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**The relationships among environmental uncertainty, cognitive style, organicity and organization culture in small growing public companies**

**Matteson, Carol Jean, Ph.D.**

**University of Pittsburgh, 1987**

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THE RELATIONSHIPS AMONG ENVIRONMENTAL UNCERTAINTY,  
COGNITIVE STYLE, ORGANICITY AND ORGANIZATION CULTURE  
IN SMALL GROWING PUBLIC COMPANIES

by

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Submitted to the Graduate Faculty of  
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Doctor of Philosophy

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1987

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## FOREWORD

Many individuals have been supportive of my efforts to complete this dissertation. I want to thank Lawrence Park for the initial encouragement to pursue the doctoral degree. I want to express special thanks to Donna Wood, my dissertation advisor, for her time and invaluable assistance. I want to express my gratitude to the other members of my dissertation committee, including James Wilson, Dennis Slevin, Raghu Nath and Norman Hummon for their time and effort. My colleagues have been helpful over the course of this project, in particular, I wish to thank Mary Adair and Charles Zuzak for their input. Finally, I want to thank Katherine M. Moore for her continuing counsel and encouragement. I am dedicating this dissertation to her.

THE RELATIONSHIPS AMONG ENVIRONMENTAL UNCERTAINTY,  
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Carol J. Matteson, Ph.D.

University of Pittsburgh, 1987

The intent of this research was to study the interrelationships of organization subunit culture, perceived environmental uncertainty, structure of the organization and cognitive style of managers whose functional area interacts primarily with the external environment. A questionnaire was used to collect data from 92 small growing publicly traded companies located throughout the United States.

Organization culture was operationalized as the shared norms (task support, task innovation, social relationships) of behavior of members in subunits in the organization. Perceived environmental uncertainty was operationalized along the three dimensions of: dynamism, complexity and munificence. The nature of the structure of the organization was operationalized via the concept of organicity. High organicity was characteristic of an organic/adaptive structure, while low organicity was characteristic of a less than organic structure. Cognitive style was determined by the Myers-Briggs Type Indicator.

A set of hypotheses proposed organicity as a moderator variable in the relationship between perceived environmental uncertainty and organization culture. For the total sample, the only significant interaction occurred with task innovation. When the sample was split into manufacturing and service businesses, significant interactions were found with task support and task innovation for service subunits. In general the findings suggest that organicity is not a good moderator of the environmental uncertainty-cultural norms relationship.

Chi-square contingency tables were used to test the hypothesized associations of the following: environmental uncertainty-organicity; cognitive style-organicity; cognitive style-cultural norms and cognitive style-environmental uncertainty. No significant associations were found.

Additional statistical analyses found a significant association between organic subunits and high levels of task support, task innovation and social relationships and a predominant NT cognitive style among top managers.

Dissertation Advisor's Signature: Donna W. Wenzel

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## 1.0 INTRODUCTION

### 1.1 Problem Statement

The business environment in the next decade is expected to continue to become more complex and dynamic. With the advent of the information age, world-wide communications systems, new technologies, and foreign competition, new threats as well as opportunities will confront America's business managers. How well and to what degree management can avoid the threats and seize the opportunities may depend on the values and beliefs system (e.g. culture) in place within their organization as well as their perception of the internal and external environment. This study investigates how perceived environmental uncertainty, the structure of the organization, and human information processing (e.g. cognitive style) interrelate with the culture of the organization.

In recent years, a growing body of literature has indicated tentatively that well-run and effective organizations have distinctive cultures (Peters and Waterman, 1982; Deal and Kennedy, 1982;). The culture of an organization can briefly be defined as the pattern of beliefs and expectations shared by individuals and groups in the organization. These same writers suggest that strong cultures are the mark of very successful companies.

However, others contend that there is no single "winning culture" (Gordon, 1985) and also question whether and when more or stronger culture is "better" (Schein, 1985, Wilkins and Ouchi, 1983). The literature is not sufficiently clear nor developed to help managers discern the methods necessary to maximize the benefits of culture in the functioning of their organization.

There is a need to study organization culture because of its potent and patterned impact on any organization (Schein, 1985). Empirical research must advance beyond the current set of simplifying assumptions which focus on integrative, monolithic cultures and naive culture change prescriptions. Incorporating issues relevant to managers in research paradigms is necessary. The business environment, organizational structure and cognitive style are three such issues.

Wilkins and Ouchi (1985), upon inspection of the contemporary literature, noted that many of those who study organization culture trace their roots to anthropology. The displacement of the concept of culture traditionally used in anthropology to the research and study of organization culture is attractive; however, Morey and Luthans (1985) caution that it should not be overinterpreted. Anthropologists do not agree on all attributes of culture however there is common agreement on the following attributes. Culture is learned; also it is shared by members of social groups. It is cumulative in its



development and it is patterned; a change in one part will bring about corresponding changes in another part of the system. It is symbolic and adaptive.

Parsons (1960) indicated that each society favors certain behaviors and attitudes over others. Thus all organizations have culture in the sense that they are embedded in specific societal cultures and are a part of them (Adler and Jelinek, 1986). Yet, organizations are important cultural artifacts themselves. While they exist on a lower level of analysis than anthropologists usually use when applying the concept of culture, they can be cultures and even have their own subcultures (Lewis, 1985; Morey and Luthans, 1985). Therefore, the displacement of the concept is appropriate to study organization culture if one takes care not to overinterpret the reality of the situation. Of relevance to organizational studies are culture's patterned, learned, shared and symbolic characteristics (Morey and Luthans, 1985).

The assumption underlying the study of organization culture is that "culture does affect organizational behavior and performance" (Kilmann, Saxton, and Serpa, 1985:3; Schein, 1985) by communicating to the employees what is expected of them. This assumption has often been defended on the basis of anecdotal evidence which demonstrates that strong positive cultures are what is necessary to maintain leadership in product/markets and keep corporate profits high. Deal and Kennedy (1982) however, while emphasizing

strong cultures for companies, also caution that the risks of a strong culture may be: a) obsolescence, if the business environment of the organization changes; b) resistance to further change as members of the organization become committed to its culture and c) inconsistency, as at times managerial behavior may contradict the company's culture.

While it may be true that organizations with a strong positive culture also perform better, there are few specific recommendations in the literature to guide managerial action when different organizational contexts are considered. Adler and Jelinek (1986:84) state "despite frequent proclamations of the importance of "open systems" perspectives, they are rarely seen in practice. The same is true of organization culture; it focuses on the inside of the organization and treats the organization as if it were separate from the societal environment". Yet there is a dearth of research on how culture covaries with other organizational constructs. Subsequently, there is a need for research that will include other variables that may impact on an organization's culture and that of its work groups.

## 1.2 Research Model

Management theorists view culture as a factor influencing performance, productivity and experience in the organization (Adler and Jelinek, 1986). For example, effective cultures may increase an organization's efficiency (Smircich, 1983), economize communications within the

organization (Sathe, 1983; Wilkins and Ouchi, 1983), and achieve goal congruence (Wilkins and Ouchi, 1983). The culture of the organization can also convey a sense of identity and belongingness to the organization's members, either as individuals or as groups, and in turn generate member and group commitment to the organization (Sathe, 1983; Peters and Waterman, 1982; Deal and Kennedy, 1982).

Fundamental to the organization culture concept is the belief that management can create, maintain, and change the culture of an organization. However, many aspects of the culture may be irrelevant to the effectiveness of the organization. Furthermore, attempts to manipulate all aspects of an organization's culture are likely doomed to failure; even the most perceptive and powerful manager cannot account for and control all the subtleties of cultural rules and interactions within a group or an organization. With additional research designed to study critical aspects of the culture which may interact with other organizational constructs, the manager won't waste scarce resources or become bogged down in total cultural analysis (Schein, 1985) when attending to the functioning of his/her subordinates or the organization. This study proposes to investigate variables that are pertinent to and practical for managerial control.

As is true in many of our approaches to organizational analysis, it may be that the "appropriate" culture for an organization is contingent upon many factors, including a)

the characteristics of the industry; b) the type of environment the organization faces; c) the organization's structure; and d) the manager's perception of the situation (Schein, 1985; Gordon, 1985; Mitroff, 1983; Schwartz and Davis, 1981). Deal and Kennedy (1982:13) stated that "the business environment is the single greatest influence in shaping a corporate culture". Recently, Kennedy, in an interview with Rhodes (1986), concluded that in the start up phase of a company, a well designed and implemented culture can succeed only if the business environment supports it. Managerial beliefs and cognitive style may impact the perception of the environment (Duncan, 1972; Starbuck, 1976), the culture of the organization and work groups (Schein, 1985), as well as the structure of the organization (Mitroff, 1983) and its subunits (Kilmann, 1978).

While the concept of perceived environmental uncertainty has had extensive theoretical and empirical analysis, researchers have not generally incorporated factors other than the environment, such as human information processing, that may influence perceptions and therefore behavior (Yasal-Ardekani, 1986). Human information processing research suggests that individuals differ in their perception of stimuli as well as the classification schemes that are used to make sense of the stimuli (i.e. cognitive structure). Individuals with complex cognitive structures perceive many environmental dimensions and are able to apply more complex and varied

classification schemes to the phenomena being addressed (Schroder, Driver, and Streufert, 1967). Taggart and Roby (1981) utilize the concept of cognitive style (Jung, 1923) as an approach to human information processing. By pairing modes of gathering information (sensation/intuition) with modes of processing information (thinking/feeling), four cognitive styles or decision styles (Myers, 1976) have been identified. A human information processing component is included in the proposed research model (Figure 1) to reflect the manager's style of perception as an underlying variable in the investigation of the interrelationship of perceived environmental uncertainty, structure, and work group culture.

Structure has been studied extensively with many different recommendations regarding the best way to design an organization so that the behaviors of members of the organization are influenced in such a manner to assure effective accomplishment of organizational goals and objectives. Yet there is still interest in trying to explain effective member behaviors more definitively. Wilkins and Ouchi (1985:459) felt that "perhaps through culture rather than formal structure, large firms can be bent to the will of their masters and rendered predictable, rational". Schein (1985) viewed structure as an artifact (a most visible and/or audible behavior pattern) of culture and considered it a secondary reinforcement mechanism in the process of embedding and transmitting culture. Davis (1981)

contended that a strong culture, in the absence of carefully formulated systems and structures, can play an important role in improving the coordination of work between units in the same organization.

Written rules and procedures reduce ambiguity and uncertainty and are characteristic of bureaucratic organizations. Wilkins and Ouchi (1983) suggested that, in a stable environment, culture may not need to be as strong in the bureaucratic type of organization because of the stabilizing role of rules and procedures. The implication is that culture will play a lesser role in the way the organization is managed in this situation. These authors also suggested that, in a competitive environment, market factors guide the behaviors of the members of the organization. Thus, in organizations that are not bureaucratic or do not operate in a stable competitive environment (or both), culture may be a more influential force in guiding the behavior of the organization's members.

The following terms, with a brief description of each, will be used to clarify the research questions posed in section 2.6. The concept of environmental uncertainty incorporated in this study takes a broader view than has been the norm in the past, incorporating resource dependence dimensions as well as the information dimensions of the environment. This approach reflects the inclusion of the resource domain as a dimension in environmental uncertainty as suggested by the work of Dess and Beard (1984) and

Lawrence (1981). It is hoped that this broader measure will better capture the concept of the environment as it impacts managers' perceptions of uncertainty.

The three broad dimensions of environmental uncertainty used in this study will be munificence, dynamism and complexity. Munificence represents the extent to which required resources are available in the environment (Aldrich, 1979; Pfeffer and Salancik, 1978). Dynamism represents the degree of stability or instability (Lawrence and Lorsch, 1967; Thompson, 1967) and turbulence, e.g. rate of change (Emery and Trist, 1965; Pfeffer and Salancik, 1978) present in the environment. In other words, dynamism represents the degree of interconnection, rate of change and predictability in the environment of the firm's organization set (Evan, 1966). Complexity is defined as the the degree of homogeneity or heterogeneity (Dill, 1958; Thompson, 1967) and concentration or dispersion of resources (Pfeffer and Salancik, 1978) in the organization's environment. That is, the greater the number of variables that a manager must contend with and the greater the economic concentration of the industry's sales in the hands of a few firms, the greater the perceived complexity. The less munificent, more complex, and more dynamic the environment, the higher the uncertainty facing the organization (Scott, 1981).

Organicity is defined with respect to the structure of the organization. Structure includes the roles, role relationships and authority system that allow role occupants

to pursue specific goals either in their work group or the organization as a whole. Low organicity indicates a mechanistic organization or subunit, while high organicity refers to an organic organization or subunit. Burns and Stalker (1961) found that the structure of a mechanistic organization contained set functional duties, precise job descriptions, and hierarchical chains of command. They also found that the structure of an organic organization contained less formal job descriptions, a network system of control and authority with an emphasis on adaptability rather than set rules and procedures.

The construct of cognitive style may be used to operationalize human information processing (Taggart and Robey, 1981). Managers are decision makers. Thus, an understanding of how they process information in the management context could be useful in matching managers to decision situations where their natural styles are most effective.

Cognitive style is based on Jung's (1923; 1966) theory of personality which suggests individuals have a predominant way of a) taking in information (i.e. sensing/intuition) and b) making a decision (i.e. thinking/feeling). By pairing the two processes, four decision styles are derived (Myers, 1976): sensation/thinking; intuitive/thinking; intuitive/feeling; and sensation/feeling.



An organization's culture is defined as the pattern of beliefs and expectations which are shared by the organization's members (Schwartz and Davis, 1981) and which help members cope with problems of survival in the external environment and integration in the internal environment (Schein, 1985). This definition of culture focuses on the beliefs of individuals and/or groups within an organization. These beliefs are value-based and can be manifested as norms of behavior, becoming the informal rules groups adopt to regulate the behavior of their members.

There has been a plethora of literature on organizational structure, and environmental uncertainty, as well as an increasing amount on culture and cognitive style. To date, however, there has been no empirical research on the interrelation of these contextual variables. Because of the lack of empirical research, the implied interrelationships among organizational structure, environmental uncertainty, cognitive style and organization culture are not depicted as a causal model with the usual single and double headed arrows. Rather, the research model (Figure 1) is one that depicts the mutual dependancies of the variables and the proposed interaction effect of structure on the environmental uncertainty - organization culture relationship. As cognitive style deals with perceptions it is depicted as a circular overlay on all the

other variables. Relevant theory and research to support the variables and their implied relationships are presented in the literature review.

#### 1.4 Research Objectives

Producing useful knowledge is a very important criterion for business related research. One group of users of this knowledge is the practitioners who run America's business organizations. A second and equally important group of users of business related research are academicians who seek to acquire additional knowledge to enhance our understanding of the various phenomena that occur within organizations. Therefore, the objectives of this study are both practical and analytical.

The purpose of the analytical objectives is to add to the existing body of knowledge of environmental uncertainty and organicity while broadening our knowledge of organization culture and cognitive style. More specifically the analytical objectives are:

1. To assess the extent to which the relationship between environmental uncertainty and organization culture of the subunit is influenced by the structure (organicity) of the subunit.

The proposed research model is interactive and implies dependency relationships between organization culture and the other variables in the model. There is great controversy among theorists whether organization culture is an independent or dependent variable. The findings of this

study will add additional information to the existing knowledge base and hopefully lend support to the position that organization culture may be treated as a dependent variable in future research studies. The assumption of this research study is that the culture of the organization can be managed, thereby implying that it may be treated as a dependent rather than an independent variable.

2. To determine the importance of a broader measure of environmental uncertainty by explicitly including the concept of resource dependence. A weighted measure of environmental uncertainty is used to predict its impact on organization culture; it may be possible to determine if the resource dependence dimension has more predictability than the information based domain.

3. To assess the importance of human information processing (as measured by cognitive style) to perceived environmental uncertainty and the types of cultural norms that may predominate in organizations with different levels of organicity. Although there is a large literature on managerial perceptions, little has been done to include as part of the perceptual process the way a manager inputs data and makes a decision. The findings of this study will contribute by including this component as one of the variables that may impact the way a manager perceives the environment, organicity and culture of the organization.

The practical objectives of a research study are designed with the intent of helping managers function more efficiently and effectively within their organization. For this research study they are as follows:

1. To provide an empirical basis for offering managers suggestions concerning the role of an organization's culture, given certain perceived business environments and organizational structures. Organization culture has been one of the management buzzwords recently. By studying the way it interacts with or is dependent on other organizational constructs, managers may be able to improve the effectiveness of their organizations.

2. To determine if there is any relationship between cognitive style and job levels, and if so, does this relationship account for perceptual differences among managers in various positions. This would help organizations in that the perception of their environment would be more correctly assessed. This, in turn, could improve planning and decision making.

3. To determine the extent to which certain types of cultural norms will predominate under various environmental conditions and levels of organicity. While organicity may be to some extent under the manager's control, environmental conditions are not. Schein (1985) and others suggest ways to develop the types of norms a manager desires in the

organization. The findings of this study will give direction to managers in the type of norms that may be most suited for their specific conditions.

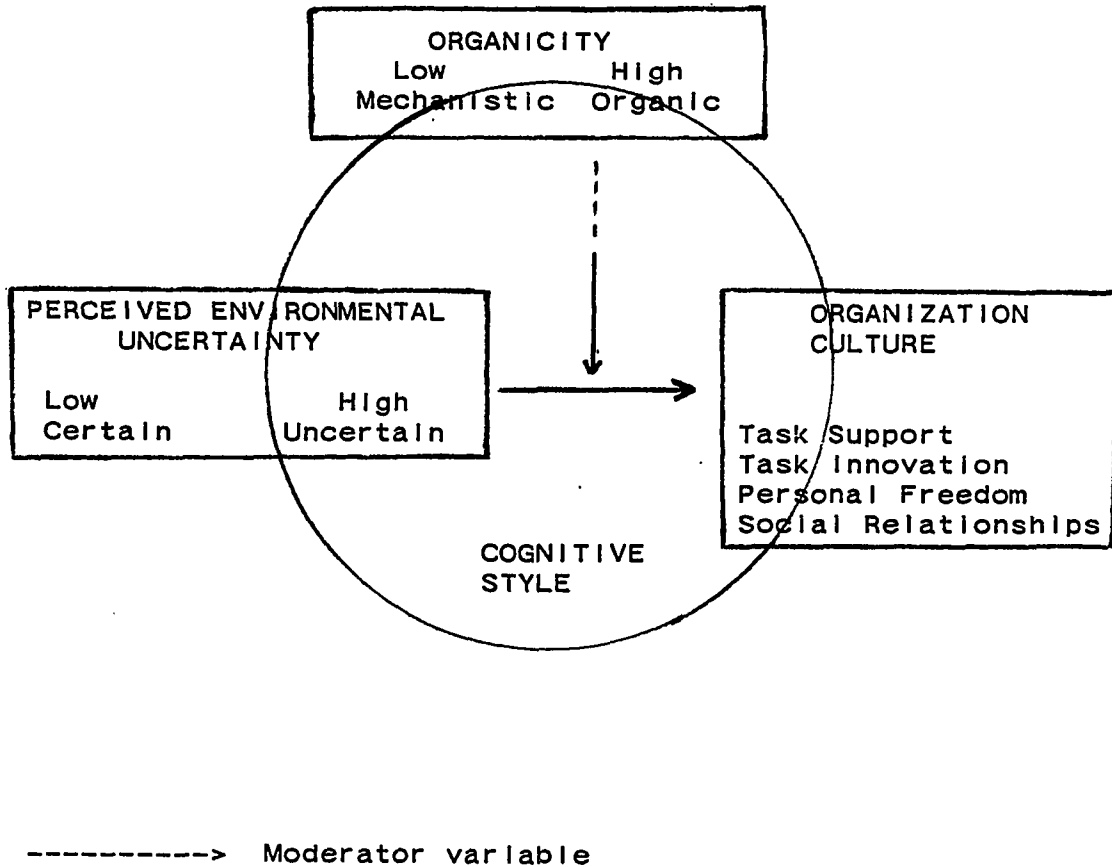


Figure 1

A MODEL OF THE INTERRELATIONSHIPS OF PERCEIVED ENVIRONMENTAL UNCERTAINTY, ORGANICITY, COGNITIVE STYLE AND ORGANIZATION CULTURE

## 2.0 LITERATURE REVIEW

The use of a contingency approach implies that environmental variables influence the appropriateness of different organizational constructs. The common argument of this approach is that the right "fit" between organizational variables such as the environment, structure, technology, leadership style, organization-control mechanisms and goals will promote organizational effectiveness. The seminal contingency research (Burns and Stalker, 1961; Lawrence and Lorsch, 1967; and Thompson, 1967) utilized a central core concept in the pursuit of the environment's effect on organizational functioning. This concept was uncertainty (Downey, Hellriegel, and Slocum, 1975).

Theoretically there are many factors that could influence an organization's culture: i.e. the business environment, business strategy, operating technologies, management systems, and the perceptions of individuals in management positions. This research study focuses on environmental uncertainty, organizational structure (conceptualized as organicity), and cognitive styles of individual managers. Empirical literature relevant to each of the variables in the research model (Figure 1) are reviewed and critiqued in this section.

## 2.1 Environmental Uncertainty

Since the emergence of the open systems models researchers have acknowledged the importance of the effects of environments on organizations. In order to conceptualize and examine potential and actual causal connections between environments and elements of the organization, background on the different levels and conceptions of environments will be reviewed.

The most general level of environmental analysis is referred to as the ecological community (Hawley, 1950). This level focuses on a collection of organizations within a delimited geographical area. The most widely used typology at this level was developed by Emery and Trist (1965). They distinguished four types of interorganizational environments as follows:

- Placid, randomized: resources required by the organization are randomly distributed and unchanging.
- Placid, clustered: location is an important factor in survival as resources are clustered but unchanging.
- Disturbed, reactive: actions of the organization determine availability of the resources, each act of the organization must also take into account the actions and responses of other organizations.
- Turbulent: comprised of many interdependent factors that affect one another thus becoming a force in the situation creating great complexity.



Emery and Trist (1965:28) further suggested the following solution to reduce uncertainty for organizations in turbulent environments: "the emergence of values that have overriding significance for all members of the field." This commonly accepted set of values creates a field "which is no longer richly joined and turbulent, but simplified and relatively static". Thus, sharing of common values could result in more rather than less certainty for organizations.

The next sublevel of analysis is referred to as the population of organizations (Hannan and Freeman, 1977). Populations may be defined as those organizations that have common structural forms or patterns of activity. The thrust of this level of analysis is that the environment selects and deselects the populations of organizations. That is, survival of the population is based on the organization's form/activity pattern and the resources in the environment. This perspective allows little managerial choice and is based on the theory of environmental determinism.

The third sublevel is that of the organization set (Blau and Scott, 1962; Evan, 1966). This level of analysis identifies the environment from the point of view of a single focal organization and those other organizations in the environment which make a difference to the organization in question. The majority of organization-environment studies have been conducted at this level, and the recent focus on organizational stakeholders (Freeman, 1984) derives

from this perspective. This research study was conducted at the organization set level, as the variables involved are directly linked to a focal organization and were measured by the managerial perceptions in that same organization.

There is not much consensus on how environments should be defined, described or measured (Scott, 1981). However, to set parameters for this research study, the following presents the two major conceptions of the environment. The first conceives the environment as a source of information thereby lending a degree of uncertainty to managerial decision making. The second conceives the environment as a stock of resources on which the organization may depend. A major criticism of the empirical organization/environment research conducted at the organization set level is that researchers have concentrated on uncertainty defined as information availability (or predictability) and have largely overlooked the issue of the availability of other resources. This research study will combine dimensions from both conceptualizations of the environment in an attempt to overcome this criticism. The following review is intended to provide a framework for defining and describing environmental uncertainty as it will be used in this research study.

Dill's (1958) approach of task environments has been the most frequently cited as a rationale for choosing those segments of the environment that should be examined when conducting research on the business environment. He first

used the term "task environment" to refer to all the aspects of the environment that were potentially relevant to goal setting and goal attainment. The four major sectors identified in his study on two Norwegian firms were 1) customers (both users and distributors); 2) suppliers of materials, labor, capital, equipment and workspace; 3) competitors, for both markets and resources; and 4) regulatory groups, such as government agencies, unions, and interfirm associations.

Thompson (1967), Lawrence and Lorsch (1967), Pfeffer and Salancik (1978), and Aldrich (1979) have all added to and tried to specify the dimensions of the environment. The two most widely accepted conceptualizations of the environment are 1) the environment as a source of information; and 2) the environment as a stock of resources. The latter conceptualization focuses on the degree of dependence the organization has on others for vital resources while the former focuses primary attention on the degree of uncertainty or unpredictability confronting the organization.

Scott (1981:168) in his work on organizational perspectives summarized the major dimensions of each conceptualization. As can be seen, Emery and Trist's (1965) typology has lent a great deal to the development of these dimensions.

## 2.11 Dimensions Affecting Uncertainty

Four dimensions thought to affect environmental uncertainty have been proposed in the literature. They are as follows:

1. Degree of Homogeneity-heterogeneity: the extent that the environmental entities to which the organization must relate are similar to one another; for example, the number of different types of clients relating to a service organization. Other labels that have been used are complexity and diversity. (Dill, 1958; Thompson, 1967)
2. Degree of stability-change: extent to which the entities are undergoing change; for example, the rate of product innovation within the industry category to which a given firm belongs. It is possible to differentiate between the rate of change and its evenness or fluctuation (Lawrence and Lorsch, 1967; Thompson, 1967).
3. Degree of Interconnectedness-isolation: extent to which the organization is linked to many other environmental entities whose actions may impinge on it; for example, the number of different suppliers from whom a manufacturing company must buy its inputs (Pfeffer and Salancik, 1978).
4. Degree of Organization-nonorganization: extent to which the organization confronts a set of environmental entities whose actions are coordinated or structured. For example, does a seller face a set of independent grocery stores or a chain of supermarkets? (Jurkovich, 1974).

Scott (1981) summarized the expectations of combining different states of the dimensions as follows. "The greater the degree of heterogeneity, the higher the rate of change or instability, the larger the degree of interconnectedness, and the lower the degree of organization within the environment, the higher will be the uncertainty facing the organization (Scott, 1981:169)".

#### 2.12 Dimensions Affecting Dependence

Three dimensions thought to affect the dependence of organizations on their environments have been proposed in the literature. They are as follows:

1. Degree of Munificence-scarcity; extent to which the resources required by the organization are available in its environment; for example, the availability of petroleum to a chemical company, or the availability of electronics engineers to the high tech company (Pfeffer and Salancik, 1978; Aldrich, 1979).

2. Degree of Concentration-dispersion: extent to which the resources required are evenly spread throughout the environment; for example, economic concentration has been defined as the proportion of an industry's sales controlled by the largest four or eight firms (Pfeffer and Salancik, 1978).

3. Degree of Organization-nonorganization: same as number 4 above (section 2.11).

Generally speaking, "the greater the scarcity of resources, the higher the degree of concentration, and the greater the degree of organization exhibited by entities within the environment, the greater the dependence" (Scott, 1981:169).

### 2.13 Environmental Research Studies

In 1981, Lawrence proposed a theoretical model of organizational adaptation with environmental uncertainty as the predominant, overriding construct. This construct included two domains: information and resources. Factors to be assessed in the information domain were: a) number of competitive variations; b) customer preferences and variations; c) knowledge generators: R & D; universities; government; d) knowledge disseminators: schools; government; and trade associations. Factors to be considered in the resource domain were: a) sources of raw materials, human and capital resources; b) customer impact on resource availability; c) competitor impact on resource availability; and d) government impact on resource availability.

Hrebiniak (1981) supports Lawrence's approach to environmental uncertainty, as the resource domain is clearly related to the information domain. That is, perceptions of customers' and competitors' impact on resource availability can vary as a function of the economy and market structure. Therefore, operationalizing environmental uncertainty on

both the information and resource dimensions adds specificity to external factors that may affect organizations.

Dess and Beard (1984) have utilized objective measures of the environment to determine the operational validity of codifying the above dimensions of uncertainty and dependence into a parsimonious set consisting of: munificence (munificence-scarcity); dynamism (stability-instability, turbulence e.g. interconnectedness) and complexity (homogeneity-heterogeneity; concentration-dispersion).

The theoretical defense for this re-alignment of dimensions was that it is "conceptually similar to those proposed by others (Jurkovich, 1974; Pfeffer and Salancik, 1978; Aldrich, 1979; and Scott, 1981)". By using factor and interitem analysis of the objective measures, Dess and Beard (1984) found tentative support for the operational validity of the three dimensions: munificence, complexity and dynamism. The first two were found to be unidimensional (identifiable with one set of variables) while dynamism was found to be multidimensional (identifiable with more than one set of variables).

The previous pages have been devoted to a review of the different approaches to studying environmental uncertainty. More recently researchers (Dess and Beard, 1984; Lawrence, 1981) have suggested the combination of the two conceptions of the environment (information sources and resource dependence). This was the approach taken in this research

study. Therefore, in this study environmental uncertainty will be defined as the manager's perception of munificence, dynamism and complexity of the environment confronting the organization set to which the focal organization belongs.

As stated earlier, environmental uncertainty has been the primary variable employed in the organization/environment research. This variable was often measured as change, and sometimes included a component of complexity. Only a few studies have used other measures. For example, Khandwalla (1973) studied 96 manufacturing firms and found overall competition was associated with the use of management controls and selectivity in the use of controls. Pfeffer and Leblebici (1973) argued that competition caused increased demands for control, directly producing a more structured organization, as well as causing product differentiation. These effects tended to lead to less decentralization and less structural elaboration than what was otherwise expected. Several key research studies have been conducted utilizing the concept of environmental uncertainty as discussed in this proposal. In the following paragraphs, several criticisms of these studies are explored.

Lawrence and Lorsch's landmark study of the plastics and container industries (selected a priori for extreme differences in uncertainty) opened a floodgate of organization/environment research. To them, environmental uncertainty involved the following: a) the rate of change in



conditions; b) the time span of feedback of results on decisions made or actions taken; and c) the certainty of information. As a result of these factors, each subunit of an organization would develop a structure matching its own environment. They found successful firms, working in uncertain environments, had a more differentiated (e.g. the degree of segmentation in the organization's subunits) structure, as well as the ability to integrate the different departments effectively. From their findings they argued that different units of the same organization faced different subenvironments and that the environment, for example, of a production department was very different from that faced by marketing or research and development.

Lawrence (1981) criticized his own work because his approach to environmental uncertainty largely ignored the impact that resource munificence/scarcity has on a manager's perceptions and, therefore, on her responses. Another major criticism of the Lawrence and Lorsch study and of other studies (Duncan, 1972) involving the uncertainty concept, is that the conceptual and methodological aspects of the uncertainty instruments have not been adequate (Pennings, 1975; Tosi, Aldag, and Storey, 1973; Downey, Hellreigel, and Slocum, 1975).

Tosi et al (1973) found that the Lawrence and Lorsch instrument lacked adequate subscale reliability coefficients while the total scale score correlations with criterion

uncertainty measures were low and inconsistent. In addition, the factor analysis of the items were not consistent with the instrument subscales. However, Tosi et al's findings are also open to criticism (Hrebiniak, 1981) in that their study equated uncertainty with volatility, arguing that volatility and uncertainty should be correlated. Hrebiniak, asserted that the researchers did not present sufficient reasoning for this as stability of sales and income (e.g. lack of volatility) may reflect a successful ability to cope with uncertainty. Similarly, Pennings' (1975) attempt to use uncertainty to identify differences among 40 units of a single organization (brokerage offices) in the same business appears to be problematic in that there was not enough observed variance across the organization. It also was inconsistent with Lawrence and Lorsch's conceptualization.

Duncan (1972) used a semantic analysis of individuals' verbalizations of the uncertainty concept. He developed a perceived environmental characteristics measure (comprised of dynamism and complexity). His conceptual framework (i.e. perceived environmental uncertainty) has been very useful, yet the scoring procedure (additive) may inappropriately weight one subscale over another by 30:1 when the theory implies that each should equally contribute (Downey et al, 1975).

The sum of this criticism of uncertainty variables and the implication for research studies is that considerable care should be exercised in selecting existing instruments for uncertainty measurement to make certain that the uncertainty concepts guiding the research (implicit or explicit) are consistent with the uncertainty concepts in the instrument. To summarize the section on environmental uncertainty, a quote by Lawrence (1981:317) is appropriate; "The notion of the environment is the type of idea that we should be completely comfortable in defining in different ways, depending on the research purpose involved".

## 2.2 Organization Culture

In the past three years, three major collections of articles on organizational culture have appeared. Much of the impetus for this increase in interest in organization culture occurred in the late 1970's and the early 1980's when researchers trying to understand the differences between highly successful Japanese and American firms began to examine the possibility that national culture might contribute to differences within the culture of firms and thus to differences in performance.

In the study of organization culture, there is no single dominant point of view or method. Of the seven most cited works (Geertz, 1973; Berger and Luckman, 1966; Clark, 1972; Deal and Kennedy, 1982; Ouchi, 1981; Pettigrew, 1979; Welck, 1979), three were written by management scholars, three by sociologists and one by an anthropologist.

Therefore, it is not surprising that to date there has not been a commonly accepted definition of culture. However, there is some agreement among theorists that organization culture deals with the beliefs, values and assumptions that are shared within an organization. These beliefs are unwritten, "taken for granted", and guide the behaviors of individuals and groups in the development of organizational norms (Kilmann, 1984; Wilkins, 1983; Sathe, 1983; Schwartz and Davis, 1981; Selhi and Martin, 1981; Lewis, 1980;)

Schein (1985) adds that culture has depth (i.e. a layer of assumptions underlie the values and beliefs); and that it is learned. Culture also functions in helping an organization adapt to its external environment and integrate its internal processes. For the purposes of this study, the following definition of culture will be used.

"A pattern of beliefs and expectations which are shared by the organization's members. These beliefs and expectations produce norms that powerfully shape the behavior of individuals and groups in the organization" (Schwartz and Davis, 1981:33) and help members cope with problems of survival in the external environment and integration in the internal environment (Schein, 1985).

The study of the concept of organization culture is not new. Rather, it has been regenerated from original studies conducted during the era of the Human Relations School of

management thought, and derives ultimately from a century old anthropological interest in the relations between culture and social structure.

Numerous studies have shown that industrial workers form strong cultures (Roethlisberger and Dickson, 1939; Whyte, 1955; Roy, 1960). These writers considered the norms exhibited by workers as a characteristic of individual behavior until Homans (1950) began to treat such behavior as a sociological phenomenon.

Homans (1950) noted that the "external system" (i.e. physical, cultural and technical environment) generates activities and interactions which in turn generate sentiments and norms (i.e. internal system or culture). Once formed, culture begins to influence the external system by dictating to some extent how the environment is perceived and dealt with by organizational actors. However, the environment initially determines the opportunities and constraints for a group, thus forcing it to specify its primary task in forming a culture. A fully formed culture influences what will be perceived and defined as the environment. Therefore, cultural assumptions act as filters for how managers perceive the environment (Schein, 1985).

In describing culture, beliefs and values are the two main distinctions of shared understandings (Sathe, 1983). Rokeach (1969) developed a concept of values that has served as a referent for researchers. He defined values as "an enduring belief that a specific mode of conduct or end-state

of existence is personally and socially preferable to alternative modes of conduct or end-states of existence" (Rokeach, 1969:160). "The term norms is sometimes used interchangeably with values, but there is an important distinction. Although both have an *ought* to implicit in them, norms are more tactical and procedural than are values" (Sathe, 1983:7). The definition of culture that is being used in this study is based in beliefs. These beliefs produce norms expectations for behavior. Jackson (1966) suggested that behavior is a dimension in which to measure norms...as a norm's object is behavior. When there is strong consensus among a group of people regarding a particular norm, it is said to be "crystalized" (Jackson, 1966).

The reason why organizational members may not realize the profound influence culture has on them may be because over a long time unchallenged beliefs and values come to be taken for granted. Allen and Craft (1982) refer to this as the "organizational unconscious" or the culture of the organization.

#### 2.21 Manifestations of Culture

Culture manifests itself as rites and rituals (Deal and Kennedy, 1982); stories (Mitroff and Kilmann, 1976); legends (Wilkins and Martin, 1980), myths (Boje et al, 1982); specialized language (Andrews and Hersch, 1983) and norms (Allen and Pinick, 1970; Schein, 1985, Kilmann, 1982). This last manifestation of culture, group norms, can be used

as a technique to assess the shared understandings that work groups have regarding aspects of organizational functioning (Allen and Pinick, 1970; Kilmann and Saxton, 1983).

Work group norms may be developed through explicit statements by supervisors, critical events in the past, and/or carryover behavior from the past, particularly if the behavior has been successful (Feldman, 1984; Schein, 1985). Numerous empirical studies have focused on examining the impact of group norms. Asch (1951) used norms to look at group conformity; Trist and Bamforth (1951) used norms to examine production restriction; Seashore (1954) used the norms concept to investigate group cohesiveness; and Janis (1973) used group norms to illuminate group decision making.

Group norms are formed and enforced only with respect to behaviors that have some significance for the group (Shaw, 1981). Significant behaviors may or may not be directly related to the group's central, formal mission. The frequent distinction between task maintenance (technical) duties and social maintenance (human) duties helps explain why groups bring selected behaviors under control. Feldman (1984:53) indicates that "only those behaviors that ensure group survival (i.e. long term orientation), facilitate task accomplishment (i.e. short term orientation), contribute to group morale or express the group's central values are likely to be brought under control".

In the 1960s Allen and Pinick conducted extensive research on the behavioral norms of delinquents. They found that the behavior of these individuals was different when in their old neighborhoods than when in the rehabilitation program. From this basic research they determined that a system of norms (i.e. expected behaviors) within the organization itself had a very powerful influence in determining the behaviors of these individuals. This finding was applied to behaviors found in business organizations and as a result Allen and Pinick (1970) developed an approach referred to as Normative Systems.

The Normative Systems research has indicated that every organization has its own distinctive normative pattern discernible through the use of a norm indicator (a survey administered to a cross section of the employees in the organization). The questions involve behavioral situations that help expose key company norms. After extensive research, these authors found that norms tend to fall into certain categories. As a result they identified ten general cluster areas around which both positive and negative norms were found. An example of a positive norm is: "In our company, we are number 1 and intend to stay there". An example of a negative norm is: "Around here there's no point in trying harder - nobody else does". Later, Allen and Dyer (1980) developed an action-oriented survey (Norms Diagnostic Index -NDI) of 38 items through a factor analytic



technique applied to 86 items that had been used by Allen over a period of 15 years. The seven scales in this instrument are:

- 1) performance facilitation
- 2) Job involvement
- 3) training
- 4) leader-subordinate interaction
- 5) policies and procedures
- 6) confrontation
- 7) supportive climate.

Other researchers have also developed instruments to assess the norms that are operating in organizations. In 1983, Kilmann and Saxton developed the Culture-Gap<sup>®</sup> Survey. There is a great deal of similarity between the theory and development of this instrument and the original work of Allen and Pinick (1970). Through statistical and clinical analysis, a set of 28 norms were found to be most consistently operating in organizations.

Kilmann and Saxton (1983) found two independent distinctions along which the norms were defined. The first differentiates the technical aspects (i.e. task support and task innovation) of work from the human aspects (i.e. personal and social relationships) of work. This distinction concurs with Bales (1952), who through laboratory experimentation, found that group members settled into "instrumental" or "expressive" roles. This distinction is also supported by the results of studies of organizational behavior by Katzell (1957) and Bennis (1966). The second distinction differentiates norms that have a short term perspective from norms that have a long

term perspective. This distinction concurs with Feldman's (1984) theoretical identification of the types of behaviors that come under normative control.

Also this distinction has been frequently discussed as an operational versus strategic focus (Kilmann, 1984). By pairing modes of distinctions, four groupings of norms are possible (note Figure 2).

These groupings are referred to as norm clusters. Each cluster has seven norm pairs (see Appendix A). An example of a norm pair is: "Share information only when it benefits your own group"; "Share information to help the organization make better decisions". The following descriptions and examples were described by Kilmann (1984).

The norms of Task Support reflect behaviors of information sharing, helping other groups. They are also concerned with efficiency. For example, in some high-technology firms there is a lack of cooperation and information sharing. The norms of Task Innovation stress creativity, being rewarded for creativity and doing new things. The most general finding to date is that Task Innovation isn't as strong in American companies as it is desired to be. The norms of Social Relationships emphasize socializing with one's work group and the mixing of friendships with business. In some social service agencies, these norms have been found to be operating so strongly that too much time is spent socializing rather than looking to get the next job done. The norms of Personal Freedom are

Indicative of self-expression, the exercising of discretion and pleasing one's self. They are not frequently found in very bureaucratic organizations where members may feel confined and constrained.

	Technical	Human
Short-term	Task Support	Social Relationships
Long-term	Task Innovation	Personal Freedom

FIGURE 2

KILMANN - SAXTON NORM CLUSTERS

For the purposes of this study the above norm clusters will be used to assess the perceived norms in an organizational setting and will be referred to as the types of norms found in an organization's culture.

2.22 Organization Culture Studies

Criticisms regarding the empirical study of organization culture centers on the broad and varied methodologies utilized to study this construct and the struggle among academics to decide if culture should be treated as an independent variable or a dependent variable.

Those who view culture as an independent variable seek to explicate ways in which the organization can influence the feelings and behaviors of its members. Those who view culture as a dependent variable assert that a determined management may alter features of the organization's culture which may have developed as a natural outgrowth of its particular time and place.

Also, there is confrontation between statisticians and phenomenologists regarding the "scientific rigor" of this new field (Ouchi and Wilkins, 1985). Management theorists have tended to approach this field with multivariate analysis of survey and experimental data. For example, Ouchi (1983) employed questionnaires to seek the differences in the cultures of companies of "A" and "Z". Meyer (1982) used both questionnaires and content analysis of stories obtained in open-ended interviews to examine the creation of shared ideologies. Martin and Power (1983) used laboratory experimentation to demonstrate that facts embedded in organizational stories are more persuasive than are quantitative summaries.

Social scientists, on the other hand, have utilized participant observation and case studies which focus on the rich and interesting stories of organizational life; ethnography which focuses on language and symbolism; and archival, historical or public documents to arrive at an understanding of a social group. For example, Clark (1970), in his study of organizational sagas at Antioch, Reed and

Swarthmore colleges, utilized historical documents supplemented with interviews; Dyer (1984) in his study of cultural evolution at "Brown" company used industry reports, annual reports, internal reports, public records and interviews; Gregory (1983) interviewed 75 professionals from several Silicon Valley companies in her analysis of language used by these professionals to enable them to make sense of their rapidly changing industry. Kanter (1983) utilized a multimethod approach in her study of corporate culture in American companies. These methods included content analysis, use of public records, in depth interviews, personal observations and conversations, qualitative and quantitative empirical comparisons of factors encouraging innovation and initiative in organizations.

### 2.3 The Structure of the Organization

The dominant approach used to explain organizational structures in both the management and sociological literature has been structural contingency theory. This theory specifies an overall perspective of managerial adaptation to environmental constraints, as well as the elements of context that affect structural choices. For the purposes of this study, structure will refer to the job definitions, spans of control and the hierarchies depicted by the organizational chart. The nature of the structure (e.g. organicity) will refer to the degree of formalization of the structure.

The three elements of organizational context that have been most frequently studied in structural contingency theory are: environment, size, and technology (Pfeffer, 1982). The primary concern in this study is the environmental context. However, findings on the size of organizations will also be briefly reviewed. While technology can be an important variable, it has not been found to be of overriding importance as the "new wave gathering force appears to be the environment" (Perrow, 1986:178).

Burns and Stalker (1961) looked at the organization as a whole and concluded that the "ideal type" of working organization depends on the degree of uncertainty in the organization's environment. The mechanistic system has rigidly set functional duties, precise job descriptions,

fixed authority and responsibility, and a well developed hierarchy through which information flows up and instructions flow down. The organismic (hereinafter organic, Bennis, 1966) form has less formal job descriptions, greater emphasis on adaptability, a lateral rather than vertical direction of communication, and a network structure of control and authority. Organic structures permit the faster, more flexible responses needed to operate in an unstable, relatively unpredictable environment.

Bennis (1966:188) indicated that in an organic system there will be less loyalty to the work group and "people will learn to develop quick and intense relationships on the job and learn to bear the loss of more enduring work relationships". He felt this was because the organic structure permits and even encourages transience rather than permanent relations of people to each other and to task assignment. Burns and Stalker (1961) found that successful firms exhibited a mechanistic system in a stable environment (low uncertainty) and an organic system in rapidly changing environmental conditions (high uncertainty).

Lawrence and Lorsch (1967), studying functional units within large organizations, reached a similar conclusion to that of Burns and Stalker (1961). They found successful firms facing an uncertain environment had a more differentiated structure and the ability to integrate these different departments effectively than did less successful

firms. Differentiation deals with the degree of normative structure present. Normative structure is the degree of segmentation in an organization's subunits. The more uncertain the environment, the more departmentalized the structure of the organization, including its subunits. Through differentiation the subunit attempts to cope with its particular environment. Differentiation implies that members of each unit will see problems involving them with other units of the organization primarily from their own point of view, thus creating the potential for conflict.

As differentiation increases, so does the need for integration. Integration is the quality of the necessary relationships among the units of the organization if the organization's overall goals are to be achieved. Lawrence and Lorsch (1967) cited two approaches to integration: a) the use of formal hierarchy of authority, rules, procedures; and b) the use of crossfunctional teams and team leaders, more open communication, influence based on knowledge and expertise rather than formal authority. These two approaches to integration are quite similar to the mechanistic and organic systems described by Burns and Stalker (1961). Research findings indicate that in differentiated organizations a high quality of integration is related to goal achievement as determined by members and groups within the organization (Lorsch, 1977).



While increased differentiation with corresponding quality integration seem to be the mark of improved performance for organizations facing uncertain environments, Galbraith's (1973) study on information processing added additional clarity. In essence, Galbraith found that improved performance flowed from the improved information processing and decision making, which in turn flowed from having the kind of differentiation and integration required to pick up and process the pertinent data from the relevant environment.

As an organization is an open system, there is a constant need for environmental support. In the simplest terms, resources must flow in and outputs must be accepted. Consequently, subsystems develop at the boundaries of the organization that have more frequent contact with the external environment than other subsystems in the organization. Lelifer and Huber (1977) were able to document that the structures and behaviors of managers in functional areas frequently involved with boundary spanning activities impacted perceived environmental uncertainties. That is, managers in the same organization but with different functional responsibilities may perceive their organization's environment differently from each other.

Katz and Kahn (1978) identified three types of boundary subsystems: procurement, disposal, and institutional relations. The functional categories associated with these subsystems are: purchasing of material resources; acquiring

human resources; marketing and public relations. Also, Schwab, Ungson and Brown (1985) in a study of 376 managers from 36 wood products and electronics firms found that these functional areas were significantly related to those who have primary responsibility for dealing with the external environment. As the managers of each of these subsystems are involved in different functional responsibilities, behaviors and perceptions of the environment may be different. As a result, the direction of causality assumed in models of environmental/ structural adaptations is questioned in that organizational structures (boundary spanning subsystems and their behaviors) may influence environmental perceptions.

Size is one of the prominent characteristics of an organization and is a fairly consistent correlate of many organizational attributes. There are many indicators of size (i.e. sales volume, net assets, and square footage) but most studies have used number of employees. This measure was used in the current study as a main concern is human perceptions and relationships and not with output volumes.

The basic arguments that derive from the literature on size are as follows. Size is:

- a) positively associated with structural differentiation (Hall, Haas, Johnson, 1967; Pugh, Hickson, and Hennings, 1969; Blau, 1970; Blau and Schoenherr, 1971);
- b) positively associated with the presence of more activities of the same general type (i.e. the scale of

- operations) (Blau, 1970; Blau and Schoenherr, 1971);
- c) negatively related to centralization (Pugh, Hickson, and Hennings, 1969; Blau and Schoenherr, 1971);
  - d) positively related to formalization; (Hall, Haas, Johnson, 1967; Pugh, Hickson, and Hennings, 1969; Blau and Schoenherr, 1971).

Recently Cullen et al (1986) re-examined Blau's theory of structural differentiation by questioning whether it was a theory of structural change or scale. These researchers concluded that Blau's theory offers a better explanation of scale than of change. Of relevance to this study, which has as its sample high growth, small public companies, is one of the reasons for the aforementioned conclusion. That is, rapid growth organizations tend to behave congruent with Blau's structural differentiation theory.

Mintzberg (1979), in his review of the structuring of organizations, stated that as organizations increase in size they become more formalized, specialized and centralized, creating a tendency for the organization to become more bureaucratic. This structuring of activities - specialization, formalization and centralization - affects environmental scanning and information processing by creating layers of management that slow down the process of information transmittal. This decreases the opportunity of cross fertilization of ideas and information sharing among specializations. With specialization, there is an increase in the number of professionals. Their occupational role

(i.e. departmental affiliation) may influence how they perceive and interpret information from the environment (Sonnenfeld, 1981), thus causing a substantial difference in managerial perceptions across the organization within different levels of structuring. As a result, structure could impact managerial perceptions of the organization's environment. This implies a two way relationship between structure and perceived environmental uncertainty (Yasal-Ardekanl, 1986).

Schein (1985:273) indicates that in the study of organization culture, generational age, rather than size and complexity, is of primary importance. Generational age "means whether the company is still managed by the founder (first generation), by the founder's family (second or third generation), or by professional managers who have no substantial ownership and control. A first or second-generation company can become very large and complex, and a fully professionalized company can remain small and simple."

The growth stages and generational age as identified by Schein (1985) are as follows.

- a) Birth and Early growth - founder domination, possible family domination;
- b) Organizational Midlife - professional managers; expansion of products and markets;
- c) Organizational maturity - professional managers; maturity or decline of markets;

The organizations in this study are small public companies that are experiencing high growth rates and are in the early growth stage. Seventy three of the one hundred firms in the sample still have the founder as the chief executive officer. The cultural thrust of organizations in the early growth stage comes from the founders and their assumptions. Culture acts as the psychological "glue" that holds the group together and is likely to be very strong. Schein (1985:234) lists the following as reasons for this strength a) the primary creators of the culture are still present; b) the culture helps the group define itself and make its way into a potentially hostile environment; c) many elements of the culture have been learned as defenses against anxiety as the group has struggled to maintain and build itself.

#### 2.4 Factors That Affect Managerial Perceptions

Perception is a mental process, which by definition, is not directly observable. Through perceptual processes individuals organize and evaluate different stimuli. Research has shown that there are differences among individuals in their perceptions and their tolerances for ambiguity (Berlyne, 1968). As managers are the prime actors in perceiving the environment and attempting to change the organization culture, it is important to include this variable as part of the research model.

The importance of managerial perceptions was clearly recognized by Duncan (1972), in his study that used perceptual measures of the environment. Miles, Snow and Pfeffer (1974) claim that organizational members enact their environments through perceptual processes of attention. They also (p.234) "heavily emphasize managerial perceptions as a key variable" in how organizations adjust to environments. Child (1972) argued that the effects of the environment on the organization are mediated through the filter of managerial perceptions. It is felt that managerial beliefs or perceptions influence the structure of the organization (Pfeffer, 1982). While the reverse of this assertion may be possible, it is improbable as the structure would have to be perceived before it could be enacted.

Human information processing research suggests that individuals differ in the complexities of their cognitive structures. Individuals with complex cognitive structures perceive many environmental dimensions and are able to apply more complex and varied classification schemes to the phenomena being addressed (Schroder, Driver, and Streufert, 1967). Individuals differ in cognitive style (Jung, 1923; 1966) and as a result may utilize different dimensions in perceiving information and in making decisions.

Taggart and Robey (1981) utilize the concept of cognitive style (Jung, 1923) as an approach to human information processing. The two dimensions of the Jungian framework are the input data dimension and the decision

making dimension. According to Jung, individuals can take data in by either sensation or intuition. Most individuals will tend to use one kind of process. Sensing types take in information through the senses and are most comfortable when attending to the details, and specifics of any situation. Intuitive types take in information by looking at the situation as a whole and are comfortable with attending to the hypothetical possibilities of a situation.

Jung proposed that there were two ways of making a decision: thinking or feeling. Thinking types base their decisions on impersonal, logical modes of reasoning and will not feel comfortable unless they have a logical, analytical basis for making decisions. They weigh the facts and impersonally judge what is true and false. Feeling types make their decisions based on personal considerations of the situation. They are skilled at understanding other people's feelings and analyzing subjective impressions. Four cognitive styles result from combining these dimensions. Figure 3 shows the different cognitive styles and each's perception of their ideal type of organization (Mitroff, 1983; Mitroff and Kilmann, 1976).

It should be noted that the Jungian framework does not say one style (or organization design) is right or wrong, good or bad. Also an organization where members are

INFORMATION INPUT

thinking

D E C I S I O N S M A K I N G	Sensation/thinking (ST) controlled; specificity; exact job descriptions; well defined hierarchy; realistic;	Intuition/Thinking (NT) no specific work rules, roles or authority; goals are fuzzy; impersonal; Idealistic;	I n t u i t i o n
	Sensation/Feeling (SF) people in the organizat'n are concerned with detail and facts; realistic;	Intuition/Feeling (NF) global themes, serving humanity; decentralized; no fixed rules / behavior Idealistic;	I n t u i t i o n

feeling

FIGURE 3  
IDEAL ORGANIZATIONAL CHARACTERISTICS AND COGNITIVE STYLE



predominantly ST, may have subunits of other types (e.g. NF) to deal with particular aspects of the environment. The Jungian typology can be used as a powerful tool for analyzing organizational structure (Mitroff, 1983). For example, in an organization where bureaucratic characteristics are necessary for success (i.e. utilities or accounting firms), the persons with the cognitive style that best suits this situation would be most comfortable working in that organization.

Mitroff and Kilmann (1976) utilized the Jungian typology to study decision making behaviors of MBA students. They found that the types were useful in predicting ways in which decisions would be approached. Also, Myers (1970), found that certain types were attracted to certain fields. For example, STs predominate in business and administration; NTs tend to go into science and research; NFs are found in the professions of counselling and writing; and SFs are attracted to sales and service professions.

Existing work that attempts to develop theories of organizational culture from a psychological point of view tend to be mid-range rather than grand abstractions (Ouchi and Wilkins, 1985). One approach that is relevant to the current study points to the underlying assumptions that give meaning to the surface manifestations of culture. Mitroff (1983) and Dandridge (1980) suggest the use of Jungian archetypes as meaning-structures to help them characterize

deeper layers of meaning in organizational life. Mitroff (1983) cited Deal and Kennedy (1982) to propose that the concept of the organization's culture can be explained in terms of the types of characters present in an organization and its system of interaction (i.e. structure). It may be that an organization's culture can be explained to some degree by the predominant cognitive style in that organization. Schein (1985) supports this proposition by stating that cognitive styles play a role in the cultural origins of a new group. In a new situation we unconsciously attempt to construct our social environment in accordance with our cognitive stylistic preference (Schein, 1985).

Organizational roles, beliefs and ideologies also affect individuals' perceptions. Beliefs rest on implicit assumptions that go unchallenged. Starbuck (1976) argued that individual beliefs strongly shape their interpretations of events. Particular beliefs can generate activity programs to repeat earlier successes and organizational commitment thus reinforcing the inertia (e.g. culture) of the organization (Nystrom and Starbuck, 1984). Clark (1972) found that activity programs reflect organizational ideologies and myths. Other research has shown that activity programs help organizations cling to traditional beliefs and worldwide views (Nystrom, Hedberg, and Starbuck, 1976). As a result, they can reduce perceptual sensitivity and consequently loosen the fit between organizations and their environments.

Early studies, other than Lorsch and Morse (1974), on managers' perceptions about their environments had a major drawback: each failed to recognize that factors other than environments, such as human information processing, can influence perceptions (Yasai-Ardekani, 1986). Lorsch and Morse (1974) found that a three way fit between individual predisposition (e.g. different tasks seem to be attractive to persons with different psychological make-ups), organizational arrangements and the environment allowed the individual a greater degree of confidence. This in turn contributed to higher performance.

In an attempt to capture what has been missing in previous studies on perceived environmental uncertainty, cognitive style was used in this study. It was operationalized via use of the abbreviated form (form AV) of the Myers-Briggs Type Indicator (see Appendix A).

Carllyn (1977) conducted a comprehensive assessment of the Myers-Briggs Type Indicator (MBTI), a self-report inventory that was developed by Katherine Briggs and Isabel Briggs Myers to measure the variables in Jung's personality typology. Results of extensive intercorrelation studies, reliability and validity studies indicated that the MBTI is an adequately reliable self-report inventory. Also, the Sensation-Intuition and Thinking-Feeling scales appear to be relatively independent of each other, measuring dimensions of personality which seem to be quite similar to those postulated by Carl Jung.

## 2.5 The Interrelatedness of Culture, Organicity, Cognitive Style and Environmental Uncertainty

Schein (1985:122) linked structure and the development of cultural norms in the following manner: "McGregor's (1960) big insight in his analysis of Theory X Theory Y was that as a structure implies a certain assumption about human nature, people may begin to adapt to that structure by behaving in the manner they are "expected" to behave". That is, they may develop norms that comply with the unwritten rules that seem to be dictated by structure. For example, if management, for tradition's sake, maintains a centralized and formalized structure yet is thinking and acting like it exists in an innovative, loosely coupled firm, it risks sending the wrong message to its employees. Argyris (1962) purported that bureaucratic values tend to stress the rational, task aspects of the work and to ignore the human factors that relate to the task. This may lead to poor, mistrustful relationships among the managerial class which in turn could decrease the effectiveness of the organization (Bennis, 1966). Shepard and Blake (1962) compared the normative goals of mechanistic and organic systems. They are listed below and are indicative of how the expected behaviors in each system may differ.

Mechanistic System: Authority-obedience relationships;  
Delegated and divided responsibility rigidly adhered to;  
Strict division of labor and hierarchical supervision;  
Centralized decision making; Conflict resolution through

suppression, arbitration, or warfare;

Organic Systems: Relationships between and within groups; Mutual confidence and trust; Interdependencies and shared responsibility; Multigroup membership and responsibility; Wide sharing of control and responsibility; Conflict resolution through bargaining or problem solving.

Numerous scholars have suggested that an organization's culture has a great deal to do with its success in achieving its goals and objectives (Wilkins and Ouchi, 1983; Sathe, 1983; Schein, 1985). Under any conditions, an effective culture helps to guide decision making and action by providing shared understandings and parameters for organizational participants. Most theorists maintain that there is no one "right" culture; instead, the effectiveness of cultural forms depends in part on the organization's environmental conditions.

Wallach (1983) proposed that a bureaucratic culture is appropriate for a mechanistic system in a certain environment while an innovative culture is appropriate for an organic organization in a uncertain environment. A brief description of each is as follows:

Bureaucratic cultures are systematic, hierarchical, compartmentalized with clear lines of authority and responsibility. The work is organized and systematic.

Innovative cultures are creative places to work; people are ambitious and willing to accept challenges, take risks, and are results-oriented.

Even though this formulation makes sense, Wallach (1983) has also suggested that it may no longer be appropriate to think of culture-environment relations in this way. Bureaucratic cultures, she says, may have been successful in yesterday's world where the business environment was more certain, but innovative cultures may be essential to be successful in today's world, where the business environment is increasingly more complex and dynamic.

The notion that the environment has a direct influence on organization culture was recognized very early by Homans (1950), later by Deal and Kennedy (1982), and Schein (1985). The culture once formed, however, influences what will be perceived by managers in the organization. The environment is a set of stimuli that are meaningless until perceived by individuals. Further, uncertainty is not an "objective" environmental attribute, but rather a perceptual concept (Downy and Slocum, 1975; Downey et al, 1975).

The cognitive style of an individual influences structure (Mitroff, 1983) and organization culture (Schein, 1985) and perceptions of environments (Lorsch and Morse, 1974). Culture is based in beliefs. Beliefs strongly shape an individual's perception of events (Starbuck 1976) and generate activity programs (Nystrom and Starbuck, 1984) which reflect these beliefs (Clark, 1972). Child (1972)

suggested that once minimum acceptable levels of organizational performance have been achieved, managerial values and inclinations may indicate a stronger imperative to organize in a particular way than would be indicated by environmental contingencies.

Bourgeois, et al (1981) reported on three studies designed to test the hypotheses that: a) managers encountering turbulent environments will react by becoming more mechanistic and managers encountering more stable environments will react by becoming more organic; and b) given a stable environment, which becomes turbulent, decision makers tend to shift from an organic to a mechanistic structure or that c) given a turbulent environment followed by a stable one, decision makers will shift from a mechanistic to an organic structure. They found support for the first two of these hypotheses but not the third. The results are different than one might expect. An explanation offered by the researchers was that companies facing turbulence may want to exercise greater control over subordinates because they aren't equipped to deal with uncertainty in any other way. Likewise, in times of stability, there is not as much concern with uncertainty, therefore, companies allow subordinates more freedom and flexibility. These studies as well as the findings of Huber et al (1975), who found that changes in structure led to changes in perceived environmental uncertainty, support

the hypothesis of this research that there is a reciprocal relationship between organicity and environmental uncertainty.

In summary, it seems plausible that environmental uncertainty, organicity and cognitive style interrelate with the culture of an organization. Also, organicity may have a reciprocal relationship with environmental uncertainty while cognitive style impacts organicity and interrelates, in the form of managerial perceptions, with organization culture and environmental uncertainty. These assertions formed the basis for the research model depicted in Figure 1.

## 2.6 Research Questions

The preceding literature review was designed to provide a theoretical background to justify the proposed interrelationships among perceived environmental uncertainty, organicity, cognitive style and organization culture as depicted in Figure 1. The single and double headed arrows represent the relationships between the variables rather than imply causality. Therefore, the specific research questions that provide the general focus of this proposed study are as follows:

1. What is the relationship between environmental uncertainty and organicity?
2. What are the relationships between environmental uncertainty (high/low), organicity (high/low) of the organization, and an organization's culture?



4. What types of cognitive styles predominate in organizations that face high/low environmental uncertainty and have high/low organicity?
5. What type of cognitive style predominates in an organization that demonstrates a predominant type of cultural norm?

### 3.0 HYPOTHESES

The first set of hypotheses focuses on the relationship between environmental uncertainty and organization culture and the potential moderating effect of organicity on this relationship. The hypotheses are worded to reflect the contingency relationship between environmental uncertainty, organizational culture and organicity, if indeed a contingency relationship exists. There is no intent to imply that environmental uncertainty cannot be significantly related to types of organization culture norms regardless of the state of organicity. It is quite possible that either high or low states of environmental uncertainty may have strong main effects on the different types of cultural norms. Any such effects will necessarily be uncovered in the testing of the hypotheses.

The contingency hypotheses indicate that organicity, the moderator variable, has a negative influence on the types of culture norms over part of its observed range and a positive influence over the remainder of the observed range. To clarify this relationship and to test for specific forms of interactions as suggested by Schoonhoven (1981), a third equation was run in the moderated regression analysis.

Information gathered through the testing of these hypotheses will permit answers to be given to the research questions posed. Specifically, it will be possible to investigate a) how strongly high/low conditions of environmental uncertainty are related to the different types of organization culture norms; b) what relationship organicity has with the environment/organization culture relationship; c) what relationship cognitive style has with perceived environmental uncertainty and d) what relationship cognitive style has with the different types of cultural norms.

As reviewed in the related literature section, culture can be manifested as work group norms. The types of culture norms identified by Kilmann and Saxton (1983) were task support, task innovation, social relationships and personal freedom. Therefore, the following hypotheses regarding the organization culture of organizational subunits are categorized by types of cultural norms.

#### TASK SUPPORT

Gordon's (1985) study compared firms in the utilities and insurance industries. Utilities faced a certain and heavily regulated environment while insurance companies did not. His findings suggest that the internal environments of those firms facing a certain environment encouraged teamwork (task support) and reliability. Burns and Stalker (1961) found that successful firms in a certain environment exhibited mechanistic characteristics. Lawrence and Lorsch

(1967) indicate that firms in certain environments are less complex in structure, that is less differentiated. This in turn necessitates fewer integration activities. With fewer units task support is enhanced.

Thus it is hypothesized that:

H1o

Under conditions of low organicity, there will be no relationship between environmental uncertainty and task support.

H1a

Under conditions of low organicity, the relationship between environmental uncertainty and task support is negative.

H2o

Under conditions of high organicity, there will be no relationship between environmental uncertainty and task support.

H2a

Under conditions of high organicity, the relationship between environmental uncertainty and task support is positive.

#### TASK INNOVATION

Innovation seems to predominate in successful organizations that face an uncertain environment (Miller and Friesen, 1983). In fact, they found in an earlier study that there must be environmental challenges before innovation occurs, thus factors such as environmental dynamism and

complexity could be expected to positively influence Innovation (Miller and Friesen, 1982). Bennis (1966) indicated that an innovative- creative capacity can be found in an organic structure. Gordon (1985), found the tendencies of more successful companies in dynamic marketplaces were to reinforce individual initiative and to have a bias toward action. Burns and Stalker (1961) found that organic companies were able to respond to unforeseen problems and to foster innovation. Mechanistic companies impede innovation because they have less ability to process information.

Thus it is hypothesized that:

#### H3o

Under conditions of low organicity, there will be no relationship between environmental uncertainty and task innovation.

#### H3a

Under conditions of low organicity, the relationship between environmental uncertainty and task innovation is negative.

#### H4o

Under conditions of high organicity, there will be no relationship between environmental uncertainty and task innovation.

## H4a

Under conditions of high organicity, the relationship between environmental uncertainty and task innovation is positive.

## SOCIAL RELATIONSHIPS

A mechanistic system may also be referred to as a bureaucratic system. A characteristic of an ideal bureaucracy is impersonality of interpersonal relationships (Weber, 1946; Hall, 1963). Yet Blau and Scott (1962) found a strong informal structure in bureaucracies which can develop commitment to work groups and which allows social interaction. Bennis (1966 p.188) points out that in the organic organization there will be less loyalty to the work group and "people will learn to develop quick and intense relationships on the job and learn to bear the loss of more enduring work relationships". This is due the transient nature of the structure. Sheperd and Blake (1962) state that relationships within and between groups is greater in the organic system.

Thus is it hypothesized:

## H5o

Under conditions of low organicity, there will be no relationship between environmental uncertainty and social relationships.

H5a

Under conditions of low organicity, the relationship between environmental uncertainty and social relationships is negative.

H6o

Under conditions of high organicity, there will be no relationship between environmental uncertainty and social relationships.

H6a

Under conditions of high organicity, the relationship between environmental uncertainty and social relationships is positive.

#### PERSONAL FREEDOM

In companies that face rapidly changing environments, more personal freedom is necessary so that individuals may respond appropriately and in a timely fashion to rapid changes. Chandler (1962) found that increases in complexity resulted in decentralization which allow for more personal freedom. Bennis (1966) indicates that people in changing environments will probably require more involvement, autonomy, and participation.

Likewise, in stable environments, rules and procedures characteristic of a mechanistic system are more often utilized as there may be repetitive occurrences of the same problem. These limit one's personal freedom. Burns and

Stalker (1961) indicate that loyalty and obedience to superiors, another indication of limited personal freedom, is a condition of membership in a mechanistic system.

Thus it is hypothesized that:

H7o

Under conditions of low organicity, there will be no relationship between environmental uncertainty and personal freedom.

H7a

Under conditions of low organicity, the relationship between environmental uncertainty and personal freedom is negative.

H8o

Under conditions of high organicity, there will be no relationship between environmental uncertainty and personal freedom.

H8a

Under conditions of high organicity, the relationship between environmental uncertainty and personal freedom is positive.

#### COGNITIVE STYLE

Several researchers (Duncan, 1972; Miles, Snow and Pfeffer, 1974; Child, 1972) have clearly shown the impact of managerial perceptions and beliefs as a key variable in how organizations perceive and subsequently adjust to their environments. Recently, Mitroff (1983) has made a strong case for utilizing the Jungian (1923) framework as a factor



that influences managerial perceptions of the environment as well as help explain organization cultures and analyze organization structure.

There has been little empirical research utilizing this construct in conjunction with any of the variables of this study. Therefore, the following null hypotheses are posed to explore the relationship of this variable with the others of the research model.

Thus it is hypothesized that:

H9o

There is no significant difference in the perception of conditions of environmental uncertainty between the four cognitive styles of managers: ST, NT, NF and SF.

H9a

There is a significant difference in the perception of conditions of environmental uncertainty between the four cognitive styles of managers: ST, NT, NF and SF.

Pfeffer (1982) indicated that managerial beliefs and perceptions influence the structure of the organization. Also, in a study of one's perceived ideal organizational characteristics and cognitive style (Mitroff, 1983; Mitroff and Kilmann 1976), it was suggested that STs and SFs prefer a more mechanistic structure, while NTs and NFs prefer a more organic structure. Insufficient research precludes predicting specific relationships, however enough research is present to suggest investigating the relationship between cognitive styles and organicity.

Thus it is hypothesized that:

H10o

There is no significant difference between the cognitive style (ST, NT, NF and SF) of managers and conditions (high/low) of organicity.

H10a

There is a significant difference between the cognitive style (ST, NT, NF and SF) of managers and conditions (high/low) of organicity.

Mitroff (1983) and Dandridge (1980) suggest the use of Jungian archetypes as meaning-structures to help them characterize deeper layers of meaning in organizational life.

Mitroff (1983) cited Deal and Kennedy (1982) to propose that the concept of the organization's culture can be explained in terms of the types of characters present in an organization and its system of interaction (i.e. structure). It may be that an organization's culture can be explained to some degree by the predominant cognitive style in that organization. Schein (1985) supports this proposition by stating that cognitive styles play a role in the cultural origins of a new group. In a new situation we unconsciously attempt to construct our social environment in accordance with our cognitive stylistic preference (Schein, 1985).

Thus it is hypothesized that:

H11o

There is no significant difference between the cognitive style (ST, NT, NF and SF) of managers and the type of organization culture norms: task support, task innovation, social relationships and personal freedom.

H11a

There is a significant difference between the cognitive style (ST, NT, NF and SF) of managers and the type of organization culture norms: task support, task innovation, social relationships and personal freedom.

#### ORGANICITY

Burns and Stalkers' (1961) classic study of electronics firms found that mechanistic structures were more appropriate for organizations facing certain environments and that organic structures were more appropriate for organizations facing uncertain environments. Later, Bennis (1966) and Lawrence and Lorsch (1967) corroborated this set of relationships. However, more recently, Bourgeois (1981) reported on three studies that investigated the relationship between a stable/unstable environment and mechanistic/organic structures: The findings were contradictory to those of Burns and Stalker (1961), Bennis (1966) and Lawrence and Lorsch (1967). Therefore, additional investigation into the relationship between organicity and perceived environmental uncertainty is warranted.

Thus it is hypothesized that:

H12o

There is no significant difference between the organicity (high/low) of an organizational subunit and the perceived environmental uncertainty (high/low) of that organizational subunit.

H12a

There is a significant difference between the organicity (high/low) of an organizational subunit and the perceived environmental uncertainty (high/low) of that organizational subunit.

## 4.0 METHODOLOGY

A survey research design (Kerlinger, 1964) was utilized to gather and assess information necessary to investigate the hypothesized relationships between organicity, environmental uncertainty, cognitive style and the organization culture of organizational subunits. This chapter is divided into four sections. Section 4.10 presents information on the businesses in the sample.

### 4.1 Research Population

The organizations researched in this study were high growth, small public companies. This population was chosen for two reasons. First, much of the research conducted on business organizations centers on the Fortune 1000. While this is commendable and necessary, small independent corporations comprise an important segment of the economy and also deserve study. Second, these small businesses tend to have a single business focus. A single business focus assures that respondents are perceiving environmental uncertainty in only one industry (Bourgeois, 1985). Hrebiniak and Snow (1980) also suggested the use of firms with a single business focus when researching the relationships of managers' perceptions of environmental uncertainty and other organizational constructs.

The list of one hundred companies used for the sample were compiled by the research staff of INC. In May, 1986, and are referred to as the INC. 100. Data from annual reports, 10 K's, directories and company prospectuses were used to identify these companies. For inclusion on this list each company had to: a) be an independent corporation, publicly held as of December 31, 1985 (banks and utilities were excluded); b) show a five year history of operating/sales; c) have 1985's sales exceed 1984's; d) show sales of \$100,000 but no more than \$25 million in 1981.

Of the one hundred, only ninety nine were used as one company had gone out of business after the list was published. Data were collected from managers in 92 businesses located throughout the continental United States. The lines of businesses represented in the sample cover a broad array of manufacturing and service industries. Below is a representative listing of these businesses.

Health Care Services	Long Distance Telephone Service
Manufacturers of Software	Manufacturers of Disk Drives
International Air Freight	Oil and Gas Exploration
Mfrs. of Integrated Cir.	Quick-service Restaurant
National HMO	Mfrs. Single ply roofing
Mfrs. Telecommunications eq.	Mfrs. Cartridge Tape Drives
Ambulatory Surgery Centers	Standardbred & Harness Horses
Manufacturers CAD/CAM	Management Information Services

Life Insurance	Country Style Restaurants
Film Processing	Mfrs. Health Care Products
Production/Sale of Ethanol	Distrs. of TV programs
Energy Services	Mfrs. Disk Controllers
Health Care Management	Ice Cream
Mfrs. Truck Bed Liners	Operation of Radio Stations
Veterinary Clinical Serv.	Mfrs. Lining of pipeline sewers

Forty nine percent of the respondents were from manufacturing companies and fifty one percent were from service companies.

The businesses have a mean annual sales of \$71.3 million. Fifty six of the respondents represented businesses having annual sales of up to \$10 million (27.6%); seventy (34.5%) represented businesses with annual sales between \$11 million and \$50 million. Thirty two respondents (15.8%) were in businesses having annual sales between \$51 million and \$100 million; while forty five (22.2%) were from businesses having over \$100 million in sales.

The mean number of employees was 681 while the median was 250. The mode was 100 with 10 in the sample reporting that number of employees in their respective firms. Sixty two (30.5%) of the respondents were from firms that had less than 100 employees, sixty eight (33.5%) represented firms that had between 101 and 500 employees; thirty six (17.7%) reported total employees between 501 and 1000 and thirty seven (18.2%) reported employees numbering over 1000. The lowest number was eight, while the highest was 6000.

TABLE 4.1

## CHARACTERISTICS OF RESPONDENTS' COMPANIES

<u>ANNUAL SALES</u>		
Sales in millions	No. of Respondents	Percent of Sample
0 - 10	56	27.6
11 - 50	70	34.5
51 - 100	32	15.8
Over 100	45	22.2
MEAN 71.3.	MEDIAN 25.	MODE 100.

<u>NUMBER OF EMPLOYEES</u>			
MEAN	681	Minimum	8
MEDIAN	250	Maximum	6000
MODE	100		

<u>COMPANY AGE IN YEARS</u>			
MEAN	7.8	Minimum	2
MEDIAN	7.0	Maximum	40
MODE	6.0		



The oldest firm in the sample had been in business forty years. This was the exception rather than the norm as 89.6% of the companies had been in business for ten or fewer years. The mean for the sample was 7.8 years while the mode was six years (43 respondents).

Close to eighty-seven percent felt that their company was in a very to extremely competitive industry. Yet over eighty-seven percent forecast increases in sales. Table 4.1 summarizes the size related data presented in the preceding paragraphs.

#### 4.11 Respondents

Individuals in the organization who have major responsibility for dealing with the external environment were chosen as respondents for this study. Therefore, in each organization the managers of the subsystems at the boundary of the organization were identified as the respondents. Katz and Kahn (1978) identified these subsystems to be procurement, disposal and institutional relations. A description of the functional areas of each subsystem follows.

The procurement subsystem involves the function of obtaining the input of materials to be converted as well as the input of personnel to get the job done. Procurement of materials is tied to the production function while the securing of personnel is tied to the human resource function. As each of these types of resources becomes scarce, more focus is placed on the outside environment.

The two positions in the organization to be sampled in this subsystem were the Director of Human Resources and Director of Purchasing.

The disposal subsystem function is to induce the public to purchase the firm's products or services. The marketing function in the organization has the primary responsibility for accomplishing this task. The position in the organization sampled in this subsystem was the Director of Marketing.

The institutional relations subsystem interacts with the environment to obtain support and legitimation of its activities from the larger social structure. The public relations/public affairs function within the organization has the primary responsibility for creating the desired image of the organization in the public mind and for dealing with environmental stakeholders (Freeman, 1984). The position in the organizations sampled in this subsystem was the Director of Public Relations/Public Affairs. In the absence of this position within the company, the Chief Executive Officer was chosen to respond.

Boundary subsystems within a single organization may or may not demonstrate consistent characteristics. For example, an individual organization may contain all bureaucratic subunits (i.e. departments); may contain subunits that are all organic, or may display a combination of organizational types, (Kilmann, 1977).

Information for this study was obtained from members in the aforementioned functional areas of the firms in this study. Names of the individuals in these positions, addresses and phone numbers of the companies were obtained through secondary sources such as stock reports and annual reports. In those companies where there was no one identified in these positions, the company was called to obtain the necessary information. There were companies for which individual managers' names were not available. In those cases the title "Director of (followed by the appropriate functional responsibility)" was used in the address. Due to the smaller size of the companies, there was not always a person specifically responsible for just one functional area. Among the 99 companies surveyed, 378 managers were identified as potential respondents.

Information from Question 1A in Section 4 was used to categorize each respondent's functional capacity in the organization. Following each functional area is the percent that responded in the sample:

Public Relations	(22.2%)	Marketing	(29.6%)
Personnel	(19.2%)	Purchasing	(28.6%)

Also, as these were relatively small firms, the level of the manager was categorized by the position title indicated in Question 1, section 4. All respondents were at the

Director's level or higher. The numbers and percent at each level were as follows:

CEOs	26	(12.8%)
Vice-presidents	64	(31.5%)
Directors	112	(55.2%)

Over 73% had worked for their firm between one and four years, while 20.7% had been at the firm between 5 and 9 years. Only 6% had worked at the firm more than ten years.

#### 4.2 Data Collection

A mailed questionnaire was used to collect the data. It is included in Appendix A. The questionnaire was in booklet form. It was comprised of two sheets of 11 by 17 bonded ivory paper. The paper was folded and saddle stapled. The cover of the booklet contained the title of the study, instructions for answering the questionnaire and my complete address.

Included with each questionnaire were a) a cover letter, individually typed (word processed) and addressed to the respondent explaining the research and guaranteeing confidentiality; b) a stamped business reply envelope addressed to me; and c) a new dollar bill. The questionnaire developed for this study, was 8 pages long and contained 157 items. Dillman (1978, p.21) concluded "that 11 pages or 125 items represent plateaus beyond which response rate reductions can be expected to occur". Jaworski's (1986) study of marketing managers showed pretest

evidence which suggested that the inclusion of a dollar substantially increased the response rate. Due to the length of the questionnaire, a dollar was included as an incentive hoping to achieve a higher return rate.

The data were collected over a seven week period from November 17, 1986 to January 5, 1987. The first mailing of questionnaires was on November 17th, with a postcard follow-up mailed on November 21st. A second mailing was sent on December 2nd followed by a second postcard on December 5th. All are included in Appendix A.

#### 4.21 Response Rate

Of the 378 questionnaires mailed, 9 were disqualified (i.e. classified as return to sender or no longer with firm). Thus the base is 369 respondents. Of the 369 respondents, 230 (62.3%) returned their questionnaire. However, only 203 were useable, for a real response rate of 55%. Table 4.2 details the response rate information.

Dillman (1978) suggests that a response rate of 60-80% is necessary to exclude the possibility of a response bias between responding and non-responding groups. As the response rate for this study was under the minimum suggested by Dillman, the sample was split into two groups. Those who returned their questionnaires early (by December 2, 1986) were placed in the early return group (N = 112). Those who returned their questionnaires after that date and those who returned their questionnaires partially filled out were put into a late responders group (N = 91). A test for response

bias was conducted in which comparisons were made between means (via the T test) of the two groups on the following variables: Task Support, Task Innovation, Social Relationships, Personal Freedom, Organicity, Importance scores, Environmental Uncertainty scores, and size of the company ( based on number of employees and sales).

TABLE 4.2

RESPONSE RATE INFORMATION

378 Questionnaires were mailed

8 Returned (no longer works there)

1 Returned (wrong address)

369 POTENTIALLY RETURNABLE QUESTIONNAIRES

230 Returned (62.3%)

27 Returned (no time to participate)

203 POTENTIALLY USEABLE (55%)

15 Returned (partially complete

useable for some analysis)

188 Used In all Analysis of Data (50.9%)

There were no significant differences ( $p > .1$ ) found between the two groups on any of the variables. Therefore, it is felt that there is not a response bias within the total response group.

### 4.3 Measurement

The instrument was designed to collect relevant information from the research sample. It was divided into five sections: organicity, environmental uncertainty, cognitive style, work group culture and background information.

#### 4.31 Organicity

The seven items that relate to this measure were developed by Khandwalla (1977), based on the original work of Burns and Stalker (1961). Bourgeois et al (1978) described three studies which used a very similar, although not identical, set of items to measure the nature of structure as defined and described in the related literature of this proposal. More recently these items were employed by Covin (1985) in a study on the effectiveness of management styles. Covin found high intra-item reliability (.73) among all but three items on the Organicity scale and dropped these from his final analysis. The items proposed to measure organicity are in appendix A.

As shown in Appendix A, each item is measured on a seven point Likert type scale. The organicity score is the average numerical value of the items. This technique for obtaining a score was also used in the aforementioned studies.

#### 4.32 Environmental Uncertainty

A number of analysts (Dill 1957, Lawrence and Lorsch, 1967, and Duncan 1972;), argue that it makes sense to measure the environment in terms of the perceptions of the participants within the focal organization. The reasoning behind this approach is that only factors that are perceived can enter into the decision making behavior of participants ( Scott 1981). Weick's (1969) concept of enactment also supports the use of a perceptual measure. However, Pfeffer and Salancik (1978) caution that while perceptual measures are necessary if one wishes to predict the choices and/or behavior of organizational participants, they may not be sufficient to predict the outcome of these choices. A perceptual (i.e. subjective) measure will be employed in this study as the behavior of organizational participants is being studied.

For the purposes of this study the three dimensions of environmental uncertainty are munificence, dynamism and complexity. The following paragraphs describe in more detail the conceptualization of these dimensions.

##### 4.32.1 Munificence

The standard variable for representing the environment's munificence is the rate of sales growth. Sales growth is the primary variable in the product life cycle; also product portfolio strategies use this measure (Hofer, 1975; Hofer and Schendel, 1978). Market growth allows member firms to strengthen their competitive position



In a given market or to expand their existing product-market scope. Starbuck (1976) defines munificence as the extent to which the environment can support sustained growth. Cyert and March (1963) found that slack resources (i.e. resources that can be expended on "nonessentials" or innovation) were generated when an organization is in a state of growth and facing environmental stability. The above suggests that rate of market growth, rate of sales growth, availability of financial resources, and reserves of cash held by the organization may be indicators of munificence.

Dess and Beard (1979; 1981), in studying objective measures of munificence, found that the level of profitability of the industry within which the focal organization competes, has been found to be a significant predictor of organizational performance. Even better than return on equity are firm size, capital intensiveness or firm debt leverage -all of which are measures of intraindustry variation. Items are included in section three of the questionnaire to collect data on the manager's perception of these measures.

#### 4.32.2 Dynamism

As stated in the review of literature, the dimension of dynamism will represent the stability/instability and turbulence in the environment. Much of the organizational literature has dealt with dynamism and suggests that

employee turnover, absence of pattern and unpredictability are the best measures of environmental stability/instability. The latter two will be utilized in this study.

Miles, Snow and Pfeffer (1974) in their study of publishing companies, contended that it was important to distinguish between the rate of environmental change and the unpredictability of environmental change. Turbulence, as it is used here follows Emery and Trist's (1965) typology. That is, turbulence emphasizes the degree of interconnection (i.e. change difficult to impossible to predict) among environmental elements. Pfeffer and Salancik (1978:68) state that interconnectedness among organizations creates unstable environments for organizations and that "changes can come from anywhere without notice and produce consequences unanticipated by those initiating the changes and those experiencing the consequences". Thus, turbulence will be measured as the unpredictability of the environment as perceived by respondents.

#### 4.32.3 Complexity

Complexity is the third dimension of the environment to be measured. In this study complexity is the degree of homogeneity-heterogeneity and concentration-dispersion in the environment. Heterogeneity is the range of different activities faced by an organization, for example, competing in several different product markets, purchasing materials from many different suppliers, and competing in tight labor markets for key employees. Under such conditions, managers

perceive greater uncertainty and have greater information processing requirements. Because complexity indicates the many different inputs for production and/or outputs to dispose of, the organization set is larger. As a result there are more variables with which the manager must contend.

Concentration-dispersion deals with the density of competition. Starbuck (1976) stated that organizational density induces organizational dependence and suggested that this aspect underlies complexity. Also, oligopolistic behavior is fostered by density. When organizations are evenly dispersed in the environment then the organizational set contains fewer similar kinds of organizations. Likewise, in a network arrangement, organizations may deal with a greater number of suppliers, customers and competitors in their task environments.

Miller and Friesen (1982) in a study of fifty-two business firms compared two models of product innovation. They included fifteen different scales to measure dimensions relevant to their hypotheses. Of these three are of importance to this study: environmental dynamism, environmental heterogeneity (i.e. complexity) and resources (munificence).

The items used by Miller and Friesen (1982) to measure the environment well exceeded guidelines (e.g. .6) set by Van de Ven and Ferry (1980) on the Cronbach (1951) alpha construct (an internal consistency and reliability

measure). The value averaged .74 for all scales; the dynamism scale was .74; the heterogeneity scale was .84; and the resources scale was .68. Additional items were added to the resources scale to reflect the conceptualization of this dimension in this study. The wording of the items were adapted for use in this research study; special care was taken not to change the intent and construct of the items. As shown in Appendix A, each item is measured on a seven point Likert type scale. Alpha scores for this study are reported in Table 5.1.

The environmental uncertainty score is a weighted measure. This allowed respondents from different industries to participate in the study as different elements in the environment may have different significance from industry to industry. The respondents were asked to assign an importance value (on a scale of 1 to 7) to each item on each scale. A weighted score was derived by utilizing the importance rating for each scale: munificence, dynamism and complexity. These three scores were summed and averaged. The resulting continuous variable was used in correlation and regression analysis. Then the score was used for nonparametric tests to separate the respondents into groups of high uncertainty and low uncertainty. Those respondents who score above the mean for all respondents were placed in the high group; while those who score below the mean were placed in the low group.

#### 4.33 Cognitive Style

Human Information processing is defined as the way individuals gather and use information in making decisions. Taggart and Robey (1981) suggest the use of cognitive style, as described by Jung (1923), as a means to measure how individuals gather and process information. Extensive assessment has been made of the Myers-Briggs Type Indicator as a tool for measuring cognitive style as represented by Jungian typology. Results indicate that it is an adequately reliable self-report inventory. The alpha coefficients on continuous scores for the sensing/intuition scale range from .75 to .87; and the alpha scores on the thinking/feeling scales range from .69 to .86 (Carlyn, 1977).

The abbreviated form of the MBTI (form AV) contains fifty items and has a .75 predictability rating which means that this form will correctly predict cognitive type 75% of the time. Form AV of the MBTI will be used to measure cognitive style in this research study. The MBTI is virtually self-administered. All the necessary instructions were included.

Scoring was in accordance with the prescribed manner and respondents were categorized as one of the following: sensing/thinking; sensing/feeling; intuitive/thinking; and intuitive/feeling. See Appendix A for the items of MBTI form AV.

#### 4.34 Culture

The manifestations of an organization's culture are many. For the purpose of this study, norms of the work group will be used to test the hypotheses. Allen and Silverzeig (1976) have assessed an organization's culture utilizing norm surveys. Schein (1985:136), although not a proponent of the use of a survey to assess an organization's culture, does concede that if a survey is treated "as an artifact to be deciphered along with other artifacts, one is probably on safe ground".

In 1983, Kilmann and Saxton developed the Culture-Gap Survey<sup>®</sup> (a normative based instrument) via the construct validity technique as described by Lovinger (1967). The survey consists of 28 norm pairs. For example, respondents are asked to respond by selecting the norm in each pair that best represents the way things are done in their work group (i.e. "Discourage new ideas" or "Encourage new ideas"). In the pretest stages of the instrument, it was found that respondents consistently selected the extremes of the Likert type scale that was presented with each norm. Whereupon, the authors developed a forced choice situation with norm pairs (i.e. Encourage creativity; Don't encourage creativity). The Culture-Gap<sup>®</sup> instrument directs the respondent to select the norm in each of the 28 norm pairs as the culture really is in his/her work unit and then as the culture should be to produce better performance and morale.

The 28 norm pairs have been factor analyzed with four groupings forming consistently. These groupings and their corresponding alpha scores (Cronbach, 1951) are: Task Support (.76) Task Innovation (.76); Personal Freedom (.42); and Social Relationships (.91).

Because of the manner in which the norms were developed, they were used in this study but were scored differently than in the Culture-Gap<sup>®</sup> Instrument. This study is not assessing culture gaps, rather the culture as it is perceived to be in the organization from the respondent's viewpoint. While this may not give the correct "objective" picture of the organization's culture, it does accurately reflect the respondent's view and thus his or her behavior. As this study is investigating the behavior of organization members and the interactions of different perceived characteristics of the environment and the organization, it is felt that this approach accurately reflects the perceived culture.

The proposed scoring system, suggested through conversation with M.J.Saxton (1986), allows a score to be created for each of the four types of cultural norm. The maximum score for each type was seven, as there are seven norm pairs per type. The norm in the pair that is indicative of the type it represents is assigned a value of 1. Thus, a score of six on the Task Innovation norms

Indicates the strong presence of this type of norm in the culture of that group. Likewise, a score of two represents a much weaker presence of this type of norm.

By using this technique a score was derived for each type of cultural norms: Task Support, Task Innovation, Social Relationships, and Personal Freedom. See Appendix A for the items and the assigned values of the culture section of the questionnaire.

As the Culture-Gap<sup>®</sup> survey is copyrighted, permission to use the norm pairs was obtained from Ralph Kilmann.

#### 4.35 Background Information

Several items are included in this section of the instrument to gather pertinent data about the respondent and his/her company. In particular, title of the respondent and functional responsibility was important as only those individuals involved in boundary subsystems of the organization were included in the study. Size of the company in sales and number of employees, as well as the perception of the competitive climate and sales growth, provided important information necessary to discuss the findings of this study. The age of the company and the number of years the respondent has worked for the company also aided in the interpretation of the findings of this study. See Appendix A for these items.



#### 4.4 Data Analysis

The SPSSX 2.1 Information Analysis System was used to conduct all statistical analyses.

Prior to testing the hypotheses, the scale sections of the instrument were analyzed for reliability via the Cronbach alpha procedure. The Cronbach (1951) alpha coefficient is a measure of the internal consistency of the items on each scale. This procedure performs an item analysis on the components of additive scales or weighted additive scales by computing a coefficient of reliability.

All data were used in this analysis. The minimum acceptable standard of  $\alpha = .6$  suggested by Van de Ven and Ferry (1980) for the Cronbach alpha was employed. An item deletion procedure was run to assess the impact of each item on the scale score. The item that would improve the scale score the most through deletion was deleted. The items that remained after the reliability tests stated above were used in the statistical analyses that were employed to examine the data and test the hypotheses.

Descriptive statistics were prepared for each section of the questionnaire. The statistics will be referred to in the body of the text, with a complete listing included in Appendix B.

##### 4.41 Hypotheses Testing Procedure

Hypotheses H10 through H8a in Chapter 3 imply that the types of cultural norms are jointly influenced by the dimensions of environmental uncertainty and organicity.

That is, these hypotheses propose that the relationship between environmental uncertainty and organization culture is contingent upon the state of organicity (i.e. mechanistic or organic). Hypothesizing in this manner implies that environmental uncertainty and organicity interact. Multiple regression analysis was used as the hypotheses testing procedure. This technique can be employed in testing conditional forms of relationships in that this methodology is directly generalizable to cases in which structure is a multivalued qualitative variable or to cases where structure is a continuous variable. The interaction of environmental uncertainty (WENVIRON) and organicity (ORGANICY) is represented by a product term (WES) in the regression equation.

According to Schoonhoven (1981), moderated regression analysis (i.e. regression analysis with product terms) is an appropriate technique for testing hypothesized contingency relationships. It allows interaction effects to be directly examined. Sharma et al (1981) outlined a procedure for identifying moderator variables. A moderator variable is one that may modify the strength and/or form of the relationship between a predictor and criterion variable. Their suggested procedure will be followed to test the hypotheses.

Three regression equations of the following form were run for each set of hypotheses for each type of cultural norm. The following notation is used to represent the variables in these equations on the next page.

WENVIRON = Environmental Uncertainty    ORGANICITY = Organicity

WES = Product of Environmental Uncertainty/Organicity

$$(1) \quad Y = a + b_1 \text{ WENVIRON}$$

$$(2) \quad Y = a + b_1 \text{ WENVIRON} + b_2 \text{ ORGANICITY}$$

$$(3) \quad Y = a + b_1 \text{ WENVIRON} + b_2 \text{ ORGANICITY} + b_3 \text{ WES}$$

Cohen and Cohen (1975) point out that in order to test the significance of an interaction term, the linear effects of the constituent variables must be partialled from their product. Thus, equation three is appropriate for this analysis.

Unless one is dealing with "experimental design data, it is almost always the case that predictor variables will be correlated to some degree" thus providing the potential for exhibiting multicollinearity (Green, 1978:227). The statistical package (SPSS-X 2.1) that was used to run the regression routines incorporates checks for serious multicollinearity. If severe multicollinearity is present then one or more of the predictor variables that represent the major offenders will be dropped.

The regression coefficient  $b_3$  must be significantly different from zero in order to say that environmental uncertainty (WENVIRON) and organicity (ORGANICY) interact and thus influence the types of norms in an organization's culture (Y). The appropriate test is:  $t = b_3 / \text{std.err.}b_3$  (Arnold, 1982).

If  $b_2$ , in equation 2, is also significantly different from zero, organicity is related to types of culture norms and would be considered a quasi-moderator of the environment-culture relationship. If  $b_3$  is significantly different from zero but  $b_2$ , in equation 2, is not, organicity is unrelated to culture and would be considered a pure moderator of the environment-culture relationship. A positive and significant  $b_3$  would imply that the positive influence environmental uncertainty has on types of cultural norms is greater for organizational subunits with higher organicity indices than for subunits with lower organicity indices. A negative and significant  $b_3$  would imply the opposite.

Hypotheses H9a through 11a state the proposed relationships between cognitive style, environmental uncertainty, organicity, and the type of cultural norms while H12 states the proposed relationship between organicity and environmental uncertainty. These hypotheses will be tested via the Chi-square contingency table technique which is suitable for investigating the independence of variables in cross classifications. For the

Chi-square distribution to be a good approximation of the distribution of the statistic in the equation below, expected frequencies in each cell should be at least five. This will be true of this study. In the case where there are cells with expected values less than five, SPSS-X prints the number of such cells and the minimum expected value (Everitt, 1977). It also gives the new Chi-square after the Yates correction.

Three separate two way contingency tables will be utilized, one for each hypothesis. Calculation of the Chi-square statistic is as follows:

$$\chi^2 = \sum_{I=1}^n \sum_{J=1}^n \frac{[O_{IJ}] - E_{IJ}]^2}{E_{IJ}}$$

where  $O_{IJ}$  denotes the actual number and  $E_{IJ}$  the expected number of observations that fall in the  $IJ$  cell.

The degrees of freedom in a two way contingency table are given by  $v = (r-1)(c-1)$  where  $r$  is the number of rows and  $c$  is the number of columns.

The strength of association between those variables that are dependent (i.e. have significant chi-squares) could be measured by the contingency coefficient. However, this coefficient does not possess the attractive property of the Pearsonian product moment correlation coefficient of being equal to one when the variables are completely dependent or perfectly correlated. Therefore, Goodman and Kruskal (1954)

proposed an Index of predictive association to indicate the proportion of the variance in one variable that is accounted for by covariation in the other. The index varies from 0 to 1.  $\lambda = 1.0$  means that the B classification allows the A classification estimates to be made without error. The index of predictive association is calculated as follows when predicting the A classification from the B classification.

$$\lambda_{A.B} = \frac{\sum_b n_{bm}}{n - n.m}$$

- \* where  $n.m$  is the largest marginal frequency among the A classification
- \*  $n_{bm}$  is the largest frequency in the  $b$  th row (or column) of the table
- \*  $n$  is taken across all B classes

An example would be for Columns A1 to A4 to represent the four types of culture norms; and Rows B1 to B4 to represent the four different cognitive styles.

#### 4.42 Tests for Monotonicity

Hypotheses H10 through 8a imply that environmental uncertainty has nonmonotonic (hereinafter nonlinear) effects on the types of cultural norms over the range of the proposed moderator variable, organicity. A monotonic relationship is one in which an independent variable has a positive or negative influence on a dependent variable over

the entire range of the moderator variable. A nonlinear relationship is one in which the independent variable has a positive influence on the dependent variable over part of the observed range of the moderator variable and a negative influence on the dependent variable over the remainder of the observed range of the moderator variable. Hypothesizing that a nonlinear relationship exists implies not only that environmental uncertainty and organicity will interactively influence types of cultural norms, but that the relationship between environmental uncertainty and types of cultural norms is positive for firms with certain structures and negative for firms with other structures.

To test for the presence or absence of monotonicity Schoonhoven (1981) graphed the partial derivative of the equation

$$Y = b_1WENVIRON + b_3WES$$

The point where the effect of WENVIRON on Y is zero ( $dY/dWE = b_1WENVIRON + b_3WES = 0$ ) is also where the modifying variable is equal to the ratio of the coefficients of the additive and interaction terms or  $ORGANICITY = -b_1/b_3$ . This ratio represents the value of the moderator variable at which the effect of the independent variable on the dependent variable will change signs. In other words,  $-b_1/b_3$  represents the point on the organicity index at which the impact of environmental uncertainty on type of cultural norms changes signs. If  $-b_1/b_3$  falls within the observed range of the moderator variable's (organicity) values, the

effect of environmental uncertainty on the organization culture is nonlinear. If, on the other hand, it falls outside the range of organicity, the effect of environmental uncertainty on organization culture is monotonic. For example, given that  $-b_1/b_3 = 4.1$  and the observed range for organicity is 1 to 7, then the interpretation is as follows. In those subunits with organicity indices below 4.1, increases in environmental uncertainty will negatively impact the culture. In subunits with organicity indices greater than 4.1, increases in environmental uncertainty will positively impact the culture.

For this study, the minimum acceptable level of significance was  $p < .1$ .



## 5.0 RESULTS

The findings of this research study are presented in this chapter. Section 5.1 presents the measurement properties of the survey and Section 5.2 presents the results of the data analysis and hypotheses testing.

### 5.1 Reliability of Measures

#### 5.1.1 Killmann-Saxton Culture Gap Survey<sup>Ⓢ</sup>

The items that measured the types of cultural norms found in the subunits of the businesses surveyed were contained in Section 1 of the questionnaire. There were twenty eight items which were subdivided into four scales with seven items each. The scales were: Task Support, Task Innovation, Social Relationships and Personal Freedom. Each item contained two statements; one which stated the norm positively, the other stated the norm negatively. Each time a respondent chose the positive norm, a score of one was recorded. A score of zero was given for the choice of a negative norm. The actual score used in the data analysis for each type of culture norm was the sum of the items on each of the four scales. This score was representative of the respondent's perception of the norms of behavior that were occurring in his/her organizational subunit. The maximum score on each scale was seven, while the minimum was zero.

An alpha of .6 as recommended by Van de Ven and Ferry (1980) was the minimum standard of acceptability for a scale to be used in the data analysis of this study. The Cronbach alpha coefficients along with the minimum and maximum inter-item correlation for the culture scales are presented in Table 5.1. Clearly, the Personal Freedom scale does not meet the minimum Cronbach alpha standard for this study. Additional analysis was conducted via item deletion in an attempt to increase the alpha. However, there was not enough increase to bring the scale to the acceptable standard. Therefore this scale was not included in the data analysis of this study.

The other three scales of the Culture-Gap Survey<sup>®</sup> instrument are equal to .79 or higher thereby well exceeding the minimum standard for alpha. The overall alpha of the instrument also is quite high. When all items are considered as a measure of the level of positive norms in an organizational subunit, the alpha is very high (.86). This indicates that all items taken together are a reliable measure of the frequency of positive culture norms within a particular work unit.

An examination of the scatterplots (Tables 5.2, 5.3, 5.4, 5.5) of each of the types of norms was done so that a visual comparison could be made between Personal Freedom and those norm scales that exhibited high alpha coefficients.

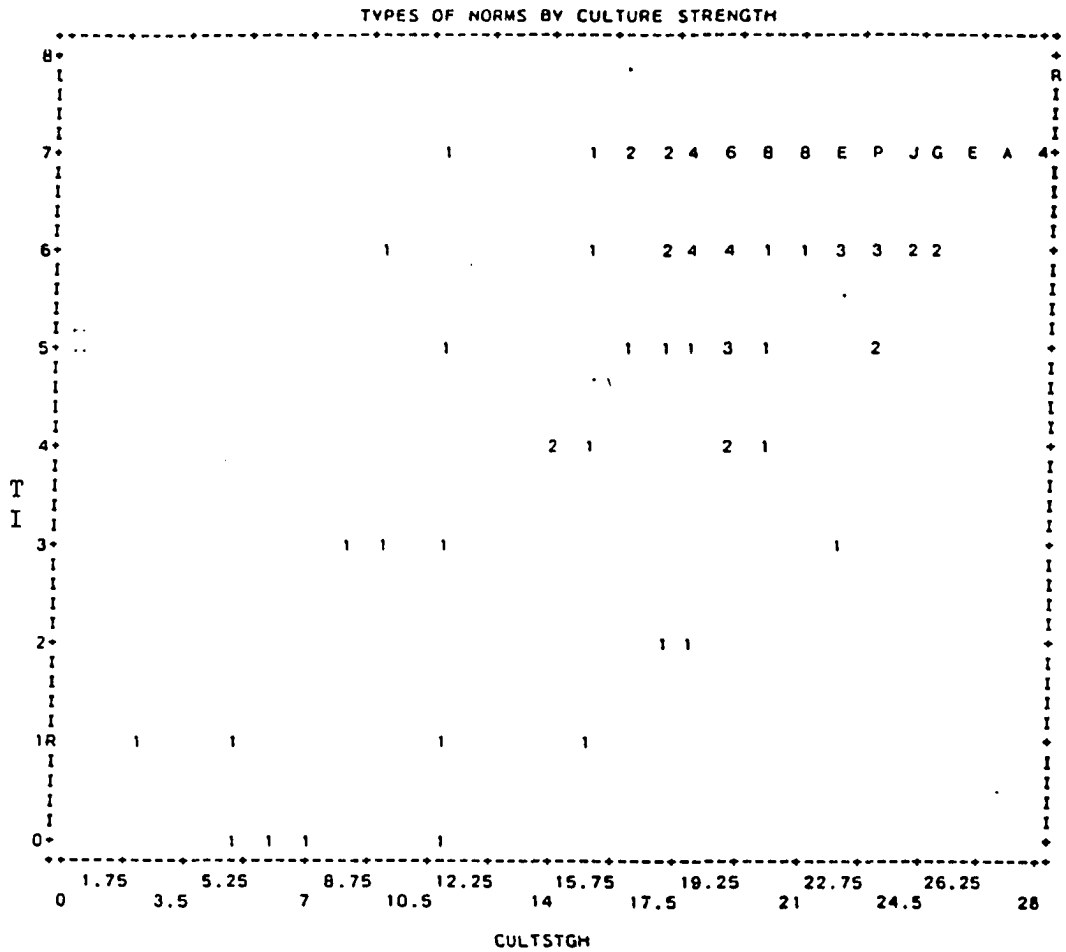
TABLE 5.1  
INTERNAL RELIABILITIES OF THE MEASURES

KILMANN-SAXTON CULTURE GAP SURVEY <sup>Ⓜ</sup>

<u>VARIABLES</u>	<u>ITEMS</u>	<u>RANGE</u>	<u>ALPHA</u>
<u>CULTURE</u>			
Task Support	1, 5, 9, 13, 17, 21, 25	.26 to .70	.80
Task Innovation	2, 6, 10, 14, 18, 22, 26	.27 to .69	.86
Soc. Relationship	3, 7, 11, 15, 19, 23, 27	.13 to .65	.79
Personal Freedom	4, 8, 12, 16, 20, 24, 28	-.1 to .46	.57
All Items	1 to 28	-.16 to .71	.86
Exclude Personal Freedom Items		-.07 to .71	.87
<u>ORGANICITY</u>			
All Items	1, 2, 3, 4, 5, 6, 7	.15 to .52	.74
<u>ENVIRONMENTAL UNCERTAINTY</u>			
Dynamism	1, 2, 3, 4, 5	.17 to .62	.70
Complexity	6, 7, 8, 9, 10, 11	.17 to .43	.64
	Item 7 deleted after initial run; alpha increased to .72		
Munificence	12, 13, 14, 15, 16, 17, 18	-.1 to .65	.61
	Item 16 deleted after initial run; alpha increased to .64		
All Items	1 to 18 w/o 7 & 16	-.25 to .62	.67



TABLE 5.3  
SCATTERPLOT: TASK INNOVATION

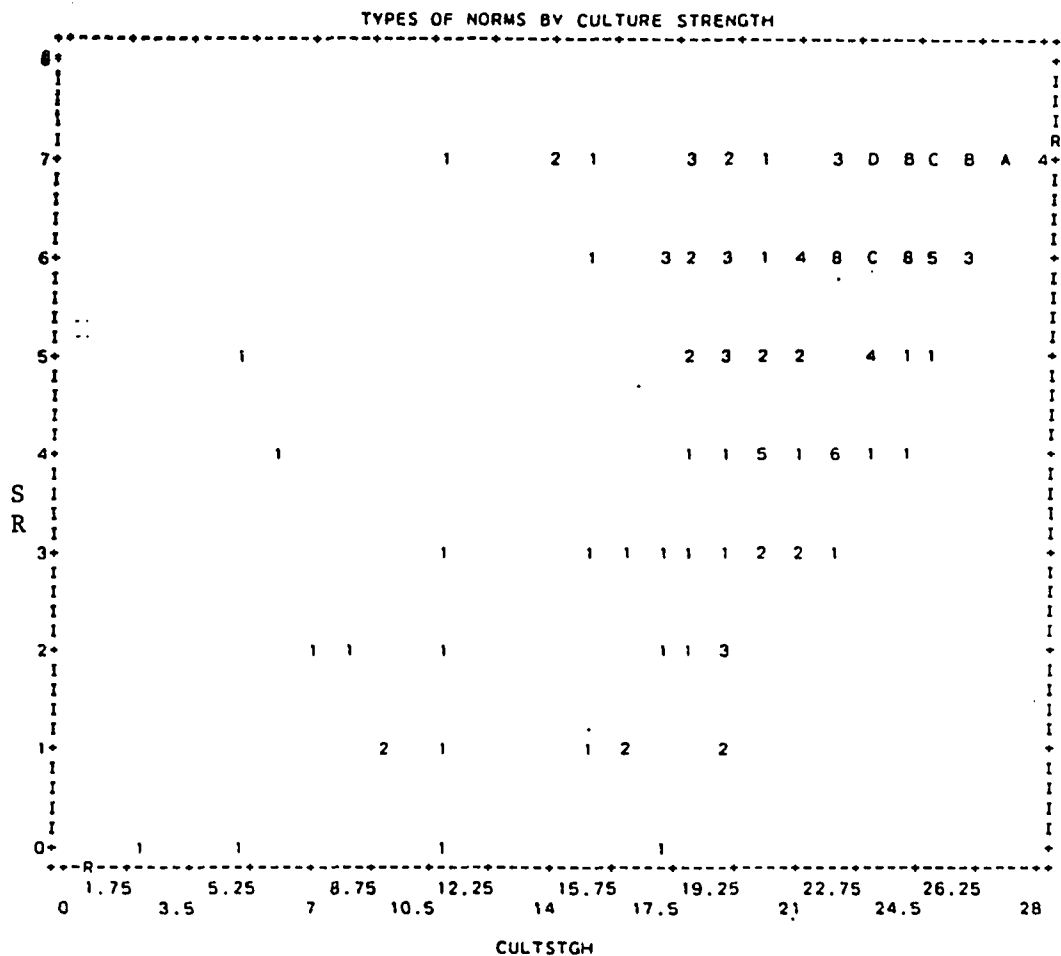


188 cases plotted. Regression statistics of TI on CULTSTGH:  
 Correlation .73976 R Squared .54725 S.E. of Est 1.06704 2-tailed Sig. .0000  
 Intercept(S.E.) 1.07660( .35405) Slope(S.E.) .24316( .01622)

Frequencies and Symbols

- A - 10
- E - 14
- G - 16
- J - 19
- P - 25

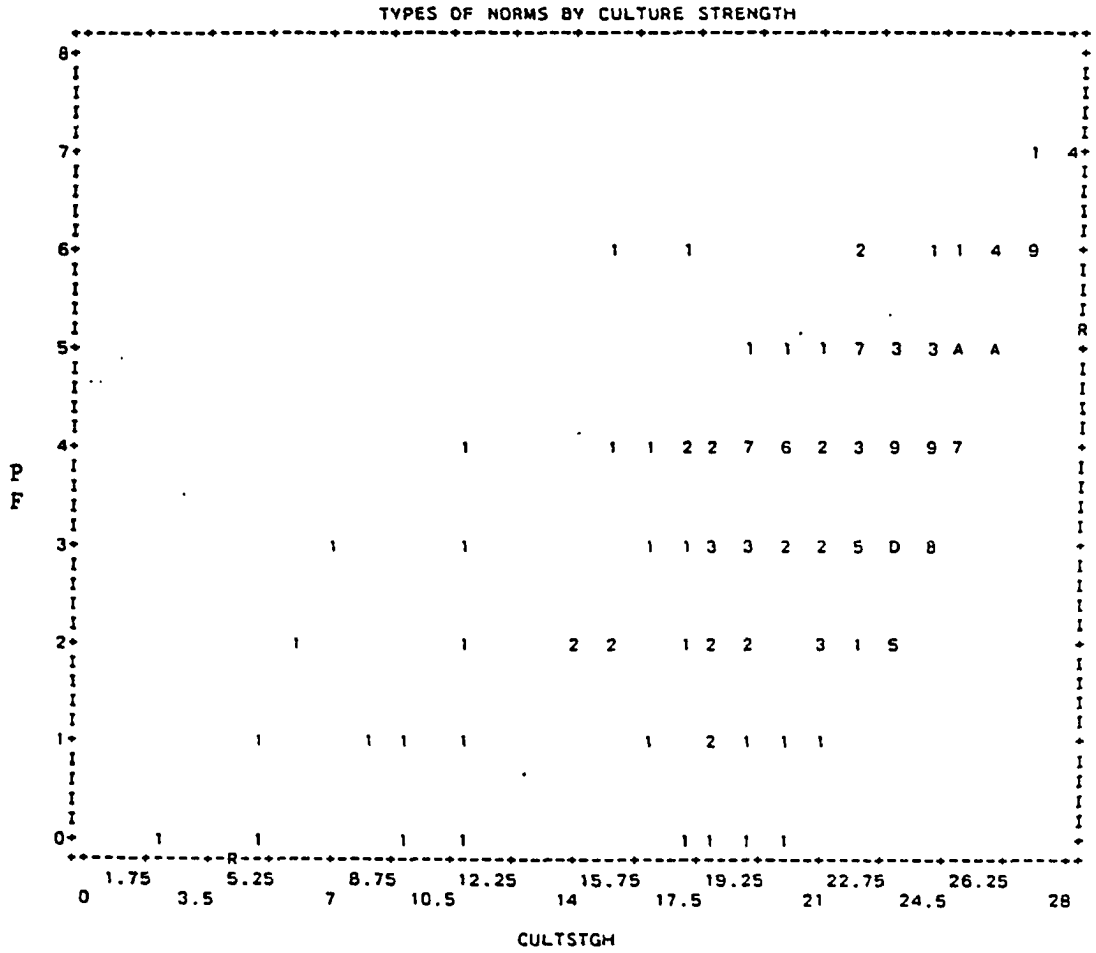
TABLE 5.4  
SCATTERPLOT: SOCIAL RELATIONSHIPS



188 cases plotted. Regression statistics of SR on CULTSTGH:  
 Correlation .66934 R Squared .44802 S.E. of Est 1.41045 2-tailed Sig. .0000  
 Intercept(S.E.) -.16805( .46799) Slope(S.E.) .26338( .02144)

- A - 10
- B - 11
- C - 12
- D - 13

TABLE 5.5  
SCATTERPLOT: PERSONAL FREEDOM



188 cases plotted. Regression statistics of PF on CULTSTGH:  
 Correlation .65119 R Squared .42405 S.E. of Est 1.21922 2-tailed Sig. .0000  
 Intercept(S.E.) -.90023( .40454) Slope(S.E.) .21684( .01853)

A - 10

It was determined that the patterns for Task Support, Task Innovation and Social Relationships are very similar to each other, with a large cluster of scores running from the middle to the upper right of the plot. The plot for Personal Freedom norms were more broadly spread and scattered with a minor clustering in the far middle right of the plot. Therefore, it appears that the response pattern to this set of norms is less straight forward than for the other three sets. Respondents may have been confused by the set of Personal Freedom norms; several individuals put question marks by the norm pairs that represented this type of norm. In particular items 24 and 28 seemed troublesome, as an individual would sometimes write the word "both" by these items. Thus, the low alpha score combined with other evidence on this set of norms make it inadvisable to utilize this set for the data analysis in this study.

The alpha scores on each of the above scales is greater than that reported by Saxton (1986) with the exception of Social Relationships which is .12 less than the alpha for that scale in the current study. Thus, it is felt that the scales of Task Support, Task Innovation and Social Relationships are measuring reliably what they purport to measure.

The means and standard deviations of these variables are shown in Table 5.6. Complete summary statistics for each of the variables is included in Appendix B. For identification purposes in the appendices and some tables



the following notation will be used in reference to types of culture norms: TS = Task Support; TI = Task Innovation; SR = Social relationships; and PF = Personal Freedom.

TABLE 5.6  
SUMMARY STATISTICS OF THE VARIABLES

<u>VARIABLES</u>	<u>MEAN</u>	<u>STD.DEV.</u>	<u>MIN/MAX</u>
<u>ENV. UNCERTAINTY</u>	21.66	5.46	13.8/33.85
DYNAMISM	27.57	9.68	23.1/33.85
COMPLEXITY	18.43	8.92	16.2/20.5
MUNIFICENCE	18.99	7.06	13.7/25.34
<u>ORGANICITY</u>	5.01	1.00	1/7
<u>CULTURE</u>			
TASK SUPPORT	5.88	1.70	0/7
TASK INNOVATION	6.26	1.58	0/7
SOCIAL RELATIONSHIPS	5.44	1.89	0/7

#### 5.12 Organicity

The items used to measure the type of structure of an organizational subunit were contained in section 2 of the questionnaire. The respondent chose a number from one to seven on a Likert type scale which represented his/her perception of the characteristics of the structure. This too was an additive score. The Cronbach alpha value was .74. It is well above the minimum acceptable standard.

An examination of the corresponding alpha coefficient on an item by item deletion basis showed that the current alpha was also the highest possible alpha for this set of items. Also the alpha score is slightly higher than that found by Covin (1985). It is felt that this scale possessed the necessary reliability to measure this construct. Thus, it was used in the data analysis of this study.

The mean and standard deviation of this variable are presented in Table 5.6. Complete summary statistics on the items and the variable, organicity, are in Appendix B. For notation purposes in some of the printouts in the appendices, ORGANICY = Organicity.

#### 5.13 Environmental Uncertainty

Eighteen items were included in Section 3 of the questionnaire; they comprised three subscales of the construct: environmental uncertainty. The subscales are: Dynamism, Complexity and Munificence. Each item was weighted by an importance value (from 1 to 7) that was assigned by the respondent. Thus the weighted item value was the product of the importance rating and the environmental uncertainty item's rating (from 1 to 7). The weighted item value was used as the item score for the reliability analysis. This is plausible as conceptually the weighted score on each item constitutes a new set of items that can be evaluated for internal consistency.

Adding the weighted values for Items 1 to 5 produces the Dynamism scale. The Cronbach alpha was .70. An analysis of the Item deletion data indicated that an alpha of .70 was the highest possible rating for this scale.

Items 6 to 11 comprise the Complexity scale. It had an alpha coefficient of .64. Examination of the Item deletion tables revealed that the deletion of Item 7 would improve the alpha value to .72. No other Item deletions would improve the initial value of .64. Item 7 contained language that seemed to confuse the respondent. There were several question marks placed by that Item on returned questionnaires. Also, the investigator had one phone call from a respondent requesting clarification of this Item's terminology. The confusion regarded the use of the phrases "evenly distributed" and "heavily concentrated" to describe competitors. The deletion of this Item is warranted.

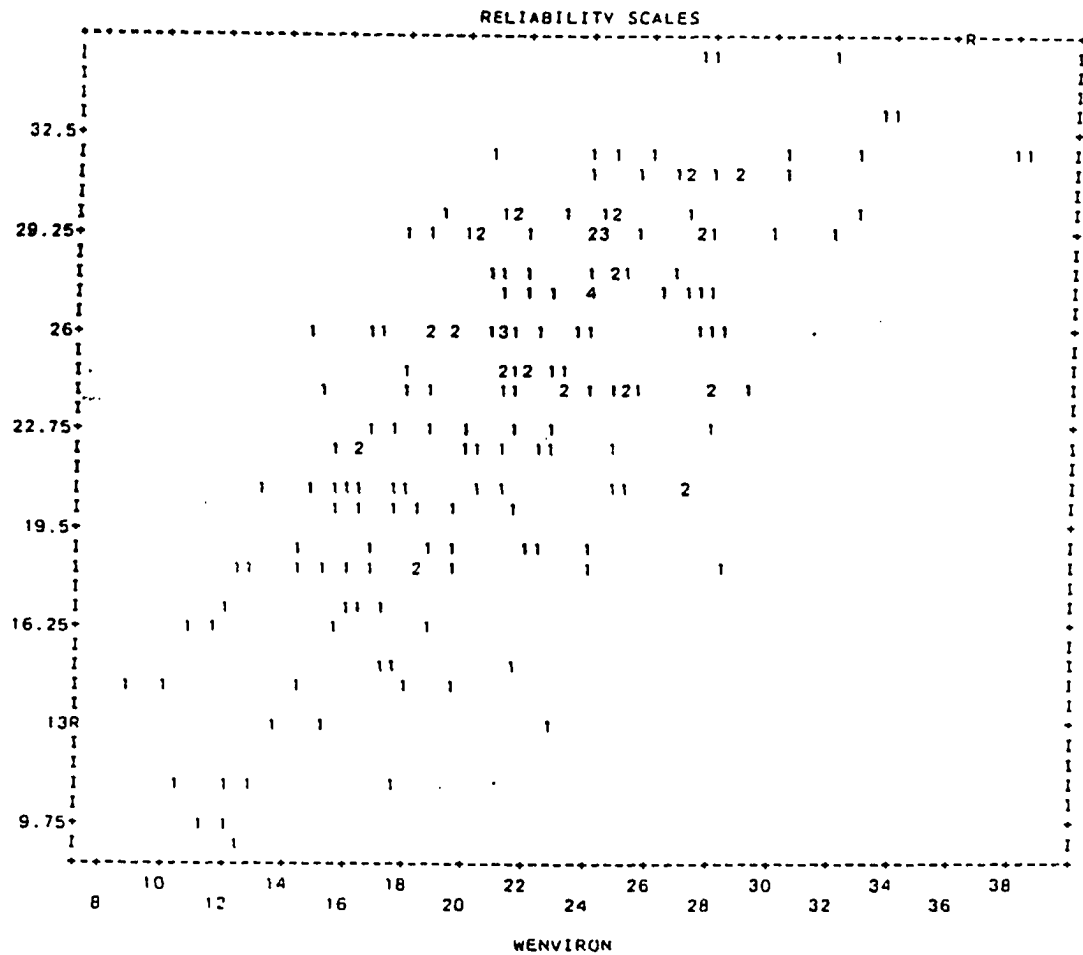
Items 12 to 18 comprise the Munificence scale. It had an alpha coefficient of .62. Examination of the Item deletion table indicated that the deletion of Item 16 would improve the alpha value of this scale to .64. Item 16 dealt with the scarcity/plentifulness of skilled labor. While the deletion of this Item did not greatly increase the alpha value, it is felt that any increase that can be gained should be gained because the scale barely meets the minimum acceptable standard for alpha.

Scott (1981) indicated that the greater the scarcity, the complexity and dynamism of the environment, the greater the environmental uncertainty. Therefore, by combining the items of the above three scales, a measure of perceived environmental certainty or uncertainty facing the subunit is derived. The Cronbach alpha was calculated for the all of the items that remained after the deletion process. The alpha coefficient for the remaining 16 items was .66. This scale is referred to as the weighted environment variable (WENVIRON) in the Tables and formulas. Other notations that are used in printouts in the appendices to represent the variables include: DYNAMISM = Dynamism; COMPLEX = Complexity; MUNIFIC = Munificence.

As the alpha coefficient for the weighted environment scale is relatively low, an examination was made of the item deletion table with all 16 items included. Items 12, 13, and 18 when deleted would give a higher alpha by .01 (.67). However, upon deletion of either of these items, the alpha score for munificence decreases below the minimum acceptable level of .6. Therefore, the tradeoff of the gain of .01 in reliability did not warrant the deletion of these additional items.

A visual comparison was also made of the scatterplots (Tables 5.7 to 5.9) of each of the three scales when compared to the total set of items. Dynamism and Complexity have relatively even distributions of scores from the lower left hand corner to the upper right hand corner of the

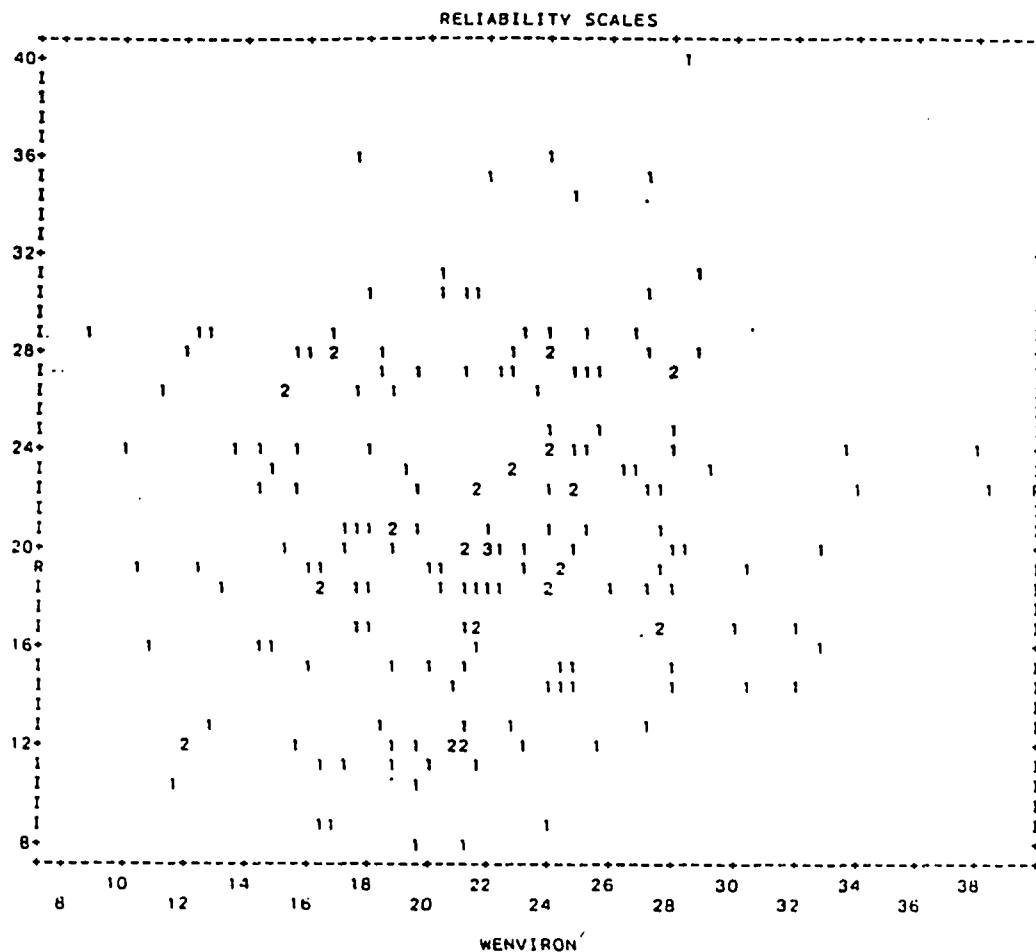
TABLE 5.7  
SCATTERPLOT: DYNAMISM



188 cases plotted. Regression statistics of DYNAMISM on WENVIRON:  
 Correlation .71765 R Squared .51502 S.E. of Est 4.03538 2-tailed Sig. .0000  
 Intercept(S.E.) 7.42424( 1.20749) Slope(S.E.) .75965( .05405)



TABLE 5.9  
SCATTERPLOT: MUNIFICENCE



188 cases plotted. Regression statistics of MUNIFIC on WENVIRON:  
 Correlation .08682 R Squared .00754 S.E. of Est 6.32719 2-tailed Sig. .2361  
 Intercept(S.E.) 18.57291( 1.89326) Slope(S.E.) .10073( .08475)

plot. Munificence scores are scattered on the outer limits of the plot and show a tendency to cluster as they move inward toward the center. This may explain why there is such a low reliability value and that with the removal of one item the value drops below .56.

The means and standard deviations of the weighted environment variable and its subscales are shown in Table 5.2. Complete summary statistics on the individual items are presented in Appendix B.

### 5.2 Descriptives

This section provides additional information on the respondents in this study as obtained from an analysis of the background information and cognitive style sections of the questionnaire. A breakdown of all respondents by type of business and functional area was conducted to examine how each of these groups responded to the variables in the equations that were used to test the hypotheses.

The following table of means (Table 5.10) is broken down first by functional area and second by type of business (manufacturing vs services). As can be seen, there is very little difference between the means of service versus manufacturing businesses, with the greatest difference occurring in the WENVIRON variable. With the exception of marketing, the respondents in the other functional areas in service work units perceived the environment as less uncertain.



As ensuing statistical analysis tested for these differences, only informational statistics are presented in this section. The number on the extreme right of the table represents the number of respondents in that category. Additional descriptive statistics (including frequencies, standard deviations, modes, minimums and maximums) are in Appendix B.

Several authors have noted that tasks differ in manufacturing and service businesses. Thomas (1978) indicates that this difference may be due in part to the extensive involvement of people, relative to machines, in the activities of service businesses. Also, in manufacturing businesses employees deal with tangible products. In service businesses the characteristics of products are different. That is, the product may be intangible and quite heterogeneous (Sasser, Olsen, and Wycoff, 1978) thus making the tasks of service firms quite different than that of manufacturing firms.

To aid in the interpretation of the results of this study, the service subgroup and the manufacturing subgroup were compared via analysis of variance on the following items that provided background information on the characteristics of the companies that responded to the survey. These variables are: annual sales, number of employees, years the firm has been in business, competitiveness of the firm's industry and projected sales growth.

TABLE 5.10  
VARIABLE MEANS BY FUNCTION BY TYPE OF BUSINESS

<u>CATEGORY</u>	<u>VARIABLES</u>					
	<u>TS</u>	<u>TI</u>	<u>SR</u>	<u>ORGN</u>	<u>WENVN</u>	<u>N</u>
<u>PUBLIC RELATIONS</u>						
Manufacturing	6.19	6.81	6.13	5.72	21.17	16
Services	6.12	6.30	5.60	4.85	20.87	26
<u>MARKETING</u>						
Manufacturing	5.86	6.36	5.36	5.31	21.62	28
Services	5.92	6.40	5.54	4.52	21.75	26
<u>PERSONNEL</u>						
Manufacturing	5.87	6.27	5.60	4.98	22.56	15
Services	6.00	6.79	6.16	4.99	20.00	19
<u>PURCHASING</u>						
Manufacturing	5.90	5.97	5.39	5.05	23.39	30
Services	6.04	6.52	5.12	4.95	20.67	25

The results of the analysis of these variables found one significant difference between the manufacturing and service businesses in this sample in the number of employees ( $F=2.78$ ;  $p=.097$ ). The mean number of employees for the service firms was 804, while the mean for manufacturing firms was 551. There were no significant differences between the two subgroups on any of the other variables.

Table 5.11 contains the zero order correlation coefficients (N = 188) between all variables in the equations that were used to test the contingency hypotheses.

The correlations between environmental uncertainty and its subscales as presented in Table 5.11 are all very significant ( $p=.001$ ). While complexity and dynamism have much higher values and may contribute more to the environmental uncertainty scale than munificence, it should be noted that only munificence is significantly related to any of the types of cultural norms (task innovation). The correlation ( $r=-.161$ ;  $p=.05$ ) indicates that as resources become more scarce, task innovation increases. Likewise, in an environment where resources are more plentiful, task innovation decreases.

As can be noted from Table 5.11, the relationships between environmental uncertainty and the norms of task support, task innovation and social relationships are negative but not significant. The relationships between these same norms and the structure of the organizational subunit are positive and significant. The implication is that structure may indeed play a role in the environmental uncertainty/culture relationship.

Moderated regression analysis was chosen to test the contingency hypotheses as it was felt that more detailed and explanatory information could be obtained. However,

TABLE 5.11  
ZERO ORDER CORRELATIONS OF THE VARIABLES

	1	2	3	4	5	6	7	8	9
	WENVIRON	ORGANC	TS	TI	SR	WES	DYNAM	COMPLEX	MUNIF
1	1								
2	.094	1							
3	-.165*	.186*	1						
4	-.138*	.358**	.643**	1					
5	-.060	.259**	.280**	.239**	1				
6	.792**	.664**	.003	.129	.111	1			
7	.750**	.159*	-.166*	-.103	-.005	.634**	1		
8	.764**	.099	-.024	-.014	-.070	.628**	.401**	1	
9	.327**	-.124	-.126	-.161*	-.044	.174*	-.138*	-.042	1

\*p = .05      \*\*p = .001

the Pearson product moment correlation technique could have been used to test the contingency hypotheses involving the variables environmental uncertainty, organicity and the types of culture norms by dividing the sample into less organic and organic subgroups and deriving the Pearson correlation coefficient. The correlations obtained from this statistical analysis are presented in Table 5.12 as additional information to the reader. There were 85 respondents in the less organic subgroup and 103 respondents in the organic subgroup.

TABLE 5.12

## PEARSON CORRELATION BETWEEN UNCERTAINTY AND CULTURE

	WENVIRON (less organic)	WENVIRON (organic)
TS	-.176 (p=.05)	-.187 (p=.03)
TI	-.130 (p=.12)	-.221 (p=.01)
SR	-.068 (p=.27)	-.082 (p=.20)

The relationships found in the less organic organizational subunits for task support, task innovation and social relationships are in the hypothesized direction; but only task support is significant. That is, subunits that have a less organic structure and are facing a more certain environment exhibit higher levels of task support. The correlations between environmental uncertainty and norms of task support and task innovation in organic subunits are significant, however, they are not in the hypothesized direction. Further comments on these results will be presented in the discussion section of the chapter six.

### 5.3 Results of Hypotheses Tests

The results of the moderated regression analyses are presented in Tables 5.13 through 5.15. As these tables show, only the hypotheses for task innovation (H3o to H4a) are supported by the data. However, when the sample is divided into manufacturing and service businesses, the hypotheses for task support are supported for the service subgroup. The findings are presented and discussed more fully in the sections that follow.

Three regression equations of the following form were run for each set of hypotheses made for of the three each types of cultural norms. Please note that those hypotheses that involved the norms of Personal Freedom will not be tested. This variable was dropped from the study due to the low reliability of the measure.

$$(1) \quad Y = a + b1 \text{ WENVIRON}$$

$$(2) \quad Y = a + b1 \text{ WENVIRON} + b2 \text{ ORGANICY}$$

$$(3) \quad Y = a + b1 \text{ WENVIRON} + b2 \text{ ORGANICY} + b3 \text{ WES}$$

WENVIRON = ENVIRONMENTAL UNCERTAINTY; ORGANICY = ORGANICITY  
WES= PRODUCT OF ENVIRONMENTAL UNCERTAINTY AND ORGANICITY

Cohen and Cohen (1975) point out that in order to test the significance of an interaction term (i.e. WES), the linear effects of the constituent variables must be partialled from their product. Thus, equation three is appropriate for this analysis.

Following each set of hypotheses, the findings for that particular set are presented and discussed.

### 5.31 Task Support Hypotheses

#### H1o

Under conditions of low organicity, there will be no relationship between environmental uncertainty and task support.

## H1a

Under conditions of low organicity, the relationship between environmental uncertainty and task support is negative.

## H2o

Under conditions of high organicity, there will be no relationship between environmental uncertainty and task support.

## H2a

Under conditions of high organicity, the relationship between environmental uncertainty and task support is positive.

Results for these hypotheses are shown in Table 5.13.

The interaction term for the entire sample was  $b_3 = .03$ . The significance of this term was  $p = .2$ . Therefore, this set of hypotheses 1o to 2a are not supported. However, the main effects of environmental uncertainty on task support as noted in Equation 1 are  $b_1 = -.200$ ; this is significant at  $p = .08$ . That is, the linear relationship between environmental uncertainty and task support is such that as environmental uncertainty increases, task support decreases.

A secondary analysis was conducted to test the above hypotheses for manufacturing and service organizations. No significant findings were obtained for the manufacturing subgroup, but a significant interaction was found between

environmental uncertainty and organicity in the service subgroup. B3 is .055 with  $p = .042$ . The following equations emerged.

$$TS = 6.94 - .051 \text{ WENVIRON}$$

$$TS = 4.63 - .060 \text{ WENVIRON} + .530 \text{ ORGANICITY}$$

$$TS = 10.77 - .333 \text{ WENVIRON} - .726 \text{ ORGANICITY} + .055 \text{ WES}$$

To test for the presence or absence of monotonicity Schoonhoven (1981) graphed the partial derivative of the equation

$$TS = b1 \text{ WENVIRON} + b3 \text{ WES}$$

The point where the effect of WENVIRON on TS is zero ( $dY/dE = b1 \text{ WENVIRON} + b3 \text{ WES} = 0$ ) is also where the modifying variable, organicity, is equal to the ratio of the coefficients of the additive and interaction terms or  $\text{ORGANICITY} = -b1/b3$ . This ratio represents the value of the moderator variable at which the effect of environmental uncertainty on the type of cultural norms will change signs. If  $-b1/b3$  falls within the observed range of the moderator variable's (organicity) values, the effect of the environmental uncertainty on Task Support is nonlinear. If, on the other hand, it falls outside the range of organicity, the effect of environmental uncertainty on organization culture is linear.

The equation used to test for nonlinearity is:

$$TS = -.333 \text{ WENVIRON} + .055 \text{ WES}$$

$$0 = .333 / .055 = 6.05$$



TABLE 5.13  
MODERATED REGRESSION ANALYSIS: TASK SUPPORT

TOTAL SAMPLE

Variables	Reg.	SE	F-Ratio	Cum. Increase		
Included	Coeff.#	of	Individual	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
	B	Variables				
WENVIRON	-.051	.022**	5.24**	.027	.027	5.24**
WENVIRON	-.058	.022***	6.71***	.068	.041	6.80****
ORGANICY	.344	.120***	8.16****			
WENVIRON	-.200	.112*	3.17*	.076	.008	5.11*
ORGANICY	-.279	.497	.32			
INTERACTION	.028	.021	1.67			

MANUFACTURING SUBGROUP

Variables	Reg.	SE	F-Ratio	Cum. Increase		
Included	Coeff.#	of	Individual	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
	B	Variables				
WENVIRON	-.052	.031**	2.90*	.032	.032	2.90*
WENVIRON	-.053	.031**	2.96*	.035	.003	1.60
ORGANICY	.105	.185	.319			
WENVIRON	.211	.204	1.075	.054	.019	1.65
ORGANICY	1.203	.855*	1.98			
INTERACTION	-.051	.039*	1.73			

SERVICES SUBGROUP

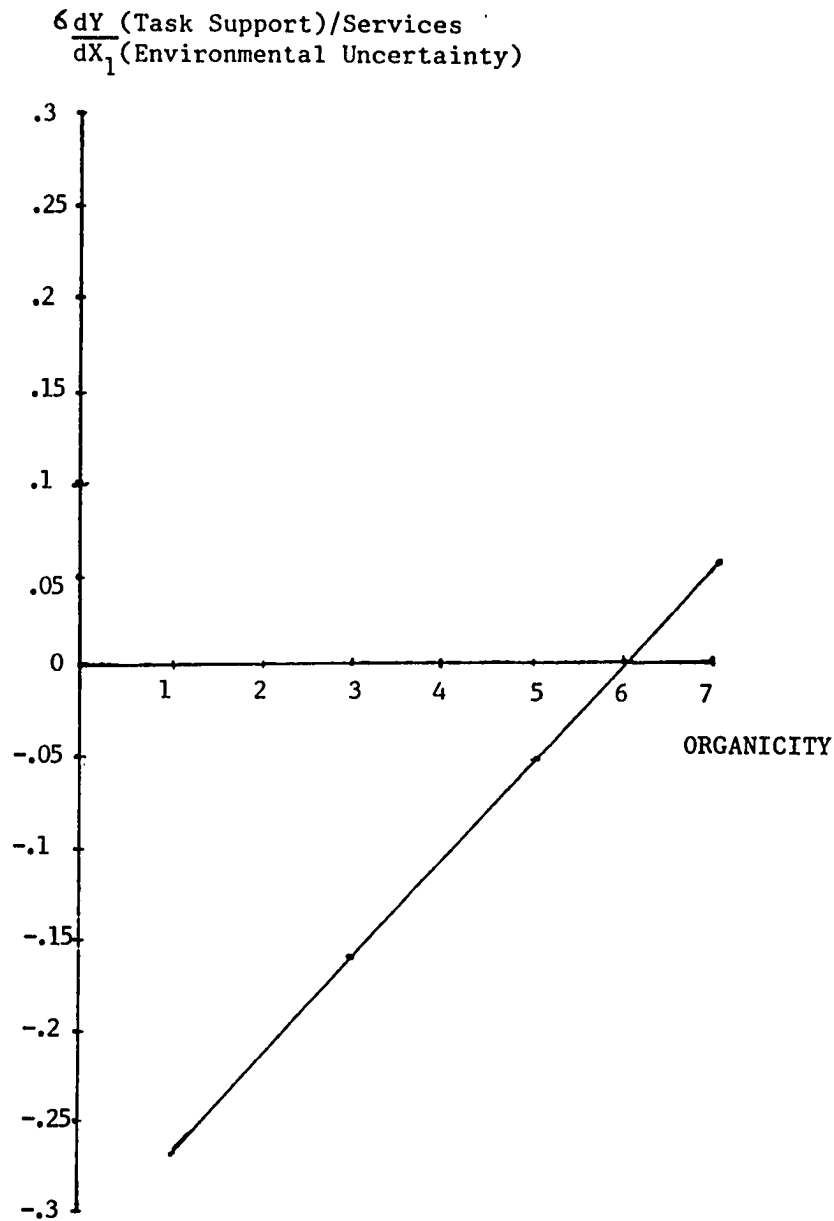
Variables	Reg.	SE	F-Ratio	Cum. Increase		
Included	Coeff.#	of	Individual	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
	B	Variables				
WENVIRON	-.051	.033*	2.37	.024	.024	2.37
WENVIRON	-.060	.032**	3.64	.119	.095	6.42***
ORGANICY	.530	.166***	10.23***			
WENVIRON	-.333	.136***	6.01**	.157	.038	5.84***
ORGANICY	-.726	.630	1.34			
INTERACTION	.055	.026**	4.25**			

\* t-significance level indicated by stars  
 \*p=.1 \*\*p=.05 \*\*\*p=.01 \*\*\*\*p=.001

The range for organicity was 1 - 7; as 6.05 falls within this range, the effect of environmental uncertainty on task support is nonlinear for subunits in service organizations.

Since B3 is positive and significant, this implies that increases in environmental uncertainty influence the norms of Task Support positively for service organization subunits with an organicity index higher than 6.05. Likewise, increases in environmental uncertainty will negatively influence the norms of Task Support for organizational subunits with organicity indices lower than 6.05. The maximum value for organicity is 7, thus 6.05 would indicate a subunit that exhibits the extensive use of loose informal control measures; an emphasis on getting things done even if this means disregarding formal procedures; an emphasis on adapting freely to changing circumstances regardless of past practice; allowing the expert to have the most say in a given situation and the open flow of important information throughout the unit. In subunits that have all or almost all of these characteristics, the norms of task support are enhanced when the subunit is facing increased rates of change and complexity and decreased resources in its environment. If the subunit is not wholly organic, then these same changes will negatively influence the norms of task support.

Thus for subunits in service businesses, Hypotheses 1a and 2a are supported. The results of these tests are graphically presented in Figure 4.



$$TS = -.333 \text{ WENVIRON} + .055 \text{ WES}$$

$$dY/dX_1 = -.333 + .055 (\text{ORGANICITY})$$

$$-b_1/b_3 = .333/.052 = 6.05$$

FIGURE 4

GRAPHIC REPRESENTATION OF RESULTS OF TASK SUPPORT  
HYPOTHESES (SERVICE SUBGROUP)

### 5.32 Task Innovation Hypotheses

H3o

Under conditions of low organicity, there will be no relationship between environmental uncertainty and task Innovation.

H3a

Under conditions of low organicity, the relationship between environmental uncertainty and task Innovation is negative

H4o

Under conditions of high organicity, there will be no relationship between environmental uncertainty and task Innovation.

H4a

Under conditions of high organicity, the relationship between environmental uncertainty and task Innovation is positive.

Results for these hypotheses are shown in Table 5.14. For the entire sample, the interaction term  $b_3 = .03$  was significant at the  $p = .08$  level of significance. Therefore, the following equations were used to test for interaction.

$$TI = 7.11 - .039 \text{ WENVIRON}$$

$$TI = 4.39 - .050 \text{ WENVIRON} + .589 \text{ ORGANICY}$$

$$TI = 8.101 - .219 \text{ WENVIRON} - .154 \text{ ORGANICY} + .034 \text{ WES}$$

The equation to be used to test for monotonicity is:

$$TI = -.219 \text{ WENVIRON} + .034 \text{ WES}$$

$$O = .219 / .034 = 6.4$$

The range for organicity was 1 - 7; as 6.4 falls within this range, the effect of environmental uncertainty on task innovation is nonlinear.

Since B3 is positive and significant, this implies that increases in environmental uncertainty impact the norms of task innovation positively for organizational subunits with an organicity index higher than 6.4. Likewise, increases in environmental uncertainty will negatively impact the norms of task innovation for organizational subunits with organicity indices lower than 6.4. The maximum value for organicity is 7, thus 6.4 would indicate a wholly organic subunit (see description p. 117). In subunits that have organic characteristics, the norms of task innovation are enhanced when the subunit is facing increased rates of change and complexity and decreased resources in its environment. If the subunit is not wholly organic, then these same changes will have a negative influence on the norms of task innovation.

Thus, hypotheses 3a and 4a are supported for the entire sample. The results of these tests are graphically presented in Figure 5.

Secondary analysis was conducted with the two subgroups: service and manufacturing businesses. The interaction term was not significant for the manufacturing group (B3 = -.018; p = .64). Summary statistics for the service and manufacturing subgroups are in Table 5.14.

TABLE 5.14  
 MODERATED REGRESSION ANALYSIS: TASK INNOVATION

## TOTAL SAMPLE

Variables	Reg.	SE of	F-Ratio	Individual	Increase	Cum.
Included	Coeff. #	B	Variables	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
WENVIRON	-.040	.021**	3.59*	.019	.019	3.59*
WENVIRON	-.050	.019***	6.51***	.139	.158	17.36****
ORGANICY	.589	.107***	30.57****			
WENVIRON	-.219	.098**	4.94**	.014	.171	12.72****
ORGANICY	-.154	.437	.123			
INTERACTION	.034	.019**	3.061*			

## MANUFACTURING SUBGROUP

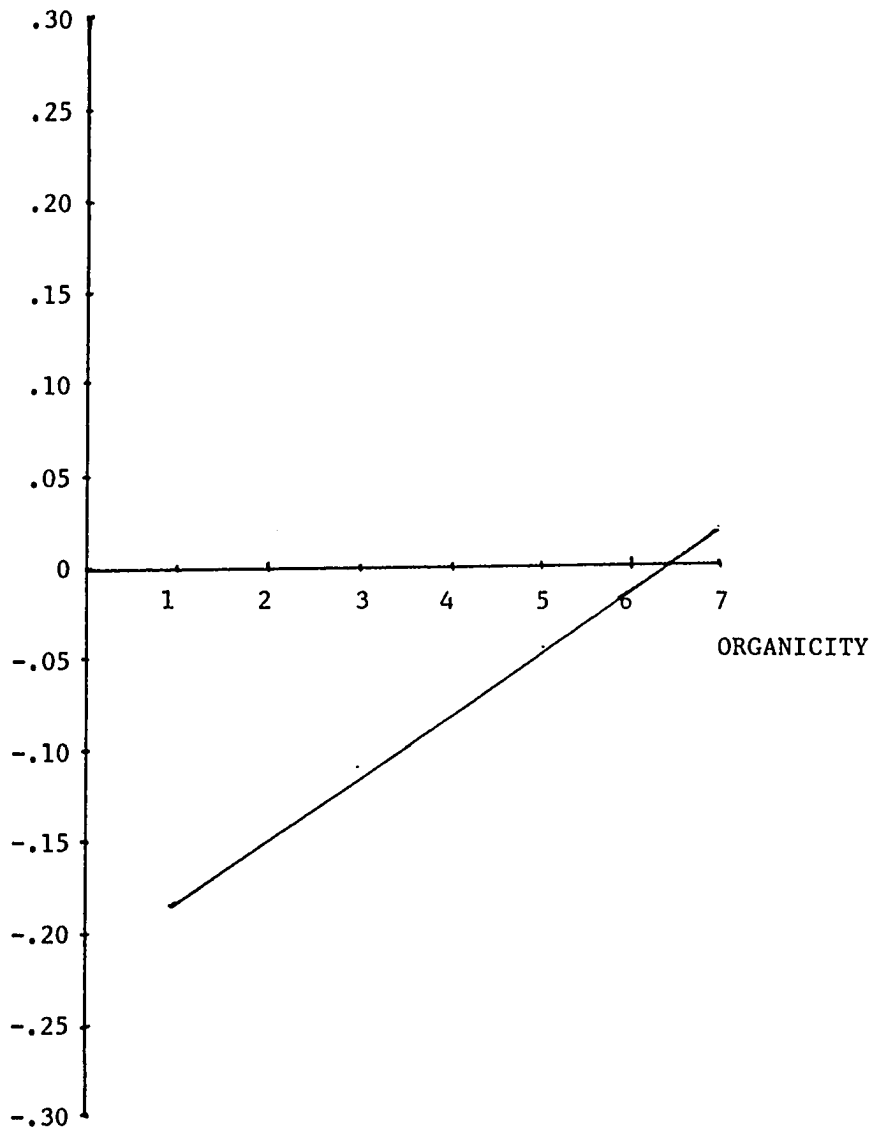
Variables	Reg.	SE of	F-Ratio	Individual	Increase	Cum.
Included	Coeff. #	B	Variables	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
WENVIRON	-.047	.031*	2.31	.026	.026	2.31
WENVIRON	-.051	.030*	2.87*	.076	.102	4.95***
ORGANICY	.489	.179***	7.42****			
WENVIRON	.040	.198	.041	.002	.104	3.34**
ORGANICY	.867	.834	1.080			
INTERACTION	-.018	.038	.216			

## SERVICES SUBGROUP

Variables	Reg.	SE of	F-Ratio	Individual	Increase	Cum.
Included	Coeff. #	B	Variables	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
WENVIRON	-.033	.029	1.277	.013	.013	1.27
WENVIRON	-.046	.026**	3.113*	.219	.233	14.44****
ORGANICY	.705	.135****	27.24****			
WENVIRON	-.302	.110***	7.57***	.044	.277	12.02****
ORGANICY	-.477	.509	.876			
INTERACTION	.052	.022***	5.76**			

\* t-significance level indicated by stars  
 \*p=.1 \*\*p=.05 \*\*\*p=.01 \*\*\*\*p=.001

$$\frac{\delta dY \text{ (Task Innovation)}/All}{dX_1 \text{ (Environmental Uncertainty)}}$$



$$TI = -.219 \text{ WENVIRON} + .034 \text{ WES}$$

$$dY/dX_1 = -.219 + .034 \text{ ORGANCITY}$$

$$-b_1/b_3 = .219/.034 = 6.44$$

FIGURE 5

GRAPHIC REPRESENTATION OF RESULTS OF TASK INNOVATION  
HYPOTHESES (ALL RESPONDENTS)

For the service subgroup, the interaction term was quite significant ( $B3 = .052$ ;  $p = .02$ ). To test for interaction the following equations were used.

$$TI = 6.99 - .032 \text{ WENVIRON}$$

$$TI = 3.86 - .046 \text{ WENVIRON} + .705 \text{ ORGANICY}$$

$$TI = 9.639 - .302 \text{ WENVIRON} - .477 \text{ ORGANICY} + .052 \text{ WES}$$

The equation to be used to test for monotonicity is:

$$TI = -.302 \text{ WENVIRON} + .052 \text{ WES}$$

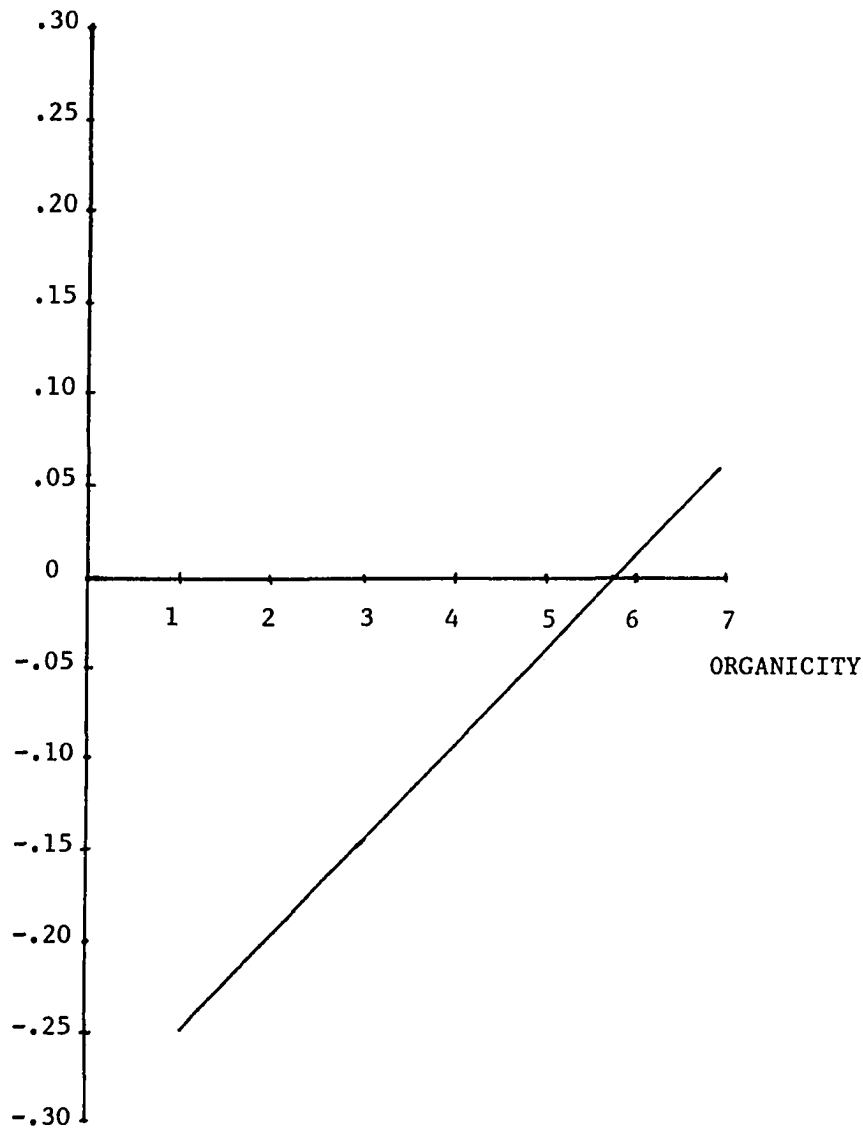
$$O = .302 / .052 = 5.81$$

Since  $B3$  is positive and significant, this implies that increases in environmental uncertainty impact the norms of Task Innovation positively for organizational subunits with an organicity index higher than 5.81. Likewise, increases in environmental uncertainty will negatively impact the norms of Task Innovation for organizational subunits with organicity indices lower than 5.81. The maximum value for organicity is 7, thus 5.81 would indicate an almost wholly organic subunit (see description p. 117). In subunits that have at least 6 of the 7 organic characteristics, the norms of task innovation are enhanced when the subunit is facing increased rates of change and complexity and decreased resources in its environment. If the subunit is not wholly or almost wholly organic, then these same changes will have a negative influence on the norms of task innovation.

Thus, hypotheses 3a and 4a are supported for the service subgroup. The results of these tests are graphically presented in Figure 6.



$$\frac{\sigma_{dY}(\text{Task Innovation})/\text{Services}}{dX_1(\text{Environmental Uncertainty})}$$



$$TI = -.302 \text{ WENVIRON} + .052 \text{ WES}$$

$$dY/dX_1 = -.302 + .052 (\text{ORGANICITY})$$

$$-b_1/b_3 = .302/.052 = 5.8$$

FIGURE 6

GRAPHIC REPRESENTATION OF RESULTS OF TASK INNOVATION  
HYPOTHESES (SERVICE SUBGROUP)

### 5.33 Social Relationship Hypotheses

#### H5o

Under conditions of low organicity, there will be no relationship between environmental uncertainty and social relationships.

#### H5a

Under conditions of low organicity, the relationship between environmental uncertainty and social relationships is negative.

#### H6o

Under conditions of high organicity, there will be no relationship between environmental uncertainty and social relationships.

#### H6a

Under conditions of high organicity, the relationship between environmental uncertainty and social relationships is positive.

Results for these hypotheses are shown in Table 5.15.

The interaction term was  $b_3 = .003$ . The significance level of this term was  $p = .9$ . Therefore these hypotheses are not supported. Also, there was not a significant main effect of environmental uncertainty in Equation 1 or 2.

TABLE 5.15  
MODERATED REGRESSION ANALYSIS: SOCIAL RELATIONSHIPS

## TOTAL SAMPLE

Variables	Reg.	SE of	F-Ratio Individual	Increase	Cum.	
Included	Coeff. #	B	Variables	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
WENVIRON	-.021	.025	.669	.004	.004	.67
WENVIRON	-.029	.024	1.43	.070	.074	7.42****
ORGANICY	.502	.134****	14.12****			
WENVIRON	-.045	.125	.13	.000	.074	4.92**
ORGANICY	.436	.553	.62			
INTERACTION	.003	.024	.015			

## MANUFACTURING SUBGROUP

Variables	Reg.	SE of	F-Ratio Individual	Increase	Cum.	
Included	Coeff. #	B	Variables	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
WENVIRON	-.018	.038	.24	.003	.003	.236
WENVIRON	-.022	.037	.36	.055	.058	2.70*
ORGANICY	.503	.222**	5.15**			
WENVIRON	.035	.245	.021	.000	.058	1.80
ORGANICY	.741	1.031	.517			
INTERACTION	-.011	.047	.056			

## SERVICES SUBGROUP

Variables	Reg.	SE of	F-Ratio Individual	Increase	Cum.	
Included	Coeff. #	B	Variables	R <sup>2</sup>	R <sup>2</sup>	F(Eqn)
WENVIRON	-.021	.034	.35	.004	.004	.35
WENVIRON	-.031	.033	.86	.010	.104	5.48***
ORGANICY	.564	.173****	10.58****			
WENVIRON	-.058	.145	.160	.000	.104	3.63**
ORGANICY	.438	.674	.423			
INTERACTION	.006	.028	.037			

\* t-significance level indicated by stars

\*p=.1 \*\*p=.05 \*\*\*p=.01 \*\*\*\*p=.001

### 5.34 Cognitive Style Hypotheses

The results of tests for the cognitive style hypotheses (90 through 11a) are presented in Tables 5.16 to 5.20. Restatement of these hypotheses are placed prior to each of these Tables. These hypotheses were tested via the Chi-square contingency table technique which is suitable for investigating the independence of variables in cross classifications.

As can be seen from these tables, none of the hypotheses were supported. A secondary analysis was conducted with manufacturing and service subgroups. The hypotheses were not supported in either of these subgroups.

Reynolds (1977) suggests many ways to descriptively analyze contingency tables. One technique that will be employed in describing relationships among the variables in the following contingency tables is referred to as the cross-product ratio, often called the odds ratio. More precisely the odds are calculated by comparing the actual count in dichotomous classifications. For example, in Table 5.16, the odds of an ST perceiving a certain environment is  $36/27=1.33$ ; while the odds of an NT perceiving a certain environment are  $37/33=1.12$ . The odds ratio then is  $1.33/1.12=1.18$ . The ratio of the odds has a simple interpretation. If they are the same in both categories, their ratio would equal 1.0. Hence 1.0 indicates no relationship. The range of the ratio is from zero to infinity. Values less than 1.0 imply a negative

relationship, while values greater than one indicate a positive relationship. The greater the departure from 1.0, the stronger the relationship. The symbol "a" will be used to denote the odds ratio. Therefore, in the above example, with  $a=1.12$ , the relationship between cognitive style and level of uncertainty is positive, but very weak.

Each type of cultural norm was divided into a high and low group. The high group consisted of scores above the mean for that measure and the low group consisted of scores below the mean on that particular measure. Given a skewed sample, the mean rather than the median was chosen to split the sample. Thus the choice of the mean provides a better conceptual split of the variables into high and low groups.

In the Tables, the following notation is used:

TSLEVEL = Task Support; TILEVEL = Task Innovation; and  
SRLEVEL = Social Relationships.

H9o

There is no significant difference in the perception of conditions of environmental uncertainty between the four cognitive styles of managers: ST, NT, NF and SF.

H9a

There is a significant difference in the perception of conditions of environmental uncertainty between the four cognitive styles of managers: ST, NT, NF and SF.

TABLE 5.16  
CROSSTABULATION OF UNCERTAINTY BY COGNITIVE STYLE

<u>UNCERTAINTY</u>	<u>COGNITIVE STYLE</u>				row total
	ST	NT	NF	SF	
More Certain	36	37	20	4	97
	37%	38%	21%	4%	51.6%
	57%	53%	46%	36%	
Less Certain	27	33	24	7	91
	30%	36%	26%	8%	48.4%
	43%	47%	54%	64%	
column total	63	70	44	11	188
	33.5%	37.2%	23.4%	5.9%	100%

Chi-square = 2.51                      p=.474

Chi-square = 2.51 and is not significant at the  $p = .1$  level. Therefore, hypothesis 90 cannot be rejected. Theory suggests that a higher number of NTs and NFs would be predominant in the uncertain environments (Mitroff, 1983; Mitroff and Kilmann, 1976), while the greatest percent of STs would be found in more certain environments. The odds ratio is 1.3 between STs and the combined group of NTs and NFs; however taken separately, the odds ratio is close to 1.0 indicating statistical independence. In fact, it should be noted that there appears to be a fairly even distribution based on percent. Table 5.28 in Appendix C contains additional statistics on these analyses.

## H10o

There is no significant difference between the cognitive style (ST, NT, NF and SF) of managers and conditions (high/low) of organicity.

## H10a

There is a significant difference between the cognitive style (ST, NT, NF and SF) of managers and conditions (high/low) of organicity.

As shown in Table 5.17, Chi-square = 1.41 and is not significant at the  $p = .1$  level. Therefore, hypothesis 10o cannot be rejected. Theory suggests that a higher number of STs would be predominant in organizations with more mechanistic structures (Mitroff, 1983), while the greatest percent of NFs would be in organizations with more organic structures. The odds ratio is 1.0 between STs and NFs. This indicates statistical independence. However, the odds ratio for STs and NTs is 1.5, indicating that the odds for NTs being in an organic subunit are 1.5 times greater than that for STs. Table 5.29 in Appendix C contains additional statistics on these analyses.

TABLE 5.17  
CROSSTABULATION OF ORGANICITY BY COGNITIVE STYLE

<u>STRUCTURE</u>	<u>COGNITIVE STYLE</u>				row
	ST	NT	NF	SF	total
Less Organic	30	28	21	6	85
	35%	33%	25%	7%	45.2%
	48%	40%	48%	55%	
Organic	33	42	23	5	103
	32%	41%	22%	5%	54.8%
	52%	60%	52%	45%	
column total	63	70	44	11	188
	33.5%	37.2%	23.4%	5.9%	100%

Chi-square = 1.41    p=.702

#### H11o

There is no significant difference between the cognitive style (ST, NT, NF and SF) of managers and the type of organization culture norms: task support, task innovation, social relationships and personal freedom.

#### H11a

There is a significant difference between the cognitive style (ST, NT, NF and SF) of managers and the type of organization culture norms: task support, task innovation, social relationships and personal freedom.



TABLE 5.18

## CROSSTABULATION OF TASK SUPPORT BY COGNITIVE STYLE

<u>TSLEVEL</u>	<u>COGNITIVE STYLE</u>				row total
	ST	NT	NF	SF	
Low TS	13	15	13	1	42
	31%	36%	31%	2%	22.3%
	21%	21%	30%	9%	
High TS	50	55	31	10	146
	34%	38%	21%	7%	77.7%
	79%	79%	70%	91%	
column total	63	70	44	11	188
	33.5%	37.2%	23.4%	5.9%	100%

Chi-square = 2.57      p=.463

Chi-square is not significant at the  $p = .1$  level; therefore, H11o is not rejected for task support. Seventy-eight percent of all respondents exhibited high levels of task support. The largest grouping was in the NT/high TS block, with 55 respondents. This hypothesis was exploratory in nature; while it was expected that there would be a relationship between the two variables, the content of this relationship was not projected. The fact that there is no relationship is important information as this may have implications for future theorizing and study. Table 5.30 in Appendix C contains additional statistics for these analyses.

TABLE 5.19  
CROSSTABULATION OF TASK INNOVATION BY COGNITIVE STYLE

<u>TILEVEL</u>	<u>COGNITIVE STYLE</u>				row total
	ST	NT	NF	SF	
Low TI	16	21	13	4	54
	30%	39%	24%	7%	28.7%
	25%	30%	30%	36%	
High TI	47	49	31	7	134
	35%	37%	23%	5%	71.3%
	75%	70%	70%	64%	
column total	63	70	44	11	188
	33.5%	37.2%	23.4%	5.9%	100%

Chi-square = .724      p = .867

Chi-square is not significant at  $p = .1$  level; therefore,  $H_{110}$  is not rejected for task innovation. Seventy-one percent of all respondents exhibited high levels of task innovation. The largest grouping was in the NT/high TI block, with 49 respondents. This accounts for 26% of the sample. Twenty-five percent of the sample were in the ST/high TI block. As intuitive types display inventive and unconventional behavior, it is not surprising that 42% (NTs + NFs) of the total sample exhibit high levels of task innovation norms and also possess the intuitive data input mode. Table 5.31 in Appendix C contains additional statistics for these analyses.

TABLE 5.20  
CROSSTABULATION OF SOCIAL RELATIONSHIPS BY COGSTYLE  
COGNITIVE STYLE

	ST	NT	NF	SF	row total
<u>SRLEVEL</u>					
Low SR	26	21	12	5	64
	41%	33%	19%	8%	34%
	41%	30%	27%	45%	
High SR	37	49	32	6	124
	30%	40%	26%	5%	66%
	59%	70%	73%	55%	
column total	63	70	44	11	188
	33.5%	37.2%	23.4%	5.9%	100%

Chi-square =3.51                      p=.319

Chi-square is not significant at  $p = .1$  level; therefore,  $H_{110}$  is not rejected for social relationships. Sixty-six percent of all respondents exhibited strong positive norms for social relationships. The largest grouping was in the NT/high SR block, with 49 respondents. This accounts for 26% of the sample. Twenty percent of the sample were in the ST/high SR block. As the feeling types are warm, personal and concerned with people's feelings, it would be expected that the majority of respondents with the F component would also exhibit strong social relationship norms. It should be noted that indeed 73% of the NFs and 55% of the SFs exhibit

high SR. However, 70% of the NTs and 59% of the STs also exhibit strong social relationship norms. Table 5.32 in Appendix C contains additional statistics for these analyses.

The following table summarizes the significance statistics for each type of cultural norm as stated in the above crosstabulation tables.

TABLE 5.21  
SUMMARY STATISTICS FOR COGNITIVE STYLE HYPOTHESES

	CHI-SQUARE	SIGN.	LAMBDA
Task Support	2.57	.46	.00
Task Innovation	.72	.86	.00
Social Relationships	3.51	.32	.04

As none of the predicted associations was significant, the Lambda statistic which is a measure of predictability, was not appropriate to test. For complete statistics see Tables 5.30 to 5.32 in Appendix C.

Due to the lack of significant findings for the above hypotheses, additional crosstabulations were conducted in an attempt to search out any significant relationships that cognitive style may have with other variables that were not in the original hypotheses. When level of position in the company and cognitive style were crosstabulated a Chi-square of 11.41 ( $p=.08$ ) was obtained.

TABLE 5.22  
LEVEL OF POSITION BY COGNITIVE STYLE

<u>COGSTYLE</u>	<u>POSITION</u>			row total
	CEO	VP	DIR	
ST	9	18	36	63
	14%	29%	57%	34%
	36%	30%	35%	
NT	12	30	28	70
	17%	43%	40%	37%
	48%	49%	28%	
NF	3	11	30	44
	7%	25%	68%	23%
	12%	18%	29%	
SF	1	2	8	11
	9%	18%	73%	6%
	4%	3%	8%	
column total	25	61	102	188
	13.3%	32.4%	54.3%	100%

Chi-square = 11.41      p=.08

The results of this analysis indicate a statistically significant association between job level and cognitive style. Top management (CEOs and VPs) are predominantly intuitive/thinking types in small high growth companies.

Forty-eight percent of the CEOs and forty-nine percent of the VPs are NTs, while only twenty-eight percent of the directors are NTs. Directors, on the other hand are predominantly sensing/thinking types (i.e. 57%).

A second significant finding was obtained when the decision making dimension (T vs F) was crosstabulated with the level of the position of the respondent (i.e. CEO, VP or Director) as shown in Table 5.23.

TABLE 5.23  
LEVEL OF POSITION BY DECISION MAKING DIMENSION

<u>COGSTYLE</u>	<u>POSITION</u>			row total
	CEO	VP	DIR	
F	4	13	38	55
	7%	24%	69%	29%
	16%	21%	37%	
T	21	48	64	133
	16%	36%	48%	71%
	84%	79%	63%	
column total	25	61	102	188
	13.3%	32.4%	54.3%	100%

Chi-square = 7.14      p=.03

The Chi-square was 7.14 ( $p=.03$ ). 84% of the CEOs, 79% of the VPs and 63% of the directors were thinking types. Overall 71% of the respondents exhibited the thinking type preference. Tables 5.33-34 In Appendix contain additional statistics for these analyses.

### 5.35 Organicity Hypotheses

#### H12o

There is no significant difference between the organicity (high/low) of an organizational subunit and the perceived environmental uncertainty (high/low) of that organizational subunit.

#### H12a

There is a significant difference between the organicity (high/low) of an organizational subunit and the perceived environmental uncertainty (high/low) of that organizational subunit.

Chi-square of 1.14 is not significant at  $p = .1$ ; therefore, H12o is not rejected. Theory would predict that less organic structures would be predominant in certain environments and organic structures in uncertain environments. While the association was not significant, the trend in percent is in the expected direction. That is, the largest grouping is in the organic/uncertain block.

TABLE 5.24  
CROSSTABULATION OF ORGANICITY BY UNCERTAINTY

<u>STRUCTURE</u>	<u>UNCERTAINTY</u>		row total
	More Certain	Less certain	
Less Organic	48	37	85
	57%	44%	45.2%
	50%	41%	
Organic	49	54	103
	48%	52%	54.8%
	50%	59%	
column total	97	91	188
	51.6%	48.4%	100%

Chi-square =1.14      p=.29

Also, 57% of the less organic subunits are in relatively certain environments. Table 5.35 in Appendix C contains additional statistics for these analyses. It is possible that this association cannot be properly tested with the current sample. Since the mean of organicity was 5.01, there are actually very few cases in which the subunit can properly be called "mechanistic"

#### 5.4 Organicity and Cultural Norms Results

The previous sections (5.31 to 5.35) have reported the results of the hypotheses testing. While examining these results, for example, equation two in the moderated regression analysis, and the Pearson correlation between



organicity and the types of culture norms (TS, TI, SR), it became apparent that a relationship existed between organicity and each type of cultural norm.

To further investigate this relationship between organicity and the norms of task support, task innovation and social relationships, the sample was divided into two groups: higher and lower organicity based on the mean of this variable for the total sample. The high group contains those who were above the mean on the variable of organicity; this group has the characteristics of a more organic structure. The low group was below the mean (5.01) on organicity and is referred to as less organic and has the characteristics of a more mechanistic structure (although most subunits in the lower half cannot truly be called mechanistic). Chi-squares were obtained to test if individuals in organic versus less organic subunits perceived the norms of task support, task innovation and social relationships differently. Also, each of the types of culture norms were divided into high and low groups based on their respective means (see page 99).

When the variable Task Support is crosstabulated with organicity, the following contingency table results. The Chi-square is significant at  $p=.03$ , indicating a strong relationship between the variables.

TABLE 5.25  
CROSSTABULATION OF TASK SUPPORT BY ORGANICITY

<u>TSLEVEL</u>	<u>STRUCTURE</u>		row total
	Less Organic	Organic	
Low TS	25	17	42
	60%	40%	22.3%
	29%	17%	
High TS	60	86	146
	41%	59%	77.7%
	61%	83%	
column total	85	103	188
	45.2%	54.8%	100%

Chi-square =3.76      p=.03

An examination of the tabulation shows that the largest group (45.7%) was in the organic/high task support block. Also an examination of the percent indicates that as the structure of the subunit moves from less organic to organic, there is a corresponding shift to a larger percentage of high levels of task support. The odds ratio is 2.1 indicating a strong positive relationship between structure and task support. The odds are twice as great for an individual to exhibit high levels of task support norms in an organic subunit when compared to a less organic subunit. Table 5.36 in Appendix C contains additional statistics on these analyses.

Task Innovation, when crosstabulated with high/low levels of organicity, also has a significant Chi-square ( $p=.009$ ). The significance level of Task Innovation with organicity is much stronger than that of either Task Support ( $p=.03$ ) or Social Relationships ( $p=.09$ ).

TABLE 5.26  
CROSSTABULATION OF TASK INNOVATION BY ORGANICITY  
STRUCTURE

	Less organic	Organic	row total
<u>TILEVEL</u>			
Low TI	33	21	54
	61%	39%	28.7%
	39%	20%	
High TI	52	82	134
	39%	61%	71.3%
	61%	80%	
column total	85	103	188
	45.2%	54.8%	100%

Chi-square =6.86       $p=.009$

An examination of the tabulation in Table 5.26 shows that the largest grouping (43.6%) were in the organic/high task innovation block. Also an examination of the percent indicates that as the structure of the subunit moves from less organic to organic, there is a corresponding shift to a larger percentage of high levels of task innovation. The odds ratio is 2.5 indicating a strong positive relationship

between structure and task innovation. The odds are two and one-half times as great for an individual to exhibit high levels of task innovation in an organic subunit when compared to a less organic subunit. Table 5.37 in Appendix C contains additional statistics for these analyses.

When the variable Social Relationships is crosstabulated with organicity, the following contingency table results. The Chi-square is significant at  $p=.085$ ; indicating a significant relationship between the variables. The relationship of organicity and Social Relationships isn't statistically as significant as that of Task Support and much less than that of Task Innovation.

TABLE 5.27  
CROSSTABULATION OF SOCIAL RELATIONSHIPS BY ORGANICITY  
STRUCTURE

	Less Organic	Organic	row total
<u>SRLEVEL</u>			
Low SR	35	29	64
	67%	33%	34%
	41%	28%	
High SR	50	74	124
	40%	60%	66%
	59%	72%	
column total	85	103	188
	45.2%	54.8%	100%
	Chi-square =2.96	p=.085	

An examination of the tabulation shows that the largest grouping (39.4%) was in the organic/high social relationships block. Also, an examination of the percent indicates that as the structure of the subunit moves from less organic to organic, there is a corresponding shift to a larger percentage of high levels of social relationships. The odds ratio is 2.1 indicating a strong positive relationship between structure and social relationships. The odds are twice as great for an individual to exhibit high levels of social relationships in an organic subunit when compared to a less organic subunit. Table 5.38 in Appendix C contains additional statistics for these analyses.

These results, high levels of task support and task innovation in organic structures, are in line with findings of the classic studies on the properties of organic versus mechanistic structures. The significance of finding this relationship in small high growth companies is the fact that small, rather than large organizations were studied. Therefore, the contribution to the management literature is that type of structure is just as important in small companies as it is in large companies, if management desires high levels of task support and innovation.

#### 5.5 Summary of Findings

For the total sample of businesses, it was found that as environmental uncertainty increases for those organization subunits that exhibit an organicity index of

6.4 or higher, there is a positive relationship with task innovation. For those organization subunits that have an organicity index lower than 6.4, increases in environmental uncertainty will negatively influence the norms of task innovation.

When the total sample is divided into service and manufacturing subgroups, it was found that as environmental uncertainty increases for service organization subunits that exhibit an organicity index of 6.05 or higher, there is a positive relationship with task support. For those organization subunits that have an organicity index lower than 6.05, increases in environmental uncertainty will negatively impact the norms of task support. It was also found that as environmental uncertainty increases for service organization subunits that exhibit an organicity index of 5.81 or higher, there is a positive relationship with task innovation. For those organization subunits that have an organicity index lower than 5.81, increases in environmental uncertainty will negatively impact the norms of task innovation.

None of the hypothesized relationships with cognitive style were supported. Further investigation revealed a significant association between cognitive style and level of position in the company. Top management (CEOs and VPs) are predominantly intuitive/thinking types.

No hypotheses were offered that focused on each factor of the information input dimension (sensing/thinking) and decision-making dimension (thinking/feeling). When these factors were crosstabulated with level of position in the company separately, it was found that a majority of the respondents at all levels were thinking types.

No hypotheses were offered that focused on only organicity and task support, task innovation and social relationships. Yet there was a significant association found for each type of culture norm. High levels of task support, task innovation and social relationships are found in organic subunits while low levels of each are found in less organic subunits.

No hypotheses were offered that focused on just the association between uncertainty and task support, task innovation and social relationships. However, high levels of task support are significantly associated with certain environments in manufacturing businesses. Also, high levels of task innovation are significantly associated with uncertain environments in manufacturing businesses.

In the next chapter, the theoretical significance of these findings is explored.

## 6.0 DISCUSSION, LIMITATIONS AND CONCLUSIONS

This chapter begins with a discussion and interpretation of the results reported in Chapter 5. The conclusions drawn are tentative because of the limitations of this research, which are discussed in section 6.2. A summation of this study and recommendations for further research are contained in section 6.3.

### 6.10 Discussion

There are six broad conclusions based on the results reported in Chapter 5 regarding small high growth businesses.

(1) Perceived environmental uncertainty, as measured by dynamism, complexity, and munificence, has a strong effect and significant interaction effects with organicity on some types of cultural norms.

Perceptual measures were used in the data analyses that evaluated the relationships and associations between the variables: environmental uncertainty, organicity, cognitive style and types of cultural norms (task support, task innovation and social relationship).

This study was interested specifically in the dependency of each of the variables on the others rather than the causal relationships between them. Therefore, the primary interest is in the interaction effect (i.e. does



organizational structure enhance the dependency between environmental uncertainty, and norms of task support, task innovation or social relationships?).

A significant interaction term was found for cultural norms of task support and task innovation in service subunits. This means that the relationship between environmental uncertainty and task innovation or task support changes as a certain level of organicity is reached. More specifically, when the organizational subunit is highly organic (6.05 for task support; 5.81 for task innovation on a 7-point scale), increases in environmental uncertainty are positively related to these cultural norms. For organicity levels lower than 6.05 or 5.81 respectively, increases in environmental uncertainty are negatively related to task support and task innovation.

Environmental uncertainty was comprised of munificence, complexity and dynamism. Munificence measured the importance and scarcity/plentifulness of resources available to the organizational subunit. Complexity measured the importance and the degree of diversification, number of competitors, customer buying habits and differences in the input necessary for producing primary product or service. Dynamism measured the importance of and the rates of change in marketing practices, obsolescence of products/services, competitors' actions, consumer demands and production/service technologies. Uncertain environments are characterized by scarcity and above average levels of

complexity and dynamism. Certain environments are characterized by plentifulness and below average levels of complexity and dynamism.

A highly organic organizational subunit exhibits the following characteristics: the extensive use of loose informal control measures; an emphasis on getting things done even if this means disregarding formal procedures; an emphasis on adapting freely to changing circumstances regardless of past practice; allowing the expert to have the most say in a given situation, and an open flow of important information throughout the unit. It is when these characteristics are found in abundance that increasing levels of environmental uncertainty positively influence the norms of task innovation and task support.

The mean of task support is 5.89, which is close to the maximum score (7) for this variable. High levels of task support indicate that work groups cooperate and support each others' work, share information, complete all tasks, and assign work fairly. Therefore, finding that a high level of organicity acts as a quasi-moderator in the relationship between environmental uncertainty and task support is supportive of the theory of other researchers.

Burns and Stalker (1961), in their description of organic structures, pointed out that this type of structure is found in successful organizations facing uncertain environments. They indicated that an organic structure would enhance work group cooperation, sharing of information

and completion of tasks. Argyris (1962) purported that bureaucratic (i.e. mechanistic) values tend to stress the rational, task aspects of the work and to ignore the human factors that relate to the task. This may lead to poor, mistrustful relationships among the managerial class which in turn could decrease the effectiveness of the organization (Bennis, 1966). Shepard and Blake (1962) compared the normative goals of mechanistic and organic systems. Characteristics of the organic system are: good relationships between and within groups; mutual confidence and trust; interdependencies and shared responsibility; multigroup membership and responsibility; wide sharing of control and responsibility; and conflict resolution through bargaining or problem solving. Finally, Davis (1981) contended that a strong culture, in the absence of carefully formulated systems and structures, can play an important role in improving the coordination of work between units in the same organization.

Thus, one can tentatively infer that under conditions of increasing environmental uncertainty, service subunits should try to maintain highly organic structures if they desire high levels of task support. However, it should be cautioned, while the interaction term was not weak ( $p=.04$ ), the correlation between organicity and task support (.186) was significant ( $p=.05$ ). It may be that the variance accounting for the significant interaction term is due primarily to organicity.

The mean on task innovation is 6.26 which is close to the maximum score (7) for this variable. High levels of task innovation indicate that work groups encourage creativity, will make changes, encourage and put new ideas into practice and are willing to take on new tasks. Therefore, finding that a high level of organicity acts as a quasi-moderator in the relationship between environmental uncertainty and task innovation is in line with the theory of other researchers as shown in the following paragraphs.

Empirical innovation literature has demonstrated an association between decentralized and informal organizational structures and increased levels of innovation. Burns and Stalker (1961) describe a contingent relationship between structure and the external environment. In their perspective, uncertain environments necessitate organic structures and innovation. They found that organic organizations were better innovators than mechanistic organizations, that is, the relationship between organic structures and innovation was positive. Lawrence and Lorsch (1967) adopt a similar perspective, pointing out that decentralized, less formalized (i.e. organic) organizational subunits are more effective at responding to change in uncertain environments than more formalized (mechanistic) units.

Meadows (1980), utilizing an experimental setting to operationalize this concept, also found that organicity was strongly and positively correlated with innovativeness in the performance of small group tasks.

Kanter (1983) found that innovation is an outcome of both structural variables and cultural variables. In Kanter's view, innovative cultures are characterized by freedom and looseness which encourage creativity and risk taking within the organization.

Thus, one can tentatively infer that under conditions of increasing environmental uncertainty, service subunits should try to maintain highly organic structures if they desire high levels of task innovation. However, it should be cautioned, while the interaction term was significant ( $p=.02$ ), the correlation between organicity and task innovation (.358) was highly significant ( $p=.001$ ). It may be that the variance accounting for the significant interaction term is due primarily to organicity.

The distribution for organicity is negatively skewed. This indicates that the hump of the distribution curve for the scores on organicity is to the right of center when compared to a normal distribution curve. Therefore, there is a possibility that the findings stated above indicate a threshold effect in the relationship among environmental uncertainty, organicity and the norms of task support and task innovation.

In order to respond to increasing environmental uncertainty with a greater emphasis on norms of task support and task innovation, the organization needs to be almost totally characterized by an organic structure. If the organization is just moderately (or even largely) organic, its managers who perceive a highly uncertain environment are also likely to exhibit lower support for norms of task support and task innovation. That is, in these situations, work groups may not be as cooperative, share as much information or be as supportive of each others' work. Likewise, work groups may not encourage creativity or be as willing to make changes or implement new ideas.

An interesting question arises about the functionality of these observed relationships for organizations. Scholars who support the organic form of structure as the most effective way of responding to environmental uncertainty might argue that the presence of any mechanistic features in the organizational structure is dysfunctional, allowing managers to tighten bureaucratic, authoritative controls in times of great uncertainty and thus freezing out the task support and innovativeness that could help steer the organization through difficult, uncertain environmental situations.

One could also argue, however, that the observed nonlinear relationship may be functional for some organizations. If the organization is not fully organic, a

tightening of controls under conditions of high uncertainty and a corresponding reduction in task support and innovation norms may be just what the organization needs to survive.

In fact, Bourgeois, et al (1981) reported on three studies (see page 57) designed to test the hypothesis that: managers encountering turbulent environments will react by becoming more mechanistic and managers encountering more stable environments will react by becoming more organic. They found support for this hypothesis. An explanation offered by the researchers for these results was that companies facing turbulence may want to exercise greater control over subordinates because they aren't equipped to deal with uncertainty in any other way. Likewise, in times of stability, there is not as much concern with uncertainty, therefore, companies allow subordinates more freedom and flexibility.

The implication seems to be that if the organization is not wholly organic, norms of task support and task innovation will be weaker or less consistent than they would be in a fully organic organization. If these norms are weaker or inconsistent, then managers encountering uncertain environments may exercise greater control because they do not have the necessary higher level of norms of task support and innovation present which may help them survive.

(2) The subunit's type of business may impact the relationship between environmental uncertainty, organicity and some types of culture norms.

Contrary to what one might expect, in this sample there are more organic subunits in manufacturing than in service businesses. In the service sector 45% (44) of the subunits are organic, compared to 66% (59) of the manufacturing subunits. Mechanistic structures characterize 55% (54) of the service subunits and 34% (31) of the manufacturing subunits. It is plausible that type of business is serving in this study as a surrogate for another variable—organizational size—that has been shown to have significant impacts on organizational structure and culture. As indicated previously (page 109), when comparing manufacturing and service subunits on sales, size, age, competitiveness of industry and future sales growth, the only significant difference between the two was in size ( $p < .1$ ). Service organizations have an average of 253 more employees than do manufacturing organizations (Service = 804; Manufacturing = 551). That is, on the average, the service organizations are 45% larger than the manufacturing organizations in this sample.

Size, as an organizational variable, has been shown to be positively related to formalization (Hall, Haas, Johnson, 1967; Blau and Schoenherr, 1971). As an organization becomes larger, Mintzberg (1979) stated it becomes more formalized, specialized and centralized, creating a tendency



to become more bureaucratic (i.e. mechanistic). The results of the comparison of the size of service versus manufacturing organizations support this. In this study, 55% of the service organizations, which are significantly larger in size, exhibited mechanistic characteristics, indicating a higher degree of formalization. Likewise, in the significantly smaller organizations, most of which are engaged in manufacturing, one would expect less formalization and predominant organic structures. Indeed the data support this as 66% of the smaller organizations are organic.

These findings beg the question as to whether it may be the type of organization that makes the difference in the relationships with some cultural norms, or is it the size? When organicity is not treated as a moderator variable, it has been shown to have a significant main effect on some types of cultural norms (see section 5.4). Since organicity was defined in this study as the degree of formalization of the structure (page 40) it could be argued that the size of the organization is more important than type of business.

Counter arguments to the above could also be based on the fact that there is something special about organicity in a service subunit versus a manufacturing subunit. That something special probably has to do with the cultural norms. Service businesses are people-intensive; therefore, work units are comprised of people working together rather than individuals working with machines. Therefore, there

may be a greater opportunity for a work group culture to form and be reinforced. The findings of this study would suggest that the norms of work group culture are influenced when a threshold for organicity has been reached; that is, the structure of the subunit has to be almost wholly organic in order for a consistently supportive set of norms for task support and task innovation to emerge.

Schein's (1985) thesis states that in the study of culture, generational age, rather than organizational size is of primary importance. The generational age of 70% of the organizations in this study is early growth. The cultural thrust of organizations in the early growth stage comes from the founders and their assumptions and beliefs. Culture acts as the psychological "glue" that holds the group together and is likely to be very strong. While cultural norms are present in all organizations, based on the high means found for task support (5.88), task innovation (6.26) and social relationships (5.44), one can tentatively suggest that there was a distinct level of cultural norms in the organizations studied. Schein (1985:234) listed the following as reasons for this strength a) the primary creators of the culture are still present; b) the culture helps the group define itself and make its way into a potentially hostile environment; c) many elements of the culture have been learned as defenses against anxiety as the group has struggled to maintain and build itself.

Also, Kilmann (1984) suggests that tremendous social energy is unleashed in the formation of a new company, thus team building and mutual dependence on others is necessary for the company to succeed.

While size may be an important determinant in the findings on service versus manufacturing subunits, it is also felt that the generational age of the companies, the high level of presence of some types of cultural norms as well as the people intensiveness nature of service organizations could also contribute to these findings.

(3) The preferred information input dimension (sensing/intuition) and the preferred decision-making dimension (thinking/feeling) of the manager do not impact the way he/she perceives levels of environmental uncertainty, organicity or types of cultural norms, regardless of the subunit's type of business.

Individuals organize and evaluate stimuli through a variety of perceptual processes. Also, there are differences among individuals in their perceptions and their tolerances for ambiguity (Berlyne, 1968). While there is strong support in the literature regarding the importance of managerial perceptions in enacting the environment or influencing the structure (Duncan, 1972; Miles, Snow, Pfeffer, 1974; Pfeffer, 1982) this study did not uncover any

significant relationships when an individual's perceptual process was operationalized via the Myers Briggs cognitive style scale.

A possible explanation as to why there were no significant findings in the hypothesized relationships, may be the fact that the strength of the organizational belief systems as embodied through types of culture norms as well as the strong influence of organizational structure overrode any possible contribution that an individual's style of human information processing could have made. For task innovation this is supported by a study on individual characteristics that was conducted by Baldrige and Burnham (1975) on the determinants of innovation in several school districts. They found that no individual characteristic of managers had any significant influence on the innovation process.

(4) The level of organicity of a subunit may have a stronger association with some types of cultural norms than does environmental uncertainty.

While the research model for this study did not assert directly the relationship between organicity and types of cultural norms, there was strong evidence to suggest that a significant relationship did exist if organicity were not treated as a moderator variable. The findings of the

associations between levels of organicity and task support, task innovation and social relationships were significant and are reported in section 5.4.

Schein (1985) suggests that structure is a secondary reinforcer of culture. The findings of this study would suggest a much stronger relationship when the cultural norms are task support, task innovation or social relationships. Higher levels of each of these cultural norms were found in organic subunits rather than less organic ones.

Written rules and procedures reduce ambiguity and uncertainty and are characteristic of bureaucratic organizations. Wilkins and Ouchi (1983) suggested that culture will play a lesser role in the way the bureaucratic organization is managed. These authors also suggested that, in a competitive environment, market factors guide the behaviors of the members of the organization. Thus, in organizations that are not bureaucratic or do not operate in a stable competitive environment (or both), culture may be a more influential force in guiding the behavior of the organization's members. The respondents in this sample indicated that they were in industries that were extremely competitive.

The characteristics of an organic structure are listed in (1) above. High levels of the norms of task support were significantly associated with more organic structures. This finding corroborates the findings of Bennis (1966), Sheppard and Blake (1962), and Argyris (1962). That is,

organic structures support the existence of norms encouraging work groups to cooperate and support each other's work, to share information, and to complete tasks. Also, in an organic organizational design, decision making, control and goal-setting processes are decentralized and shared at all levels of the organization. These practices are intended to implement a basic assumption of the organic model, which states that an organization will be effective to the extent that its structure allows maximum probability for interaction in all relationships in the organization. Thus each member, in light of his/her values and expectations will view the experience as supportive (Likert, 1961; 1967).

The findings and related research on task innovation are more extensive than that for task support or social relationships. In addition to the seminal research quoted in (1) above under the discussion on task innovation, Cohn (1980) found that innovation was inversely related to degree of formalization, that is, the greater the formalization the less the innovation. Shepard (1967) states that a low degree of formalization (i.e. use of set rules and procedures) allows for more freedom and openness in an organization which results in an increased initiation of new ideas. Formal structure tends to reduce or more severely channel communication and information flows among members of the organization, consequently managers are less likely to be aware of innovative opportunities. Also, the formal

rules of a mechanistic organization could constrain actions of managers even if they were aware of innovation opportunities.

Empirical innovation literature has demonstrated an association between decentralized and informal organizational structures and increased levels of innovation. Therefore, the fact that innovation was found to be strongly positively associated ( $p=.009$ ) to organicity is not surprising. What is significant, however, is the fact that this relationship has been found in small organizations as the most of the supporting research in this area has been with larger organizations.

The association between social relationship norms and organicity was significant but weak ( $p=.09$ ). High levels of norms supporting social relationships indicate that work groups are willing to mix friendships with business, get to know people in their work group, socialize with each other and with members of other work groups both on and off the job.

This finding has mixed support in the literature. A mechanistic system may also be referred to as a bureaucratic system. A characteristic of an ideal bureaucracy is impersonality of interpersonal relationships (Weber, 1946; Hall, 1963). Yet Blau and Scott (1962) found a strong informal structure in bureaucracies which can develop commitment to work groups and which allows social interaction. Bennis (1966 p.188) points out that in the

organic organization there will be less loyalty to the work group and "people will learn to develop quick and intense relationships on the job and learn to bear the loss of more enduring work relationships". This is due to the fluid nature of the structure. Sheperd and Blake (1962) state that relationships within and between groups is greater in the organic system. The norms of social relationships indicated above are not of the same nature as the social interaction referred to by Blau and Scott (1962). They studied social interaction on the job. The social relationship norms include this interaction, but also include socializing off the job and with business clients.

It is difficult to make inferences regarding social relationship norms because of the low level of significance of the findings of this study and the difficulty in assessing the importance of socializing with other company members. It is safe to indicate that the organic structure would more easily permit social interaction if that is desirable.

One can tentatively conclude that an organic structure is positively associated with the cultural norms of task support, task innovation and social relationships.

(5) Some dimensions of cognitive style are more predominant than others in top management (i.e. CEOs and VPs) of small high growth companies.



The predominant cognitive style exhibited by top management of small high growth companies was intuitive/thinking (NT). This finding is contrary to Myers' (1970) findings on predominant cognitive styles and occupations. She found STs to be the predominant cognitive style in business and administrative roles. The intuitive dimension was exhibited by respondents 1.5 times more frequently than the sensing dimension. The thinking dimension was exhibited by respondents 2.4 times more frequently than the feeling dimension.

The intuitive type is characterized as follows: risk-taker; concerned with the whole; generalist; speculative; inventive; unconventional; lives in the future and likes to produce many alternative ideas. The thinking type is characterized as follows: logical; analytical; scientific; impersonal; theoretical dispassionate; and concerned with rationality.

Many times in studies of cognitive style (Briggs and McCauley, 1985), a dichotomy is drawn between the ST and NF as they represent the polarities of the combined information input and decision-making dimensions. The NT is not talked about much. This cognitive style, the intuitive/thinking type, may be better in today's world of increasing dynamic complexity which is fraught with ambiguous rather than well structured problems. The NT is able to deal with the whole

even when it isn't well defined and then able to make logical, analytical, rationally based decisions regarding ambiguous problems.

This cognitive style blends well with the management needs of the small high growth firm. Managers must be comfortable with taking risks but at the same time be able to conceptualize in a wholistic manner the overall direction of the firm. Because these firms are facing rapid increases in sales and other changes in the environment, attention to the operational details of the firm is also extremely important for overall success. The intuitive/thinking type exhibits these characteristics and may be best suited to be in a top management role, all other skills being equal.

Task Innovation exhibited the most significant relationships with the other variables in this study. Cohn (1981) found in a study of managerial attitudes on the process of innovation that there was a positive relationship between innovation adoption and managerial propensity toward risk. Gerstenfeld and Sumiyoshi (1980) state that Japanese firms have become more innovative than their American counterparts because Japanese managers are encouraged to take risks. The small high growth service firms in this study exhibit high levels of task innovation and the managers are predominant intuitive types. Intuitive types have a propensity toward risk and are inventive. Thus, one

could tentatively conclude that subunits that are headed by managers who are intuitive/thinking types will exhibit higher levels of task innovation.

(6) The inclusion of the resource dimension along with information dimensions in the conceptualization of environmental uncertainty is appropriate.

This study incorporated a measure for environmental uncertainty that included both an information dimension (complexity and dynamism) and a resource dimension (munificence). This was done as theorists (Lawrence, 1981; Dess and Beard, 1984) have suggested that both dimensions are important when measuring environmental uncertainty.

The measure of environmental uncertainty was comprised of munificence, complexity and dynamism. Munificence measured the importance and scarcity/plentifulness of resources available to the organizational subunit. Complexity measured the importance and the degree of diversification, number of competitors, customer buying habits, and differences in the input necessary for producing primary product or service. Dynamism measured the importance and the rates of change in marketing practices, obsolescence of products/services, competitors actions, consumer demands and production/service technologies. Uncertain environments were characterized by scarcity and

above average levels of complexity and dynamism. Certain environments were characterized by plentifulness and below average levels of complexity and dynamism.

All three of the subscales (complexity, dynamism and munificence) correlated positively and significantly ( $p=.001$ ) with the composite measure of environmental uncertainty (see Table 5.4). However, the coefficient for munificence (.327) was about half that of complexity (.750) and dynamism (.763). Due to the lower correlation of the munificence subscale with the overall measure, and the fact that it had a lower alpha score (.64), serious consideration should be given to the development of additional subscale items for the measurement of scarcity/plentifulness of resources.

When each of the subscales was correlated with each type of cultural norm, dynamism was negatively ( $-.166$ ;  $p=.05$ ) related to task support. That is, as the rates of change in marketing practices, obsolescence of products/services, competitors actions, consumer demands and production/service technologies increase, task support decreases. Complexity was not significantly related to any of the cultural norms. Munificence had a significant negative ( $-.161$ ;  $p=.05$ ) relationship with task innovation.

This may be interpreted as follows: when resources decrease, task innovation decreases; consequently, the amount of resources that a subunit has access to may impact how innovative that subunit is. If a work group is

committed to achieving some objective, a scarcity of resources pressures the group to be less inventive about how it uses those resources to meet its objectives. Additional implications of this finding are that the scarcity/plentifulness of resources may have a greater impact than cognitive style, managerial style, strategy and other organizational variables in how innovative a subunit may be.

Now that significant relationships have been found between task innovation and munificence, the inclusion of a measure of the resource dimension for research purposes seems to be justified. These findings support theorists' view (Lawrence, 1980; Dess and Beard, 1984) that an important aspect of environmental uncertainty is the resource dimension.

Complexity and dynamism are significantly and positively related (.401;  $p=.001$ ). It may well be that a more parsimonious measure of environmental uncertainty can be obtained from combining these two subscales.

It can be tentatively concluded that the inclusion of the resource dimension to the traditional conceptualization of environmental uncertainty (i.e. information dimension: complexity and dynamism) may be useful and appropriate.

## 6.2 Limitations

Any study is subject to limitations. The following are felt to be the key limitations of this research study.

(1) Measurement limitations may have influenced this study.

Arnold (1982) indicated that the accurate detection of interaction effects is impaired when measures are used that exhibit imperfect reliability. The alpha scores were above the acceptable minimum (.6) for this study, however, the environmental uncertainty alpha was only .67, with organicity at .74. While these lower reliability scores present a problem, Arnold (1982) has shown that inferential problems arising from the use of measures with imperfect reliabilities decrease as the sample size increases. The larger the sample size the smaller the probability of a Type II error. More specifically, an error of this nature in this study would involve concluding that organicity does not moderate the relationship between environmental uncertainty and some types of culture norms when in fact it does moderate this relationship.

(2) Likert type rating scales were used for the organicity and environmental uncertainty measures.

The ordinal rating scales, however, were treated analytically as ratio rating scales. Each respondent's mean score on the scale items was used as the data input for the respondent on a particular scale. Therefore, different response patterns among the measure's items could possibly

result in the same scores on the measure and the data analysis would not detect conditions that may be manifested differently in the subunits of the respondent.

This limitation may be less significant than it seems if one remembers that the manager's perception of environmental uncertainty -not any "objective" measure of uncertainty- is the variable being used. If a group of managers perceive the environment as being highly uncertain, this may be a more important guide to their behavior than any differences among them on which portions of the environment seem uncertain.

(3) This study relied on perceptual measures rather than objective measures.

While it is felt this type of measure was appropriate, it is impossible to judge to what extent the data accurately reflect actual organizational subunit conditions. A number of analysts (Dill 1957, Lawrence and Lorsch, 1967, and Duncan 1972;), argued that it made sense to measure the environment in terms of the perceptions of the participants within the organization. The reasoning behind this approach is that only factors that are perceived can enter into the decision making behavior of participants ( Scott 1981). Weick's (1969) concept of enactment also supported the use of a perceptual measure. However, Pfeffer and Salancik (1978) caution that while perceptual measures are necessary if one wishes to predict the choices and/or behavior of organizational participants, they may not be sufficient to

predict the outcome of these choices. That is, the objective reality may be such that the outcome is different than the prediction.

(4) The respondents chosen for this study were employed by businesses that were representative of high growth businesses but not representative of all small publicly traded companies.

The criteria for success of these businesses was the ability over a five year period to continually grow at a 100%+ rate and by December, 1985 to have gone public. These businesses may not perform as well on other financial criteria and therefore, may not be considered by others as "successful". This, in turn could influence the interpretation of the findings of this research.

(5) The means on task support, task innovation and social relationships and organicity were high when compared to the mid-points of their respective scales (i.e. 3.5).

This did not allow for much variance in the analysis, nor did it allow for the median to be used as the dividing point for the high/low groupings in the crosstabulation analysis. Therefore, in some cases there was not an equal marginal distribution which may have impacted the statistical analysis.

However, the findings do suggest that there may be a threshold for organicity in terms of its moderating effects on relationships between environmental uncertainty and



cultural norms. That is, an organizational subunit may have to be almost wholly organic in order for an increase in environmental uncertainty to enhance the norms of task support and task innovation. In which case, the data while being negatively skewed, may have indeed allowed the researcher to investigate a relationship that might have otherwise gone unnoticed.

### 6.3 Conclusion

Organization culture has received a great deal of attention in the recent literature. Much of this research has centered on the phenomenon of culture at the organizational level, rather than subunit level. Also, previous work has not primarily dealt with how culture interrelates with other organizational constructs.

This research study attempted to identify the interdependencies between environmental uncertainty, organicity, cognitive style and the cultural norms of task support, task innovation and social relationships. It was hypothesized that organicity would moderate the relationship between environmental uncertainty and types of cultural norms.

Data were collected from 92 business firms located throughout the United States. Approximately equal numbers of manufacturing and service businesses are represented in the sample. The average size in number of employees is 681. The mean annual sales were 71.3 million dollars. The mean age of the companies is 7.8 years.

The businesses in the sample were the INC. 100 list for 1986. This is a listing of the 100 fastest growing small publicly traded firms. A mailed questionnaire was used to collect the data. The sample members were 188 managers in the boundary spanning subsystems of the organization (i.e. marketing, public relations, purchasing and personnel). The response rate was 55%.

Organization culture was operationalized as the perceived norms of behavior of members in subunits in the organization. Perceived environmental uncertainty was operationalized along three dimensions: dynamism, complexity and munificence. These three dimensions represent both the information and resource dependence approaches to the environment as suggested by Lawrence (1981) and Dess and Beard (1984).

The nature of the structure of the organization was operationalized via the concept of organicity. High organicity was characteristic of a more flexible/adaptive structure, while low organicity was characteristic of a more mechanistic/bureaucratic structure. Cognitive style was used to operationalize the human information processing aspect relevant to studies which use managers' perceptions as part of the measure.

Moderated regression analysis was used to test the hypotheses which had organicity as a moderator variable. The degree to which organicity moderated the environmental

uncertainty-cultural norms relationship was determined by the interaction effects of environmental uncertainty and organicity on types of cultural norms.

For the total sample, the only significant interaction that was found occurred with norms of task innovation. When the sample was split into manufacturing and service businesses, significant interactions were found with task support and task innovation.

Organicity had a significant correlation with task support, task innovation and social relationships, which means that it is a quasi-moderator of the relationship between environmental uncertainty and cultural norms. In general the findings suggest that organicity does not seem to be a good moderator of the environmental uncertainty - cultural norms relationship in small, high-growth companies.

Chi-square contingency tables were used to test the hypothesized associations of the following variables: environmental uncertainty-organicity; cognitive style-organicity; cognitive style-cultural norms and cognitive style-environmental uncertainty. No significant associations were found.

Additional statistical analyses found a significant association between organic subunits and high levels of the norms of task support, and between task innovation and social relationships. The intuitive/thinking cognitive style was predominant among top managers. Also, it was

concluded that the addition of a resource dimension to the traditional measure of environmental uncertainty is appropriate and valid.

These findings, however, must be interpreted with caution because of the limitations of this study. These limitations involve the accuracy of the data due to the use of perceptual measures; the low reliabilities of two of the measures; and the low variability on task support, task innovation and social relationships.

Several recommendations for future research can be made.

(1) Further exploration should be done with organizational subunits that exhibit predominantly mechanistic characteristics to ascertain if the same "threshold" effect appears as did with the organic subunits in this study. If so, this may have implications for theorists who support the view that the presence of structural characteristics in an organization can be measured on a sliding scale.

(2) Causality cannot be demonstrated with cross-sectional data collected at one point in time. Longitudinal research on cultural norms may help to uncover the causal linkages between organicity, environmental uncertainty, or other variables, such as performance, that are of interest to advancing the knowledge of organization culture.

(3) Different samples of businesses (i.e. small in size, but not high growth) should be used in order to assess the generalizability of the findings.

(4) The study could be reconceptualized to treat organicity as an independent variable along with environmental uncertainty, type of business, functional responsibility of the respondent, and job level of the respondent to measure the impact of each of the variables on types of cultural norms.

(5) Different measures of human information processing, culture, environmental uncertainty and organicity should be used in future research. The use of different measures in future studies may help to highlight the biases of any one measurement method.

## APPENDIX A

## SECTION 1

## KILMANN-SAXTON CULTURE-GAP SURVEY ITEMS (Kilman and Saxton, 1983)

TS-Task Support  
PF-Personal Freedom

TI-Task Innovation  
SR-Social Relationships

Instructions: Please circle the "A" or "B" which best describes the actual norm in your group. It is important that you choose the norm according to the pressures your work group puts on its members. This may be different than how you behave.

(Note to the reader: the following norms had a mixed order in the final format of the survey)

- TS(0) 1. A. Put down the work of other groups.  
(1) B. Support the work of other groups.
- TS(1) 5. A. Share information to help other groups  
(0) B. Share information with other groups only when it benefits your own work group.
- TS(0) 9. A. Don't divide and assign work fairly.  
(1) B. Divide and assign work fairly.
- TS(1) 13. A. Complete all tasks in the best possible way.  
(0) B. Do as little as necessary to get by.
- TS(0) 17. A. Share information only when it benefits you.  
(1) B. Share information to help the organization make better decisions.
- TS(1) 21. A. Help others complete their tasks.  
(0) B. Concentrate only on your own tasks.
- TS(0) 25. A. Compete with other work groups.  
(1) B. Cooperate with other work groups.
- TI(1) 2. A. Encourage creativity.  
(0) B. Discourage creativity.
- TI(0) 6. A. Keep things the same.  
(1) B. Make changes.
- TI(1) 10. A. Try new ways of doing things.  
(0) B. Don't "rock the boat."
- TI(0) 14. A. Don't try to change.  
(1) B. Always try to improve.

- TI(1) 18. A. Help others put new Ideas into practice.  
(0) B. Resist putting new Ideas into practice.
- TI(0) 22. A. Resist taking on new tasks.  
(1) B. Be willing to take on new tasks.
- TI(1) 26. A. Encourage new Ideas.  
(0) B. Discourage new Ideas.
- SR(0) 3. A. Don't socialize with your work group.  
(1) B. Socialize with your work group.
- SR(1) 7. A. Mixing friendships with business if fine.  
(0) B. Don't mix friendships with business.
- SR(0) 11. A. Don't develop friendships with your  
co-workers.  
(1) B. Develop friendships with your co-workers.
- SR(1) 15. A. Encourage socializing on the job.  
(0) B. Discourage socializing on the job.
- SR(0) 19. A. Don't bother getting to know the people in  
your work group.  
(1) B. Get to know the people in your work group.
- SR(1) 23. A. Participate in social activities with others  
in  
your organization.  
(0) B. Don't participate in social activities with  
others in your organization.
- SR(0) 27. A. Don't socialize with those in other work  
groups.  
(1) B. Socialize with those in other work groups.
- PF(1) 4. A. Dress as you like.  
(0) B. Dress in the accepted manner.
- PF(0) 8. A. Don't go outside the regular lines of  
communication.  
(1) B. Feel free to communicate with anyone.
- PF(1) 12. A. Use your own judgement in following rules  
and regulations.  
(0) B. Comply with all rules and regulations.
- PF(0) 16. A. Please the organization.  
(1) B. Do what pleases you.
- PF(1) 20. A. Express your personal preferences on the job.  
(0) B. Keep your personal preferences to yourself.
- PF(0) 24. A. Live for your job or career.  
(1) B. Live for yourself or your family.



- PF(1) 28. A. Believe in your own values.  
 (0) B. Believe in the organization's values.

## SECTION 2

ORGANICITY ITEMS (Khandwalla, 1977; Bourgeois et al  
1982; Covin, 1985)

- |   |               |  |
|---|---------------|--|
| 1. Tight formal control of most operations by means of sophisticated control and information systems                    | 1 2 3 4 5 6 7 | Loose, informal control; heavy dependance on informal relationships and norm of cooperation for getting work done  |
| 2. Strong emphasis on always getting personnel to follow the formally laid down procedures                              | 1 2 3 4 5 6 7 | Strong emphasis on getting things done even if this means disregarding formal procedures   |
| 3. A strong emphasis on holding fast to true and tried management principles despite any changes in business conditions | 1 2 3 4 5 6 7 | A strong emphasis on adapting freely to changing circumstances without too much concern for past practice  |
| 4. Strong emphasis on giving the most to say in decision making to formal line managers                                 | 1 2 3 4 5 6 7 | Strong tendency to let the expert in a given situation have the most to say in decision making even if this means temporary bypassing of formal line authority |
| 5. Strong insistence on a uniform managerial style throughout the business unit   | 1 2 3 4 5 6 7 | Manager's operating styles allowed to range freely from the very formal to very informal   |
| 6. Strong emphasis on getting line and staff personnel to adhere closely to formal job descriptions                     | 1 2 3 4 5 6 7 | Strong tendency to let the requirements of the situation and the individual's personality define proper on-job behavior  |

7. Highly structured channel of communication and a highly restricted access to important financial and operating information
- 1 2 3 4 5 6 7
- Open channels of communication with important financial and operating information flowing quite freely throughout the business unit

## SECTION 3

## ENVIRONMENTAL UNCERTAINTY ITEMS (Miller and Friesen, 1982)

## Dynamism

1. Our firm must rarely change in its marketing practices to keep up with the market and competitors
- 1 2 3 4 5 6 7
- Our firm must change its marketing practices extremely frequently (e.g. semiannually)
- How important is this factor to the success of your business?
- not important 1 2 3 4 5 6 7 extremely important
2. The rate at which products/services are getting obsolete in the industry is very slow (e.g. basic metal like copper)
- 1 2 3 4 5 6 7
- The rate of obsolescence is very fast (as in some fashion goods and semi-conductors)
- How important is this factor to the success of your business?
- not important 1 2 3 4 5 6 7 extremely important
3. Actions of competitors are quite easy to predict (as in some primary industries)
- 1 2 3 4 5 6 7
- Actions of competitors are unpredictable
- How important is this factor to the success of your business?
- not important 1 2 3 4 5 6 7 extremely important
4. Demand and consumer tastes are fairly easy to forecast (e.g. for milk companies)
- 1 2 3 4 5 6 7
- Demand and tastes are almost unpredictable (e.g. high fashion goods)
- How important is this factor to the success of your business?
- not important 1 2 3 4 5 6 7 extremely important

5. The production/ service technology is not subject to very much change and is well established (e.g. in steel companies)      1 2 3 4 5 6 7      The modes of production/service change often and in a major way (e.g. advanced electronic components)

How important is this factor to the success of your business?

not important      1 2 3 4 5 6 7      extremely important

#### Complexity

6. We are very undiversified firm and cater to the same buyers (e.g. local beer firms)      1 2 3 4 5 6 7      We are a highly diversified conglomerate and operate in unrelated industries

How important is this factor to the success of your business?

not important      1 2 3 4 5 6 7      extremely important

7. Our competitors are very different from one another and are evenly distributed in our business environment.      1 2 3 4 5 6 7      Our competitors are few and very heavily concentrated in our business environ.

How important is this factor to the success of your business?

not important      1 2 3 4 5 6 7      extremely important

8. Customers' buying in our industry are very much alike.      1 2 3 4 5 6 7      Customers' buying habits in our industry are extremely varied.

How important is this factor to the success of your business?

not important      1 2 3 4 5 6 7      extremely important

9. The nature of the competition for our products or services is very much alike.      1 2 3 4 5 6 7      The nature of the competition for our products or services is extremely varied.

How important is this factor to the success of your business?

not important      1 2 3 4 5 6 7      extremely important

10. Market dynamism and uncertainty for our products or services very much alike.      1 2 3 4 5 6 7      Market dynamism and uncertainty for our products or services is extremely varied.

How important is this factor to the success of your business?  
not important      1 2 3 4 5 6 7      extremely important

11. The inputs necessary to produce our primary product or service are very much alike.      1 2 3 4 5 6 7      The inputs necessary to produce our primary product or service are extremely varied.

How important is this factor to the success of your business?  
not important      1 2 3 4 5 6 7      extremely important

#### Munificence

12. The rate of sales growth of our primary product or service is very low.      1 2 3 4 5 6 7      The rate of sales growth of our primary product or service is quite high.

How important is this factor to the success of your business?  
not important      1 2 3 4 5 6 7      extremely important

13. The rate of growth of the total market for our primary product or service is very low.      1 2 3 4 5 6 7      The rate of growth of the total market for our primary product or service is high.

How important is this factor to the success of your business?  
not important      1 2 3 4 5 6 7      extremely important

14. The level of profitability of our industry is low compared to other industries.      1 2 3 4 5 6 7      The level of profitability of our industry is high compared to other industries.

How important is this factor to the success of your business?  
not important      1 2 3 4 5 6 7      extremely important

RATE THE ABUNDANCE OF THE FOLLOWING IN THE BUSINESS ENVIRONMENT IN WHICH YOU COMPETE.

15. Financial capital is 1 2 3 4 5 6 7 Financial capital  
scarce and/or quite expensive. is quite plentiful.

How Important is this factor to the success of your business?  
not important 1 2 3 4 5 6 7 extremely important

16. Skilled labor is 1 2 3 4 5 6 7 Skilled labor is  
very scarce and/or quite expensive. quite plentiful.

How Important is this factor to the success of your business?  
not important 1 2 3 4 5 6 7 extremely important

17. Material supplies are 1 2 3 4 5 6 7 Material supplies  
very scarce and/or quite expensive. are quite plentiful.

How Important is this factor to the success of your business?  
not important 1 2 3 4 5 6 7 extremely important

18. Managerial talent is 1 2 3 4 5 6 7 Managerial talent  
very scarce and/or quite expensive. is quite plentiful.

How Important is this factor to the success of your business?  
not important 1 2 3 4 5 6 7 extremely important

#### SECTION 4

##### BACKGROUND INFORMATION

1. What is your job title?

a. What is your functional responsibility?

2. How many years have you worked for this firm?

3. What is the primary business of this firm?

4. The approximate annual sales revenue of this firm is \_\_\_.

5. The approximate number of employees in this firm is \_\_\_.

6. The number of years this firm has been in business is \_\_\_.

7. How would rate the competitiveness of your industry?
  - 1 = extremely competitive
  - 2 = very competitive
  - 3 = competitive
  - 4 = not very competitive
  - 5 = not at all competitive
  
8. How would you characterize this firm's sales growth in the next five years?
  - 1 = large decrease
  - 2 = decrease
  - 3 = steady sales
  - 4 = increase
  - 5 = large increase

#### SECTION 5

#### MYERS-BRIGGS TYPE INDICATOR FORM AV

Part I: Which answer comes closest to telling how you usually feel or act?

1. When you go somewhere for the day, would you rather
  - A. plan what you will do and when, or
  - B. just go?
  
2. If you were a teacher, would you rather teach
  - A. fact courses, or
  - B. courses involving theory?
  
3. Are you usually
  - A. a "good mixer", or
  - B. rather quiet and reserved?
  
4. Do you prefer to
  - A. arrange dates, parties, etc., well in advance, or
  - B. be free to do whatever looks like fun when the time comes?
  
5. Do you usually get along better with
  - A. imaginative people, or
  - B. realistic people?
  
6. Do you more often let
  - A. your heart rule your head, or
  - B. your head rule your heart?
  
7. When you are with a group of people, would you rather
  - A. join in the talk of the group, or
  - B. talk with one person at a time?
  
8. Are you more successful
  - A. at dealing with the unexpected and seeing quickly what should be done, or
  - B. at following out a carefully worked out plan?

9. Would you rather be considered  
A. a practical person, or  
B. an ingenious person?
10. In a large group, do you more often  
A. introduce others, or  
B. get introduced?
11. Do you admire more the people who are  
A. conventional enough never to make themselves conspicuous, or  
B. too original and individual to care whether they are conspicuous or not?
12. Does following a schedule  
A. appeal to you  
B. cramp you?
13. Do you tend to have  
A. deep friendships with a very few people, or  
B. broad friendships with many different people?
14. Does the idea of making a list of what you should get done over a weekend  
A. appeal to you, or  
B. leave you cold, or  
C. positively depress you?
15. Is it a higher compliment to be called  
A. a person of real feeling, or  
B. a consistently reasonable person?
16. Among friends, are you  
A. one of the last to hear what is going on, or  
B. full of news about everybody?
- (On this next question only, if two answers are true, mark both)
17. In your daily work, do you  
A. rather enjoy an emergency that makes you work against time, or  
B. hate to work under pressure, or  
C. usually plan your work so that you won't need to work under pressure?
18. Would you rather have as a friend  
A. someone who is always coming up with new ideas, or  
B. someone who has both feet on the ground?

19. Do you  
 A. talk easily to almost anyone for as long as you have to,  
 or  
 B. find a lot to say only to certain people or under certain conditions?
20. When you have a special job to do, do you like to  
 A. organize it carefully before you start, or  
 B. find out what is necessary as you go along?
21. Do you usually  
 A. value sentiment more than logic, or  
 B. value logic more than sentiment?
22. In reading for pleasure, do you  
 A. enjoy odd or original ways of saying things, or  
 B. like writers to say exactly what they mean?
23. Can the new people you meet tell what you are interested in  
 A. right away, or  
 B. only after they really get to know you?
24. When it is settled well in advance that you will do a certain thing at a certain time, do you find it  
 A. nice to be able to plan accordingly, or  
 B. a little unpleasant to be tied down?
25. In doing something that many other people do, does it appeal to you more to  
 A. do it in the accepted way, or  
 B. invent a way of your own?
26. Do you usually  
 A. show your feelings freely, or  
 B. keep your feelings to yourself?

Part II: Which word in each pair appeals to you more? Think what the words mean, not how they look or how they sound.

- |                   |                |
|-------------------|----------------|
| 27. A. scheduled  | B. unplanned   |
| 28. A. gentle     | B. firm        |
| 29. A. facts      | B. ideas       |
| 30. A. thinking   | B. feeling     |
| 31. A. hearty     | B. quiet       |
| 32. A. convincing | B. touching    |
| 33. A. statement  | B. concept     |
| 34. A. analyze    | B. sympathize  |
| 35. A. systematic | B. spontaneous |
| 36. A. justice    | B. mercy       |
| 37. A. reserved   | B. talkative   |
| 38. A. compassion | B. foresight   |
| 39. A. systematic | B. casual      |



- |                    |                   |
|--------------------|-------------------|
| 40. A. calm        | B. lively         |
| 41. A. benefits    | B. blessings      |
| 42. A. theory      | B. certainty      |
| 43. A. determined  | B. devoted        |
| 44. A. literal     | B. figurative     |
| 45. A. firm-minded | B. warm-hearted   |
| 46. A. imaginative | B. matter-of-fact |
| 47. A. peacemaker  | B. judge          |
| 48. A. make        | B. create         |
| 49. A. soft        | B. hard           |
| 50. A. sensible    | B. fascinating    |

**SLIPPERY ROCK**  
UNIVERSITY

Slippery Rock, Pennsylvania 16057-1326

<NAME>  
<TITLE>  
<COMPANY>  
<ADDRESS>  
<CITY> <STATE> <ZIP>

November 14, 1986

Dear <SALUTATION> <LAST NAME>:

I am currently in the process of collecting data for my doctoral dissertation. In this research I am concerned with the way managers perceive the relationships between the culture and structure of their work group under differing levels of uncertainty in their business environment. By understanding these interrelationships, it is hoped that recommendations can be made to managers concerning the role of organization culture, given certain perceived environmental conditions and organizational structures.

I am writing to request your participation in completing the enclosed questionnaire. The questionnaire is designed so that no data or file search on your part is required. You were selected to participate in this study because of the functional responsibilities you have within your company. I can guarantee complete confidentiality of all your responses. Only summary, aggregate information will ever be reported. While the questionnaire has an identification number, it is for mailing purposes only. This is so I can check your name off the mailing list when your questionnaire is returned. Your name will never be placed on the questionnaire.

Only a small sample of individuals is being surveyed. Thus your response is crucial to the successful completion of my doctoral dissertation. If you have any questions please do not hesitate to call me anytime, either at my office (412-794-7324) or at home (412-748-4641).

A summary of the findings will be provided to you after I complete the dissertation. Thank you for your assistance.

Sincerely,

Carol J. Matteson  
Doctoral Candidate

CJM:cm  
Enclosure

November 21, 1986

Last week a questionnaire seeking your response about work group culture, environmental conditions and structure was mailed to you.

If you have already completed and returned it to me, please accept my sincere thanks. If not, I would appreciate your response as soon as possible. Because it was sent to only a small sample of professionals, it is extremely important that your response be included in the study.

If by some chance you did not receive the questionnaire, or it got misplaced, please call me (412-794-7324) and I will mail you another.

*Thanks!*

Sincerely,  
Carol Matteson  
Doctoral Candidate

December 5, 1986

Last week you received the second mailing of a questionnaire seeking your perceptions about work group culture, environmental conditions and structure. The original was mailed to you on November 17, 1986.

If you have already completed and returned it to me, please accept my sincere thanks. If not, I would appreciate your response as soon as possible as it is crucial to the successful completion of my doctoral dissertation.

If by some chance you did not receive the questionnaire, please call me at (412-794-7324).

Sincerely,  
Carol Matteson  
Doctoral Candidate

## APPENDIX B

## SECTION 1: TYPES OF CULTURE NORMS

## Task Support

value	frequency	mean	std. dev.	mode	min/max
.00	3	5.89	1.65	7.0	0.0/7.0
1.00	5				
2.00	7				
3.00	8				
4.00	6				
5.00	16				
6.00	57				
7.00	101				

## Task Innovation

value	frequency	mean	std. dev.	mode	min/max
.00	4	6.26	1.57	7.0	0.0/7.0
1.00	4				
2.00	3				
3.00	4				
4.00	7				
5.00	10				
6.00	25				
7.00	146				

## Social Relationships

value	frequency	mean	std. dev.	mode	min/max
0.00	4	5.45	1.86	7.0	0.0/7.0
1.00	8				
2.00	9				
3.00	12				
4.00	17				
5.00	19				
6.00	56				
7.00	78				

## Personal Freedom

value	frequency	mean	std. dev.	mode	min/max
0.00	8	3.73	1.59	4.0	0.0/7.0
1.00	10				
2.00	22				
3.00	44				
4.00	55				
5.00	37				
6.00	21				
7.00	6				

## SECTION 2 ORGANICITY

	mean	std. dev.	mode	min/max
Question 1	4.93	1.54	5.0	1.0/7.0
Question 2	5.08	1.58	6.0	1.0/7.0
Question 3	5.26	1.53	6.0	1.0/7.0
Question 4	4.62	1.65	6.0	1.0/7.0
Question 5	5.41	1.43	6.0	1.0/7.0
Question 6	5.08	1.59	6.0	1.0/7.0
Question 7	4.86	1.71	5.0	1.0/7.0

## SECTION 3 ENVIRONMENTAL CONDITIONS

Environmental Items	mean	std. dev.	mode	min/max
Question 1	5.37	1.62	7.0	1.0/7.0
Question 2	4.82	1.92	6.0	1.0/7.0
Question 3	5.43	1.81	7.0	1.0/7.0
Question 4	4.36	1.65	5.0	1.0/7.0
Question 5	4.26	1.63	5.0	1.0/7.0
Question 6	3.22	1.83	2.0	1.0/7.0
Question 7	5.00	1.70	6.0	1.0/7.0
Question 8	3.86	1.77	2.0	1.0/7.0
Question 9	3.35	1.77	2.0	1.0/7.0
Question 10	4.02	1.76	4.0	1.0/7.0
Question 11	3.68	1.96	2.0	1.0/7.0
Question 12	2.89	1.86	1.0	1.0/7.0
Question 13	3.05	1.87	2.0	1.0/7.0
Question 14	3.53	1.82	3.0	1.0/7.0
Question 15	3.79	1.91	3.0	1.0/7.0
Question 16	3.92	1.86	3.0	1.0/7.0
Question 17	2.87	1.68	2.0	1.0/7.0
Question 18	4.43	1.90	7.0	1.0/7.0

Importance Items	mean	std. dev.	mode	min/max
Question 1	5.94	1.42	7.0	1.0/7.0
Question 2	5.43	1.81	7.0	1.0/7.0
Question 3	5.22	1.62	7.0	1.0/7.0
Question 4	5.27	1.53	6.0	1.0/7.0
Question 5	5.20	1.66	7.0	1.0/7.0
Question 6	4.73	1.73	4.0	1.0/7.0
Question 7	5.26	1.54	7.0	1.0/7.0
Question 8	5.00	1.60	6.0	1.0/7.0
Question 9	4.81	1.67	6.0	1.0/7.0
Question 10	4.74	1.55	4.0	1.0/7.0
Question 11	4.59	1.85	6.0	1.0/7.0
Question 12	6.07	1.33	7.0	1.0/7.0
Question 13	5.80	1.48	7.0	1.0/7.0
Question 14	5.65	1.39	7.0	1.0/7.0
Question 15	5.60	1.49	7.0	1.0/7.0
Question 16	5.30	1.58	7.0	1.0/7.0
Question 17	4.86	1.85	7.0	1.0/7.0
Question 18	5.69	1.53	7.0	1.0/7.0

## SECTION 4 BACKGROUND INFORMATION

Question	1	Job Title	Frequency
		CEO	26
		Vice President	64
		Director or lower	112

Question	1a	Functional Responsibility	Frequency
		Public Relations	45
		Marketing	60
		Personnel	39
		Purchasing	58

## SECTION 4 CONT'D

Question	2	Years Worked for Firm	Mean	=	3.66
			Std. Dev.	=	3.13
			Mode	=	2.1
			Min/Max	=	1/27
Question	3	Primary Business of Firm	Frequency		
		Manufacturing	100		
		Services	103		
Question	4	Annual Sales Revenue (In millions of dollars)	Mean	=	71.30
			Std. Dev.	=	103.45
			Mode	=	100
			Min/Max	=	.4/600
Question	5	Number of Employees	Mean	=	681
			Std. Dev.	=	1027
			Mode	=	100
			Min/Max	=	8/6000
Question	6	Years Firm in Business	Mean	=	7.82
			Std. Dev.	=	4.47
			Mode	=	6.0
			Min/Max	=	2/40
Question	7	Competitiveness of Industry	Value	Frequency	
		Extremely Competitive	1	113	
		Very Competitive	2	63	
		Competitive	3	21	
		Not very Competitive	4	6	
		Mean = 1.60	Std. Dev. = .79	Mode = 1.0	Min/Max = 1/4
Question	8	Projected Sales Growth next 5 Year			
		Large Decrease	1	3	
		Decrease	2	4	
		Steady Sales	3	18	
		Increase	4	78	
		Large Increase	5	100	
		Mean = 4.32	Std. Dev. = .83	Mode = 5.0	Min/Max = 1/5

## SECTION 5 COGNITIVE STYLE

## Information Input dimension

Type	Frequency	Percent
Missing	9	4.4
Intuition	116	57.1
Sensing	78	38.4

## SECTION 5 CONT'D

## Decision Making Dimension

Type	Frequency	Percent
Missing	9	4.4
Feeling	57	28.1
Thinking	137	67.5

## Combined cognitive styles

Type	Frequency	Percent
Missing	9	4.4
Sensing/thinking	66	32.5
Intuition/thinking	71	35.0
Intuition/feeling	45	22.2
Sensing/feeling	12	5.9



## APPENDIX C

TABLE 5.28  
 C R O S S T A B U L A T I O N O F  
 U N C E R T A I N T Y B Y C O G S T Y L E , C O G N I T I V E S T Y L E

		COGSTYLE				ROW TOTAL
COUNT	ROW PCT	IST	NT	NF	SF	TOTAL
COL PCT	TOT PCT	1.00I	2.00I	3.00I	4.00I	
UNCERTNY	1.00	I 36	I 37	I 20	I 4	I 97
CERTAIN		I 37.1	I 38.1	I 20.6	I 4.1	I 51.6
		I 57.1	I 52.9	I 45.5	I 36.4	
		I 19.1	I 19.7	I 10.6	I 2.1	
UNCERTAIN	2.00	I 27	I 33	I 24	I 7	I 91
		I 29.7	I 36.3	I 26.4	I 7.7	I 48.4
		I 42.9	I 47.1	I 54.5	I 63.6	
		I 14.4	I 17.6	I 12.8	I 3.7	
COLUMN TOTAL	63	70	44	11	188	
TOTAL	33.5	37.2	23.4	5.9	100.0	

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F. < 5
2.50717	3	0.4740	5.324	NONE

STATISTIC	SYMMETRIC	WITH UNCERTNY DEPENDENT	WITH COGSTYLE DEPENDENT
LAMBDA	0.03349	0.07692	0.00000
UNCERTAINTY COEFFICIENT	0.00694	0.00968	0.00540
SOMERS' D	0.10040	0.08649	0.11963
ETA		0.11548	0.11341
STATISTIC	VALUE	SIGNIFICANCE	
CRAMER'S V	0.11548		
CONTINGENCY COEFFICIENT	0.11472		
KENDALL'S TAU B	0.10172	0.0675	
KENDALL'S TAU C	0.11951	0.0675	
PEARSON'S R	0.11341	0.0606	
GAMMA	0.17238		

TABLE 5.29

STRUCTRE		COGSTYLE				ROW TOTAL
LEVEL OF ORGANICITY	COUNT	1.00I	2.00I	3.00I	4.00I	
	ROW PCT	NT	NF	SF		
	COL PCT					
	TOT PCT					
MECHANISTIC	1.00	30	28	21	6	85
		35.3	32.9	24.7	7.1	45.2
		47.6	40.0	47.7	54.5	
		16.0	14.9	11.2	3.2	
ORGANIC	2.00	33	42	23	5	103
		32.0	40.8	22.3	4.9	54.8
		52.4	60.0	52.3	45.5	
		17.6	22.3	12.2	2.7	
COLUMN TOTAL		63	70	44	11	188
		33.5	37.2	23.4	5.9	100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F. < 5
1.41423	3	0.7022	4.973	1 OF 8 ( 12.5%)

STATISTIC	SYMMETRIC	WITH STRUCTRE DEPENDENT	WITH COGSTYLE DEPENDENT
LAMBDA	0.01478	0.01176	0.01695
UNCERTAINTY COEFFICIENT	0.00391	0.00548	0.00304
SOMERS' D	-0.00935	-0.00803	-0.01119
ETA		0.08673	0.01960

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.08673	
CONTINGENCY COEFFICIENT	0.08641	
KENDALL'S TAU B	-0.00948	0.4446
KENDALL'S TAU C	-0.01109	0.4446
PEARSON'S R	-0.01960	0.3947
GAMMA	-0.01613	

TABLE 5.30  
CROSS TABULATION OF  
BY COGSTYLE COGNITIVE STYLE

		COGSTYLE					ROW TOTAL
	COUNT	IST	NT	NF	SF	TOTAL	
TSLEVEL	1.00	13	15	13	1	42	
LOW TS	31.0	35.7	31.0	2.4	1	22.3	
	20.6	21.4	29.5	9.1	1		
	6.9	8.0	6.9	.5	1		
HIGH TS	2.00	50	55	31	10	146	
	34.2	37.7	21.2	6.8	1	77.7	
	79.4	78.6	70.5	90.9	1		
	26.6	29.3	16.5	5.3	1		
COLUMN TOTAL	63	70	44	11	188	100.0	

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F. < 5
2.56875	3	0.4630	2.457	1 OF 8 ( 12.5%)

STATISTIC	SYMMETRIC	WITH TSLEVEL DEPENDENT	WITH COGSTYLE DEPENDENT
LAMBDA	0.00000	0.00000	0.00000
UNCERTAINTY COEFFICIENT	0.00818	0.01364	0.00584
SOMERS' D	-0.02813	-0.02113	-0.04207
ETA		0.11689	0.01895
CRAMER'S V	0.11689		
CONTINGENCY COEFFICIENT	0.11610		
KENDALL'S TAU B	-0.02982		0.3307
KENDALL'S TAU C	-0.02920		0.3307
PEARSON'S R	-0.01895		0.3982
GAMMA	-0.06079		

TABLE 5.31

----- C R O S S T A B U L A T I O N O F -----  
 T I L E L E V E L B Y C O G S T Y L E C O G N I T I V E S T Y L E  
 -----

TILELEVEL	COGSTYLE										
	COUNT	I	NT		NF		SF		ROW		
	ROW PCT	IST							TOTAL		
	COL PCT	I									
TOT PCT	I	1.001	2.001	3.001	4.001						
LOW TI	1.00	I	16	I	21	I	13	I	4	I	54
		I	29.6	I	38.9	I	24.1	I	7.4	I	28.7
		I	25.4	I	30.0	I	29.5	I	36.4	I	
		I	8.5	I	11.2	I	6.9	I	2.1	I	
HIGH TI	2.00	I	47	I	49	I	31	I	7	I	134
		I	35.1	I	36.6	I	23.1	I	5.2	I	71.3
		I	74.6	I	70.0	I	70.5	I	63.6	I	
		I	25.0	I	26.1	I	16.5	I	3.7	I	
COLUMN		63		70		44		11		188	
TOTAL		33.5		37.2		23.4		5.9		100.0	

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F. < 5
0.72441	3	0.8674	3.160	1 OF 8 ( 12.5%)
STATISTIC		SYMMETRIC	WITH TILEVEL DEPENDENT	WITH COGSTYLE DEPENDENT
LAMBDA		0.00000	0.00000	0.00000
UNCERTAINTY COEFFICIENT		0.00208	0.00319	0.00154
SOMERS' D		-0.04752	-0.03784	-0.06385
ETA			0.06207	0.05429
STATISTIC		VALUE	SIGNIFICANCE	
CRAMER'S V		0.06207		
CONTINGENCY COEFFICIENT		0.06196		
KENDALL'S TAU B		-0.04915	0.2351	
KENDALL'S TAU C		-0.05229	0.2351	
PEARSON'S R		-0.05429	0.2297	
GAMMA		-0.09196		

TABLE 5.32

CROSS TABULATION OF  
BY COGSTYLE COGNITIVE STYLE

SRLEVEL	COGSTYLE						ROW TOTAL
	1.00I	2.00I	3.00I	4.00I	5.00I	6.00I	
LOW SR	26 I	21 I	12 I	5 I	64		
	40.6 I	32.8 I	18.8 I	7.8 I	34.0		
	41.3 I	30.0 I	27.3 I	45.5 I			
	13.8 I	11.2 I	6.4 I	2.7 I			
HIGH SR	37 I	49 I	32 I	6 I	124		
	29.8 I	39.5 I	25.8 I	4.8 I	66.0		
	58.7 I	70.0 I	72.7 I	54.5 I			
	19.7 I	26.1 I	17.0 I	3.2 I			
COLUMN TOTAL	63	70	44	11	188		
	33.5	37.2	23.4	5.9	100.0		

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F. < 5
3.51114	3	0.3193	3.745	1 OF 8 ( 12.5%)

STATISTIC	SYMMETRIC	WITH SRLEVEL DEPENDENT	WITH COGSTYLE DEPENDENT
LAMBDA	0.02747	0.00000	0.04237
UNCERTAINTY COEFFICIENT	0.00986	0.01446	0.00748
SOMERS' D	0.07277	0.06004	0.09236
ETA		0.13666	0.06290

STATISTIC	VALUE	SIGNIFICANCE
-----------	-------	--------------

CRAMER'S V	0.13666	
CONTINGENCY COEFFICIENT	0.13540	
KENDALL'S TAU B	0.07447	0.1370
KENDALL'S TAU C	0.08296	0.1370
PEARSON'S R	0.06290	0.1956
GAMMA	0.13253	

TABLE 5.33

CROSS TABULATION OF  
 COGSTYLE COGNITIVE STYLE BY Q41 Job Title

COGSTYLE	COUNT ROW PCT COL PCT TOT PCT	Q41			VP Level Director or lower	ROW TOTAL
		CEO	1	2		
ST	1.00	9	18	36	63	33.5
		14.3	28.6	57.1		
		36.0	29.5	35.3		
		4.8	9.6	19.1		
NT	2.00	12	30	28	70	37.2
		17.1	42.9	40.0		
		48.0	49.2	27.5		
		6.4	16.0	14.9		
NF	3.00	3	11	30	44	23.4
		6.8	25.0	68.2		
		12.0	18.0	29.4		
		1.6	5.9	16.0		
SF	4.00	1	2	8	11	5.9
		9.1	18.2	72.7		
		4.0	3.3	7.8		
		.5	1.1	4.3		
COLUMN TOTAL	25 13.3	61 32.4	102 54.3	188 100.0		

CHI-SQUARE 11.41499 D.F. 6 SIGNIFICANCE 0.0764 MIN E.F. 1.463 CELLS WITH E.F. < 5 2 OF 12 ( 16.7%)

STATISTIC SYMMETRIC WITH COGSTYLE WITH Q41  
 DEPENDENT DEPENDENT  
 LAMBDA 0.04902  
 UNCERTAINTY COEFFICIENT 0.02832  
 SOMERS' D 0.08264  
 ETA 0.10675  
 0.06780  
 0.02518  
 0.03235  
 0.07617  
 0.22222

TABLE 5.34

Q53 CROSSTABULATION OF BY Q41 Job Title

Q53	COUNT ROW PCT COL PCT TOT PCT	Q41			ROW TOTAL
		VP Level Director or lower			
		11	21	31	
F		4 7.3	13 23.6	38 69.1	55 29.3
		16.0 2.1	21.3 6.9	37.3 20.2	
T		21 15.8	48 36.1	64 48.1	133 70.7
		84.0 11.2	78.7 25.5	62.7 34.0	
COLUMN TOTAL	25 13.3	61 32.4	102 54.3	188 100.0	

CHI-SQUARE D.F. SIGNIFICANCE MIN E.F. CELLS WITH E.F. < 5

7.13610 2 0.0282 7.314 NONE

STATISTIC SYMMETRIC WITH Q53 DEPENDENT WITH Q41 DEPENDENT

LAMBDA 0.00000 0.00000 0.00000  
 UNCERTAINTY COEFFICIENT 0.02499 0.03245 0.02032  
 SOMERS' D -0.18340 -0.15684 -0.22078

STATISTIC VALUE SIGNIFICANCE

CRAMER'S V 0.19483  
 CONTINGENCY COEFFICIENT 0.19123  
 KENDALL'S TAU B -0.18608 0.0040  
 KENDALL'S TAU C -0.18277 0.0040  
 GAMMA -0.38683



TABLE 5.35

STRUCTRE		LEVEL OF ORGANICITY		UNCERTNTY		CROSS TABULATION OF		BY UNCERTNY ENVIRONMENTAL UNCERTAINTY	
ROW PCT	COL PCT	ICERTAIN	UNCERTAI	UNCERTAIN	UNCERTAI	ROW	TOTAL	MIN E.F.	CELLS WITH E.F. < 5
TOT PCT	TOT PCT	N	N	N	N	TOTAL	TOTAL	( BEFORE YATES CORRECTION )	
1.00	1.00	48	37	85	85	85	85	41.144	NONE
56.5	43.5	49.5	40.7	45.2	45.2	45.2	45.2		
25.5	19.7								
2.00	2.00	49	54	103	103	103	103		
47.6	52.4	50.5	59.3	54.8	54.8	54.8	54.8		
26.1	28.7								
COLUMN		97	91	188	188	188	188		
TOTAL		51.6	48.4	100.0	100.0	100.0	100.0		
CHI-SQUARE	D.F.	SIGNIFICANCE		MIN E.F.		CELLS WITH E.F. < 5			
1.14148	1	0.2853		41.144		NONE			
1.47627	1	0.2244		( BEFORE YATES CORRECTION )					
STATISTIC		SYMMETRIC		WITH STRUCTRE		WITH UNCERTNY			
				DEPENDENT		DEPENDENT			
LAMBDA		0.02841		0.00000		0.05495			
UNCERTAINTY		0.00570		0.00571		0.00568			
SOMERS' D		0.08861		0.08825		0.08898			
ETA				0.08861		0.08861			
STATISTIC		VALUE		SIGNIFICANCE					
PHI		0.08861							
CONTINGENCY COEFFICIENT		0.08827							
KENDALL'S TAU B		0.08861				0.1128			
KENDALL'S TAU C		0.08816				0.1128			
PEARSON'S R		0.08861				0.1133			
GAMMA		0.17684							

TABLE 5.36

CROSS TABULATION OF  
TSLEVEL BY STRUCTRE LEVEL OF ORGANICITY

TSLEVEL	STRUCTRE		ROW TOTAL
	MECHANIS ITIC	ORGANIC	
	1.00	1.00	2.00
LOW TS	25	17	42
	60	86	146
HIGH TS	85	103	188
	45.2	54.8	100.0
COLUMN TOTAL			

CHI-SQUARE D.F. SIGNIFICANCE MIN E.F. CELLS WITH E.F. < 5

3.75854 1 0.0525 18.989 NONE  
4.47154 1 0.0345 ( BEFORE YATES CORRECTION )

STATISTIC SYMMETRIC WITH TSLEVEL WITH STRUCTRE  
DEPENDENT DEPENDENT

LAMBDA 0.06299 0.0000 0.09412  
UNCERTAINTY COEFFICIENT 0.01946 0.02234 0.01723  
SOMERS' D 0.15181 0.12907 0.18428  
ETA 0.15422 0.15422 0.15422

STATISTIC VALUE SIGNIFICANCE

PHI 0.15422  
CONTINGENCY COEFFICIENT 0.15242  
KENDALL'S TAU B 0.15422 0.0175  
KENDALL'S TAU C 0.12789 0.0175  
PEARSON'S R 0.15422 0.0173  
GAMMA 0.35647

TABLE 5.37

TILEVEL		STRUCTURE		MECHANIS ORGANIC		ROW TOTAL		CROSS TABULATION OF STRUCTURE LEVEL OF ORGANICITY	
COUNT	ITIC	1.001	2.001	33	21	54	28.7	MIN E.F.	CELLS WITH E.F. < 5
TILEVEL	1.00	1	1	1	1	1	1	24.415	NONE
LOW TI	1.00	1	1	1	1	1	1	( BEFORE YATES CORRECTION )	
HIGH TI	2.00	1	1	1	1	1	1		
COLUMN TOTAL	85	103	188						
TOTAL	45.2	54.8	100.0						
CHI-SQUARE	D.F.	SIGNIFICANCE		WITH TILEVEL DEPENDENT	SYMMETRIC	WITH STRUCRE DEPENDENT			
6.85631	1	0.0088		0.0000	0.08633	0.14118			
7.73054	1	0.0054		0.03431	0.03195	0.02988			
LAMBDA				0.18435	0.20186	0.22305			
UNCERTAINTY COEFFICIENT				0.20278		0.20278			
SOMERS' D				VALUE	SIGNIFICANCE				
ETA				0.20278	0.42496				
PHI				0.20278					
CONTINGENCY COEFFICIENT				0.19874					
KENDALL'S TAU B				0.20278		0.0028			
KENDALL'S TAU C				0.18266		0.0028			
PEARSON'S R				0.20278		0.0026			
GAMMA				0.42496					

TABLE 5.38

SRLEVEL		STRUCTURE		CROSS TABULATION OF BY STRUCTURE LEVEL OF ORGANICITY	
COUNT	MECHANIS ORGANIC ITIC	ORGANIC	ROW TOTAL	MIN E.F.	CELLS WITH E.F. < 5
SRLEVEL	1.00	1.001	2.001	28.936	NONE
LOW SR	35	29	64	( BEFORE YATES CORRECTION )	
HIGH SR	50	74	124		
COLUMN TOTAL	85	103	188		
	45.2	54.8	100.0		
CHI-SQUARE	D.F.	SIGNIFICANCE			
2.96049	1	0.0853			
3.51650	1	0.0608			
STATISTIC		SYMMETRIC	WITH SRLEVEL DEPENDENT	WITH STRUCTRE DEPENDENT	
LAMBDA		0.04027	0.00000	0.07059	
UNCERTAINTY COEFFICIENT		0.01405	0.01456	0.01356	
SOMERS' D		0.13660	0.13021	0.14365	
ETA			0.13677	0.13677	
STATISTIC		VALUE	SIGNIFICANCE		
PHI		0.13677			
CONTINGENCY COEFFICIENT		0.13550			
KENDALL'S TAU B		0.13677	0.0307		
KENDALL'S TAU C		0.12902	0.0307		
PEARSON'S R		0.13677	0.0306		
GAMMA		0.28218			

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