of the administrative office of the U. S. State Department.

In general, Steers' study shows that a relatively large and varied number of models exists to provide measures of OE. Based on the criteria examined, it can be concluded that very little congruence exists between the models. This has led Steers to identify the following eight problems that are inherent in several of the current models of OE:

⁶⁹Paul E. Mott, The Characteristics of Effective Organizations (New York, 1972), p. 17.

Construct Validity

The first problem mentioned is that of construct validity, where a construct is defined as "an abstract idea rather than a concrete phenomenon."⁷⁰ The issue revolves around the question of whether or not the construct OE actually exists, since there is so much disagreement as to what criteria should be included in the construct as witnessed by the variety of criteria specified in the 17 models reviewed.

According to Steers:

. . . it appears that either the effectiveness construct is invalid or that there may indeed be such a valid construct for which the relevant observable criteria have not yet been discovered.⁷¹

While there is little agreement as to what constitutes valid evaluation criteria for OE, there have been efforts by some researchers to investigate the validity of certain criteria. House and Rizzo, in a study on scale development and validation, contend that the only measures for determining OE are primarily gross end result, economic measures (e.g., net profit), or unvalidated opinion.⁷² In their study, House and Rizzo specified six scales as measures of

⁷⁰Steers (1975), p. 551.

⁷¹Ibid., p. 552.

⁷²R. J. House and J. R. Rizzo, "Toward the Measurement of Organizational Practices: Scale Development and Validation," Journal of Applied Psychology, 56 (1972), pp. 388-396.

OE. These six include: (1) conflict and inconsistency, (2) decision delay, (3) information distortion and suppression, (4) adequacy of planning, (5) work flow coordination, and (6) adaptability. In a later (1977) study by Morgan and Hitt, the validity of the six scales was tested.⁷³ The results of their study did not provide strong support for the scales. The scales or criteria showing the strongest support were: (1) decision delay, (2) information distortion and suppression, and (3) adaptability.

Criterion Stability

Another problem, according to Steers, involves the notion of criterion stability. This refers to the appropriateness of a given criterion over time. In several of the models reviewed, the criteria specified are relatively unstable over time. As an example, the OE of a firm may be related to the level of capital investment; however, under poor economic conditions, capital liquidity may emerge as a more relevant criterion and high capital investment may change from an asset to a liability.⁷⁴

⁷³Cyril P. Morgan and Michael A. Hitt, "Validity and Factor Structure of House and Rizzo's Effectiveness Scales," Academy of Management Journal, 20, 1 (1977), pp. 165-169.

⁷⁴Steers (1975), p. 552.

Time Perspective

Related to the problem of criterion stability is that of time perspective. The argument is that different criteria should be used for the short, intermediate, and long run time periods. In this way, explicit recognition is given to the time dimension.

Multiple Criteria

The use of multiple criteria can create a problem where there is conflict between the criteria. For example, Steers cites a case where employee satisfaction and productivity are considered as relevant OE criteria. Conflict between the two may arise if management applies a relatively high degree of pressure to produce and this, as a consequence, results in a lowering of employee satisfaction. Conflict between the two criteria may also arise if the opposite is true. That is, employee satisfaction may be increased significantly by reducing the amount of pressure to perform, but this tactic may result in unacceptably low levels of productivity.

Precision of Measurement

Precision of measurement is still another problem associated with current OE models. This problem appears where the assumption is made that it is possible to quantify the concept of OE accurately and consistently.

Generalizability

Generalizability is a problem associated with the question as to how broadly the evaluation criteria of a model can validly be applied to other organizations.

Theoretical Relevance

The problem of theoretical relevance involves the argument that if a given OE model does not contribute to an understanding of an organization's structure, processes, or behavior, then it is of little value from a theoretical viewpoint.

Level of Analysis

The last problem mentioned by Steers is that of level of analysis. This problem refers to the fact that many of the OE models only view OE from the macro level, and as such discuss only organization-wide phenomena and their relation to effectiveness. It can be argued that this macro level of analysis disregards what undoubtedly is a critical relation between OE and individual behavior that can only be properly viewed from a micro level. Thus, it would seem "there is little integration between macro and micro models of performance and effectiveness."⁷⁵

⁷⁵Ibid., p. 556.

As possible solutions to many of the problems mentioned above, as well as to suggest possibilities for future model development, Steers argues for the following:

1. In measuring OE the focus should be on the operative goals of the firm, i.e., those goals that the firm is actually trying to accomplish as opposed to the stated official goals of the firm. This suggestion, of course, recognizes the great difficulty that may be encountered in trying to ascertain exactly what the actual behavioral intentions of a firm may be.
2. In model building, the model should be designed to take into account the different weights (reflecting degree of importance) an organization would attach to each of its operative goals.
3. New models should specify, in explicit terms, the constraints that are in the structure, technology, environment, and membership of a given organization that impede or limit the maximization of the effectiveness criteria embodied in the models.⁷⁶

Because of the constraints to maximization referred to in item 3 above, Steers contends it is more realistic to try to achieve goal optimization as opposed to attempts to achieve some desired goal set. The desired goal set should specify goals that are all considered to be possibly and totally attainable, without objective consideration of the above-mentioned constraints. Thus, it would be possible when using a desired goal set for some of the goals to not be feasible when the constraints are placed on the organization's goal-oriented activities. The goal optimization

⁷⁶Ibid.

emphasis is on measuring OE against a feasible goal set. Based on this logic, Steers further contends that it would seem appropriate for future OE models to be linear optimization models. Steers' advocacy of the use of linear optimization models is possibly based on the knowledge that many organizations are familiar with their operation from use of operations research tools, and thus would be more receptive to their application in an OE context. Utilizing this type of model, OE would be measured as:

. . . the extent to which an organization optimizes its [weighted] feasible goal set, subject to a set of irreducible constraints found at various levels in the organization environment.⁷⁷

In summary, Steers believes linear optimization models would enable us to move away from the value-laden, prescriptive evaluation criteria that frequently appear in the literature to a more meaningful approach.

As mentioned previously, there is considerable disagreement among researchers as to how OE should be defined and conceptualized. One of the more recent arguments of note involves the research work of Goodman and Pennings⁷⁸ that can be compared to that of Steers.⁷⁹

⁷⁷ Ibid.

⁷⁸ Goodman and Pennings.

⁷⁹ Steers (1975), pp. 546-558; and Richard M. Steers, Organizational Effectiveness: A Behavioral View (Santa Monica, 1977).

As previously discussed, Steers' concept of OE is strongly oriented towards the goal attainment model, while Goodman and Pennings advocate a systems approach. Goodman and Pennings argue that OE should be analyzed in terms of official goals that represent desired end states specified by the dominant coalition, while Steers argues that studies dealing with OE should focus on operative goals, i.e., the goals an organization is actually trying to accomplish.

To Goodman and Pennings:

. . . organizations are effective if relevant constraints can be satisfied and if organizational results approximate or exceed a set of referents for multiple goals.⁸⁰

Steers, on the other hand, views organizational effectiveness in terms of the degree of achievement of the operative goals. However, there is some degree of agreement on the use of a multivariate approach to the study of OE. Steers' argument for the development and use of multivariate models is explicit and relatively detailed, while Goodman and Pennings' support is more implicit.⁸¹

Review of the arguments of both Goodman and Pennings and Steers shows that the seemingly large incongruence between the two approaches is not as large as it appears at first glance. It seems plausible to view the linear optimization model within a systems framework.

⁸⁰ Goodman and Pennings, p. 160.

⁸¹ Ibid., pp. 164-165.

Summary of OE Literature

The concept of OE is both ambiguous and controversial in nature. The amount of research on OE is large and growing, but there is still little agreement on how to conceptualize, measure, and explain OE.

From the writings of Barnard on OE extending to 1960, the goal attainment model was emphasized. The basic premise of this model is that the degree of OE achieved is a function of the degree of attainment of the goals an organization has set for itself.

During the 1960's, the systemic or systems model of OE became popular as an alternative to the goal attainment model. Important systems concepts include the notions that the organization is a functionally differentiated subsystem of a larger social system, and that the goals of the organization are only functions to be performed for the benefit of some larger system.

Both types of the above-mentioned models, as well as many versions of these models, have received many criticisms in terms of the way they conceptually structure OE and the criteria they specify for measurement of OE.

The thrust in contemporary research points toward the future development and refinement of both systems and goal models with the inclusion of multiple criteria as opposed to the single criteria models of early OE studies. As an example, Steers, who is basically an advocate of the goal

model, argues for the use of linear optimization models. These models would permit the inclusion of multiple criteria and provide an objective means whereby the degree of OE, in terms of optimizing an organization's operative goals, could be determined with the relevant constraints considered.

However, Goodman and Pennings believe that if an organization's official multiple goals approximate or exceed some previously determined standards, and if the organization's relevant constraints are satisfied, the organization can be said to be effective. The notion of multiple criteria for OE is implicit in this conceptual scheme.

The following chapter will present and discuss that part of the research literature providing the specific theory upon which this study was based. Also, the hypotheses that are to be tested will be delineated.

CHAPTER III

THEORY AND HYPOTHESES

The relationship between varying levels of stress and performance effectiveness has been experimentally established for individuals as discussed in the previous chapter. This relationship, it may be recalled, is represented by the curve shown in Figure 2 (Chapter II). However, the survey of literature indicates that this approach has not been applied to typical organizational settings. For example, while threshold values of stress for individual subjects have been established, no attempt has been made to identify similar threshold values for formal organization groups utilizing the variables of occupational stress and organizational effectiveness.

The objective determination of a group threshold value could be made if the relationship between occupational stress and organizational effectiveness is found to be similar in nature to the curvilinear relation depicted in Figure 2. The analytical procedure for making this determination will be delineated in Chapter IV, Research Methodology.

From the research efforts of Janis et al., Burke, and Selye, a framework can be developed for the creation of an occupational stress/organizational effectiveness model for formal organization groups.¹ This model can be derived from the conceptual extension of the research findings for individuals to that of formal groups.

The research work by Janis et al., McDaniel, and McGrath is of major importance for developing the group occupational stress/organizational effectiveness model.² As may be recalled, their research established the existence of a curvilinear relationship between the level of threat or stress a person experiences and his or her level of task performance or adaptive effectiveness. This finding provides the foundation for hypothesizing the existence of a similar relationship for formal organization groups with occupational stress and organizational effectiveness as the variables of concern. Hypothesis I, which follows later, formally sets forth this argument and also embraces the notion of functional and dysfunctional categories of

¹Irving L. Janis et al., Personality: Dynamics, Development and Assessment (New York, 1969); Ronald J. Burke, "Occupational Stresses and Job Satisfaction," The Journal of Social Psychology, 100 (1976), pp. 235-244; Hans Selye, The Stress of Life (New York, 1967); and Hans Selye, Stress Without Distress (New York, 1974).

²Janis et al., pp. 124-155; James W. McDaniel, Physical Disability and Human Behavior (New York, 1969); and Joseph E. McGrath, "Stress and Behavior in Organizations," Handbook of Industrial and Organizational Psychology, ed. M. Dunnette (Chicago, 1976), pp. 1351-1395.

stress. These were identified by Burke in his research on the relationship between occupational stresses and job satisfaction.³ As previously mentioned, Burke found four occupational stresses that could be classified as functional in nature to an employee and nine occupational stresses that were dysfunctional.

The results of Selye's research from a variety of physiological experiments indicate that both an excess of stress on the human organism as well as a virtual lack of stress can be damaging.⁴ Selye's research implies the existence of a threshold level of stress. This level or value of stress, unique for each individual, is the dividing point between levels of stress with which the individual can effectively cope, and those levels of stress that are uncomfortable for the individual and with which he or she cannot effectively cope. When considered in conjunction with the previously discussed curvilinear relationship between stress and performance effectiveness, the degree of performance effectiveness associated with this threshold value would be the maximum possible, i.e., 100 percent.

³Burke, pp. 235-244.

⁴Selye (1967); and Selye (1974).

The validity of conceptual extension is arguable in terms of general systems theory as developed by von Bertalanffy⁵ and others.

According to general systems theory:

Complex structures which carry out living processes . . . can be identified at seven hierarchical levels--cell, organ, organism, group, organization, society, and supranational system.⁶

Within the context of this study, the hierarchical level labeled "organism" can be considered to correspond to the individual, while the more advanced hierarchical level labeled "group" obviously corresponds to that of the formal organization group. Recognizing this, it follows that the basic concepts embraced by the theory as a whole are applicable to each hierarchical level, since each level represents a living system in and of itself. The only difference between the systems at each level is in degree of complexity in structure⁷ and processes⁸ associated with their various subsystems.

⁵Ludwig von Bertalanffy, "The History and Status of General Systems Theory," Academy of Management Journal, 15, 4 (1972), pp. 407-426; and Ludwig von Bertalanffy, General Systems Theory--Foundations, Development, Applications (New York, 1968).

⁶James Grier Miller, Living Systems (New York, 1978), p. 1.

⁷The structure of a system is considered by Miller to be "the arrangement of its subsystems and components in three-dimensional space at a given amount of time." *Ibid.*, p. 22.

⁸Process is defined by Miller as "all change over time of matter-energy or information in a system." *Ibid.*, p. 23.

A primary concept from general systems theory to be considered here is the notion of a system's steady state. Steady state refers to the stability or equilibrium condition of a system in response to variations in its many subsystems which process matter-energy or information.⁹

According to Miller:

All living systems tend to maintain steady states (or homeostasis) of many variables, keeping an orderly balance among subsystems which process matter-energy or information.¹⁰

Implied in this statement is the notion of a range of stability for each of the many variables in all living systems. Stress is the term used as part of the steady state concept to describe situations where there is either an excess or lack of input or output of either matter-energy or information that forces the system variables beyond the range of stability.¹¹

Based on the steady state concept, it seems reasonable to argue that the notion of a threshold value for stress is compatible with the range of stability concept. The threshold value represents the upper limit within the range of stability.

The research suggests that a curvilinear relationship between stress and performance effectiveness exists for

⁹Ibid., p. 34.

¹⁰Ibid.

¹¹Ibid.

individuals, together with a threshold value of stress. In addition, the literature emphasizes that an individual represents one level in the hierarchy of living systems. Thus, it can be argued that for the next higher level in the hierarchy, the formal group, a conceptual extension can be made so that it is logical to hypothesize that a similar relationship between stress and organizational effectiveness exists for formal groups along with a threshold value of stress.

Since this study is concerned with formal organization groups as opposed to individuals per se, the term "organizational effectiveness" is used to replace the term "performance effectiveness" as the dependent variable. Organizational effectiveness is a broader concept and encompasses performance effectiveness, according to Mott's criteria of organizational effectiveness discussed in the previous chapter.¹²

The justification for combining the research findings of Janis et al., McDaniel, McGrath, and Burke to create Hypothesis I, which follows, centers on the following argument.

The research efforts of Janis et al., McDaniel, and McGrath focus primarily on the level or intensity of

¹²Paul E. Mott, The Characteristics of Effective Organizations (New York, 1972).

stress.¹³ However, from the research of Burke, it appears that not only the level or intensity of stress should be considered, but also the type of stress being studied.¹⁴ Thus, it seemed appropriate in the construction of Hypothesis I to consider not only the conceptual extension of stress intensity for an individual, but also extension of the functional/dysfunctional scheme of classification. The combination of these two aspects of stress resulted in the creation of Hypothesis I as given below:

Hypothesis I: The experimentally established curvilinear relationship between level of stress and performance effectiveness for individuals, when combined with an empirically-derived functional/dysfunctional classification for occupational stress, can be extended to formal groups to establish, in linear terms, a similar relationship for a given type of stress.

The results of the previously discussed research work of Selye provided a major stimulus for the development of Hypothesis II.¹⁵

Since the notion of threshold values of stress for individuals has been established, it seems appropriate to extend this concept to a group setting in consideration of the hypothesized stress/effectiveness relationship for formal groups as set forth in Hypothesis I. This

¹³Janis et al., McDaniel; and McGrath, pp. 1351-1395.

¹⁴Burke, pp. 235-244.

¹⁵Selye (1967); and Selye (1974).

conceptual extension has been formalized as Hypothesis II, which is given below:

Hypothesis II: For any formal organization group, there exists a threshold value of occupational stress that can be objectively determined.

The justification for this extension of the threshold value concept is based on the logic of general systems theory as previously discussed in justifying the conceptual extension embodied in Hypothesis I. That is, if a concept is applicable to one level in the living systems hierarchy, e.g., the organism (individual), then it is also applicable to the other levels; in this case, the level of concern is the next higher level which is the group.

This chapter has presented and discussed the applicable theory leading to, and in support of, the above hypotheses. The following chapter will discuss in detail the methodology used in the study and explain the analytical methods that were applied to the data.

CHAPTER IV

RESEARCH METHODOLOGY

Research Setting and Subjects

Four firms, all located in the Oklahoma City, Oklahoma, area and from three different industries, participated in the study. One firm was from the meat packing and food processing industry, two firms were a part of the petroleum industry, and the remaining firm was engaged in the manufacture and sales of private aircraft.

All subjects participating in the study were employees classified as working in white-collar occupations. The sample size varied from firm to firm. The meat packing firm, identified hereafter as Firm 1, provided 69 subjects. Firm 2, one of the two petroleum companies, provided 44 subjects; while in Firm 3, the other petroleum company, 36 subjects participated. In Firm 4, the aircraft firm, some 34 subjects participated, making the total sample size across all firms equal 183 subjects.

The subjects in the study were asked as a group to participate on a voluntary basis with anonymity guaranteed. The questionnaires were disseminated at the subjects' work places and were picked up at a central drop-off location

approximately 7 to 10 days later. Out of a total of 300 questionnaires disseminated, 185 were returned with 183 being usable, for a 61 percent response rate. The two unusable questionnaires lacked responses to several questions and, therefore, were deleted. The questionnaires disseminated at each firm were distributed as follows: Firm 1, 100 questionnaires; Firm 2, 70 questionnaires; Firm 3, 65 questionnaires; and Firm 4, 65 questionnaires. Therefore, all firms had greater than a 50 percent response rate.

Survey Questionnaire

A copy of the questionnaire used in the study is provided in Appendix A. The questionnaire is comprised of three parts. Part A provided a means of gathering data on the amount or level of stress a subject was experiencing on his or her job. Part B of the questionnaire provided a means of classifying a subject's stressful experiences as being either functional or dysfunctional in nature. The third part of the questionnaire, Part C, contained questions designed to obtain a measure of perceived organizational effectiveness.

Part A is taken from a questionnaire used by House and Rizzo in their research on role conflict and ambiguity.¹ However, a significant portion, approximately 60 percent, of House and Rizzo's instrument is taken from the Manifest Anxiety Scale developed by Taylor in 1953 and widely utilized in a variety of studies since that time.²

Part B was from Burke's³ study on the relationship between occupational stress and job satisfaction, but it was originally created by Kahn et al.⁴ in their comprehensive study of organizational stress.

Part C was taken from Mott's study on the characteristics of effective organizations.⁵ The justification for selecting Mott's instrument over the many others available was based on several considerations. First, the model is applicable or generalizable to all types of organizations; hence, where a study deals with a variety of firms and

¹R. J. House and J. R. Rizzo, "Role Conflict and Ambiguity as Critical Variables in a Model of Organizational Behavior," Organizational Behavior and Human Performance, 7 (1972), pp. 467-505.

²Janet A. Taylor, "A Personality Scale of Manifest Anxiety," Journal of Abnormal and Social Psychology, 48 (1953), pp. 285-290.

³Ronald J. Burke, "Occupational Stresses and Job Satisfaction," The Journal of Social Psychology, 100 (1976), pp. 235-244.

⁴Robert L. Kahn et al., Organizational Stress: Studies in Role Conflict and Ambiguity (New York, 1964).

⁵Paul E. Mott, The Characteristics of Effective Organizations (New York, 1972).

industries, as this one does, this consideration is important. Second, the model is normative, as opposed to descriptive, in nature. That is, the model attempts to prescribe what actions an organization needs to undertake in order to become effective instead of only indicating the characteristics found in effective organizations. And third, the criteria embraced by the model, namely production, adaptation, and flexibility, appear more frequently in models of effectiveness than any of the other criteria additionally included in these models.

For the questions included in Part A, House and Rizzo reported Kuder-Richardson reliabilities⁶ of .825, .759, and .724 for the grouping of the questions into the three categories of job induced stress, somatic tension, and general fatigue and uneasiness, respectively.⁷ Utilizing the data sample from this study, a Kuder-Richardson reliability coefficient of .819 was calculated for all questions considered as a whole. These reliability coefficients can be considered as moderately large and sufficiently adequate for basic research according to the standards of

⁶Kuder-Richardson reliabilities are estimates of reliabilities based on the internal consistency of the items comprising a test, i.e., the amount of correlation between the item responses within one test. The Kuder-Richardson formula estimates "the correlation between an existing test and a hypothetical equivalent form." Jum C. Nunnally, Jr., Introduction to Psychological Measurement (New York, 1970), p. 125.

⁷House and Rizzo, pp. 467-505.

reliability as specified by Nunnally.⁸ No validity indexes were reported for the instrument.

As stated above, the questions for Part B were originally taken from work by Kahn et al.⁹ No test-retest reliability figures were given; however, the results of an intercorrelation analysis of the questions were provided. From the data on a national sample of some 725 employed adults, it was found that only two of the inter-item correlations were negative. Also, out of the 105 correlations calculated, less than 10 were positive but not significant at the .05 level.

Ideally, it would be desirable to have no negative inter-item correlations, since these do not add to the reliability of the measuring instrument. However, it is not necessary, according to Nunnally, that all the inter-item correlations be positive, only that a large majority be this way.¹⁰ In numerical terms, this "large majority" should be equal to at least 70 percent of the inter-item correlations.¹¹ Since a vast majority (approximately 98 percent) of the inter-item correlations in Part B were found to be positive, the impact of the two negative

⁸Jum C. Nunnally, Jr., Psychometric Theory (New York, 1967).

⁹Kahn et al., p. 424.

¹⁰Nunnally (1967).

¹¹Ibid.

correlations should be viewed as inconsequential with respect to affecting the reliability of the Part B instrument.

As mentioned above, less than 10 of the positive inter-item correlations were not significant at the .05 level. Since some 105 correlations were calculated in all, and considering the two negative correlations also, this leaves approximately 90 percent of the inter-item correlations positive and significant at the .05 level. This suggests that a modestly high degree of homogeneity or internal consistency exists with respect to the grouping of the items into a meaningful scale or instrument.

In their review and evaluation of the instrument, Robinson, Athanasiou, and Head do not specify a single figure for the average correlation among items (internal consistency), but instead state that ". . . the average inter-item correlation appears to be in the middle .20's."¹² Thus, the items seem to be independent. It should be noted that the above average correlation is for the Part B instrument as a whole, that is, with all 14 items comprising Part B considered as one group of stress items.

In spite of the fact that more or less of a range of figures was indicated for the average inter-item

¹²John P. Robinson, Robert Athanasiou and Kendra B. Head, Measures of Occupational Attitudes and Occupational Characteristics (6th ed., Ann Arbor, 1974), p. 206.

correlation for the 14 questions comprising Part B, it is still possible to estimate the reliability of the instrument using average correlation by assuming that the figures .24, .25, and .26 adequately represent what Robinson, Athanasiou, and Head referred to as an average inter-item correlation in the middle .20's. This assumption was made in this study and enabled estimates to be made of the reliability of the Part B instrument using average correlation.

The results of using each of the three assumed average correlations in turn as input to estimate the reliability of the Part B instrument yielded reliability coefficients of $r_{kk} = .81$, $r_{kk} = .82$, and $r_{kk} = .83$.¹³ As with the reliability coefficients for the Part A instrument, these coefficients can be considered as adequate in size for basic research.¹⁴

Although the above estimates of reliability were based on the average correlation among items or the internal consistency, the basic formula for determining reliability based on internal consistency is coefficient alpha.¹⁵ The formula for coefficient alpha has been shown by Nunnally to be equivalent to the formula for r_{kk} .¹⁶ The major difference in the two formulas is that coefficient alpha utilizes

¹³Nunnally (1967), pp. 192-194.

¹⁴Ibid., p. 226.

¹⁵Ibid., p. 210; and Nunnally (1970), pp. 550-552.

¹⁶Nunnally (1967), pp. 194-196.

the variances of the scores on each item and the variance of total scores on the instrument, while the formula for r_{kk} requires the average correlation among items.

In order to obtain an estimate of the reliability of Part B using the data from this study's respondents, coefficient alpha was calculated. The value of coefficient alpha was determined to be $r_{11} = .76$,¹⁷ which can be considered a moderately high estimated reliability, again according to the standards of reliability previously referred to. As in the calculations for the r_{kk} 's, all 14 items in Part B were utilized as one sample group of stress items.

In comparing the above value of coefficient alpha with the values of r_{kk} , it can be noted that while they are not equivalent, they are nevertheless quite close in magnitude. This finding adds additional research support to an evaluation of the Part B instrument as possessing moderately high reliability.

With regard to validity, it was noted that the survey by Kahn et al. utilized an open-ended question to elicit information about the number, content and intensity of job-related worries. These variables were found to be closely related to the tension index.¹⁸

¹⁷The symbol r_{11} is used to indicate the theoretical notion that one is correlating a test with itself when utilizing coefficient alpha. Nunnally (1970), p. 549.

¹⁸Robinson, Athanasiou, and Head.

For Part C, no reliability coefficients were reported by Mott¹⁹; however, inter-item correlations were determined and showed that the individual items tended to be correlated more highly with other items in the same conceptual area (i.e., productivity, adaptability, or flexibility) than with items from different areas. However, most of these correlations were in the .30's and .40's; thus, their common variance was not high. According to Mott, each item appeared to be measuring a substantially different aspect of the concept of effectiveness.

As implied above, Mott apparently did not use the above-mentioned correlations to determine the average correlation among items so that the reliability coefficient r_{kk} could be determined. Nevertheless, by utilizing the data from this study's respondents, an estimate of the reliability of the Part C instrument can be obtained by calculating coefficient alpha.²⁰ As mentioned previously in the discussion of the reliability of the Part B instrument, coefficient alpha and the reliability coefficient r_{kk} have been shown to be equivalent.²¹ The value of coefficient alpha for Part C was calculated as $r_{11} = .857$, which

¹⁹Mott, pp. 190-191.

²⁰Nunnally (1970), pp. 550-552; and Nunnally (1967), pp. 194-196.

²¹Nunnally (1967), pp. 194-196.

can be interpreted as a relatively high estimated reliability.

Mott also performed a factor analysis of the effectiveness items and found the factor groupings as represented in Part C. As further support for Mott's groupings of items under the three factors as presented, a previous and somewhat similar study by Georgopoulos and Mann produced comparable results using a factor analysis of their effectiveness items.²² Mott described the correlations among the three indexes of effectiveness, i.e., productivity, adaptability, and flexibility, as all positive, statistically significant, but moderate in size. None explains more than 25 percent of the variance in the others. Thus, they probably are not mere reproductions of one another. Again, according to Mott, they appear to measure three different but related organizational processes, which lends support to their value as a credible index of overall effectiveness.

No validity indexes were reported by Mott since, as he noted, hard criteria measures of organizational effectiveness for some 12 diverse and complex divisions were virtually impossible to obtain. To circumvent this problem, Mott utilized two other validating approaches. In the first approach, top executives for all 12 divisions were

²²Basil S. Georgopoulos and Floyd C. Mann, The Community General Hospital (New York, 1962).

asked to evaluate the effectiveness of each division using the Part C instrument which had also been used by the respondents in each division. In the second approach, employees in each division were asked to evaluate the effectiveness of other divisions with which they had fairly frequent contact, again using the Part C instrument.

The results of these evaluations were used to construct a ranking by top management and a ranking by the employees for the effectiveness levels of the various divisions. From these resultant individual rankings, a composite rank ordering was constructed and rank-order correlations were calculated. The rank-order correlations were as follows: between self-ratings and top management ratings, $r_s = .72$; between self-ratings and ratings by people in other divisions, $r_s = .55$. These rank-order correlations were found to be statistically significant at the .01 and .05 levels, respectively. Lastly, it was found that the rank-orders of people in other divisions and top management correlate significantly, $r_s = .77$. As Mott noted, these correlations suggest considerable agreement on the relative effectiveness of the various divisions.

Analytical Methods

Before discussing how the data from the study's questionnaire are to be utilized in construction of the linear model specified in Hypothesis I, the rationale for

hypothesizing this type of model as opposed to a curvilinear one will be discussed.

Assuming the relationship between stress and organizational effectiveness for a given group is found to be curvilinear in nature, the threshold value would be that level of stress associated with the curve's maximum obtainable organizational effectiveness level. This threshold value of stress is not obtained by an arithmetic summation of individual stress scores, but rather by applying differential calculus. That is, by noting that at the curve's maximum obtainable organizational effectiveness level, the first derivative of the equation of the curve (or the slope of a line drawn tangent to the curve at this point) is zero, one can algebraically solve for that value of stress (the threshold value) associated with this maximum by setting the first derivative equal to zero and then solving for the stress threshold value.

The viability of this analytical procedure utilizing differential calculus is dependent upon whether or not sufficient data points are available to permit establishment of a "meaningful" function. That is, even if a function is established using accepted mathematical procedures (e.g., trial and error fitting of various polynomials to the data points), it is possible to have cases where the natural grouping or clustering of data points will result in a function that is not meaningful as a tool of analysis for an organization. Two such cases in point are

illustrated in Figure 3. The primary question in the two cases shown is whether or not the peak of a function fitted to the data points would adequately represent the true vertical maximum for the function. Obviously, with so few data points situated where one would expect the function to peak, as well as on one given side of the curve or the other, the validity of any function fitted to the data becomes somewhat suspect.

Assuming the curve is a "meaningful" one, once the threshold value for each function is established,²³ the number of group members and their stress and effectiveness levels relative to this threshold value can be determined. This would enable the number of group members operating in the desirable and undesirable ranges of the function with respect to the intensity of the stress to be determined.

To reduce the likelihood of obtaining a less than meaningful function as just described, it is possible to utilize a linear-based approach in establishing the threshold value of the theoretical function, as well as approximating the shape of the function. This approach would negate the impact of the cases discussed above where the data might cluster or group itself in an "undesirable" manner. The procedure involves dividing the data and using linear regression to establish a straight line through each

²³This group threshold value would be analogous to the one indicated for individuals and shown as point B in Figure 2.

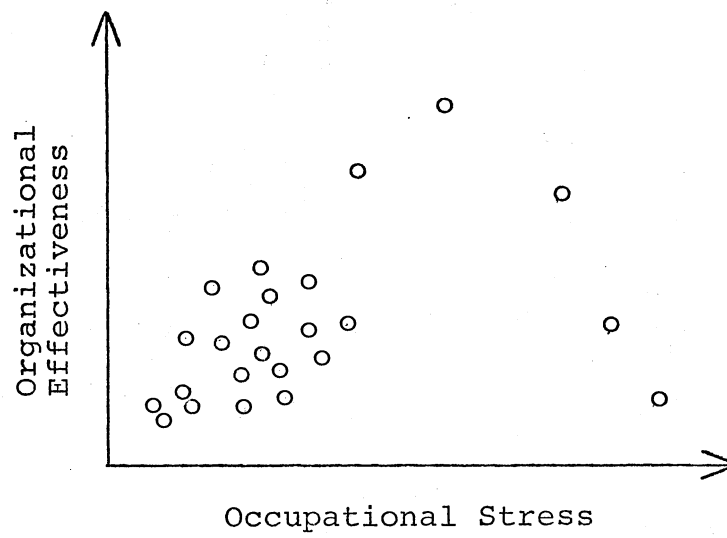
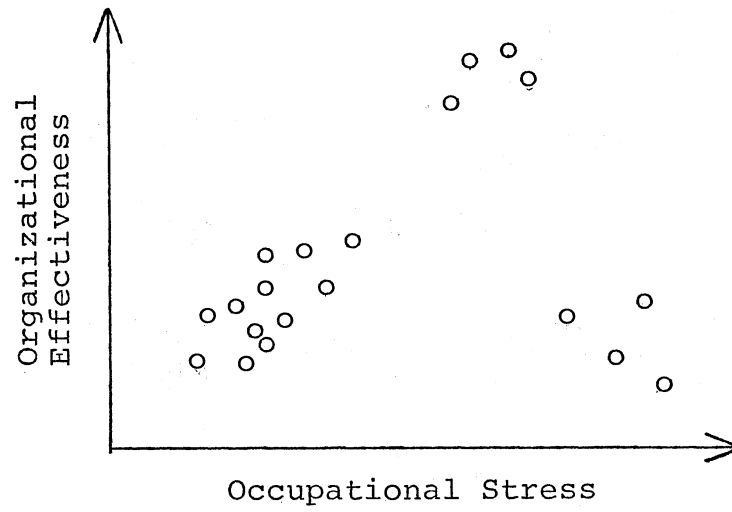


Figure 3. Examples of Data Clusters That Would Limit the Meaningfulness of Any Function Derived From the Data.

of the two data sets created. A hypothetical example of how this might appear is depicted in Figure 4.

The intersection of the two regression lines determines the threshold value, at point B, for the group. Applying this approach successfully depends upon the proper division of the data. A mathematical model utilizing Bayesian analysis can provide a viable means for accomplishing this task.²⁴ A detailed description of the mathematical procedures utilized by the model will be given later.

Data obtained from the three-part questionnaire previously discussed was used in the following manner to construct the appropriate (i.e., either functional or dysfunctional) linear stress model for each firm surveyed.

With regard to the labeling of the graphs' axes, perceived organizational effectiveness will be considered the dependent variable and will appear as the ordinate (vertical axis) in all graphs illustrated. The variable, occupational stress, will be considered the independent variable and will appear as the abscissa (horizontal axis).

Construction of the actual linear model for a given group on a graph involves not only the plotting of the data, but also a determination of the equations of the

²⁴Donald Holbert and Lyle Broemeling, "Bayesian Inferences Related to Shifting Sequences and Two-Phase Regression," Communications in Statistics--Theory & Methods, A6, 3 (1977), pp. 265-275.

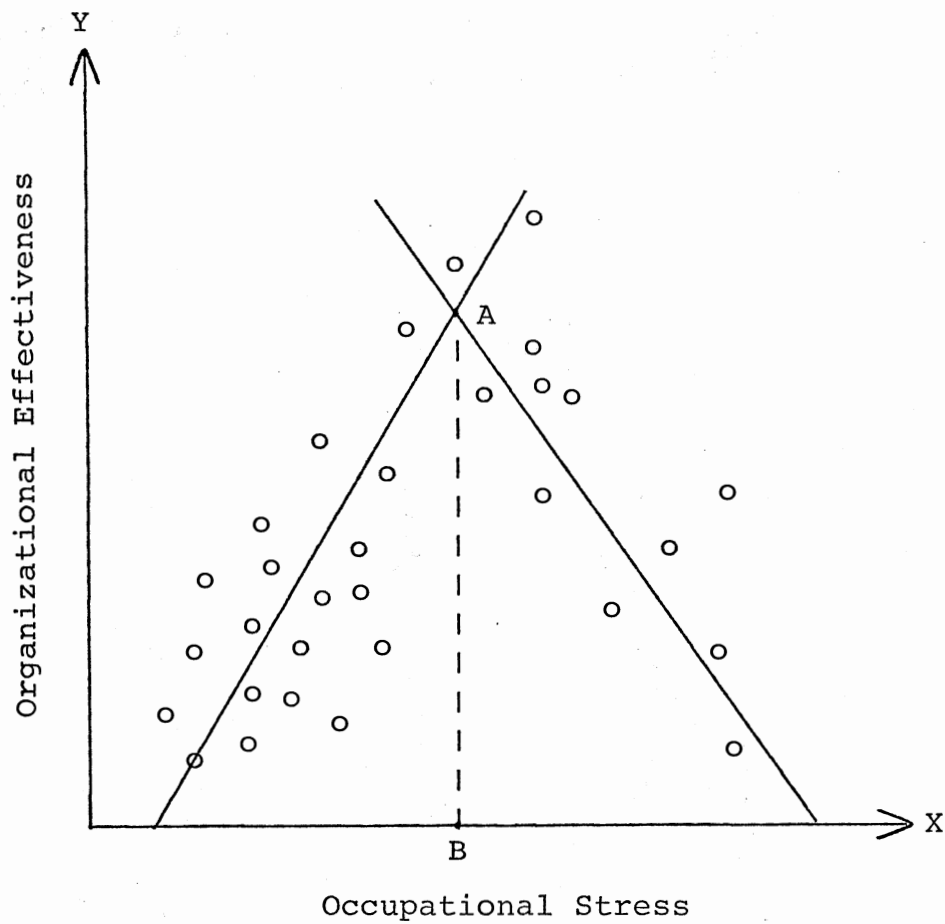


Figure 4. Linear Model Showing Hypothesized Relationship Between Level of Stress and Organizational Effectiveness

straight lines derived from the data points, after a determination of the dividing point for the data.

An analytic method or model with the capability of determining the dividing point for a set of data was developed by Holbert and Broemeling.²⁵ In essence, the model uses Bayesian inference to calculate the dividing point, or more accurately, the switch point for a given set of data. The switch point represents the end of the data set for the first regression line but not the beginning of the data set for the second regression line. The formula for calculating the switch point is given below:

$$\begin{array}{l} P(M_i | \text{Data}) \\ \text{Posterior} \end{array} = \frac{P(\text{Data} | M_i) \cdot P(M_i) \text{Prior}}{\sum_{j=2}^{n-2} P(\text{Data} | M_j) \cdot P(M_j)} \quad (4.1)$$

The left side of the equation is read as the probability of the switch point M_i , given the particular data set being evaluated. Turning to the right side of the equation, the numerator reads the probability of the data being evaluated given the switch point, multiplied by the probability of the switch point prior to evaluation. The denominator is read as a summation of the probability of the data given that the switch point has occurred (at some potential switch point being evaluated), multiplied by the prior probability of the switch point. The summation ranges from

²⁵Ibid.

$j=2$ to $n-2$ data points, so that the minimum of two data points required for each regression line and one data point required for the switch point can be accounted for.

The general equation from which the above equation was derived is Bayes' theorem given below²⁶:

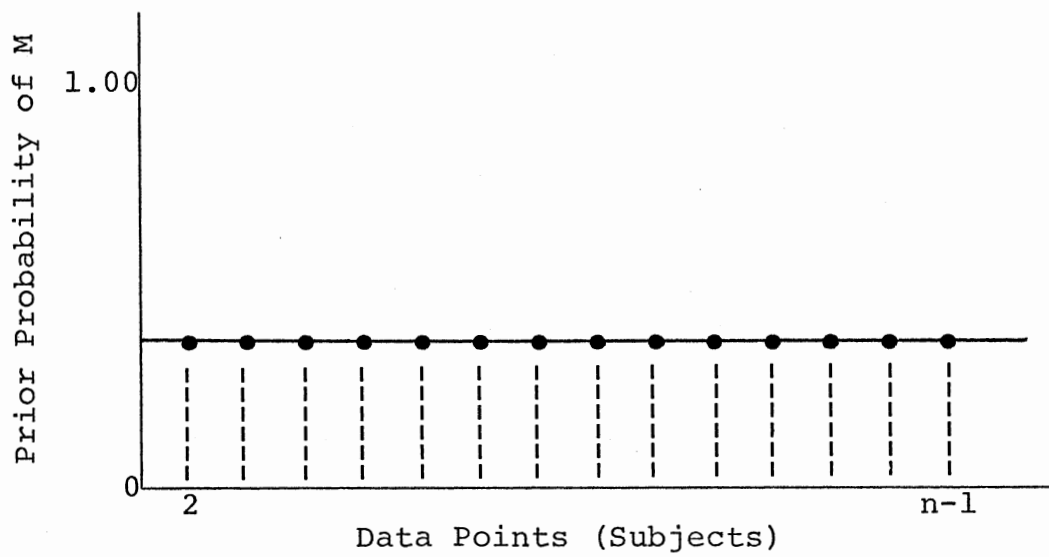
$$P(B_i|A) = \frac{P(B_i)P(A|B_i)}{P(B_1)P(A|B_1)+P(B_2)P(A|B_2)+\dots+P(B_n)P(A|B_n)} \quad (4.2)$$

Where $P(B_i|A)$ is the conditional probability of occurrence for any one of the events B_i , given that event A has occurred. A is any event for which $P(A)$ is not equal to zero. B_1, B_2, \dots, B_n are n mutually exclusive events, one of which must occur in a given trial, i.e., $P(B_1) + P(B_2) + \dots + P(B_n) = 1$.²⁷

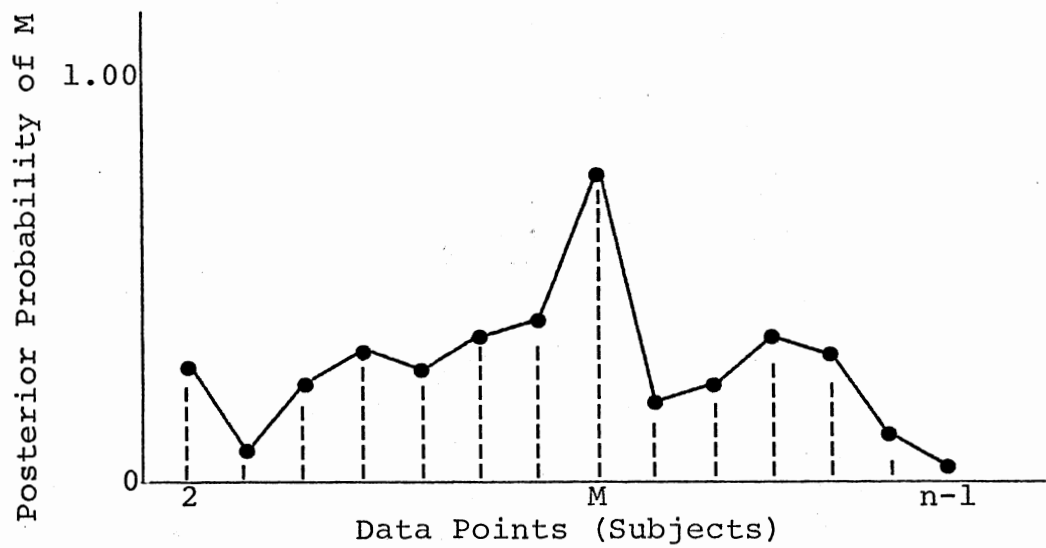
The Holbert and Broemeling model carries out three basic steps in determining the switch point M for a set of data. First, the model makes an assumption regarding the prior density of the switch point. The assumption is that the switch point M has an equal chance or probability of occurring anywhere in a given data set between the range of data points occurring after the first data point to the $n-1$ data point. This is depicted graphically in Figure 5(a).

²⁶Henry L. Alder and Edward B. Roessler, Introduction to Probability and Statistics (4th ed., San Francisco, 1968), p. 65.

²⁷Ibid.



(a) Prior Probability Distribution of the Switch Point M



(b) Posterior Probability Distribution of the Switch Point M

Figure 5. Prior and Posterior Probability Distributions of Hypothetical Data Utilizing Statistical Bayesian Inference

The vertical axis of the graph, it can be noted, is simply the probability of M before considering the data and is equal for all data points in the set. For example, if there were 100 data points in the set, then this probability would be .01.

The second step carried out by the model involves processing a given group's occupational stress and organizational effectiveness scores, by individual subject, through equation 4.1 given earlier. The results of this step permit step three to be accomplished by providing the probability of each data point in the set being the switch point M , given the data set, or more simply, by providing the posterior probabilities for the data set.

The third step involves taking the posterior probabilities from step two and creating a posterior probability distribution for the data set as shown in part (b) of Figure 5. The switch point M is the data point having the largest posterior probability.

Referring back to equation 4.1, it should be emphasized that the term $P(\text{Data}|M)$, in both the numerator and the denominator, refers to the likelihood of the data given that the switch point has occurred at some potential switch point being evaluated.

After determining the switch point M for each data set, the data can then be divided using the value of occupational stress associated with M as the dividing point. Following division of the data, a linear regression can be

run on the data to the left and right of the dividing point. The hypothetical results of such a procedure are shown in the previously referenced Figure 4.

Once the regression equations are derived, a determination can then be made of the threshold value of occupational stress for the group. This involves setting the two regression equations equal to each other and solving for the threshold value of occupational stress. This is a valid procedure, since the equations of the two regression lines are equal at their point of intersection and also since this point of intersection determines the threshold value of stress as previously mentioned. The mechanics of the procedure are demonstrated below:

1. Assume the following equations represent the two regression lines shown in Figure 4:

$$Y_a = a_0 + a_1 \cdot S \text{ (left regression line),}$$

$$Y_b = b_0 + b_1 \cdot S \text{ (right regression line),}$$

where Y_a and Y_b represent the amount of organizational effectiveness, a_0 and b_0 the Y-intercept, a_1 and b_1 the slope of the lines, and S the amount of occupational stress.

2. Setting the equations equal to each other and solving for the threshold value of occupational stress, we have:

$$\begin{aligned}
 a_0 + a_1 \cdot S &= b_0 + b_1 \cdot S \\
 a_1 \cdot S - b_1 \cdot S &= (b_0 - a_0) \\
 (a_1 - b_1) \cdot S &= (b_0 - a_0)
 \end{aligned}$$

$$\text{Therefore, } S = \frac{b_0 - a_0}{a_1 - b_1}$$

This, of course, is the algebraic solution to determining the threshold value of occupational stress. However, this threshold value could, as an alternative, be determined from a purely graphical approach; that is, by an actual plotting of the regression lines and then reading the threshold value from the plot per se.

As a measure of the strength of the relationship between occupational stress and perceived organizational effectiveness, as presented by the linear model, a coefficient of determination, R^2 , will be calculated for all data sets for which regression lines are established. For each regression, R^2 will indicate the proportion of total variation in perceived organizational effectiveness that can be explained by its linear relationship with occupational stress.

Hypothesis I states that the combination of the established curvilinear relationship between level of stress and performance effectiveness for individuals, and the empirically derived functional/dysfunctional classification for occupational stress, can be extended to formal groups to establish, in linear terms, a similar relationship for a given type of stress. To test this hypothesis, the first

step in the analysis is dependent upon establishing the linear model previously discussed. A plot of the data, together with the procedure described above for establishing the two regression lines for a set of data, will establish or deny support for the feasibility of the linear model hypothesized.

Assuming the linear model is established, the second step of the analysis would be to determine which, if either, of the two categories of stress is dominant. It is assumed that for any given group, both types of stress are operating simultaneously.²⁸ However, for some unknown number of cases, there may be a situation where one type of stress occurs more frequently than the other, and thus dominates. In order to ascertain the existence or non-existence of such cases, the Wilcoxon signed-ranks test²⁹ will be applied to the data obtained from Part B of the study's questionnaire (Appendix A). This particular test is a nonparametric statistical test for use where samples are related.

Questions 37 through 40 will provide the data needed to obtain a functional stress score for each subject, while questions 27 through 36, excluding question 30 (a neutral

²⁸Based on the previously cited studies of Kahn et al.; and Burke, pp. 235-244.

²⁹Hubert M. Blalock, Jr., Social Statistics (2nd ed., New York, 1972), p. 265; and James L. Bruning and B. L. Kintz, Computational Handbook of Statistics (Glenview, 1968), p. 205.

question), will provide the data needed to compute a dysfunctional stress score for each subject. The functional stress score and dysfunctional stress score for each subject are obtained by summing the scores for the questions assigned to each type of stress as indicated above.

For those cases where the results of the Wilcoxon test indicate a significant difference exists between the frequency of occurrence of the two types of stress, a comparison will have to be made between the magnitude of the sum of the rankings (provided by the Wilcoxon test) for each type of stress. The dominant type of occupational stress will be the one that has the larger sum. Utilizing this procedure, it will be possible to objectively categorize all occupational stress models established as being either functional or dysfunctional in nature, where a statistically significant difference³⁰ exists. Where a significant difference does not exist, the interpretation is that the two types of stress are in equilibrium or a balanced state where one type of stress does not dominate the other.

Hypothesis II, it may be recalled, states that for any formal organization group, there exists a threshold value of occupational stress that can be objectively determined. It is possible to solve for a given group's threshold value of occupational stress by first dividing the data using statistical Bayesian inference, then taking the divided

³⁰At the .05 level or lower.

data and establishing a linear regression equation for each divided part, followed by setting the two regression equations equal to each other. This threshold value is denoted by point B in Figure 4. The achievement of this analytic procedure would provide support for Hypothesis II. If, because of the data configuration, the linear model depicted in Figure 4 cannot be established, the results would not support the hypotheses.

The next chapter will focus on the results of the study and an analysis of the data using the methodology described.

CHAPTER V

ANALYSIS AND RESULTS

The previous chapter presented and discussed the research methodology used in this study together with specifications of the conditions under which the study's hypotheses would be tested. The present chapter describes the application of the analytical methods specified in the methodology and the results obtained.

Division of Data

As a first step in the analysis, a plot was made using the raw data scores for organizational effectiveness and occupational stress for each firm.¹ These raw data scores are provided in Tables IV through VII, Appendix B. The data were plotted so that a preliminary inspection could be made to determine if the data might be arranged in a configuration supporting the hypothesized curvilinear relationship. That is, as occupational stress increases in value, there should be, according to the hypothesized relationship, a corresponding increase in perceived

¹W. J. Dixon and M. B. Brown, BMDP-77 Biomedical Computer Programs P-Series (Berkeley, 1977), p. 230.

organizational effectiveness up to a point,² and then after this point is reached, increasing values of occupational stress would result in correspondingly decreasing values of organizational effectiveness.

The plot for each firm is shown in Figures 6 through 9, Appendix B. Also, a plot of the aggregate data for all firms is shown in Figure 10, Appendix B. An inspection of the plots in each figure did not seem to indicate the curvilinear data configuration hypothesized. Instead, it appeared that the data configuration for each plot might be better represented by a negatively sloping straight line.

After plotting the data, the data for each firm were divided into two groups using Holbert and Broemeling's Bayesian inference procedure.³ The data group to the left of the dividing point, in essence, represents functional levels of occupational stress, while that to the right represents dysfunctional levels. These groupings provide the data necessary for establishing a linear regression on each side of the dividing point.

Because Holbert and Broemeling's procedure evaluates only one value of the dependent variable (i.e., organizational effectiveness) for each value of the independent

²This point would theoretically be the threshold value for occupational stress.

³Donald Holbert and Lyle Broemeling, "Bayesian Inferences Related to Shifting Sequences and Two-Phase Regression," Communications in Statistics--Theory & Methods, A6, 3 (1977), pp. 265-275.

variable (occupational stress) considered, it was necessary to transform the data to meet this requirement where several subjects had the same value of occupational stress but differing values of organizational effectiveness. The transformation in these instances took the form of averaging the different effectiveness scores for a single stress score. The results of this transformation are given in Table VIII, Appendix C, for each firm, as well as a plot of the transformed data in Figures 11 through 14, Appendix C.

The transformed data, when input to the Bayesian model, resulted in the output shown in Tables IX through XII, Appendix D. To more clearly illustrate these results, a plot of the probabilities and corresponding data points is provided in Figures 15 through 18, Appendix D. An interpretation of the results of each of these plots, firm by firm, is given in the paragraphs that follow.

The probability plot for Firm 1, shown in Figure 15, indicates that data point number 2 with a probability of .2183 has the highest probability, and thus is considered the switch point M for the data set.

For Firm 2, the probability plot shown in Figure 16 indicates that data point number 2 with a probability of .3296 should be considered as the switch point M.

The probability plot for Firm 3, shown in Figure 17, indicates that data point number 11 with a probability of .0910 is the switch point.

While in Figure 18, the probability plot for Firm 4 indicates that data point number 7 with a probability of .2340 should be considered as the switch point.

Regression Analysis Utilizing Switch Point

The switch point for each firm's data is represented in Figures 19 through 22, Appendix E, by its corresponding occupational stress value. The figures contain not only the results of regression analyses utilizing a switch point, but also regression results obtained without a switch point.

Firm 1

The data point having the highest probability of being the switch point for Firm 1's data is data point number 2. A linear regression was run using BMDP Program P1R⁴ on the data located on each side of data point 2. Data Point 2 was considered the last point in the first regression (left side of the plot) with data point 3 being the first point in the second regression (right side of the data plot). The results of the two regressions are shown in Table I, and also in Figure 19, Appendix E.

Turning to Table I, it can be seen from an examination of the F ratios that the regression models were not significant at any meaningful level, i.e., with a $p < .10$.

⁴Dixon and Brown, pp. 380-398.

TABLE I
REGRESSION RESULTS WITH SWITCH POINT ANALYSIS

	Firm 1		Firm 2		Firm 3		Firm 4	
	Left	Right	Left ^a	Right	Left	Right	Left	Right
Constant (Intercept)	4.625	3.548	--	3.914	3.750	-2.830	4.194	3.025
Regression Coefficient (b)	-0.542 (-0.906)	-0.025 (-1.315)	-- --	-0.045 (-1.943)*	-0.052 (-1.227)	0.384 (2.257)	-0.036 (-0.396)	0.035 (0.976)
R ²	0.170	0.028	--	0.086	0.046	0.836	0.009	0.074
F	0.82	1.73	--	3.77*	1.51	5.09	0.16	0.95
n	6	63	2	42	33	3	20	14

*p < .10

^aInsufficient cases for computation

t-values indicated in parentheses; all tests are two-tail

Also, the direction of the slope (b) of the left regression line is negative instead of positive. Further, the value of (b), the regression coefficient, was found to be insignificant for the left regression as was the value of (b) for the right regression.

Firm 2

The lack of significant F ratios for Firm 1 also characterized the findings for the regressions of the remaining firms, except for the right regression line established for Firm 2. This can be seen from an examination of Table I. From this table, it can be seen that for the right regression of Firm 2, the F ratio is 3.77, which is significant at $p < .10$. However, R^2 is rather low, having a value of .086, which indicates that only approximately nine percent of the total variance in perceived organizational effectiveness can be explained by its linear relationship with occupational stress. Examination of the regression coefficient (b), which is the slope of the regression line, shows that the slope is relatively mild, .045, and is both negative and significant. This negative slope is supportive of the hypothesized relation between occupational stress and perceived organizational effectiveness for regressions to the right of the switch point. However, this finding is of no consequence in this situation, since there were only two data points remaining to the left of the switch point, and this was not sufficient for a regression computation using

the PLR Program. The regression plots for Firm 2 are shown in Figure 20, Appendix E.

Firm 3

From an examination of Table I, it can be seen that the coefficient of determination R^2 , for the right regression, was high (.836); however, since $n = 3$, it has no practical meaning.

The direction of the slope (b) of the right regression line was found to be positive when the hypothesized direction was negative for all regressions to the right of the switch point as mentioned previously. In addition, the value of (b) was not statistically significant.

For the left regression, $R^2 = .046$, only approximately five percent of the total variation in organizational effectiveness could be explained. But, again, the F ratio of 1.51 was not statistically significant. Also, the direction of the slope (b) of the left regression line was negative when the hypothesized direction was positive. In addition, (b) was not statistically significant. Figure 21, Appendix E, provides an illustration of the regression plots for Firm 3.

Firm 4

The lowest R^2 value obtained was .009, which was associated with the left regression for Firm 4, as indicated in Table I. This is a very low value indicating that

only about one percent of the variance in perceived organizational effectiveness can be explained by the linear relationship with occupational stress. For the right regression, R^2 was equal to .074, indicating that over seven percent of the variance in organizational effectiveness could be explained by its linear relation with occupational stress.

For both regression lines, the direction of their slope (b) was the opposite of that hypothesized. That is, for the left regression, the sign of (b) was negative when a positive sign was hypothesized; and for the right regression, (b) had a positive sign when a negative sign was hypothesized. These results can be seen from an examination of Figure 22, Appendix E, which shows the regression plots for Firm 4. In addition, the value of (b) for each of the two regressions was not statistically significant.

The F ratios of 0.16 for the left regression and 0.95 for the right regression were both not statistically significant.

Examination of the regression results for each firm leads to the conclusion that the results do not provide support for the hypothesized relationship between occupational stress and perceived organizational effectiveness (as depicted in Figure 4, Chapter IV).

Regression Without Switch Point

Because of the inability of the switch point analysis to provide sample sizes suitable for regression analysis in most cases, single regressions were run on all data points for each individual firm as well as aggregate firm data points in order to determine whether the data conformed to a pattern other than a curvilinear form. The results of these regressions are shown in Table II, and also in Figures 19 through 23, Appendix E. Figure 23 is a regression plot for the aggregate firm data.

As can be seen from an examination of Table II, the coefficient of determination, R^2 , for each firm is quite similar in value with the exception of Firm 3. In all cases, the R^2 value is relatively low, ranging from .056 for Firm 1 to a high of .167 for Firm 3. This range of values for R^2 indicates that from approximately 6 to 17 percent of the total variance in organizational effectiveness can be explained by its linear relationship with occupational stress. While the explained variation in organizational effectiveness for each firm seems rather low, this condition should be somewhat expected, since there are likely other variables not included in this study that are impacting on organizational effectiveness at the same time as occupational stress. Therefore, for the single independent variable of occupational stress, the

TABLE II
REGRESSION RESULTS WITHOUT SWITCH POINT ANALYSIS

	Firm 1	Firm 2	Firm 3	Firm 4	All Firms
Constant (Intercept)	3.648	3.836	3.882	4.170	3.799
Regression Coefficient (b)	-0.034 (-1.993)**	-0.038 (-1.751)*	-0.082 (-2.615)**	-0.045 (-1.962)*	-0.040 (-3.626)***
R ²	0.056	0.068	0.167	0.107	0.068
F	3.97**	3.07*	6.84**	3.85*	13.15***
n	69	44	36	34	183

*p < .10

**p < .05

***p < .001

t-values in parentheses; all tests are two-tail

above range of percent-explained variance in perceived organizational effectiveness seems reasonably satisfactory.

The regression coefficient (b), which ranged in value from a low of .034 for Firm 1 to a high of .082 for Firm 3, was negative for each firm as well as for the aggregate firm data. Thus, the direction of the slope for all regression lines was negative, indicating that, in general, as occupational stress increases in value, there is a corresponding decrease in perceived organizational effectiveness.

A t-test was used to test the significance of the regression coefficients obtained. All t-values were negative and ranged from a value of -1.751 for Firm 2 to -3.626 for the aggregate firm data. In every instance, i.e., for each firm and for the aggregate firm data, the regression coefficients were found to be significant at $p < .10$.

An inspection of the F ratio for each firm and the aggregate firm data reveals that each F ratio was significant at $p < .10$.

Dominant Type of Stress

To determine whether functional or dysfunctional stress⁵ dominated within each sample group, the Wilcoxon

⁵Based on Burke's scheme of classification for occupational stress. Ronald J. Burke, "Occupational Stresses and Job Satisfaction," The Journal of Social Psychology, 100 (1976), pp. 235-244.

signed-ranks test was utilized. As previously mentioned, this is a nonparametric statistical test for use where the samples are not independent. In this study, the samples referred to are the functional stress score and dysfunctional stress score each subject received as provided by Part B of the study's questionnaire (Appendix A). Since each of these scores, i.e., samples, is obtained from the same subject, they are not independent.

The functional stress score for each subject is obtained by summing the scores on questions 37 through 40, while the dysfunctional stress score was obtained by summing the scores on questions 27 through 36, excluding question 30, a neutral question. Table XIII, Appendix F, gives a listing of the functional and dysfunctional stress scores by subject and by firm.

Biomedical Computer Program P3S⁶ provided the Wilcoxon test used to analyze the data for the two types of occupational stress. The results of the Wilcoxon test for each firm are given in Table III. From an examination of the table, it can be seen that for every firm there is a significant difference between the frequency of occurrence of functional occupational stress and that of dysfunctional occupational stress. The level of significance, as shown in the table, is less than .001 for each firm. This level of significance is because there are no instances, in any

⁶Dixon and Brown, pp. 605-619.

TABLE III
 WILCOXON SIGNED-RANKS TEST RESULTS ON COMPARISON
 OF THE FREQUENCY OF OCCURRENCE OF FUNCTIONAL
 STRESS AND DYSFUNCTIONAL STRESS

	Firm 1	Firm 2	Firm 3	Firm 4
Number of Non-Zero Differences ^a	69	44	36	34
Smaller Sum of Like-Signed Ranks (T) ^b	0***	0***	0***	0***
n	69	44	36	34

***p < .001

^aDifferences referred to are between functional stress and dysfunctional stress scores.

^bThis value is compared to a critical value to judge the significance of the differences.

firm, where a subject's functional stress score total equaled or exceeded his dysfunctional stress score total. (This can be seen from an examination of Table XIII, Appendix F.) This condition leads to a significant difference between the two types of stress as analyzed by the Wilcoxon test.

Since there is not a single instance in any of the firms where a subject's functional stress score total equaled or exceeded his dysfunctional stress score total, it is apparent that the summing of the subject's score totals in each category, for each firm, will show the dysfunctional stress grand total as being larger than the functional stress grand total for each firm. This means that for each firm, the dominant type of stress is dysfunctional in nature. The relevance of this result will be discussed in the following chapter.

Discussion of Hypotheses

Neither of the study's two hypotheses, as set forth in Chapter III, was supported by the results of the above data analysis.

Hypothesis I was not supported because the switch point analysis and regression analyses do not lend support to the hypothesized curvilinear relationship between occupational stress and perceived organizational effectiveness. The relationship between occupational stress and perceived

organizational effectiveness, although not as hypothesized, appears to be negative.

Since the hypothesized curvilinear relationship between occupational stress and perceived organizational effectiveness could not be established, it was impossible to establish a threshold value of occupational stress for the sample group of each firm as set forth in Hypothesis II.

This chapter has presented an analysis of the data and the associated results. It was found that neither of the study's two hypotheses could be supported.

However, a linear regression analysis of the data for each firm, without utilizing a switch point, revealed a relatively slight negative but significant relationship between occupational stress and perceived organizational effectiveness. Also, the results indicated that the dysfunctional type of occupational stress was dominant in all sample groups.

The following chapter will provide a detailed discussion of the study's results and relate these results to the appropriate theory and research findings from the literature. Also, several conclusions based on the study's results will be presented, together with several implications for practicing managers and possible directions for future research.

CHAPTER VI

DISCUSSION AND CONCLUSIONS

The purpose of this chapter is to discuss the results of the study, with an emphasis on possible reasons why the study's hypotheses were not supported. Also, several conclusions will be presented based on the study's results, together with implications for practicing managers and possible directions for future research.

Discussion of Results

The results of the study did not support the hypotheses. Thus, a conceptual extension of Janis et al., McDaniel, and McGrath's empirically determined curvilinear relationship between performance effectiveness and stress for individuals, to an analogous relationship for formal groups involving organizational effectiveness and occupational stress, does not seem justifiable based on this data sample.¹ Also, the establishment of a group threshold

¹Irving L. Janis et al., Personality: Dynamics, Development and Assessment (New York, 1969), pp. 124-155; James W. McDaniel, Physical Disability and Human Behavior (New York, 1969); and Joseph E. McGrath, "Stress and Behavior in Organizations," Handbook of Industrial and Organizational Psychology, ed. M. Dunnette (Chicago, 1976), pp. 1351-1395.

value for occupational stress may not be feasible, since this procedure depends upon first establishing the group organizational effectiveness/occupational stress relationship mentioned above.

The results of this study suggest that it may be inappropriate to extend a micro concept, i.e., the established curvilinear relationship between performance effectiveness and stress for individuals, to a more macro level of analysis--that is, group behavior in formal organizations. However, this suggestion seems to be somewhat of a contradiction to general systems theory which argues that concepts applicable to a system at one hierarchical level (e.g., the individual) are also applicable (and therefore extendable) to systems at other hierarchical levels (e.g., the group).²

A partial explanation for the lack of support for the hypotheses may result from the finding that for the sample group of each firm, the dominant type of occupational stress was dysfunctional in nature. It may be that when dysfunctional stress dominates, the hypothesized curvilinear relationship between occupational stress and perceived organizational effectiveness does not exist, because dysfunctional stress by definition is bad. Thus, increases in its level of intensity likely result in decreases in

²Ibid.

perceived organizational effectiveness, as suggested by the linear relation found in this study.

Dysfunctional stress, it may be recalled, is considered to be composed of some nine occupational stresses by Burke.³ Stresses such as too little job authority and little influence with one's boss were conceived of as indicating a lack of control over the work situation. Stresses associated with a lack of information about job duties, promotional opportunities, standing with one's boss, and lack of information needed to do the job properly were classified as being indicative of a lack of organizational support to a person on the job. The three remaining stresses included concern that someone else may get the job the individual wants, slow job progress, and feeling unreasonable pressure for improved job performance.

Given a situation where functional stress dominates, the relation between occupational stress and perceived organizational effectiveness may possibly be found to be curvilinear in nature. However, additional research would be needed in order to properly evaluate this possibility.

Another possible, and also partial, reason for non-supportive data results could be the subjective nature of the organizational effectiveness instrument itself. The instrument requires that subjects make perceptually-based

³Ronald J. Burke, "Occupational Stresses and Job Satisfaction," The Journal of Social Psychology, 100 (1976), pp. 235-244.

judgments in responding to the questions, and this could be too large a source of measurement error. That is, at times there can be significant differences between what a person perceives and what actually exists. The instrument used in this study, which was developed by Mott,⁴ as well as possibly all contemporary multivariate models for measuring organizational effectiveness, may need additional research and development with the goal of achieving higher degrees of reliability and validity. This argument is also advanced quite strongly by Steers and Goodman and Pennings in the literature to date, and was discussed in detail in Chapter II of this study.⁵ In the same vein, perhaps the inclusion of an overall greater degree of objective criteria in the multivariate models of organizational effectiveness would help to improve their validity. This suggestion revolves around what is basically a source problem of organizational effectiveness criteria, as discussed in the literature by Cameron,⁶ involving the issue of whether objective criteria, based on organizational records, is preferable to subjective criteria, which is

⁴Paul E. Mott, The Characteristics of Effective Organizations (New York, 1972), p. 17.

⁵Richard M. Steers, Organizational Effectiveness: A Behavioral View (Santa Monica, 1977); and Paul S. Goodman and Johannes M. Pennings, New Perspectives on Organizational Effectiveness (San Francisco, 1977).

⁶Kim Cameron, "Measuring Organizational Effectiveness in Institutions of Higher Education," Administrative Science Quarterly, 23 (1978), pp. 604-629.

on personal perceptions. The literature shows relatively strong opinions voiced for each type of criteria with Campbell⁷ being an advocate of subjective criteria, while researchers such as Seashore and Yuchtman⁸ believe objective criteria are best.

Although the hypothesized relationship between occupational stress and perceived organizational effectiveness was not supported by the data, it was found that when a linear regression was run on the data without considering a switch point, all the results were significant below the .10 probability level. As mentioned earlier, the proportion of the total variance in perceived organizational effectiveness explained by its linear relationship with occupational stress was relatively low, ranging from a high of $R^2 = .167$ to a low of .056. However, for analyses involving only one independent variable (i.e., occupational stress), these results were considered as acceptable, since there are likely many other factors affecting organizational effectiveness.

Given the significance level of the regressions calculated without considering the various switch points, it

⁷John P. Campbell, "On the Nature of Organizational Effectiveness," New Perspectives on Organizational Effectiveness, ed. Paul S. Goodman and Johannes M. Pennings (San Francisco, 1977), pp. 13-55.

⁸Stanley E. Seashore and Ephraim Yuchtman, "Factorial Analysis of Organizational Performance," Administrative Science Quarterly, 12 (1967), pp. 377-395.

seems plausible that the theory and arguments of those researchers such as Kahn et al., Buck, and House and Rizzo are more valid than the theory extension (i.e., from individual to group settings) embodied in the hypotheses of this study.⁹ These researchers maintain that occupational stress is, in general, dysfunctional for both the individual and the organization and should be minimized. Evidence of the dysfunctional consequences of occupational stress was indicated by the results of their studies as previously mentioned in Chapter II. The research work of Kahn et al. dealt with stress generated from role conflict and role ambiguity. The study strongly implied that occupational stress should be basically considered as a cost to both the individual and the organization. For example, it was found that as stress generated from role conflict varied from low to high, trust in, respect for, and liking for role senders decreased significantly.¹⁰

House and Rizzo's research, which is an extension of the findings of Kahn et al., agrees with their

⁹Robert L. Kahn et al., Organizational Stress: Studies in Role Conflict and Ambiguity (New York, 1964); Vernon E. Buck, Working Under Pressure (New York, 1972); R. J. House and J. R. Rizzo, "Role Conflict and Ambiguity as Critical Variables in a Model of Organizational Behavior," Organizational Behavior and Human Performance, 7 (1972), pp. 467-505.

¹⁰Kahn et al., p. 68.

conceptualization of occupational stress as primarily a detriment to both the individual and the organization.¹¹

Buck's research investigated the relationship between job pressure (stress) and job satisfaction and mental health.¹² The results of this research indicated that job pressure and job satisfaction were negatively related. However, the relationship between job pressure and mental health was found to be ambiguous.¹³

If, as the above-mentioned research suggests, occupational stress should be viewed as generally dysfunctional in nature, then the regression results of this study would seem to be more clearly understandable.

The regression lines for each firm, and for all firms combined, possessed a relatively mild negative slope--thus indicating that, in general, as occupational stress increases, perceived organizational effectiveness will decrease in magnitude.

As a final note, it should be pointed out that the regression results obtained in this study may simply be a peculiarity of the sample data.

¹¹House and Rizzo, pp. 467-505.

¹²Buck.

¹³Ibid., p. 160.

Conclusions

Based on the results of the study, several conclusions can be reached. First, since no evidence was found of a linear approximation to the hypothesized curvilinear relationship between occupational stress and perceived organizational effectiveness for the sample groups analyzed, it can be concluded that the likelihood of such a relationship for the organizational groups surveyed may be small, given the research design and measuring instruments utilized in this study.

Second, since a linear approximation to a curvilinear relationship could not be established, a threshold value of occupational stress for each group could not be determined. Based on this result, one possible conclusion is that such a value does not likely exist for the groups surveyed. However, this conclusion may not be entirely valid since the possibility remains, as previously discussed, that if dysfunctional occupational stress had not been so dominant relative to functional stress, then the hypothesized curvilinear relationship may have been found to exist, thus permitting establishment of a threshold value of occupational stress for each group. Based on this possibility, the above-mentioned conclusion should be revised to reflect the notion that a threshold value of occupational stress does not likely exist for the groups surveyed, given that dysfunctional occupational stress is dominant.

Dysfunctional occupational stress is represented in the study by a negatively sloping regression line for each firm. This fact precludes the establishment of the hypothesized threshold value of occupational stress, since the threshold value itself is to be determined from the intersection of a positively and a negatively sloping regression line for each firm as previously discussed in Chapter IV.

A third possible conclusion that can be drawn from the results of this study is based on the linear regression established for each sample group without the consideration of a data switch point. Instead of a linear approximation to the hypothesized curve representing the relationship between occupational stress and perceived organizational effectiveness, the above-mentioned regression results suggest that a simple linear relationship is more appropriate. The relationship suggests that as occupational stress increases in intensity, there is a concomitant and moderate decrease in the level of perceived organizational effectiveness.

The fourth and final conclusion derived from the study's results is concerned directly with the relative amounts of functional and dysfunctional types of occupational stress present in each of the sample groups. As discussed earlier, for each of the four groups, the results of the analysis to determine the dominant type of stress very strongly suggest that the dysfunctional type of

occupational stress is dominant. Since dysfunctional stress by definition is bad for the group and the organization, it would seem desirable for management to seek ways of creating situations where functional as opposed to dysfunctional stress would dominate.

Implications for Managers

Based on the results and conclusions of the study, at least two implications for practicing managers can be identified. First, since increasing levels of occupational stress in general appear to be associated with decreasing levels of perceived organizational effectiveness, it behooves managers to seek tactics for minimizing the level of occupational stress experienced by their subordinate group(s).

The second implication involves the notion that managers may want to develop personnel programs and job conditions based on the factors identified by Burke¹⁴ that comprise the functional type of occupational stress and to minimize the influence, through appropriate decisions and behavior, of those factors associated with dysfunctional stress. In the functional category, it may be recalled, there were four occupational stresses that were positively related to job satisfaction. These included too much responsibility, too heavy a workload, feeling not

¹⁴Burke, pp. 235-244.

qualified, and making decisions that affect the lives of others. There were nine occupational stresses identified in the dysfunctional category. These stresses were found to be positively related to job dissatisfaction and included lack of information about job duties, promotional opportunities, standing with one's boss, lack of information needed to do the job properly, too little job authority, little influence with one's boss on his decisions that affect oneself, concern that someone else may get the job desired, slow job progress, and feeling unreasonable pressure for improved job performance.

Directions for Future Research

In addition to the implications for practicing managers, there are several suggestions that can be made with regard to possible directions for future research on occupational stress and organizational effectiveness.

Because of the relatively small number of firms and associated industries surveyed in this study, it seems desirable that future research test the negative linear relationship found between occupational stress and perceived organizational effectiveness. By extending research efforts to other firms and industries, a broadening of the data base, and thus the applicability of the results obtained, could be achieved.

Future research should examine the shape of the perceived organizational effectiveness/occupational stress

function under varying degrees of both functional and dysfunctional stress. More research is particularly needed in situations with functional stress domination.

A last suggestion for future research efforts concerns the need for further development and validation of organizational effectiveness models. The need for greater validity and reliability of the currently available instruments has been well-documented and was discussed previously in this study. Perhaps the inclusion of objective-based criteria in models that are currently solely perceptually-based (e.g., Mott's model¹⁵) would improve their validity to a significant extent. This is purely speculative, however.

In summary, while the results of this study did not support the hypotheses, they did indicate that a mild, and significant, negative relationship exists between perceived organizational effectiveness and occupational stress for the sample groups. Also, it should be emphasized again that the dominant type of occupational stress for each sample group was found to be dysfunctional in nature. Future research is suggested to ascertain what the results would be under a condition of functional stress dominance.

¹⁵Mott.

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APPENDIXES

APPENDIX A

SAMPLE QUESTIONNAIRE

Introduction

This questionnaire is designed to obtain information needed to determine the relationship between occupational stress and perceived organizational effectiveness for formal organization groups. Also, the questionnaire provides information that will permit classifying a particular occupational stress as being either functional or dysfunctional for the organization.

This is an anonymous questionnaire. Your name is not needed, nor desired. Also, no attempt will be made to identify who made given responses to the questions. However, to enable a comparison of stress scores by sex, you are respectfully asked to indicate your sex by checking the appropriate blank at the bottom of this page.

Since the validity of this research study rests with the responses you make to the questions, please answer each question with complete truthfulness.

The questionnaire is in three parts. Please read the instructions to each part carefully before responding. Your cooperation in this research study is deeply appreciated and will undoubtedly provide a means of achieving greater understanding of group effectiveness under varying degrees of work-related stress.

_____ Female _____ Male

Part A

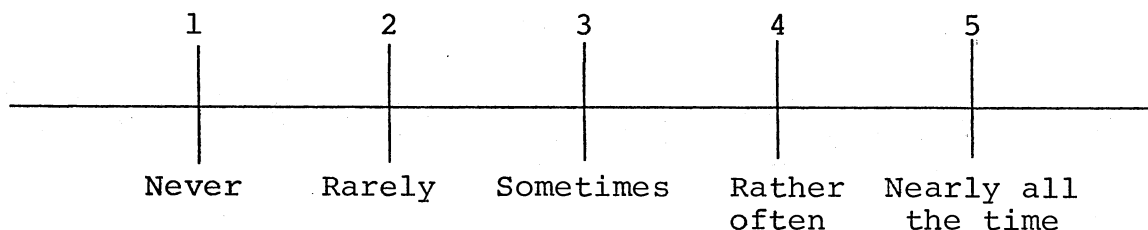
Many people experience some strain or ill health as a result of working hard at their jobs. The findings of some surveys show that this is an important factor to understand when studying people at work. For this reason, the following statements have been included. Read each statement and mark those that tend to be TRUE of you with a "T" and those which are definitely not true of you with an "F" for FALSE.

1. ___ I would consider myself in good or excellent health.
2. ___ I would consider myself in fair health.
3. ___ I do not have very good health.
4. ___ I feel restless and uneasy more often than I probably should.
5. ___ I am often bothered by acid indigestion or heartburn.
6. ___ I sometimes feel weak all over.
7. ___ I wake up with stiffness or aching in joints or muscles.
8. ___ I have had trouble getting to sleep or staying asleep.
9. ___ My job tends to directly affect my health.
10. ___ I work under a great deal of tension.
11. ___ I have felt fidgety or nervous as a result of my job.
12. ___ I get irritated or annoyed over the way things are going.
13. ___ I have an ulcer condition.
14. ___ I have fairly frequent headaches.
15. ___ If I had a different job, my health would probably improve.
16. ___ I seem to tire quickly.
17. ___ Job worries sometimes get me down physically.
18. ___ I have felt down and out fairly often.
19. ___ I have had arthritis or rheumatism.

20. ___ Problems associated with my job have kept me awake at night.
21. ___ I have worried, after making a decision, whether I did the right thing.
22. ___ I may now have an ulcer but I am not sure of it.
23. ___ I have felt nervous before attending meetings in the company.
24. ___ I often "take my job home with me" in the sense that I think about it when doing other things.
25. ___ I have trouble with my digestion.
26. ___ I find I am inclined to "take things hard."

Part B

All of us occasionally feel bothered by certain things in our work. The following is a list of things that sometimes bother people. Using the scale provided, please write in the space provided the whole number (no fractions or decimals, please) that best indicates how frequently you feel bothered by each of them.



27. ___ Feeling that you have too little authority to carry out the responsibilities assigned to you.
28. ___ Being unclear on just what the scope and responsibilities of your job are.
29. ___ Not knowing what opportunities for advancement or promotion exist for you.
30. ___ Thinking that you'll not be able to satisfy the conflicting demands of various people over you.
31. ___ Not knowing what your supervisor thinks of you, how he evaluates your performance.
32. ___ The fact that you can't get information needed to carry out your job.
33. ___ Feeling that you may not be liked and accepted by the people you work with.
34. ___ Feeling unable to influence your immediate supervisor's decisions and actions that affect you.
35. ___ Feeling that your progress on the job is not what it should be or could be.
36. ___ Thinking that someone else may get the job above you, the one you are directly in line for.
37. ___ Feeling that you have too heavy a workload, one that you can't possibly finish during an ordinary workday.
38. ___ Feeling that you're not fully qualified to handle your job.

39. ___ Having to decide things that affect the lives of individuals, people that you know.
40. ___ Feeling that you have too much responsibility and authority delegated to you by your superiors.

Part C

Every worker produces something in his work. It may be a "product" or a "service." But sometimes it is very difficult to identify the product or service. Below are listed some of the products and services typically produced by an administrative office:

Typed pages	Recommended policies and
Delivered mail	procedures
Dispatch automobiles	New programs
Staff papers and studies	Classified jobs
Coding systems	Supplying new equipment
Contracts	

These are just a few examples of things being produced.

We would like you to think carefully of the things that you produce in your work and of the things produced by those people who work around you in your office.

41. Production: Quantity

Thinking now of the various things produced by the people you know in your office, how much are they producing?

- (1) Their product is very low
- (2) It is fairly low
- (3) It is neither high nor low
- (4) It is fairly high
- (5) It is very high

42. Production: Quality

How good would you say is the quality of the products or services produced by the people you know in your office?

- (1) Their products or services are of poor quality
- (2) Their quality is not too good
- (3) Fair quality
- (4) Good quality
- (5) Excellent quality

43. Production: Efficiency

Do the people in your office seem to get maximum output from the resources (money, people, equipment, etc.) they have available? That is, how efficiently do they do their work?

(1) They do not work efficiently at all

(2) Not too efficient

(3) Fairly efficient

(4) They are very efficient

(5) They are extremely efficient

44. Adaptation: Anticipating Problems and Solving Them Satisfactorily

How good a job is done by the people in your office in anticipating problems that may come up in the future and preventing them from occurring or minimizing their effects?

(1) They do a poor job in anticipating problems

(2) Not too good a job

(3) A fair job

(4) They do a very good job

(5) They do an excellent job in anticipating problems

45. Adaptation: Awareness of Potential Solutions

From time to time newer ways are discovered to organize work, and newer equipment and techniques are found with which to do the work. How good a job do the people in your office do at keeping up with those changes that could affect the way they do their work?

(1) They do a poor job of keeping up-to-date

(2) Not too good a job

(3) A fair job

(4) They do a good job

(5) They do an excellent job of keeping up-to-date

46. Adaptation: Promptness of Adjustment

When changes are made in the routines or equipment, how quickly do the people in your office accept and adjust to these changes?

- (1) Most people accept and adjust to them very slowly
- (2) Rather slowly
- (3) Fairly rapidly
- (4) They adjust very rapidly, but not immediately
- (5) Most people accept and adjust to them immediately

47. Adaptation: Prevalence of Adjustment

What proportion of the people in your office readily accept and adjust to these changes?

- (1) Considerably less than half of the people accept and adjust to these changes readily
- (2) Slightly less than half do
- (3) The majority do
- (4) Considerably more than half do
- (5) Practically everyone accepts and adjusts to these changes readily

48. Flexibility

From time to time emergencies arise, such as crash programs, schedules moved ahead, or a breakdown in the flow of work occurs. When these emergencies occur, they cause work overloads for many people. Some work groups cope with these emergencies more readily and successfully than others. How good a job do the people in your office do at coping with these situations?

- (1) They do a poor job of handling emergency situations
- (2) They do not do very well
- (3) They do a fair job

___ (4) They do a good job

___ (5) They do an excellent job of handling these
situations

APPENDIX B

RAW DATA SCORES AND ASSOCIATED PLOTS

FOR EACH FIRM AND THE AGGREGATE

FIRM DATA

TABLE IV
RAW DATA SCORES FOR FIRM 1 BY SUBJECT

Subject No.	Occupational Stress (X)	Organizational Effectiveness (Y)
1	1.0000	4.3750
2	1.0000	4.3750
3	1.0000	3.5000
4	2.0000	4.0000
5	2.0000	4.1250
6	2.0000	2.5000
7	3.0000	3.2500
8	3.0000	4.0000
9	3.0000	4.0000
10	3.0000	4.1250
11	4.0000	3.5000
12	4.0000	2.8750
13	4.0000	2.7500
14	4.0000	3.2500
15	4.0000	4.1250
16	5.0000	4.3750
17	5.0000	2.7500
18	5.0000	3.3750
19	5.0000	3.6250
20	5.0000	3.5000
21	5.0000	3.2500
22	5.0000	3.5000
23	5.0000	3.0000
24	5.0000	3.8750
25	5.0000	3.5000
26	5.0000	2.5000
27	5.0000	2.7500
28	5.0000	3.5000
29	6.0000	4.2500
30	7.0000	2.3750
31	7.0000	3.7500
32	7.0000	2.6250
33	7.0000	2.5000
34	7.0000	2.5000
35	7.0000	4.7500
36	8.0000	3.7500
37	8.0000	4.2500
38	8.0000	3.3750
39	8.0000	3.1250
40	9.0000	2.8750
41	9.0000	4.3750
42	9.0000	3.0000

TABLE IV (Continued)

Subject No.	Occupational Stress (X)	Organizational Effectiveness (Y)
43	9.0000	3.2500
44	9.0000	4.2500
45	9.0000	2.6250
46	10.0000	2.2500
47	10.0000	2.2500
48	11.0000	3.5000
49	11.0000	4.2500
50	11.0000	3.8750
51	11.0000	2.6250
52	11.0000	3.3750
53	11.0000	3.2500
54	12.0000	2.5000
55	12.0000	4.3750
56	13.0000	3.8750
57	13.0000	2.1250
58	13.0000	3.5000
59	13.0000	3.5000
60	14.0000	2.5000
61	14.0000	3.6250
62	14.0000	3.1250
63	15.0000	3.5000
64	16.0000	3.6250
65	16.0000	3.6250
66	17.0000	3.1250
67	17.0000	2.8750
68	17.0000	2.3750
69	19.0000	3.1250

TABLE V
RAW DATA SCORES FOR FIRM 2 BY SUBJECT

Subject No.	Occupational Stress (X)	Organizational Effectiveness (Y)
1	1.0000	3.6250
2	2.0000	3.2500
3	3.0000	4.3750
4	3.0000	4.5000
5	3.0000	3.5000
6	3.0000	4.7500
7	3.0000	3.0000
8	4.0000	3.7500
9	5.0000	3.6250
10	5.0000	3.7500
11	5.0000	3.2500
12	5.0000	4.0000
13	6.0000	3.5000
14	6.0000	3.3750
15	6.0000	3.8750
16	6.0000	2.5000
17	6.0000	3.3750
18	6.0000	4.3750
19	7.0000	3.5000
20	7.0000	3.2500
21	7.0000	3.6250
22	7.0000	2.8750
23	7.0000	4.0000
24	8.0000	3.7500
25	8.0000	3.6250
26	8.0000	4.5000
27	8.0000	3.5000
28	8.0000	3.8750
29	9.0000	3.2500
30	9.0000	3.0000
31	9.0000	3.3750
32	9.0000	2.8750
33	10.0000	3.3750
34	10.0000	3.0000
35	10.0000	2.8750
36	10.0000	5.0000
37	11.0000	2.2500
38	11.0000	3.7500
39	13.0000	3.0000
40	14.0000	3.7500

TABLE V (Continued)

Subject No.	Occupational Stress (X)	Organizational Effectiveness (Y)
41	14.0000	3.5000
42	15.0000	3.5000
43	17.0000	3.5000
44	18.0000	3.0000

TABLE VI
RAW DATA SCORES FOR FIRM 3 BY SUBJECT

Subject No.	Occupational Stress (X)	Organizational Effectiveness (Y)
1	1.0000	3.3750
2	2.0000	3.8750
3	3.0000	2.8750
4	3.0000	5.0000
5	3.0000	3.2500
6	3.0000	2.5000
7	3.0000	3.8750
8	3.0000	4.0000
9	4.0000	3.0000
10	4.0000	3.6250
11	4.0000	3.5000
12	4.0000	3.8750
13	4.0000	3.0000
14	4.0000	3.7500
15	5.0000	3.8750
16	5.0000	3.1250
17	5.0000	4.3750
18	5.0000	3.0000
19	5.0000	3.0000
20	5.0000	3.7500
21	6.0000	3.6250
22	6.0000	4.2500
23	6.0000	3.6250
24	6.0000	3.5000
25	7.0000	4.0000
26	7.0000	2.5000
27	8.0000	2.8750
28	8.0000	3.6250
29	9.0000	2.5000
30	9.0000	3.8750
31	10.0000	2.7500
32	11.0000	2.3750
33	11.0000	4.2500
34	12.0000	1.8750
35	14.0000	2.2500
36	15.0000	3.1250

TABLE VII
RAW DATA SCORES FOR FIRM 4 BY SUBJECT

Subject No.	Occupational Stress (X)	Organizational Effectiveness (Y)
1	1.0000	4.5000
2	1.0000	4.8750
3	3.0000	4.2500
4	3.0000	4.6250
5	3.0000	2.3750
6	3.0000	3.8750
7	3.0000	4.2500
8	4.0000	3.7500
9	4.0000	4.2500
10	5.0000	3.8750
11	5.0000	4.8750
12	5.0000	1.8750
13	5.0000	4.1250
14	5.0000	4.3750
15	5.0000	3.6250
16	6.0000	4.7500
17	7.0000	4.5000
18	7.0000	4.0000
19	7.0000	4.0000
20	8.0000	3.8750
21	9.0000	3.1250
22	10.0000	3.7500
23	11.0000	3.3750
24	11.0000	3.0000
25	11.0000	3.6250
26	12.0000	4.1250
27	12.0000	2.7500
28	12.0000	3.6250
29	15.0000	3.7500
30	15.0000	3.1250
31	15.0000	3.1250
32	15.0000	4.0000
33	16.0000	3.7500
34	21.0000	3.7500

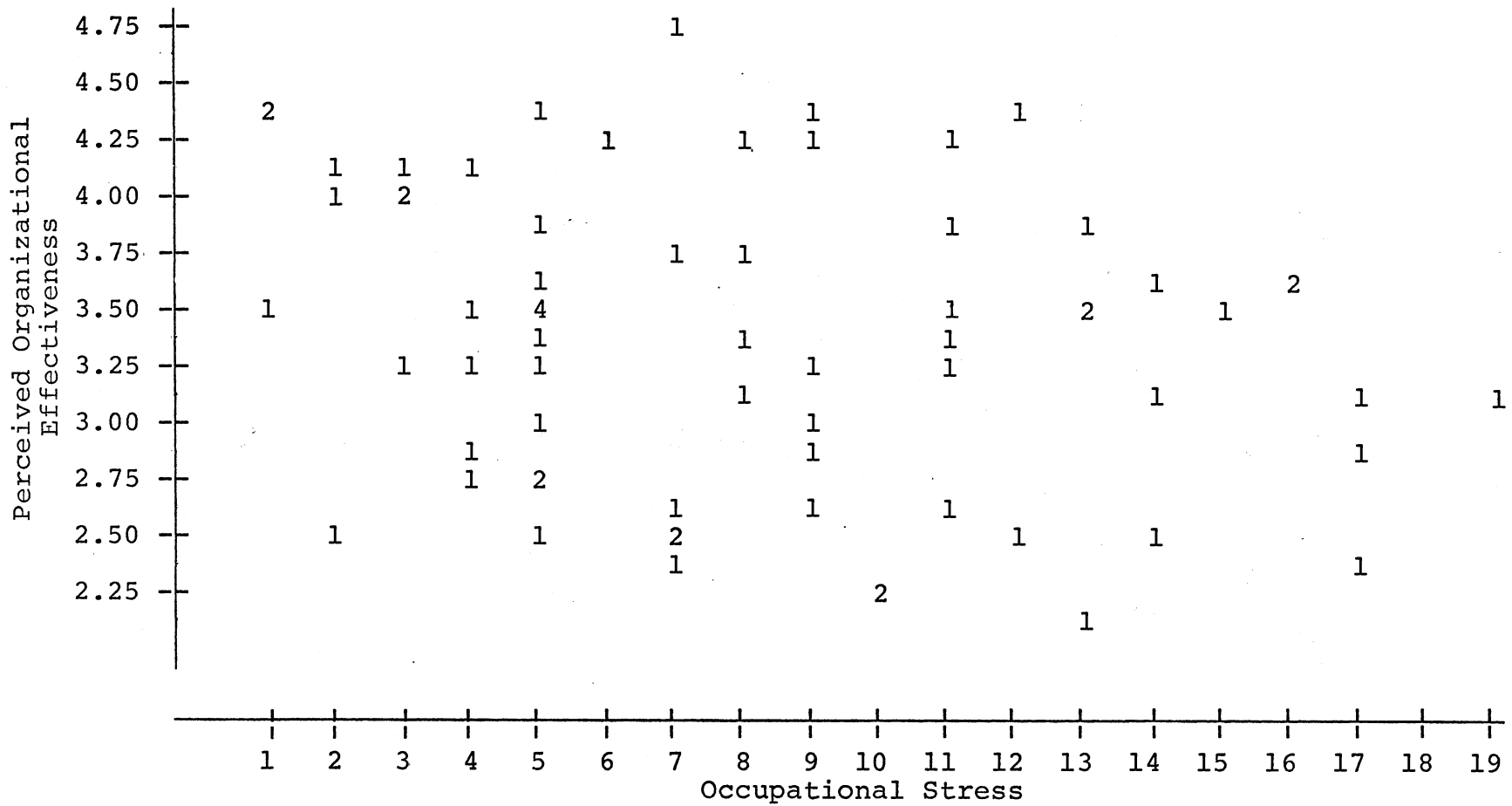


Figure 6. Raw Data Plot of Perceived Organizational Effectiveness Versus Occupational Stress for Firm 1

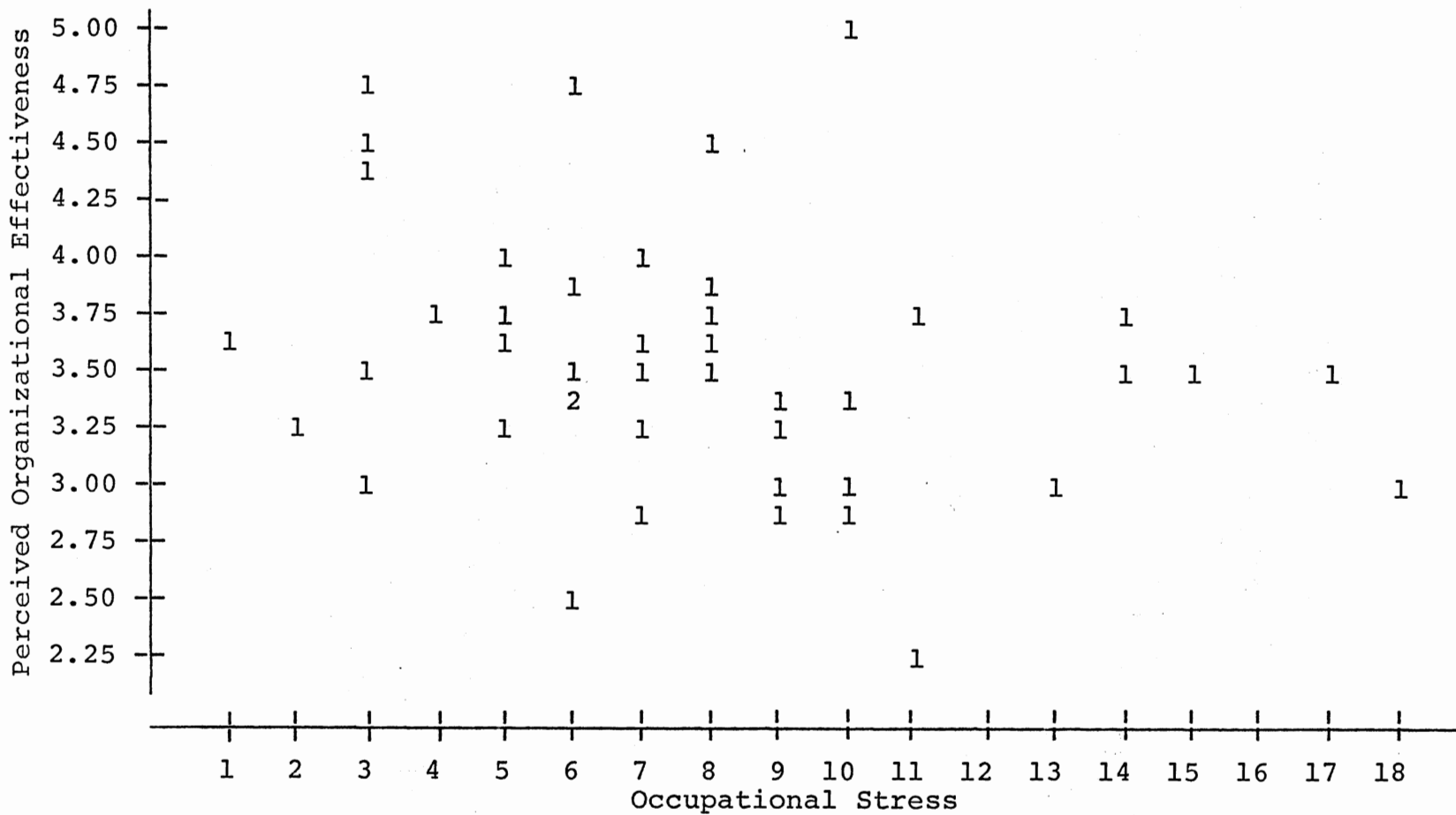


Figure 7. Raw Data Plot of Perceived Organizational Effectiveness Versus Occupational Stress for Firm 2

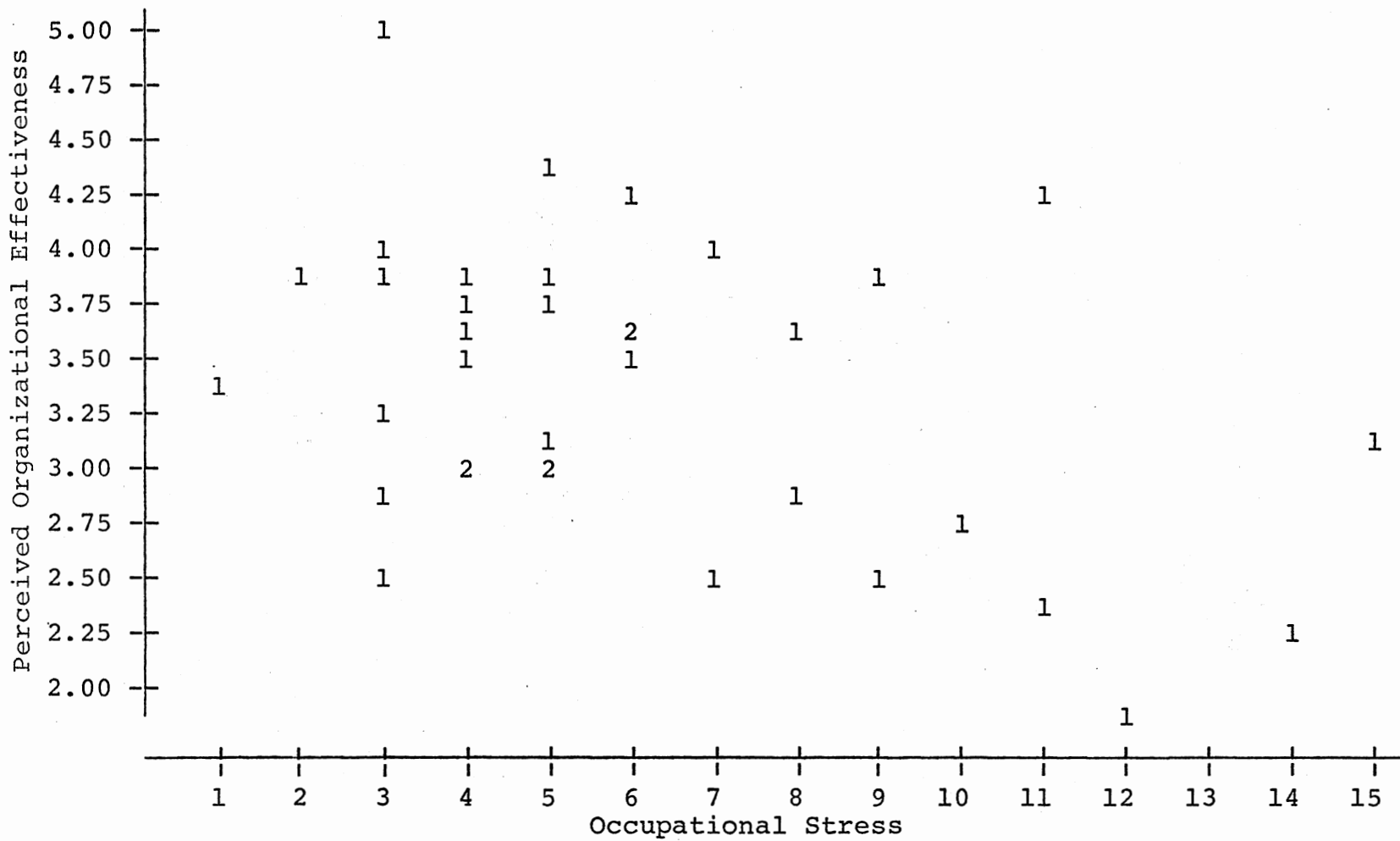


Figure 8. Raw Data Plot of Perceived Organizational Effectiveness Versus Occupational Stress for Firm 3

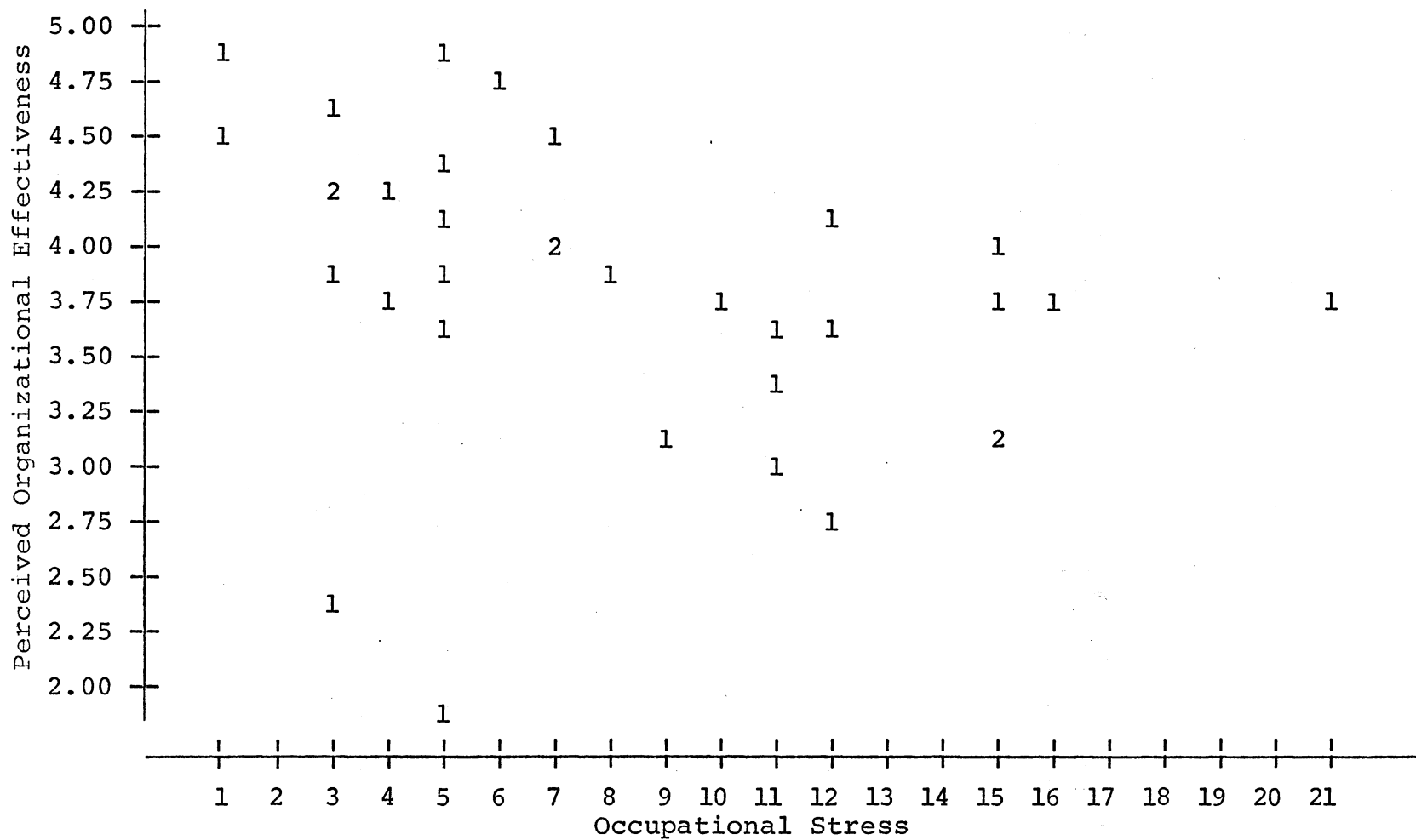


Figure 9. Raw Data Plot of Perceived Organizational Effectiveness Versus Occupational Stress for Firm 4

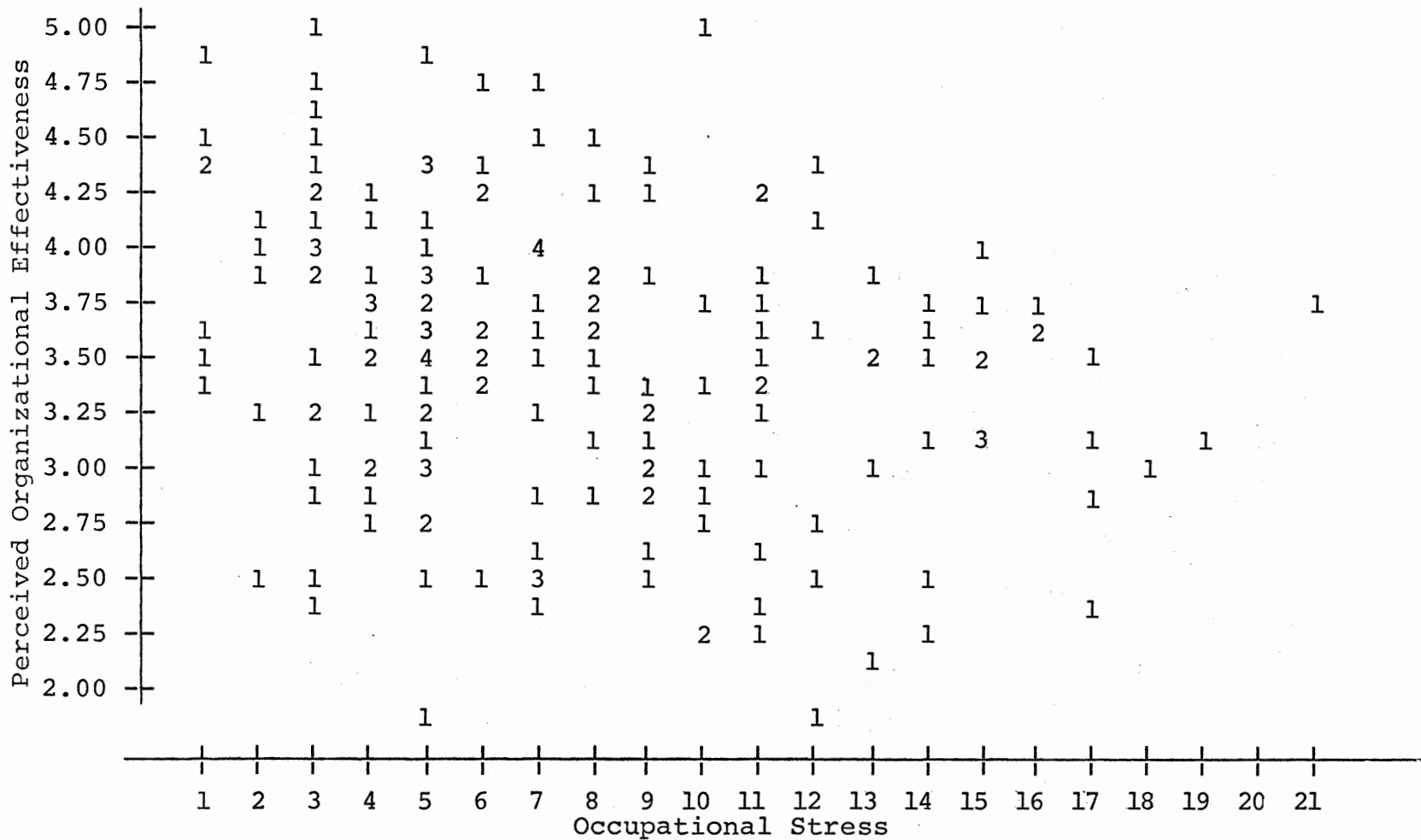


Figure 10. Raw Data Plot of Perceived Organizational Effectiveness Versus Occupational Stress for All Firms

APPENDIX C
TRANSFORMED DATA AND ASSOCIATED
PLOTS FOR EACH FIRM

TABLE VIII

RESULTS OF TRANSFORMING RAW DATA BY AVERAGING
ORGANIZATIONAL EFFECTIVENESS SCORES FOR A
SINGLE OCCUPATIONAL STRESS SCORE

Data Point Number	Firm	Occupational Stress	Averaged Organizational Effectiveness
1	1	1	4.083
2	1	2	3.542
3	1	3	3.844
4	1	4	3.300
5	1	5	3.346
6	1	6	4.250
7	1	7	3.083
8	1	8	3.625
9	1	9	3.396
10	1	10	2.250
11	1	11	3.479
12	1	12	3.438
13	1	13	3.250
14	1	14	3.083
15	1	15	3.500
16	1	16	3.625
17	1	17	2.792
18	1	19	3.125
1	2	1	3.625
2	2	2	3.250
3	2	3	4.025
4	2	4	3.750
5	2	5	3.656
6	2	6	3.500
7	2	7	3.450
8	2	8	3.850
9	2	9	3.125
10	2	10	3.563
11	2	11	3.000
12	2	13	3.000
13	2	14	3.625
14	2	15	3.500
15	2	17	3.500
16	2	18	3.000

TABLE VIII (Continued)

Data Point Number	Firm	Occupational Stress	Averaged Organizational Effectiveness
1	3	1	3.375
2	3	2	3.875
3	3	3	3.583
4	3	4	3.458
5	3	5	3.521
6	3	6	3.750
7	3	7	3.250
8	3	8	3.250
9	3	9	3.188
10	3	10	2.750
11	3	11	3.313
12	3	12	1.875
13	3	14	2.250
14	3	15	3.125
1	4	1	4.688
2	4	3	3.875
3	4	4	4.000
4	4	5	3.792
5	4	6	4.750
6	4	7	4.167
7	4	8	3.875
8	4	9	3.125
9	4	10	3.750
10	4	11	3.333
11	4	12	3.500
12	4	15	3.500
13	4	16	3.750
14	4	21	3.750

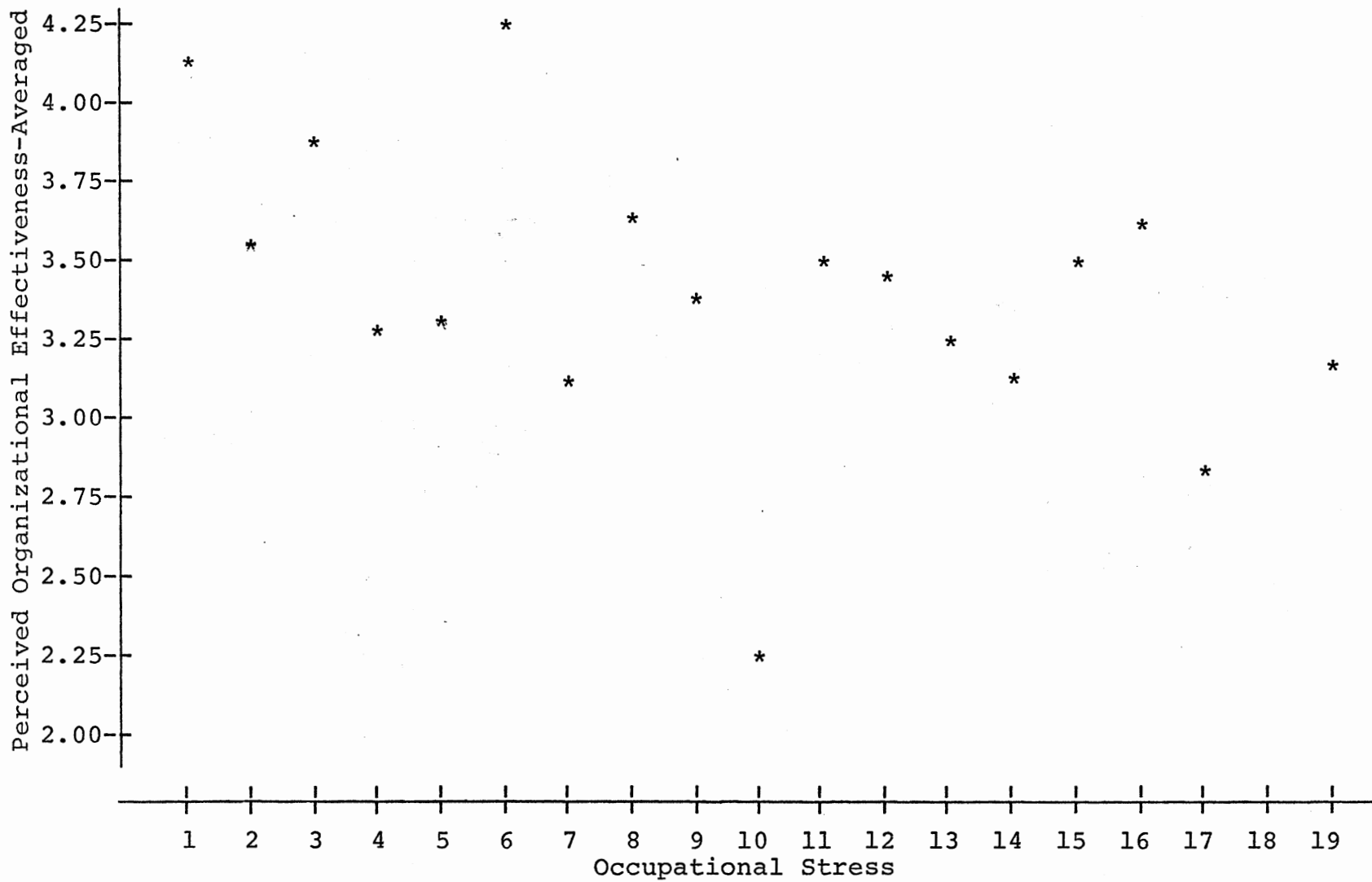


Figure 11. Plot of Averaged Organizational Effectiveness Scores Versus Occupational Stress for Firm 1

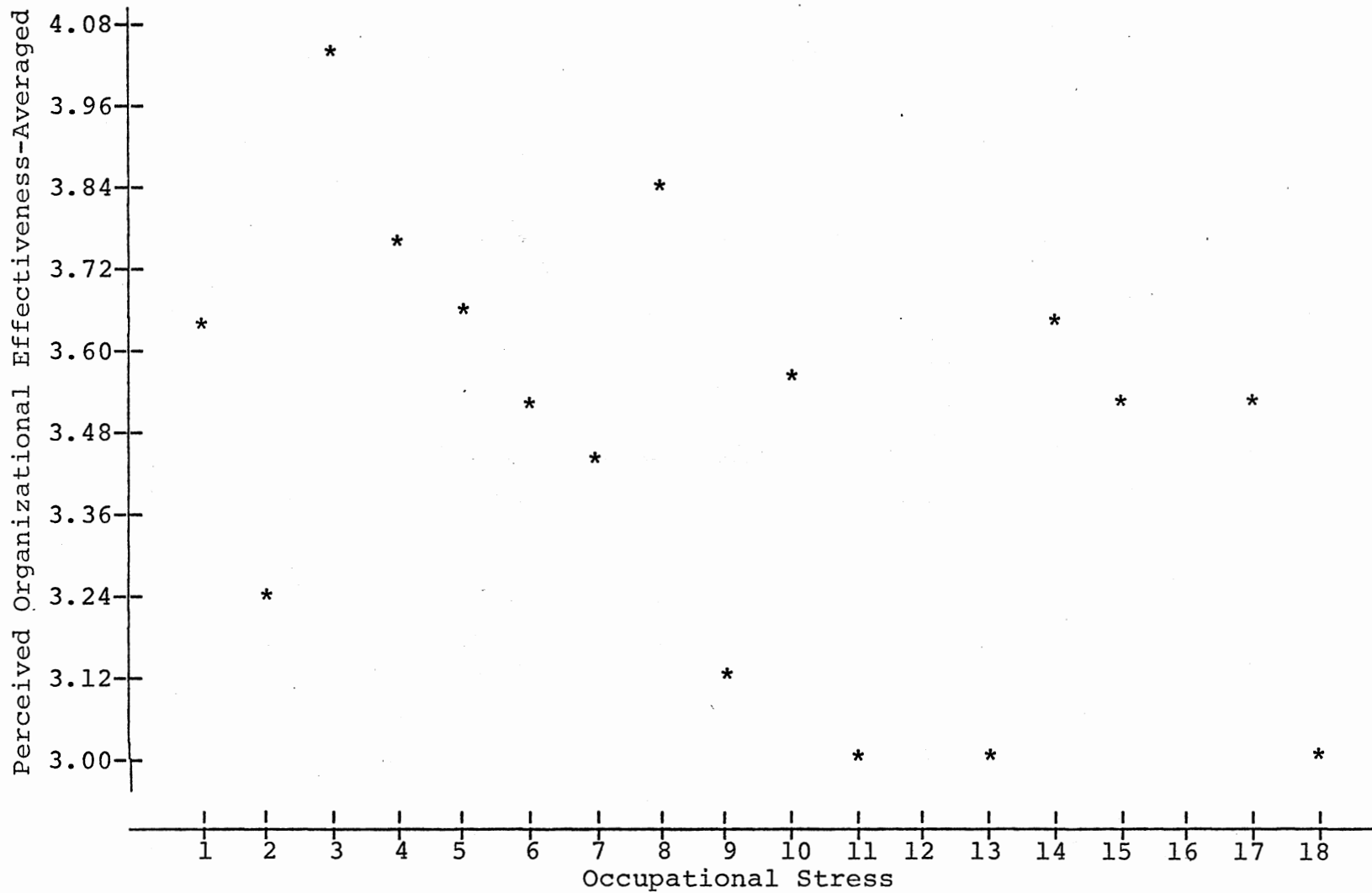


Figure 12. Plot of Averaged Organizational Effectiveness Scores Versus Occupational Stress for Firm 2

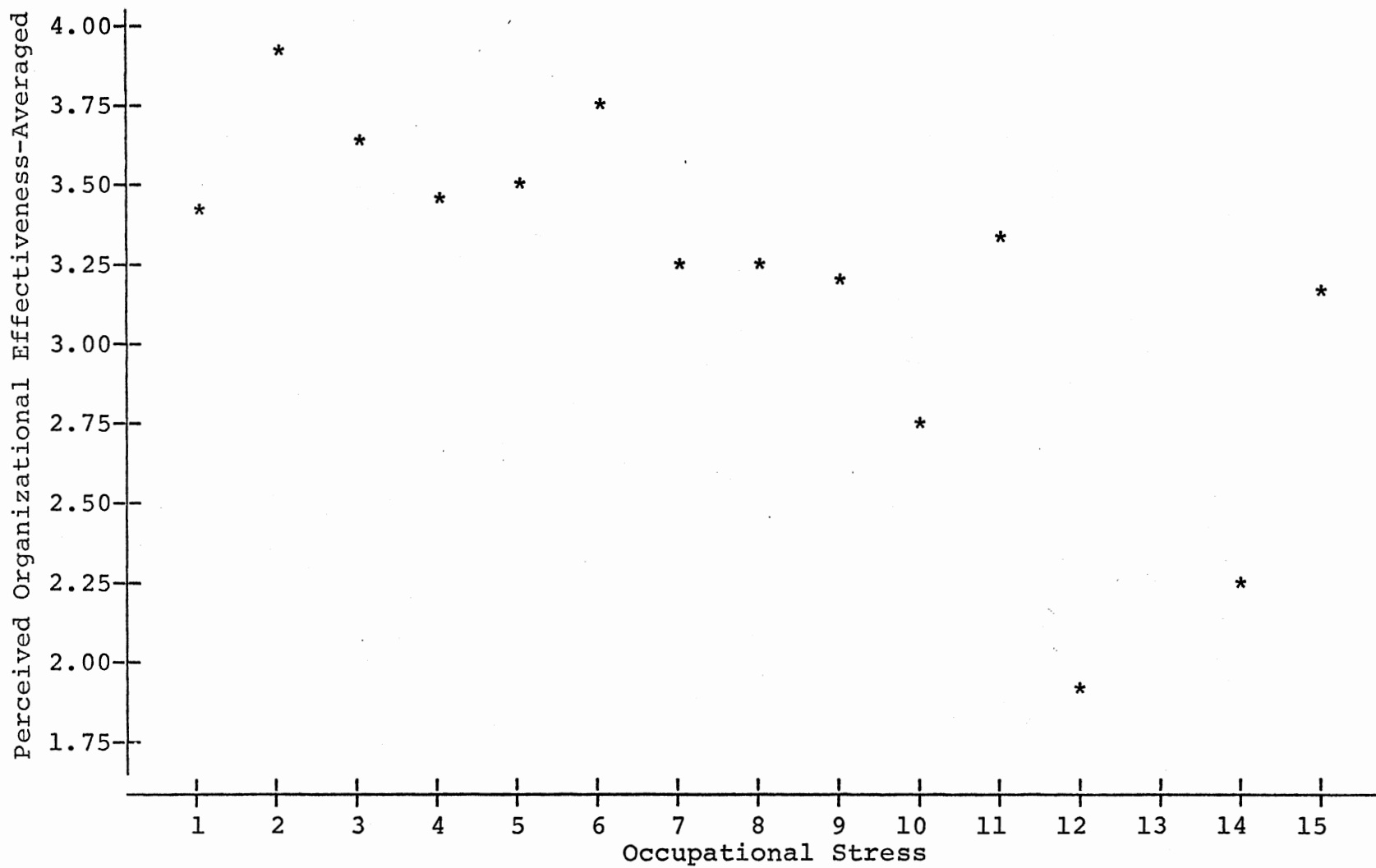


Figure 13. Plot of Averaged Organizational Effectiveness Scores Versus Occupational Stress for Firm 3

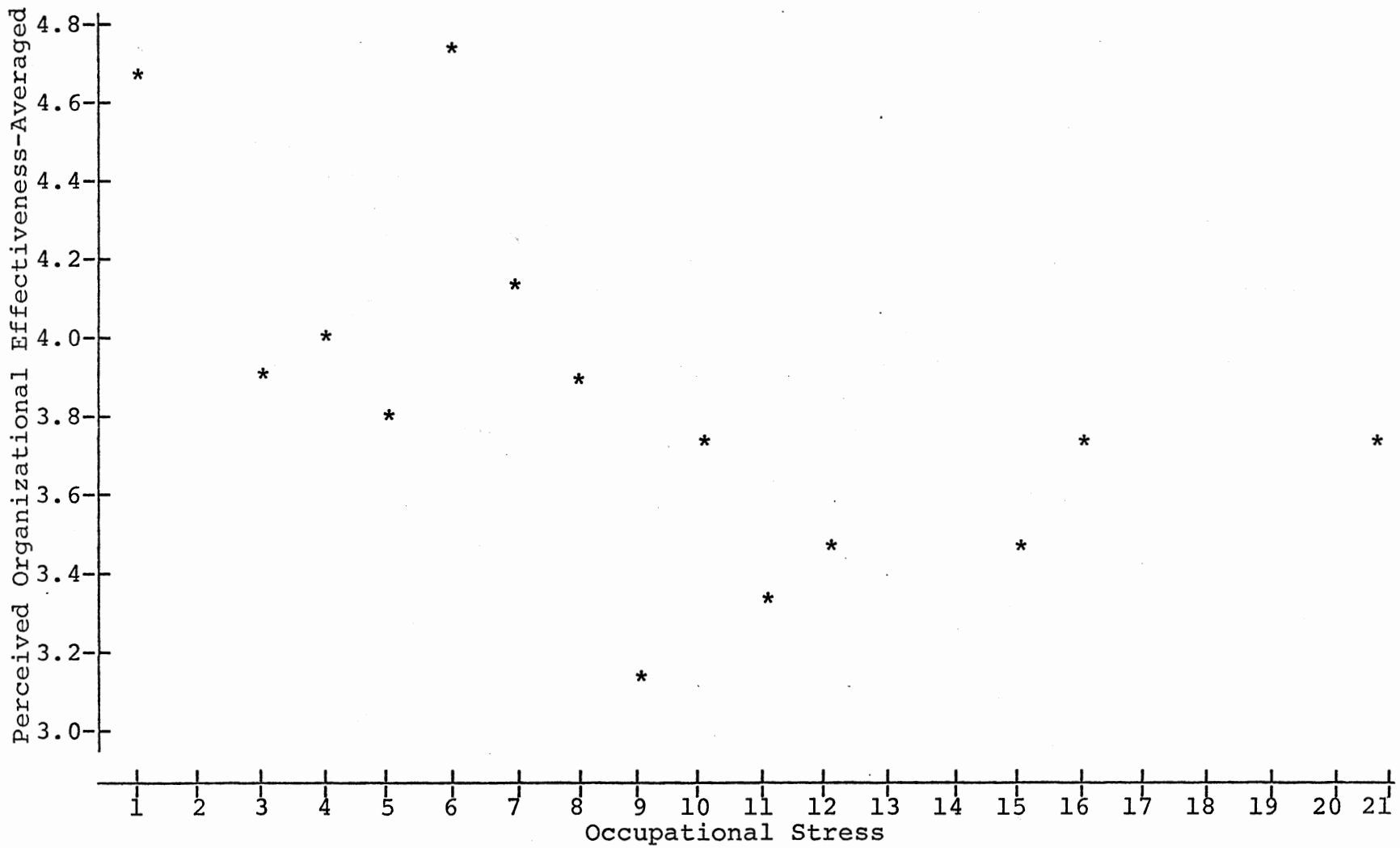


Figure 14. Plot of Averaged Organizational Effectiveness Scores Versus Occupational Stress for Firm 4

APPENDIX D

SWITCH POINT PROBABILITY DATA
AND CORRESPONDING PLOTS
FOR EACH FIRM

TABLE IX
 POSTERIOR PROBABILITY OF EACH DATA POINT
 BEING THE SWITCH POINT M, GIVEN
 THE DATA FOR FIRM 1

Data Point Number	Posterior Probability of Data Point Being the Switch Point M	Cumulative Probability*
2**	0.2183	0.2183
3	0.0954	0.3137
4	0.0618	0.3755
5	0.0473	0.4228
6	0.0548	0.4776
7	0.0298	0.5075
8	0.0377	0.5451
9	0.0472	0.5923
10	0.0869	0.6793
11	0.0427	0.7220
12	0.0317	0.7537
13	0.0352	0.7889
14	0.0625	0.8514
15	0.0518	0.9032
16	0.0968	1.0000

*Due to rounding error, Probabilities in Column 2 may not total to be exactly equal to the Cumulative Probabilities shown.

**This Data Point has the highest Posterior Probability, and thus is the most likely candidate for the Switch Point M in consideration of all other Data Points listed.

TABLE X
 POSTERIOR PROBABILITY OF EACH DATA POINT
 BEING THE SWITCH POINT M, GIVEN
 THE DATA FOR FIRM 2

Data Point Number	Posterior Probability of Data Point Being the Switch Point M	Cumulative Probability*
2**	0.3296	0.3296
3	0.0785	0.4081
4	0.0493	0.4574
5	0.0326	0.4900
6	0.0200	0.5101
7	0.0155	0.5256
8	0.0425	0.5681
9	0.0161	0.5842
10	0.0288	0.6130
11	0.0230	0.6360
12	0.1221	0.7581
13	0.0535	0.8116
14	0.1884	1.0000

*Due to rounding error, Probabilities in Column 2 may not total to be exactly equal to the Cumulative Probabilities shown.

**This Data Point has the highest Posterior Probability, and thus is the most likely candidate for the Switch Point M in consideration of all other Data Points listed.

TABLE XI
 POSTERIOR PROBABILITY OF EACH DATA POINT
 BEING THE SWITCH POINT M, GIVEN
 THE DATA FOR FIRM 3

Data Point Number	Posterior Probability of Data Point Being the Switch Point M	Cumulative Probability*
2	0.0177	0.0177
3	0.0066	0.0243
4	0.0042	0.0285
5	0.0032	0.0318
6	0.0037	0.0355
7	0.0027	0.0382
8	0.0028	0.0410
9	0.0041	0.0451
10	0.0033	0.0484
11**	0.9010	0.9493
12	0.0507	1.0000

*Due to rounding error, Probabilities in Column 2 may not total to be exactly equal to the Cumulative Probabilities shown.

**This Data Point has the highest Posterior Probability, and thus is the most likely candidate for the Switch Point M in consideration of all other Data Points listed.

TABLE XII
 POSTERIOR PROBABILITY OF EACH DATA POINT
 BEING THE SWITCH POINT M, GIVEN
 THE DATA FOR FIRM 4

Data Point Number	Posterior Probability of Data Point Being the Switch Point M	Cumulative Probability*
2	0.1082	0.1082
3	0.0520	0.1602
4	0.0391	0.1993
5	0.0447	0.2440
6	0.1265	0.3706
7**	0.2340	0.6046
8	0.0565	0.6610
9	0.0708	0.7318
10	0.0756	0.8074
11	0.0982	0.9056
12	0.0944	1.0000

*Due to rounding error, Probabilities in Column 2 may not total to be exactly equal to the Cumulative Probabilities shown.

**This Data Point has the highest Posterior Probability, and thus is the most likely candidate for the Switch Point M in consideration of all other Data Points listed.

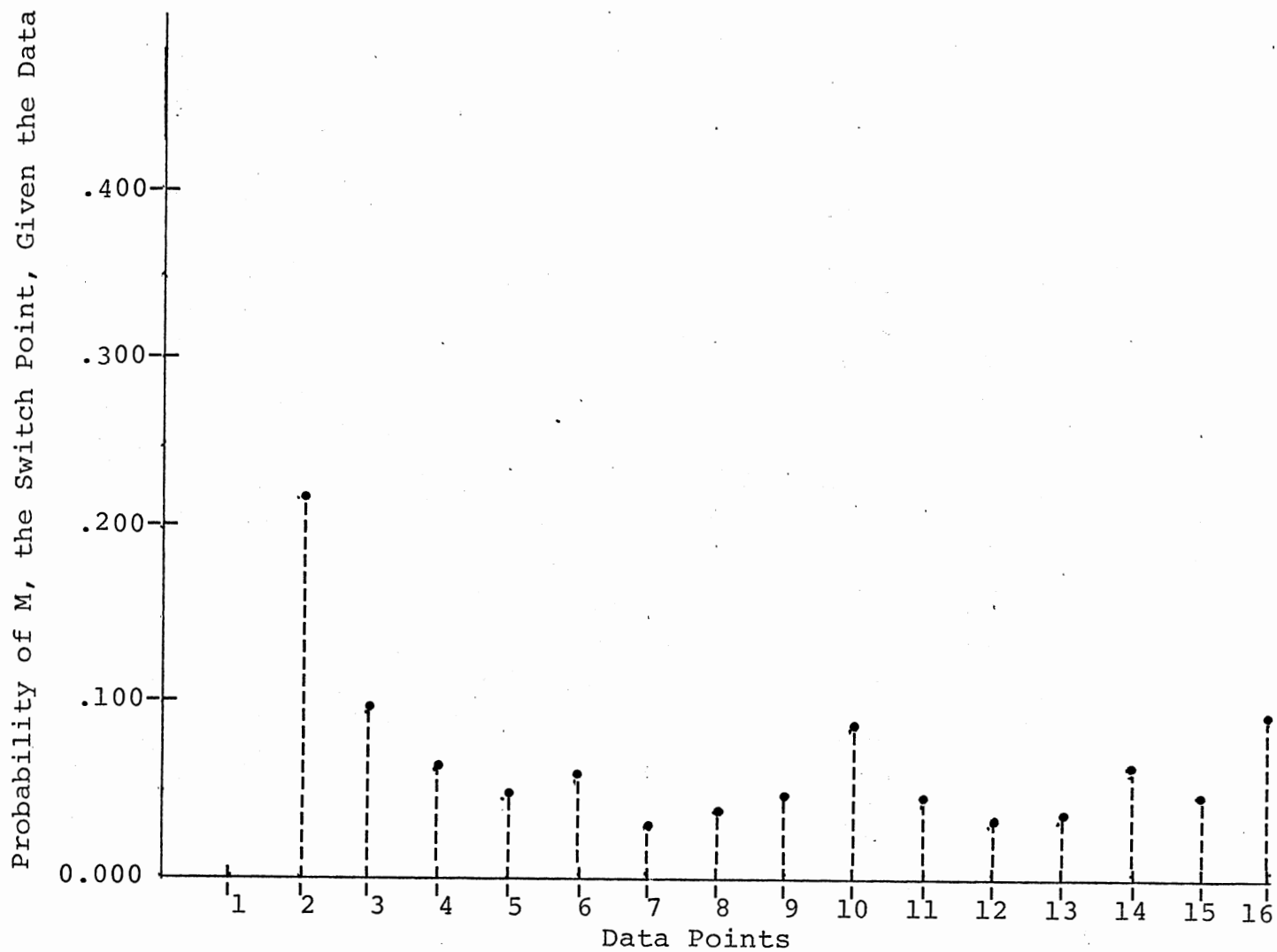


Figure 15. Posterior Probability Plot of Each Data Point Being the Switch Point M, Given the Data for Firm 1

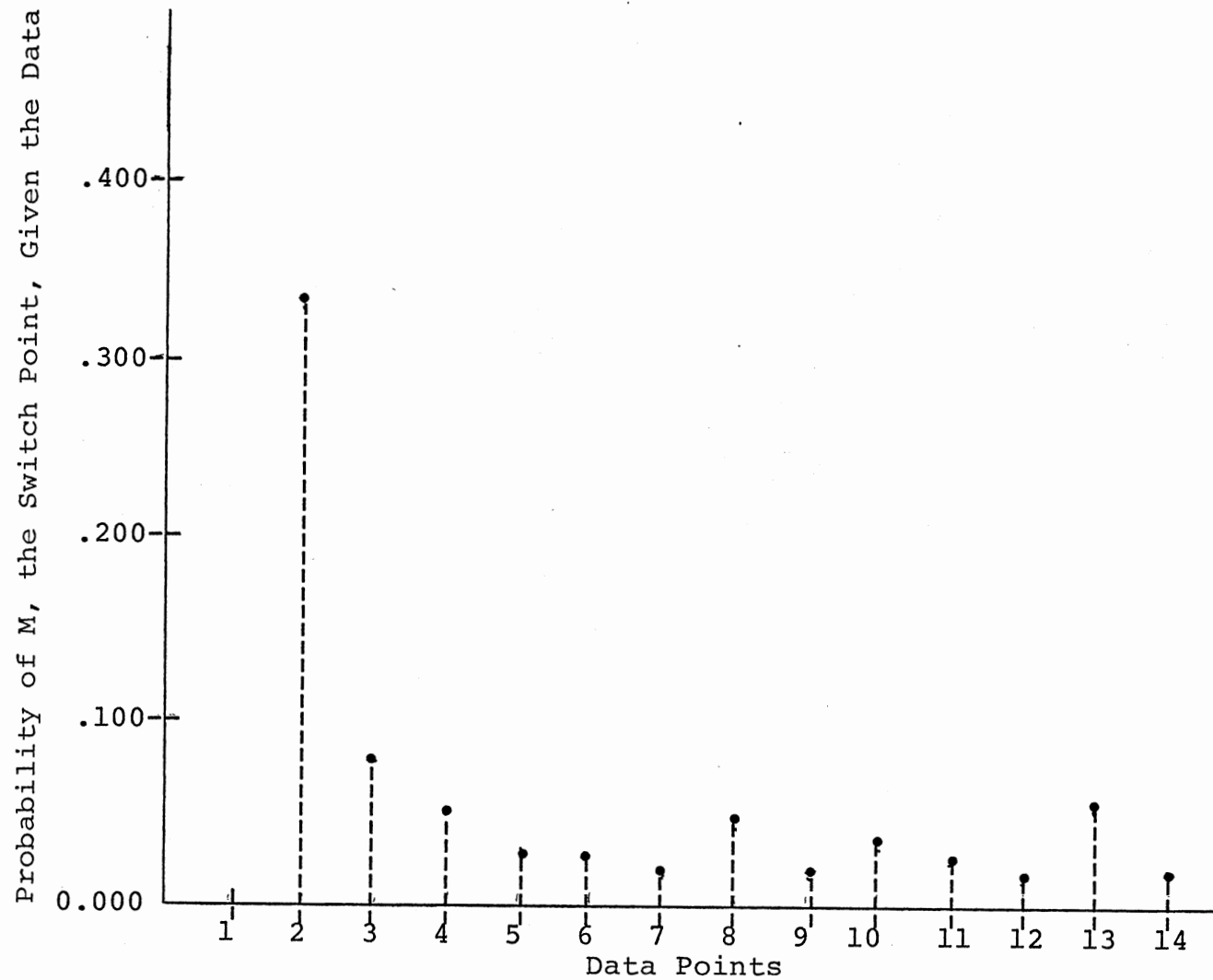


Figure 16. Posterior Probability Plot of Each Data Point Being the Switch Point M, Given the Data for Firm 2

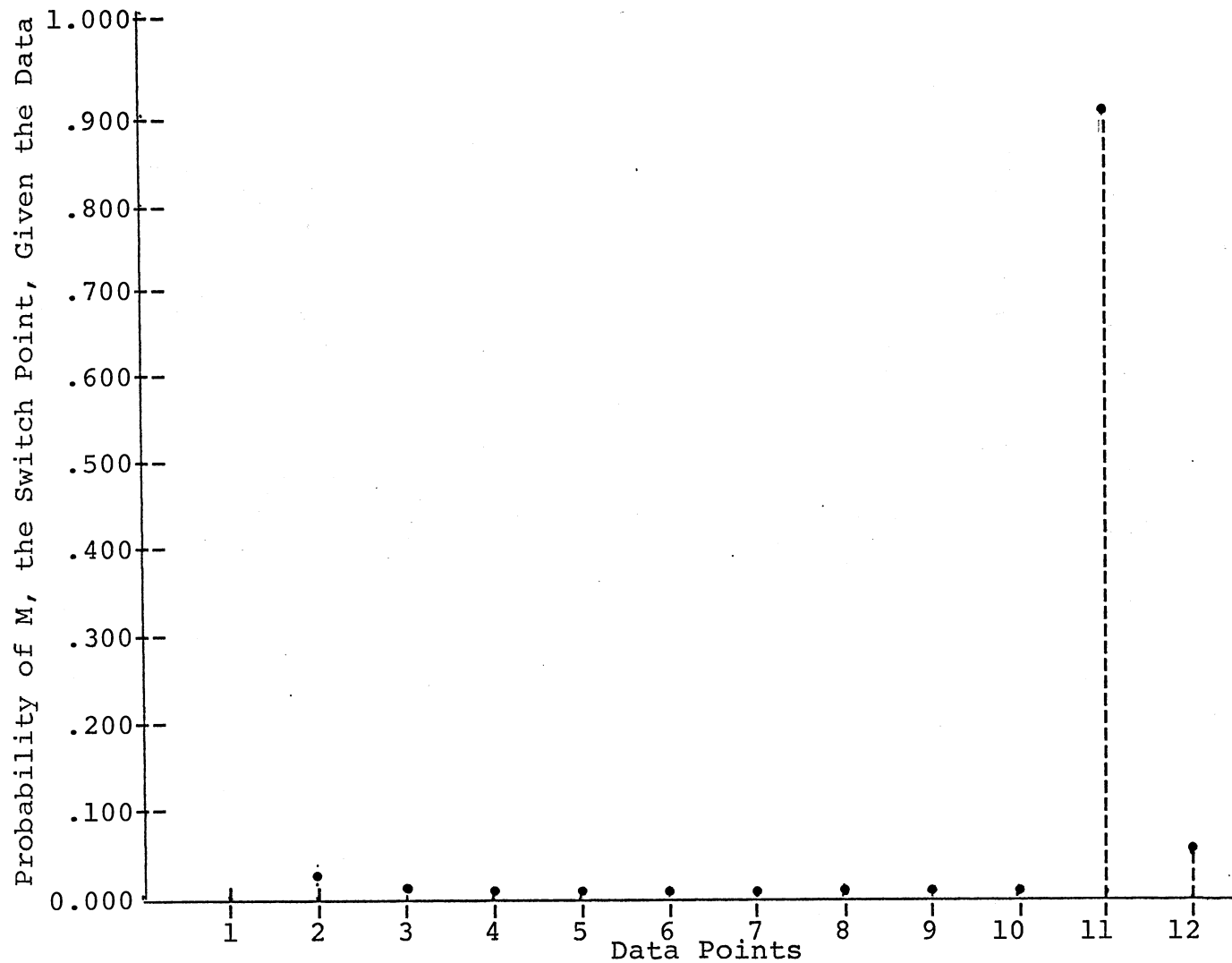


Figure 17. Posterior Probability Plot of Each Data Point Being the Switch Point M, Given the Data for Firm 3

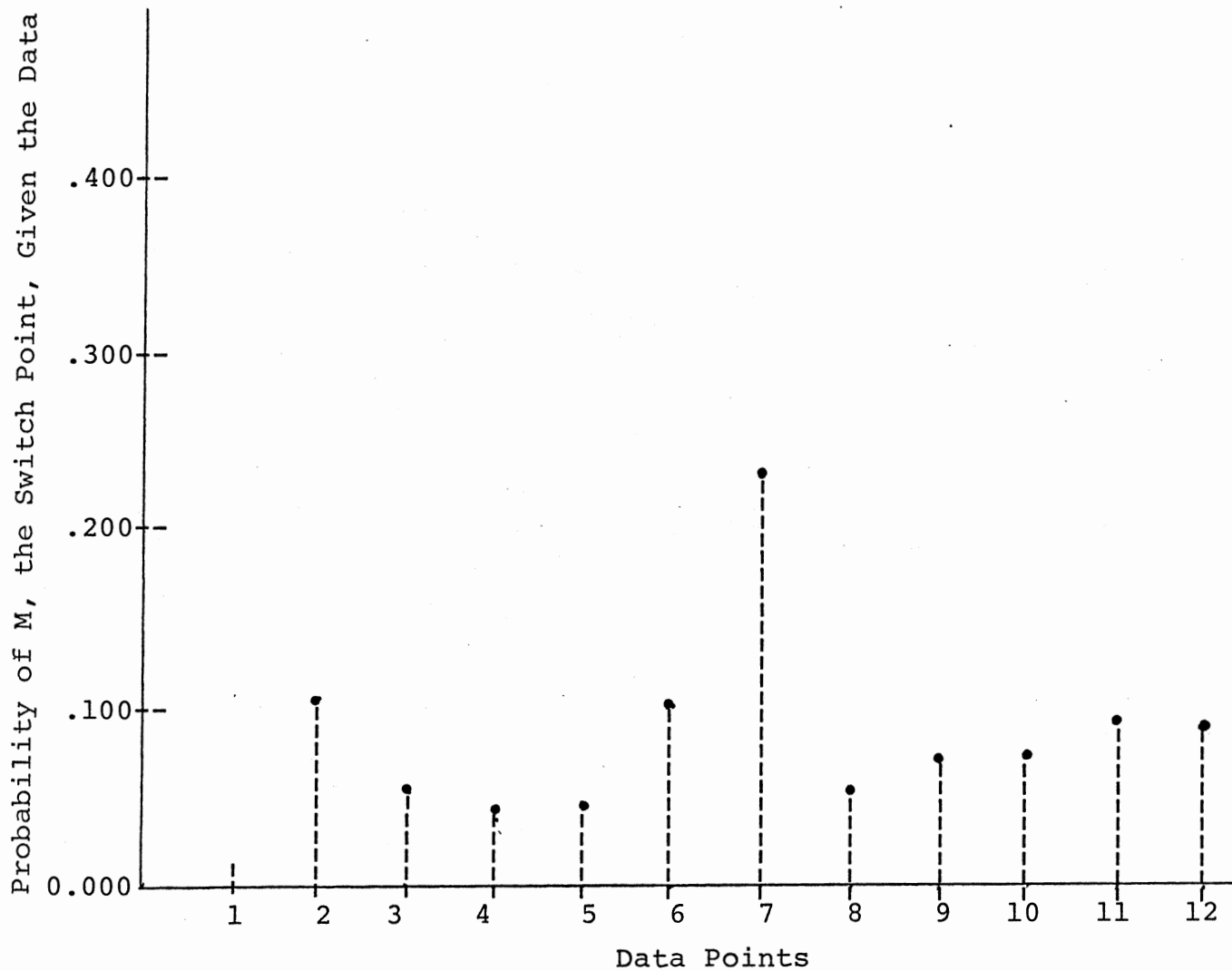
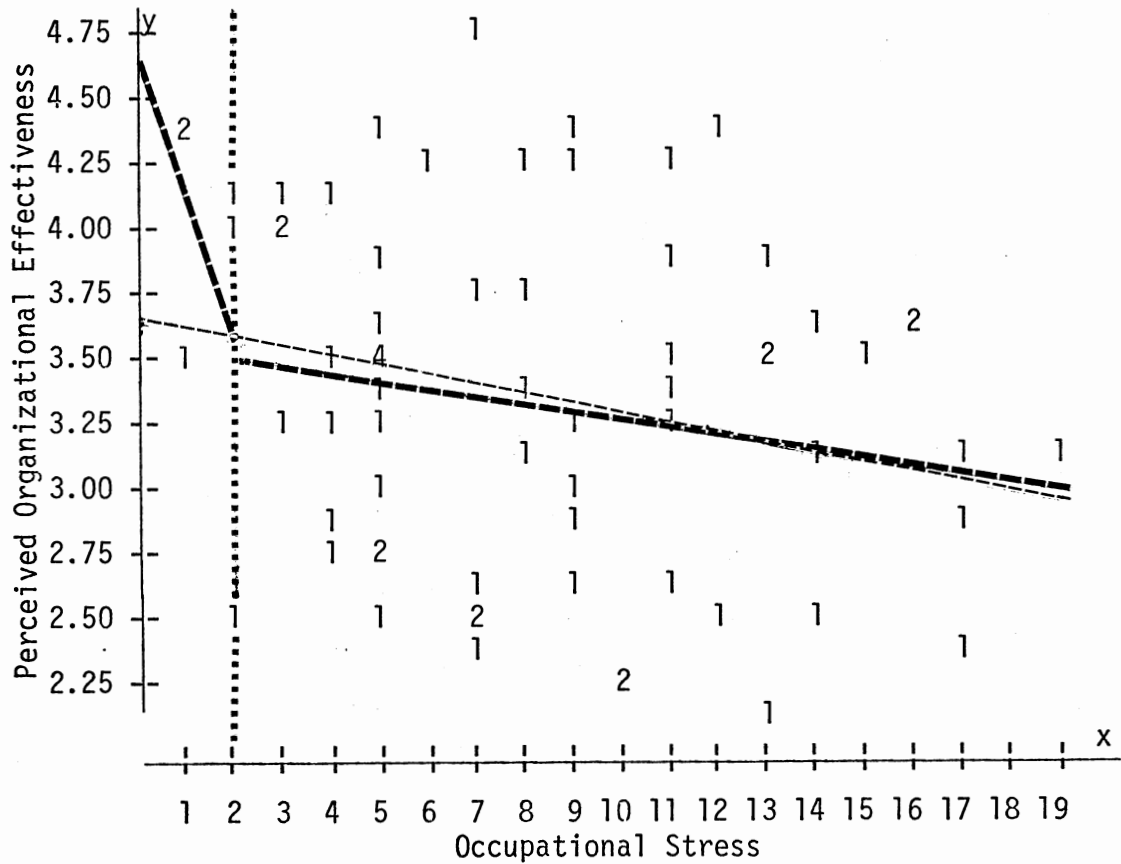


Figure 18. Posterior Probability Plot of Each Data Point Being the Switch Point M, Given the Data for Firm 4

APPENDIX E

REGRESSION PLOTS FOR EACH FIRM AND
THE AGGREGATE FIRM DATA



..... Switch Point

————— Regression Utilizing the Switch Point

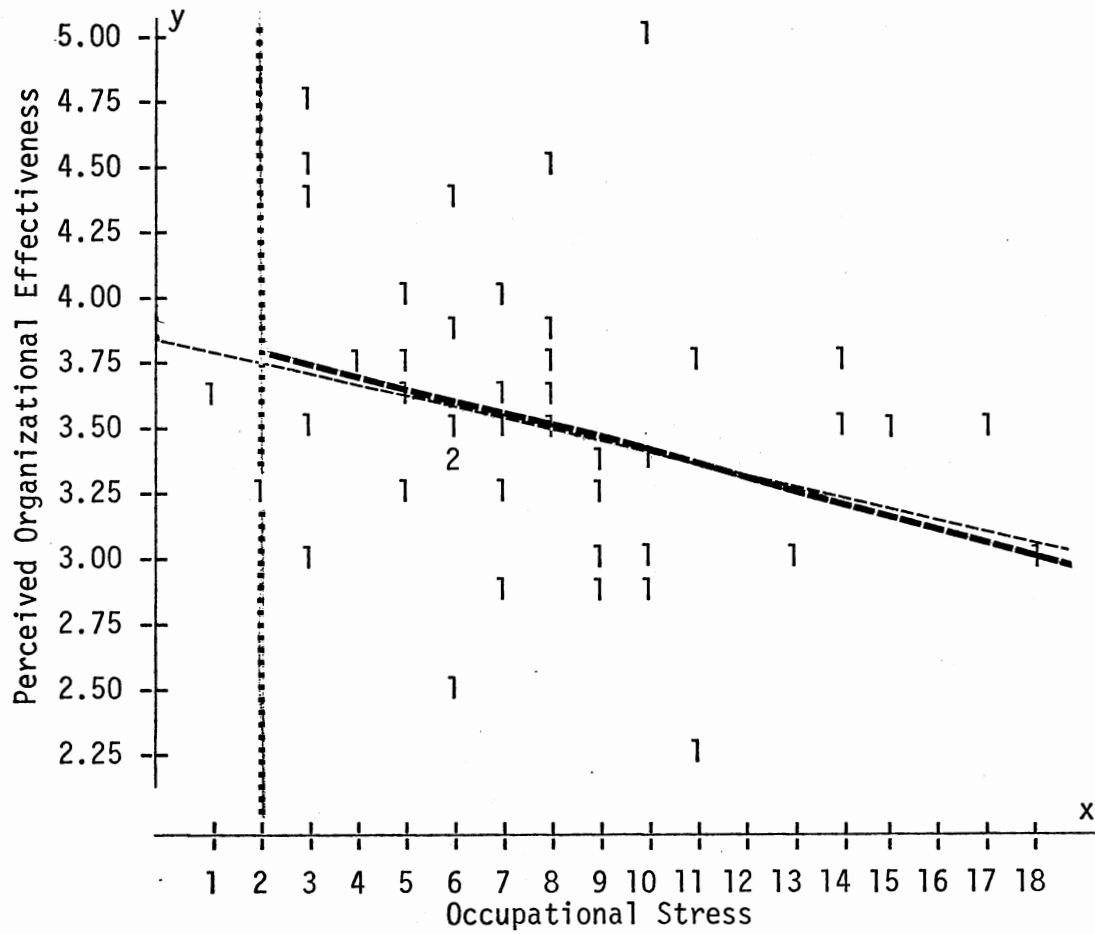
Left Regression: $y = 4.6250 + (-.54167)(x)$
 (n = 6)

Right Regression: $y = 3.5480 + (-.02495)(x)$
 (n = 63)

----- Regression Without Utilization of Switch Point (n = 69)

$y = 3.6480 + (-.03402)(x)$

Figure 19. Regression Plots for Firm 1



.....Switch Point

—————Regression Utilizing the Switch Point

Left Regression:

(n = 2)

Insufficient cases for computation.

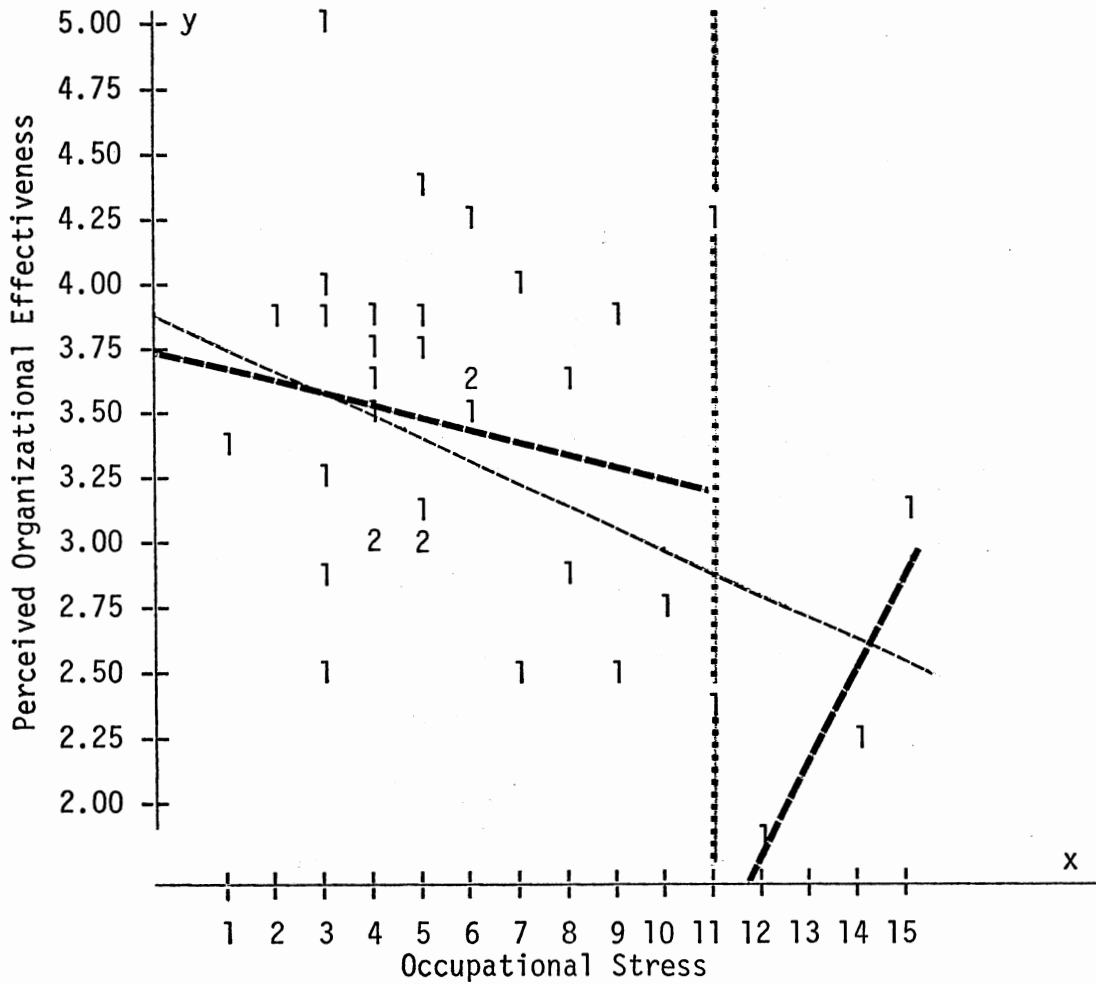
Right Regression: $y = 3.9138 + (-.04536)(x)$

(n = 42)

— · — · — · —Regression Without Utilization of Switch Point (n = 44)

$y = 3.83628 + (-.03778)(x)$

Figure 20. Regression Plots for Firm 2



.....Switch Point

———Regression Utilizing the Switch Point

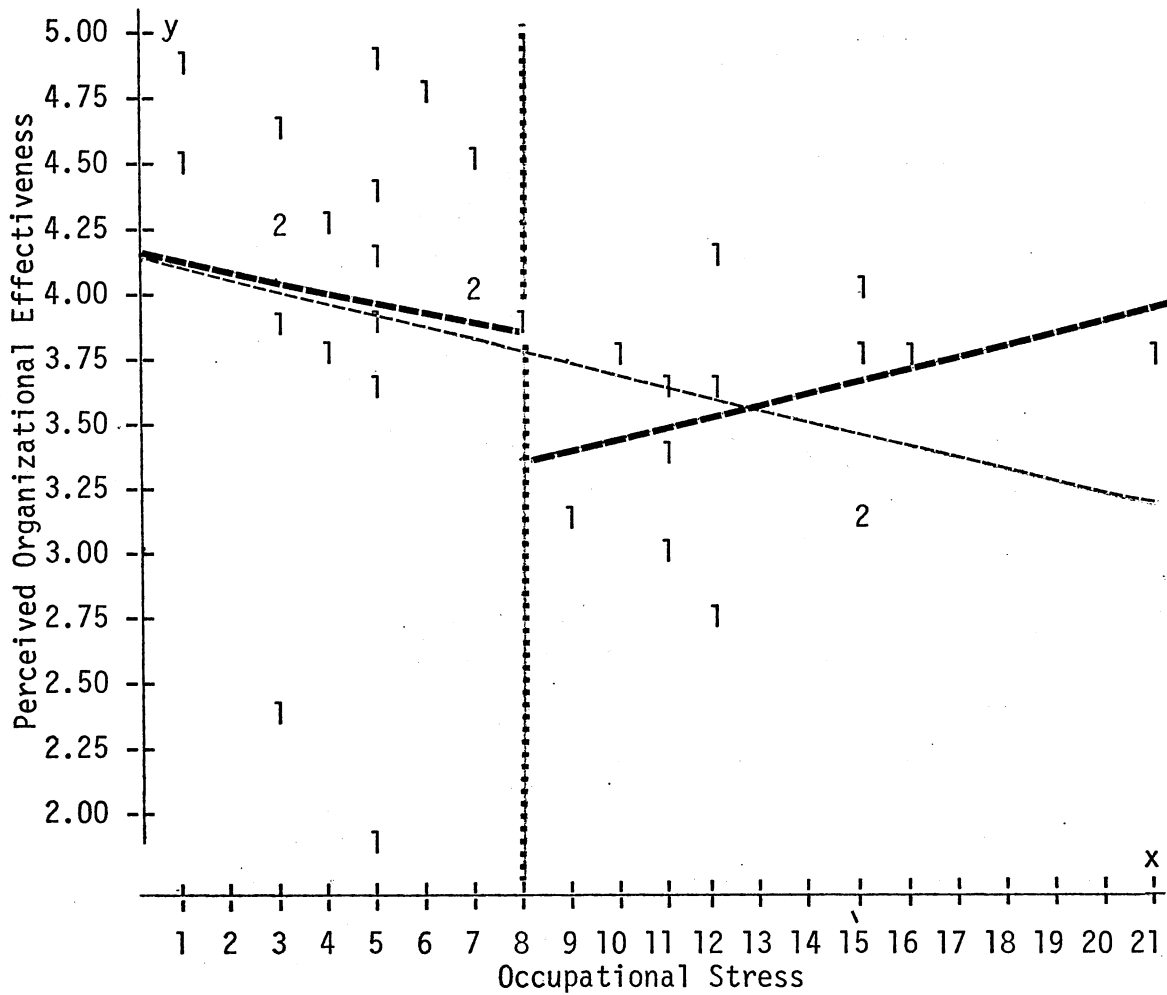
Left Regression: $y = 3.7500 + (-.05238)(x)$
($n = 33$)

Right Regression: $y = -2.8304 + (.38393)(x)$
($n = 3$)

-----Regression Without Utilization of Switch Point ($n = 36$)

$y = 3.88150 + (-.08231)(x)$

Figure 21. Regression Plots for Firm 3



.....Switch Point

—————Regression Utilizing the Switch Point

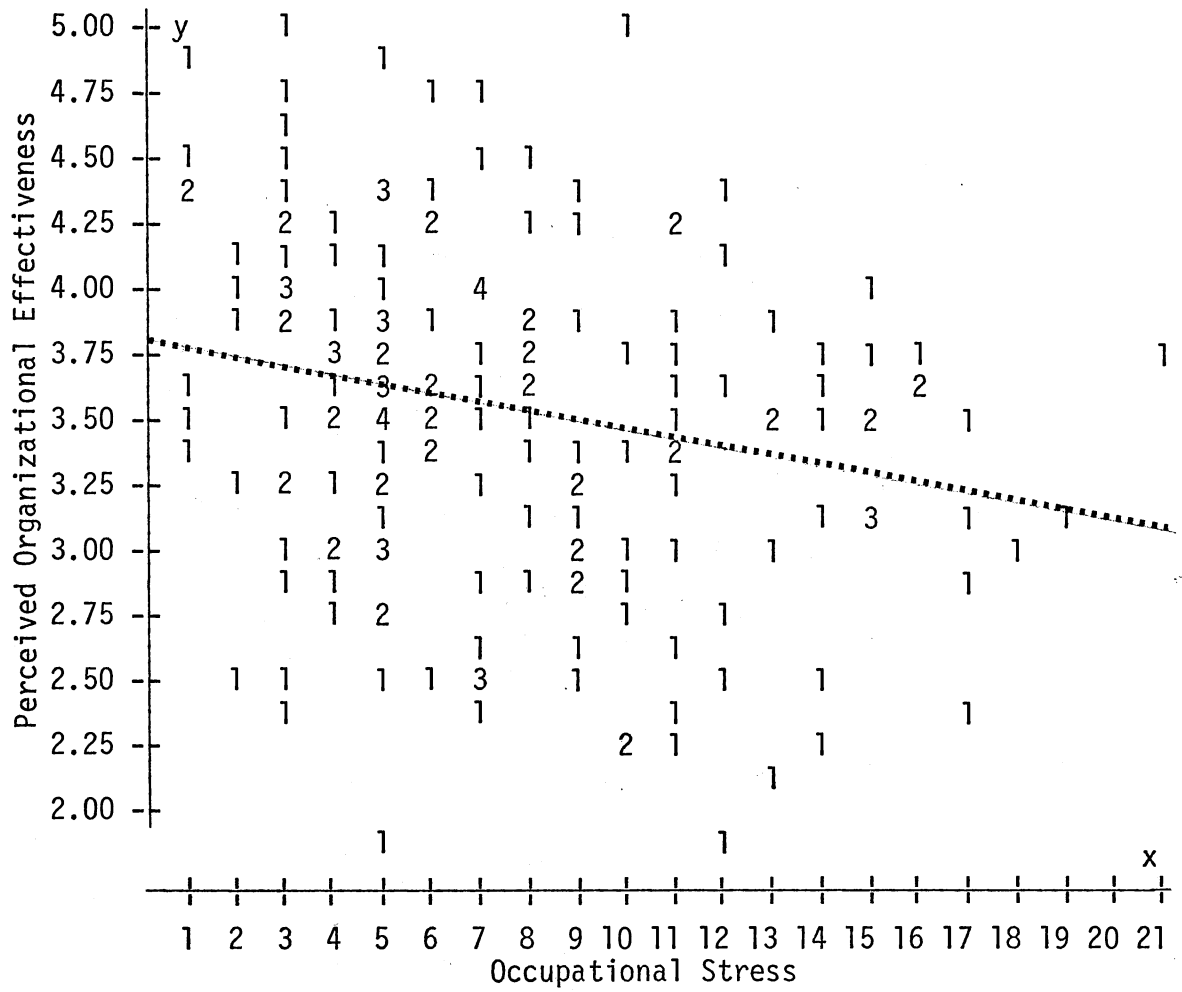
Left Regression: $y = 4.19366 + (-.03609)(x)$
(n = 20)

Right Regression: $y = 3.02504 + (.03527)(x)$
(n = 14)

-----Regression Without Utilization of Switch Point (n = 34)

$y = 4.16974 + (-.04462)(x)$

Figure 22. Regression Plots for Firm 4



(n = 183)

$$y = 3.79903 + (-.03977)(x)$$

Figure 23. Regression Plot for All Firms

APPENDIX F

FUNCTIONAL AND DYSFUNCTIONAL
STRESS SCORES

TABLE XIII
 FUNCTIONAL AND DYSFUNCTIONAL STRESS
 SCORES BY SUBJECT AND FIRM

Firm	Subject Number	Functional Stress	Dysfunctional Stress
1	1	8	20
1	2	6	30
1	3	12	27
1	4	5	20
1	5	11	27
1	6	6	29
1	7	6	28
1	8	8	35
1	9	6	21
1	10	8	25
1	11	7	23
1	12	7	20
1	13	9	14
1	14	9	25
1	15	8	26
1	16	9	24
1	17	6	22
1	18	5	19
1	19	6	27
1	20	4	17
1	21	10	21
1	22	5	24
1	23	11	28
1	24	10	14
1	25	7	32
1	26	8	23
1	27	10	33
1	28	5	10
1	29	7	21
1	30	8	18
1	31	11	22
1	32	7	30
1	33	7	18
1	34	8	22
1	35	7	32
1	36	4	26
1	37	11	30
1	38	8	20
1	39	6	22
1	40	4	11
1	41	11	23
1	42	4	10

TABLE XIII (Continued)

Firm	Subject Number	Functional Stress	Dysfunctional Stress
1	43	8	19
1	44	9	21
1	45	7	21
1	46	11	23
1	47	8	24
1	48	6	20
1	49	8	16
1	50	10	11
1	51	10	26
1	52	9	24
1	53	6	18
1	54	12	26
1	55	4	22
1	56	7	14
1	57	8	14
1	58	8	23
1	59	6	19
1	60	7	27
1	61	5	21
1	62	13	33
1	63	6	21
1	64	7	17
1	65	12	23
1	66	9	28
1	67	12	25
1	68	5	17
1	69	5	23
2	1	10	21
2	2	8	22
2	3	5	17
2	4	10	17
2	5	6	23
2	6	8	25
2	7	12	32
2	8	9	24
2	9	12	23
2	10	11	20
2	11	8	21
2	12	5	17
2	13	10	19
2	14	4	18
2	15	10	22
2	16	12	21
2	17	6	21

TABLE XIII (Continued)

Firm	Subject Number	Functional Stress	Dysfunctional Stress
2	18	6	29
2	19	8	22
2	20	4	15
2	21	11	18
2	22	10	24
2	23	6	10
2	24	7	21
2	25	5	15
2	26	12	24
2	27	8	20
2	28	9	26
2	29	6	12
2	30	4	21
2	31	4	9
2	32	7	22
2	33	8	15
2	34	12	22
2	35	11	24
2	36	7	24
2	37	6	22
2	38	6	27
2	39	11	22
2	40	9	23
2	41	12	28
2	42	6	26
2	43	10	25
2	44	9	17
3	1	9	27
3	2	8	22
3	3	6	24
3	4	4	12
3	5	8	25
3	6	7	32
3	7	9	37
3	8	6	18
3	9	12	22
3	10	4	14
3	11	6	28
3	12	9	24
3	13	9	33
3	14	4	13
3	15	7	23
3	16	8	19
3	17	5	13

TABLE XIII (Continued)

Firm	Subject Number	Functional Stress	Dysfunctional Stress
3	18	6	22
3	19	6	25
3	20	4	16
3	21	7	15
3	22	5	26
3	23	4	20
3	24	7	16
3	25	11	25
3	26	9	22
3	27	5	24
3	28	7	16
3	29	6	27
3	30	5	29
3	31	6	18
3	32	9	21
3	33	4	24
3	34	11	28
3	35	8	20
3	36	4	24
4	1	7	22
4	2	11	20
4	3	10	13
4	4	11	22
4	5	7	17
4	6	6	24
4	7	5	13
4	8	6	11
4	9	4	11
4	10	8	25
4	11	7	23
4	12	6	11
4	13	10	21
4	14	8	25
4	15	12	15
4	16	9	20
4	17	9	23
4	18	5	13
4	19	6	27
4	20	13	27
4	21	10	18
4	22	5	39
4	23	6	25
4	24	8	28
4	25	8	28

TABLE XIII (Continued)

Firm	Subject Number	Functional Stress	Dysfunctional Stress
4	26	6	21
4	27	10	26
4	28	5	19
4	29	11	20
4	30	9	21
4	31	12	20
4	32	9	22
4	33	5	30
4	34	7	20

VITA⁹

Richard Douglas Allen

Candidate for the Degree of

Doctor of Philosophy

Thesis: A STUDY OF THE RELATIONSHIP BETWEEN OCCUPATIONAL STRESS AND PERCEIVED ORGANIZATIONAL EFFECTIVENESS FOR FORMAL ORGANIZATION GROUPS WITH A THRESHOLD VALUE FOR STRESS CONSIDERED

Major Field: Business Administration

Biographical:

Personal Data: Born in Tulsa, Oklahoma, October 27, 1938, the son of Mrs. Eva Lynn Allen.

Education: Graduated from Duncan High School, Duncan, Oklahoma, in May, 1956; received Bachelor of Science degree in Industrial Engineering from Oklahoma State University in 1964; received Master of Business Administration degree in Management from Oklahoma State University in 1971; completed requirements for the Doctor of Philosophy degree at Oklahoma State University in May, 1980.

Professional Experience: Industrial Engineer, U. S. Air Force, Tinker Air Force Base, 1964-68; Graduate Assistant, College of Business Administration, Oklahoma State University, 1969-70; Research Associate, Oklahoma State Department of Vocational and Technical Education, 1971; Industrial Engineer, Federal Aviation Administration, 1971-72; Graduate Teaching Assistant, College of Business Administration, Oklahoma State University, 1972-75; Assistant Professor of Management, Central State University, 1975-Present.