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STATIC AND DYNAMIC DETERMINANTS OF ORGANIZATIONAL FUNCTIONING:

A MODEL AND EMPIRICAL EVALUATION

by
Doris Louise Hausser

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Psychology)
in The University of Michigan
1975

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I.

STATIC AND DYNAMIC DETERMINANTS OF ORGANIZATIONAL FUNCTIONING

Traditionally, the effects of structure and process on organizational functioning have been examined in terms of their relationships to outcomes. More specifically, these outcomes have been categorized as individual and organizational. The individual outcomes which organization theory and research have focused on are usually attitudinal, such as satisfaction, or behavioral, such as absenteeism and turnover. The organizational outcomes are usually concerned with performance and productivity.

The conceptualizations of organizational structure and process which one finds in the literature are less easily typified, but some general trends are observable in several definitions.

> *Both structure and process are concerned with authority, communication, decision making, goal setting, and conflict resolution. But process implies the implementation of these as dynamic behavioral events and interactions, whereas structure describes these as ongoing sets of durable roles and relationships.* (Friedlander & Brown, 1974, p. 315)

> *A distinction must be made between the broad dimensions of different types of social situations in which people interact* [*structure*] *and the modes of interaction exemplified in their behavior* [*process*]. (Sells, 1968, p. 31)

> *Structure refers to the arrangement of a system's subsystems and components in social psychological and physical space. Here we are concerned mainly with those characteristics that tend to remain constant over time.... Common process classifications tend to be in terms of the variables and relationships that maintain the system in a steady state, or that deal with the adjustment processes that are mobilized to maintain those steady states.* (Indik, 1968, p. 5)

> *Structure has been defined to mean the positions and parts of organizations and their systematic and relatively enduring relationships to each other.* (Porter & Lawler, 1965, p. 24)

> *Process consists of the individual or collective actions of the people who have been assigned a task...the actual steps taken by an individual or group when confronted by a task.* (Steiner, 1972, p. 8)

It is clear from these definitions that the terms structure and process have not been used in any uniform or traditional manner. However, some common factors can be discerned in these citations. Friedlander and Brown, Porter and Lawler, and Indik all seem to point out the durability or constancy of structure. In contrast, process is characterized by Friedlander and Brown, Sells, Steiner, and Indik as having a more active or adaptive nature; process consists of actions and behaviors. Thus, the distinction between structure and process which can be seen most clearly in these definitions revolves around the relative stability or enduring quality of structure versus the dynamic or adaptive quality of process.

For the purposes of the investigation reported here, this enduring/adaptive distinction will be applied to differentiate structure from process factors and variables. The terms "static" and "dynamic" will be used to distinguish these two classes of variables. A variable's being classified as static is not meant to imply immutability. Many static/structure factors are indeed changeable. The whole branch of organizational development that uses techno-structural interventions is witness to this. Rather, the static label is used to describe a relatively enduring feature which is not considered naturally adaptive, as a process feature would be.

Examples of enduring or static variables would include organizational or subunit size, organizational shape, degree of centralization, hierarchical level, task characteristics, and functional specialization. One can also categorize many individual level variables as static in the sense that they are relatively enduring; examples would include sex, race, education, age, tenure, aptitudes, and region of upbringing.

Examples of dynamic variables include leadership, communication, decision making, influence, socialization, coordination, and conflict resolution. At the individual level, variables such as attitudes, motivation, degree of effort, and task performance could be considered dynamic.

Table 1 presents additional examples of static and dynamic factors in the form of lists of variables which various authors have used to catalogue organizational properties.

TABLE 1

EXAMPLES OF STATIC AND DYNAMIC VARIABLES

STATIC VARIABLES	DYNAMIC VARIABLES
From James and Jones (1974)	From James and Jones (1974)
STRUCTURE Size Centralization of Decision Making Configuration Specialization Standardization of Procedures Formalization of Procedures Interdependence of Subsystems	PROCESS Leadership Communication Control Conflict Resolution Change Coordination Selection Socialization Reward Decision Making Status and Power Relationships
From Indik (1968)	From Indik (1968)
STRUCTURE VARIABLES Size Span of Control Number of Hierarchical Levels Authority Structure Communication Structure Degree of Task Specification Degree of Task Interdependence Task Specialization Status and Prestige Structure Psychological Distance between Decision Makers and Operating Level	FUNCTION OR PROCESS VARIABLES Communication Control Coordination Organizational Socialization-Integration Process Supervision Adaptability to Change Conflict Control Process Mutual Understanding of Reciprocal Role Relations Degree of Bureaucracy Amount and Distribution of Communication Interaction
From Porter and Lawler (1965)	From Taylor and Bowers (1972)
STRUCTURAL PROPERTIES Suborganization Organizational Levels Line and Staff Hierarchies Span of Control Size: Subunit Total-Organization Properties Size: Total Organization Shape: Tall or Flat Shape: Centralized or Decentralized	SOCIAL-PSYCHOLOGICAL FACTORS Organizational Climate Decision Making Practices Communication Flow Motivational Conditions Human Resources Primacy Lower Level Influence Technological Readiness Supervisory Leadership Support Work Facilitation Goal Emphasis Team Building Peer Leadership Support Work Facilitation Goal Emphasis Team Building Group Process Satisfaction

EFFECTS OF STATIC AND DYNAMIC FACTORS ON ORGANIZATIONAL FUNCTIONING

As mentioned earlier, there is a vast body of theory and research which focuses on the effects of structure and process. Using the new distinction, one could say that static and dynamic determinants of organizational functioning have been the objects of many investigations. These factors have been examined as they relate to organizational outcomes, to each other, and to themselves. The brief review of the literature which follows will be presented according to the different relationships which exist among these factors. First, research on the effects of static properties on outcomes, on dynamic factors, and on other static properties will be reviewed. Then the evidence for the effects of dynamic properties on outcomes, on static factors, and on other dynamic properties will be presented. These results are summarized in Table 2.

Static Determinants of Outcomes

There are many studies which consider the effects of structure on job attitudes and job behavior. In 1965, Porter and Lawler reviewed the research of this kind which had been conducted to that point in business and industrial organizations. They looked at the effects of seven structural properties on such outcomes as satisfaction, absenteeism, turnover, and productivity. Briefly, they reported that two suborganization properties, organizational level and subunit size, have strong effects on attitudes and behavior. The effects of three other properties, line/staff function, total-organization size and tall/flat shape, were significant in some cases, but not consistently so. Porter and Lawler concluded their review with a call for continued

TABLE 2

SUMMARY OF FINDINGS FROM SELECTED RESEARCH ON RELATIONSHIPS

AMONG STATIC AND DYNAMIC FACTORS AND OUTCOMES

	ON OUTCOMES	ON DYNAMIC FACTORS	ON STATIC FACTORS
EFFECTS OF STATIC PROPERTIES	•Effects of structure on job attitudes. (Herman & Hulin, 1972; Porter & Lawler, 1965) •Effects of structure on job behaviors. (Ivancevich & Donnelly, 1975; Porter & Lawler, 1965) •Relationship between demographic characteristics and job attitudes. (Herman, Dunham, & Hulin, 1975)	•Effects of structure on climate factors. (Blankenship & Miles, 1968; Mahoney, Frost, Crandall, & Weitzel, 1972; Payne & Mansfield, 1973) •Effects of structure on leadership. (Michaelsen, 1973) •Effects of structure on group process. (Morris, 1966; O'Dell, 1968) •Effects of individual characteristics on group process. (Conway, 1967)	•Effects of total organization structure on other total organization structural properties. (Child, 1973; Meyer, 1972) •Effects of total organization structure on subunit structure. (Pheysey, Payne, & Pugh, 1971)
	ON OUTCOMES	**ON STATIC FACTORS**	**ON DYNAMIC FACTORS**
EFFECTS OF DYNAMIC PROPERTIES	•Effects of leadership on job attitudes. (Bowers & Seashore, 1966) •Effects of leadership on job behavior. (Bowers & Seashore, 1966; Drexler & Bowers, 1973; Taylor & Bowers, 1972) •Effects of group process on job behavior. (Hackman & Morris, 1974; Lanzetta & Roby, 1960)	•Effects of leadership on group structure. (Hrebiniak, 1974)	•Effects of climate on leadership. (Franklin, 1973; Michaelsen, 1973) •Effects of supervisory leadership on peer leadership. (Franklin, 1975) •Effects of leadership on group process. (Franklin, 1975)

study in this area saying:

> *The importance attached to the study of organization structure is not misplaced. Increased attention in the future to research on structural properties of organizations should improve our understanding of the way people think and behave when they function in their jobs within organizations.* (1965, p. 49)

In the years since that review, additional studies have generally supported these findings (James & Jones, 1974). For example, Ivancevich and Donnelly (1975) found that salesmen in flat organizations were more satisfied and performed more efficiently than salesmen in tall organizations.

A recent series of studies has looked at the effects of an additional set of static determinants of attitudes and behavior (Herman, Dunham, & Hulin, 1975; Herman & Hulin, 1972). Besides traditional organizational structure properties, this research considered some demographic characteristics of organization members. Organizational structure and demographic characteristics accounted for a significant proportion of the variance in employees' job performance and attitudes about their work and environment. It was also found that organizational structure characteristics showed stronger relationships than did the demographics.

In summary then, the empirical evidence surrounding the effects of static factors on organizational outcomes demonstrates the existence of significant relationships. Further, these relationships are found across many kinds of outcome variables. Size, tall/flat shape and hierarchical level have been found to be strongly related to both

attitudes like satisfaction and job behaviors like performance. In addition, static variables at the individual level, namely demographic characteristics, have been shown to be related to job attitudes.

Static Determinants of Dynamic Factors

Another group of studies can be categorized as examining the effects of static or structural properties on dynamic or process variables. Many different kinds of dynamic factors have been considered in these investigations: dimensions of organizational climate (e.g., participation, decision practices, practicality, risk-orientation), leadership behavior, and group interaction processes.

Blankenship and Miles (1968) reported that hierarchical level is "strongly and consistently associated with a manager's decision-making style" (p. 119). Payne and Mansfield (1973) found significant relationships between hierarchical level and several additional aspects of organizational climate. Persons at higher levels tend to perceive the organization as less authoritarian, providing greater work interest, more friendly, and more ready to innovate. Another study found that organization size was related to the process dimensions of staffing flexibility, delegation, and results emphasis (Mahoney, Frost, Crandall, & Weitzel, 1972).

In contrast to these findings, Lawler, Hall, and Oldham (1974) found that organization structure variables were not significantly related to measures of organizational climate. They did find significant relationships between several other process variables and climate. Their results "suggest that structure simply does not play a noticeable role in determining an organization's climate" (p. 152). Pheysey, Payne, and Pugh (1971) obtained mixed results in investigating the

effects of organizational and subunit structure variables on perceptions of the climate factors of involvement and pressure. Thus, evidence for the effects of static organizational properties on organizational climate remains mixed.

An area of research where the results seem much clearer concerns the effects of static variables on leadership behavior (Drexler, 1974). Michaelsen (1973) found strong relationships between supervisory behavior and such structural properties as work group size and hierarchical level. In addition, he looked at relationships between supervisory leadership and individual level static properties like subordinates' tenure, education, age, and degree of urbanization; once again, significant relationships were found. In reviewing the research on effects of supervisors' own demographic characteristics on their behavior, Stogdill (1974) reported that evidence supporting such relationships exists. He does acknowledge, however, that situational conditions are more powerful predictors of supervisory behavior than individual differences.

A final area of research where significant effects of static properties on dynamic factors have been found concerns group interaction process. O'Dell (1968) found that interaction patterns were related to group size. Task characteristics, such as the type and difficulty of the tasks to be done, can be classified as static properties. Such characteristics strongly affected group interaction (Morris, 1966). Finally, in a study which considered the effects of static properties of individuals, the personality characteristics of a group's members were found to affect its problem solving processes (Conway, 1967). It should be noted that these studies were conducted in a laboratory

setting. They have, however, been cited in work concerned with organizational behavior (Hackman & Morris, 1974).

In summary then, there is research evidence which demonstrates relationships between static and dynamic properties in organizations. Climate variables appear to be affected by hierarchical level. Leadership behavior was found to be related to level, size, and individual characteristics. Finally, group interaction processes are affected by group size, the nature of the task and group member characteristics.

Relationships Among Static Variables

The final area of research on the effects of static properties looks at their relationships to other static properties. Here, the research evidence presents a somewhat mixed picture.

Several studies have examined the effects of organizational size. In 1967, Hall, Haas, and Johnson investigated relationships among size, complexity, and formalization. They reported that at best there is "only a weak relationship between size and structural characteristics. It is suggested that size should not be taken as an indicator of organizational structure" (p. 903). In contrast to this finding, Meyer (1972) found "ubiquitous" positive relationships between size and such parameters as number of subunits, levels of hierarchy, and supervisors. Further, this study was longitudinal, rather than cross-sectional, thus allowing some inferences about causality. There is evidence of a time lag in the causal effect of size on these other static properties. Child (1973) found that size was a major predictor of decentralization. This study also showed that size predicts complexity, which, in turn, has a direct positive relationship with formalization.

Pheysey et al. (1971) found that organization structure was consistently related to group structure. High role prescription was associated with high group formality and highly centralized authority was associated with low group autonomy.

In their review of the literature in this area, James and Jones (1974) concluded that the evidence surrounding relationships among structure variables was not clear-cut. However, they did summarize by saying "it would appear that the structural dimensions of size, standardization, formalization, and specialization are at least moderately related" (p. 25). A further search of the literature has not uncovered any substantial evidence to refute that view (Moch, 1975).

To summarize the research on static properties, it can be said that some evidence has been reported for their effects on outcomes, dynamic properties, and other static properties. These effects were strongest in the areas of outcomes and dynamic processes.

Dynamic Determinants of Outcomes

There is a wealth of empirical evidence concerning the effects of dynamic factors on individual and organizational outcomes. Bowers and Seashore (1966) found positive relationships between each of four supervisory behavior measures and five facets of satisfaction. The effects were strongest for two interpersonal behavior measures and satisfaction with manager. This strong positive relationship between person-oriented measures of supervisory behavior and satisfaction has been found quite consistently in many studies (Stogdill, 1974).

Managerial leadership measures have been found to be negatively related to absenteeism and turnover (Taylor & Bowers, 1972). These same

measures were also positively related to reenlistment rates in the U.S. Navy (Drexler & Bowers, 1973).

Turning to the effects of leadership on organizational outcomes, one finds a somewhat mixed picture. It appears that while the relationship between person-oriented supervisory behavior and productivity is not consistent, task-oriented behavior is generally positively related to productivity (Stogdill, 1974).

Bowers and Seashore (1966) found that productivity was better predicted by peer behavior measures than by supervisory behavior measures. A related finding is that measures of group interaction predicted task success better than did measures of more static factors such as task-relevant knowledge (Lanzetta & Roby, 1960).

Hackman and Morris (1974) feel that the "key to understanding the 'group effectiveness problem' is to be found in the on-going interaction process which takes place among group members while they are working on a task" (p. 2). They conducted a series of studies around this issue and have evidence showing that interventions designed to improve a group's interaction process have resulted in increased performance effectiveness.

Thus, there is evidence for effects of several kinds of dynamic properties on outcomes. Further, these effects operate on both individual and organizational outcomes. Supervisory leadership behavior has been found to be related to both job attitudes and job behavior. The dynamic processes among work group members appear to affect performance.

Dynamic Determinants of Static Factors

The literature concerning the effects of dynamic factors on static properties remains largely conceptual. In the model of organizational

functioning espoused by Likert, the operation of processes at the top levels of an organization can result in structural changes elsewhere in the organization (Bowers, 1975b). For example, an adaptive problem-solving effort at the top echelon of an organization (a dynamic factor) might result in a decision to decentralize the organization. Here the effects of the dynamic factor would be realized as a revamped organizational structure. Such effects of dynamic factors on static properties are intuitively reasonable and possibly inferrable from anecdotal evidence; systematic evidence is lacking, however.

Thus, while there has been much theorizing in this area, there is little empirical research available on possible effects of dynamic properties on static aspects of organizations. One recent study, however, does look at the effect of leadership style on group structure (Hrebiniak, 1974). While measures of technology were also used in this analysis, "the perceived independence and decisional participation of supervisors were related to various measures of group structure" (p. 408). While this provides some evidence of the dynamic determinants of static properties, there is generally a dearth of such investigations making firm conclusions about the nature of such relationships impossible.

Relationships Among Dynamic Variables

In contrast to the area just examined, numerous studies exist demonstrating the effects of dynamic factors on other dynamic factors. Michaelsen (1973) found strong relationships between climate conditions and supervisory behavior. The finding was replicated by Franklin (1973).

Determinants of peers' leadership behavior toward each other and their interaction processes have been investigated recently. Franklin

(1975) found that the best predictor of peer leadership behavior was supervisory leadership behavior. The best predictors of group interaction processes were peer leadership behaviors. Further, an important finding in this study was that the best predictor of dynamic factors at one level of an organization is the group process of the level above. These strong dynamic effects occur across hierarchical levels and, perhaps more importantly, require some lag time.

Recently a question has been raised concerning causation among these dynamic variables (Porter, Lawler, & Hackman, 1975). It is posited that although it is generally assumed that supervisory behavior determines subordinate behavior, the reverse may very well be true. Franklin's findings provide strong evidence for the more general assumption of downward effects. After conducting analyses to determine both superior-to-subordinate and subordinate-to-superior predictability, Franklin concluded that looking at between-time effects "lends overwhelming support for...the efficacy of downward over upward predictability" (1975, p. 160).

Thus, the relationships among dynamic factors in organizations are generally quite strong. Climate seems to affect supervisory leadership behavior, which, in turn, affects peer leadership behavior, which, in its turn, affects group process factors. Further, there is evidence of a time lag for these effects.

To summarize the research on dynamic properties, it appears that with the exception of effects on static factors, strong effects have been reported in the literature. Dynamic determinants have been identified for individual and organizational outcomes and for several other dynamic variables.

A NEED FOR INTEGRATIVE MODELS

Even the brief review of the literature presented above demonstrates that the relationships among static and dynamic properties of organizations are plentiful. Further, they exist in many configurations using variables aggregated at many different levels of analysis. With few exceptions, past studies have looked at relationships involving only one or two sets of variables, e.g., structure-attitudes, process-behavior, process-process, structure-process. Many researchers and theoreticians have indicated the need for including other sets of variables as potential intervenors or moderators (Herman & Hulin, 1972; James & Jones, 1974; Porter & Lawler, 1965).

Another way of characterizing the literature in this area would point out that researchers have generally adopted either a "micro" or a "macro" approach in investigating organizational functioning. That is, they either consider the effects of individual or perhaps group level phenomena, or they consider the effects of large organizational sub-systems or total organizations. In each case, the exclusion of whole sets of factors associated with other levels of analysis results in narrowed investigations of organizational functioning.

Thus, consideration of a limited number of types of variables precludes learning the effects of intervening or moderating variables. Knowledge of these intervenors and moderators is crucial to an adequate and accurate understanding of the complex relationships that characterize organizational functioning. Oversimplifying these relationships by limiting the variables being considered leads to misconceptions about their true nature. Likewise, concentration on either the micro or macro level to the neglect of the other also restricts the degree to which one

can understand the way organizations function. To put it yet another way,

> *Research strategies which fail to consider the influences of both the structure of the organization, the characteristics of organizational members, and the interactions between these variables cannot cope with complex organizational phenomena.* (Herman & Hulin, 1972, p. 85)

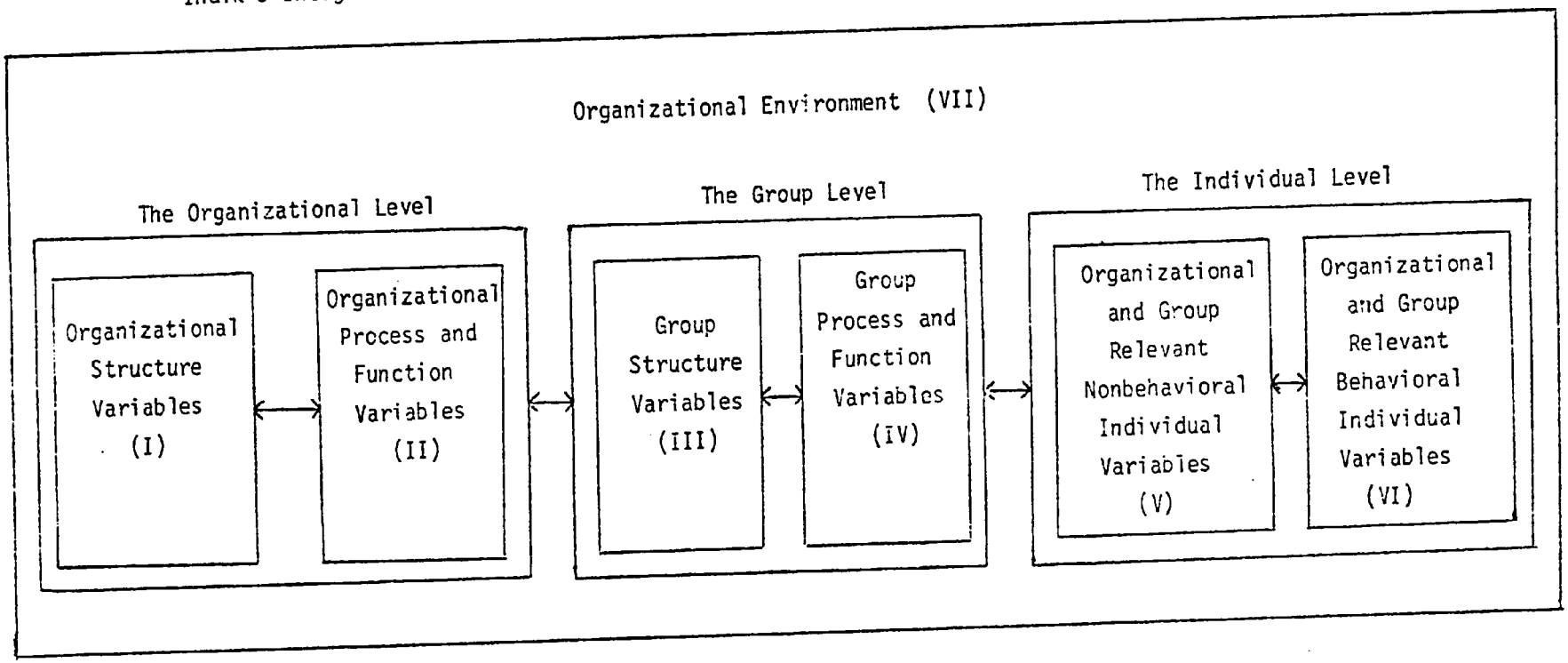
James and Jones (1974) go beyond this recognition of the need to study a wider range of static properties. They claim that an adequate "approach to organizational research requires the addition of more levels of analysis (e.g., subsystems, total organizations, socio-cultural environment), the identification of general aspects of social situations, and the study of adaptive and dynamic organizational processes" (p. 2).

Conducting comprehensive, integrative research on organizations requires comprehensive, integrative models of organizations. Such models should take into account both static and dynamic properties of organizations and their members as well as multiple levels of analysis.

One such integrative model has been proposed by Indik (1968). The model is presented as a classification system for organizational variables and is conceived in terms of open systems theory. It takes both static and dynamic factors into account as panels of variables and includes four levels of analysis. Figure 1 depicts the resulting integrative linkage model. Appendix A lists more specifically the variables which Indik assigns to each panel in the model. Those variables which this discussion has thus far labelled outcomes are included in this model. Attitudes are included in panel V; behaviors are included in panel VI.

Figure 1

Indik's Integrative Model Showing the Relation of Variables in a Basic Classification Structure



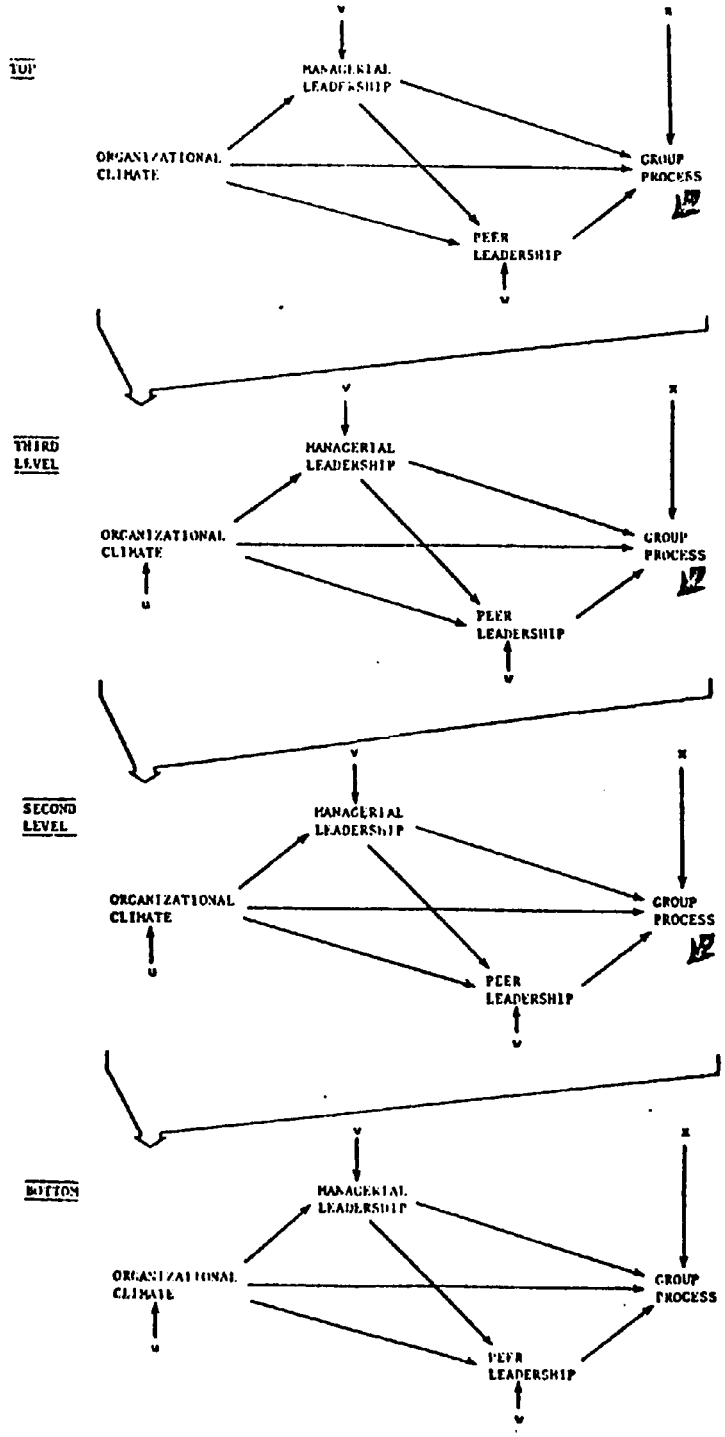
Those variables most likely to be studied together are paired by means of arrows. Each of variables I-VI may be studied in conjunction with organizational environment (VII).

It is assumed that variables within the same level of analysis are more likely to be consistently and directly related to each other. It is also assumed that panels closest to one another but not at the same level of analysis will be more closely related than panels not in close proximity. Finally, it is assumed that the relationships between nonadjacent panels are mediated by variables from intervening panels. This latter assumption allows the delineation of more complex relationships and moves beyond the supposition of simple bivariate relationships. This model's merit lies in its integrative aspects and its relative simplicity. It generates easily tested hypotheses. It is, however, in need of empirical investigation.

One model of organizational functioning which has been empirically tested and for which the evidence provides strong support is the hierarchical model of organizational functioning proposed by Franklin (1973). This model is depicted in Figure 2. According to the criteria described above, this is not an integrative model in the strictest sense of the word since it does not explicitly include outcomes, static factors and individual level determinants. These variables were not ignored in the development of the model, however. At each level in the larger model, a smaller, subunit model can be seen to recur. This submodel was taken from work by Likert (1967) and Bowers (1975b) where a model was proposed which did include outcomes. This latter model is presented in Figure 3. In this smaller model, individual outcomes, e.g., satisfaction, personnel performance, are seen as the output of a causal chain of the same social-psychological factors included in Franklin's model (see Figure 2). Further, organizational outcomes, e.g., productive efficiency, are the output of a causal chain that

Figure 2

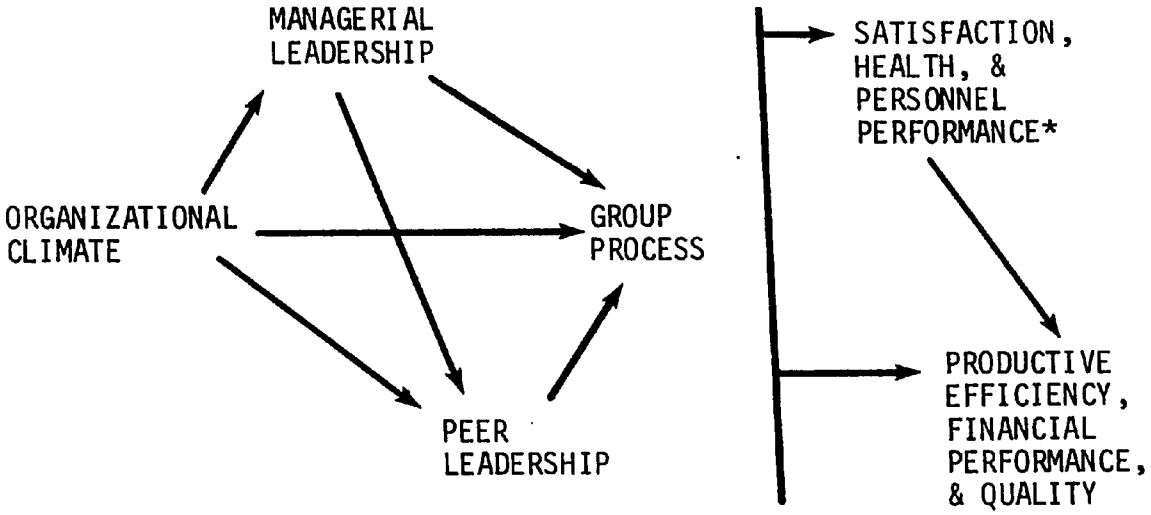
HIERARCHICAL MODEL OF
ORGANIZATIONAL FUNCTIONING



(reprinted from Franklin, 1973)

Figure 3

RELATIONSHIPS AMONG
SOCIAL-PSYCHOLOGICAL FACTORS
AND OUTCOMES



*Personnel performance includes such factors as turnover, grievance and absence rate.

includes both the social-psychological factors and the individual outcomes. Thus, in a sense, outcomes are implicit in Franklin's model; they would be the end-results of the other factors. Static factors and individual level variables are also implicit in this model. As Franklin (1973) puts it:

> *The letters u, v, w, and x [in Figure 3] indicate causal factors -- residuals -- not accounted for by factors explicitly included in the model. Measurement error, individual differences, structure, group size, and organizational size are examples of such factors.* (pp. 26-28)

Franklin's path-analytic research on this model provides evidence of strong relationships among these dynamic factors in patterns predicted by the model. The effects of static factors on these dynamic properties, while not explicitly examined, seemed at least secondary.

Thus, Franklin found strong, direct relationships between dynamic factors at different levels of analysis, i.e., dynamic properties of a group were best predicted by dynamic properties outside that group (higher-level group processes). This suggests that a main assumption of Indik's integrative linkage model (see Figure 1) may not be warranted. Indik assumes that effects proceed through a single line of panels of variables, that is, that the effects of dynamic factors at one level of analysis on dynamic factors at another level of analysis must be mediated by static factors at the latter level (effects of panel II on panel IV are mediated by panel III). Given Franklin's findings, it would appear that a model which attempts to integrate static and dynamic factors across levels of analysis, while implying strong relationships between levels of analysis, should also allow for strong effects directly between either static or dynamic factors.

To summarize this discussion thus far, several points can be made:

1. A search of the literature reveals a wealth of empirical evidence for the existence of relationships among static and dynamic determinants of organizational functioning.
2. These relationships have been found for many different combinations of such determinants and at several levels of analysis.
3. While the need for comprehensive models which effectively integrate these determinants and levels of analysis has been recognized, few models have been proposed and even fewer have been empirically tested.
4. Those models which have been proposed are either (a) comprehensive, but without empirical support [Indik, 1968], or (b) empirically supported, but less than comprehensive [Franklin, 1973].
5. Further, models are needed which better represent the nature of those relationships among static and dynamic factors at various levels of analysis for which there is empirical evidence in the literature.

The next chapter presents such a model. That proposed model was then tested in this investigation.

II.

THE MODEL: PROPOSITIONS AND TESTS

The purpose of this chapter is to (1) describe a proposed integrative model of organizational functioning, and (2) propose an empirical test of that model.

To reiterate from the previous chapter, it appears that a comprehensive, integrative model of organizational functioning should have the following elements and implications:

- Both static and dynamic properties of organizations and their members.
- Multiple levels of analysis.
- Relationships among static and dynamic variables across levels of analysis.
- Strong within-level of analysis effects.
- Strong within-static or within-dynamic category effects.
- The inclusion of both individual and organizational outcomes.
- The generation of testable hypotheses.

A model which purports to meet these criteria is presented in Figure 4. Basically, it is a two-dimensional model composed of six segments or sets of variables.

The horizontal dimension implies three levels of analysis. The first and highest level of analysis is called "extra-group." It includes all variables which could be measured for a total organization or its subsystems, such as total organizational shape or size, a total organization's climate, and size or function of large units within an

Figure 4

Proposed Integrative Model

NATURE OF VARIABLES	LEVEL OF ANALYSIS: EXTRA-GROUP	GROUP	INDIVIDUAL
STATIC	organizational or extra-group structure	group structure	demographics, aptitudes, etc.
DYNAMIC	organizational or extra-group process	group process	performance, membership behaviors

organization, to name a few.

The second level of analysis is called "group." It is confined to measures which are aggregated for a single work group, which is defined as a supervisor and all those persons who report directly to him or her. Examples of such measures would be group size, hierarchical level, supervisory leadership behaviors, and group interaction process.

The final level of analysis is called "individual." Variables at this level would include demographic characteristics, personality characteristics, aptitudes, attitudes, membership behaviors, and task performance behaviors.

The vertical dimension of the model implies differences in the nature of the variables. There are two classes of variables: static and dynamic. Those terms are used here as they generally have been applied in the previous discussion. Thus, static variables would include enduring features such as structural characteristics, demographic characteristics, personality characteristics, and aptitudes. The dynamic class of variables includes factors such as climate, leadership, interaction process, attitudes, membership behaviors, and task performance behaviors. Thus, in this model, those variables which are traditionally considered outcomes are incorporated into the model at the dynamic/individual level.

Taken to this point, the model appears to be more of a classification system for organizational variables than an integrative model. However, this model also suggests many relationships among sets of variables which could be investigated. One could look at variables within a level of analysis; for instance, the effects of group size (static) on group interaction process (dynamic). One could consider

relationships within a class of variables; for instance, the effects of total organizational climate (extra-group) on group interaction process (group). Finally, one could look at relationships between levels of analysis and between classes of variables; for instance, the effects of total organization shape (static/extra-group) on group interaction process (dynamic/group).

The model also implies some relativity in the nature and strengths of relationships between segments of the model. These relative strengths are conditioned by two principles called "permeability" and "proximity." By way of illustrating the first of these principles, in Figure 4 the horizontal line separating classes of variables is darker than the vertical lines separating levels of analysis. This means that effects within a class of variables and between levels of analysis will be stronger than effects within a level of analysis and between classes of variables. In other words, the line separating variables of the same class at different levels of analysis is more "permeable," thus allowing greater direct effects than the thicker, less permeable line separating variables at the same level of analysis but in different classes.

The other principle which has implications for the relative strength of relationships between segments is called "proximity." This implies that relationships between adjacent segments will be stronger than relationships between nonadjacent segments. Further, the more distant the nonadjacent panels are, the weaker the relationship will be.

In their operation as conditioners of the strength of relationships, permeability takes precedence over proximity. That is, in

considering the comparative strength of relationships between adjacent segments within the same class of variables versus relationships between adjacent segments within the same level of analysis, the model would predict that the latter would be weaker because a less permeable boundary is being crossed.

Another way these principles can be operationalized in making predictions about the relative strengths of relationships is to count the number of lines a relationship must "cross." A permeable boundary is considered one line; a less permeable boundary counts as one and one-half lines. The strength of a relationship between two segments of the model is inversely related to the number of lines it crosses.

Before moving on to some proposals for a test of this model, a couple of explanatory points should be made about some of its limitations. First, the exclusion from the model of organizational context variables was deliberate for this investigation. However, their inclusion in the model does not seem problematic. There are at least two ways they could easily be incorporated. One could treat context as Indik (1968) does (see Figure 1) and embed the entire model in some kind of contextual environment. On the other hand, work such as that by Pugh, Hickson, Hinings, and Turner (1969) suggests that another level of analysis such as "extra-organizational" could be added to the model, to the left of the extra-group level. In fact, a static/dynamic classification of possible contextual variables is at least intuitively reasonable.

Another way this model is perhaps unnecessarily limited is in its two dimensions. It is conveivable that another dimension, such as time or stage of organizational development, could be added to the model

thereby increasing its comprehensiveness and implying additional sets of relationships which could be investigated. For example, the addition of a time dimension would be conducive to tests of lag times and causal effects.

These limitations having been noted, however, the model as it stands still generates many testable hypotheses. That is, the model implies many relationships among variables which can be tested in any number of fashions. One method would be to choose a dependent variable or variables from one segment of the model and independent variables or predictors from other segments and test the relative strength of their predictive ability. This investigation has been undertaken to do just that.

The dependent variable is found in the dynamic/group level segment of the model. Its exact nature and those of the predictors will be described more fully in the next chapter. The predictors are from four of the five remaining segments of the model: static/extra-group, dynamic/extra-group, static/group, and static/individual. The specific variables were chosen because data were available for each of them.

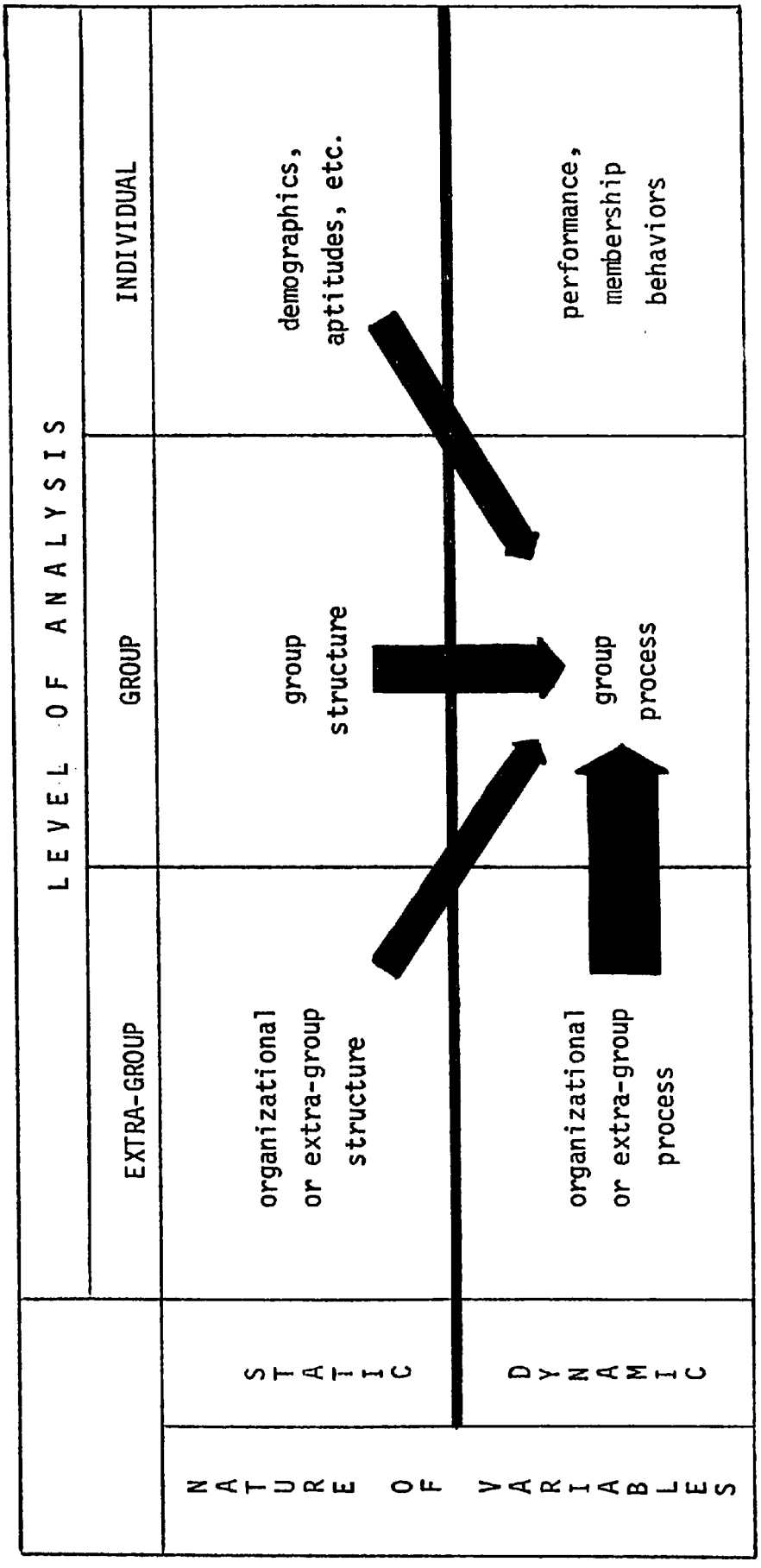
Two general propositions about the nature and relative strength of relationships between these predictors and dependent variables are derivable from the model. From each general proposition, more specific hypotheses are implied. Figure 5 provides a visual representation of these hypotheses.

Proposition I: Significant relationships exist between different segments of the model. Each of the following hypotheses is represented by an arrow in Figure 5.

Figure 5

Proposed Integrative Model

with Hypothesized Relationships



a. Predictors from the dynamic/extra-group segment are related to variables in the dynamic/group segment.

b. Predictors from the static/extra-group segment are related to variables in the dynamic/group segment.

c. Predictors from the static/group segment are related to variables in the dynamic/group segment.

d. Predictors from the static/individual segment are related to variables in the dynamic/group segment.

Proposition II: Relationships among segments of the model have relative strengths determined by permeability across levels of analysis and proximity. Each of the following hypotheses is represented by the relative thickness of the arrows in Figure 5.

a. Variables from the dynamic/extra-group segment predict variables from the dynamic/group segment better than do variables from the static/group segment.

b. Variables from the static/group segment predict variables in the dynamic/group segment better than do variables from the static/extra-group segment.

c. Variables from the static/extra-group segment predict variables from the dynamic/group segment no better than do variables from the static/individual segment.

Empirical analyses of these propositions and hypotheses allowed an evaluation and refinement of the proposed model.

III.

METHODOLOGY

Adequate testing and evaluation of the propositions outlined in the previous chapter required an extensive data set and sophisticated capabilities for multivariate analyses. Conducting tests focusing on the effects of extra-group factors implies that data from a range of "extra-groups," or organizations, are available. Determining the relative strength of sets of predictors implies a capacity for simultaneous consideration of multiple predictors. Fortunately, the combined resources of the Organizational Development Research Program (ODRP) and the Survey Research Center of the Institute for Social Research made these analyses possible.

SITES AND SAMPLE

Over the past ten years, ODRP has gathered information using a standardized questionnaire from over 50,000 respondents in approximately 75 organizations. At most of these sites, as many as five repeat measures were obtained at intervals ranging from six to 32 months. The bulk of the resulting data are standardized in that they were gathered using (1) standard administration procedures, (2) the same instrument, (3) the same quality control mechanisms, and (4) the same data processing procedures. While some of the data points needed for this study were not in the large ODRP data bank itself, they were retrievable from other data banks and records.

This investigation ultimately used a specifically sampled subset of this large data bank. With the exception of some of the total organization variables, all data were aggregated at the group level. A group consists of all persons who report directly to the same supervisor. Each group's data were subjected to several tests to determine its eligibility for inclusion in the subset. There were five criteria for inclusion.

1. Sufficient data to create values for all predictors and the dependent variable.
2. Two waves of data available for each group. This was necessary because predictor values were created from wave 1 data, while the dependent variable used wave 2 data.
3. Data available for each group's supervisor's own work group. This was necessary because one of the extra-group predictors was derived from these data from a higher hierarchical level.
4. The supervisor of each work group remaining constant over both waves of data.
5. Each group consisting of at least three members. This criterion was used to assure the reliability of the dependent variable.

Applying these criteria to the available data resulted in a sample of 612 groups consisting of 4,982 individual respondents from a total of sixteen sites. The number of groups per site ranged from 7 to 100. The mean number of groups per site was 37.5. This sample included organizations from a wide range of industries including oil, chemical, insurance, automotive, paper and glass products. The

sample covered work activities such as sales, fabrication, assembly, continuous processing, and paper processing. Other features of this sample are described more fully in the next section. It was felt that these industries and activities constituted a wide enough range to allow generalizability of the results.

MEASURES

The measures used in this investigation consisted of (1) a dependent variable from the dynamic/group segment of the proposed model, and (2) sets of predictors from four of the five remaining segments of the model. Table 3 lists these measures and their sources.

DEPENDENT VARIABLE: GROUP TYPE

Among the many variables which can be included in the dynamic/group segment of the model are several social-psychological factors which are measured by the Survey of Organizations (SOO).[1] This survey is the standardized instrument which was administered to all respondents in the sample. A facsimile of the questionnaire is presented in Appendix B.

The questionnaire consists of 105 items which are directed toward different aspects of a person's work environment. In addition, there are six items concerning individual demographic characteristics.

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[1]A detailed description of this instrument can be found in the questionnaire manual (Taylor & Bowers, 1972). The manual includes statistical information concerning the reliability and validity of the survey's measures, as well as directions for the administration of the questionnaire.

TABLE 3

DEPENDENT VARIABLE AND PREDICTORS

VARIABLE TYPE	SEGMENT OF THE MODEL	VARIABLE	SOURCE
DEPENDENT	Dynamic/Group	Group Type	SOO data
PREDICTORS	Dynamic/Extra-Group	Superior Group Process	SOO data
	Static/Extra-Group	Organization Size	Sum of SOO respondents
		Organization Shape	Total size plus supervisory rosters
	Static/Group	Group Size	Sum of SOO respondents
		Group Function	Supervisory rosters
		Group Level	SOO data
	Static/Individual	Tenure	SOO data
		Age	SOO data
		Education	SOO data

Most items were designed to be used with a five-point extent scale for recording responses. The response alternatives for questions of this type were:

1. to a very little extent
2. to a little extent
3. to some extent
4. to a great extent
5. to a very great extent

There are a few questions which provide five separate statements as response alternatives.

Measures of a Group's Social-Psychological Environment

Fifty-one SOO items have been grouped into 16 indices. These indices and their component items are presented in Table 4. The indices are measures of various social-psychological factors and are grouped into five basic categories:

1. Organizational Climate -- consists of six major indices

   (a) Decision Making Practices
   (b) Communication Flow
   (c) Motivational Conditions
   (d) Human Resources Primacy
   (e) Lower Level Influence
   (f) Technological Readiness

2. Supervisory Leadership -- consists of four major indices

   (a) Supervisory Support
   (b) Supervisory Work Facilitation
   (c) Supervisory Goal Emphasis
   (d) Supervisory Team Building

3. Peer Leadership -- consists of four major indices

   (a) Peer Support
   (b) Peer Work Facilitation
   (c) Peer Goal Emphasis
   (d) Peer Team Building

4. Group Process -- consists of seven items

TABLE 4

SOO INDICES AND COMPONENT ITEMS

Organizational Climate Indices

Decision Making Practices

*34. How are objectives set in this organization?

35. In this organization to what extent are decisions made at those levels where the most adequate and accurate information is available?

36. When decisions are being made, to what extent are the persons affected asked for their ideas?

37. People at all levels of an organization usually have know-how that could be of use to decision-makers. To what extent is information widely shared in this organization so that those who make decisions have access to all available know-how?

Communication Flow

12. How adequate for your needs is the amount of information you get about what is going on in other departments or shifts?

13. How receptive are those above you to your ideas and suggestions?

14. To what extent are you told what you need to know to do your job in the best possible way?

Motivational Conditions

*16. How are differences and disagreements between units or departments handled in this organization?

*24. Why do people work hard in this organization?

27. To what extent are there things about working here (people, policies or conditions) that encourage you to work hard?

Human Resources Primacy

8. To what extent does this organization have a real interest in the welfare and happiness of those who work here?

9. How much does this organization try to improve working conditions?

11. To what extent are work activities sensibly organized in this organization?

*Please refer to Appendix B for the response alternatives to these items.

TABLE 4 (CONTINUED)

Lower Level Influence

In general, how much say or influence does each of the following groups of people have on what goes on in your department?

30. Lowest-level supervisors (foreman, office supervisors, etc.)

32. Employees (people who have no subordinates)

Technological Readiness

7. To what extent is this organization generally quick to use improved work methods?

104. To what extent are the equipment and resources you have to do your work with adequate, efficient, and well-maintained?

Supervisory Leadership Indices

Support

42. How friendly and easy to approach is your supervisor?

44. When you talk with your supervisor, to what extent does he pay attention to what you're saying?

46. To what extent is your supervisor willing to listen to your problems?

Work Facilitation

54. To what extent does your supervisor show you how to improve your performance?

56. To what extent does your supervisor provide the help you need so that you can schedule work ahead of time?

58. To what extent does your supervisor offer new ideas for solving job-related problems?

Goal Emphasis

48. How much does your supervisor encourage people to give their best effort?

50. To what extent does your supervisor maintain high standards of performance?

TABLE 4 (CONTINUED)

Team Building

60. To what extent does your supervisor encourage the persons who work for him to work as a team?

62. To what extent does your supervisor encourage people who work for him to exchange opinions and ideas?

Peer Leadership Indices

Support

75. How friendly and easy to approach are the persons in your work group?

77. When you talk with persons in your work group, to what extent do they pay attention to what you're saying?

79. To what extent are persons in your work group willing to listen to your problems?

Work Facilitation

85. To what extent do persons in your work group help you find ways to do a better job?

87. To what extent do persons in your work group provide the help you need so that you can plan, organize, and schedule work ahead of time?

89. To what extent do persons in your work group offer each other new ideas for solving job-related problems?

Goal Emphasis

81. How much do persons in your work group encourage each other to give their best effort?

83. To what extent do persons in your work group maintain high standards of performance?

Team Building

91. How much do persons in your work group encourage each other to work as a team?

93. How much do persons in your work group emphasize a team goal?

95. To what extent do persons in your work group exchange opinions and ideas?

TABLE 4 (CONTINUED)

Group Process

97. To what extent does your work group plan together and coordinate its efforts?

98. To what extent does your work group make good decisions and solve problems well?

99. To what extent do persons in your work group know what their jobs are and know how to do them well?

100. To what extent is information about important events and situations shared within your work group?

101. To what extent does your work group really want to meet its objectives successfully?

102. To what extent is your work group able to respond to unusual work demands placed upon it?

103. To what extent do you have confidence and trust in the persons in your work group?

Satisfaction

17. All in all, how satisfied are you with the persons in your work group?

18. All in all, how satisfied are you with your supervisor?

19. All in all, how satisfied are you with your job?

20. All in all, how satisfied are you with this organization, compared to most others?

21. Considering your skills and the effort you put into the work, how satisfied are you with your pay?

22. How satisfied do you feel with the progress you have made in this organization up to now?

23. How satisfied do you feel with your chances for getting ahead in this organization in the future?

5. Satisfaction -- consists of seven items concerning satisfaction with:

   (a) Work Group
   (b) Supervisor
   (c) Job
   (d) Organization
   (e) Pay
   (f) Progress up to now
   (g) Future Progress

With the possible exception of the Satisfaction category, which perhaps more accurately belongs in the dynamic/individual segment of the model, all these indices would be included in the dynamic/group segment of the model. Generally, questions from the SOO elicit the respondent's perceptions of conditions rather than his or her attitudes about them. Thus, the data provide a description of many social-psychological factors. When aggregated at the group level, SOO data can be used as a fairly extensive measure of a group's internal social-psychological environment (Franklin, 1973).

A Typology of Work Groups

Recently, Bowers and Hausser (1974) investigated the possibility that the internal social-psychological environments measured by the SOO could be conceived of as analogous to "states of nature." That is, they tried to determine whether each group is totally unique or whether there are "types" of such internal environments.

Each group's scores on the 16 major SOO indices (see Table 4) can be used to create its "profile" of social-psychological factors. The profiles of a representative sample of groups can then be analyzed to find similar profiles which can subsequently be characterized as being representative of a particular group type. In the statistical literature, this is known as a "Q-type analysis" (Nunnally, 1967).

Bowers and Hausser (1974) applied one such Q-type analysis technique, called Hierarchical Grouping, to three samples of groups for which SOO index scores were available. Two samples were randomly selected from the large civilian data bank of ODRP, one sample was chosen from data gathered from a representative sample of U.S. Navy personnel.

The particular computer program used in this analysis, called HGROUP (Veldman, 1967), identifies clusters of cases using a distance measure. That is, each group's SOO index scores were used to determine its location in 16-dimensional space. The difference between two groups' profiles amounts to the Pythagorean "distance" between their respective points in that 16-dimensional space. If profiles are similar, the distance measure is small. Using a distance measure to determine profile similarity is usually recommended because it takes all three characteristics of profiles, i.e., level, dispersion and shape, into account (Nunnally, 1967). HGROUP creates clusters of cases by grouping them in a step-wise fashion such that total within-clusters variance will be minimized. This variance is a measure of the "closeness" of the cases in the various clusters.

As a result of applying this analysis technique to the SOO profiles of approximately 560 groups, from two civilian and one military samples, seventeen group types were identified. These types were replicated to varying degrees across the three samples used in the study. Appendix C contains the profiles of these types as they appeared in the three samples. Each profile consists of a group's SOO index scores plotted against percentile norms based on the combined responses of approximately 30,000 SOO respondents. Also included for

the 16 major indices for each type are the index scores which are used to define that type. These scores were determined by finding the average group index score for all groups from all samples falling into that HGROUP cluster or type.

A visual examination of these type profiles reveals that approximately half of them (Types 1 to 8) could be described as "I-profiles." They are differentiated by the general percentile levels at which the lines of their profiles fall. Thus, Type 1 is referred to as "I 80-85," while Type 8 is called "I 25." The letter "I" denotes the fact that the means for all sixteen indices fall at approximately the same percentile level. The rest of the profiles are loosely categorized as "non-I profiles." Usually, one or both of the leadership areas are divergent from the rest of the profile. Here, too, there are a few similar shapes which recur at different percentile levels.

Aside from its utility in a wide range of research on group processes and the effects of interventions (Bowers, 1975a), this typology had great merit for this investigation. It provides a useful distillation of a large number of variables which serve to define a group's internal social-psychological environment. This, in turn, allowed the prediction of a single dependent variable, group type, encompassing extensive measurement of the variables in the dynamic/group segment of the model, rather than predicting a panel of such variables.

Identification of Group Type for This Investigation's Sample

Each group in the sample used in this investigation had its "type" determined from its wave 2 SOO index scores.[2] This was done using the following procedures:

1. To identify a group's type, each index score was substracted from the type-defining score for the corresponding index for each type (see Appendix C).

2. For each type, these differences or discrepancy scores were squared and summed across all 16 indices.

3. The type for which this summed squared discrepancy score was lowest was determined to be the type of the group being analyzed.

Table 5 shows the number of groups identified as each type. Fifteen of the seventeen group types were represented in this sample. The two types which are not present here had not been found in the two civilian samples used to generate the typology.

Because of one of the restrictions of the analysis technique used in this investigation, it was not possible to predict to all group types. That analysis technique recommends that no category of the dependent variable should contain less than ten percent of the total sample. To meet this criterion, several sets of group types present in this sample were collapsed. Types from the original set of seventeen were combined if their respective profile shapes and levels were fairly similar. In three cases, this amounted to combining two contiguous I-profiles (e.g., I 80-85 + I 70). Another combination (↓50 + ↓40 + ↓55-60) could be characterized as having Climate indices

[2]Wave 2 data were used for creating the dependent variable, while all predictors were derived from wave 1 data. This was done to maximize potential time lag effects. Research evidence exists which supports these time lag effects (Franklin, 1973; Meyer, 1972).

TABLE 5

DISTRIBUTION OF SAMPLE GROUPS

ACROSS SEVENTEEN GROUP TYPES

GROUP TYPE	PROFILE SHAPE & PERCENTILE LEVEL	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
1	I 80-85	21	3.4
2	I 70	38	6.2
3	I 60-65	108	17.7
4	I 50	74	12.1
5	I 45	62	10.1
6	I 40	20	3.3
7	I 30-35	70	11.5
8	I 25	25	4.1
9	∠ 60	11	1.8
10	⅃ 50	31	5.1
11	⊦ 40	46	7.5
12	⊰ 40	16	2.6
13	⅂ 55-60	39	6.4
14	⊬ 50	19	3.1
15	⅃ 25	31	5.0
16	⊰ 25	0	0.
17	⊦ 25	0	0.
	TOTALS	612	100%

at one percentile level and one or both sets of Leadership indices at a higher level. The final combination of types actually should be called an "else" category since it contains four non-I profiles which did not fit in the previous combination. However, three of these four profiles, (♩60, ♮40 and ♪50) did have Climate indices at one level and one or both sets of Leadership indices at a lower level, but their combined percentage of the sample added up to only 7.5%. Therefore, the final type represented in this sample (♭25) was added to this combination, bringing the combined percentage up to 12.5%.

This process of collapsing group types resulted in what could be considered a "special" typology of work groups for the purposes of this study. This adapted typology consists of five I-profile types, one homogeneous non-I-profile combination, and one "else" type. Table 6 shows the categories of the adapted typology, their component types from the original typology, the number of groups in each of the new categories, and percentage of total sample in each of the new categories.

PREDICTORS

A total of nine predictor variables were used in this study. Sets of these variables were chosen to represent four of the five remaining segments of the proposed model. Only the dynamic/individual segment went unrepresented in this investigation.

Dynamic/Extra-Group Segment

One variable was chosen to represent the dynamic/extra-group segment of the model, namely, a measure of the group interaction processes, a dynamic variable, of a group with influence over the

TABLE 6

ADAPTED TYPOLOGY OF WORK GROUPS

WITH DISTRIBUTION OF SAMPLE GROUPS

NEW TYPE	LABEL	COMPONENT TYPES FROM ORIGINAL TYPOLOGY	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
1	I 80	I 70, I 80-85	60	9.80
2	I 60	I 60-65	108	17.65
3	I 50	I 50	74	12.09
4	I 40	I 40, I 45	82	13.40
5	I 30	I 25, I 30-35	95	15.52
6	Low Climate High Leadership	⅄ 50, ⅄ 40, ⅄ 55-60	116	18.95
7	Others	⅄ 60, ⅄ 40, ⅄ 50, ⅄ 25	77	12.58
		TOTALS	612	100%

sample group. This was the SOO Group Process index score of the group which includes the supervisor of a particular group from the sample as one of its members. Figure 6 presents this predictive relationship figuratively. Two work groups are represented. The subordinate group is a case from the sample of 612 groups. The superior group, which contains the sample group's supervisor, represents a unit or subsystem of the organization which operates and extends influences beyond the sample group; thus, measures for this superior group are considered extra-group.

Scores from this Group Process index can range from 1.00 to 5.00. Using decile scores from the normative distribution of combined SOO responses, a ten-point scale was developed. A superior group's Group Process score from wave 1 data was assigned a value of one to ten, depending on where its mean fell along this ten-point scale. Table 7 shows this scale, the range of Group Process scores associated with each scale value, the number of sample groups for which the Group Process index scores of the superior level groups were categorized at each scale value, and the percentage of the total sample which had each scale value for this predictor.

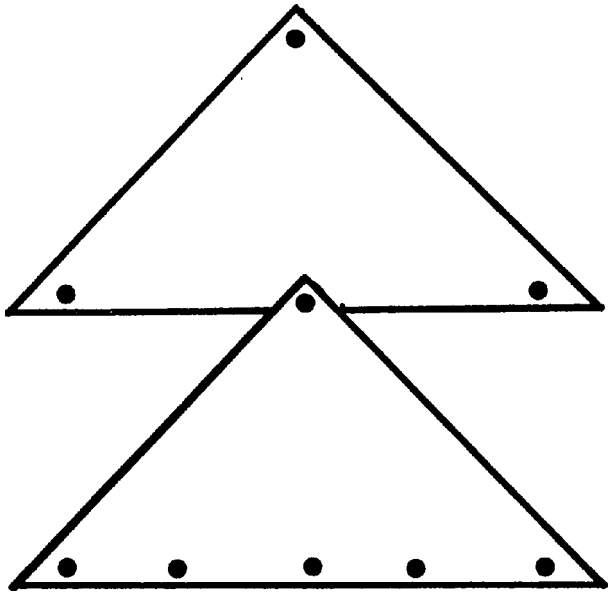
Static/Extra-Group Segment

Two variables were chosen to represent the static/extra-group segment of the model. Each was a measure of total organization, or at least subsystem, structure.

Figure 6

Illustration of Predictor Taken from

The Dynamic/Extra-Group Segment of the Model



GROUP PROCESS INDEX
from superior group (wave 1)

is used to predict

GROUP TYPE of subordinate,
sample group (wave 2)

TABLE 7

DISTRIBUTION OF SAMPLE GROUPS ACROSS TEN CATEGORIES

OF DYNAMIC/EXTRA-GROUP PREDICTOR

SCALE	RANGE OF SUPERIOR GROUP PROCESS SCORES	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
1	1.00 - 2.60	3	0.5
2	2.61 - 3.00	22	3.6
3	3.01 - 3.20	30	4.9
4	3.21 - 3.40	83	13.6
5	3.41 - 3.60	137	22.4
6	3.61 - 3.80	143	23.4
7	3.81 - 4.00	109	17.8
8	4.01 - 4.20	33	5.4
9	4.21 - 4.43	26	4.2
10	4.44 - 5.00	26	4.2
	TOTALS	612	100%

Organization Size. For each site in the sample, a measure of its size was obtained by summing all persons who had responded to the wave 1 SOO regardless of whether their groups fell into this study's sample. These sums ranged from 67 to 2,366 respondents. A three-point ordinal scale was developed to classify each site's size. It should be noted that this measure of size, based as it was on the number of SOO respondents, was used with the assumption that the SOO was administered to the total population of the site. There were some known exceptions to this (e.g., total representation of salaried workers with sampling of hourly employees), but for these sites a separate measure of the organization's size had been obtained from company records. Where appropriate, this measure was substituted for the total number of SOO respondents in this data set. Doing so expanded the range of total size to 5,610.

A related potential problem concerned the fact that a few sites were departments or units within a much larger total organization. In these cases, it was felt that since these units were fairly self-contained within the larger organization, the obtained size value could be considered a measure of subsystem structure. Such a measure was thus able to qualify as a static/extra-group factor and be considered comparable with other total size values for other sites in the sample.

Table 8 shows the scale, the range of sizes associated with each scale value, the number of sites assigned each value, the number of sample groups associated with each value, and the percentage of the total sample which had each scale value for this predictor.

TABLE 8

DISTRIBUTION OF SITES AND SAMPLE GROUPS ACROSS THREE CATEGORIES OF THE STATIC/EXTRA-GROUP PREDICTOR: ORGANIZATION SIZE

ORGANIZATION SIZE	SCALE	RANGE OF TOTAL N	NUMBER OF SITES	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
SMALL	1	<500	5	129	21.1
MEDIUM	2	500 - 2,000	5	202	33.0
LARGE	3	>2,000	6	281	45.9
		TOTALS	16	612	100%

Organization Shape. For each site in the sample, a measure of the relative tallness of flatness of the organization, or subsystem, was obtained by calculating the ratio of number of hierarchical levels at wave 1 to total site size at wave 1 (see above discussion). The number of hierarchical levels was determined by counting the number of "links" in the longest chain in the hierarchy of each site. These link counts were obtained from an examination of the organization chart as derived from rosters of supervisors with reporting relationships indicated. The resulting ratios ranged from 16.8 to 935.0. This ratio could be interpreted as a measure of "flatness," that is, the larger the ratio, the flatter the organization's shape. A three-point ordinal scale was developed to allow classification of sites as "tall," "intermediate," or "flat." Table 9 presents this scale, the ratio values associated with each scale category, the number of sites assigned each value, the number of sample groups associated with each value, and the percentage of the total sample which had each scale value for this predictor.

Static/Group Segment

Three variables were chosen to represent the static/group segment of the model. Each was a measure of group structure.

Group Size. For each group in the sample, a measure of its size was obtained by counting the number of its members who responded to the first administration of the SOO. As mentioned earlier, groups with fewer than three members were excluded from the sample. The sizes of the sample groups ranged from 3 to 38, with a mean of 8.14.
A four-point ordinal scale was used to classify each group's size.

TABLE 9

DISTRIBUTION OF SITES AND SAMPLE GROUPS ACROSS THREE CATEGORIES OF THE STATIC/EXTRA-GROUP PREDICTOR: ORGANIZATION SHAPE

ORGANIZATION SHAPE	SCALE	RANGE OF SIZE/LEVELS RATIOS	NUMBER OF SITES	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
Tall	1	<100	5	124	20.3
Intermediate	2	100 - 300	5	257	42.0
Flat	3	>300	6	231	37.7
	TOTALS		16	612	100%

Table 10 shows this scale, the range of sizes associated with each scale value, the number of sample groups assigned each value, and the percentage of the total sample which had each scale value for this predictor.

Group Function. For each group in the sample, a functional classification was assigned based on an inference of the usual work activities of the group. Five functional categories of substructure were derived from Katz and Kahn (1966). The functional categories and a brief characterization of each is presented below:

1. Production -- concerned with task accomplishment and primary processes of the organization.

2. Maintenance -- concerned with maintaining stability and predictability in the organization; socializing new members, administering rewards and sanctions, rule enforcement.

3. Boundary-Spanning -- concerned with transactional exchanges with the environment; merchandising, recruitment, purchasing, public relations.

4. Adaptive -- concerned with adapting present organizational practices to future environmental demands; intelligence, research and development, planning.

5. Managerial -- concerned with coordination of functional substructures; control, conflict resolution.

Groups were classified by a member of the research staff of ODRP. This individual acquainted herself with the conceptual distinctions between the functional categories listed above. She then examined the supervisory rosters for each site in the sample; these rosters also included each group's supervisor's organizational title. Classification of groups amounted to interpreting these titles and applying the conceptual definitions of the functions. Needless to say, very often

TABLE 10

DISTRIBUTION OF SAMPLE GROUPS ACROSS FOUR CATEGORIES OF THE STATIC/GROUP PREDICTOR: GROUP SIZE

SCALE	RANGE OF GROUP N	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
1	≤5	217	35.5
2	6-10	261	42.6
3	11-15	80	13.1
4	>15	54	8.8
	TOTALS	612	100%

these titles were ambiguous. Fortunately, the classifier had a great store of unique knowledge of the component subsystems of each site in the sample which aided her interpretation to no end.[3]

In addition, two further criteria were applied to the interpretation and classification of groups' functions. They were (1) the probable work activities of the work group members themselves, rather than the supervisor's specific activities; and (2) the nature of the work activities of the total system. This latter criterion allowed a more sophisticated classification which went beyond the simple interpretation of organization titles. For example, groups concerned with technical maintenance would generally be classified into the Maintenance category, based on a cursory analysis of the term. However, if one considers the nature of the total system, there are cases where that classification could conceivably change. In this investigation, it was decided that for sites involved in continuous process production, technical maintenance groups were crucial to the production process itself and therefore legitimately included in a general production subsystem. Using this reasoning, in these latter sites, technical maintenance groups were classified into the Production category.

Table 11 shows the resulting classification of group functions, with the number of groups assigned to each category and the percentage of the total sample which fell into each category of the predictor.

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[3]The author gratefully acknowledges the efforts of Ms. Edie Wessner who classified the entire sample single-handedly.

TABLE 11

DISTRIBUTION OF SAMPLE GROUPS ACROSS FIVE CATEGORIES OF THE STATIC/GROUP PREDICTOR: GROUP FUNCTION

FUNCTION	SCALE	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
Production	1	340	55.6
Maintenance	2	169	27.6
Boundary-Spanning	3	44	7.2
Adaptive	4	37	6.0
Managerial	5	22	3.6
	TOTALS	612	100%

It should be noted that since only one individual possessed the knowledge of the organizations required for classifying these groups, the classification could not be replicated by any other raters. Thus, establishing inter-rater reliability was not possible in this investigation.

Group Level. For each group in the sample, a measure of its hierarchical level was obtained from ODRP's SOO data bank. As part of the established data processing procedures of ODRP, a level designation is assigned to each work group based on information from the supervisory roster and its indicated reporting relationships. There are five such level designations. Table 12 shows the categories of this variable, the number of sample groups having each level designation, and the percentage of the total sample that fell into each category for this predictor.

Static/Individual Segment

Three variables were chosen to represent the static/individual segment of the model. Each was a demographic measure. A rather special problem was encountered at this segment of the model. While up to this point, the predictor variables were meaningful when applied at a group level, traditionally, demographic characteristics have been dealt with and applied at an individual level. This problem of obtaining demographic measures which could be applied at the group level was solved by creating pattern variables for these predictors. A pattern was designed based on the absolute level of a group's mean score for a characteristic plus the relative homegeneity or heterogeneity of the group on that characteristic based on the level of the standard

TABLE 12

DISTRIBUTION OF SAMPLE GROUPS ACROSS FIVE CATEGORIES OF THE STATIC/GROUP PREDICTOR: GROUP LEVEL

GROUP LEVEL DESIGNATION	SCALE	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
Top Management	4	20	3.3
Upper-Middle Management	3	98	16.0
Lower-Middle Management	2	289	47.2
First-Line Blue Collar	1	112	18.3
First-Line White Collar	0	93	15.2
	TOTALS	612	100%

deviation from the mean. In these pattern variables, the term "homogeneous" means a group had low variance on the characteristic in question; "heterogeneous" implies high variance.

Tenure. For each group in the sample, a measure of the group's average tenure was obtained from its SOO data. The following item and response alternatives are contained in the SOO:

When did you first come to work here?

1. Less than 1 year ago
2. Between 1 and 5 years ago
3. Between 5 and 10 years ago
4. Between 10 and 15 years ago
5. Between 15 and 20 years ago
6. More than 25 years ago

A six-category pattern variable was created for the classification of groups' scores on this tenure measure based on three degrees of tenure, short, medium, and long. To illustrate these categories, the term "Short Tenure" can be interpreted as meaning that, on the average, members of the group have less than five years experience. The term "Long Tenure" implies an average of more than fifteen years experience. Table 13 presents these six tenure categories, their levels, the range of mean scores and range of standard deviations associated with each category, the number of groups assigned to each category, and the percentage of the total sample included in each category of this predictor.

Age. For each group in the sample, a measure of the group's average age was obtained from its SOO data. The following item and response alternatives are contained in the SOO:

TABLE 13

DISTRIBUTION OF SAMPLE GROUPS ACROSS SIX CATEGORIES OF

THE STATIC/INDIVIDUAL PREDICTOR: TENURE

CATEGORY	CATEGORY NAME	RANGE OF MEAN SCORES FOR TENURE ITEM	RANGE OF STANDARD DEVIATIONS	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
1	Short Tenure/Homogeneous	1.00 - 2.00	<1.00	38	6.2
2	Short Tenure/Heterogeneous	1.00 - 2.00	≥1.00	7	1.1
3	Medium Tenure/Homogeneous	2.01 - 4.00	<1.00	72	11.8
4	Medium Tenure/Heterogeneous	2.01 - 4.00	≥1.00	252	37.9
5	Long Tenure/Homogeneous	4.01 - 6.00	<1.00	162	26.5
6	Long Tenure/Heterogeneous	4.01 - 6.00	≥1.00	101	16.5
			TOTALS	612	100%

Into what age bracket do you fall?

1. 25 years or under
2. 26 years to 30 years
3. 31 years to 35 years
4. 36 years to 40 years
5. 41 years to 45 years
6. 46 years to 55 years
7. 56 years or over

A six-category pattern variable was created to classify groups' scores on this age item, based on three age levels, young, middle-aged, and old. The term "young" implies that, on the average, the group's members are under 30 years of age. The term "old" means that the group's average age is over 45 years. Table 14 presents the six categories for the age pattern variable, their labels, the range of mean scores and range of standard deviations associated with each category, the number of groups in each category, and the percentage of the total sample which fell into each category of this predictor.

Education. For each sample group, a measure of the group's average educational level was obtained from its SOO data. The following item and response alternatives are found in the SOO:

How much schooling have you had?

1. Some grade school
2. Completed grade school
3. Some high school
4. Completed high school
5. Some college
6. Completed college
7. Some graduate school
8. Completed graduate school

A six-category pattern variable was developed to classify groups' education scores, based on three levels of education, grade school, high school and college. For example, classification into the "high

TABLE 14

DISTRIBUTION OF SAMPLE GROUPS ACROSS SIX CATEGORIES OF

THE STATIC/INDIVIDUAL PREDICTOR: AGE

CATEGORY	CATEGORY NAME	RANGE OF MEAN SCORES FOR AGE ITEM	RANGE OF STANDARD DEVIATIONS	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
1	Young/Homogeneous	1.00 - 2.00	<1.00	21	3.4
2	Young/Heterogeneous	1.00 - 2.00	≥1.00	19	3.1
3	Middle-Aged Homogeneous	2.01 - 5.00	<1.00	36	5.9
4	Middle-Aged/Heterogeneous	2.01 - 5.00	≥1.00	370	60.5
5	Old/Homogeneous	5.01 - 7.00	<1.00	76	12.4
6	Old/Heterogeneous	5.01 - 7.00	≥1.00	90	14.7
			TOTALS	612	100%

school" category implies that, on the average, members of the group have had at least some high school. No groups in the sample had means which would have categorized them at the grade school level. The two grade school categories were dropped from the scale. Table 15 shows the resulting four education categories, their labels, the range of mean scores and range of standard deviations associated with each category, the number of sample groups in each category, and the percentage of the total sample assigned to each category of this predictor.

ANALYSIS PROCEDURES

Using the data set just described to test the propositions and hypotheses outlined in the previous chapter implied two sets of requirements for the analysis technique used. The first set of requirements concerned the nature of the data set. Because the dependent variable used in this investigation is nominally scaled, the use of many traditional analysis techniques, like multiple regression, was precluded. While a few of the predictors are at least ordinally scaled (e.g., size, extra-group process), several of them are nominative variables (e.g., group function, tenure, age, education). This fact also restricted the analysis techniques which could be used in this investigation. Further, while there was a single dependent variable, group type, there were a total of nine predictors which the analysis technique had to be capable of handling simultaneously.

The second set of requirements concerned the analysis technique's capabilities for providing information about the absolute and relative strength of bivariate and multivariate relationships among the

TABLE 15

DISTRIBUTIONS OF SAMPLE GROUPS ACROSS FOUR CATEGORIES OF

THE STATIC/INDIVIDUAL PREDICTOR: EDUCATION

CATEGORY	CATEGORY NAME	RANGE OF MEAN SCORES ON EDUCATION ITEM	RANGE OF STANDARD DEVIATIONS	NUMBER OF GROUPS	PERCENTAGE OF TOTAL SAMPLE
1	High School/Homogeneous	1.00 - 4.00	<1.00	86	14.1
2	High School/Heterogeneous	2.01 - 4.00	≥1.00	67	10.9
3	College/Homogeneous	4.01 - 6.00	<1.00	357	58.3
4	College/Heterogeneous	4.01 - 6.00	≥1.00	102	16.7
			TOTALS	612	100%

predictors and dependent variable. Testing the hypotheses outlined earlier implied an ability to answer the following two questions:

1. *How well can a particular predictor, or set of predictors, explain variation in the dependent variable?*

2. *What is the marginal usefulness of a particular predictor, or set of predictors, in explaining the dependent variable over and above what all other predictors, or sets of predictors, can explain?*

An ability to answer the first question allows one to evaluate the first proposition from the previous chapter, which proposed that relationships exist between the set of predictors from each of the chosen segments of the model and the dependent variable from the dynamic/group segment. An ability to answer the second question allows one to evaluate the second proposition, which posited differences in the relative strength of sets of predictors. These data-handling and analytic requirements severely restricted the analysis techniques which could be applied in this investigation.

Fortunately, researchers at the Institute for Social Research had recently developed a multivariate analysis technique which was ideally suited to this investigation. The Multivariate Nominal Scale Analysis (MNA) technique was specifically designed by Andrews and Messenger (1973) to relate a nominally scaled dependent variable to a set of predictors which can be interval, ordinal or nominal. This technique is thus capable of dealing with a number of predictors simultaneously. Further, its output allows an analysis of strength of relationships (see below). Statistically, it is useful to conceive of the MNA technique as a series of dummy variable multiple regressions. A detailed description of MNA, its capabilities, and its computer program is available in the MNA manual (Andrews & Messenger, 1973).

MNA is available as part of the Institute's OSIRIS package. In this investigation, OSIRIS was also used for some basic data management and to obtain descriptive statistics for the data set.

MNA Output

Among the many univariate, bivariate, and multivariate statistics which the MNA program provides as standard output, several were of considerable interest in this study.

Overall Distribution. The overall percentage distribution of the sample across all categories of the dependent variable is given. The percentage found in the modal category provides some perspective for the subsequent predictive relationships. For example, if the modal category contained 30% of the sample, one could predict that each sample case fell into the modal category and be correct 30% of the time. What becomes of interest then is the degree to which relationships of the predictors to the dependent variable act to increase this predictability above 30%.

Multiple Relationships. The strength of the relationship between predictors taken together as a set and the dependent variable is shown in two ways by MNA. First, a generalized squared multiple correlation, R^2, is provided. This is roughly interpretable as the percentage of the variance in the dependent variable which the set of predictors has explained.

Second, a multivariate Theta, Θ, is provided. This indicates the proportion of cases which could be correctly classified into the various categories of the dependent variable after taking into account

the case's scores on the predictors in question. It is this proportion which can be compared to the percentage of cases in the modal category, in order to evaluate any gain in the accuracy of prediction.

Predictor-Specific Relationships. Two basic summary statistics are provided which can be used to "measure the strength of the bivariate relationship between the dependent variable and each predictor" (Andrews & Messenger, 1973, p. 30). The first, the generalized eta-squared statistic, η^2_i (i = predictor), measures the ability of the predictor to explain variation in the dependent variable. It "indicates the proportion of the total sum of squares explainable by the predictor" (Andrews, Morgan, & Sonquist, 1967, p. 22).

The second predictor-specific summary statistic which MNA provides is the bivariate theta statistic, θ_i. This measure indicates the proportion of cases which could be correctly classified into the dependent variable categories if a case's score on the predictor in question was known. Again, this proportion can be compared with the original modal percentage to ascertain the gain in predictive accuracy provided by a single predictor. A gain over the modal percentage implies that knowledge of the predictor would allow one to correctly predict to categories of the dependent variable other than the modal category.

These standard summary statistics which MNA provides allowed judgements to be made concerning the existence of relationships between the sets of predictors from the various segments of the model and the dependent variable. These statistics also allowed some inference concerning the relative strength of the sets of predictors.

A more complete judgement of these relative strengths required additional analyses. One way to ascertain this relativity is to determine the marginal utility of a set of predictors. This was to be accomplished by running a series of MNAs, removing one set of predictors from each run. The marginal utility of a predictor set was then assessed by comparing the multivariate statistic R^2 from the MNA run which included all possible predictors with that from the MNA run which excluded the set in question. The increase in R^2 which occurred when a set of predictors was included in the MNA run was interpreted as a measure of that set's marginal usefulness. Comparing these measures of marginal utility across sets of predictors allowed an estimation of their relative predictive strengths.

MNA Restrictions and Assumptions

The MNA technique is not without certain restrictions and assumptions in its use. One such restriction, which was mentioned earlier, is the need to have 10% of the sample in each category of the dependent variable. This was discussed under the section describing group types. The solution to this problem amounted to combining group types for this investigation.

A second restriction is that there can be no perfect linear dependencies between pairs of variables. This was determined by examining joint frequency distributions of all possible pairs of predictors before proceeding to run any MNAs. Appendix D consists of these bivariate frequency distributions. No linear dependencies were found in these data. Other MNA restrictions, such as limits to the number of categories per predictor and a minimum sample size, were easily met by the data set used in this study.

While MNA does not require the assumption that relationships among predictors are linear, it does assume additivity, i.e., that there are no substantial interactions in the data. In this study, the analyses were carried out by proceeding with the assumption that no substantial interactions existed among the predictors. This assumption was made based on two considerations. First, there was some historical precedent for using such predictors with an assumption of additivity (Herman et al., 1975; Herman & Hulin, 1972; James & Jones, 1974). Second, the existence of interactions in these data would only suppress expected effects, rather than inflate them. Thus, if interactions were present, any findings of this investigation would be conservative estimates of the relationships between predictors and group type.

Organization of Analyses

The analyses undertaken in this investigation were conducted in two stages. The first stage consisted of determining the strength of relationships between the set of predictors from each of the four chosen segments of the model and the dependent variable. This required running MNA four separate times, once with all predictors, once with just the static/extra-group predictors, once with the static/group predictors, and once with the static/individual predictors. Because the dynamic/extra-group segment was represented by a single variable, its relationship to the dependent variable had to be determined from the bivariate summary statistics obtained from the MNA which included all predictors.

The second stage of these analyses investigated the relative strength of relationships between predictor sets and the dependent

variable. To do this, four additional MNAs were run. For each set of predictors, MNA was run using all predictors except the set in question. These results were compared with the overall nine-predictor MNA results. Any difference in R^2 was considered an indication of the marginal utility of the particular predictor set.

IV.

RESULTS

This chapter is presented in three sections. The first two sections report the results of the analyses conducted to investigate the two major propositions presented in Chapter II. Any indications which these results provide of support or lack of support for the hypotheses associated with each proposition are noted. Finally, the results of some additional analyses, which were prompted by the outcomes of the initial analyses, are presented.

RELATIONSHIPS BETWEEN SEGMENTS OF THE MODEL

The hypotheses derived from the first proposition were tested using two indicators of predictor importance. The first such indicator was the proportion of variance in the dependent variable accounted for by the predictor(s). Tests of significance were conducted on these indicators. The second indicator was the proportion of cases which were correctly classified on the basis of the predictor(s) being tested. This latter indicator was examined for any increase in predictive accuracy which the predictor(s) may provide over and above the mode of the overall percentage distribution of the dependent variable. This mode was 18.95% (see Table 6). Where the hypothesis involved a single predictor, bivariate statistics were used in the evaluation. Multivariate statistics were used to evaluate hypotheses concerning sets of predictors.

Relationship Between Dynamic/Extra-Group Segment and Dynamic/Group Segment

The hypothesis that "predictors from the dynamic/extra-group segment are significantly related to variables in the dynamic/group segment" (p. 30) was tested using a single predictor, the superior Group Process index score. Table 16 presents the results for this predictor. Superior Group Process, a measure of group interaction and coordination, explained almost 4% of the total variance in the dependent variable. The fact that this predictor accounts for a significant fraction of the variance in the dependent variable plus the substantial gain (34.7%) in predictive accuracy which the θ for this predictor indicates, is evidence which supports the first hypothesis of the first proposition. This percentage gain was derived by dividing the θ by the modal proportion from the original overall distribution (.2549 ÷ .1895 = 1.347).

Relationships Between Static/Extra-Group Segment and Dynamic/Group Segment

The hypothesis that "predictors from the static/extra-group segment are significantly related to variables in the dynamic/group segment" (p. 30) was tested using a set of two predictors: organization size and organization shape. Table 17 contains the multivariate statistics for this set as well as the bivariate statistics for each predictor. Taken together, predictors from the static/extra-group segment accounted for 2.1% of the variance in the dependent variable. The significance of the R^2 for these predictors and the gain in predictive accuracy which they produce (23.3%) provide evidence for the second hypothesis of the first proposition.

TABLE 16

RELATIONSHIP BETWEEN DYNAMIC/EXTRA-GROUP

PREDICTOR AND DYNAMIC/GROUP DEPENDENT VARIABLE

BIVARIATE RELATIONSHIPS	η^2	F [4]	θ
Superior Group Process	.0337	2.328*	.2549

*$p<.05$

[4]The significance of η^2 was determined using the ratio:

$$F = \left(\frac{\eta^2}{1 - \eta^2}\right)\left(\frac{N - J}{J - 1}\right)$$

where N equals the number of cases in the sample and J equals the number of categories of the predictor being tested. The significance of F was evaluated using J - 1 and N - J degrees of freedom (Hays, 1973).

TABLE 17

RELATIONSHIPS BETWEEN STATIC/EXTRA-GROUP

PREDICTORS AND DYNAMIC/GROUP DEPENDENT VARIABLE

MULTIVARIATE RELATIONSHIPS	R^2	F [5]	Θ
Predictors as a Set	.0211	13.149**	.2337
BIVARIATE RELATIONSHIPS	η^2	F	θ
Organization Size	.0116	3.574*	.2173
Organization Shape	.0115	3.542*	.2239

*p<.05

**p<.01

[5]The significance of R^2 was determined using the ratio:

$$F = \left(\frac{R^2}{1 - R^2}\right)\left(\frac{N - K}{K - 1}\right)$$

where N equals the number of cases in the sample and K equals the number of predictors in the set under consideration. The significance of F was evaluated using K - 1 and N - K degrees of freedom (Hays, 1973).

In addition, each component predictor in this set was significantly related to the dependent variable. Each accounted for an almost identical amount of variance (1.1%), while organization shape was associated with a somewhat larger gain in predictive accuracy than organization size (18.2% vs. 14.7%).

Relationships Between Static/Group Segment and Dynamic/Group Segment

The third hypothesis derived from the first proposition stated that "predictors from the static/group segment are significantly related to variables in the dynamic/group segment" (p. 30). This hypothesis was tested using a set of three predictors: group size, group function and group level. Table 18 presents the results for this set of predictors and its component variables. Taken together, these predictors are significantly related to group type and account for 6.6% of the total variance. They produce an increase of 63% in accuracy of predicted classification. These findings can be taken as support for the third hypothesis.

When these predictors are taken individually, only two of them, group size and group level, account for significant proportions of the total variance. The predictor group function does increase predictive capability slightly (13.8%), but group size is somewhat more effective (22.4%) and group level is a great deal more effective (51.8%) at increasing prediction.

Relationships Between Static/Individual Segment and Dynamic/Group Segment

The hypothesis that "predictors from the static/individual segment are significantly related to variables in the dynamic/group segment" (p. 30) was the final hypothesis derived from the first

TABLE 18

RELATIONSHIPS BETWEEN STATIC/GROUP PREDICTORS

AND DYNAMIC/GROUP DEPENDENT VARIABLE

MULTIVARIATE RELATIONSHIPS	R^2	F	Θ
Predictors as a Set	.0662	21.587**	.3088
BIVARIATE RELATIONSHIPS	η^2	F	θ
Group Size	.0186	3.841**	.2320
Group Function	.0124	1.905	.2157
Group Level	.0457	7.267**	.2876

**p<.01

TABLE 19

RELATIONSHIPS BETWEEN STATIC/INDIVIDUAL PREDICTORS

AND DYNAMIC/GROUP DEPENDENT VARIABLE

MULTIVARIATE RELATIONSHIPS	R^2	F	Θ
Predictors as a Set	.0306	9.622**	.2467
BIVARIATE RELATIONSHIPS	η^2	F	θ
Tenure	.0087	1.064[6]	.2157
Age	.0109	1.336[6]	.2141
Education	.0119	2.441[7]	.2157

**p<.01

[6]p<.05: F ≈ 2.23

[7]p<.05: F ≈ 2.62

proposition which was tested in this investigation. Three predictors were used to test this hypothesis: tenure, age and education. The multivariate and bivariate statistics for these predictors are presented in Table 19. Once again, these predictors taken together account for 3% of the variance in the dependent variable; this proportion was significant. Together, these predictors are associated with a 30.2% gain in predictive accuracy. Thus, the fourth and final hypothesis from the first proposition stands supported.

This set of predictors provided little gain in predictive accuracy; tenure and education each produced a modest gain (13.8%) and age was slightly less effective (13.0%). Further, these predictors seem to have their greatest effect when applied jointly. Taken individually, none of them are significant, although education would have been significant if the original six-point scale of educational level had had been retained.

A note of caution must be raised concerning interpretation of these particular results. The fact that none of the bivariate relationships were significant raises a serious question. Some methodologists would argue against determining a multiple correlation coefficient from predictors which have no nonzero relationships with the dependent variable. The resulting multiple correlation may be significant due to random error. Under the null condition, that is, when the bivariate relationships for the predictors in question are zero in the population, one could still expect the multiple correlation to equal K/(N-1), where K is the number of predictors and N the number of cases. For the static/individual predictors in question here, the expected multiple correlation under the null condition would have

been .0049. The multiple correlation for a set of predictors must deviate significantly from this value rather than from zero to be considered statistically significant. Fortunately, the method used for computing the F ratio takes account of this fact (McNemar, 1969).

Another way to interpret these results would suggest that a single predictor may have a direct effect on the dependent variable in one direction, either positive or negative, and an indirect effect on the dependent variable in the opposite direction. This would account for the fact of individual predictors having nonsignificant relationships with the dependent variable when considered independently, while having a significant relationship when considered jointly. Having raised these issues, this investigation will proceed having concluded that the R^2 between the static/individual predictors and group type is significant.

In summary then, the first proposition, that significant relationships exist between different segments of the proposed model, is supported by the results of these analyses. Four relationships between sets of predictors representing segments of the model and a dependent variable from another segment of the model were tested here. All four were found to be significant.

RELATIVE PREDICTIVE STRENGTH OF SEGMENTS OF THE MODEL

The second proposition presented in Chapter II posited differences in the strength of relationships between segments of the model based on the class of variables being considered, the level of analysis being considered, and the proximity of segments. The three hypotheses which were derived from this proposition were tested using the indicators of

predictor importance reported in the preceding section plus an additional indicator. This was a measure of the marginal utility of a set of predictors, that is, the unique explanatory power of the predictors in question. The marginal utility of each set of predictors which was used to represent a segment of the model was determined. Doing so required using all nine predictors in one MNA. The results of that MNA showed that all predictors taken together accounted for almost 12% of the variation in group type. Also, using all nine predictors more than doubled predictive accuracy (gain = 100.9%). The results of this MNA for all predictors plus those MNAs conducted to assess the marginal utility of sets of predictors are presented in Table 20. This table also reiterates the results of assessing simple relationships between sets of predictors and the dependent variable which were reported earlier.

These results indicate that the strongest relationship of those examined in this investigation exists between the static/group and dynamic/group segments of the model. This was inferred from the findings that (1) the static/group predictors accounted for the greatest amount of variance in the dependent variable, (2) these predictors produced the greatest gain in predictive accuracy, and (3) the exclusion of these predictors resulted in the greatest reduction in explained variance.

Applying this same method of inference to the remaining relationships allows the conclusion that the relationship between the dynamic/extra-group segment and dynamic/group segment is second strongest. The relationship between the static/individual and dynamic/group segments is next strongest and the relationship between static/

TABLE 20

RELATIONSHIPS INDICATING RELATIVE STRENGTH OF PREDICTOR SETS

	SIMPLE RELATIONSHIPS			MARGINAL UTILITY		
	R^2	F	Θ	R^2 for all predictors save those in question	ΔR^2	F [8]
ALL PREDICTORS	.1192	10.200**	.3807			
Dynamic/Extra-Group	(η^2=).0337	2.328*	(θ=) .2549	.0968	.0224	15.311**
Static/Extra-Group	.0211	13.149**	.2337	.1058	.0134	4.580**
Static/Group	.0662	21.587**	.3088	.0747	.0445	10.150**
Static/Individual	.0306	9.622**	.2467	.1028	.0164	3.737**

*p<.05 **p<.01

[8]The significance of the marginal utility of a set of predictors was determined from the significance of a difference in R^2's. This was found using the ratio:

$$F = \frac{(R^2_{\text{all}} - R^2_{\text{all - x}})/(K_{\text{all}} - K_{\text{all - x}})}{(1 - R^2_{\text{all}}) \quad / (N - K_{\text{all}} - 1)}$$

where R^2_{all} equals the R^2 for all available predictors; $R^2_{\text{all - x}}$ equals the R^2 for all but those predictors whose marginal utility is being tested; K_{all} equals the number of available predictors; and $K_{\text{all - x}}$ equals the number of predictors remaining when those in question are excluded. The significance of this F was evaluated using $(K_{\text{all}} - K_{\text{all - x}})$ and $(N - K_{\text{all}} - 1)$ degrees of freedom (Kerlinger & Pedhazur, 1973).

extra/group predictors and the dynamic/group dependent variable is the weakest of those examined here.

In applying these results to the hypotheses derived from the second proposition, an additional question must be raised, namely, whether the differences in predictive strength among sets of predictors are significant. To accomplish this, an additional test was conducted for each hypothesis. The difference in strength of predictive relationships for the two sets of predictors associated with each hypothesis was tested for significance using the ratio

$$F = \left(\frac{R^2_{\text{all-x}} - R^2_{\text{all-y}}}{1 - R^2_{\text{all-x}}}\right)\left(\frac{K_{\text{all-x}} - K_{\text{all-y}}}{N - K_{\text{all-x}} - 1}\right)$$

where $R^2_{\text{all-x}}$ equals the R^2 for all predictors except that set being tested which includes the fewest predictors; $R^2_{\text{all-y}}$ equals the R^2 for all predictors except the other set being evaluated; $K_{\text{all-x}}$ equals the number of predictors associated with the first R^2; and $K_{\text{all-y}}$ equals the number of predictors associated with the second R^2. The significance of F was determined using $(K_{\text{all-x}} - K_{\text{all-y}})$ and $(N - K_{\text{all-x}} - 1)$ degrees of freedom (Kerlinger & Pedhazur, 1973).

The first hypothesis from the second proposition, that "variables from the dynamic/extra-group segment predict variables from the dynamic/group segment better than do variables from the static/group segment," could have been rejected without conducting this additional test since at best its findings could support a hypothesis of no difference in predictive power. However, in the interests of possibly refining the model, the test was conducted. Variables from the static/group segment were found to predict significantly better than the variables from the dynamic/extra-group segment ($F = 7.377$, $p<.01$). The first hypothesis

of the second proposition was not only rejected, but strong evidence for its reversal was found.

The second hypothesis, that "variables from the static/group segment predict better than do variables from the static/extra-group segment," was also tested using this method. The initial results had been encouraging: the predictive strength of the static/group predictors was larger than that of the static/extra-group predictors. This difference was found to be significant ($F = 21.008$, $p<.01$). Thus, the second hypothesis received strong support from these results.

The last hypothesis, that "variables from the static/extra-group segment predict no better than do variables from the static/individual segment," was evaluated using the same test as before, but this time a result of no difference was expected. While the static/individual predictors had shown relatively greater predictive strength, applying the significance test to this difference produced an F ratio of 2.026, which was not significant ($p<.05$: $F \simeq 3.86$). Thus, the null hypothesis was not rejected. Variables from the static/extra-group segment do not predict significantly better than do variables from the static/individual segment.

In summary then, the proposition that the relative strengths of relationships among segments of the model are determined by class of variable, level of analysis, and proximity, in that order, was not fully supported in its present form. This conclusion was based on examinations of the relative importance and marginal utility of four sets of predictors, as well as tests of the significance of differences in the relative strength of predictive relationships. The fact that two of the three hypotheses derived from this second proposition were

supported suggests that some modification of the proposition is warranted, rather than rejection of the entire proposition.

RESULTS OF ADDITIONAL ANALYSES

While the preceeding results are fairly straightforward and clear in their implications, the rejection of the first hypothesis from the second proposition, that dynamic/extra-group effects are stronger than static/group effects, did raise a question which prompted some additional analyses. This question revolved around the number of predictors used to represent each segment of the model. The strongest predictive relationship had been expected to occur between the dynamic/extra-group and dynamic/group segments. This was not found to be true. Rather, the strongest effect appeared for the static/group predictors. The question to be examined here has to do with the fact that while the static/group segment of the model was represented by three predictors, group size, group function, and group level, the dynamic/extra-group segment was represented by a single predictor, a measure of superior Group Process. Perhaps the predictive strength of the dynamic/extra-group segment was suppressed by under-representation in comparison to the other segments of the model. The discussion from the first chapter demonstrated that each segment of the model could be represented by an array of variables. Those which were actually used in this investigation were chosen for a variety of reasons, not the least of which was availability of the necessary data. The other main reason particular variables were selected was the existence of at least some empirical evidence of relationships between the variable and other aspects of organizational functioning.

One way to determine whether the number of predictors per segment affected the findings of significant relative predictive strength would have involved choosing additional variables from the dynamic/extra-group segment and analyzing all relationships once again. Unfortunately, the data set which was specially constructed for this investigation did not allow that approach.

Another, albeit more tenuous, approach reduced the number of predictors for the segments other than dynamic/extra-group. The "single best" predictor for each segment was determined using a combination of size of η^2, size of θ, and marginal utility. Organization shape was chosen to represent the static/extra-group segment; group level represented the static/group segment; and education represented the static/individual segment. Actually, this approach may be most suitable to this particular investigation since, in point of fact, superior Group Process was chosen to represent the dynamic/extra-group segment because in Franklin's study (1973) it had been the best predictor of most of the same variables which are used to determine group type. This approach seemed further justified by the fact that when the marginal utility of each predictor taken individually was computed, after running another series of MNAs, the dynamic/extra-group predictor showed the greatest absolute reduction in R^2. Table 21 shows these measures of marginal utility for all predictors.

An MNA using these four "single best" predictors from the four segments of the model was then conducted and the results analyzed as before. Because only one predictor now represented each segment, the relationship between a segment and the dependent variable had to be determined using bivariate statistics. Measures of marginal utility

TABLE 21

MARGINAL UTILITY OF EACH PREDICTOR TAKEN INDIVIDUALLY

Segment of The Model	Predictor	R^2 for all predictors except that in question	ΔR^2 (R^2 for all predictors = .1192)
Dynamic/Extra-Group	Superior Group Process	.0968	.0224
Static/Extra-Group	Organization Size	.1124	.0068
	Organization Shape	.1078	.0114
Static-Group	Group Size	.1098	.0094
	Group Function	.1105	.0087
	Group Level	.0969	.0223
Static/Individual	Tenure	.1137	.0055
	Age	.1128	.0064
	Education	.1152	.0040

were computed as before. Because there was only one predictor per segment, the significance of differences in marginal utility could not be tested.

Table 22 contains the results for this analysis. All four predictors are significant on at least one criterion of predictor importance. Once again, it seems worth noting that the η^2 for education would have been significant had the original six-point scale been retained.

These predictors and the segments they represent are rank ordered according to strength of predictive relationship exactly as they had been when all nine predictors were used. Thus, it appears from this analysis of available data that the results of the earlier analyses are not distorted by the number of predictors used for each segment. A question does remain, however, concerning the possible effect of adding more dynamic/extra-group predictors.

One final test of the general model was conducted using two measures of the strength of relationship with the dependent variable for each individual predictor. A rank ordering of these relationships was predicted based on the second proposition of the model. Because the model does not imply the relative strengths of variables within a segment, tied ranks were predicted for all variables within a given segment. Further, because the model does imply no significant difference between the strength of relationships for static/extra-group and static/individual variables, tied ranks were predicted for the variables in both these segments.

The two measures of strength of relationship with the dependent variable were the bivariate coefficient, η^2, and the measure of

TABLE 22

PREDICTIVE RELATIONSHIPS OF FOUR

"SINGLE BEST" PREDICTORS

		Simple Relationships			Marginal Utility		
Predictors as a Set		R^2 .0810	F 17.823**	Θ .3382	R^2 for all "single best" predictors except that in question		
Segment of the Model	Predictor	η^2	F	θ		ΔR^2	F
Dynamic/ Extra-Group	Superior Group Process	.0337	2.328*	.2549	.0582	.0228	15.059**
Static/Extra-Group	Organization Shape	.0115	3.542*	.2239	.0720	.0090	5.945**
Static/Group	Group Level	.0457	7.267**	.2876	.0515	.0295	19.485**
Static/ Individual	Education	.0119	2.441	.2157	.0711	.0099	6.539**

*p<.05

**p<.01

marginal utility, ΔR^2. Each of these measures was rank ordered on the basis of its absolute level. Table 23 presents the predicted rank order for all predictor variables, their η^2 and ΔR^2 values, and the rank orders based on these two measures. The degree of association between the predicted rank order and each obtained rank order was evaluated using the Spearman rank order correlation coefficient (r_s) adjusted for tied ranks (Siegal, 1956). Each proved to be highly significant. The r_s based on ranking η^2's was .9037 ($p<.01$). It should be noted that the dynamic/extra-group variable was not ranked first, as the model had predicted it would be. Other than that, however, the model is supported by this finding. The r_s for the ΔR^2's was .8012 ($p<.01$). In this case, the dynamic/extra-group variable was ranked highest. Thus, this finding supports the model as it was originally proposed.

TABLE 23

RANK ORDERS OF PREDICTOR VARIABLES AS PREDICTED BY THE MODEL

AND DERIVED FROM MEASURES OF STRENGTH OF RELATIONSHIP

Segment of The Model	Predictor Variable	Predicted Rank Order	Simple Relationship		Marginal Utility	
			η^2	Rank Order	ΔR^2	Rank Order
Dynamic/Extra-Group	Superior Group Process	1	.0337	2	.0224	1
Static/Group	Group Size	3	.0186	3	.0094	4
	Group Function	3	.0124	4	.0087	5
	Group Level	3	.0457	1	.0223	2
Static/Extra-Group	Organization Size	7	.0116	6	.0068	6
	Organization Shape	7	.0115	7	.0114	3
Static/Individual	Tenure	7	.0087	9	.0055	8
	Age	7	.0109	8	.0064	7
	Education	7	.0119	5	.0040	9

V.

DISCUSSION

This discussion is divided into three sections. First, an overview of the major findings is presented. The second section outlines some limitations of this study. Finally, the implications of the results are discussed.

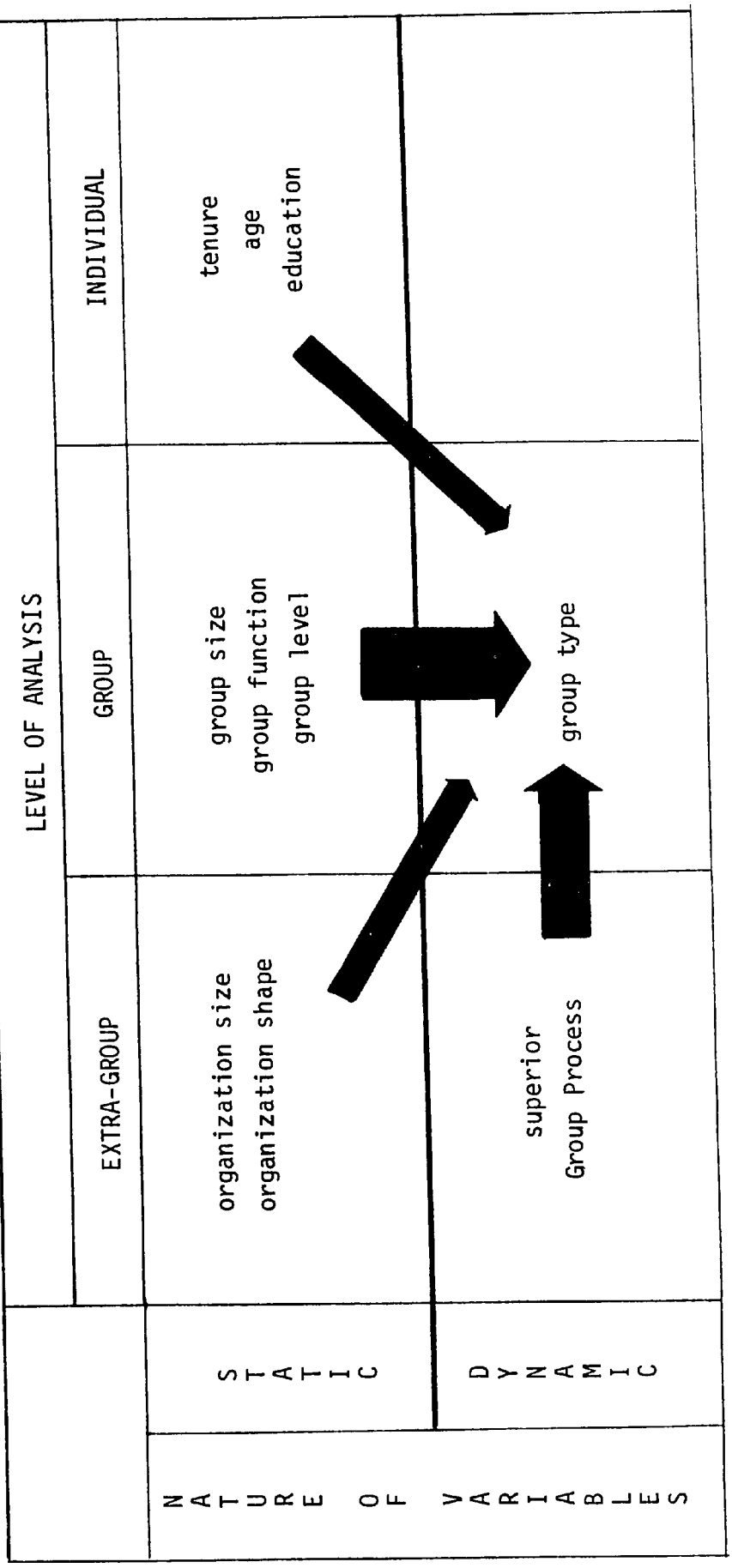
RESULTS OF THIS INVESTIGATION

In this investigation, a model of organizational functioning which attempted to integrate static and dynamic properties of organizational functioning at several levels of analysis was proposed and tested. Two propositions concerning relationships among its segments were derived from this model and a series of hypotheses was generated for each proposition. One series concerned the existence of relationships between different segments of the model. The second series of hypotheses concerned the nature and relative magnitude of those relationships. These hypotheses were tested through a series of multivariate analyses which attempted to predict values of a variable in one segment of the model using sets of predictors representing other segments of the model. The results presented in the preceding chapter were derived from the bivariate and multivariate statistics produced by those analyses. These results are illustrated in Figure 7. In this figure, an arrow between two segments of the model indicates the existence of a significant relationship between a set of predictors and the dependent variable. The thickness of these arrows indicates the relative strength of the predictive relationship.

Figure 7

Proposed Integrative Model

Showing Results of this Investigation



Evidence for the First Proposition

The first proposition derived from the proposed integrative model posited the existence of relationships between different segments of the model. This proposition had four associated hypotheses. The first of these stated that predictors from the dynamic/extra-group segment are related to variables in the dynamic/group segment. The results indicated a significant relationship between superior Group Process and group type. Thus, the first hypothesis was supported and a direct relationship between variables of the same class (dynamic) was found across levels of analysis (extra-group to group).

The second hypothesis associated with the first proposition suggested that predictors from the static/extra-group segment are related to variables in the dynamic/group segment. Two predictors were tested here: organization size and organization shape. A significant predictive relationship was found for these predictors taken either jointly or individually. These results thus supported the second hypothesis. A relationship had been found which crossed both class of variables (static to dynamic) and level of analysis (extra-group to group).

The third hypothesis was that predictors from the static/group segment are related to variables in the dynamic/group segment. Three predictors were used in this analysis: group size, group function, and group level. Taken individually, only group size and group level were significantly related to group type. Jointly, these predictors were related to group type, thus supporting the third hypothesis. The remaining potential relationship had been confirmed, namely, one which occurred across classes of variables (static to dynamic) and within a

level of analysis (group).

The fourth and final hypothesis associated with the first proposition stated that predictors from the static/individual segment are related to variables from the dynamic/group segment. The static/individual segment was represented by three predictors: tenure, age and education. Individually, none of these predictors were significantly related to group type, but when they were considered jointly, a significant relationship was found. These results then supported the fourth hypothesis and another example of a relationship across class of variables (static to dynamic) and across level of analysis (individual to group) had been found.

These findings thus provide consistent support for the hypotheses associated with the first proposition derived from the proposed model. Strong evidence exists for the presence of relationships between a dependent variable from one segment of the model and sets of predictors from four of the remaining segments of the model.

Evidence for the Second Proposition

The second proposition derived from the proposed model suggests that the strength of relationships between segments of the model is conditioned by two factors, permeability and proximity. The first of these conditioners implies that the relationship between two adjacent segments of the model will be stronger if the segments fall within the same class of variables than if they fall within the same level of analysis. The class of variable boundary is more permeable to effects across segments.

The notion of proximity implies that relationships between adjacent segments will be stronger than relationships between nonadjacent segments. Further, relationships between more proximate nonadjacent segments will be stronger than those between less proximate nonadjacent segments. Hypotheses associated with all but the very last of these implications of the second proposition were developed and tested in this investigation.

The first hypothesis was related to permeability and stated that variables from the dynamic/extra-group segment predict variables from the dynamic/group segment better than do variables from the static/group segment. In other words, within-class of variable effects are stronger than within-level of analysis effects. This hypothesis was rejected. The results indicate that the opposite may be true since variables from the static/group segment predicted group type significantly better than did the variable which represented the dynamic/extra-group segment. This finding thus raised a serious question concerning the accuracy of the second proposition as it related to the issue of permeability.

The second hypothesis in this second series was related to proximity. It stated that variables from the static/group segment predict variables in the dynamic/group segment better than do variables from the static/extra-group segment. This represents the implication that relationships between adjacent segments are stronger than relationships between nonadjacent segments. The findings supported this hypothesis: static/group variables predicted group type a great deal better than did static/extra-group variables. This evidence thus supports the notion of proximity.

The third and final hypothesis associated with the second proposition provided an additional test of the proximity effect. It stated that variables from the static/extra-group segment predict variables from the static/group segment no better than do variables from the static/individual segment. In other words, given two segments of the model which are equidistant from a third, nonadjacent segment, the strength of predictive relationships from each of the first two segments to the third will not be significantly different. The results served to support this hypothesis. While the absolute predictive strength of the static/individual predictors was larger than the static/extra-group predictors, the difference was not significant. This is depicted in Figure 7 by the equal thickness of the arrows representing these two relationships. This finding thus provided additional support for the effect of proximity.

Because the dependent variable used in this investigation was chosen from the central level of analysis, an additional test of the proximity effect was not possible. To do so would have required an additional test, for example, predicting dynamic/individual variables from the static/group and static/extra-group segments. If proximity affects the strength of relationships, one would expect the static/group variables to be better predictors. Although the data set used in this study would have made it possible, such an additional test was not conducted here. Nevertheless, the two hypotheses from the second proposition which were supported by the results did provide evidence that proximity affects the relative strength of predictive relationships.

The results associated with the second proposition derived from the model are thus somewhat mixed. There is consistent support for a proximity effect. The results for the permeability effect as stated in the proposition, i.e., that within-class of variable relationships are stronger than within-level of analysis relationships, were in a direction opposite to that which was expected.

In summary then, the results of this investigation demonstrate that the proposed model is accurate in its implication of relationships between segments and its depiction of the relative strength of those relationships based on adjacency and proximity. On the basis of these findings, the model is not accurate in its postulation of stronger within-class of variable relationships than within-level of analysis relationships. Fortunately, these results can be used to modify the model where it is needed. Before moving on to suggesting possible modifications, however, some limitations of this investigation deserve mention.

LIMITATIONS OF THIS INVESTIGATION

The results of this investigation should be considered with several of its limitations in mind. This is true in general, but it is especially pertinent to the contemplation of modifications to the model based on the rejection of the first hypothesis of the second proposition. This hypothesis had implied that superior Group Process would predict group type better than group size, group function and group level in combination. This turned out to be untrue.

One limitation of this study which has implications for interpreting this finding has been mentioned previously. It centers on the fact that the dynamic/extra-group segment was represented by a single variable. Even though an analysis was conducted which reduced the representation of the other segments and still found the dynamic/extra-group predictor less powerful than expected, a question still remains whether increasing the number of variables representing that segment would raise its predictive power.

A second limitation which could conceivably have affected the results for this hypothesis concerns the time lag which may be required for the effects in question. The relationship under consideration was the only one tested which occurred across the dynamic class of variables. All other predictions were made from static, i.e., relatively more stable and enduring, variables. While wave 1 data were used to predict to wave 2 data in an effort to allow an expected time lag to take effect, it may very well be that these data were not measured at the most propitious interval. The average time lapse between waves of data was approximately 13 months. One solution to this problem would be to use repeated measures of the predictors, especially the dynamic predictors. As they stand, however, the results of this study need to be considered with the possibility in mind that the true or greatest effects of the dynamic/extra-group predictor were not represented in these data.

The final limitation of this investigation which will be mentioned here should be applied to all the results and their implications. This limitation concerns the generalizability of these results given the representativeness of the sample. An examination of the distribu-

tions of the sample across the various predictors shows that most of them adequately represent a more general population of work groups. Some are not evenly distributed but this accurately reflects population distributions. For example, 55.6% of the sample groups were classified into the Production category of the group function predictor. This high a proportion of groups is not a distortion in the sample since most organizations are primarily made up of production groups.

There was one predictor which caused some consternation, however. The distribution of groups across the group level predictor shows that 66.5% of the sample were management groups, with 47.2% of the sample being categorized as Lower-Middle Management. This occurred because a few large sites in the sample contained no data for first-line groups. Irrespective of its cause, however, the distortion in this distribution makes it top-heavy; not enough first-line groups fell into the sample. The point of consternation arises because this predictor was found to be the best single predictor of group type. A question must be raised regarding whether the effects of other predictors are suppressed because of the distortion in the sample. For example, it may be that for lower-middle management groups, the effects of a factor like superior Group Process on the variables used to determine group type is much lower than the effects of that factor are for first-line groups. If this were the case, generalizing from the results of this investigation would be misleading since the sample contained a disproportionate number of groups for which the dynamic/extra-group predictor had low effects. Conducting the analyses undertaken here on a sample which better reflects the distribution of groups across hierarchical levels would clear up this question. For the purposes

of this investigation, however, raising the issue while proceeding with caution in considering its implications will have to suffice.

To summarize these limitations, it can be said that at least three factors have been identified, which should be considered in interpreting the results of this investigation, especially the rejection of the hypothesis concerning the effect of the dynamic/extra-group predictor. These factors were (1) the possible under-representation of that segment of the model, (2) the possibility that time lag effects of the dynamic predictor were not adequately represented in the data, and (3) the possible effects of generalizing from a sample which was distorted on the very predictor which showed the strongest effect. Even with these limitations in mind, however, the results of this investigation have strong implications for the adequacy of the proposed model.

IMPLICATIONS OF THIS INVESTIGATION

This study can be seen to have major implications in three areas. The first concerns the implications of these results for increasing knowledge about organizations. The second area revolves around the accuracy of the model. Finally, the third area concerns the implications of the model itself.

Increased Knowledge of Organizational Properties

Even without a consideration of the model which was proposed, one can view the results of the analyses undertaken here in light of their contributions to more general knowledge of organizations and how they and their members function. A series of complex relation-

ships were examined. It was found that the internal social-psychological environment in which a work group exists and must operate is strongly related to the way the work group immediately hierarchically superior to it interacts and coordinates its efforts. It also appears that the group's size and level in the hierarchy also strongly affect this social-psychological state.

Less strong predictors of this state include structural characteristics of the total organization, specifically, size and tallness or flatness; and demographic characteristics of the group's members, specifically, tenure, age and education. It must be recognized, however, that while these relationships were weaker, they did demonstrate significant effects of those predictors on a group's social-psychological environment. Thus, these results have provided evidence concerning the comparative strength of effects of several different factors on the social-psychological environment of work groups.

Other research has produced evidence that the factors which were used here to characterize that environment are related to traditionally valued individual and organizational outcomes, such as attitudes and performance (Bowers & Seashore, 1966; Hackman & Morris, 1974; Lawler et al., 1974). The results of this investigation can now aid in understanding some determinants of those outcomes.

This study has demonstrated that an adequate description of organizational properties, both static and dynamic, requires complex rather than simple conceptualizations of relationships among variables. Further, it has been demonstrated that the methodological state-of-the-art allows an examination of such complex conceptualizations. The results found here show that both static and dynamic factors need to

be considered when work groups' internal social-psychological environments are being investigated. It would be inadequate and regressive to base research on more simplistic approaches or conceptualizations.

Accuracy of the Model

The results of this study have major implications for the adequacy and accuracy of the model. Originally, the model was proposed in an effort to integrate many of the relationships among static and dynamic properties of organizations which have been found at various levels of analysis in the empirical research on organizations. These relationships were represented in the juxtapositions of the various segments of the model.

In addition to these simple relationships, some principles which operated to affect the relative strength of these relationships among segments of the model were proposed. Those principles which were actually proposed were selected from competing principles concerning the effects of proximity and permeability. These principles could be stated as follows:

1. Proximity affects the relative strength of relationships between segments of the model (i.e., adjacent-segment relationships are stronger than nonadjacent-segment relationships).

2. Proximity has no effect on the relative strength of relationships between segments of the model.

3. "Horizontal permeability" affects the relative strength of relationships between segments of the model (i.e., between-class of variable relationships are stronger than between-level of analysis relationships).

4. "Vertical permeability" affects the relative strength of relationships between segments of the model (i.e., between-level of analysis relationships are stronger than between-class of variable relationships).

5. Permeability has no effect on the relative strength of relationships between segments of the model.

The two principles which were selected for inclusion in the original model were the first and third. The results of this investigation provide evidence for the acceptance or rejection of more than those two, however.

In general, the results demonstrate support for the model as it was originally proposed. The relationships between segments derived from the first proposition were indeed found to exist. Further, the hypotheses concerning the effects of proximity of segments on the relative strengths of relationships between them were also supported. Thus, although an additional test of proximity could be made concerning the relative predictive power of nonequidistant nonadjacent segments, that part of the second proposition suggesting the effects of proximity stands supported. In addition, these results can be used as evidence for rejection of the principle which states that proximity has no effect.

The one area where the results fail to support the model as proposed concerns the permeability issue. Originally, the horizontal permeability principle had been used. In other words, it had been proposed and hypothesized that stronger effects would occur between segments within the same class of variable than between segments at the same level of analysis. The results of this investigation failed to support this and in fact, force the rejection of the horizontal permeability principle. Even though several limitations of this study have been cited which could help explain why the expected results were not found, one could at least have expected a result of no significant

difference in relative strength of the two relationships if the model as proposed were accurate. The fact that the reverse finding was highly significant makes it difficult to dismiss as the unfortuitous result of limitations in the study. Rather, it appears that a modification of the model is in order.

Happily, this modification is rather easily made and poses no serious conceptual problems. The modification amounts to changing the second proposition in its implications about the permeability of boundaries between segments of the model. The horizontal permeability principle, which had originally been proposed, is rejected. Unfortunately the results of this study do not allow a conclusion as to which of the remaining permeability principles, that of vertical effects or that of no effects, is correct.

Choosing between these two principles would require additional analyses. One would need to test the relative strengths of different sets of relationships. For example, one could predict a dynamic/individual dependent variable from dynamic/group predictors and from static/individual predictors. If the predictive strength of the static/individual predictors was significantly greater, that result plus the results of this study would be evidence that permeability operates vertically. Thus, the no-effect principle would be rejected and the vertical permeability principle would be supported. The model would need to be modified so that relationships between segments at the same level of analysis would be strongest. Figure 8 presents such a modified model; the thickness of the lines between levels of analysis represents their lower permeability.

Figure 8

Integrative Model Modified to Incorporate Vertical Permeability

NATURE OF VARIABLES	LEVEL OF ANALYSIS		
	EXTRA-GROUP	GROUP	INDIVIDUAL
STATIC	organizational or extra-group structure	group structure	demographics, aptitudes, etc.
DYNAMIC	organizational or extra-group process	group process	performance, membership behaviors

If, however, the predictive strength of the dynamic/group predictors was either significantly greater than or not significantly different from the strength of the static/individual predictors, the vertical permeability principle would be rejected. That result plus the results reported here would support the principle that permeability has no effect on the relative strength of relationships between segments of the model. In this situation, the model would need to be modified to remove any implications of permeability, that is, all lines between segments would be of the same thickness. Figure 9 presents this altered form of the model.

While either of these modifications may seem like a rather major change in the model, the additional tests and refinements should be made for four important reasons. First, and perhaps foremost, all the results of this investigation would support the model in either of its altered forms. The first proposition derived from the original model would remain unchanged and only the statement in the second proposition regarding permeability would need to be changed.

The second reason either modification should be made is that between-class of variable relationships would remain at least second strongest in the model. This would allow the results of research such as Franklin's (1973) to still be handled very well by the model.

The third reason for altering the model is the fact that proximity would still be a conditioner of strength of relationship. If the results of this study had indicated that relationships between nonadjacent segments were stronger than relationships between adjacent segments, the necessary modifications to the model would not have seemed so intuitively reasonable as those implied here.

Figure 9

Integrative Model Modified to Remove Permeability Effects

NATURE OF VARIABLES		LEVEL OF ANALYSIS		
		EXTRA-GROUP	GROUP	INDIVIDUAL
STATIC		organizational or extra-group structure	group structure	demographics, aptitudes, etc.
DYNAMIC		organizational or extra-group process	group process	performance, membership behaviors

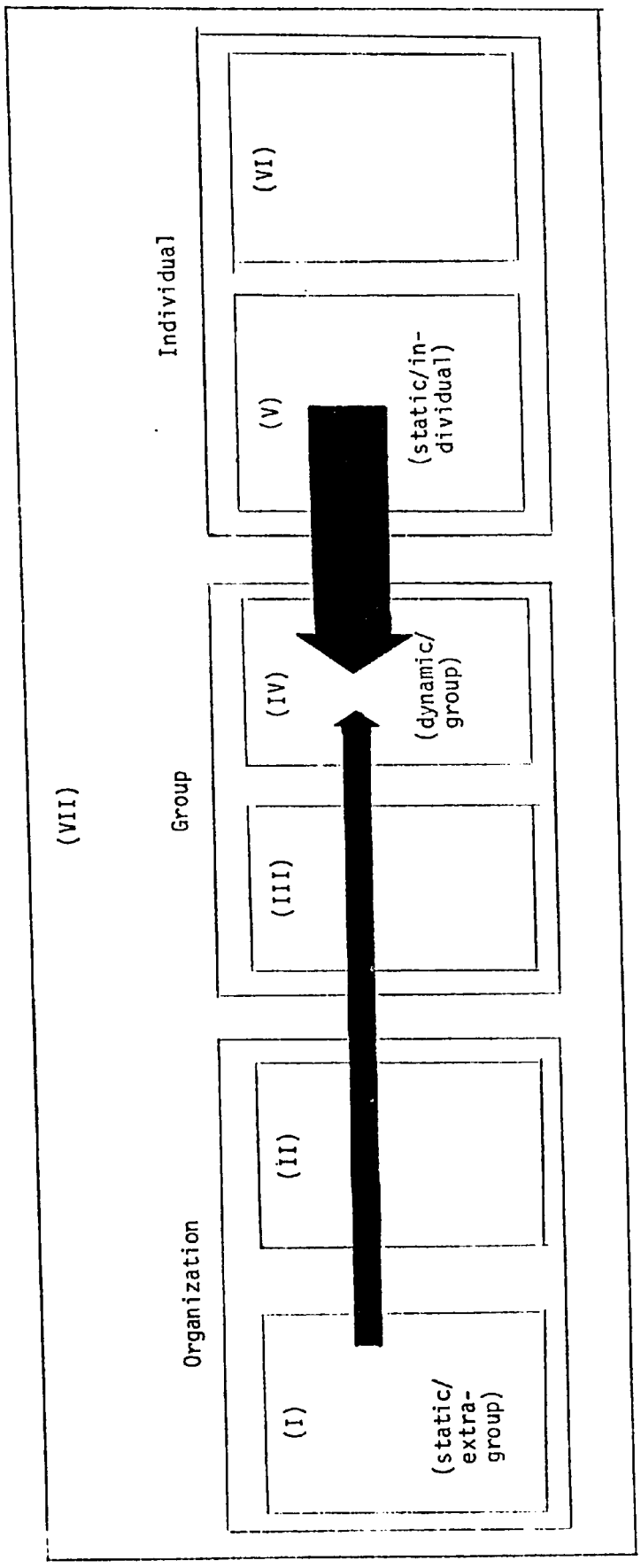
The fourth and final reason for making either modification is that the altered model would continue to meet the criteria for a comprehensive, integrative model which were cited in Chapters I and II. It could still be expanded to include additional levels of analysis and dimensions. It also would generate additional hypotheses which, while not investigated here, deserve further study.

It should be noted that if additional analyses demonstrated support for the vertical permeability principle, at least one question would be raised, namely, whether this and the refining investigation had succeeded in reinventing the wheel. In an earlier consideration of integrative models, one proposed by Indik (see Figure 1) was rejected because it assumed stronger direct effects within level of analysis than within class of variables. If this investigation's model were modified to incorporate that very assumption, which would be the effect of adding the vertical permeability principle, one might justifiably ask if Indik's model would not have served perfectly well in this investigation. The answer is that it would have until the last hypothesis of the second proposition was developed. Here, using Indik's model, the hypothesis would have been that static/individual variables are better predictors of group type than static/extra-group variables, because the former segment or panel is closer to the dependent variable. Figure 10 illustrates this hypothesis. Since this investigation found no significant differences in these two relationships, Indik's model is not supported by these results, even without additionally modifying the model proposed here. Either of the altered models described above would be supported by all the

Figure 10

Form of Hypothesis IIc

Derived from Indik's Integrative Model



results of this investigation. Therefore, the evidence provided by the analyses undertaken and proposed here seems to suggest that either altered model may have potential as a comprehensive, integrative model. Some of its possible implications will be considered next.

Implications of the Model

The integrative model of organizational functioning which was proposed and generally supported in this investigation and whose refinement was discussed above has implications in at least three areas. They are the interpretation of present research, the direction of future research, and the application of knowledge of organizations and how they function.

In the first area, this model provides a useful conceptualization of the properties of organizations and their relationships, which can be applied to a perusal of a wide range of research on those properties and relationships. Using it, one can organize and integrate the results of a multitude of studies. Most of the research cited in the first chapter involved simple relationships between two of the segments of the model (Blankenship & Miles, 1968; Bowers & Seashore, 1966; Franklin, 1973; Hackman & Morris, 1974; Michaelsen, 1973; Pheysey et al., 1971; Porter & Lawler, 1965). The model can account for all the results found in those studies, subject to some decisions about what variables fall into which segments of the model. A few of the studies cited earlier involved complex sets of relationships (Herman et al., 1975; Lawler et al., 1974). Again, subject to the same variable categorization, the proposed model is basically supported by their results. These facts, coupled with the earlier

demonstration that other comprehensive integrative models cannot account for the results of this investigation, make this model appear to be a useful tool for facilitating an understanding of complex sets of relationships that have been both theorized and demonstrated empirically to varying degrees.

For a research scientist, any such enhanced conceptualization and integration of past studies which the model may furnish leads directly to the second area of implications one can find for this model. These involve the direction which the model can provide for future research into organizational functioning. The model generates a wealth of hypotheses about complex relationships among variables. It offers a method for classifying these variables according to their nature and the level of aggregation involved. In addition, its propositions which have already been and may be further validated suggest the comparative strengths of relationships. This latter capability adds a degree of sophistication to hypotheses generated from this model which both allows a better conceptualization and test of reality and lends itself to multivariate analysis techniques which are now available. Thus, this model seems to have potential utility for guiding many lines of inquiry into organizations and the ways they function.

The results of these potential inquiries could lead to the final area where this model seems to have implications. This concerns the application of knowledge about organizations. Looking at just one example of such applications, conducting efforts aimed at improving the way an organization functions, one can see uses for the model. For example, if the goal of an intervention in an organization was a change in the job performance of its members, the model would suggest

to the intervenor that changing the structure of the organization or its work groups would be less directly effective than working to improve the social-psychological environment of the groups in which those members operate or perhaps changing the reward structure to better capitalize on those things which motivate the organization's members.

Another way this model could be applied would be as an aid in understanding organizational phenomena. For example, changes occurring in variables from one segment of the model, say leadership behavior or group process, might be better understood and coped with if they can be seen as related to changes occurring elsewhere in the organization, say the size of the groups or the degree of specialization. A natural concomitant of such understanding and coping is the possibility of foreseeing negative effects of implementing changes in one segment of the model on its other segments and taking steps to ameliorate them.

These few examples can serve to demonstrate that the model has the potential for uses beyond those related to conducting research and developing theories of organizational functioning. Given its possibilities, further validation and refinement of the model which was proposed and tested in this investigation would seem to be a worthwhile effort.

VI.

SUMMARY AND CONCLUSIONS

This investigation was undertaken in an effort to increase knowledge about the relationships among various properties of organizations. These properties have traditionally been conceived and studied as determinants of both individual and organizational outcomes such as satisfaction, turnover, and productivity. Thus, an increased understanding of the determinants of these outcomes might ultimately contribute to more effective control of those outcomes.

A brief review of the literature demonstrated that these properties of organizations can be categorized as being static, or relatively stable, and dynamic, or relatively adaptive. Properties can also be considered at various levels of analysis. Further, evidence of many sets of relationships among these categorizations of properties can be found in the empirical literature.

A review of this literature led to the conclusion that simple representations of the relationships among organizational properties are not adequate descriptions of reality. A need for integrative models of organizational functioning was recognized. Further, several criteria for an adequate integrative model were outlined. Briefly, they include:

- Representation of both static and dynamic properties of organizations.
- Multiple levels of analysis.
- Implications or propositions regarding relationships among properties represented in the model.

Two integrative models were examined and their shortcomings discussed. As a response to their limitations, a new integrative model was proposed.

The proposed model consisted of six segments representing both static and dynamic variables aggregated at three levels of analysis. Two propositions were developed concerning the existence and nature of relationships between different segments of the model. Several hypotheses were derived from these propositions and evaluated in this investigation.

The data used in this study were selected from a large data bank of responses to a standardized questionnaire. A subset of these data was chosen based on certain criteria including group size and the availability of non-questionnaire data. The resulting data set consisted of 612 sample groups from 16 sites. For each sample group, measures were available for nine predictor variables, both static and dynamic, representing four of the segments of the model, and one dependent variable, a measure of the group's dynamic social-psychological environment, representing one of the remaining segments.

The hypotheses were evaluated by conducting analyses which examined the relationships between the four segments of the model for which there were predictors and the segment containing the dependent variable. These analyses allowed judgements of the relative strength of these relationships.

Basically, the proposed model was supported by the results. Relationships do exist between segments of the model. The size of these relationships is conditioned by the proximity of the segments, but the effect of a relationship's being within the same level of

analysis remains unclear. More specifically, a group's social-psychological environment, or its type, is related strongly to the processes of the group immediately superior as well as to its own structural characteristics. The demographic makeup of the group and the structural characteristics of the entire organization are related to a group's type to a lesser extent.

This study had several limitations, including an uneven representation of the predictor segments, limited measures of variables which may have specific time lags in their effects, and a possibly distorted sample on the group level variable. Nevertheless, its findings consistently supported the existence of expected relationships and the effect of the proximity of segments in the model. Some suggestions were made concerning possible modifications and refinements of the model.

The model as it was proposed and as it may be refined, seems to hold some promise. It provides a conceptualization of complex relationships among diverse organizational properties and across various levels of analysis that should prove useful to those who study organizations, both from a theorist's and from a researcher's perspective. Further, those who seek to apply knowledge about organizations and the way they function may find this model useful for determining and understanding their efforts.

In conclusion then, having shown the need for integrative models of organizational functioning, this study proposed and evaluated such a model. The model was generally supported by the results of complex, multivariate analyses. While it needs and deserves further refinement, the model appears to have potential utility for developing theory, research and applications in the field of organizational psychology.

APPENDIX A

VARIABLES INCLUDED IN SEVEN PANELS OF INDIK'S PROPOSED INTEGRATIVE MODEL

Panel I: Organizational Structure Variables

A. Size.

B. Span of control.

C. Number of hierarchical levels in the organization.

D. Authority structure.

E. Communication structure.

F. Degree of task specification.

G. Degree of task interdependence.

H. Task specialization.

I. Status and prestige structure.

J. Psychological distance between the decision makers and the operating level in the organization.

Panel II: Organizational Function or Process Variables

A. Communication.

- Average amount of communication interaction within the organization.
- Distribution of communication interaction within the organization.

B. Control.

- Average amount of influence exerted by members in the organization.
- Distribution of influence exerted by members in the organization.

- Discrepancy between the actual distribution of influence and the desired distribution of influence in the organization.

C. Coordination.

- Extent to which the parts of the organization are geared and articulated toward the objectives of the organization.
- Clarity of understanding of the goals of the organization by the members.
- Extent to which the parts of the organization are articulated in time sequence toward the objectives of the organization.

D. Organizational socialization-integration processes.

- Recruitment process.
- Orientation and adaptation process.
- Reward process.

E. Supervision.

- Initiating structure.
- Consideration.
- Leadership style.
- Supervisory skill mix.

F. Adaptability to change.

- Adaptability to internal changes.
- Adaptability to external changes that are relevant to the organization.
- Rate of change.

G. Conflict control process.

- Amount of tension and conflict.
- Amount of conflict resolution and tension reduction.
- Discrepancy between above two variables.

H. Mutual understanding of reciprocal role relations.

I. Degree of bureaucracy.

J1. Amount of communication interaction by members of the organization with nonmembers for organizational purposes.

J2. Distribution of communication interaction by members of the organization with nonmembers for organizational purposes.

Panel III: Small-Group Structure Variables

A. Size of the group.

B. Authority and influence structure of the group.

C. Communication structure of the group.

D. Degree of task specification.

E. Degree of task interdependence.

F. Degree of task specialization.

G. Status and prestige structure of the group.

H. Psychological distance between the leader(s) of the group and the rest of its members.

Panel IV: Group Function or Process Variables

A. Communication.

- Average amount of communication interaction.
- Distribution of communication interaction.
- Proportion of socioemotional negative communications.
- Proportion of socioemotional positive communications.

- Proportion of "ask for information" communications.
- Proportion of "giving information" communications.
- Amount and distribution of communications by members of the group with the larger system in the organization.
- Amount, proportion, and distribution of communication interaction by members of the group with nonmembers of the organization.

B. Control.

- Average amount of influence exerted by members in the group.
- Distribution of influence exerted by members in the group.
- Discrepancy between the actual distribution of influence and the desired distribution of influence in the group.
- Amount of influence from the larger system.

C. Coordination.

- Extent to which parts of the group are geared and articulated toward the objectives of the organization.
- Clarity of understanding of the goals of the group by the members.
- Extent to which the parts of the group are articulated in time sequence toward the objectives of the larger organization.

D. Group socialization-integration processes.

- Recruitment process.
- Orientation and adaptation process.
- Reward process.

E. Supervision.

- Initiating structure.
- Consideration.
- Leadership style.
- Supervisory skill mix.

F. Adaptability to change.

- Adaptability to internal changes.
- Adaptability to external changes that are relevant to the group.
- Rate of change.

G. Conflict control processes.

- Amount of tension and conflict.
- Amount of conflict resolution and tension reduction.
- Discrepancy between above two variables.

H. Mutual understanding of reciprocal role relations.

I. Degree of bureaucracy.

J1. Amount of communication interaction by members of the group with nonmembers for organizational purposes.

J2. Distribution of communication interaction by members of the group with nonmembers for organizational purposes.

Panel V: Organization and Group-Relevant (Nonbehavioral) Individual Variables.

A. Motivational variables.

- Need for achievement
- Need for affiliation.
- Need for power.

- Need for ego support, status, and recognition.
- Need for affection.
- Need for acquisition.

B. Attitudinal variables.

- Attitude toward the organization.
- Attitude toward supervision.
- Attitude toward the work group.
- Attitude toward the job.
  - --Intrinsic job satisfaction.
  - --Extrinsic job satisfaction.
- Attitude toward influential ancillary organizations.

C. Perceptual role relations variables.

- Discrepancies between the organizationally relevant expectations of the individual and his experiences as he sees them.
- Job-related stress.
- Role conflict.

D. Aptitude variables.

- Perceptual.
- Psychomotor
- Intellectual
  - --Memory abilities.
  - --Cognitive factors.

E. Dimensions of temperament.

F. Ascriptive dimensions.

Panel VI: Organizationally Relevant Individual Behavior Variables

A. Member job outputs.

- Relative number of job cycle units per unit time (repetitive jobs).
- Relative quality of job performance in repetitive type jobs.
- Relative amount of job performance of unequal units of job performance in complex jobs.

B. Member participation.

- Attendance rates.
- One minus turnover rates.
- One minus lateness rates.

C. Strain symptoms.

- Rate of behavior inappropriate to the organization.
- Rate of behavior inappropriate to the individual.
- Rate of behavior inappropriate to the group.

Panel VII: Organizational Environment Variables

A. Natural aspects of the environment.

- Weather.
- Gravity.
- Terrain.
- Natural resources.

B Availability of resources needed by the organization.

- Personnel resources.
- Material resources.
- Financial resources.
- Market resources.
- Technological resources.

C. Structure and relations with social environment.

- Technological structure.
- Amount of contact with nonorganizational personnel.
- Dependence on social environment.
- Other characteristics of the social environment that influence behavior in the systems.

APPENDIX B

THE SURVEY OF ORGANIZATIONS

To some extent | To a great extent | To a very great extent

How much do persons in your work ... encourage each other to give their best effort?

81. This is how it is now: ① ④ ⑤

82. This is how I'd like it to be ① ④ ⑤

To what extent do persons in yo... maintain high standards of performance?

83. This is how it is now: ① ④ ⑤

84. This is how I'd like it to b ① ④ ⑤

To what extent do persons in y... help you find ways to do a better job?

85. This is how it is now: ① ④ ⑤

86. This is how I'd like it to be ① ④ ⑤

To what extent do persons in yo... provide the help you need so that you can p... and schedule work ahead of time?

87. This is how it is now: ① ④ ⑤

88. This is how I'd like it to be ① ④ ⑤

To what extent do persons in y... offer each other new ideas for solving job ... ns?

89. This is how it is now: ① ④ ⑤

90. This is how I'd like it to b ① ④ ⑤

How much do persons in your ... encourage each other to work as a team?

91. This is how it is now: ① ④ ⑤

92. This is how I'd like it to b ① ④ ⑤

How much do persons in your w... hassle a team goal?

93. This is how it is now: ① ④ ⑤

94. This is how I'd like it to be ① ④ ⑤

To a very little extent | To a little extent | To some extent | To a great extent | To a very great extent

To what extent do persons in your work group exchange opinions and ideas?

95 This is how it is now ① ② ③ ④ ⑤

96 This is how I'd like it to be ① ② ③ ④ ⑤

97 To what extent does your work group plan together and coordinate its efforts? ① ② ③ ④ ⑤

98 To what extent does your work group make good decisions and solve problems well? ① ② ③ ④ ⑤

99 To what extent do persons in your work group know what their jobs are and know how to do them well? ① ② ③ ④ ⑤

100 To what extent is information about important events and situations shared within your work group? ① ② ③ ④ ⑤

101 To what extent does your work group really want to meet its objectives successfully? ① ② ③ ④ ⑤

102 To what extent is your work group able to respond to unusual work demands placed upon it? ① ② ③ ④ ⑤

103 To what extent do you have confidence and trust in the persons in your work group? ① ② ③ ④ ⑤

104 To what extent are the equipment and resources you have to do your work with adequate, efficient, and well-maintained? ① ② ③ ④ ⑤

105 To what extent do you feel a real responsibility to help the company be successful? ① ② ③ ④ ⑤

APPENDIX C

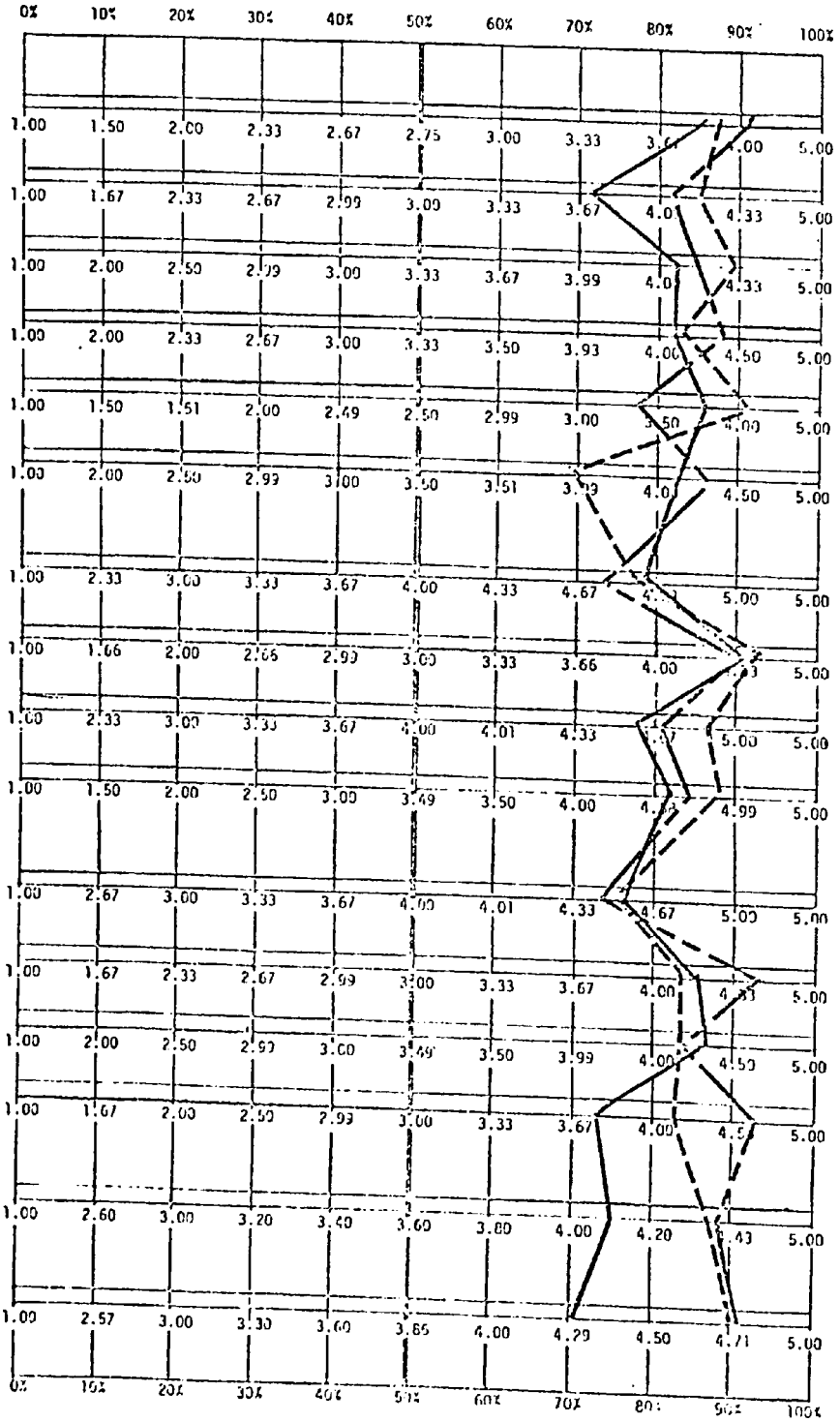
PROFILES ASSOCIATED WITH SEVENTEEN GROUP TYPES GENERATED FROM THREE SAMPLES OF WORK GROUPS

Civilian First Sample — — — —
Civilian Second Sample — — — —
Navy Sample ————

MAJOR INDICES

Type 1 I 80-85

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
3.94

197. Communication Flow
3.99

198. Motivational Conditions
4.18

196. Human Resources Primacy
4.22

204. Lower Level Influence
3.76

193. Technological Readiness
4.13

SUPERVISORY LEADERSHIP

176. Support
4.83

180. Work Facilitation
4.39

178. Goal Emphasis
4.74

182. Team Building
4.73

PEER LEADERSHIP

184. Support
4.52

183. Work Facilitation
4.28

185. Goal Emphasis
4.23

190. Team Building
4.18

201. GROUP PROCESS
4.29

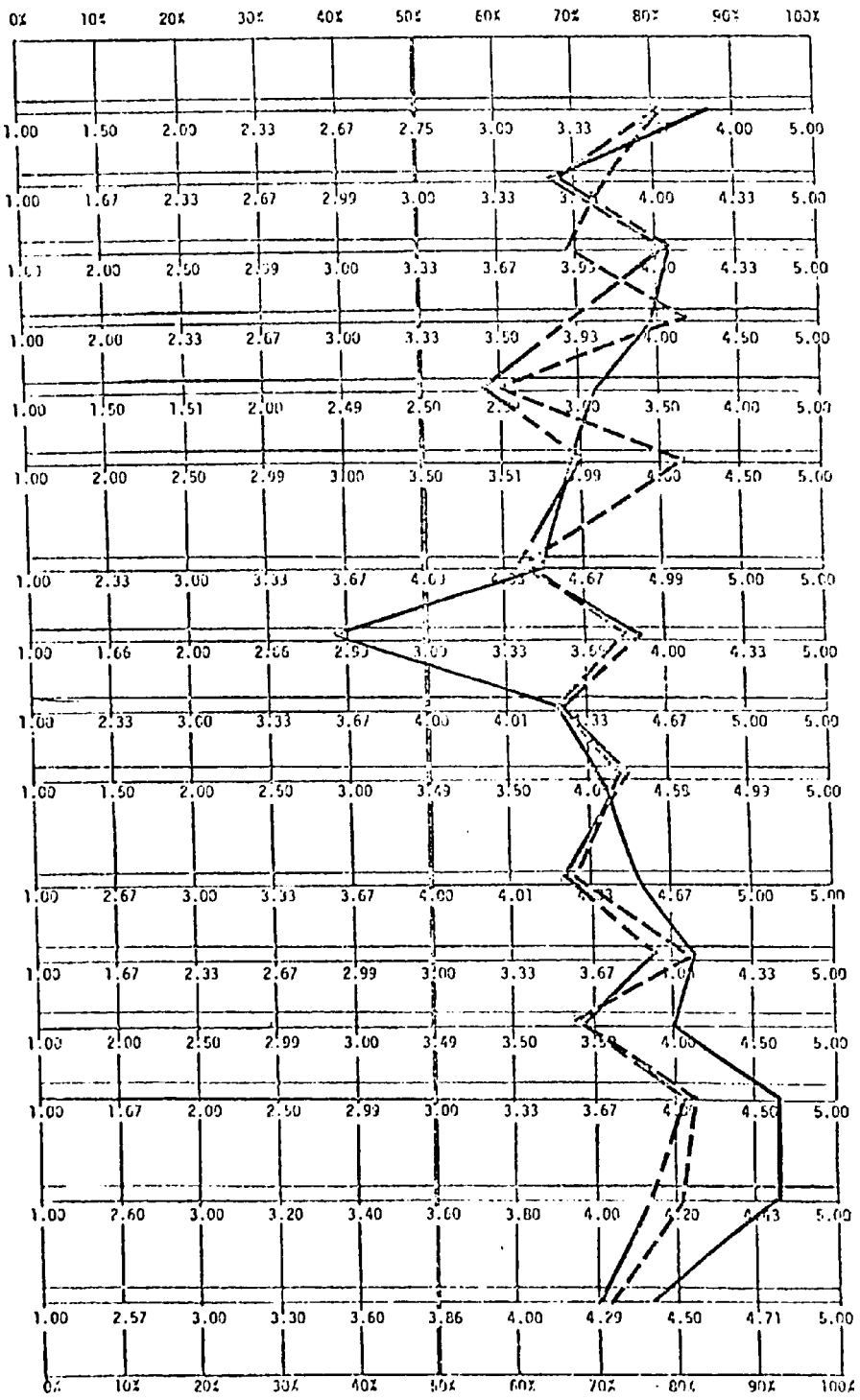
200. SATISFACTION
4.58

Civilian First Sample ———
Civilian Second Sample — — —
Navy Sample ———

MAJOR INDICES

Type 2 I 70

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
3.76

197. Communication Flow
3.67

198. Motivational Conditions
4.02

196. Human Resources Primacy
4.03

204. Lower Level Influence
2.98

193. Technological Readiness
4.09

SUPERVISORY LEADERSHIP

176. Support
4.43

180. Work Facilitation
3.56

178. Goal Emphasis
4.24

182. Team Building
4.18

PEER LEADERSHIP

184. Support
4.34

189. Work Facilitation
4.06

186. Goal Emphasis
4.13

190. Team Building
4.28

201. GROUP PROCESS
4.33

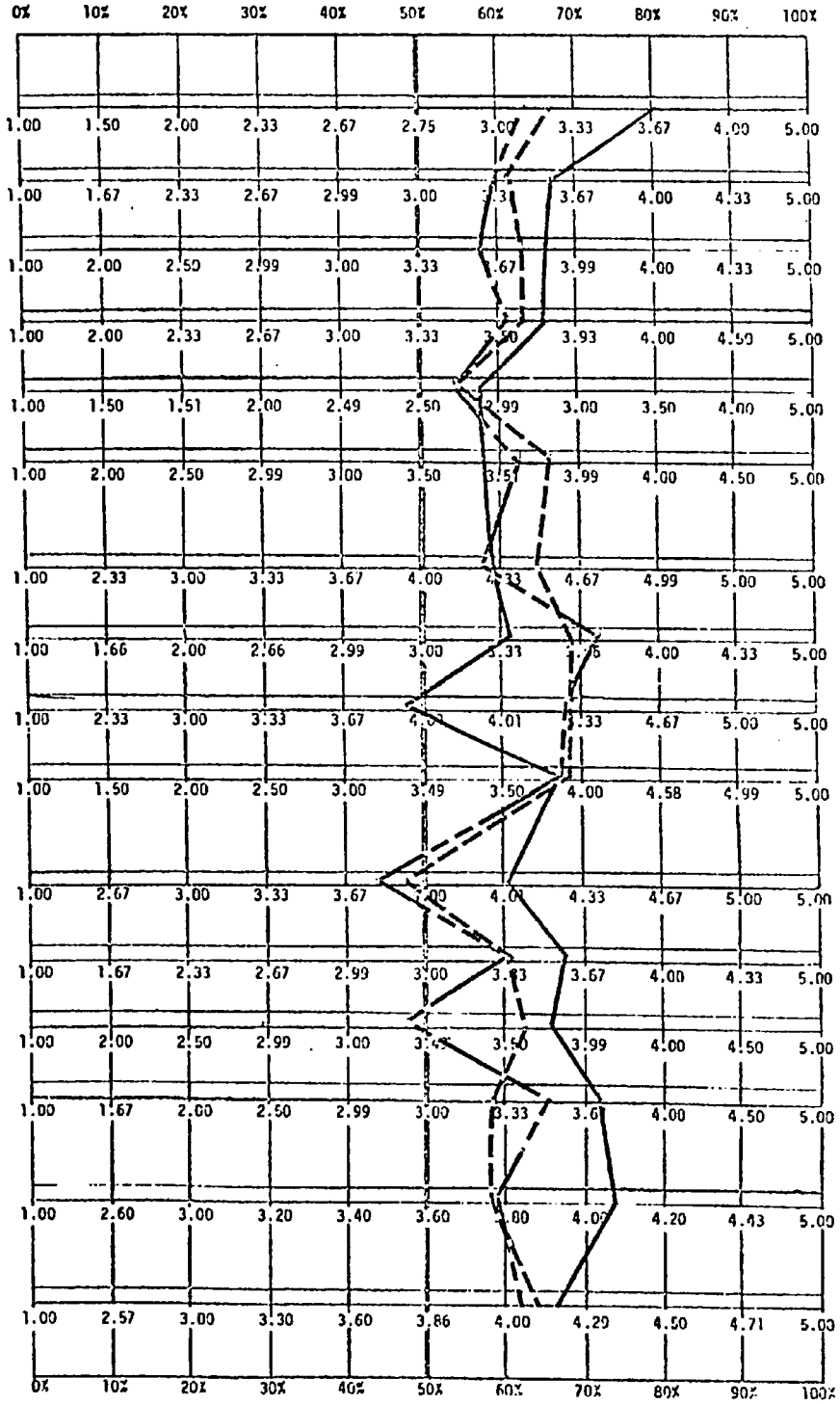
200. SATISFACTION
4.37

Civilian First Sample
Civilian Second Sample
Navy Sample

MAJOR INDICES

Type 3 I 60-65

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
3.35

197. Communication Flow
3.43

198. Motivational Conditions
3.73

196. Human Resources Primacy
3.63

204. Lower Level Influence
2.76

193. Technological Readiness
3.68

SUPERVISORY LEADERSHIP

176. Support
4.35

180. Work Facilitation
3.57

178. Goal Emphasis
4.15

182. Team Building
3.85

PEER LEADERSHIP

184. Support
3.92

188. Work Facilitation
3.44

186. Goal Emphasis
3.61

190. Team Building
3.46

201. GROUP PROCESS
3.87

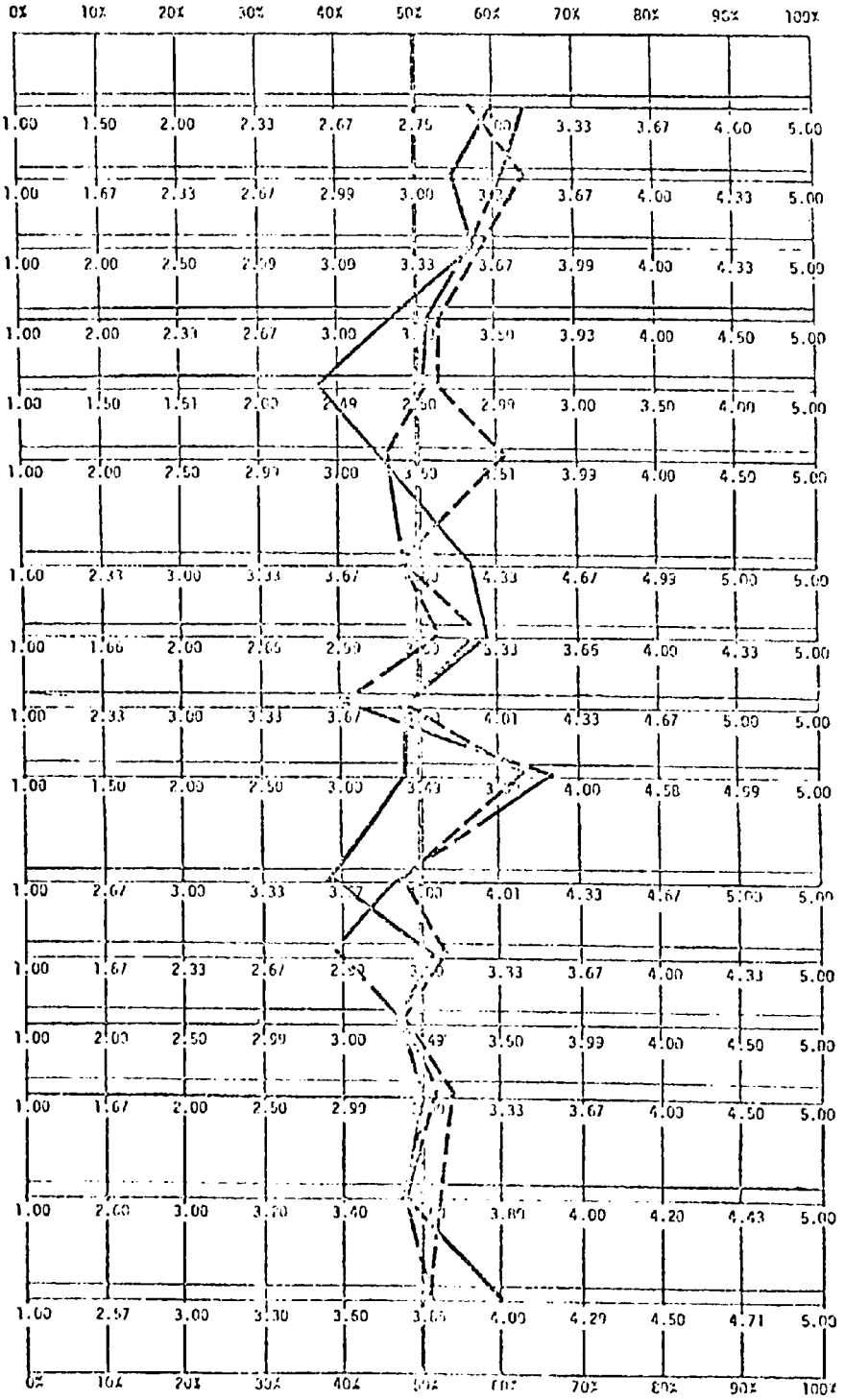
200. SATISFACTION
4.12

Civilian First Sample — — — —
Civilian Second Sample .— — —.
Navy Sample ————

MEAN INDICES

Type 4 I 50

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
3.03

197. Communication Flow
3.33

198. Motivational Conditions
3.60

196. Human Resources Primacy
3.34

204. Lower Level Influence
2.51

193. Technological Readiness
3.44

SUPERVISORY LEADERSHIP

176. Support
4.02

180. Work Facilitation
3.20

178. Goal Emphasis
3.82

182. Team Building
3.63

PEER LEADERSHIP

184. Support
3.80

188. Work Facilitation
3.03

186. Goal Emphasis
3.36

190. Team Building
3.06

201. GROUP PROCESS
3.59

200. SATISFACTION
3.91

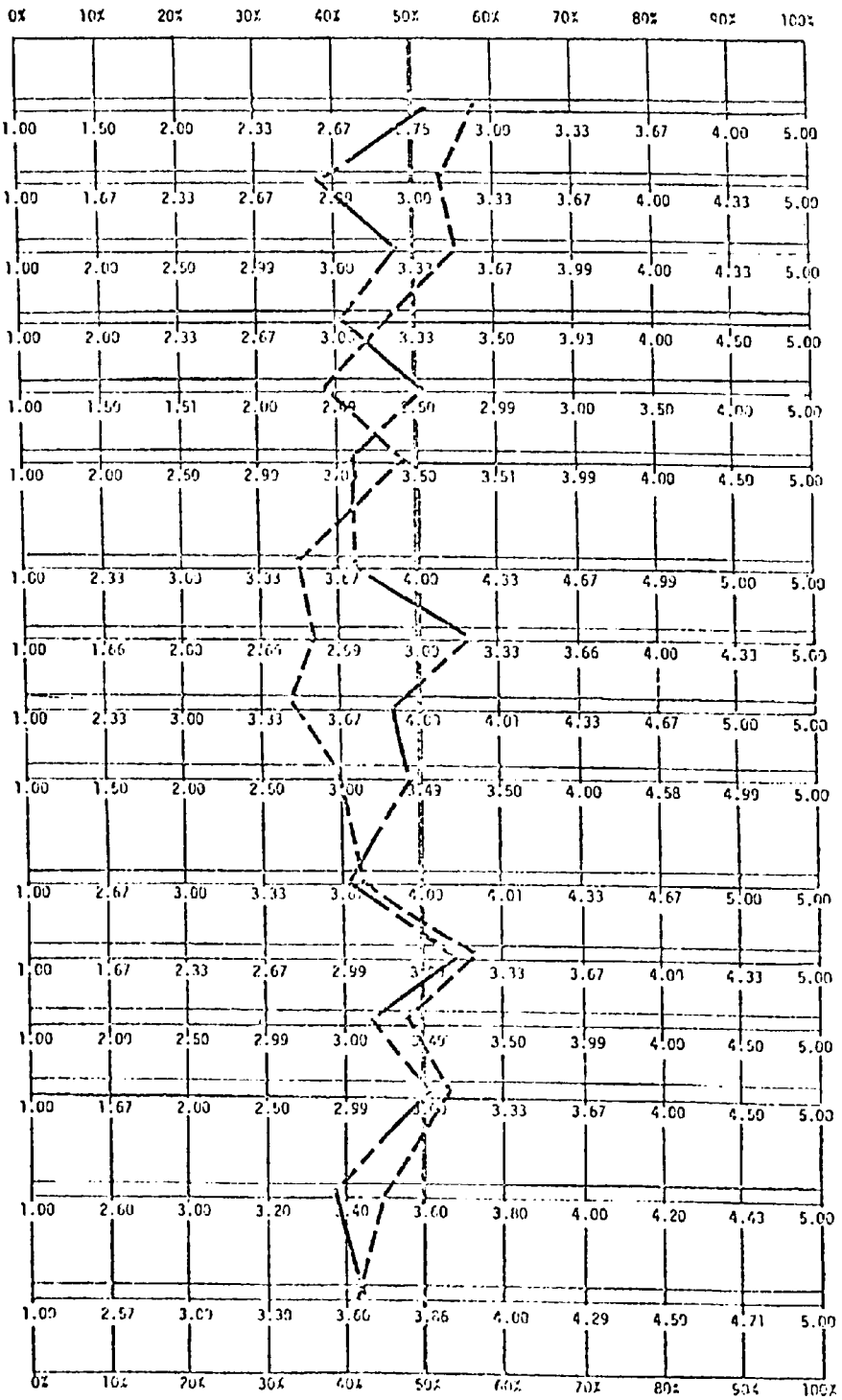
Civilian First Sample ———

Civilian Second Sample — — — —

MAJOR INDICES

Type 5 1 45

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

189. Decision Making Practices

2.87

197. Communication Flow

3.02

193. Motivational Conditions

3.39

196. Human Resources Primacy

3.12

204. Lower Level Influence

2.48

193. Technological Readiness

3.30

SUPERVISORY LEADERSHIP

176. Support

3.64

180. Work Facilitation

3.05

178. Goal Emphasis

3.65

182. Team Building

3.22

PEER LEADERSHIP

184. Support

3.70

183. Work Facilitation

3.19

186. Goal Emphasis

3.26

190. Team Building

3.06

201. GROUP PROCESS

3.44

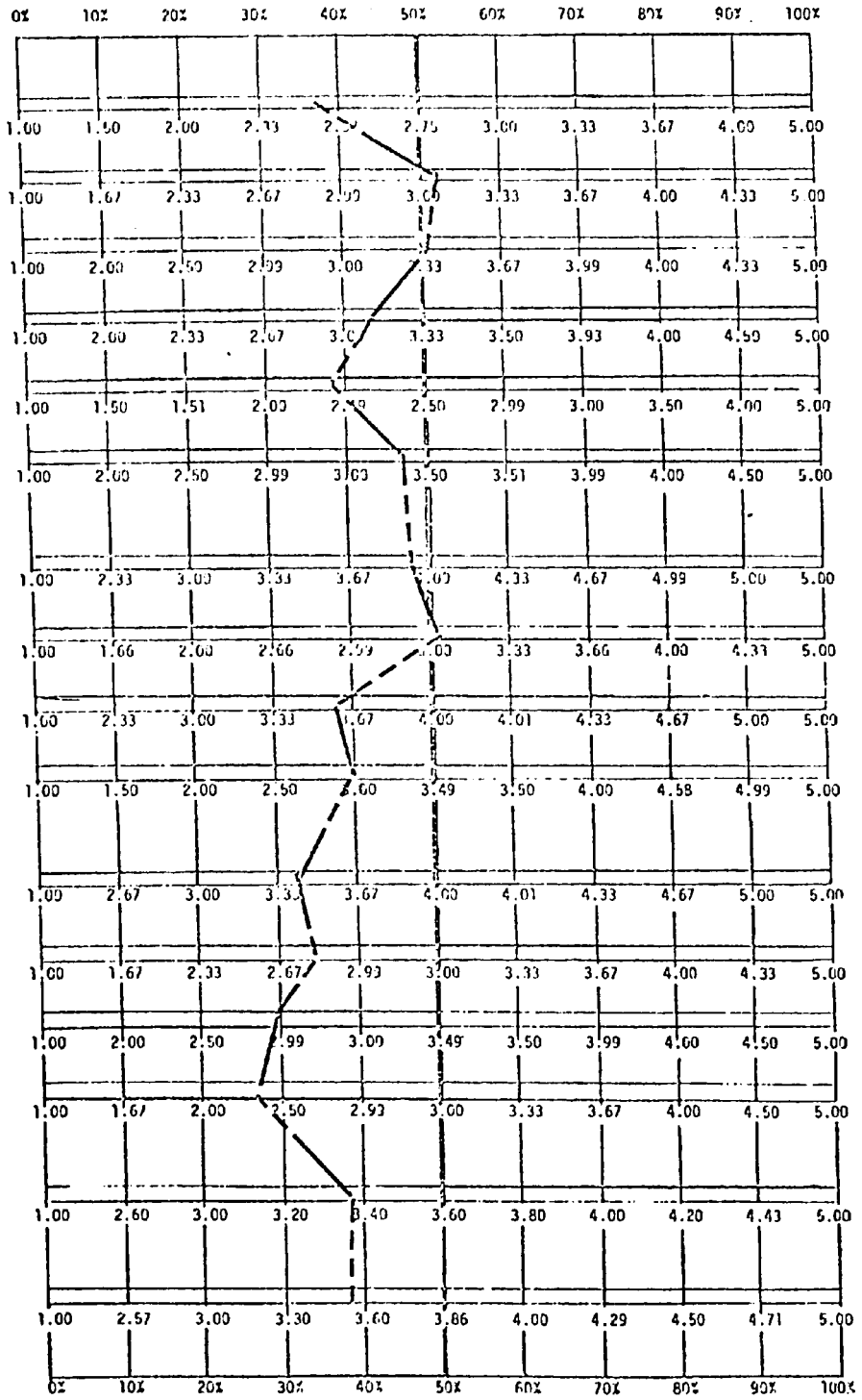
200. SATISFACTION

3.66

Civilian First Sample ——— MAJOR INDICES

Type 6 I 40

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.56

197. Communication Flow
3.05

193. Motivational Conditions
3.40

196. Human Resources Primacy
3.10

204. Lower Level Influence
2.42

193. Technological Readiness
3.36

SUPERVISORY LEADERSHIP

176. Support
3.93

180. Work Facilitation
3.02

178. Goal Emphasis
3.61

182. Team Building
2.99

PEER LEADERSHIP

184. Support
3.43

188. Work Facilitation
2.81

186. Goal Emphasis
2.97

190. Team Building
2.36

201. GROUP PROCESS
3.36

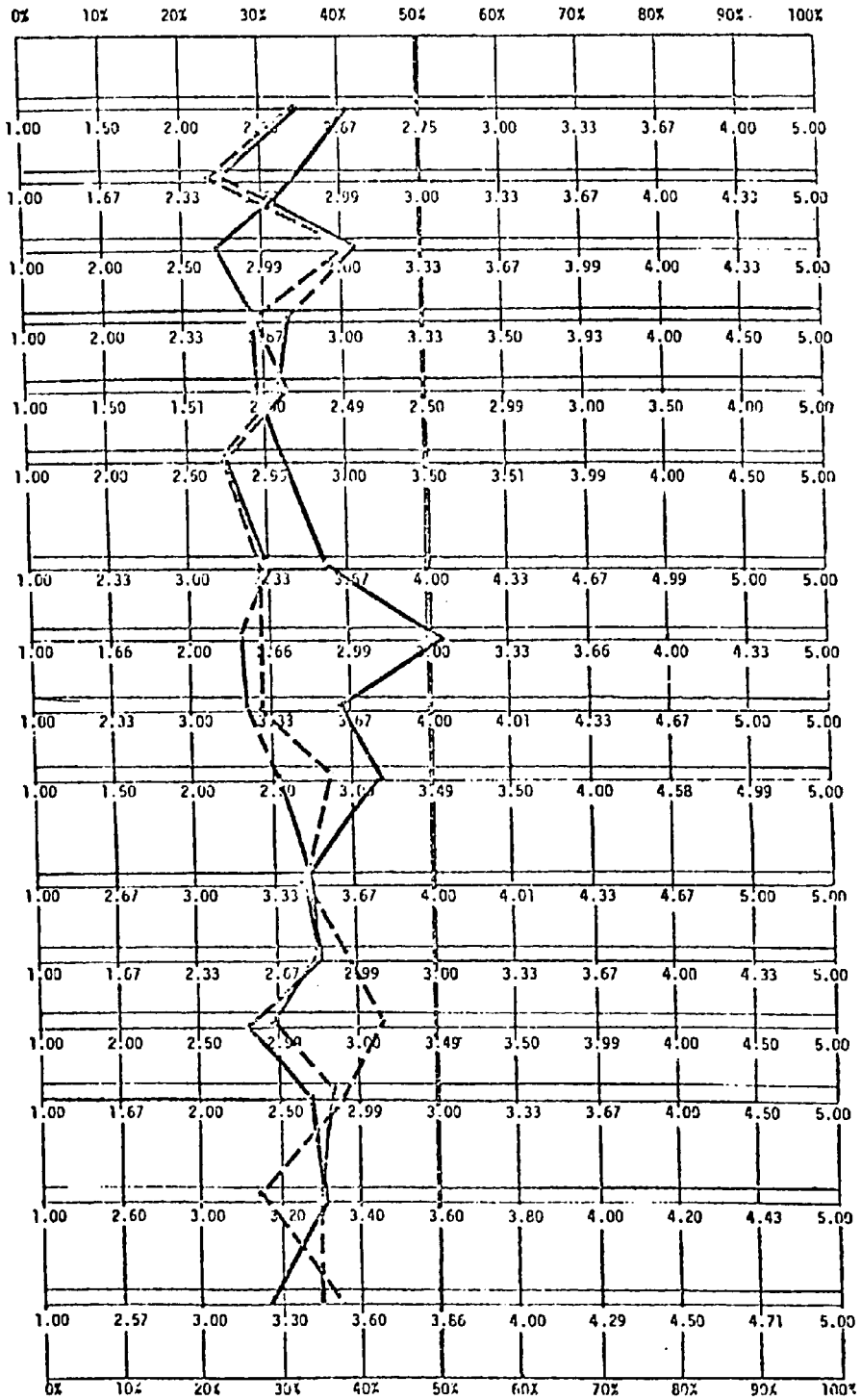
200. SATISFACTION
3.55

Civilian First Sample — — — —
Civilian Second Sample — — — —
Navy Sample ————

MAJOR INDICES

Type 7 I 30-35

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.57

197. Communication Flow
2.57

198. Motivational Conditions
2.93

196. Human Resources Primacy
2.67

204. Lower Level Influence
2.06

193. Technological Readiness
2.74

SUPERVISORY LEADERSHIP

176. Support
3.40

180. Work Facilitation
2.69

178. Goal Emphasis
3.38

182. Team Building
2.86

PEER LEADERSHIP

184. Support
3.46

188. Work Facilitation
2.86

186. Goal Emphasis
2.98

190. Team Building
2.80

201. GROUP PROCESS
3.25

200. SATISFACTION
3.38

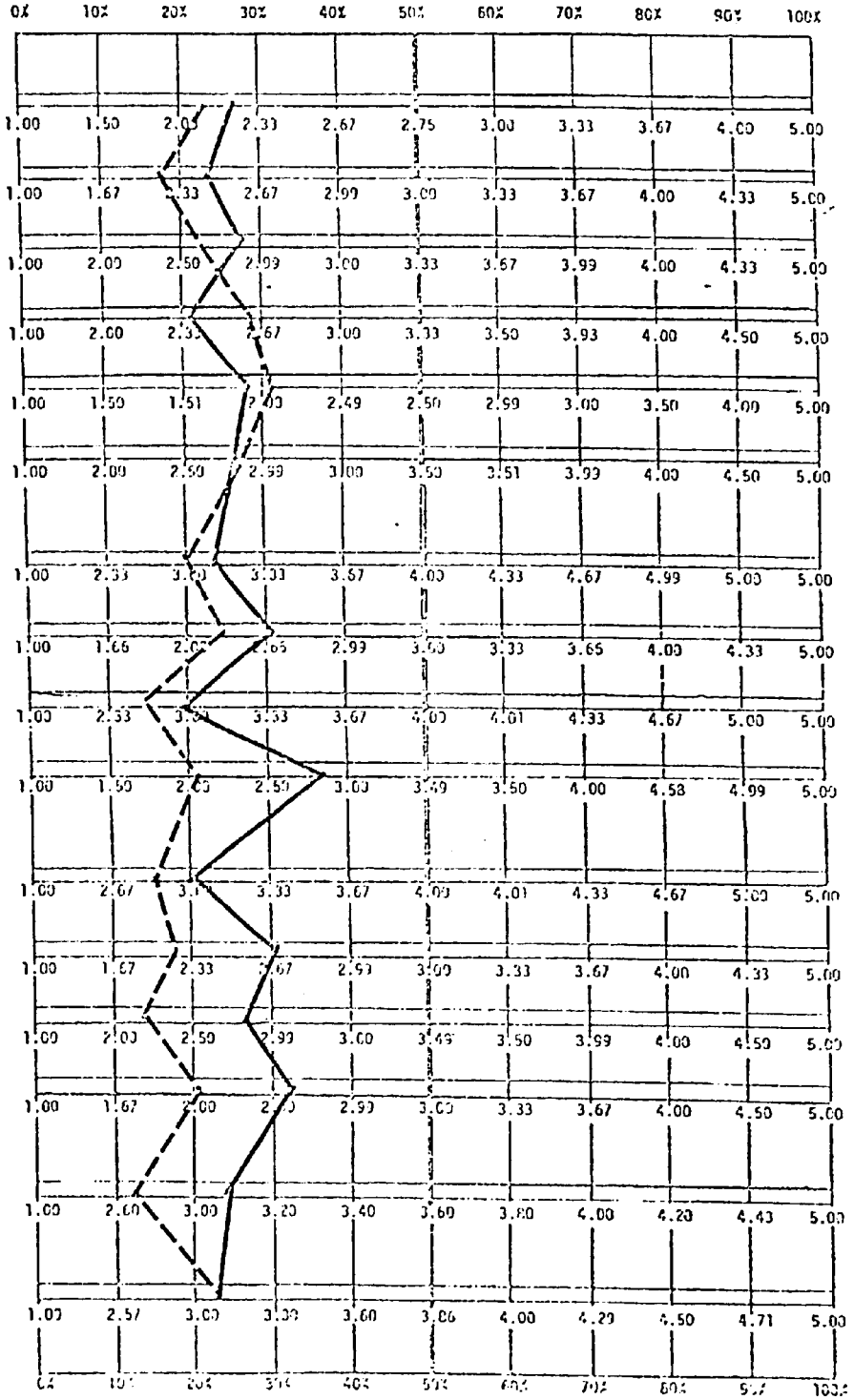
Civilian Second Sample - - - - - -

Navy Sample ——————

MAJOR INDICES

Type 8 I 25

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.18

197. Communication Flow
2.28

198. Motivational Conditions
2.72

196. Human Resources Primacy
2.50

204. Lower Level Influence
2.00

193. Technological Readiness
2.91

SUPERVISORY LEADERSHIP

176. Support
3.07

180. Work Facilitation
2.52

178. Goal Emphasis
2.79

182. Team Building
2.42

PEER LEADERSHIP

184. Support
2.96

188. Work Facilitation
2.44

186. Goal Emphasis
2.56

190. Team Building
2.33

201. GROUP PROCESS
2.88

207. SATISFACTION
3.09

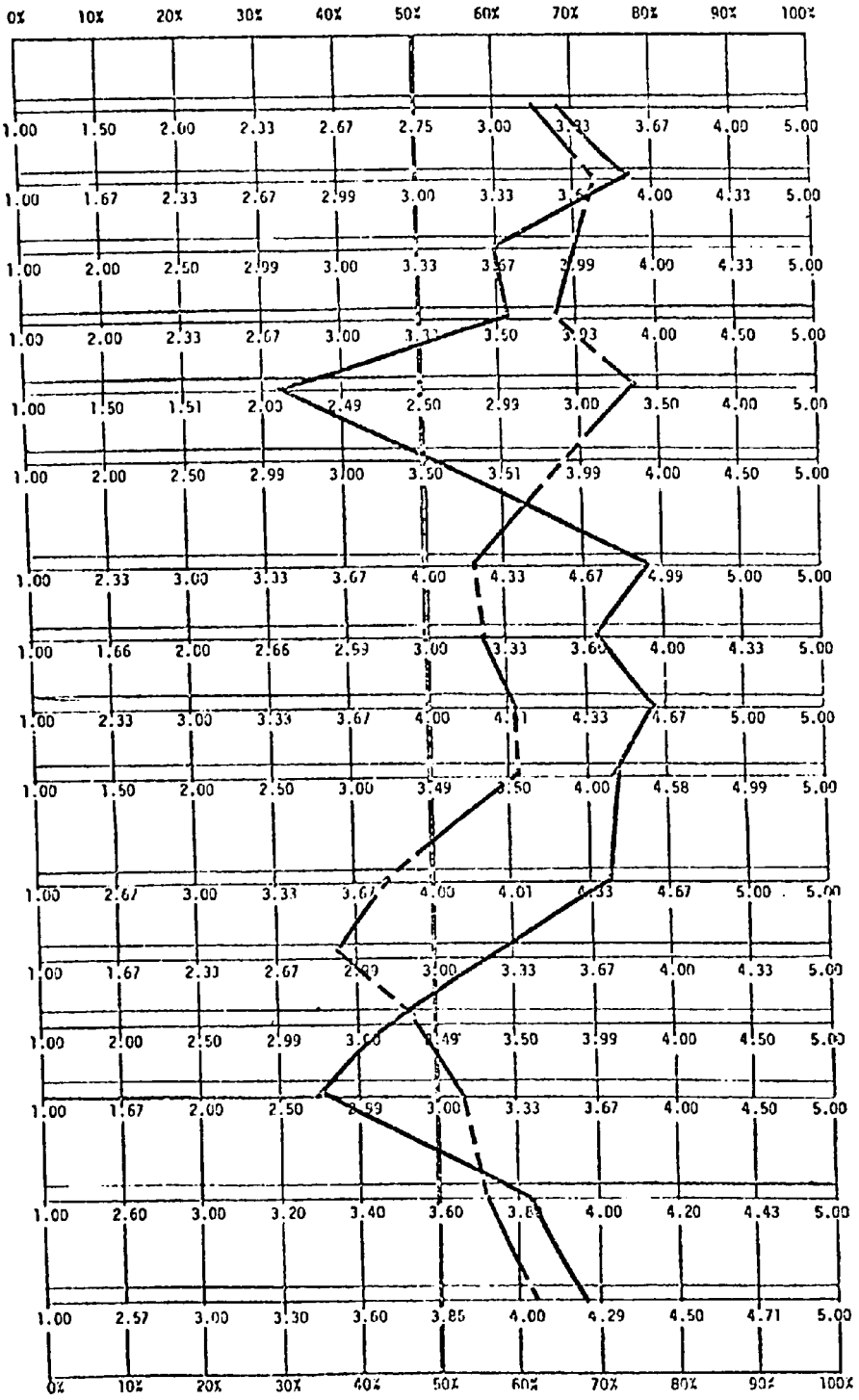
Civilian First Sample - - - - -

Navy Sample ———

MAJOR INDICES

Type 9 ♀ 60

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
3.22

197. Communication Flow
3.82

198. Motivational Conditions
3.84

196. Human Resources Primacy
3.68

204. Lower Level Influence
2.69

193. Technological Readiness
3.91

SUPERVISORY LEADERSHIP

176. Support
4.56

180. Work Facilitation
3.46

178. Goal Emphasis
4.31

182. Team Building
3.87

PEER LEADERSHIP

184. Support
4.10

183. Work Facilitation
2.80

186. Goal Emphasis
3.27

190. Team Building
2.90

201. GROUP PROCESS
3.76

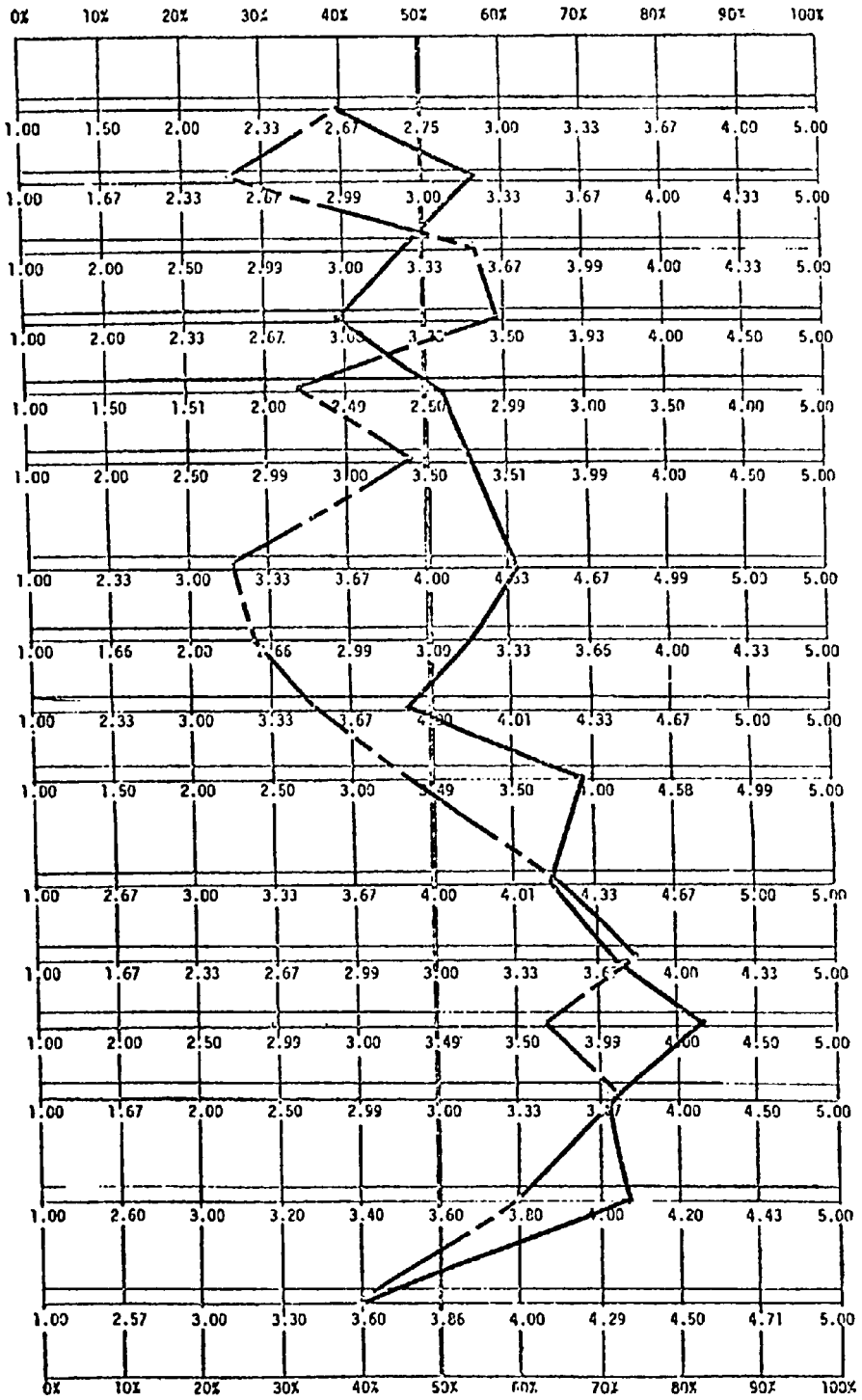
200. SATISFACTION
4.15

Civilian First Sample - - - -
Navy Sample ——

MAJOR INDICES

Type 10 & 50

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.64

197. Communication Flow
2.86

198. Motivational Conditions
3.42

196. Human Resources Primacy
3.22

204. Lower Level Influence
2.38

193. Technological Readiness
3.45

SUPERVISORY LEADERSHIP

176. Support
3.76

180. Work Facilitation
2.84

178. Goal Emphasis
3.68

182. Team Building
3.60

PEER LEADERSHIP

184. Support
4.14

188. Work Facilitation
3.72

186. Goal Emphasis
4.16

190. Team Building
3.74

201. GROUP PROCESS
3.93

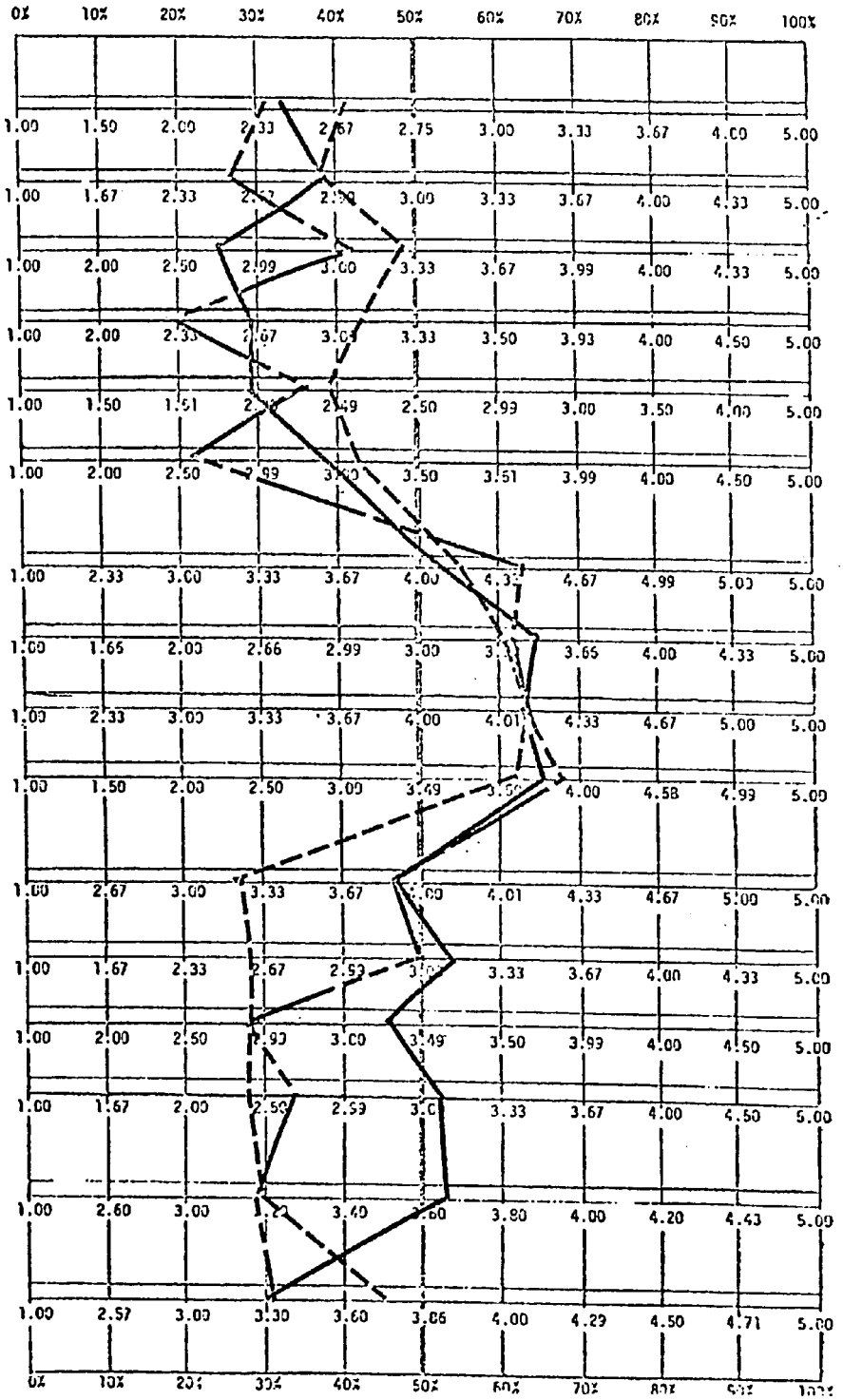
200. SATISFACTION
3.60

Civilian First Sample - - - -
Civilian Second Sample - - - - -
Navy Sample ———

MAJOR INDICES

Type 11 ½40

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.48

197. Communication Flow
2.81

198. Motivational Conditions
3.36

195. Human Resources Primacy
2.68

204. Lower Level Influence
2.24

193. Technological Readiness
2.86

SUPERVISORY LEADERSHIP

176. Support
4.24

180. Work Facilitation
3.41

178. Goal Emphasis
4.11

182. Team Building
3.73

PEER LEADERSHIP

184. Support
3.67

185. Work Facilitation
2.91

186. Goal Emphasis
3.03

190. Team Building
2.73

201. GROUP PROCESS
3.34

200. SATISFACTION
3.46

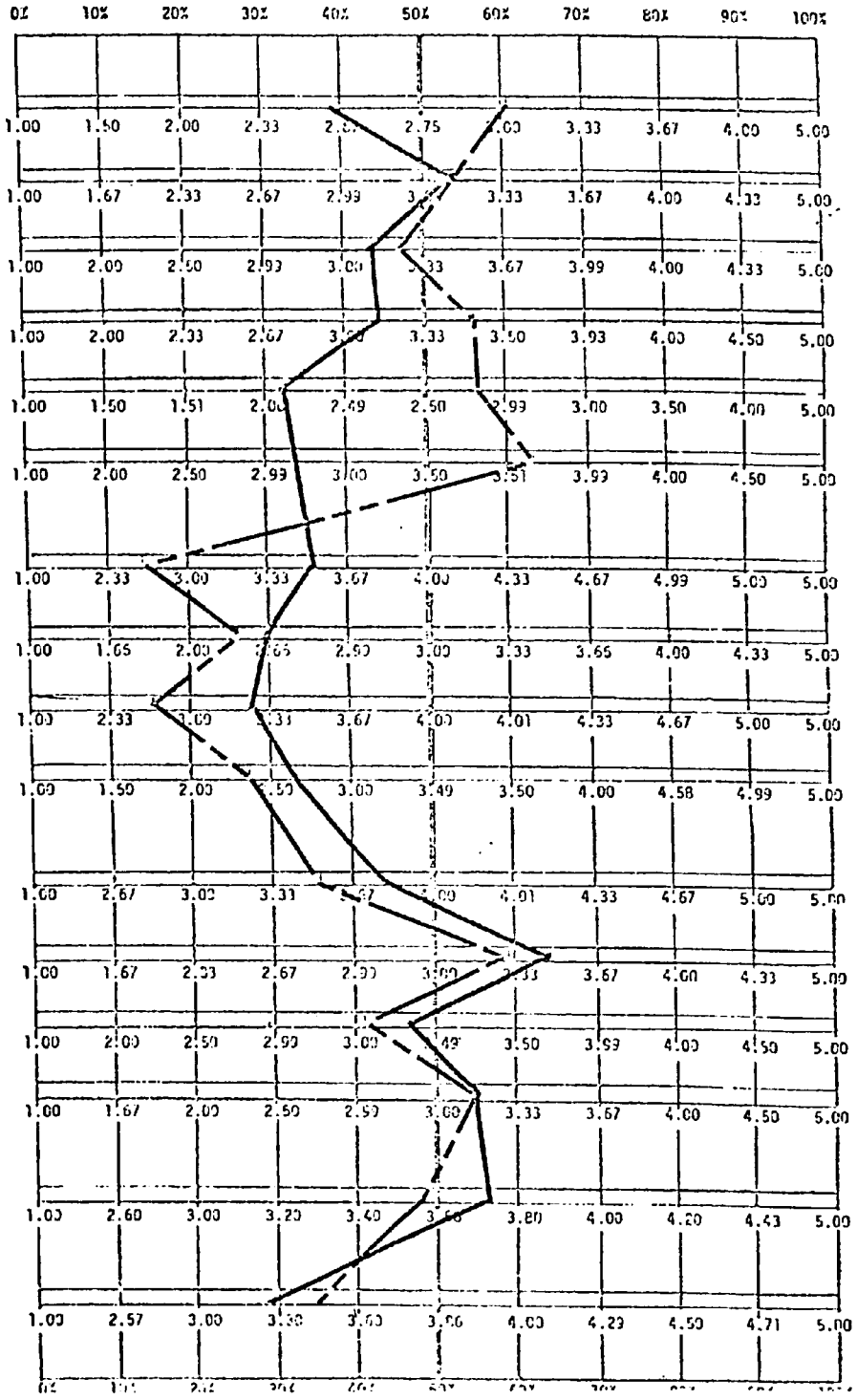
Civilian First Sample ----

Navy Sample ——

MAJOR INDICES

Type 12 & 40

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.82

197. Communication Flow
3.12

198. Motivational Conditions
3.18

196. Human Resources Primacy
3.28

204. Lower Level Influence
2.46

193. Technological Readiness
3.66

SUPERVISORY LEADERSHIP

176. Support
3.06

180. Work Facilitation
2.51

178. Goal Emphasis
2.98

182. Team Building
2.50

PEER LEADERSHIP

184. Support
3.66

188. Work Facilitation
3.38

186. Goal Emphasis
3.20

190. Team Building
3.16

201. GROUP PROCESS
3.66

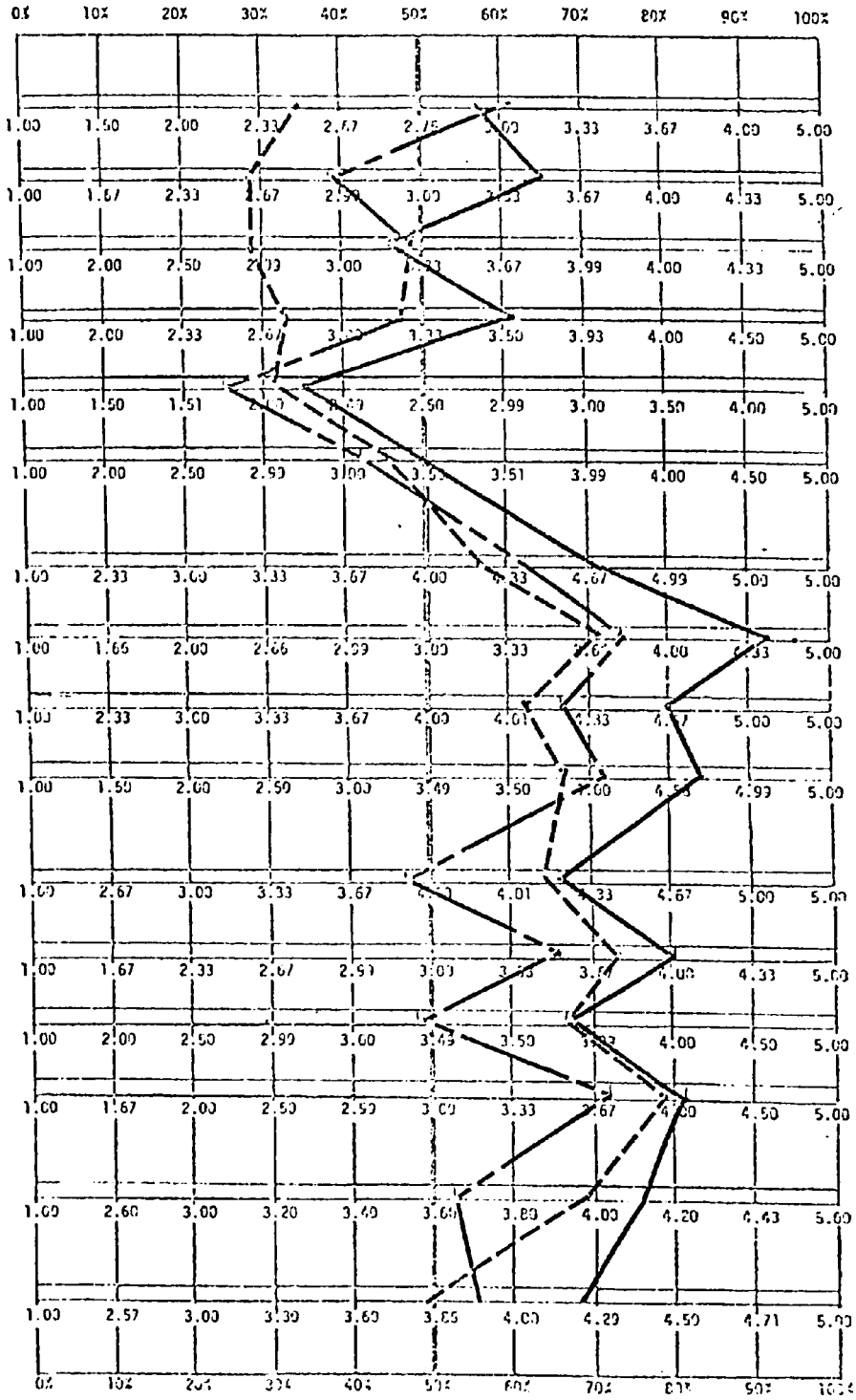
200. SATISFACTION
3.37

Civilian First Sample — — — —
Civilian Second Sample — — — —
Navy Sample ————

MAJOR INDICES

Type 13 455-60

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.82

197. Communication Flow
3.02

198. Motivational Conditions
3.17

196. Human Resources Primacy
3.20

204. Lower Level Influence
2.03

193. Technological Readiness
3.20

SUPERVISORY LEADERSHIP

176. Support
4.43

180. Work Facilitation
3.99

178. Goal Emphasis
4.30

182. Team Building
4.22

PEER LEADERSHIP

184. Support
4.09

189. Work Facilitation
3.80

186. Goal Emphasis
3.68

190. Team Building
3.92

201. GROUP PROCESS
3.91

200. SATISFACTION
4.00

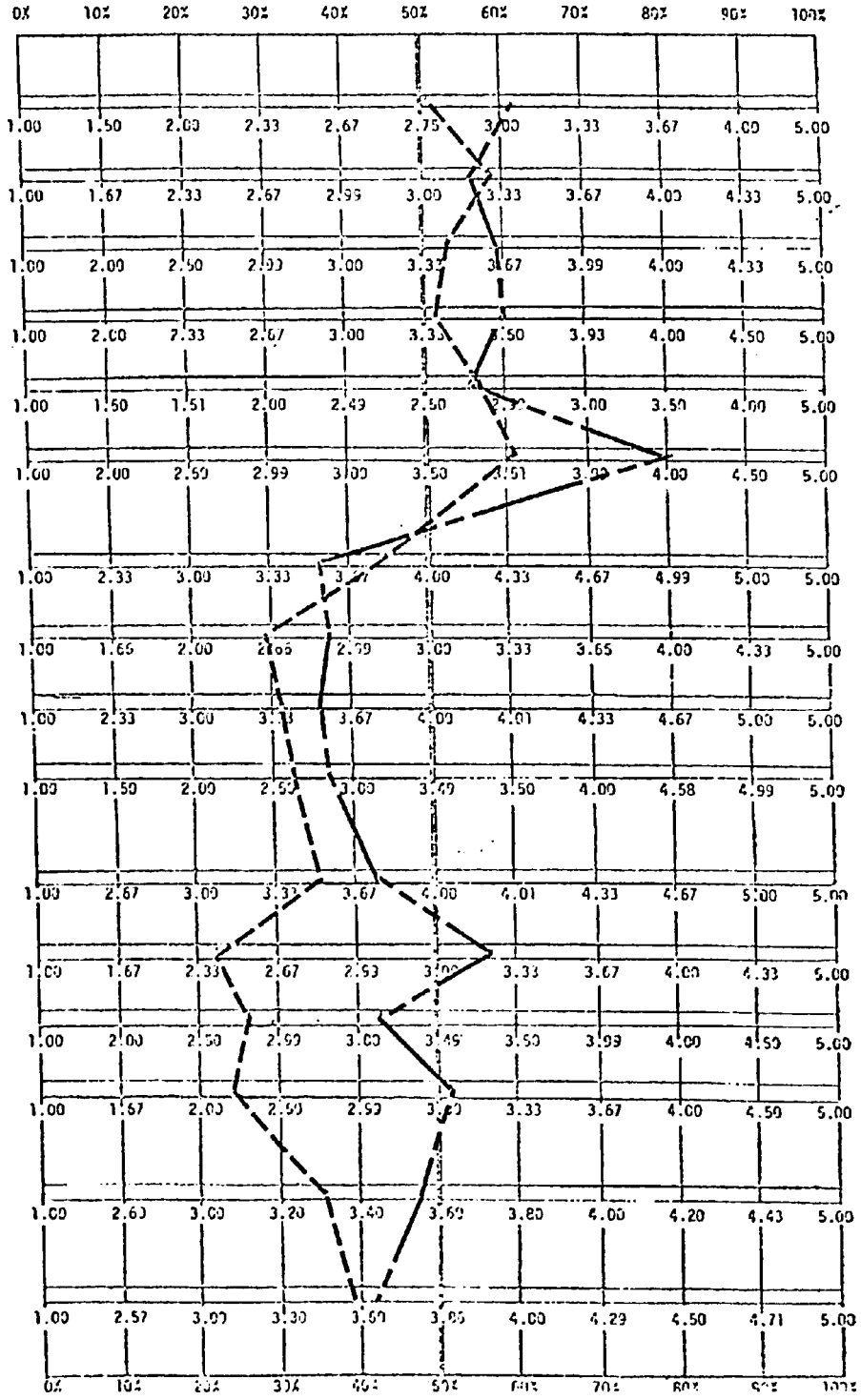
Civilian First Sample ———

Civilian Second Sample - - - -

MAJOR INDICES

Type 14 r50

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.89

197. Communication Flow
3.24

198. Motivational Conditions
3.53

195. Human Resources Primacy
3.44

201. Lower Level Influence
2.69

193. Technological Readiness
3.80

SUPERVISORY LEADERSHIP

176. Support
3.68

180. Work Facilitation
2.76

178. Goal Emphasis
3.44

182. Team Building
2.69

PEER LEADERSHIP

184. Support
3.64

183. Work Facilitation
2.82

185. Goal Emphasis
2.98

190. Team Building
2.64

201. GROUP PROCESS
3.50

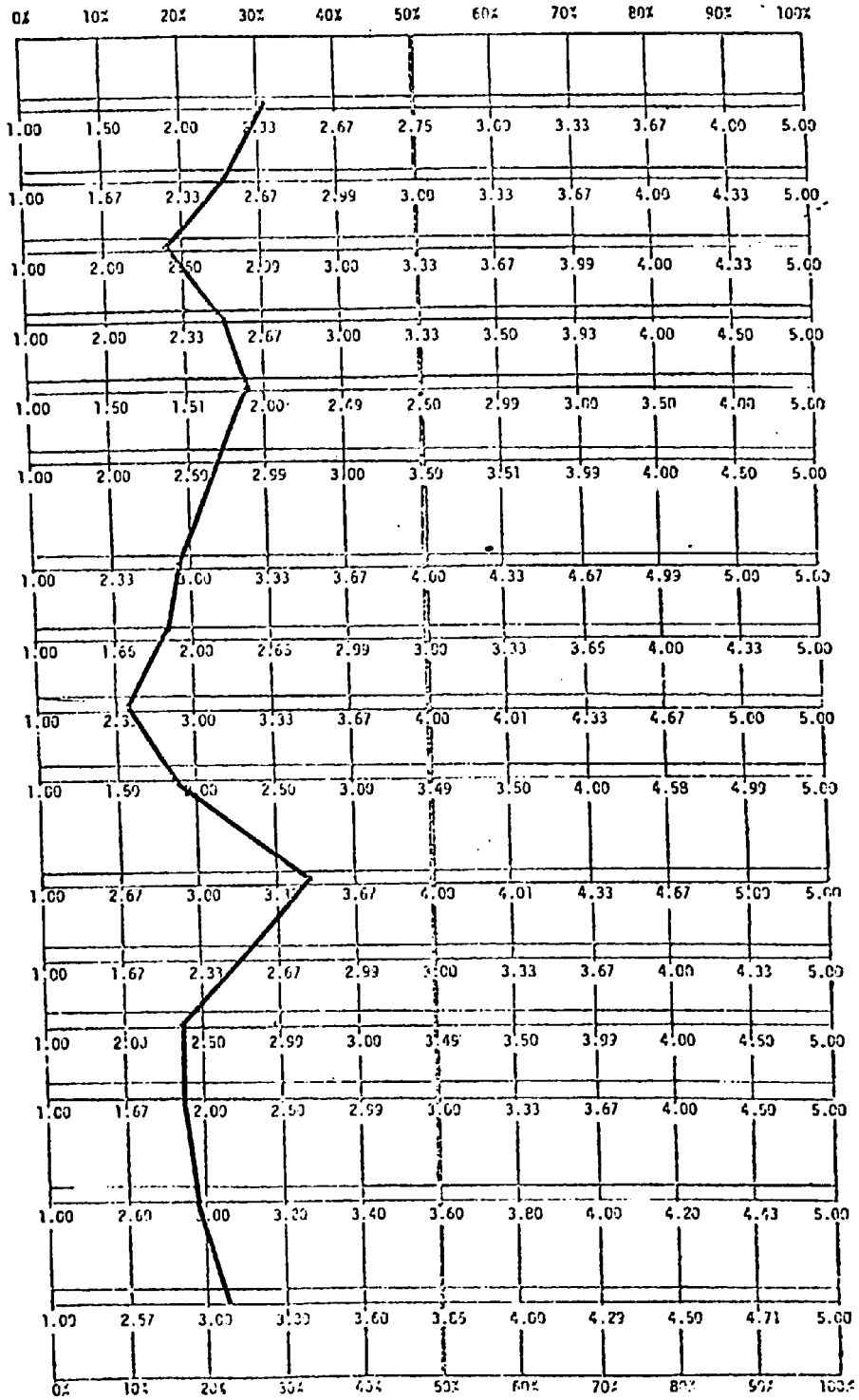
200. SATISFACTION
3.58

Navy Sample ———

MAJOR INDICES

Type 16 ξ 25

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
2.36

197. Communication Flow
2.54

190. Motivational Conditions
2.40

196. Human Resources Primacy
2.51

204. Lower Level Influence
1.91

193. Technological Readiness

SUPERVISORY LEADERSHIP

176. Support
2.94

180. Work Facilitation
1.88

178. Goal Emphasis
2.40

182. Team Building
1.80

PEER LEADERSHIP

184. Support
3.48

181. Work Facilitation
2.56

186. Goal Emphasis
2.35

190. Team Building
1.92

201. GROUP PROCESS
2.97

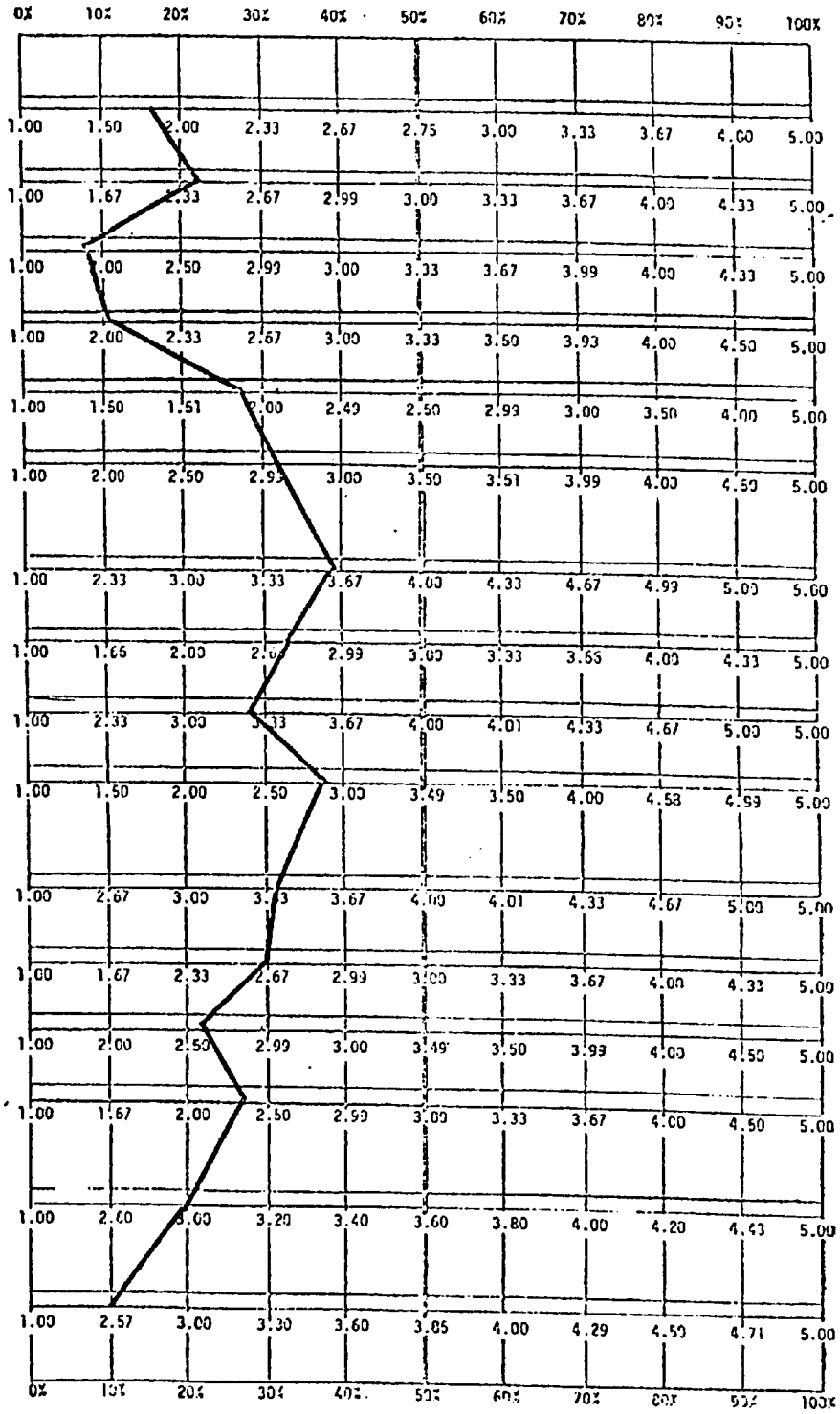
200. SATISFACTION
3.09

Navy Sample ——————

MAJOR INDICES

Type 17 ϟ 25

Percentile Profile for Combined Groups



ORGANIZATIONAL CLIMATE

199. Decision Making Practices
1.83

197. Communication Flow
2.45

198. Motivational Conditions
1.77

196. Human Resources Primacy
2.04

204. Lower Level Influence
1.87

193. Technological Readiness

SUPERVISORY LEADERSHIP

176. Support
3.65

180. Work Facilitation
2.73

178. Goal Emphasis
3.30

182. Team Building
2.86

PEER LEADERSHIP

184. Support
3.40

189. Work Facilitation
2.66

186. Goal Emphasis
2.57

190. Team Building
2.33

201. GROUP PROCESS
3.01

200. SATISFACTION
2.58

APPENDIX D

BIVARIATE FREQUENCY DISTRIBUTIONS FOR ALL PAIRS OF PREDICTORS

TABLE D-1

BIVARIATE FREQUENCY DISTRIBUTION

OF SUPERIOR GROUP PROCESS AND ORGANIZATION SIZE

		Superior Group Process										
	Scale	1	2	3	4	5	6	7	8	9	10	Total
Organization Size	1	0	3	6	21	32	46	20	1	0	0	129
	2	2	12	20	39	53	24	36	7	3	6	202
	3	1	7	4	23	52	73	53	25	23	20	281
	Total	3	22	30	83	137	143	109	33	26	26	612

TABLE D-2

BIVARIATE FREQUENCY DISTRIBUTION

OF SUPERIOR GROUP PROCESS AND ORGANIZATION SHAPE

Organization Shape: Scale	Superior Group Process: 1	2	3	4	5	6	7	8	9	10	Total
1	2	1	10	19	24	30	24	5	3	6	124
2	1	15	16	45	61	59	51	9	0	0	257
3	0	6	4	19	52	54	34	19	23	20	231
Total	3	22	30	83	137	143	109	33	26	26	612

TABLE D-3

BIVARIATE FREQUENCY DISTRIBUTION

OF SUPERIOR GROUP PROCESS AND GROUP SIZE

Group Size Scale	Superior Group Process 1	2	3	4	5	6	7	8	9	10	Total
1	0	4	10	26	46	56	41	7	11	16	217
2	3	13	11	32	66	56	45	16	11	8	261
3	0	3	5	15	16	19	12	6	3	1	80
4	0	2	4	10	9	12	11	4	1	1	54
Total	3	22	30	83	137	143	109	33	26	26	612

TABLE D-4

BIVARIATE FREQUENCY DISTRIBUTION

OF SUPERIOR GROUP PROCESS AND GROUP FUNCTION

Group Function Scale	Superior Group Process 1	2	3	4	5	6	7	8	9	10	Total
1	3	14	20	54	65	76	57	23	10	18	340
2	0	8	6	19	26	46	37	4	15	8	169
3	0	0	3	8	14	13	6	0	0	0	44
4	0	0	1	2	21	6	3	4	0	0	37
5	0	0	0	0	11	2	6	2	1	0	22
Total	3	22	30	83	137	143	109	33	26	26	612

TABLE D-5

BIVARIATE FREQUENCY DISTRIBUTION

OF SUPERIOR GROUP PROCESS AND GROUP LEVEL

Group Level Scale	Superior Group Process 1	2	3	4	5	6	7	8	9	10	Total
4	0	0	0	0	9	4	4	2	1	0	20
3	0	0	0	15	25	11	19	8	3	17	98
2	0	3	17	30	63	83	52	12	22	7	289
1	3	10	11	27	21	14	17	7	0	2	112
0	0	9	2	11	19	31	17	4	0	0	93
Total	3	22	30	83	137	143	109	33	26	26	612

TABLE D-6

BIVARIATE FREQUENCY DISTRIBUTION

OF SUPERIOR GROUP PROCESS AND TENURE

Tenure Scale	Superior Group Process 1	2	3	4	5	6	7	8	9	10	Total
1	0	0	3	7	8	11	3	3	0	3	38
2	0	1	0	0	2	1	3	0	0	0	7
3	1	3	4	9	18	11	10	6	6	4	72
4	1	14	11	38	61	59	30	7	7	4	232
5	1	1	7	16	31	37	37	10	10	12	162
6	0	3	5	13	17	24	26	7	3	3	101
Total	3	22	30	83	137	143	109	33	26	26	612

TABLE D-7

BIVARIATE FREQUENCY DISTRIBUTION

OF SUPERIOR GROUP PROCESS AND AGE

Age Scale	Superior Group Process 1	2	3	4	5	6	7	8	9	10	Total
1	0	0	4	2	4	6	3	2	0	0	21
2	0	2	0	4	5	5	2	0	0	1	19
3	0	0	0	5	7	9	4	3	4	4	36
4	2	17	18	53	86	86	55	20	19	14	370
5	0	0	4	8	13	20	20	3	2	6	76
6	1	3	4	11	22	17	25	5	1	1	90
Total	3	22	30	83	137	143	109	33	26	26	612

TABLE D-8

BIVARIATE FREQUENCY DISTRIBUTION

OF SUPERIOR GROUP PROCESS AND EDUCATION

Education	Superior Group Process										
Scale	1	2	3	4	5	6	7	8	9	10	Total
1	0	6	9	12	13	14	17	6	3	6	86
2	1	4	3	8	13	16	12	8	2	0	67
3	2	11	16	50	91	91	55	10	15	16	357
4	0	1	2	13	20	22	25	9	6	4	102
Total	3	22	30	83	137	143	109	33	26	26	612

TABLE D-9

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SIZE AND ORGANIZATION SHAPE

		Organization Size			
	Scale	1	2	3	Total
Organization Shape	1	83	41	0	124
	2	46	125	86	257
	3	0	36	195	231
	Total	129	202	281	612

TABLE D-10

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SIZE AND GROUP SIZE

		Organization Size			
	Scale	1	2	3	Total
Group Size	1	30	67	120	217
	2	65	77	119	261
	3	29	30	21	80
	4	5	28	21	54
	Total	129	202	281	612

TABLE D-11

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SIZE AND GROUP FUNCTION

Group Function Scale	Organization Size 1	2	3	Total
1	68	129	143	340
2	19	26	124	169
3	31	9	4	44
4	1	29	7	37
5	10	9	3	22
Total	129	202	281	612

TABLE D-12

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SIZE AND GROUP LEVEL

		Organization Size			
	Scale	1	2	3	Total
Group Level	4	10	4	6	20
	3	9	23	66	98
	2	59	80	150	289
	1	8	74	30	112
	0	43	21	29	93
	Total	129	202	281	612

TABLE D-13

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SIZE AND TENURE

		Organization Size			
	Scale	1	2	3	Total
Tenure	1	18	17	3	38
	2	5	1	1	7
	3	8	38	26	72
	4	82	88	62	232
	5	4	25	133	162
	6	12	33	56	101
	Total	129	202	281	612

TABLE D-14

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SIZE AND AGE

		Organization Size			
	Scale	1	2	3	Total
Age	1	10	7	4	21
	2	10	6	3	19
	3	7	10	19	36
	4	87	144	139	370
	5	4	10	62	76
	6	11	25	54	90
	Total	129	202	281	612

TABLE D-15

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SIZE AND EDUCATION

		Organization Size			
	Scale	1	2	3	Total
Education	1	6	47	33	86
	2	7	22	38	67
	3	98	115	144	357
	4	18	18	66	102
	Total	129	202	281	612

TABLE D-16

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SHAPE AND GROUP SIZE

		Organization Shape			
	Scale	1	2	3	Total
Group Size	1	36	79	102	217
	2	60	99	102	261
	3	18	47	15	80
	4	10	32	12	54
	Total	124	257	231	612

TABLE D-17

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SHAPE AND GROUP FUNCTION

Group Function Scale	Organization Shape 1	2	3	Total
1	78	163	99	340
2	20	58	91	169
3	17	24	3	44
4	2	4	31	37
5	7	8	7	22
Total	124	257	231	612

TABLE D-18

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SHAPE AND GROUP LEVEL

Group Level Scale	Organization Shape 1	2	3	Total
4	7	8	5	20
3	11	22	65	98
2	53	109	127	289
1	24	88	0	112
0	20	30	34	93
Total	124	257	231	612

TABLE D-19

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SHAPE AND TENURE

		Organization Shape			
	Scale	1	2	3	Total
Tenure	1	18	16	4	38
	2	6	0	1	7
	3	29	9	34	72
	4	57	94	81	232
	5	3	82	77	162
	6	11	56	34	101
	Total	124	257	231	612

TABLE D-20

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SHAPE AND AGE

		Organization Shape			
	Scale	1	2	3	Total
Age	1	7	7	7	21
	2	8	7	4	19
	3	4	12	20	36
	4	94	126	150	370
	5	5	42	29	76
	6	6	63	21	90
	Total	124	257	231	612

TABLE D-21

BIVARIATE FREQUENCY DISTRIBUTION

OF ORGANIZATION SHAPE AND EDUCATION

		Organization Shape			
	Scale	1	2	3	Total
Education	1	19	41	26	86
	2	9	44	14	67
	3	74	147	136	357
	4	22	25	55	102
	Total	124	257	231	612

TABLE D-22

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP SIZE AND GROUP FUNCTION

		Group Size				
	Scale	1	2	3	4	Total
Group Function	1	126	138	45	31	340
	2	63	76	14	16	169
	3	6	21	15	2	44
	4	10	16	6	5	37
	5	12	10	0	0	22
	Total	217	261	80	54	612

TABLE D-23

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP SIZE AND GROUP LEVEL

		Group Size				
	Scale	1	2	3	4	Total
Group Level	4	11	9	0	0	20
	3	52	35	6	5	98
	2	120	120	29	20	289
	1	17	52	23	20	112
	0	17	45	22	9	93
	Total	217	261	80	54	612

TABLE D-24

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP SIZE AND TENURE

		Group Size				
	Scale	1	2	3	4	Total
Tenure	1	13	17	6	2	38
	2	1	4	1	1	7
	3	35	30	4	3	72
	4	64	100	47	21	232
	5	70	68	11	13	162
	6	34	42	11	14	101
	Total	217	261	80	54	612

TABLE D-25

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP SIZE AND AGE

Age Scale	Group Size 1	2	3	4	Total
1	10	7	3	1	21
2	4	7	6	2	19
3	24	12	0	0	36
4	111	168	55	36	370
5	45	21	4	6	76
6	23	46	12	9	90
Total	217	261	80	54	612

TABLE D-26

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP SIZE AND EDUCATION

		Group Size				
	Scale	1	2	3	4	Total
Education	1	25	32	15	14	86
	2	22	31	6	8	67
	3	125	159	48	25	357
	4	45	39	11	7	102
	Total	217	261	80	54	612

TABLE D-27

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP FUNCTION AND GROUP LEVEL

		Group Function					
	Scale	1	2	3	4	5	Total
Group Level	4	2	2	0	0	10	20
	3	46	38	5	3	6	98
	2	149	87	36	17	0	289
	1	105	7	0	0	0	112
	0	38	35	3	17	0	93
	Total	340	169	44	37	22	612

TABLE D-28

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP FUNCTION AND TENURE

		Group Function					
	Scale	1	2	3	4	5	Total
Tenure	1	23	10	2	2	1	38
	2	3	3	1	0	0	7
	3	46	15	1	7	3	72
	4	115	50	36	21	10	232
	5	91	59	2	6	4	162
	6	62	32	2	1	4	101
	Total	340	169	44	37	22	612

TABLE D-29

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP FUNCTION AND AGE

		Group Function					
	Scale	1	2	3	4	5	Total
Age	1	12	6	0	3	0	21
	2	10	8	0	1	0	19
	3	26	6	1	0	3	36
	4	201	94	32	28	15	370
	5	36	33	4	1	2	76
	6	55	22	7	4	2	90
	Total	340	169	44	37	22	612

TABLE D-30

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP FUNCTION AND EDUCATION

		Group Function					
	Scale	1	2	3	4	5	Total
Education	1	78	7	0	0	1	86
	2	57	7	0	2	1	67
	3	158	109	39	31	20	357
	4	47	46	5	4	0	102
	Total	340	169	44	37	22	612

TABLE D-31

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP LEVEL AND TENURE

		Group Level					
	Scale	4	3	2	1	0	Total
Tenure	1	1	2	11	4	20	38
	2	0	0	2	0	5	7
	3	2	9	33	13	15	72
	4	7	39	110	35	41	232
	5	6	35	84	32	5	162
	6	4	13	49	28	7	101
	Total	20	98	289	112	93	612

TABLE D-32

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP LEVEL AND AGE

		Group Level					
	Scale	4	3	2	1	0	Total
Age	1	0	1	7	1	12	21
	2	0	1	1	2	15	19
	3	3	6	21	2	4	36
	4	13	56	180	68	53	370
	5	2	20	36	14	4	76
	6	2	14	44	25	5	90
	Total	20	98	289	112	93	612

TABLE D-33

BIVARIATE FREQUENCY DISTRIBUTION

OF GROUP LEVEL AND EDUCATION

		Group Level					
	Scale	4	3	2	1	0	Total
Education	1	0	9	36	37	4	86
	2	1	3	22	40	1	67
	3	19	50	178	31	79	357
	4	0	36	53	4	0	102
	Total	20	98	289	112	93	612

TABLE D-34

BIVARIATE FREQUENCY DISTRIBUTION

OF TENURE AND AGE

		Tenure						
	Scale	1	2	3	4	5	6	Total
Age	1	12	1	6	2	0	0	21
	2	5	3	5	6	0	0	19
	3	4	0	7	9	15	1	36
	4	16	3	52	198	33	68	370
	5	0	0	2	4	68	2	76
	6	1	0	0	13	46	30	90
	Total	38	7	72	232	162	101	612

TABLE D-35

BIVARIATE FREQUENCY DISTRIBUTION

OF TENURE AND EDUCATION

		Tenure						
	Scale	1	2	3	4	5	6	Total
Education	1	4	0	9	21	36	16	86
	2	0	1	3	12	30	21	67
	3	30	4	43	158	78	44	357
	4	4	2	17	41	18	20	102
	Total	38	7	72	232	162	101	612

TABLE D-36

BIVARIATE FREQUENCY DISTRIBUTION

OF AGE AND EDUCATION

		Age						
	Scale	1	2	3	4	5	6	Total
Education	1	0	0	5	51	15	15	86
	2	0	0	1	30	12	24	67
	3	20	17	27	216	36	41	357
	4	1	2	3	13	13	10	102
	Total	21	19	36	370	76	90	612

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