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Date April 14, 1980
ABSTRACT

The purpose of this study was to examine crisis management in business enterprises. The study had four objectives:

1) to integrate theories of crisis behaviour into a conceptual model of crisis management providing a basis for empirical research;
2) to test specific hypotheses concerning crisis behaviour, susceptibility to crises, and coping abilities;
3) to develop managerial tools for diagnosing organizational strengths and vulnerabilities in coping with crises;
4) to develop prescriptions for improving abilities to cope with crises and for preventing crises.

A conceptual model was developed that provided a framework for studying decision-making and implementation processes during crises. Data on environmental, organizational, and managerial characteristics were collected from senior executives in 94 firms in Canada and the U.S. by means of a structured questionnaire.

Thirty hypotheses derived from the crisis model were tested. Environmental predictability and a managerial style reflecting process rather than task orientation were two factors associated with lower than average susceptibility to crisis. A general dimension of coping abilities was identified. Firms that have a high ability to cope with one type of crisis tend to have high abilities to cope with other kinds of crises.

In addition to the general dimension the study discovered a specialized dimension of coping abilities. Firms that develop high abilities to deal with continuous threats tend to have poor abilities to deal with
discontinuous threats if the general dimension of coping abilities is kept constant. High levels of organizational slack and a decentralized decision-making structure were identified as two major factors relating to the ability to cope with market failures.

Diagnostic functions were constructed that predicted vulnerabilities to crisis on the basis of executive and organizational attributes. Discriminant Analysis was used to derive the predictive functions for different types of threatening situations (discontinuous threats and opportunities, market stagnation, declining markets, and cyclical markets). The powers of discrimination for these functions generally were high.

Prescriptions were developed for improving crisis coping abilities and for preventing crises. To help reduce crisis susceptibility, for example, improved scanning and monitoring techniques were prescribed to temper the impact of an uncertain environment. Dual organizational structures, one for routine decision-making and one for crisis decision-making were prescribed to improve performance in crises. Other prescriptions were of a type that generally would improve management capabilities, for example, expanding the repertoire of standard operating procedures, increasing the motivation of operating departments, and making procedural modifications in decision-making processes.

The dissertation concludes by reviewing the successes and weaknesses of the empirical study, and proposals are made for future research.
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1. INTRODUCTION

The modern organization exists in a turbulent, often hostile world where there are constant threats to its growth and survival. In the long term, only some organizations will survive; these are defined in this paper as effective organizations. Although the concept of organizational effectiveness has been widely studied, there is little agreement among investigators as to the important indicators of effectiveness or how to measure effectiveness. Goal achievement, efficiency, resource acquisition, and adaptability are some of the dimensions of effectiveness that have been investigated (Bennis, 1966; Etzioni, 1975; Seashore and Yuchtman, 1972; Schein, 1972).

In his distillation of the research literature, Steers (1977:174) suggests that the most salient dimensions of effectiveness may be adaptability, resource acquisition, productivity, and profitability. He notes "the role of management ... is to organize and utilize the available resources in a way that minimizes external threats and pressures and facilitates the attainment of the ultimate aim of the organization". For an organization to maximize long term effectiveness, however, it must develop the flexibility to cope not only with day-to-day events, but also with unexpected external threats and pressures of critical importance. Threats of this nature are commonly called crises.

If a crisis is defined as an objective state, there must be some universal acceptance of the elements that constitute a crisis. In addition, researchers need to designate thresholds for these elements, which when exceeded, precipitate a crisis. Such a universal definition of "crisis" does not exist, nor would it be particularly useful.
A more valuable analytic construct is to view a crisis as a subjectively defined event. A researcher can then study the particular patterns of behaviour that emerge and influence effectiveness during situations perceived to be very threatening by the members of an organization. This study adopts the second approach: crises are viewed as subjectively-defined states.

Although many facets of organizational effectiveness have been examined, few studies have focussed on crises as a separate class of behavioural phenomena. There is an extensive body of research that examines crises and crisis decision-making in the fields of foreign policy and international relations (Allison, 1971; de Rivera, 1968; Hermann, 1972; Holsti, 1972; Janis, 1972; Paige, 1968; Wagner, 1974). Organizational effectiveness during crises also has been examined in the context of natural hazards and natural disasters (Barton, 1969; Dynes, 1970; Fritz and Marks, 1954; Slovic, Kunreuther, and White, 1974). There appears to be an empty research niche, however, with respect to studies of crises in an organizational framework and particularly with a focus on business enterprises.

The purpose of this study is to examine the phenomena of corporate crises, and to identify the structural and behavioural attributes that increase or decrease the susceptibility of business enterprises to crises. In the analysis, both the external and internal environments of the firm are considered. Although crises may originate from external environmental threats, defects within the organization in the form of biased perceptions and pathological processes can affect initial perceptions of threat, and the coping abilities invoked to deal with threats. Starbuck, Greve, and Hedberg (1978:114) note that firms encountering crises do not have qualitatively unusual characteristics, nor are they fundamentally abnormal.
"Probably the great majority of organizations have the potential to work themselves into crises, and the processes which produce crises are substantially identical with the processes which produce successes". This study seeks to achieve insight into those processes.

1.1 Defining the Concept of Crisis

The word 'crisis' is an often over-used term with a very imprecise meaning. All crises are not identical; they vary in kind and degree depending upon the perceptions of individual actors. "In a sense, crises are unto the beholder. What is a crisis to one individual or group may not be to another" (Kupperman, et al, 1975:404).

Hermann (1972:13) developed a definition of a crisis that has achieved wide acceptance, particularly among foreign policy scholars:

"[a crisis] (1) threatens high priority goals of the decision-making unit, (2) restricts the amount of time available for response ... and (3) surprises the members of the decision-making units by its occurrence."

Researchers in other disciplines also have attempted to develop workable definitions of a crisis emphasizing different behavioural aspects of the concept. For example, Fink Beak, and Taddeo (1971:16) focus on the failure of organizational coping responses:

"A human system is assumed to be in a state of crisis when its repertoire of coping responses is not adequate to bring about the resolution of a problem."

Milburn (1972:262) defines crisis in terms of stressors that affect behaviour:
"Crises may be regarded as a type of stress-producing stimulus ... involving three simple stressors: (1) threat of value loss, (2) pressure to decide relatively quickly, and (3) pressure to innovate in problem solving since no programmed decision, or relevant contingency plan, exists."

Other researchers emphasize threat to goal achievement and the urgency for action as factors demarcating crises:

"[a crisis is] a situation in which goals are at stake that are of high importance to the system ... when the probability that these ... goals will be achieved is ... small." (Mulder, van Eck, de Jong, 1971:21)

"Crises are generally distinguished ... by a sense of urgency and a concern that problems will become worse in the absence of action." (Kupperman, Wilcox, Smith, 1975:404)

From these definitions it appears that certain psychological and sociological factors distinguish crises from routine decision situations:

a) the occurrence of an event that is unanticipated.
b) a perceived threat to high-priority individual or organizational goals.
c) a sense of urgency to take action brought about by perceived time pressures.
d) the uncertainty of outcomes concerning the initial threat and actions taken to alleviate the threat.
e) the failure of standard operating procedures to eliminate or reduce the threat.
f) a high level of psychological stress among decision makers.

Although each crisis may differ in specific content, in general, they all can be viewed as comprising a class of phenomena with some common characteristics and underlying causes. However, in perceiving a crisis not
all decision-makers will place equal importance on the six factors given above. The importance of a factor will also vary over time for a single decision-maker given different types of threatening events and different situational factors.

While crises may be unique in structure and content, they may be inevitable features of corporate life. Given the current pace of technological and social change, one is hard put to identify organizations, public or private, unlikely to experience situations that the members perceive to be crises (Holsti, 1978:50). One should note, however, that the effects of a crisis are not always dysfunctional. Crises can pose both a threat and an opportunity to a firm. On the positive side, a crisis often provides the impetus for an organization to make constructive changes.

To evaluate the effectiveness of an organization in coping with crises, one must first understand the major dimensions that contribute to their emergence. Three dimensions are of prime importance in analyzing crises: (a) the environmental context, (b) the individual context, and (c) the organizational context. The theoretical underpinnings of this research were derived from a wide variety of studies that deal with various aspects of these dimensions.
2. THEORETICAL CONCEPTS

2.1 The Environmental Context

An individual corporation does not exist in isolation; it is only one part of a larger, more complex socio-economic system. Organizations "both respond to and operate upon the contexts in which they are imbedded" (Leavitt, Pinfield, and Webb, 1974:xii). This section examines those dimensions of the external environment that may influence a firm's vulnerability to crises.

The external environment of an organization has been conceptualized in various ways. One major dimension identified is the degree of environmental stability. Emery and Trist (1965) were early researchers of this theme. They suggested the concept of turbulence and its opposite, placidity. Turbulence, broadly defined, is a measure of change that occurs in the factors or components of an organization's environment. At one end of a continuum of change there is a static environmental state (no change); at the other end, a turbulent or dynamic state where all factors are in constant flux. The amount of environmental turbulence is closely related to the degree of uncertainty facing a firm. As the environment becomes increasingly turbulent, factors become less predictable and more uncertain; the values of important variables and the variables themselves move in an erratic fashion.

The absolute amount of environmental turbulence is only one aspect of change important to a firm. The rate of change is also a critical factor. Although the meaning of 'rate of change' has been defined only vaguely in the literature, Jurkovitch (1974) has attempted to add operational clarity to the term. He suggests that rate of change can be defined by measuring the amount of alteration to major goals in a given period. The higher the
change rate in the environment, the higher the number of major organizational goals that must be altered and vice versa. The ability to time organizational changes to keep pace with environmental change rates is an important indicator of an organization's coping abilities.

A second major dimension of the external environment is that of simplicity/complexity. This dimension is concerned with the number of factors in the environment that must be taken into consideration by the firm in a decision-making situation. Child (1972) defined complexity as the heterogeneity and range of activities relevant to organizational operations. Steers (1977:86) noted that "a simple, or placid, environment is one in which the external factors with which an organization must deal are few in number and are relatively homogeneous". Simon (1965) suggested that complex systems were composed of parts that interacted in a non-simple manner. A simple, non-complex environment frees the organization from the necessities of sophisticated information systems since there are only a limited number of information categories to be monitored that are critical for organizational decision-making. Complex environments in contrast, not only place greater demands on an information system, but also call for a higher quality of decision-making to account for diverse constituencies in the environment.

The two dimensions of stability and complexity were integrated by Duncan (1972) into a four cell matrix of environmental states. He suggests that the dimensions of stability and complexity influence the degree of uncertainty in organizational decision-making. The more complex and dynamic the environment, the greater is the perceived uncertainty for the firm. In contrast, a static and simple environment has low perceived uncertainty.¹

¹ Note that a firm operating in a static and simple environment can by its actions unsettle that environment and increase uncertainty.
Duncan suggests that decision units with dynamic environments always experience significantly more uncertainty regardless of whether the environment is simple or complex.

It is important to note the nature of human perception in the assessment of environmental uncertainty. Weick (1969) suggests that individual perceptions need not correspond to any objective reality. Managers will 'enact' an environment that is consistent with their psychological set. An environment that one organization perceives as simple, static, with little uncertainty, may be perceived by a second organization as complex, dynamic, with a high degree of uncertainty. Organizational responses to an identical environment will be highly variable as will the responses of different parts of the same organization. Uncertainty, complexity, and other factors are not constant features of a firm's environment, but are dependent on the prior beliefs of individual members (Starbuck, 1973). Individual tolerance for ambiguity and uncertainty thus become critical factors in determining organizational responses to environmental stimuli.

The existing coping mechanisms of a firm can influence its perceptions of the environment. An organization's members can perceive the environment as posing a threat or offering an opportunity (Perrow, 1970). With flexible coping strategies and a positive attitude towards uncertainty, a dynamic organization will find even the most turbulent environment a source of opportunity rather than threat.

Steers (1972:96) suggests that the predictability of environmental states decreases with greater uncertainty. "The capacity of an organization to successfully adapt to its environment is facilitated to a large extent by its ability to know what the external environment is going to be like in the future". If an organization can predict the extent and
direction of environmental change with some degree of certainty, there is a much greater probability that appropriate coping responses can be taken.

Several writers have elaborated upon the dimension of complexity. Osborn and Hunt (1974) suggest that the concept of dependency can be viewed as a component of environmental complexity. Dependency refers to the degree to which an organization relies upon specific elements in its environment for growth and survival, and the extent to which these elements interact. The more dependent the organization, the more open to threat it is, and the less able it is to exercise control over environmental variables. Jurkovitch (1974) extended the concept of dependency by distinguishing between organized and unorganized sectors of a firm's environment. An unorganized sector refers to organizations or individuals that use a firm's goods and services but are not bound together by formal or informal rules requiring coordinated interaction to reach a defined goal. Jurkovitch suggests that unorganized sectors, with greater sources of uncertainty, are much more difficult for a firm to deal with than organized sectors.

Organizations interacting with complex, dynamic, and unpredictable environments face special problems of management and planning. The potential for crisis is great. Flexible strategies are essential for effectively coping with environmental discontinuities. Segal (1974) developed a set of organizational typologies for responding to various types of environments. Two types are of particular interest: the chain-structured organization and the adaptively-structured organization. The chain-structured organization is designed to accomplish a particular task or narrow range of tasks with great efficiency, but it is without sufficient flexibility to easily change its structure in response to changes in its environment. Organizations with this structure perceive their environments as static and
homogeneous. Management procedures are based on standardization (for example, bureaucracies). When the environment makes impossible demands on such an organization, (for example, through rapid change) the firm may be unable to do little more than repeat standardized and unsatisfactory behaviour, making its position even more perilous.

In contrast, Segal suggests that an adaptively-structured organization is comprehensively responsive to a turbulent environment. This type of organization is prepared to alter both its structure and internal roles to adapt to new conditions. Coping mechanisms are well developed to ensure the survival of the organization: Jurkovitch (1974:390) notes that in highly adaptive organizations existing in turbulent, uncertain environments, "problem solving is replaced by problem coping. Problems are never completely solved and people are forced to learn to live with the consequences of the unsolved aspects of problems".

2.2 The Individual Context

The effectiveness of an organization as a "problem solving, decision making, action taking system" (Olmstead, 1974:181) ultimately is dependent upon managerial effectiveness. This is particularly true during crises when the need for decision may be immediate and responsibility is concentrated in one or a very few senior individuals (Hermann, 1973; Mulder, et al, 1971). Effectiveness "ultimately reduces to the judgments and actions of key leaders, both individually and collectively. It depends upon skills in acquiring and interpreting information; choices concerning to whom acquired information is to be communicated, as well as the accuracy and completeness of the communications; decisions concerning ways to cope with unusual or unanticipated situations; and the execution of actions resulting
from such decisions - all performed at a high level of sensitivity and coordination" (Olmstead, 1974:181).

There is a large body of literature directed towards establishing criteria of effective managerial behaviour. Although the subject has been dealt with extensively, no satisfactory global indices of managerial effectiveness have been developed nor is there any agreement which factors should be incorporated in such indices. Some research suggest that a manager's effectiveness is contingent on his situation at any moment in time, reflecting his personal attributes, the special characteristics of his job, and his organization's motivational policies and practices (Campbell, et al, 1970).

Two dimensions are particularly relevant when assessing managerial effectiveness during organizational crises. These are: cognitive performance (particularly the effects of stress on information processing and perception) and preferred leadership style.

Cognitive Performance:

During crises when individuals are under great stress, and important decisions must be made within a short time, cognitive performance may be subject to certain pathologies. As the size of the decision unit contracts during crises, the amount of stress on individual decision makers increases since each member feels a greater responsibility for potential failure (Hermann, 1963). The greater the level of felt stress, the greater the perceived pressure for decisive action. The intensity of felt stress appears to depend upon the perceived magnitude of losses the decision-maker anticipates from his chosen actions (Janis and Mann, 1978:49). Although a moderate level of stress may promote learning in a decision situation (Cangelosi and Dill, 1965), during a crisis, stress is usually
of such a magnitude that it promotes dysfunctional cognitive behaviour. With decreasing levels of cognitive efficiency, behaviour becomes even less adaptive, and the resulting decision is often of poor quality (Levine, 1971; Robinson, 1972). An "increasingly severe crisis tends to make creative policy-making both more important and less likely" (Holsti, 1971:62).

Stress-related maladaptive behaviour is manifested in numerous ways. Milburn (1972) suggests that stress has a curvilinear effect on individual performance. While a moderate level of stress may be conducive to good decision-making, high levels of stress lead to a breakdown in perceptual accuracy and reduced ability to focus on relevant information from the environment (Easterbrook, 1959; Holsti, 1971). Decision makers become increasingly concerned with short-range issues at the expense of long-range outcomes (Paige, 1968; Albers, 1966). Stress also promotes a rigidity in problem solving ability, a functional fixedness that reduces the individual's capacity for abstract reasoning and tolerance for ambiguity (Beier, 1951; Smock, 1955; Loomis, 1960). The impaired cognitive abilities of the individual may result in an inability to predict the consequences of various alternative courses of action (Holsti, 1972). Postman and Bruner (1948) note that under stressful conditions, individuals make premature interpretation of stimuli, and the ability to distinguish the dangerous from the trivial is impaired. Due to the effects of cognitive dissonance, there is reduced objectivity and increased bias in the way individuals perceive and evaluate alternatives. Inconsistent cognitions motivate people to change their ideas or beliefs; this change is usually in the direction of bolstering the decision taken (Festinger, 1964). "The consensus of most behavioural research is that men operating under ... acute stress are scarcely capable of considered judgment. Strain and fatigue commonly
produce actions which are caricatures of day-to-day behavior" (Nathan, 1975:259).

The onset of a crisis usually results in key decision-makers receiving sharply increased volumes of complex information stimuli. In many instances individuals are unable to cope with the cognitive demands of this increased volume. Decision-makers may attempt to cope with information overload by narrowing their span of attention to include only essential aspects of the decision task. Holsti (1978:46) notes that this can be a functional strategy if it allows decision-makers to "eliminate trivial distractions, filter out irrelevant information, and develop an agenda of priorities". However, the results of this strategy more often are pathological. The error rate on task performance is positively correlated with the increased volumes of information received by decision-makers (Lanzetta and Roby, 1957). "When the degree of complexity of an issue exceeds the limits of cognitive abilities, there is a marked decrease in adequacy of information processing as a direct effect of information overload and ensuing fatigue" (Janis and Mann, 1977:17).

Under conditions of information overload, an individual's perceptions act as a screening device, selectively discriminating and interpreting data. The more ambiguous the circumstances, the more likely an individual will enact an environment consistent with his own personal predispositions irrespective of any external 'reality' (Weick, 1969). Prior beliefs affect not only the interpretation of informational stimuli, but also whether one initially takes note of particular stimuli. Individuals selectively expose themselves to information compatible with their belief structure and screen out potentially incompatible information.
The biases resulting from selective attention are compounded by errors of judgment and concept formation in interpreting the information at hand. Decision-makers develop and employ mental models of their environment. These models play a dual role. They provide a framework for assessment of decision consequences as well as a framework for further information collection. These models are the images of reality upon which decision processes are based.

The development of models and the processes by which they are revised when more data becomes available to decision-makers are affected by several sources of error resulting from faulty techniques of concept generation. Tversky and Kahneman (1974) suggest that decision-makers are prone to cognitive errors as a result of over-reliance on certain intuitive heuristics as a means of making judgments under uncertainty. Although these heuristics sometimes produce good estimates of subjective probabilities, most often large errors are consistently made. The stress/information overload syndrome serves to accentuate these cognitive errors.

Paradoxically, during crises, decision-makers suffer not only the effects of information overload, but also the effects of information underload. The information available to top decision-makers may be of little use; thus, managers may feel deprived of adequate amounts of information necessary to do their job. It has been demonstrated that information deprivation leads individuals to seek out stimuli (Jones et al., 1961; Suedfeld, 1971). This psychological state may lead a decision-maker to seize upon irrelevant or incorrect information without appropriate discrimination. During crises both information overload and information underload reinforce already high levels of stress.

\[\text{Information filtering within the organizational hierarchy may be one cause of information deprivation.}\]
Cognitive performance during periods of high stress may be further impaired by the inability of individuals to correctly judge time perspectives. Under great stress, individuals overestimate how quickly time passes (Langer et al, 1961). A moderate amount of perceived time pressure stimulates creativity and increases the rate of performance, but beyond moderate levels, perceived time pressure has detrimental effects on cognitive abilities. Complex tasks particularly suffer from the effects of time pressure. Individuals display tendencies to retain familiar solutions to problems even when these solutions prove ineffective, or the problems are substantially different from previously encountered problems (Steinbruner, 1974). "There is ... evidence that time pressure increases the propensity to rely upon stereotypes, disrupts both individual and group problem-solving, narrows the focus of attention, and impedes the use of information ... high stress tends to result in a shorter time perspective and, as a consequence, a reduced resistance to premature closure" (Holsti, 1978:47).

Leadership Style:

The success or failure of an organization is often dependent upon the skills of the leader. There are suggestions in the literature that leadership behaviour during crises is, and should be, qualitatively different than during normal times. "In crisis situations, some kind of powerful leadership is functionally required, and will occur more often, or will be more often considered necessary by group members, than in non-crisis situations" (Mulder, van Eck, and de Jong, 1971:21). The need for a different type of leader during crises is also noted by Blake and Mouton (1964:14). "Management of people in the crisis of an explosion situation is likely to be different than it would be under circumstances that are routine". Hamblin (1958b) found that during crises, groups tend to replace leaders with new
people if leaders do not have obvious solutions to crisis problems. House
and Dessler (1975:35) note that people under threat prefer "strong" leaders
because "... they are perceived as improving the chances of adequately re-
spinding to the threat, and because such leaders reduce the dissatisfying
effects of the uncertainties of the situation".

Although leadership is a much studied phenomena, there is no agree-
ment generally on what contributes to effective leadership either in crisis,
or in normal times, nor is there any integrated understanding of the factors
important in assessing the quality of leadership. This situation exists in
spite of an "endless accumulation of empirical data" (Stogdill, 1974:vii).
It is recognized, however, that the leader of an organization can have a great
influence on its affairs. "Since control of information and rewards can
significantly influence the beliefs, attitudes, and behaviors of group
members, the formal leader should be in a strong position to affect what
a group does and how well it does it" (Porter, et al, 1975:428).

Many of the early theories attempted to explain leadership behaviour
by identifying universal traits of successful leaders. For example Stogdill
(1948) found that intelligence, scholarship, dependability, responsibility,
social participation, and socio-economic status differentiated leaders from
other individuals. In a later study, Ghiselli (1963) found that intelli-
gence, supervisory ability, initiative, self assurance, and individuality
were significantly correlated with management performance and organizational
level.

In the 1950's a school of research developed that sought to explain
leadership in terms of what a leader does, rather than in terms of what a
leader is. Leadership was studied as a means of developing effective
organizations (Blake and Mouton, 1964; McGregor, 1966). Many studies
focused on three styles of leadership: autocratic (authoritative),
democratic (supportive or participative) (Lipitt and White, 1943), and
instrumental (Filley and House, 1969).

An autocratic leader is defined as one who is arbitrary in decision-
making and dogmatic in relations with subordinates. His style is to com-
mand; compliance is achieved through the ability to reward and punish.
Bass and Valenti (1973:146) found that "... a directive leader style was
consistently and positively related to effectiveness". Other researchers
have found that there is no consistent relationship between autocratic style
and organizational effectiveness (usually defined in terms of productivity).
However, Tannenbaum and Schmidt (1958) suggested that emergency situations
called for a unilateral (autocratic) leadership style.

In contrast, a democratic or supportive leader attempts to create a
climate where subordinates want to perform. He solicits inputs to problem-
solving and relies on general supervision rather than close task supervision.
Supportive leadership styles have been found to be correlated with positive
attitudes and satisfaction in subordinates (Indik, et al, 1960; Spector,
et al, 1960). In some studies, supportive behaviour was found to have
positive effects on productivity (Blau and Scott, 1962; Katz and Kahn,
1953), but no consistent relationship between supportiveness and produc-
tivity has been found.

While researchers generally have found subordinates are more
satisfied with democratic or supportive leaders, there is no agreement

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3 A directive style was defined as "telling subordinates what was expected
of them, seeing that they work to capacity, emphasizing meeting deadlines,
setting standards, ruling with an iron hand, encouraging uniformity,
scheduling subordinates' tasks, telling subordinates to follow rules and
regulations, changing subordinates' duties without first talking it over
with them" (Bass and Valenti, 1973:139).
which style (democratic or autocratic) promotes greater organizational effectiveness. In summarizing the various empirical studies on autocratic and democratic leadership, Stogdill (1974:370) notes "... results clearly indicate that neither democratic nor autocratic supervision can be advocated as a method for increasing productivity, but member satisfaction is associated with a democratic style of supervision". Vroom and Mann (1960) conclude that the efficacy of autocratic versus supportive leadership style is dependent upon the expectations and needs of subordinates.

An instrumental leader is defined as one who exhibits teleological behaviour designed to achieve organizational objectives. An instrumental leader often perceives his primary purpose as obtaining and allocating resources effectively and efficiently. In one study, task oriented (instrumental) leaders were found to be more effective than interaction oriented leaders (Bass and Dunteman, 1963). Simpson and Gulley (1973) note that organizations with narrowly defined instrumental goals will be thoroughly centralized and undemocratic. The broader the range of goals, however, the greater the pressure for member participation as well as task efficiency. Filley and House (1969) suggest that individuals who exhibit both instrumental and supportive behaviour will be effective leaders in any situation.

Some of the best known work on managerial style (particularly among practising managers) was carried out by Blake and Mouton (1964); they developed the concept of the Managerial Grid. The authors suggest that managerial style is not fixed, but is determined by a range of factors: organizational requirements, situation, values, personality, and chance. These factors operate on two dimensions that are significant in determining a manager's style. The dimensions are concern for production and concern
for people. Each of these dimensions was measured on a 9 point scale. Blake and Mouton were able to describe certain profiles of managerial styles by locating a position on a 9 x 9 matrix. For instance a 9,1 or task management style (high concern for production/low concern for people) is similar to an autocratic style. Subordinates are expected to obey orders without question. Management communication is formal, rigid, and usually in written form. Decision-making is concentrated at the highest level of the hierarchy. There is an overriding concern for firm direction and control of operations.

A 1,9 or 'country club' management style (low concern for production/high concern for people) is exactly the opposite. The manager who adopts this style believes employees should be shown rather than directed in their jobs, and that people should be aided and supported in their efforts. Conditions of work are arranged so that the personal, social, and welfare needs of employees can be met on the job. A 1,9 manager will try to avoid conflict and will seek positive, harmonious relationships with employees.

Both the 9,1 and 1,9 styles are of course extreme types. Blake and Mouton suggest the ideal managerial style is 9,9 (high concern for production/high concern for people). A 9,9 manager views the organization as a vehicle to promote the conditions that integrate creativity, high productivity, and high morale through concerted team action. This manager is orientated towards accepting the best and most effective solution in a given situation not a solution defined by tradition (not unlike an instrumental manager). Management/employee relations are based on participation, mutual goal commitment, and open two-way communication.

Another trend in leadership research has been the development of contingency or situational theory (Fiedler, 1967). The contingency approach posits that leader behaviour can be explained in terms of the
interaction between a leader and the organizational environment. Fiedler suggests that there are no universal characteristics indicative of an effective leader, however, in specific circumstances, one kind of behaviour may be more appropriate than another. The type of leadership behaviour that promotes effective performance is a function of three situational or contingent variables: leader-member relationships, the degree of task structure, and the formal power or authority of the leader's position. "[M]anaging, controlling, directive leaders tend to be most effective in situations which are either very favorable for them or which are relatively unfavorable. Nondirective, permissive, considerate leaders tend to perform best in situations of intermediate difficulty" (Fiedler, 1967:15).

Burns and Stalker (1961) conducted a study that related environmental characteristics to managerial practices (including leadership styles). Their analysis concluded that managers employed two distinct styles that were a function of the degree of environmental stability. The two styles of management identified were called mechanistic and organic. Mechanistic systems are characterized by specific goals, close performance measurement, many rules, close supervisory enforcement of the rules, high task specialization, and centralization of authority with primarily vertical communication patterns. Bureaucracies are typically cited as prime examples of mechanistic systems. Burns and Stalker found that a mechanistic style was associated with effective task performance and high levels of individual satisfaction when tasks were routine, repetitive, and predictable, and where interdependence is high and only narrow deviation is tolerated.

4 Situations high on leader authority and task structure and with strong leader/group relations were considered by Fiedler to be favorable.
Organic systems are characterized by less specification of goals, less measurement, primarily process goals, general supervision, decentralization of authority, and primarily horizontal communication patterns. Burns and Stalker found an organic style of management was effective when tasks were changing, uncertain, and unpredictable, and in situations that required independent problem-solving, innovation, and creativity.

Steers (1974) enlarged upon Burns and Stalker's findings relating leadership style to a firm's external environment. He suggests the role of management is to understand environmental conditions and to adapt management practices to meet those conditions. Steers (1974:89) proposes that a mechanistic style may be more appropriate in highly predictable and stable environments "... where market and technological conditions remain largely unchanged over time". Task routinization and centralized authority promote maximum efficiency and effectiveness in this environment. In unstable, complex environments, however, an organic style may be more appropriate since it is more flexible allowing a firm to respond to new conditions. Filley and House (1969:98) made much the same suggestion. "In a relatively predictable environment, decisions are more effectively made at the top of the organization ... In a highly unpredictable type of situation, in which all levels of management need considerable influence to deal with environmental uncertainty, a more participative structure ... would be advisable".

Although the literature suggests that an organization may require a different kind of leader during crises than during normal times, little progress has been made in identifying the specific attributes of such leaders. Note that the response may take the form of adapting or coping with threatening situations, exploiting newly-identified opportunities, and attempting to exert control over the environment.
leaders. There is some evidence that emergency situations (crises) call for an autocratic, decisive leader (Tannenbaum and Schmidt, 1958). Conversely, crises often require creative, innovative behaviour to promote concerted team action to resolve the situation. A more open, participative style in this instance may be more effective in securing implementation and resolving the crisis. At best the evidence is mixed with respect to the most desirable leadership style. The type of leadership that promotes effective performance in crises is probably contingent on a number of factors such as individual characteristics, the environment, and the type of threat.

A later chapter examines changing preferences during normal periods and crises for some of the leadership styles described in this section.

2.3 The Organizational Context

In the previous sections two factors were examined that can affect individual behaviour during crises: limited cognitive capacities and management style. However, one must also take into account the behavioural impact of multiple decision-makers interacting within a complex organization. In large corporations critical decisions are made not only as a result of the careful deliberations of individual managers, but also as a result of organizational processes or political bargaining (Allison, 1971). The position of the decision unit within the organizational network, thus, becomes an important factor. Under stress, deficiencies in decision-making can result from organizational characteristics and group processes, as well as from individual pathologies. Three dimensions of organization process can be identified that contribute to deficient decision-making during crises: communications distortion, premature decision choice, and defective judgment.
Communications Distortion:

Key decisions during a crisis usually are made by a relatively small group of senior managers. The size of the decision-making group relative to the total organization produces difficulties when managers attempt to process large volumes of information during periods of stress. In a previous section it was noted that individuals are prone to information overload during crisis. In much the same way, groups also can suffer from this condition. In critical periods, information flows within an organization become extremely important and subject to malfunction. Carter (1977:27) notes "the scarcity in today's environment is not information but capacity to process information". 

Under conditions of crisis-induced stress, Hermann (1963) suggests that the number of communication channels used for collection and distribution of information between senior decision-makers and the rest of the organization will be reduced. At the same time, the volume of information flows over these channels increases. Heavy frequency of information over a restricted number of channels results in a communications overload. The probability of information distortion increases which in turn leads to deficient decision-making. Perceptions of shortened time horizons also increase the probability of decision error since fewer sources of information will be relied upon if decision-makers perceive a need to act quickly.

In most organizations, the level of an operating unit within the hierarchy is an important factor that affects communications distortion. Information must travel through a lengthy screening and filtering process at various levels of the organization before it reaches senior

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6 Carter may overstate his position; one also must be cognizant of the costs involved in producing information.
management. Not only is there often a time delay, but the form in which data are received by senior managers represents the accumulation of impacts of information processing distortions at various intermediary levels. Downs (1967) calculates that with a six level hierarchy, there may be a 98% loss of informational content in communications between the first and highest level of the organization.

Tullock (1965) notes that information is subject to 'hierarchical distortion', both in quantity and quality. The quantity of information being received by senior managers is reduced as a result of high costs of communication and by the limited cognitive capacities of individual decision-makers. Secondly, the quality of information is distorted as it moves up the hierarchy as a result of perceptual biases held by managers at each level. "The greater the channelling of information-processing, the greater the differentiation of perceptions within the organization" (March and Simon, 1958:128). Decentralized organizations in particular are prone to this perceptual distortion.

The necessity of specialization in large organizations also causes excessive information filtering that results in further distortion. Individuals at lower levels in the firm have a much narrower range of official interests than senior decision-makers. Subordinates naturally abstract parts of information stimuli that are most relevant for their own needs, not the needs of their superiors. A large portion of potentially relevant information content is thus discarded at low levels of the organizational hierarchy. "Those who decide which information their boss shall see rarely see their bosses' problem" (Allison, 1971:120).

This is only one view of information flow (bottom to top) throughout an organizational hierarchy. Managers may also engage in information-seeking behaviour, in some instances by-passing the hierarchy. By doing so, some of the effects of communication distortion are avoided.
Lower level managers also have different self interests and transmit information of a type and in a manner that suits their own purposes not the needs of senior management. Downs (1967:136) notes that in any large organization, a significant portion of all the activity being carried out is completely unrelated to the formal goals of the organization or the goals of senior management. As a result of this filtering, when information finally reaches the decision-makers at the top of the hierarchy, many critical pieces of data may have been lost; what content remains may be of little use. Ackoff (1967) notes that most senior managers suffer from an 'overabundance of irrelevant information'.

Many senior decision-makers are aware of these information distortions and attempt to offset them by counter-biasing strategies. A superior may make adjustments to all information received from subordinates in an effort to counteract the distortions. However, if the corrections are not made in the right directions, further distortions take place.

While the distortions accruing in the process of filtering information tend to bring about decision errors of the third type, wrong problem definition, the time delays involved in the process of information transmission bring about what Raiffa (1968) termed errors of the fourth type, defining and solving the problem correctly, but too late. The standard operating procedures (SOPs) of the organization may contribute to this lack of timeliness in communications that can have important ramifications during crises.

One function of SOPs is to coordinate complex routines and tasks performed by a large number of people. SOPs are intended to ensure alignment of interpretation between senders and recipients of communications. While ensuring some predictability, SOPs also may introduce an element of conservatism and rigidity into communications that works at odds with the
needs of senior managers for timely and accurate information. Crisis situations often involve sharp environmental discontinuities that require adjustments in resource allocations, members' roles, and operating procedures. To obtain the required flexibility to deal with crises, regular communications networks and information processing procedures may be interrupted or bypassed. However, since the process of organizational socialization usually penalizes deviations from SOPs, it may be difficult to obtain the needed flexibility to cope with crises.  

Allison (1971) suggests that SOPs are highly resistant to change because they are usually grounded in the norms of the organization, and the basic attitudes of its members. Novel situations requiring communications that do not fit established procedures may be ignored. If important information is not brought to senior management's attention, the probability of a crisis occurring is greatly increased.

SOPs may also contribute significantly to information filtering and distortion. Since various groups within an organization pursue divergent patterns of activity, each group develops its own specialized procedures over and above corporate SOPs. Information is interpreted differently depending upon the particular interests of an operational unit and the procedures developed for pursuing that interest. Consequently, information that reaches senior management may be considerably biased and distorted by the procedures employed by contributing units. "The records that are kept determine in large part what aspects of the environment will be observed and what alternatives of action will be considered by the firm" (Cyert and March, 1963:106).

Although some organizations have 'crisis' SOPs, these may be applicable to specific situations only. When threats are unfamiliar, there is a tendency to fall back on these procedures, since they are known, even though they are inappropriate for the new situation.
The internal politics of the organization also directly contribute to information distortion. The perceptions of decision-makers are often influenced by the process of bargaining between levels and individuals in the organizational hierarchy. Members' perceptions are biased by highly personalized goal structures of organizational and personal interests. The aphorism "where you stand depends on where you sit" (Allison, 1971:176), expresses the premise that the bargaining position of each player reflects his own perceptions of priorities and issues. The power (in terms of ability to acquire resources and influence policy) and the strategic positions of individuals or departments within an organization often determine which issues are brought to the attention of senior management and also which interpretation of events is adopted. Often times decisions are made not on the basis of rational choice, but on the basis of political gamesmanship.

A second dimension of organizational politics affects the efficiency of information diffusion. Information can be viewed as a resource, subject to manipulation by groups or individuals in order to achieve a power base within the organization. In an analysis of information flows, Barth and Vertinsky (1973:127) observed that information was concentrated at the top of the hierarchy even though decisions were made at all levels of the organization. They conclude that information is often monopolized in an effort to increase bargaining power. Etzioni (1968), theorizing about the principles of dynamic controls, also commented upon the tendency of organizations to distribute information less equally than other organizational resources. While standard operating procedures prescribe what information is made available and to whom, delays in diffusing information often occur and are hard to control. Operating units or staff groups can manipulate information release times for their own advantage. The combination of
information distortion resulting from selectivity and filtering, and the manipulation of information diffusion, explains to a large extent why senior managers often have inadequate information for making critical decisions or they are unaware of situations developing that are potentially threatening to the organization.

Premature Decision Choice:

The effects of stress on group processes produce a second dimension of deficient decision making — premature choice.\(^9\) During crises, when the potential losses to an organization are great, one would expect that a wide range of alternatives would be considered and carefully evaluated in an attempt to make the best possible decision. Paradoxically, fewer alternatives may be considered than during non-crisis periods when the stakes are much lower. Decision-making by "flight and oversight" (March and Olsen, 1976:34) may become a major feature of crisis decision-making.

During crises, the authority for decision-making shifts to the highest levels of an organization and there is a reduction in the number of persons participating those decisions (Mulder, van Eck, and de Jong, 1971). As the size of the decision group shrinks, there is an accompanying increase in stress levels. Some examples of non-adaptive behaviour manifested by individuals under high stress conditions were noted previously; in particular, cognitive abilities are reduced. Impaired cognitions significantly effect the abilities of decision-makers to generate and evaluate alternative courses of action.

\(^9\) Holsti (1978:41) notes that there is a lack of consensus in the literature on the operational measures of stress. Some authors define stress as a stimulus, while others define stress as a perceptual and behavioural response to a stimulus. In this paper, the second view is adopted, that is, stress is viewed as a response to a stimulus.
A moderate degree of stress in response to environmental threats "induces a vigilant effort to scrutinize the alternative courses of action carefully and to work out a good solution" (Janis and Mann, 1977:51). However, when decisional conflict is great due to the high risks involved with alternatives, as is the case during crises, the likelihood of pathological decision responses increases. Janis and Mann note that one form of decision response may be defensive avoidance of the threat cues. This behaviour is manifested by a lack of vigilant search for alternatives, selective inattention, selective forgetting, distortion of meaning of warning messages, and minimization of potential negative consequences of actions. When stress levels reach extremely high levels and decisional conflict is severe, there is increased likelihood that the dominant response will be panic — decision-makers will seize upon the nearest alternative without properly evaluating the ramifications of their choice.

During crises, the decision-making unit of a firm is usually a tightly-knit homogeneous group, limited to a small number of senior managers (Hermann, 1972). The members of this group are insulated from the rest of the organization by their sense of urgency and responsibility. As a result of this isolation, alternative viewpoints and fresh ideas from other members of the organization who may be 'closer to the action' and have different experiences and expertise are severely restricted.

Under stress, decision-makers also may be prone to over-simplification of a problem in order to reduce it to manageable proportions. However, George (1974) notes that the tendency to rely on a simple decision rule may lead to a premature choice that overlooks non-obvious negative consequences. Cyert and March (1963) note a tendency to base decisions on factors of short run acceptability when managers are uncertain about the long run
consequences of alternatives. The result, in either case, may be a poor
decision with severe consequences for the organization.

Defective Judgment:

During crises, under a particular combination of circumstances, pressures within the decision-making group bring about a third type of pathological behaviour that results in defective judgment. A tendency towards concurrence-seeking may become so dominant in a cohesive group that it causes individuals to indulge in a mode of thinking that prevents realistic appraisal of alternative courses of action. Janis (1972) used the term 'groupthink' to describe this behaviour. "Groupthink involves nondeliberate suppression of critical thoughts as a result of internalization of the group's norms ... the more cohesive the group, the greater the inner compulsion on the part of each member to avoid creating disunity, which inclines him to believe in the soundness of whatever proposals are prompted by the leader or by a majority of the group's members" (Janis, 1971:44).

Groupthink is most likely to occur when individuals are placed under great stress. The effects of stress and dominant, directive leadership promote a high level of cohesiveness that insulates a decision-making group from the advice of qualified experts. The group usually lacks methodical procedures for search and appraisal of policy alternatives. When these antecedent conditions occur, there is an increase in concurrence-seeking tendencies that promotes the following symptoms of groupthink: (see Janis, 1972)

(1) Group members develop an illusion of invulnerability that promotes excessive optimism and encourages decisions of very high risk.
(2) Group members ignore warnings and negative feedback that might force a reassessment of a decision. Members attempt to rationalize the status quo.

(3) Group members display an inviolate belief in their own morality; the ethical and moral consequences of a decision may be ignored entirely.

(4) Group members hold stereotyped views of their adversaries. Competitors may be regarded as too immoral and evil, or too stupid and weak to take any effective action.

(5) Groups apply direct pressure to any member who expresses doubts about a course of action or questions arguments supporting policies that are favoured by the majority. The potential negative ramifications of a decision are never discussed.

(6) Individual members practice self-censorship. They avoid deviating from group consensus by keeping silent about their own doubts and misgivings. This occurs not because of a lack of faith in one's own ideas, but through a fear of losing approval of fellow group members. The assumption that silence means consent reinforces self-censorship.

(7) Group members share an illusion that unanimity of opinion means truth.

(8) Groups develop "mindguards" — self-appointed members who try to shield other members from information that may go against shared beliefs.

When a management group displays most of these symptoms in a crisis situation, its decisions may have disastrous consequences for the organization.
Implementation Failures:

Crisis situations require precise and speedy implementation of deci-
sions. In large organizations, most problems require the support of others
for implementation of solutions. Rarely does a decision-making unit have
the ability to implement policies directly. Thus, a decision may be timely,
well thought out, and represent the best action in a crisis, but the organi-
ization may still be susceptible to disaster through faulty implementation
techniques. MacCrimmon (1973) suggests that in organizations with multiple
implementation units, there is considerable room for discretionary action
resulting in accidental or purposeful misimplementation. Difficulties in
implementation seem rooted in three areas: operating units are not moti-
vated to carry out the decision selected; noisy channels of communication
and inflexible procedures affecting coordination may delay receipt of
messages and timing of actions; and operating units may not understand
their orders.

The actions required to cope with crises may disrupt existing organi-
zational patterns. The uncertainty produced by organizational reshuffling
may strengthen the tendency of operating units to engage in defensive moves
for preserving their territories and may heighten the commitment to famil-
liar, parochial goals. Varying degrees of exposure to crises and therefore
varying degrees of felt threat may increase the existing differences in
perceived organizational priorities between units. While an external threat
may be the best motivator for long-term organizational cohesiveness, in the
short run, differentiated exposure to this threat can intensify internal
organizational conflicts (Allison, 1971). Even when operating units are
sufficiently motivated to adopt organizational objectives as their own
objectives, implementation may fail because operating units do not
understand what is required of them, or they are incapable of executing the required course of action.

In the discussion of standard operating procedures and their effect on communications, it was suggested that operating units may ignore novel situations or interpret them in light of existing procedures. Such resistance to change unintentionally subverts directives from senior management. Control systems providing quick feedback to central decision-making units for corrective actions, also often suffer from rigidity of programming and therefore fail to signal implementation failures.

2.4 A Conceptual Model of Crisis

Figure 1 illustrates the components of the conceptual model of crisis. Three major dimensions provide the theoretical bases of the model: the individual context, the organizational context, and the environmental context. In the figure, solid lines indicate immediate impacts; broken lines indicate long run or historical impacts.

An organization's susceptibility to crises is directly affected by the type of environment in which it operates. Environmental threats are mediated by an organization's coping abilities. Over the long term, these coping abilities evolve in response to environmental pressures.

The degree of threat that is perceived to be emanating from the environment and the ability to cope with threats directly influence the individual context through the intervening variable of stress. Changes in cognitive processes (for instance, the ability to process information, time perceptions, and the impacts of biases) are attributed mainly to the effects of stress. Preferences for leadership style also change, given high or low levels of stress.
Individual factors, in turn, have an impact on the organizational context of a firm. Leadership style directly affects the communications processes and group processes. These two factors in conjunction with individual cognitive processes influence the quality of decision-making. Leadership style and communications processes also have a direct impact on implementation. The quality of decision-making and the ability to implement decisions determine the overall ability of the organization to cope with threat, and, hence, susceptibility to crises.

These interactions formed the basis of the empirical study described in the next section.
Figure 1
A Conceptual Model of Crisis

- Individual Cognitive Processes
- Group Processes
- Leadership Style
- Communications Processes
- Decision-making
- Coping Abilities
- Implementation
- Stress
- Threat
- Susceptibility to crisis
- Environmental Complexity
- Environmental Turbulence
3. RESEARCH QUESTIONS

3.1 What is the Nature of Crisis?

This study addresses several questions concerning the nature of crises and the responses of individuals and organizations to crises. The first question concerns the attributes of a situation that identify it as a crisis. The relationship between elements present in situations that are generally regarded as crises are of particular interest. These elements are:

1) threats to high priority goals and values of an organization
2) surprise occurrence of threats
3) restricted time available for decision-making
4) a high degree of uncertainty in possible outcomes of decisions
5) the lack of plans or their failure to deal with threats
6) the experience of stress by decision-makers

From these elements, the following hypotheses were developed concerning the nature of crises:

$H_1$: Threats to high priority goals, stress, and restricted decision time are universal criteria in labelling a situation as a crisis.

$H_2$: The subjective criteria defining a crisis are invariant with the type of environments that individuals face.
3.2 What are the Determinants of Crisis Susceptibility?

A second question that arises is what are the determinants of organizational susceptibility to crises? How prone to crises are certain industries? Do crises occur in patterns? The following hypotheses were identified that are derived from theories of the environmental and individual context of an organization.

Environmental Context

H₃: Firms operating in predictable environments will have a low frequency of crises.

Rationale: When there is little environmental uncertainty, a firm is better able to predict future states. Steers (1977:96) notes that the capacity for an organization to successfully adapt to its environment is facilitated to a large extent by its ability to know what the environment will be like in the future. The more certain managers are about future states, the greater opportunity they have to develop adequate coping responses and take preventive measures against crises. High environmental complexity or turbulence will not by themselves contribute directly to a high frequency of crises. Rather, susceptibility may be more "a function of the extent to which ... instability (and the direction of such changes) can be predicted in advance with some degree of certainty" (Steers, 1977:97).¹⁰

¹⁰Alternatively, one could argue that although the frequency of crises is low in predictable environments, a firm's sensitivity to them is high. This results primarily from inexperience in dealing with surprises.
H₄: Firms with a high degree of control over their environments will have a low susceptibility to crisis.

Rationale: The more control a firm can exert on various environmental factors, the more simple and predictable that environment becomes. Firms that control a large portion of their resource inputs and final markets through vertical integration are not highly dependent on other organizations (Williamson, 1970). Thus, firms do not have as many sources of uncertainty to contend with. Pfeffer (1972:218) notes that large size also allows a firm to exercise more environmental control. Large organizations are better able to survive mistakes, and through growth they can diversify, further reducing susceptibility to crisis.

H₅: Firms that are very dependent on other elements in the environment are prone to crisis.

Rationale: The more dependent a firm is on other elements in its environment, the less control it can exert. Thus, it becomes susceptible to changes in resource markets, product markets, or labour markets. Without some control in these markets a firm is not able to buffer itself against changes and is particularly open to crises. Pfeffer (1972) notes that interlocking boards of directors are a technique of co-optation sometimes used to reduce the interdependence of firms.

Individual Context

H₆: Organizations managed by process oriented managers will have a low frequency of crises.
Rationale: Process managers will encourage delegation of responsibility and decentralized programs that allow for local freedom of actions (flexibility). Lower level managers and supervisors are able to act quickly on threats. This reduces the potential for surprise threats to central goals.

H7: Managers who prefer decision-making strategies associated with groupthink come from organizations that are prone to crisis.

Rationale: Janis (1972) noted a number of factors that foster the development of group norms, bolstering cohesiveness and morale to the detriment of critical analysis. He noted eight major symptoms of groupthink: invulnerability, rationale, morality, stereotypes, pressure, self-censorship and unanimity.11 When decision-makers display most or all of these symptoms decisions of such poor quality are made that an organization is prone to crisis.

3.3 What are the Determinants of Coping Abilities?

A third question of interest with respect to crises is what are the correlates and determinants of organizational coping abilities? Coping is defined in this study as the ability to reduce threats directly (for example, by eliminating external sources) or to minimize the impact of threats (for example, by making internal changes). Three areas are of particular importance:

11 The reader is referred to page 31 for a complete description of the symptoms of groupthink.
1) preferred decision structures during crises and susceptibilities to pathologies
2) the dimensionality of coping abilities
3) formal preparedness

The following hypotheses arise from these areas:

Preferred Decision Structures

Environmental Context

H₈: Managers from firms with complex environments will tend to consider only a limited number of alternatives during crises.

Rationale: A great deal of cognitive stress is placed upon decision-makers operating in complex environments. Janis and Mann (1977) note that when the degree of complexity of an issue begins to exceed the limits of cognitive abilities, a decision-maker seeks methods to provide closure of the problem. One of the ways this is achieved is to limit the number of alternatives being considered to a quantity that is comfortably handled. A satisficing strategy may be adopted rather than an optimizing strategy.

H₉: Firms operating in complex environments will develop strong adherence to Standard Operating Procedures.

Rationale: SOPs traditionally have been developed as an instrument to deal with complexity (March and Simon, 1958).

H₁₀: Managers from firms with more complex environments will seek the aid of many individuals to help evaluate actions and alternatives during crises.

Rationale: Decision-making in complex environments requires the use of many computational resources. Managers may delegate and
seek input from a variety of sources to aid in decision-making.

$H_{11}$: Managers from firms with more complex environments will concentrate on the short term effects of proposed solutions rather than long term effects during crises.

Rationale: Complex environments are characterized by the interactions of many diverse components. Because of this diversity, managers in complex environments often find it difficult to accurately assess or predict changes in components and their impact on the firm. This is particularly true over the long term. For this reason, emphasis is placed on short-run impacts in an effort to simplify the decision process (Cyert and March, 1963). One should note a competing hypothesis found in the literature. Experience with complexity may sensitize decision-makers to the need to take into account long term impacts (Forrester, 1969; Holling, 1978).

$H_{12}$: Firms operating in turbulent environments will not develop strong adherence to Standard Operating Procedures.

Rationale: If a firm operates in changing environments, there are no economies to be gained by developing standard programs to deal with these environments. Furthermore, learning is limited and no commitment to a particular program of response can develop.

Individual Context

$H_{13}$: Task oriented managers will follow SOPs closely and use only official information channels during crises.
Rationale: Burns and Stalker (1961) identified a mode of managerial practice called mechanistic management. In this style, task routinization is closely associated with specification of performance procedures, close enforcement of procedures, and centralization of authority with primarily vertical communication patterns.

H₁₄: Process oriented managers will not perceive information gathering to be an important activity during crises. Rationale: Process management is based on the premise of decentralization and local coping. Information gathering activities are usually aimed at increasing information for a different type of system, that is, centralized decision-making.

H₁₅: During crises, process oriented managers will find it particularly important for employees to understand the decisions made by management. Rationale: Process managers are results oriented. Their style favours decentralization and delegation of authority. To effectively delegate it is important that employees understand the reasons for decisions. Although this process is important during normal periods, the potential for misimplementation and its attendant high costs during crises intensifies the need for employee understanding.

H₁₆: Executives who prefer a democratic management style will encourage individuals who are responsible for implementing a decision to be involved in making the decision during crises.
Rationale: If an executive generally subscribes to norms of democratic management, he would tend to maintain this style during crises. Increased needs for information and information processing channels during crises are served better by a democratic style of management rather than an autocratic style of management.

$H_{17}$: Executives who prefer an autocratic style of management will find it desirable for an organization to have a directive leader during crises.

Rationale: Autocratic managers feel a need to work in an organization that reflects their own style: a desire for order, centralization and strong leadership. Although this preference may exist under normal conditions, during crises, when uncertainty increases and there are perceived pressures for immediate action, these needs are intensified.

$H_{18}$: Managers who think it is important to maintain organizational harmony during crises will encourage executives who disagree with company policies to keep their reservations to themselves.

Rationale: Strong concurrence-seeking tendencies have been observed among very cohesive groups. Janis (1972) notes that in such groups direct pressure may be applied to members who express strong arguments against group policies. Dissent is not expected of loyal group members.

$H_{19}$: Managers who find it important to maintain organizational harmony during crises will encourage members of an executive committee to minimize conflict within itself and to be loyal to the Chief Operating Officer.
Rationale: Highly cohesive groups are closely associated with norms of strong leadership. These groups tend to minimize conflict in order to maintain solidarity. (See $H_{18}$).

The Dimensionality of Coping Abilities

Organizational Context

$H_{20}$: Organizations that are capable of coping successfully with one type of threat are capable of coping with any type of threat.

Rationale: The skills required to deal with surprise and the abilities to reduce the impact of stress are not situation specific, but are developed as part of a general dimension of coping abilities.

$H_{21}$: Organizations develop special abilities to cope with one of two types of threats: those that occur precipitately and without warning (discontinuous), or those that build up gradually over a period of time (continuous).

Rationale: The mechanisms required to deal with a constantly high level of threat are different than the mechanisms required to deal with occasional, unpredicted high levels of threat. In the first case, one can invoke strategies and programs specifically developed to absorb stress. There is also some tendency for organizations to recruit executives who are adapted to high stress situations. In the second case, the intermittent nature of threat occurrences does not permit the development of such permanent mechanisms. Intense, remedial strategies that are specific to the threat may be required to alleviate stress.
H22: Organizations have less ability to cope with threats that have a sudden onset than with threats that build up gradually. 

Rationale: Threats that build up gradually with a small incremental impact may not be perceived as threats to organizational goals in the short term. Declining sales or loss of market share, for example, frequently are rationalized as short term declines that can be managed with normal procedures. A threat may not be interpreted as critical until a certain threshold is reached. An event with a surprise onset and a large initial impact, in contrast, may be perceived as a critical threat since extraordinary measures are required to cope with it and potential losses are large.

H23: Predictable threats in stable environments will stimulate information gathering activities during crises. 

Rationale: Firms with the ability to cope with predictable threats require a long term orientation. Information gathering, which is a long term activity, will pay off when focussed towards long term, continuing types of threats rather than non-recurring types of threats.

H24: Organizations that have a high level of slack can cope better with crises involving threats to market share or sales than they can with crises involving threats to other areas of operations.

Rationale: High slack organizations can mobilize resources to meet changing market conditions (Cyert and March, 1963). They can switch product emphasis or increase/decrease sales. These
actions require a critical mass of resources. Other types of crises may not be resource intensive.

$H_{25}$: Organizations that maintain a decentralized decision-making structure under threat can cope better with crises precipitated by a drop in sales than organizations that centralize decision-making authority under threat.

Rationale: Coping with market failures requires a high reliance on field managers and personnel for information and market contacts. Organizations that react to threats by reducing the authority of managers lose these information sources.

Environmental Context

$H_{26}$: Firms operating in complex environments have a greater ability to cope with crises than firms operating in simple environments.

Rationale: Successful decision-making in crisis situations requires effective and economical information processing to evaluate a complex system of interactions. Such a system will tend to evolve in firms with complex environments rather than in firms with simple environments.

$H_{27}$: Firms operating in turbulent environments have a greater ability to cope with crisis than firms operating in static environments.

Rationale: A turbulent environment develops the capability to deal with change. Firms learn to adapt and they develop a tolerance for surprise and stress that increases their coping abilities.
Firms operating in turbulent environments have a greater ability to cope with cyclical market conditions than firms operating in static environments.

Rationale: Firms with experience in dynamic environments will develop more adaptive procedures to deal with contingencies. Familiarity with change breeds confidence in managerial abilities to cope with turbulence.

Individual Context

H_{29}: Firms managed by entrepreneurial executives have a greater ability to cope with a major technological breakthrough than firms not managed by entrepreneurs.

Rationale: By definition entrepreneurial managers actively seek opportunities and are most attuned to exploiting an opportunity when it is presented.

H_{30}: Firms managed by executives with an aggressive marketing orientation have a greater ability to cope with a sudden drop in sales than firms managed by executives with other orientations.

Rationale: An aggressive marketing program is an indication of a firm's preparedness to cope with the contingency of market failure.

H_{31}: Firms managed by more democratic executives have a greater ability to cope with the death of a number of key executives than firms managed by less democratic executives.

Rationale: Since democratic managers encourage a high level of employee participation in decision-making, there is a greater
depth of management talent in departments or organizations headed by these managers. There is also greater knowledge of problems, issues, and strengths of the firm when many subordinates participate in the process. Participatory organizations may be able to absorb the death of key executives more easily than other organizations that do not have trained people backing up incumbent management.

3.4 What are Some of the Standard Responses to Crises?

The fourth major area of interest in the study is to identify some of the standard responses to crises (programmed behaviour) and to find explanations for them. The following hypotheses were developed:

Organizational Context

$H_{32}$: Managers from firms with a high degree of flexibility are likely to adopt entrepreneurial behaviour as a response to crisis.

Rationale: Entrepreneurial behaviour requires flexible adjustment in goals and means.

Individual Context

$H_{33}$: Managers make parochial responses based on their previous business experience during crises.

Rationale: Dearborn and Simon (1958) suggested that a manager's business specialization influences the manner in which he views business problems. In responding to crises, managers will invoke behaviour or SOPs based on previous training and experience rather than developing new behaviours.
$H_{34}$: Process oriented managers prefer programmed behaviour strategies that manipulate the managerial structure of the firm during crises.

Rationale: If a manager is process oriented, he would not focus on individual actions, but on the organizational processes used to obtain the end goals.
4. RESEARCH METHODOLOGY

Although specific aspects of processes that affect crisis decision-making have been studied previously (for example, information processing, cognitive abilities, group cohesiveness, etc.) there is a paucity of empirical work that examines in an integrated manner the various dimensions important to understanding business crises. In this study a structured questionnaire was administered to a sample of senior executives in major Canadian and American business enterprises. The data obtained were subjected to a series of statistical analyses to test the formulated hypotheses. The study investigated the major areas of organizational susceptibility to crises, and the determinants of crisis coping abilities. Methods by which this susceptibility can be decreased and coping abilities improved are proposed.

4.1 The Sample

A random sample of Canadian and American companies was selected from a population of approximately 1200. The population was determined to be those firms listed in the Fortune 500 Directory (American) and the Canadian Business 400 for 1977. The sizes of firms in the population ranged from $48 million to $55 billion (General Motors). The population considered was restricted to large enterprises since public information was readily available for these firms. Also it was felt that executives in large corporations would have had experience with many different kinds of crises and would therefore be able to give richer responses to questions than executives in small companies.

All firms in the population were assigned an identification number and a random sample was selected through use of a random number generator.
The sample size was determined on the basis of a common 'rule of thumb' used in multivariate analysis: the ratio of the number of observations to the number of variables should be between 3:1 to 5:1. The maximum number of variables to be analyzed at any one time was 18, thus, 90 observations were required (using the more conservative 5:1 ratio). Assuming a 25% return rate on mailed questionnaires, the minimum sample size required was calculated to be 360 cases.

Firms selected for the study represented a wide variety of products and services. The composition of the sample, by industry, is given in Table I.

4.2 The Research Instrument

A 12 page questionnaire with a personalized covering letter was sent to the President or Chief Operating Officer of each company selected (Appendix 1). The questionnaire examines various dimensions of the firm and its environment that theoretically could affect susceptibility to crisis and management capabilities. Two separate pilot studies composed of graduate and undergraduate students (n = 65, n = 71) were used to pretest the questionnaire. After each pilot study, modifications to the instrument were made, both in form and content.

The questionnaire consists of seven sections that examine the following dimensions:

1) programmed behaviour styles during crises
2) quality of decision-making and susceptibility to pathologies during crises
3) preferred managerial style during crisis and non-crisis situations
Table I
Sample Composition by Industry

<table>
<thead>
<tr>
<th>Industry Description*</th>
<th>No. of firms sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry (logging, pulp and paper, sawmills, services)</td>
<td>17</td>
</tr>
<tr>
<td>Mines (metals and non-metals)</td>
<td>6</td>
</tr>
<tr>
<td>Fuels (petroleum and natural gas)</td>
<td>16</td>
</tr>
<tr>
<td>Food and beverage (meat, poultry, fruit, dairy, flour)</td>
<td>59</td>
</tr>
<tr>
<td>Tobacco products</td>
<td>2</td>
</tr>
<tr>
<td>Textiles (cottons, wools, synthetics, ropes, carpets, knitting mills)</td>
<td>8</td>
</tr>
<tr>
<td>Clothing mfg.</td>
<td>4</td>
</tr>
<tr>
<td>Furniture and fixtures</td>
<td>2</td>
</tr>
<tr>
<td>Printing and publishing</td>
<td>6</td>
</tr>
<tr>
<td>Metal and metal fabricating (iron, steel, aluminum)</td>
<td>61</td>
</tr>
<tr>
<td>Transportation equipment (motor vehicles, aircraft, rolling stock, ship building)</td>
<td>22</td>
</tr>
<tr>
<td>Electrical products (appliances, radio, T.V., computers)</td>
<td>22</td>
</tr>
<tr>
<td>Non-metallic mfg. (cement, concrete, glass, etc.)</td>
<td>9</td>
</tr>
<tr>
<td>Refineries</td>
<td>15</td>
</tr>
<tr>
<td>Rubber and chemicals (plastics, fertilizers, pharmaceuticals, paint, soaps)</td>
<td>45</td>
</tr>
<tr>
<td>Construction</td>
<td>2</td>
</tr>
<tr>
<td>Transportation (airlines, railways, buses, pipelines, etc.)</td>
<td>9</td>
</tr>
<tr>
<td>Communications (radio-T.V. broadcasting, telephones, cables, etc.)</td>
<td>4</td>
</tr>
<tr>
<td>Utilities (electric, gas, water)</td>
<td>6</td>
</tr>
<tr>
<td>Trade (wholesale, retail)</td>
<td>14</td>
</tr>
<tr>
<td>Finance (banks, insurance, investments)</td>
<td>29</td>
</tr>
<tr>
<td>Amusement, recreation (movies, hotels, restaurants)</td>
<td>3</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>376</strong></td>
</tr>
</tbody>
</table>

* Categories developed from Standard Industrial Classifications (Statistics Canada) and Industry Codes (Office of Management and Budget).
4) environment of the organization
5) coping abilities of the firm with respect to different dimensions of threat
6) factors defining a crisis
7) demographic characteristics

Section 1 of the questionnaire investigates two dimensions of managerial posture in terms of preferred strategies in dealing with crises. Decision-makers may choose between two different postures: a defensive (reactive) style, or an entrepreneurial (active) style. A defensive manager is defined as one who favours reactive strategies oriented towards retrenchment or curtailment of organizational programmes when the firm is threatened by crisis. In particular, there is a preoccupation with cutting expenses. Defensive managers tend to focus on costs rather than benefits when evaluating programmes. During crises, a defensive manager reacts to a specific problem stimulus and corrective measures are primarily oriented towards returning to or maintaining the status quo. There is more concern for survival of the organization than for its growth and development.

In contrast, an entrepreneurial manager is defined as one who favours active or offensive strategies that enable an organization to exert control over its environment. When threatened by crisis, an entrepreneurial manager favours flexible strategies aimed towards turning threats into opportunities for organizational growth. The potential benefits of programmes are stressed rather than the costs. Unlike the defensive manager, who concentrates primarily on financial factors, the entrepreneurial manager is more systems oriented; he attempts to exert control over the environment from various points throughout the organization. Thus an entrepreneurial manager's response to a profit crisis may be to increase
advertising expenditures and institute incentives for sales personnel in an effort to achieve greater sales volume. A defensive manager in contrast, may impose across-the-board cuts in all operating budgets as a response to a profit crisis.

Positive responses to questions 1, 4, 7, 8, 11, and 14 are indicative of an entrepreneurial style while positive responses to questions 2, 3, 5, 6, 9, 10, and 12 are indicative of a defensive style.

In addition to assessing the two dimensions of managerial posture, the items in Section 1 can be further classified into three categories of strategies: personnel, operational, and developmental. Personnel strategies are defined as those actions concerning human relations, motivation, and incentives. Questions 4, 5, 10, 12, and 13 fall into this category. Operational strategies describe actions concerning the non-human functions of the firm, primarily finance, control, and marketing (questions 1, 2, 3, 6, and 9). Developmental strategies are defined as primarily long term actions that do not directly affect current operations, but may contribute to the future development of the firm. Expansion of R&D activities and structural re-organization are examples of developmental strategies (questions 7, 8, 11, and 14).

It was surmised that one of two well-defined response patterns to items in section 1, with regard to the preferred strategies selected to deal with crises, would be found. The first premise was that it would be possible to classify individual respondents as favouring either predominantly entrepreneurial or defensive strategies. Managers from certain industries were expected to favour one mode over the other.

On a second level, it was surmised that certain categories of strategies (personnel, operational or developmental) would be highly correlated.
with the functional backgrounds of managers. The findings of Dearborn and Simon (1958) suggest that a manager's business specialization influences the manner in which he views business problems. For example, managers with a strong orientation in finance (comptrollers, financial V.P.s, etc.) may tend to rate the operational strategies as most useful in dealing with crises. On the other hand, managers with staff backgrounds in R&D or corporate planning may rate the developmental strategies as most useful.

Section 2 of the questionnaire is concerned with group attitudes and behaviours that may affect the quality of decisions made during a crisis and that may prevent successful implementation of those decisions. Previously three sources of deficient decision-making behaviour were identified: communications distortion, premature decision choice, and defective judgment. A series of questions relate to each of these dimensions.

Three questions are concerned with the characteristics of information processing procedures and communications networks that contribute to communication distortion. For example, rigid adherence to standard operating procedures and official communications channels can reduce organizational flexibility. Managers who insist that SOPs be adhered to during crisis are faced with the possibility of responses being made that are unsuited to the current conditions, or of time delays in the transmission of vital information (question 6). Strong biases, through excessive filtering, may be introduced if subordinates transmit only information they think is important or appropriate (question 7). In order to meet needs for unbiased, timely information, it may be necessary for senior management to develop their own communications channels that by-pass the formal organizational hierarchy (question 3).
Five questions relate to aspects of decision-making behaviour that result in premature choice. When a decision-making group under intense stress becomes isolated from the rest of the organization, too few alternatives and fresh ideas may be presented. This is due primarily to restricted information sources (questions 10 and 17). During crises, the tendency for decision-making authority to shift to the top of the organization puts tremendous pressures on the leadership. Executives may act hastily and without due consideration in order to give the impression of decisiveness and to maintain confidence in their leadership (question 16). At the same time, decision-makers may become overly concerned with short-range issues to the neglect of long-range outcomes and they may overlook possible negative ramifications of their decisions (questions 12 and 15).

Janis' (1972) identification of groupthink phenomena provides the theoretical basis for six questions that assess tendencies leading to development of defective judgment. Dominant leadership, high cohesiveness, and insulation of the decision-making group from the rest of the organization are conditions that foster the emergence of groupthink (questions 13 and 14). A cohesive group may develop illusions of invulnerability that promote over-optimism and encourage high-risk decisions (questions 11 and 18). Adversaries or competitors may be viewed in a stereotyped manner and the effectiveness of their actions underestimated (question 4). Cohesive groups also will attempt to apply pressure to any member who tries to express a viewpoint different from dominant group beliefs, and there is a tendency for members to suppress their own doubts about a course of action (question 9).

Four questions in this section examined the problems of implementation failure. In conditions of crisis, when the organization is under
stress, there will be increased conflict between the decision-making group and other parts of the organization. This conflict may be manifested in the form of intensified factionalism between various divisions or departments. Some groups may view the actions of senior decision-makers as an infringement on their powers and therefore resist implementation of decisions even if the decisions are of high quality (question 8). Implementation failures may also occur because of 'noisy' communication channels. Operating units either don't understand directions (question 1), or they have no commitment to implement decisions since they are excluded from the decision-making process (question 2). For successful implementation to occur, it is not necessary for operating units to agree with a decision, but it is necessary for them to understand the process by which the decision was reached and why a particular decision was chosen (question 5).

Section 3 of the questionnaire examined different managerial styles and evaluated preferences during normal times and during crises. One cluster of variables is composed of items that relate to styles of task performance, either mechanistic or organic (Burns and Stalker, 1961). Managers with preference for a mechanistic style will agree with close employee supervision, well-defined procedures, enforcement of rules, and well-defined performance measures (question 9). Organic managers, in contrast, will prefer process rather than task goals, fewer performance measurements, and general supervision with an emphasis on outcomes (question 3).

Mechanistic style may be appropriate in situations where tasks are routine, repetitive, and predictable, for instance, large bureaucracies during non-crisis times. Managers in organizations with placid, simple environments may also find this style appropriate. Burns and Stalker note that under such conditions, the characteristics of a mechanistic system
promote effective task performance and high levels of individual satisfaction. An organic style may be best when the environment is rapidly changing, and when task accomplishment requires independent problem-solving, innovation, and creativity. Such conditions may occur during crises, for example.

Questions 2, 5, and 11 assessed preferences for autocratic or democratic style (Lippett and White, 1943). Authoritarian leaders do not encourage participation in decisions. They are generally arbitrary and dogmatic with employees. Democratic leaders, in contrast, are generally supportive and encourage the contributions of all employees. Although neither an autocratic nor a democratic style can be advocated as a means to ensure productivity, Gibb (1969:261) notes that "group decisions which have been arrived at interactively elicit more solid support and issue into action more frequently than do those which are handed down more authoritatively." If Gibb's premise is correct, in non-crisis times one would expect fewer problems of implementation in organizations headed by democratic managers, particularly when acceptability of a decision to subordinates is an important issue (Vroom and Yetton, 1973). However, Hamblin (1958) notes that during crises, groups prefer strong leadership. He found that a group may replace its leaders with a new person if the leader does not have an obvious solution to a crisis. Where there are time pressures for a quick decision, authoritarian leadership may be required. For these reasons one would therefore expect that an autocratic, directive style would be preferred during crisis (both by leaders and subordinates).

Questions 7 and 10 assessed preferences for an instrumental style of management. Filley and House (1969) defined an instrumental leader as one who has the ability to exhibit rational, intellectual behaviour in order to
facilitate group accomplishment of organizational objectives. Parsons (1951) further suggested that instrumental behaviour was characterized by a concern for obtaining and allocating resources. An instrumental style may be either autocratic or democratic as the situation demands, but the emphasis is always on teleological decision behaviour aimed at task accomplishment in the most efficient manner. Instrumental behaviour may be equally appropriate in crises or normal situations, but during crises there may be a need to find new and novel solutions to problems at the expense of organizational traditions.

The final cluster of variables in this section assessed concern for people versus concern for production (Blake and Mouton, 1964). Managers with a high concern for people believe that employees should be supported and aided in their jobs, and that the attitudes and feelings of employees are important. People-oriented managers arrange work conditions so that personal, social, and welfare needs of employees are met before the production needs of the firm. Questions 1 and 4 assess preferences for this style.

A people-oriented style is the opposite of a production oriented style. In the extreme, managers who adopt a production orientation disregard totally the needs of employees. The organization is viewed as a vehicle for achieving production. Decision-making authority is concentrated at the highest levels of the organization and communication is formal and rigid. Question 6 assessed preferences for a production-oriented style.

Question 8 assessed preferences for a style balanced between concern for people and concern for production. Managers adopting this style recognize that an effective organization will attempt to meet both objectives,
although given a particular set of circumstances, people or production may take priority in the short run. During crises, when organizational survival could be at stake, more emphasis may be placed on achieving production or implementation of decisions at the expense of concern for people. During normal times, a balanced style, with more emphasis on organization harmony and employee satisfaction may be favoured.

Section 4 of the questionnaire is concerned with collecting information on a number of dimensions of environmental phenomena that contribute to organizational uncertainty. Three dimensions have been included: turbulence, complexity, and degree of predictability. Questions on two dimensions of organizational response to environmental stimuli were also included: flexibility and controllability.

Question 1 measured the amount of perceived turbulence in the firm's environment (Emery and Trist, 1965). The dimension of complexity is measured by three questions. Question 4 examines the concept of dependency as a component of complexity (Osborn and Hunt, 1974). Question 9 examines the degree of environmental heterogeneity (Child, 1972). Question 8 deals with routineness as a component of complexity (Jurkovitch, 1974). The combined dimensions of turbulence and complexity influence the degree of uncertainty facing a firm (Duncan, 1972). Organizations with environments perceived as predominantly simple and static, theoretically will experience significantly less uncertainty than organizations with environments perceived as predominantly complex and dynamic. It was hypothesized that there would be a strong positive correlation between high environmental uncertainty (complex and turbulent) and perceived susceptibility to crises.

The third dimension of environment investigated in the questionnaire is the degree of predictability. Question 6 measured this dimension. High
predictability suggests a more certain environment (Steers, 1976) with potentially fewer crises than in highly uncertain environments. Question 2 also examined the dimension of predictability, but in terms of the firm's predictions vis-a-vis reality. The more successfully an organization can predict the extent and direction of environmental change, the greater the degree of certainty it enjoys. With increased certainty, there is a higher probability the firm can develop appropriate coping responses to deal with changes and either avoid crises or manage crises better when they do occur.

It is essential for an organization to develop effective coping strategies to deal with environmental discontinuities. Coping with complex, dynamic, and unpredictable environments requires a high degree of organizational flexibility. Two questions measured the degree of perceived flexibility of the respondent firms. Question 3 examined the firm's motivation to respond adaptively to perceived environmental turbulence (Segal, 1974). Firms that are unwilling to alter goals and structures may be insufficiently flexible to deal with rapid environmental change.

Question 7 examined the extent to which flexibility is built into organizational structures in the form of slack (Cyert and March, 1963). High slack is equated with high flexibility and the potential to cope with crises. The orientation of decision-makers with regard to the environment will also affect organizational coping abilities. A decision-maker can perceive the environment as either offering an opportunity, or posing a threat (Perrow, 1970). Decision-makers who view the environment as threatening are judged to have a defensive orientation; those who perceive environmental opportunities are judged to have an entrepreneurial orientation. The coping mechanisms of firms run by defensive managers may be aimed towards developing protective contingency plans to deal with environmental change. In contrast,
the coping mechanisms of firms with entrepreneurial managers may be more in the nature of sophisticated information systems capable of alerting the firm to new opportunities brought about by changing environmental conditions.

In addition to the Likert scale items in Section 4, a number of questions in Section 7 (Background) are related to dimensions of the firm's environment. Specifically these questions concern firm size (5), type of industry (6), competitive situation (8), and degree of vertical integration (9). Responses to these items provided an estimate of the degree of control the firm is able to exert over its environment. For example, a very large firm is able to extend a much greater degree of control than can a small firm. The competitive nature of the environment is also important. One may reasonably expect a firm in a monopoly position to face a much smaller degree of uncertainty than a firm in an environment where cutthroat competition is the norm. Likewise, a firm that is integrated vertically can exert influence on the product market (if integrated forward) and control sources of raw materials (if integrated backward). Such firms face a lesser degree of uncertainty than firms with no integration.

The particular industry within which a firm operates is a critical factor. Some industries by their very nature are extremely complex and dynamic, generating high levels of uncertainty (for example, merchandising and electronics). Firms in other industries may face rather low levels of uncertainty due to the relatively simple and static nature of their environments (for example, public utilities). One hypothesis is that firms with a high degree of control, and thus a lower level of uncertainty, initially will be less prone to crises. However, firms in crisis-prone industries may be more adept at managing crises (a skill developed through necessity) than firms from relatively stable industries where crises are uncommon events.
Section 5 of the questionnaire is concerned with the perceptions of senior managers vis-a-vis the performance of their corporation when exposed to a variety of events. Heretofore, crises have been treated as an unitary phenomenon. It is clear, however, that there are many different kinds of crises, some of which may be less threatening (and therefore perceived as more manageable by some organizations) than others. The items in this section addressed the following questions: a) is there a general crisis dimension? b) what classes of crisis are perceived as most threatening? c) how do managers perceive the ability of their corporation to deal with different types of crises?

Four general classes of events were posited: discontinuities, stagnation, decline, and cycles. Questions 1, 2, and 5 assessed perceived ability to deal with different types of discontinuous threats, that is, unexpected threats in markets, personnel, or the natural environment. Although some managers may perceive a high ability on the part of their organization to deal with a sudden market slump, they may not have the same confidence in their firm's ability to deal with the sudden death of key senior executives.

Question 4 is concerned with a discontinuous opportunity, the potential to rapidly increase sales. Some firms may be capable of coping with threatening events, but lack the ability to capitalize on opportunities that are suddenly presented. Failure to exploit opportunities, in the long term, can be threatening for the firm. This is especially true in industries where technology changes rapidly. For example, in the 'sixties, firms that utilized newly developed semi-conductor technology in the electronics industry found themselves with almost unlimited opportunities for growth. On the other hand, firms that were more conservative and failed
to switch over to the new technology, rapidly lost market share. Many soon found themselves on the verge of bankruptcy.

Question 3 examined a manager's perceptions of his firms ability to deal with conditions of market stagnation. While this situation is not commonly associated with threat and crisis, a steady-state environment with no real growth can indeed constitute a threat to a firm whose existence is predicated on unlimited growth and expansion. The current economic 'crisis' of many Western nations is the result of difficulties in adjusting to a slow-down in growth; many firms are faced with the same phenomenon. Stagnant market conditions may require entirely different marketing techniques, new products, and even a different management to deal with new realities. The need for such drastic changes can precipitate a crisis.

A long term decline in markets (question 6) can also pose a threat. However, the threat is so insidious that firms may not recognize the condition as inherently threatening. Market decline may be so gradual that companies take little corrective action; the situation is often viewed as merely 'a bad year'. By the time the true situation is realized, a firm may be in a very precarious financial position.

Cyclical market conditions (question 7) can pose either a threat or an opportunity to a firm depending on its flexibility. In many industries cyclical conditions are common, and firms that adapt to them, thrive. For instance, merchandising firms make a very large percentage of their yearly sales in the two months of November and December, and a very small percentage in January and February. However, their operating systems, procedures, and personnel levels are designed to cope with such extreme cycles. Clearly environmental variation can be beneficial for some firms. They become more adaptive and flexible, and are able to capitalize on market upswings.
However, firms in more stable environments may perceive a much lesser ability to cope with cyclical conditions. A manager's confidence in the ability of his firm to cope with various contingent events may be highly correlated with the type of industry in which the firm operates and its prior preparations for crisis.
5. **ANALYSIS OF RESULTS**

The general response rate to the questionnaire was 25.0% (94 companies). The returns were distributed as follows: 64 Canadian companies (a 34.6% response rate) and 30 American companies (a 15.7% response rate). Due to technical reasons such as preparation of covering letters and collation of the questionnaire package, the U.S. portion of the sample was sent out approximately three weeks later than the Canadian portion. Unfortunately, a postal strike occurred shortly after the American questionnaires were mailed and an embargo was placed on all U.S. mail coming into Canada for the duration of the strike. This may be one reason why the U.S. response rate was not higher.

5.1 **Demographic Attributes**

The participants in the study were from the most senior ranks of their companies. Forty-four percent of the respondents \((n = 41)\) were Presidents or Chief Operating Officers of their firms. The remaining respondents were primarily vice-presidents, controllers, or executives of equivalent rank. Sixty percent of the executives in the sample had backgrounds in major staff or line functions, for example, production (16%), sales marketing (22%), and finance/accounting (22%). Only one respondent gave R&D as his primary experience, and only 2 respondents gave their backgrounds as Human Relations functions. Table II shows the frequency distribution by categories.

Sixty-five percent of the respondents were age 50 and older; 28% were between 40 and 49; and only 6% younger than 39 years of age. Seventy-three percent of the Presidents and Chief Operating Officers participating
### Table II

#### Functional Background of Respondents

<table>
<thead>
<tr>
<th>Function</th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td>Production</td>
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<tr>
<td>Sales, marketing</td>
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<tr>
<td>Finance, accounting</td>
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<td>Personnel, industrial relations</td>
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<td>D.N.A.</td>
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</tbody>
</table>
in the study were clustered in the over 50 year age group. Only 3 Presidents were between 30 and 39 years of age. They were CEOs of a petroleum exploration, a retailing, and a food manufacturing firm, respectively, and all 3 were in Canadian companies.

Overall, the participating executives had a very high level of formal education. Eighty-four percent of the respondents had completed university, and 40% had obtained a graduate degree. The average level of education for American executives was higher than for Canadians; 94% of the American respondents had completed university versus 80% of the Canadians.

5.2 Managerial Style

Researchers have found that during crises there is a need for a qualitatively different kind of leadership than during normal times (Mulder, van Eck, and de Jong, 1971; Hamblin, 1958b; House and Dessler, 1974). Little progress has been made, however, in identifying the patterns of behaviour that are the mark of an effective leader. This study examined executives' preferences for a number of theoretically important dimensions of leadership. In particular, any shifts in preferences of leadership style between normal times and times of crisis were noted. Three categories of leadership variables were examined: styles of task performance; autocratic/democratic orientation; and people/production orientation. Preferences were assessed on a 7 point Likert scale. Differences between the means for normal periods and crisis periods were tested.

The results of the analysis indicate that executives favour a process management style of task performance during non-crisis periods. During
crises, however, their preferences shift towards a style of specific task
direction (question 3: $\bar{x}_{\text{normal}} = 4.426 > \bar{x}_{\text{crisis}} = 3.479; \alpha \leq .05$). It
is interesting to note that although managers prefer task supervision over
process supervision during crisis, there is no significant difference be­
tween the degree of programming and enforcement of rules preferred during
these periods. Those who favour a high degree of programming in task
performance, tend to do so, whether or not a crisis exists.

There was consensus among executives that a democratic style of
management was most suitable during normal times. There is a significant
shift in preferences, however, towards a more autocratic style of management
during crises. Tests of differences between the means in normal and crisis
periods were significant for the three questions comprising this dimension
(question 2: $\bar{x}_{\text{normal}} = 5.989 > \bar{x}_{\text{crisis}} = 5.032; \alpha \leq .05$;
question 5: $\bar{x}_{\text{normal}} = 2.500 < \bar{x}_{\text{crisis}} = 3.096; \alpha \leq .05$;
question 11: $\bar{x}_{\text{normal}} = 2.936 < \bar{x}_{\text{crisis}} = 4.245; \alpha \leq .05$).

The majority of executives recognize the need to explain directions
to employees during normal times in order to facilitate implementation of
decisions. During crises, however, there is a significant shift in prefer­
ences towards more directive management (question 7: $\bar{x}_{\text{normal}} = 2.096 < \bar{x}_{\text{crisis}} = 2.670; \alpha \leq .05$). The urgency of a crisis situation may preclude
the need for explanations and may justify a more autocratic style to facil­
itate the accomplishment of organizational objectives.

There is agreement among respondents that during normal times it is
important to achieve a balanced management style stressing both the human
needs and the production goals of the organization. However, there is a
significant shift towards preferences for a more problem-solving orienta­
tion during crises. In the short term, the need to meet production goals
becomes dominant. The objective of meeting employees' social needs (a long term goal) seems to be expendable during a crisis (question 6: $\bar{x}_{\text{normal}} = 4.053 > \bar{x}_{\text{crisis}} = 2.851; \alpha \leq .05$).

A goal of maintaining organizational harmony can be particularly important during crises since it affects implementation. If there is friction between individual employees or groups there may be intentional or unintentional subversion of directives and lack of coordination, both of which can adversely affect attempts to reduce a crisis. There was a consensus among respondents that it is important to encourage organizational harmony at all times. This need for harmony, however, is perceived to be somewhat less important during crises (question 1: $\bar{x}_{\text{normal}} = 2.106 < \bar{x}_{\text{crisis}} = 2.638; \alpha \leq .05$).

During normal times, on the average, executives agree that achievement of job satisfaction for subordinates is an important goal. During crisis, however, there is a highly significant shift away from this norm. It is interesting to note the relationship of the satisfaction variable (question 4) with the harmony variable (question 1). During crisis, it is perceived that harmony is more important (due to implementation requirements) than is satisfaction. Employee satisfaction, while a desirable goal in the long term, is an expendable goal during the short term (question 4: $\bar{x}_{\text{normal}} = 1.745 < \bar{x}_{\text{crisis}} = 3.202; \alpha \leq .05$).

Executives indicate a willingness to trade-off high employee morale for increased production during crisis. In normal times high employee morale is an important organizational goal, however, during crisis there is a significant shift towards a greater emphasis on productivity (question 8: $\bar{x}_{\text{crisis}} = 2.883 < \bar{x}_{\text{crisis}} = 3.296; \alpha \leq .05$). It is interesting
to note that the degree of concern for employee morale during normal times is less than concern for employee satisfaction.

5.3 Corporate Attributes

The frequency distribution by industry for the responding firms is given in Table III. Minor discrepancies between industries sampled (Table I) and industries responding (Table II) are due to the respondent's perceptions of his firm's industry affiliation. Respondents were asked directly to give the industry affiliation of their firm. For this reason, the classification was subjective and may differ somewhat from standard industry classifications given by Fortune and the Financial Post. For example, one of the respondents gives his industry as Agriculture but no firms in the sample were so classified. Most probably this firm belongs to the Food and Beverage industry.

Fifty-seven percent of the executives responding to the questionnaire described the competitive situation of their industry as one where a few firms dominate the market (oligopoly). Twenty-nine percent responded that their firms operated in a competitive environment with many firms but none dominating, and 7% indicated a market situation dominated by one large firm. Only 22% of the respondents suggested their firms had any degree of control over sources of raw material. The remainder of the firms were dependent to a greater degree on institutions within the environment for their sources of supply. Fully 30% of the firms indicated no control over inputs, a situation that suggests high vulnerability to environmental fluctuations.

There was a great deal of consensus with respect to the nature of the environment of participating firms. Most respondents perceived their firm's environment as very complex, with many diverse components, and very
Table III

Frequency Distribution by Industry of Respondent Firms

<table>
<thead>
<tr>
<th>Industry Description</th>
<th>No. of Firms Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>1</td>
</tr>
<tr>
<td>Forestry</td>
<td>3</td>
</tr>
<tr>
<td>Mines</td>
<td>3</td>
</tr>
<tr>
<td>Fuels</td>
<td>4</td>
</tr>
<tr>
<td>Food and beverage</td>
<td>11</td>
</tr>
<tr>
<td>Furniture and fixtures</td>
<td>2</td>
</tr>
<tr>
<td>Printing and publishing</td>
<td>1</td>
</tr>
<tr>
<td>Metal and metal fabricating</td>
<td>4</td>
</tr>
<tr>
<td>Transportation equipment</td>
<td>5</td>
</tr>
<tr>
<td>Electrical products</td>
<td>6</td>
</tr>
<tr>
<td>Rubber and chemicals</td>
<td>8</td>
</tr>
<tr>
<td>Construction</td>
<td>3</td>
</tr>
<tr>
<td>Transportation</td>
<td>2</td>
</tr>
<tr>
<td>Communications</td>
<td>2</td>
</tr>
<tr>
<td>Utilities</td>
<td>3</td>
</tr>
<tr>
<td>Trade</td>
<td>3</td>
</tr>
<tr>
<td>Finance</td>
<td>8</td>
</tr>
<tr>
<td>Amusement, recreation</td>
<td>1</td>
</tr>
<tr>
<td>Professional consultants</td>
<td>3</td>
</tr>
<tr>
<td>Conglomerates, holding companies</td>
<td>10</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>8</td>
</tr>
<tr>
<td>Did not answer</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
</tr>
</tbody>
</table>
turbulent. Approximately 86% of the executives felt their firm's environment was in a continual process of change. The respondents' perceptions varied as to the degree of predictability of their environment. Some executives thought their firm's environment was very predictable, others characterized the environment as highly unpredictable.

As might be expected, there is some positive correlation between perceived predictability and characterization of the firm's problems as routine and capable of being dealt with by established corporate procedures ($\tau = .23, \alpha = .05$). The degree of perceived complexity of the firm's environment is the major determinant of predictability of events. Those executives who noted their firm's environment had only a small number of homogenous components, (that is, a simple environment) often perceived a higher degree of environmental predictability ($\tau = .45, \alpha = .01$).

There was consensus among respondents that their firms were willing to alter structure and goals to respond to the demands of a changing environment. In other words, they perceived high flexibility on the part of their firms. This is an important characteristic to consider when assessing susceptibility to crisis. With a high degree of flexibility, it is possible for firms to develop coping strategies to deal with environmental change. In this way the firm either can avoid crises, or manage crises better when they occur.

In the total sample of 94 firms, only 45% of the executives responded that their firms had any formal plans to deal with potential crises. In general, the plans to deal with crises were not well developed, perhaps reflecting the respondents optimism that crises were not a probable occurrence. Only 14% of all respondents assigned a greater than .50 probability of a crisis occurring in their firm within 5 years. Respondents were
slightly more pessimistic when assessing the probability of crisis in an average firm in their industry. Twenty-nine percent gave a greater than .50 probability. Obviously the respondents think of their own firms as better than average performers. This is perhaps a reasonable assessment given that the firms in the sample were drawn from a population of top performing companies. Overall, executives were very optimistic about the probability of crises occurring; fully 64% of respondents gave a probability of .25 or less to a crisis occurring in their firm.

5.4 Interactions Between Variables

As a first step in understanding the dynamics of crises, the pattern of correlations between the component variables were investigated. Since a portion of the sample data was not distributed normally, Kendall's tau (τ) rank order correlation was used.\(^{12}\)

Although Spearman's rho (r\(_s\)) may be the more commonly used nonparametric correlation coefficient, the Kendall and Spearman techniques are quite similar in that both produce standardized coefficients based on the amount of agreement between two sets of ordinal rankings. However, Nie, et al, (1975:289) note that the Kendall coefficient may be more appropriate when the sample data contain a large number of tied ranks, and a large number of cases are classified into a relatively small number of categories. Since the sample data in this study met these conditions, the Kendall coefficient was used. Kendall's τ has a further advantage over Spearman's r\(_s\) in that it can be generalized to a partial correlation coefficient.

\(^{12}\) The Kolmogorov-Smirnov Test was used to test the sample data for a normal distribution (see Appendix 2).
In general, the absolute value of tau tends to be smaller than the parametric Pearson's r. Siegel (1956:223) notes that when used on data to which the Pearson r are properly applicable, tau has an efficiency of 91 percent. Kendall's tau was used to investigate the relationships between variables that affected susceptibility to crises and coping abilities.

5.5 The Nature of Crises

An analysis of the data indicates that the most important criterion identifying a situation as a crisis is the high degree of uncertainty felt by decision-makers with respect to possible outcomes of decisions. Criteria of secondary importance in defining a crisis are: an element of surprise; a threat to high priority goals; and a restricted time for decisions. It was postulated initially that stress would be one of the universal criteria defining a crisis ($H_1$). This hypothesis was not supported. Stress was not rated highly by the respondents as an important factor. Executives, in fact, ranked the two criteria of stress on decision-makers and the failure of SOPs as the two least important factors in defining a crisis.

One must be aware of a possible bias in the respondents' answers to this item. The degree of felt stress is not a criterion on which a respondent can rate himself objectively. Executives may be unwilling to admit that they feel stressed during crises. In fact, many executives may not be aware of the levels of stress under which they operate. It is likely that stress, as a contributing factor to crisis, arises from the interactions of uncertainty, threat, and time pressure within a given situation. The degree of stress experienced by decision-makers will be a function of the type of
goal threatened, the immediacy of the threat, the degree of generated uncertainty, perceived time for decision, and the personality of the decision-maker.

The degree of felt stress is positively correlated with the level of goals threatened and it is also a function of how soon the impact of that threat will be felt. Some threats may have potentially serious impacts on an organization, however, if this impact is far in the future, the level of stress experienced by managers will be low. The combined factors of threat to high priority goals and the immediacy of impact have a synergistic effect on stress levels.

Unfamiliarity with a type of threat, or surprise associated with its occurrence also will have considerable influence upon the degree of stress felt. If a threat is of a type that is unfamiliar to an organization, the level of stress will be higher than that generated by more 'familiar' threats. Lack of experience with an event induces a high level of stress since the organization has no repertoire of responses to help it cope with the threat and the effects of the potential impact are uncertain.

The surprise occurrence of familiar situations also may induce stress but it has a shorter life span than the stress produced by uncertainty. When organizations attempt to deal with uncertainty there is a need to develop a model of the situation with an appropriate repertoire of responses. This process of concept formation typically is slow, as it requires discrimination among alternative models of the situation and estimation of their parameters. When an organization deals with familiar threats the availability of a model to manage the situation permits quick convergence in reconciling new data (the surprise) with existing concepts in the organization.
Although structural factors are important, the personality of a decision-maker may be the factor that contributes most to feelings of stress. Certain personality types are stress-prone and this tendency is accentuated under conditions of threat. As managers come under high stress levels, psychotic and neurotic tendencies which may have been latent are aggravated. They in turn elevate the level of perceived stress in a self-perpetuating cycle (de Rivera; 1968).

Hypothesis 2 postulated that the criteria defining a crisis were invariant irrespective of a particular firm's environment. This hypothesis was not supported. Significant differences were found on two environmental variables: flexibility and predictability. Executives from firms with considerable flexibility perceived restricted decision time as a much more important criterion in defining a crisis than executives from firms without much flexibility. The high flexibility group also rated the criterion of uncertainty as significantly less important in defining a crisis than did other managers.

There was also a significant difference in the way certain managers viewed a failure in SOPs. Executives from firms with predictable environments indicated a failure in SOPs was more important to them in defining a crisis than executives whose firms operated in unpredictable environments. When environments are predictable, consistency of actions becomes possible. Firms are able to develop standard operating procedures as a major management tool. In contrast, unpredictable environments do not allow firms to develop standard responses since they would be obsolete rapidly. A failure in SOPs is not as critical for such organizations as it is for firms that rely extensively on standardization.
5.6 Determinants of Susceptibility to Crisis

Some organizations may be particularly prone to crises; others have the facility to avoid serious crises. Organizations that avoid crises may be only marginally different from those organizations that encounter crises. Starbuck, et al. (1978:116) note that all organizations possess disadvantageous characteristics and all organizations make mistakes. Crises occur when environmental threats pick out specific organizations and bring them face-to-face with their mistakes. Hypotheses 3 through 7 postulated environmental and individual factors that may affect a firm's susceptibility to crises.

A positive association was found between the degree of environmental predictability of a firm and the perceived probability of crisis ($H_3$: $\tau = .49; \alpha = .01$). The Chief Operating Officers of firms with predictable environments assessed a lower probability of crisis occurring in their firms than did COO's operating companies in unpredictable environments. Steer's (1977) observation appears accurate when he notes that the degree of change and complexity of a firm's environment are not in themselves critical factors. Susceptibility to crises is more a function of the extent to which environmental change can be predicted with some measure of certainty. Those firms who cannot adequately predict their environments will be more susceptible to crises.

Management style also seems to be a contributing factor to crisis susceptibility. The results indicated that process oriented managers perceived their companies to have a lower probability of crisis than task oriented managers ($H_6$: $\tau = .15; \alpha = .05$). Line managers who are evaluated and supervised on the basis of outputs have the flexibility enabling them
to act quickly on threats at the local level. In contrast, organizations managed by executives who are primarily concerned that subordinates follow all the specified procedures and who do not encourage individual initiatives, do not have this same flexibility. One can speculate that this latter style may be appropriate in simple, placid environments, but during times of rapid environmental change or during crises, organizational requirements for independent problem-solving, creativity, and innovation may outweigh any advantages of rigid programming. A process management orientation seems to provide some of the flexibility needed to avoid major organizational crises.

It is surprising to note that no relationship was found between the degree of control a firm has over its environment and its susceptibility to crisis ($H_4$, $H_5$). These results are counter-intuitive to accepted premises of why businesses attempt to extend control through growth or diversification. There is also a well developed body of theory suggesting that vertical integration, large size, market control, etc. help to buffer firms against environmental uncertainty (Pfeffer and Salancik, 1978; Williamson, 1970, 1975). No significant differences were found in perceived susceptibility to crisis between firms with a high degree of environmental control and firms with little control.

Susceptibility to crises may also occur as a result of group interactions within the decision-making process. Janis (1972) documented instances of defective decision-making behaviour in policy making groups that resulted in a high susceptibility to crisis. This behaviour, which took the form of defensive-avoidance decision-making, was called groupthink. $H_7$ postulated that certain organizations would be particularly susceptible to crisis when their managers preferred strategies associated with
groupthink. This hypothesis, unfortunately, could not be tested since the number of respondents who met the criteria defining groupthink behaviour was too small.

Predicting Susceptibility to Crisis

A major purpose of this study was to test some specific relationships between variables that hypothetically contribute to crisis susceptibility. From a managerial standpoint, however, a secondary purpose was to predict those companies or individuals who were particularly susceptible. For this purpose, discriminant analysis was used to develop an index representing profiles of attributes that predict high and low categories of crisis susceptibility.

Discriminant analysis is a multivariate technique that permits a researcher to distinguish between two or more groups of cases. A discriminant function is derived from the data that consists of variables measuring characteristics on which the groups are expected to differ. Mathematically, discriminant analysis weights and linearly combines selected variables so that the resulting groups are as statistically different as possible. In the simplest case of categorizing into two groups, discriminant analysis is basically multiple regression analysis where the dependent variable is group membership (Kerlinger and Pedhazur, 1973:337).

Discriminant analysis has a two-fold objective in research: analysis and classification. As an analytic technique, discriminant analysis provides a statistical test for determining how well the resulting function actually distinguishes between groups. The variable coefficients "can be interpreted much as in multiple regression or factor analysis ... they
serve to identify the variables which contribute most to differentiation along the respective dimension" (Nie, et al, 1975:436). Once a function has been derived that provides satisfactory discrimination for cases with known membership, the technique can then be used to classify new cases with unknown membership.

The conceptual model of crisis developed in a previous section suggests that the environmental context, the individual context, and the organizational context are dimensions relating to crisis. Specific variables were selected from these dimensions to derive a discriminant function that predicts high and low susceptibility to crisis. (High susceptibility was defined as a probability $\geq .5$ of a crisis occurring in a company within five years.) The variables included in the analysis were: programmed behaviour, decision-making strategies, environmental characteristics, managerial style, and perceived coping abilities.

A stepwise discriminant analysis produced the following function:

$$D_s = -.224C_3 - .298C_{32} - .378C_{55} + .365C_{61} + 1.974$$

This equation reflects the fact that severe environmental turbulence ($C_{55}$) and low levels of organizational slack ($C_{61}$) are important contributors to crisis susceptibility. Similarly, tendencies to cope with threats by adopting extreme retrenchment strategies ($C_{3}$) or, in contrast, by adopting high-risk innovative strategies ($C_{32}$) also contribute to an increased probability of crisis.
The discriminant function classified 79% of the highly susceptible cases correctly. This figure is rather impressive given that $C_{pro} = .52$ and $C_{max} = .60$.\textsuperscript{13}

5.7 The Dimensionality of Coping Abilities

This section examines the premise that the ability to cope with crises is unidimensional, that is, generalizable to all types of crisis situations. Coping abilities may not be confined to certain specialized types of crises. $H_{20}$ postulated that organizations capable of coping successfully with one type of crisis are capable of coping with any type of crisis. This hypothesis was supported. It seems that organizations do develop some general coping abilities. A positive relationship was found between the ability to cope with crises brought about by two very different types of events, discontinuous threats and continuous threats ($r = .439$, $\alpha = .001$).

Crisis precipitated by discontinuous threats are defined as those with an abrupt onset, for example, the death of a number of key executives.

\textsuperscript{13} The discriminant analysis program provides a classification table of the following type:

<table>
<thead>
<tr>
<th>Classified</th>
<th>group 1</th>
<th>group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>$n_{11}$</td>
<td>$n_{12}$</td>
</tr>
<tr>
<td></td>
<td>$n_{21}$</td>
<td>$n_{22}$</td>
</tr>
</tbody>
</table>

where $(n_{11} + n_{22})/n$ is the proportion of cases classified correctly. The maximum chance criterion ($C_{max}$) is the appropriate statistic to use if one is interested in maximizing the percentage of cases correctly classified. If the discriminant function cannot do better than $C_{max}$, all cases should be classified as belonging to the larger of the two groups. When one wishes to correctly identify members of both groups, and in particular the smaller group, the proportional chance criterion ($C_{pro}$) is the correct statistic to use (Morrison, 1969:157,158).
in an air disaster. Crises brought about by continuous threats, in contrast are defined as those having a gradual onset, and where a crisis condition is not recognized as existing until a critical threshold is reached. A long term decline in market share is an event that falls into this class. The results suggest that successful coping abilities are learned behaviours that can be applied to either of these two classes of crises.

Although there is evidence of a general dimension of coping abilities, certain firms develop a special capability to cope with particular types of crises. The effects of general coping abilities were removed from the data by discounting for average performance and constructing two indices: one representing discontinuous crises and the other continuous crises. When these two indices were correlated a perfect inverse relationship was found between them ($\tau = -1.00$, $\alpha = .001$). The results suggest that although a firm may have abilities to cope with all types of crises it has specialized advantages in dealing with crises brought about by either continuous or discontinuous threats. Coping with continuous threats, for example, may require the ability to develop a long term perspective. Since continuous threats build up gradually, it may be necessary to develop information systems or other 'early warning systems' to cope adequately.

Discontinuous threats, in contrast, have a sudden, unpredictable onset. Successful coping with this type of crisis may be predicated on having sufficient built-in flexibility and organization slack for the firm to act quickly in response to threats and to absorb short run impacts.

Since discontinuous crises are associated with a sudden onset, they may be perceived as more threatening than those crises with gradual onsets ($H_{22}$). This hypothesis was not supported when tested. In general, executives did not perceive discontinuous crises as more threatening than
continuous ones. One particular type of discontinuous crisis, however, was rated by most respondents as potentially very threatening. This was the death of key senior executives in an air disaster. Of seven types of events given in the questionnaire, executives perceived that their firms had the least ability to deal with unexpected losses of key personnel. The differences in perceived coping abilities between this particular type of discontinuous crisis and the continuous crises were found to be significant ($T = 2.18, \alpha = .032; T = 3.12, \alpha = .002$).

The analysis shows that managers thought certain strategies would be most effective with a particular type of crisis. It was found that a predictable threat in stable environments tended to stimulate information gathering activities ($H_{23}: \tau = .14, \alpha = .05$). A relationship also was found between the degree of organizational slack and the ability to cope with some types of market threats. The more slack an organization has (in terms of mobilizable resources) the greater is its perceived ability to cope with a sudden drop in sales ($\tau = .18, \alpha = .05$). High slack organizations perhaps can switch product emphasis more easily. It is interesting to note, however, that this ability does not seem to apply in predictable cyclical markets where a 'boom' is followed by a 'bust'. High slack also does not seem to give an organization any special capabilities in exploiting markets when a technological breakthrough occurs.

The ability to cope with a sudden drop in sales also was found to be associated with the role field managers and department heads play during a crisis. Firms that rely on the mobilization of these managers during crises have confidence in their ability to deal with a sudden drop in sales ($H_{25}: \tau = -.19, \alpha = .05$). Organizations that centralize authority and decision-
making during crises may lose 'on the spot' market information and contacts vital for successful resolution of the crisis.

The ability to cope with certain broad classes of crises or with a specific type of threat may be a function of the environmental context of the firm. It was posited, for instance, that experience with a complex environment would improve general coping abilities relative to all types of crises \( (H_{26}) \). Two constituents of complexity were tested: the degree of heterogeneity and the degree of routineness. No relationship was found between environmental complexity and coping abilities that were generalizable to all types of crises. A relationship was found, however, between complexity and the ability to deal with a specific type of threat. Firms with complex environments, measured by high degrees of heterogeneity and unpredictability, obtained a significantly higher rating of their ability to cope with periodic growth and decline of markets (cyclical) than did firms with simple environments \( (T = -2.00, \alpha = .049; T = -1.96, \alpha = .05) \).

Another hypothesis tested was that managers operating in turbulent environments (that is, environments with a high rate of change) would develop general crisis coping abilities \( (H_{27}) \). Surprisingly, this hypothesis was not supported. No relationship was found between the degree of environmental turbulence and the ability to cope either with general classes of crises or with specific threats. Experience with a turbulent environment may develop some capabilities to deal with change but these capabilities do not seem to be generalizable to crisis situations.

The relationship between turbulence and the ability to cope with cyclical markets was also tested \( (H_{28}) \). Again, it was found that familiarity and experience with dynamic environments does not seem to induce improved coping abilities. The results indicate, in fact, that the
reverse relationship holds. Firms rated as having a high ability to cope with cyclical conditions tend to have more placid environments ($T = -2.05$, $\alpha = .043$). When environmental components do not undergo much change they may become manageable through the use of SOPs. Cyclical market conditions would seem to have sufficient regularity that they also could be managed by SOPs. The degree of predictability of this type of threat may match the organizational style of firms in placid environments and, thus, their abilities to cope are increased.

Managerial characteristics or behaviours may also affect a firm's ability to cope with particular types of crises. The results of the analysis show that managers with an aggressive marketing orientation perceived a high ability to cope with crises brought on by a sudden drop in sales ($H_{30}: \tau = .15, \alpha = .05$). The special abilities of market oriented managers seem to be tailored to cope with this type of crisis. Market oriented firms with SOPs emphasizing aggressive strategies will be attuned to coping with market failures. No relationship was found, however, between an aggressive marketing orientation and the ability to exploit market opportunities ($H_{29}$ not supported).

It was noted previously that the death of key executives was perceived as a highly threatening event for most respondents. It was hypothesized, however, that participatory organizations would be able to cope with this type of crisis more easily than other organizations. This hypothesis was not supported ($H_{31}$). Although there may be greater depth of management talent in participatory organizations, executives from these firms perceive them as equally vulnerable to this threat as other firms.
5.8 The Determinants of Organizational Coping Abilities

The long term viability of an organization ultimately rests upon its ability to cope with threats. An inability to cope with environmental discontinuities leaves a firm particularly vulnerable to crises. In this section some factors were examined that may facilitate organizational adaptation to new circumstances and that increase abilities to buffer threats and cope effectively with them.

What Patterns of Decision-Making Contribute to Effective Coping?

During crises certain aspects of the decision-making process may become susceptible to pathological behaviour. These pathologies can cause an organization to be particularly susceptible to crisis (for instance, groupthink) or reduce the chance of a successful resolution of the crisis. Section 2 of the questionnaire provided the data for examining the underlying patterns of decision-making, some of which may be pathological to the firm.

The items in Section 2 of the questionnaire concentrated on four broad classes of activities that could affect the quality of decision-making during crises: communications, evaluation, choice, and implementation. The frequency analysis of the variables in this section showed that there is a great deal of consensus in the responses to six of the items:

- 98% agreed it is important for employees to understand the decisions of management (variable 1).

- 89% felt it was important for those responsible for implementing a decision to be involved in making the decision (variable 2).

- 81% agreed it was more important to reach the 'best' decision during a crisis rather than satisfying certain interest groups within the organization (variable 8).
- 86% felt that executives should not remain silent if they disagreed with proposed policies (variable 9).

- 92% felt it was desirable to have a very strong leader during crises (variable 14).

- 80% agreed that during crises executives need to make decisions quickly and decisively to maintain corporate confidence in the leadership (variable 16).

The consensus on variables 1 and 2 reflect the importance placed on factors that increase the probability of successful implementation. In part, this may demonstrate the successful dissemination of 'good' management principles. These attitudes are consistent with behaviour that reduces the probability of misimplementation, particularly in two areas: lack of motivation to carry out instructions and misunderstanding orders.

One important area of possible difficulty is ignored, however, the sample group rejects the premise that acceptability of a decision to certain interest groups within the organization sometimes may be more important than the optimality of a decision (the political aspects of decision-making).

There is ample evidence in the literature that political gamesmanship either can slow implementation, or prevent it entirely even during critical periods (Allison, 1972). However, one cannot determine whether or not subjects are responding to this item in terms of an expected 'rational' decision-making norm, or whether there is truly a tendency to disregard (or fail to recognize) the political realities in most organizations.

The importance of strong directive leadership is illustrated by the consensus of agreement on variables 14 and 16. The success or failure of any organization is often dependent on the quality of the leader. This is true whether the organization is a nation, a business enterprise, or an athletic team. During crises and times of rapid change, the perceived need for strong leadership intensifies. Yet, ironically when the need for strong
leadership interacts with group norms for cohesiveness-building, the result for the organization may be pathological (Janis and Mann, 1977).

The items in Section 2 of the questionnaire were analyzed to identify the important underlying concepts of decision-making during crises. Factor analysis is a technique commonly used by researchers to identify underlying structures in sample data which appropriately may be analyzed with parametric statistics. In this study, however, portions of the data were not normally distributed, therefore, an alternate method of analysis was used. Smallest Space Analysis (SSA), a type of 'nonmetric factor analysis' was the technique selected.

SSA is a multidimensional scaling technique that identifies underlying patterns in non-metric data and represents them in the form of a geometric model or picture (Shepard, 1972). Although SSA is a method of rigorous multivariate analysis it differs from a traditional factor analysis in that it provides a visual presentation of the dimensions. Visualizability is the most important criterion in SSA, therefore, the representation is confined when possible to two, or at most, three spatial dimensions. Interpretation of the spatial representation is made in a number of ways: a) by examining directionality of the axes; b) by looking at the manner in which data points cluster into homogeneous groups throughout the space; and c) by examining how the data are ordered into simple geometric structures. Appendix 3 gives a detailed description of Smallest Space Analysis.

The results of the SSA appear in Table IV (2-space coordinates) and in Figure 2 (a geometric representation). The data can be represented adequately in two dimensions (coefficient of alienation = .19461, Kruskal's stress = .16776). The goodness of fit did not improve appreciably with greater dimensionality. (The coefficient of alienation for m = 3 is .12623).
Table IV
Smallest Space Coordinates for \( m = 2 \)
Patterns of Decision-Making

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</tr>
<tr>
<td>18</td>
<td>-55.558</td>
<td>-100.000</td>
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</table>

Guttman-Lingoes' Coefficient of Alienation = 0.91461
Kruskal's Stress = 0.17221
FIGURE 2

SSA GEOMETRIC REPRESENTATION: PATTERNS OF DECISION-MAKING

VECTOR PLOTS

VECTOR 2 PLOTTED AGAINST VECTOR 1
Figure 2 shows a structural configuration in the form of a rough wheel. One central cluster of variables forms the hub of the wheel and other clusters lie at various points on the rim. The central cluster is defined as a leadership cluster. It is composed of variables 14 and 16, which denote two aspects of leadership: a) problem-solving ability, and b) decisiveness and the ability to maintain subordinates' confidence. The placement of the leadership dimension in the spatial configuration reflects the centrality of leadership to crisis decision-making. (Note that variables 14 and 16 are items on which there was a high level of agreement.)

Other clusters of variables on the rim of the wheel define various aspects of decision-making along two vectors: a) the quality of the decision-making process (vector 1), and b) exposure to uncertainty (vector 2). The quality of the decision-making process is a latent dimension that delineates decision-making styles on the basis of the number of people participating in the decision, the extent to which alternatives are generated, the amount of alternative evaluation, etc. The decision process becomes more rational and open, moving from left to right on vector 1. (The rational decision model assumes a complete information base and generation of all alternatives.) Exposure to uncertainty is delineated in terms of risk posture. The lower end of vector 2 represents exposure to risk while the upper end of the vector represents risk absorption. The central placement of the leadership dimension (relatively neutral on both vectors) suggests that it is independent of a particular decision-making orientation. Strong leadership is associated with all styles of decision-making during a crisis.

A particular paradigm is implied by the use of the word "quality". In this context it is assumed that better crisis decisions are made given free flows of information, diverse sources of alternative generation and evaluation, and an enlarged decision circle.
The first decision-making component is defined by three variables spread along vector 1 in the upper half of the space. This cluster represents a bureaucratic risk absorption component. The central variable of the cluster (11) reflects patterns of risk preference in strategic choices. To the left lies variable 7, which is concerned with internal risk absorption through hierarchical filtering. Variable 6 makes up the third variable in the cluster. It is concerned with the predictability of organizational responses as represented by the degree of programming in the firm.

The second broad cluster of variables represents an implementation component. It consists of three variables (5, 1, 2) and is concentrated on the far right side of vector 1. Variable 1 is at the center of the cluster and it is concerned with the degree of understanding that implementors possess with respect to decisions made. To the left there is a variable (5) that reflects the extent of employee agreement with decisions. Variable 2 makes up the third item in the cluster. It reflects a strategy of active involvement by implementors in decision-making. One should note that the degree of openness in decision-making increases as one moves from left to right along vector 1 in the cluster, for example, from variable 5 to 1 to 2. The circle of participants in the decision process is enlarged. Agreement with a decision (variable 5) involves only a passive role; understanding a decision (variable 1) may offer the potential for active involvement in the process; while actual involvement of implementors (variable 2) enlarges the scope of the decision-making process.

Moving clockwise along the rim of the wheel, the next cluster of variables is defined as an evaluation component. It is composed of variables 17 and 15. Both of these variables represent a high degree of openness to ideas, alternatives, and people (high on vector 1) and represent a
relatively high level of risk confrontation (vector 2). Variable 17 reflects the willingness of executives to be exposed to ideas and opinions outside the normal management decision circle. This strategy is augmented by variable 15, which reflects an orientation of confronting and emphasizing all the negative aspects of proposed solutions. In a sense, variable 15 measures the degree of dialectic confrontation built into the decision process.

At the bottom of the wheel there is a cluster of variables representing a component of risk confrontation (variables 4 and 18). Variable 4 represents the risk facing orientation of the decision-making process as reflected by the conceptual model of the task environment held by executives. (Do executives see themselves as being in competition with an aggressive environment?) Variable 18 reflects tendencies for risk-taking as a response to threats.

The final broad cluster on the wheel is composed of six variables (8, 3, 13, 10, 12, 9). This cluster represents a collection of threats to the quality of decision-making, that is, threats to optimality. Variables 9 and 13 reflect closure of the domain of alternatives by exerting pressure on decision-makers to adhere to the consensus of group decisions. Two variables are concerned with actions that may bring about premature closure of the alternatives. Variable 12 reflects a tendency towards myopia in decision-making, that is, only concentrating on short term effects, and variable 10 is concerned with restricting the domain of alternatives. A further threat to optimality may occur through the behaviour suggested by variable 8. The negative impact of consensus searching may threaten the quality of decisions taken. The last variable in the cluster (3) is concerned with the pathological effects on information processing that may
occur when the decision circle is tightened too much. Information overload of key decision-makers can result when middle managers are by-passed and responsibility for decision-making is not delegated.

The variable clusters identified in the Smallest Space Analysis emphasize certain factors. It was found that strong leadership is central to crisis decision-making. Specific patterns of decision-making adopted by managers, however, can be defined on the basis of the quality of the decision-making process, (for example, susceptibility to pathologies), and the degree of exposure to uncertainty. The relationships of these variables to some specific questions are now examined.

What are the Relationships between Decision Structures and the Environment?

As well as trying to identify some of the various decision-making styles that may be selected during crises, some specific hypotheses that might reduce a firm's coping abilities were examined, for instance, strategies that increase susceptibility to pathologies. It was postulated that managers in complex environments would limit the number of alternatives considered during crisis to avoid cognitive overload ($H_8$). This hypothesis was not supported. In fact, the correlation matrix suggests that it is managers from simple environments who tend to restrict the number of alternatives they consider ($\tau = .14, \alpha = .05$). This tendency may be a function of the environment. In simple environments there are fewer factors of which one needs to take account; the number of alternatives generated reflects this condition.

A related hypothesis, that managers from firms with complex environments will concentrate on short term effects of solutions rather than long term effects during crises also was not supported ($H_{11}$). The results of the
analysis indicate that, as with \( H_8 \), it is managers from simple environments who display this tendency. Cyert and March (1963) note that concentration on short run effects helps to simplify the decision process. In simple environments there may not be great negative consequences in ignoring long term effects. In this sample, however, the competing hypothesis advanced by Forrester (1969) may be correct. Executives from complex environments are sensitized by their experiences to the danger of ignoring the long term. There need not be a contradiction between the premises of Cyert and March (1963) and Forrester (1969). The questionnaire tests the attitudes of executives not their actions. During a crisis, the feasibility of particular actions ultimately determines whether a short term or long term perspective is adopted.

No relationship was found between complexity and turbulence of the firm's environment and a tendency to develop SOPs (\( H_9, H_{12} \)). There was a relationship, however, between management style and adherence to SOPs. Tests suggest that task oriented managers find it useful to follow SOPs' closely during crises (\( r = .25, \alpha = .01 \)). While this tendency may limit individual initiatives and thus reduce a firm's coping abilities, task oriented management is not feasible without precise specification of procedures and enforcement of those procedures.

What are the Relationships between Decision Structures and Managerial Style?

A task oriented management style requires an extensive information system as a control device since decision-making is usually centralized. For this reason perhaps, a strategy of increasing information gathering was perceived as being useful by task oriented managers. Conversely, a negative relationship was found between information gathering activities and a process management style. Since process management is based on the
premise of local coping and decentralization, the need for (centralized) information activities was not perceived. ($H_{14}$ was supported; $\tau = .25$, $\alpha = .01$).

Two other hypotheses concerning coping abilities and managerial style were supported ($H_{16}$, $H_{17}$). Executives who favoured a democratic managerial style during crises indicated they found it useful to involve employees in decision-making, especially when those employees were responsible for implementation ($\tau = .39$, $\alpha = .01$). These executives appeared to give credence to the rationale that acceptance of a decision is often essential to ensuring that the decision is carried out. Maier (1970) notes that acceptance comes about through participation in the decision-making process. Since crises may generate problems that require solutions dependent upon the support of others to be effective, participation becomes an even more important facet of decision-making during such times.

Previously it was noted that most of the executives participating in the study believed it is important to have a strong leader during crises. Twenty percent of the sample, however, diverged from the consensus. Tests of the differences between these two groups show a delineation based on preferred managerial style. Those executives who favoured strong leaders during crises tended to be more autocratic than those executives who did not think strong leaders were important ($\tau = 2.73$, $\alpha = .008$). The rationale for the hypothesis seems to be that during crises, autocratically oriented managers feel an intensified need to work in an organization reflecting their own style.

The two remaining hypotheses in this section ($H_{18}$, $H_{19}$) that posited relationships between maintenance of group harmony and the tendency towards developing group pathologies were not supported. Although Janis (1972)
notes that cohesive groups may be particularly susceptible to these pathologies, in this study no support was found for this premise. One must note, however, that the act of maintaining group harmony may not be equivalent to building group cohesiveness.

Predicting Coping Abilities

Some of the individual hypotheses tested in the previous section suggested that organizations have differentiated abilities to cope with specific types of crisis. From a managerial point of view, it is interesting to identify those characteristics that promote high coping abilities. A series of discriminant analyses were run for seven different threatening situations.

1) Coping with a sudden drop in sales

The following discriminant function was derived:

\[ D_s = .225C_{25} + .424C_{32} - .310C_{41} + .344C_{55} - 2.677 \]

The equation reflects the fact that successful coping with this type of threat is predicated upon a firm being risk averse in general \((C_{25})\), but not so bound by conservatism that it cannot adopt innovative measures when they are required \((C_{32})\). A relatively low level of environmental turbulence \((C_{55})\) also seems to contribute to success in dealing with market failures. The discriminant function correctly classified 85% of the cases with high coping abilities \((C_{pro} = .64; C_{max} = .76)\).
2) Coping with sudden death of key executives

The following discriminant function was derived:

\[
D_s = -0.504C_{28} + 0.296C_{31} - 0.243C_{33} - 0.424C_{54} \\
+ 0.269C_{55} + 1.346
\]

An organization's success in coping with the sudden death of key decision-makers is related to its experience with complex environments (\(C_{55}\)) and to its abilities in developing a wide network of external inputs to decision-making (\(C_{31}\)). Successful firms tend to adopt norms of autocratic management (\(C_{54}\)) and to cope with threats by focussing on productive needs rather than employees' needs (\(C_{33}\)) in the short run. More importantly, however, successful firms do not concentrate the locus of decision-making power in the hands of a single strong leader (\(C_{28}\)). The discriminant function correctly classified 66% of the organizations with high coping abilities (\(C_{\text{pro}} = 0.56; C_{\text{max}} = 0.68\)).

3) Coping with stagnant markets

The following discriminant function was derived:

\[
D_s = 0.266C_{37} - 0.251C_{51} + 0.454C_{61} - 1.860
\]

This equation reflects the fact that a process management style (\(C_{37}\)) and high levels of organizational slack (\(C_{61}\)) are important contributors to successful coping in stagnant markets. Similarly, a tendency to abide by established organizational traditions seems to promote coping abilities (\(C_{51}\)). The discriminant function correctly classified 75% of the cases with high coping abilities (\(C_{\text{pro}} = 0.59; C_{\text{max}} = 0.72\)).
4) Coping with a major technological breakthrough

The following discriminant function was derived:

\[ D_s = .472C_{16} - .419C_{32} + .958 \]

The equation suggests that successful exploitation of opportunities in expanding markets is predicated upon a firm adopting strategies that involve implementors in decision-making \((C_{16})\). Tendencies to avoid innovative, but high risk strategies also promote successful coping. The discriminant function correctly classified 62% of the cases with coping abilities \((C_{pro} = .50; C_{max} = .52)\).

5) Coping with natural disasters

The following discriminant function was derived:

\[ D_s = -.303C_{54} + .469C_{57} - .197C_{59} + .390C_{61} - .701 \]

This equation suggests that a strong orientation towards achieving corporate goals \((C_{57})\) contributes to successful coping with a major natural disaster. A low level of organizational slack \((C_{61})\) and a strong sense of threat emanating from the environment \((C_{59})\) seem to reinforce preferences for high levels of independent actions on the part of employees \((C_{54})\) to cope with this event. The discriminant function correctly classified 67% of those cases with high coping abilities \((C_{pro} = .65; C_{max} = .78)\).

6) Coping with a long term market decline

The following discriminant function was derived:

\[ D_s = - .187C_{32} + .283C_{55} + .382C_{57} + .488C_{61} - 2.294 \]
The equation suggests that experience with turbulent environments ($C_{55}$) and high levels of organizational slack ($C_{61}$) contribute to successful coping in declining markets. A firm's coping abilities are also increased by adoption of a risk averse stance ($C_{32}$) and a willingness to alter goals and structures to meet new contingencies ($C_{57}$). The discriminant function correctly classified 69% of the cases with high coping abilities ($C_{\text{pro}} = 0.55; C_{\text{max}} = 0.66$).

7) Coping with cyclical markets

The following discriminant function was derived:

$$D_s = 0.374C_{10} + 0.436C_{32} - 3.736$$

The equation suggests that a firm's ability to cope with cyclical markets is increased when it centralizes decision-making authority ($C_{10}$). A tendency towards risk averse strategies also promotes coping abilities ($C_{32}$). The discriminant function correctly classified 68% of the cases with high coping abilities ($C_{\text{pro}} = 0.51; C_{\text{max}} = 0.56$).

5.9 Standard Responses Invoked During Crises

In a previous section it was noted that organizations develop Standard Operating Procedures (SOPs) to coordinate complex routines and tasks. These SOPs ensure economical information processing and predictibility of responses to recurring stimuli. However, since SOPs are grounded in the basic norms of the organization, even novel situations will trigger the same predictable patterns of responses as routine situations. Like organizations, individuals develop preferences for set patterns of behaviour that aid them in
decision-making and problem-solving. This behaviour is programmed in the sense that it is not consciously selected, but is a function of personality, background, a particular organizational climate, and previous successful interventions.

Section 1 of the questionnaire was designed to investigate the types of programmed behaviour that executives may select during crises. The initial premise was that two dimensions of programmed behaviour would be evident in the types of strategies that managers believe to be useful in helping an organization cope with a financial crisis. The two dimensions of behaviour are: 1) a defensive style characterized by retrenchment or cutback strategies with an emphasis primarily on financial factors. Individuals who favour this type of behaviour tend to focus on costs not benefits when evaluating programs; 2) an entrepreneurial style characterized by a preference for offensive strategies that potentially enable an organization to exert control over its environment.

Further, it was surmised that behaviour could be categorized into three types of strategies that are a function of an executives' background: personnel (human relations orientation); operational (functional orientation); developmental (long term orientation). It was expected that a manager's business specialization and previous experience would programme him to prefer one of these categories of strategies. For example, executives with a financial background may prefer defensive or cutback strategies, focussing primarily on cost reductions. In contrast, an individual with a marketing background may prefer entrepreneurial strategies such as increased advertising and a stepped-up sales programme as a solution to a financial crisis.
The frequency analysis of the variables in section 1 indicated that the responses were normally distributed on all but three of the questions. The respondents were in consensus, however, in their ratings of questions 4, 9, and 13. Most respondents rated these three strategies as being particularly useful during a financial crisis:

a) enlisting the support of unions to improve productivity (72% of respondents);

b) cutting back on expense items such as photocopying, long distance telephone calls, etc. (87% respondents);

c) introducing Management by Objectives (MBO) and profit incentive programmes (75% of respondents).

The high consensus on the strategy of cutting back on expense items is probably best explained by the ease with which this step can be implemented. Also, on the surface, it seems an obvious step to take when a firm is financially pressed, and in the short run, benefits will probably outweigh any negative impacts. The consensus on the other two items however, is more puzzling. With respect to enlisting union support, the state of mistrust or antagonism that permeates the relationships between management and unions in many firms would seem to preclude any real chances of cooperation. The introduction of a Management by Objectives programme, while an attractive idea, also has its own pitfalls. Most notable of these is the difficulty in measuring an individual's contribution and establishing standards and norms against which performance is measured. In addition, MBO is not likely to provide a short term solution to problems since the technique requires a period of organizational learning before it functions properly. The marked degree of consensus on these two strategies may reflect the dissemination of current teachings about "good" management.
practices. A 1974 survey suggested that less than 10% of Fortune 500 firms had implemented a true MBO program although the term was freely used by many companies (Schuster and Kindall, 1974).

A smallest space analysis (SSA) was performed on the 14 variables of section 1 to test the premise concerning the underlying dimensions of programmed behaviour. The results of the SSA appear in Table V (2-space coordinates), and in Figure 3 (geometric representation). The data could be represented adequately in two dimensions (coefficient of alienation = .19533, Kruskal's stress = .16776). The goodness of fit does not improve in large increments with greater dimensionality. The coefficient for m = 1 is .33198 and that for m = 3 is .12260.

There are no obvious clusters of homogenous variables in the geometric representation. The configuration of the variables in the space seems to lend itself best to interpretation based on the two axes. Vector 1 was identified as an entrepreneurial/defensive orientation. This dimension lends some support to the original theory. Moving from left to right, the individual strategies become less active or entrepreneurial and more defensive. The entrepreneurial orientation is characterized by strategies that attempt to shape or control the firm's environment in line with organizational objectives, as opposed to strategies that are merely reactive or defensive responses to environmental threat. The three most clearcut examples of entrepreneurial strategies are: variable 1: developing an aggressive marketing strategy to increase sales; variable 7: increasing capital expenditures on more efficient equipment to reduce production costs; and variable 8: expanding R&D to help maintain a firm's competitive position. These strategies may help a firm to alleviate a crisis by enabling it to gain a competitive advantage, greater market share, or higher profits.
### Table V
Smallest Space Coordinates for \( m = 2 \)
Programmed Behaviour

<table>
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<th>Dimension</th>
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<td>14</td>
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Guttman-Lingoes' Coefficient of Alienation = 0.19533

Kruskal's stress = 0.16776
**FIGURE 3**

SSA GEOMETRIC REPRESENTATION: DIMENSIONS OF PROGRAMMED BEHAVIOR

**VECTOR PLOTS**

**VECTOR 2 PLOTTED AGAINST VECTOR 1**

\[
\begin{array}{cccccccccccc}
100 & 92 & 84 & 72 & 64 & 56 & 48 & 40 & 32 & 24 & 16 & 8 \\
92 & 4 & 9 & 13 & 1 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
84 & 9 & 1 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
72 & 13 & 9 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
64 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
56 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
48 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
40 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
32 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
24 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
16 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
8 & 1 & 4 & 14 & 2 & 5 & 3 & 12 & 8 & 100 \\
\end{array}
\]

VECTOR 2

\[
\begin{array}{cccccccccccc}
-100 & -80 & -60 & -40 & -20 & 20 & 40 & 60 & 80 & 100 \\
-100 & -80 & -60 & -40 & -20 & 20 & 40 & 60 & 80 & 100 \\
\end{array}
\]
In all three cases, a firm seeks to control events by its actions; it tries to produce greater benefits to alleviate financial difficulties.

Variable 11, increasing information gathering activities, is also an entrepreneurial strategy but to a lesser extent than the previous ones. Greater information may improve a firm's 'early warning system' and alert it to possible threats. By removing the element of surprise, a firm has time to cushion itself against possible adverse impacts. In this way, the organization retains some control over its destiny and is not forced merely to react to external stimuli.

In contrast, the defensive orientation is characterized by programmed behaviour that is clearly reactive consisting of retrenchment or cutback strategies. Most of the variables at the upper end of this vector are concerned with financial cutbacks: variable 2: cut back operating budgets of departments; variable 3: make across-the-board cutbacks of budgets in all departments; variable 5: reduce staff; variable 6: eliminate marginally profitable new products to reduce costs. A variable concerned with organizational reforms (variable 14) also is considered to be indicative of financial retrenchment. Although this variable may at first appear to be qualitatively different than the more obvious financial strategies, it is interpreted as a cost-saving move. For example, firms may undertake major organizational reforms to eliminate redundant staff, departments, or programmes to reduce costs.

Variable 10, reducing the authority of field managers and department heads, is also a highly defensive strategy. There is some essence of financial retrenchment implicit in this behaviour. Reduced authority often is related to decreased discretionary budget and expense control.
This strategy also implies a greater centralization in decision-making power with responsibility being assumed by senior management.

All these actions represent a retrenchment in the face of a hostile or threatening environment. By employing these strategies, managers do not try to change the course of events but merely try to 'ride it out' in the best way possible. If indeed, the cause of a financial crisis is lack of adequate financial control, these strategies may be effective. However, if the crisis is rooted in another area of operations, for instance, obsolete products or insufficient market share, these actions will only deal with the symptoms not with the underlying causes.

The remaining 4 variables in the section are relatively neutral along this dimension, not clearly entrepreneurial or defensive. They have more explanatory power with respect to the second dimension.

The second dimension of programmed behaviour (vector 2) identified by the SSA, is concerned with the immediacy of impact of crisis management strategies. Strategies that will have an immediate impact in reducing the deleterious effects of a financial crisis are located at the upper end of the scale. There are two types of strategies represented, those previously identified as being primarily of a financial nature such as cutting budgets, reducing staff, cutting expense items, etc. (variables 2, 5, 9, 14) and strategies that are concerned with improving the firm's productivity. This latter group includes seeking union cooperation, introducing MBO, and increasing sales (variables 4, 13, 1).

The financial strategies contribute to immediate alleviation of the crisis (at least the symptoms) by improving cost effectiveness. Cash resources are reallocated in a more effective manner, adapting to the firm's current state. It is interesting to note the differences between variable
2 (cutting departmental budgets) and variable 3 (making across-the-board cuts in departmental budgets). In the SSA, variable 2 appears to be higher in this vector, that is, it is more effective in immediately relieving the crisis. The behaviour associated with variable 2 suggests some evaluation of programs. Financial cutbacks are made, but in selective areas, presumably in less effective (in terms of profit) departments or programmes. In contrast, across-the-board cuts, although equitable, may in fact contribute further to the financial pressure on a firm. Operating budgets may be reduced proportionately in all departments without evaluating the contributions of various parts of the organization. This adversely affects operations by cutting back on very profitable programs that contribute more than their share to overhead. The productivity enhancing strategies help to alleviate the financial crisis by concentrating more on achieving greater benefits than costs.

One should note the positioning of variables 4, 9, and 13 on the upper part of this dimension. These are the three variables on which there was a high degree of consensus that they were useful strategies to employ during crisis. The interpretation of the second dimension, the degree of immediate impact on crisis, is supported by the skewed responses to the item. One of the reasons the majority of respondents find these strategies to be very useful is because they believe the strategies contribute to an immediate relief of the crisis.

Strategies on the lower end of the scale may not contribute much to the immediate alleviation of a crisis. (They may indeed aggravate the short run problems). Variables 7, 8, and 11 which are concerned with increasing capital expenditures, R&D, and information gathering, for example, are strategies with long run impacts. While in the long term they may
substantially contribute to a firm's effectiveness by developing new technology and increasing productivity, in the short run these strategies will be costly. Implementing them diverts resources from current operations. Eliminating new products, still only marginally profitable (variable 6), and reducing the authority of field managers and department heads (variable 10), are two defensive strategies with low immediate impact. It could be less damaging for a firm to fire managers outright (variable 12) than to reduce their authority and leave them in a position to cause trouble for the organization.

The results of the SSA suggest a division into 4 broad categories of strategies based on the two dimensions: entrepreneurial/high immediate impact; entrepreneurial/low immediate impact; defensive/high immediate impact; defensive/low immediate impact. While some of the strategies are relatively neutral on one or both of the dimensions, it is possible to identify some variables that represent extreme types of programmed behaviour in each category as shown in Figure 4.

One would expect that strategies on the diagonal of the matrix would be the most different since they are opposite on both dimensions. Examination of the SSA geometric representation (Figure 3) shows that the two most different strategies (as measured by the greatest distance between pairs) are variables 1 and 10. These are located in the upper left and lower right cells. Developing an aggressive marketing strategy (variable 1) and reducing the authority of managers (variable 10) are diametrically opposed behaviours. There is a highly significant negative correlation between these two variables (τ = -.26, α = .01).
Figure 4
Categories of Programmed Behaviour Developed from SSA

<table>
<thead>
<tr>
<th>high immediate impact on crisis</th>
<th>entrepreneurial mode</th>
<th>defensive mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Develop an aggressive marketing strategy to increase sales (var. 1)</td>
<td>• Undertake major organizational reforms (var. 14)</td>
</tr>
<tr>
<td></td>
<td>• Increase capital expenditures on more efficient equipment (var. 7)</td>
<td>• Cut back the operating budgets of all divisions and departments (var. 2)</td>
</tr>
<tr>
<td></td>
<td>• Expand R&amp;D to help maintain competitive position (var. 5)</td>
<td>• Reduce staff (var. 5)</td>
</tr>
<tr>
<td>low immediate impact on crisis</td>
<td></td>
<td>• Reduce the authority of field managers and department heads (var. 10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Eliminate new products, still only marginally profitable (var. 6)</td>
</tr>
</tbody>
</table>
It is interesting to note the relationship between variables 6 and 10 (both in the lower right cell). These two variables have a significant positive correlation ($\tau = .25, \alpha = .01$). Although these strategies are substantively different, in terms of specific content, they are qualitatively the same, in terms of their impact on the organization. As might be expected, variable 6 also is negatively correlated with variable 1 on the diagonal, although at a lower level of significance ($\tau = -.16, \alpha = .05$).

It is not too surprising to find great distance between these three strategies. Logically, strategies of reducing a manager's authority (var. 10) and eliminating new products (var. 6) are incompatible with developing a strong marketing presence (var. 1). Quite often the ability to close a sale is predicated upon the authority to make in-the-field decisions without having to wait for time-consuming referrals to head office. Timing can be critical for sales personnel, especially in fiercely competitive markets. It is often the new product that attracts customers to a firm. Dropping innovative products from the line, even though they still make only a marginal contribution to profit, may weaken an organization's competitive position.

The two next most distant strategies are found on the other diagonal. They are variable 5, reducing staff, and variable 7, increasing capital expenditures. Although this pair is negatively correlated, it is not immediately obvious how the two strategies are conflicting ($\tau = -.14, \alpha = .05$). If one examines the geometric representation, however, it can be seen that the greatest delineation between the two occurs on the entrepreneurial/defensive dimension. Increasing capital expenditures is highly entrepreneurial, and cutting staff is highly defensive. Although there is a
considerable difference between the two strategies as regards their immediate contribution in relieving crises, this axis appears to be of secondary importance in accounting for the differences between the strategies.

Qualitatively, variable 7, increasing capital expenditures, and variable 8, increasing R&D, are the same strategies. The reader will note a highly significant positive correlation between these two variables ($\tau = 34, \alpha = .01$). Like variable 1, the R&D strategy is negatively correlated with a strategy of reducing staff ($\tau = -.18, \alpha = .05$). In addition to their placement on the entrepreneurial/defensive dimension, the distance separating these two items best can be explained in terms of feasibility. Increasing R&D and reducing staff would seem to be mutually exclusive behaviours. When staff cutbacks are made, they usually are implemented in 'non-essential' departments, quite often in staff functions. Since R&D is a personnel-intensive operation, which may be considered a 'luxury', and therefore expendable by many executives, this function would feel the direct impact of staff cuts. At the very least, it would seem a difficult feat to increase manpower for R&D projects while staff cuts were being made in other parts of an organization, unless the firm had an extraordinary commitment to R&D or that function was the firm's primary business.\(^\text{15}\)

There is also a great spatial distance between the two entrepreneurial strategies in the lower left cell and variable 14, undertaking major organizational reforms and variable 2, cutting operating budgets (both in the upper right cell). As mentioned previously, these latter two strategies are interpreted as financial retrenchment actions (note their positive

\(^{15}\) The reader should note that this discussion applies to business enterprises. The two strategies need not be incompatible in highly bureaucratized organizations such as government departments where there may be little lateral communication or accountability.
correlation, \( \tau = .25, \alpha = .01 \)). Their distance from variables 7 and 8 is not surprising. The two entrepreneurial strategies require increased outlays of resources and call for behaviour that is completely antithetical to cutting budgets in all departments. Although the immediacy of impact on crisis is an important dimension of differentiation, again it is the entrepreneurial/defensive vector that is the most explanatory.

One other relationship on the SSA geometric representation is worth noting. Although variable 1 (aggressive marketing strategy) and variable 5 (reduce staff) are approximately equal with respect to immediate contribution in alleviating a crisis, spatially, they are one of the most distant pairs of variables. The two variables also have a significant negative correlation (\( \tau = -.20, \alpha = .05 \)). Their great separation occurs almost entirely as a result of differences along the entrepreneurial/defensive dimension. Referring to Table V, the reader will note that on vector 1, variable 1 = -1000.000 and variable 5 = 100.000. The two types of behaviour would appear to be incompatible and likely would be favoured by firms in different industries.

The perceived value of certain strategies is emphasized by noting the distribution of responses to the four major types of programmed behaviour. The distribution of variable 1, a highly entrepreneurial strategy, is positively skewed (\( \bar{x} = 3.447, \text{S.D.} = 1.899 \)). Approximately 51% of respondents indicated that an aggressive marketing strategy would be useful in a crisis, while 23% thought it would be damaging to the firm. Most respondents did not find the other two entrepreneurial strategies (variables 7 and 8) to be nearly as useful. Thirty-nine percent of the executives judged a strategy of increasing capital expenditures to be useful (\( \bar{x} = 4.234, \text{S.D.} = 1.589 \)). A large group of respondents (51%) indicated
they thought increasing R&D would be damaging to the firm during crises ($\bar{x} = 4.596$, S.D. = 1.476). It seems obvious that the long term nature of these latter two strategies diminishes their value in the eyes of most managers.

The usefulness of short term 'fire fighting' strategies is once again emphasized when one examines responses to some of the defensive variables. Executives clearly favoured the short term defensive behaviour over the long term. 51% of respondents indicated it was useful to make budget cuts (variable 2) in all divisions and departments ($\bar{x} = 3.819$, S.D. = 1.906). 63% thought it was useful to reduce staff during a crisis ($\bar{x} = 3.96$, S.D. = 1.422). In contrast the long term defensive strategies were seen to be far less useful by most executives. Only 27% of respondents, for example, indicated it would be useful to eliminate new products ($\bar{x} = 4.66$, S.D. = 2.019). Most executives did not favour a strategy of reducing the authority of field managers and department heads. In fact, a majority (54%) believed that this would be damaging behaviour during a crisis ($\bar{x} = 4.683$, S.D. = 1.831).

It was hypothesized originally that managers from firms with a high degree of flexibility would invoke entrepreneurial behaviour as a response to crises ($H_{32}$). No support was found for this premise, however. Flexibility may be a general dimension. There is no evidence of any selection process occurring, that is, entrepreneurs seeking out flexible organizations and vice versa. Rather, one speculates that entrepreneurs create their own flexibility.

Dearborn and Simon (1958) suggested that an executive's business specialization influences the way he approaches business problems. No evidence was found, however, that managers will respond parochially on the basis of their functional backgrounds during a crisis ($H_{33}$). Implementation
of a particular management style also had no effect on the patterns of programmed behaviour displayed (H<sub>34</sub>).

Predicting Programmed Behaviour

A stepwise discriminant analysis was used to try and predict the variables that contribute to entrepreneurial and retrenchment behaviour. The following function was derived for entrepreneurial behaviour:

\[ D_s = 0.379C_{33} + 0.196C_{41} - 0.232C_{51} - 0.290C_{63} + 0.848 \]

This equation reflects the fact that managers who prefer entrepreneurial behaviour tend to be highly democratic, encouraging a lot of employee input to decision-making (\(C_{41}\)), and to be very concerned with maintaining organizational harmony even during times of threat (\(C_{33}\)). Entrepreneurial managers also tend to come from firms with very complex environments (\(C_{63}\)) but tend to rely on organizational traditions to lend stability to their actions (\(C_{51}\)). The discriminant function correctly classified 72% of the entrepreneurial managers (\(C_{\text{pro}} = 0.66; C_{\text{max}} = 0.79\)).

It was not possible to derive a discriminant function to predict retrenchment behaviour. The best function consisted of twelve variables; these were too many for meaningful interpretation.
6. IMPLICATIONS FOR COPING WITH CRISIS

6.1 Reducing Susceptibility to Crises

Two specific findings associated with corporate susceptibility to crises emerged from the analysis (see Table VI for a summary of all hypotheses tested). First, firms have a lower susceptibility to crisis if their environments are predictable. While this observation may seem rather simplistic, it has implications for corporate behaviour. Since most firms today operate in turbulent and complex environments with little inherent predictability, it becomes essential for them to upgrade their intelligence systems and long range forecasting. Improved scanning and monitoring techniques of the information environment will help ensure that key decision-makers receive timely and useful information. Special information systems concentrating on particularly vulnerable areas may be developed. These systems, based on effective sampling techniques, would flag critical trends above a given threshold.

Constant scanning of the organizational environment for possible threats may reduce the chance of surprise. It may be possible, for example, to form special intelligence groups whose major responsibility would be the identification of possible rare events with threat potential. While the formation of special scanning groups offers an advantage to the organization in anticipating the future, the problem associated with such independent centers is one of credibility. The hyper-innovative tendencies of such groups may build up feelings of mistrust among other organizational groups. The result is an isolation from power with accompanying inability to influence decision processes. The problem of credibility can be eliminated partially by involving other organizational members in the activities of such groups.
Table VI
Summary of Results

<table>
<thead>
<tr>
<th>The Nature of Crises</th>
<th>Hypotheses</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypotheses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>H</strong>: Threats to high priority goals, stress, and restricted decision time are universal criteria in labelling a situation as a crisis.</td>
<td></td>
<td>Not supported: stress was rated as one of the least important factors in defining a crisis. Threat to high priority goals and restricted decision time are very important determinants of crisis.</td>
</tr>
<tr>
<td><strong>H</strong>: The subjective criteria defining a crisis are invariant with the type of environments that individuals face.</td>
<td></td>
<td>Not supported: differences were found based on the degree of flexibility + environmental predictability.</td>
</tr>
<tr>
<td><strong>Susceptibility to Crisis</strong></td>
<td></td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H</strong>: Firms operating in predictable environments have a low frequency of crises.</td>
<td></td>
<td>Not supported.</td>
</tr>
<tr>
<td><strong>H</strong>: Firms with a high degree of control over their environments have a low susceptibility to crises.</td>
<td></td>
<td>Not supported.</td>
</tr>
<tr>
<td><strong>H</strong>: Firms that are very dependent on other elements in the environment are prone to crises.</td>
<td></td>
<td>Not supported.</td>
</tr>
<tr>
<td><strong>H</strong>: Organizations managed by process oriented managers will have a low frequency of crises.</td>
<td></td>
<td>Supported.</td>
</tr>
<tr>
<td><strong>H</strong>: Managers who prefer decision-making strategies associated with groupthink come from organizations that are prone to crises.</td>
<td></td>
<td>Not tested; not enough respondents met criteria for groupthink.</td>
</tr>
<tr>
<td><strong>Preferred Decision Structures</strong></td>
<td></td>
<td>Not supported: managers from simple environments tend to limit the number of alternatives considered.</td>
</tr>
<tr>
<td><strong>H</strong>: Managers from firms with complex environments will tend to consider only a limited number of alternatives during crises.</td>
<td></td>
<td>Not supported.</td>
</tr>
<tr>
<td><strong>H</strong>: Firms operating in complex environments will develop strong adherence to Standard Operating Procedures.</td>
<td></td>
<td>Not supported.</td>
</tr>
<tr>
<td><strong>H</strong>: Managers from firms with more complex environments will seek the aid of many individuals to help evaluate actions and alternatives during crises.</td>
<td></td>
<td>Not supported.</td>
</tr>
<tr>
<td><strong>H</strong>: Managers from firms with more complex environments will concentrate on the short term effects of proposed solutions rather than long term effects during crises.</td>
<td></td>
<td>Not supported.</td>
</tr>
</tbody>
</table>
Table VI (cont'd)

Hypotheses

Preferred Decision Structures (cont'd)

\(H_{12}^{2}\): Firms operating in turbulent environments will not develop strong adherence to Standard Operating Procedures.

\(H_{13}^{2}\): Task oriented managers will follow SOPs closely and use only official information channels during crises.

\(H_{14}^{2}\): Process oriented managers will not perceive information gathering to be an important activity during crises.

\(H_{15}^{2}\): During crises, process oriented managers will find it particularly important for employees to understand the decisions made by management.

\(H_{16}^{2}\): Executives who prefer a democratic management style will encourage individuals who are responsible for implementing a decision to be involved in making decisions during crises.

\(H_{17}^{2}\): Executives who prefer an autocratic style of management will find it desirable for an organization to have a directive leader during crises.

\(H_{18}^{2}\): Managers who think it important to maintain organizational harmony during crises encourage executives who disagree with company policies to keep their reservations to themselves.

\(H_{19}^{2}\): Managers who find it important to maintain organizational harmony during crises encourage members of an executive committee to minimize conflict within itself to be loyal to the Chief Operating Officer.

Results

Not supported

Supported

Supported

Not supported

Supported

Supported

Not supported

Not supported

Supported

Supported
Table VI. (cont'd)

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Dimensionality of Coping Abilities (cont'd)</td>
<td></td>
</tr>
<tr>
<td><strong>H24</strong>: Organizations that have a high level of slack can cope better with crises involving threats to market share or sales than they can with crises involving threats to other areas of operations.</td>
<td>Supported for sudden drop in sales</td>
</tr>
<tr>
<td><strong>H25</strong>: Organizations that maintain a decentralized decision-making structure under threat can cope better with crises precipitated by a drop in sales than organizations that centralize decision-making authority under threat.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H26</strong>: Firms operating in complex environments have a greater ability to cope with crises than firms operating in simple environments.</td>
<td>Not supported</td>
</tr>
<tr>
<td><strong>H27</strong>: Firms operating in turbulent environments have a greater ability to cope with crises than firms operating in static environments.</td>
<td>Not supported</td>
</tr>
<tr>
<td><strong>H28</strong>: Firms operating in turbulent environments have a greater ability to cope with cyclical market conditions than firms operating in static environments.</td>
<td>Not supported: firms with placid environments have a greater ability to cope with cyclical conditions.</td>
</tr>
<tr>
<td><strong>H29</strong>: Firms managed by entrepreneurial executives have a greater ability to cope with a major technological breakthrough than firms not managed by entrepreneurs.</td>
<td>Not supported</td>
</tr>
<tr>
<td><strong>H30</strong>: Firms managed by executives with an aggressive marketing orientation have a greater ability to cope with a sudden drop in sales than firms managed by executives with other orientations.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H31</strong>: Firms managed by more democratic executives have a greater ability to cope with the death of a number of key executives than firms managed by less democratic executives.</td>
<td>Not supported</td>
</tr>
<tr>
<td>Standard Responses to Crises</td>
<td></td>
</tr>
<tr>
<td><strong>H32</strong>: Managers from firms with a high degree of flexibility are likely to adopt entrepreneurial behaviour as a response to crises.</td>
<td>Not supported</td>
</tr>
<tr>
<td><strong>H33</strong>: Managers make parochial responses based on their functional backgrounds during crises.</td>
<td>Not supported</td>
</tr>
<tr>
<td><strong>H34</strong>: Process oriented managers prefer programmed behaviour strategies that manipulate the managerial structure of the firm during crises.</td>
<td>Not supported</td>
</tr>
</tbody>
</table>
Corporate susceptibility to crises also can be reduced by enriching an organization's repertoire of responses, for example, by developing contingency plans with appropriate, sensitive trigger mechanisms. The seriousness of environmental threats can be mitigated by timely, appropriate responses. At a minimum, the impact of surprise associated with a threat can be reduced by contingency planning.

The second important finding is that a process style of management (one that evaluates employees on the basis of results rather than on how well they follow specific procedures) is associated with reduced susceptibility to crises. Creativity and independent problem-solving appear to be necessary requirements in evading crisis. Process management allows for individual discretion and gives greater flexibility to employees for dealing with local threats before they escalate to the critical level.

Although rigid programming and task specification provide a corporation with a greater degree of control, a high level of task programming is only effective in coping with anticipated events. If programming is too rigid, corporate vulnerability to crises is increased when novel situations occur. Inappropriate procedures may delay the realignment required to cope with novel decision situations. Corporations must, therefore, obtain an appropriate balance between standardization, which ensures control, and flexibility, which enables employees to deal with local threats.

The executives who participated in this study clearly perceive their corporations to be susceptible to crises. Only 13% of the respondents indicated that there was no probability of a crisis occurring in their companies within five years. In contrast, 15% of executives suggested that there was at least a .50 probability of crisis occurring.
Although the respondents perceived crises to be probable events, only 45% of the firms had any formal plans to deal with crises. Contingency budgeting was the most common measure adopted by corporations to reduce the impact of crises. Other types of plans included: decision-making and problem-solving training, vulnerability analysis, long range planning, secondary document sources, and management succession plans. Fifty-five percent of the sample corporations, however, had no plans to help them weather the effects of a crisis, in spite of their own assessments of susceptibility.

Corporations must be willing to make a strong commitment to precrisis training, both in time and in money, to effectively reduce their susceptibility to crises. Clearly the size of a corporation, its resources, and its objectives will determine the specific strategies chosen to help reduce susceptibility and to improve coping abilities. One relatively simple measure that a firm can take is to enrich its repertoire of Standard Operating Procedures. Quite often SOPs increase organizational inertia and lead to the subversion of new programs, however, the institutionalized commitment to procedures can be made to work for the firm's advantage. Special cues for triggering new automatic programs designed to deal with crises can be developed and incorporated into existing SOPs. These cues can be reinforced by the use of precrisis drills and simulations. During an actual crisis, much of the required behaviour is, thus, preprogrammed, reducing the latitude for error.

On a more major scale, basic modifications can be made in an organization's structure that will improve its performance in crises. For example, a firm can develop dual structures, one for routine situations and the other for crises, with appropriate cues that determine when either
structure is to become operational. The structure for crises would be characterized by a flexible repertoire of operating procedures capable of responding to novel situations. Key positions in staff and line units would be filled by crisis specialists (who may not be the same executives filling key positions during normal operations). These individuals would be selected on the basis of their creative, adaptive abilities in high-stress situations. Special emergency communications networks and intelligence systems can be developed to augment the crisis structure.

The concept of dual structures is not particularly radical; the closely-related project management form of organization has been used successfully by many corporations for years. Personnel are assigned on a temporary basis to particular projects; when a firm's needs change, personnel are reassigned. This type of structure is particularly suitable for situations that require flexible strategic and operational responses (Ansoff and Brandenburg, 1971). It is important, however, that membership in a crisis project management team remain relatively stable. Studies have shown that during periods of high stress, permanent decision-making groups tend to perform better than ad hoc groups (Hall and Williams, 1966).

6.2 Improving Coping Abilities During Crises

The analysis suggested that there is a general dimension of coping abilities applicable to all types of crises. Corporations that are capable of coping successfully with one type of crisis, in general, are capable of coping with any type of crisis. Firms develop specialized advantages, however, in dealing with particular types of threatening events. Some firms are more adept at coping with threats that build up into a crisis over a long term. Successful coping in this situation requires the
ability to develop a long run perspective. Early warning systems and other scanning techniques, thus, are needed to alert an organization to threatening trends developing in the environment.

In contrast, threats that occur with a sudden onset, as for example, natural disasters, require different coping skills. A high level of flexibility, which allows a firm to act quickly in response to threats, and a high degree of slack, which allows a firm to absorb short run impacts, are prerequisites for coping with this type of threat.

Strong leadership was found to be a crucial element for effectively coping with a crisis. Leaders may adopt many different styles and orientations but two characteristics of leadership are considered essential: problem-solving ability and the ability to maintain the confidence of group members. Five important components of the decision-making process were identified. These components were: risk absorption, implementation, evaluation, risk confrontation, and threats to optimality.

Each of these components was delineated on the basis of two underlying dimensions: the quality of decision-making processes (number of people participating in the decision, number of alternatives generated, degree of evaluation, etc.) and the exposure to uncertainty (risk posture). The bureaucratic risk absorption component reflects a concern for the process of decision-making. Exposure to uncertainty is minimized by reliance on procedures and programming. The implementation component is concerned with ensuring that decisions, once reached, are put into effect. The degree of employees' understanding of decisions, participation in the process, and agreement with decisions are important factors. The evaluative component is concerned with the quality of decisions reached. It represents a high degree of openness to ideas, alternatives, and people
to ensure an optimal choice. The risk confrontation component represents the extent to which decision-makers are willing to accept high levels of uncertainty (risk) during the decision process. Threats to optimality reflects a collection of threats to the quality of decision-making such as tendencies for groupthink and information filtering.

Reducing Bureaucratization

It was noted previously that Standard Operating Procedures are valuable tools for an organization. SOPs, however, are clearly dysfunctional when they are used as a means to avoid decision responsibility by over-reliance on rules and regulations (the bureaucratic syndrome). A firm can attempt to minimize the effects of bureaucratic risk absorption tendencies either by expanding the repertoire of programmed solutions to account for more contingencies, or by building higher levels of personal discretion into existing procedures.

A strategy of expanding SOPs involves high development and maintenance costs to an organization, and, clearly, it is effective only in coping with events that can be anticipated. The vulnerability of the organization is actually increased when novel situations occur. Complex but inappropriate decision programs may delay organizational realignment necessary to cope with the novel decision situation. While an expanded repertoire of SOPs will reduce the number of errors that occur when information is forced into rigid formats, the complexity involved will increase random noise in the information system and make the tracing of errors more difficult. A strategy of allowing more individual discretion in following procedures gives greater flexibility but organizational economies obtained by standardization and programming are lost.
Every organization must develop SOPs to obtain an appropriate balance between flexibility and standardization to fit its specific environment. A dialectic component can be built into every information processing and decision program, however, to guard against the introduction of biases. The dialectic will ensure that counterplans are developed for all major decisions and contradictory points of view are examined. In this manner any latent biases can be identified. This procedure is similar to the dialectical approach suggested as a measure to prevent groupthink — episodic dialectics are supplemented by routine programmed dialectics.

Reducing Implementation Dysfunctions

An organization's effectiveness in coping with crises is a function of its ability to implement decisions. Dysfunctions in the implementation component of decision-making, clearly, can have grave consequences for a firm. Implementation failures, in part, can be prevented through the development of general coping abilities. For example, a group's motivation to implement a decision can be improved by involving at least one representative from each group in the actual decision process. When a group solves a problem, each member participating feels responsible for making the solution work. If a solution has been imposed without consultation, however, there is not the same commitment to implementation.

Action groups involved with the decision will also be more aware of critical timing factors. Maier (1967:249) noted that "a low-quality solution that has good acceptance can be more effective than a higher-quality solution that lacks acceptance". Motivation also can be improved by thorough indoctrination programs for all members of the organization to develop a heightened commitment to goals. While this procedure will not
remove entirely the problems of political games and bargaining between units, there will be some reduction in the incompatibility of goal structures between the diverse units of the organization.

Problems of comprehension are also reduced by participation in the decision process. Implementation units frequently do not understand the reasons for choosing a course of action that they regard as arbitrary or threatening. A tendency to subvert the implementation process either consciously or unconsciously often emerges. Participation in the decision process increases understanding of the decision through exposure to all the alternatives considered and the reasons for their rejection. Participation also leads to a widened perspective of the total crisis, including overall organization goals, not just a narrow perspective dominated by self-interest. Commitment to and understanding of the decision facilitates diffusion of information throughout the organization.

Implementation dysfunction, in the form of misinterpretation and lack of coordination, can occur as a result of noisy channels of communication between decision and implementation units. This in part can be alleviated by placing trusted people in the field to affect coordination. Usually such people will be in direct communication with the senior decision-makers to reduce the probability of error.

Reducing Evaluation Dysfunctions

Previously, it was noted that strong leadership is a desirable and necessary factor for effective coping during crises. Strong leadership, however, has been recognized as an element of group dynamics that can lead to dysfunction in the evaluative component of the decision process. Specifically, a very strong leader promotes the tendency toward premature
convergence on a single alternative without fully evaluating all other alternatives (Maier, 1967; Janis, 1972). This tendency can be alleviated by the Chief Operating Officer or other decision leader encouraging critical evaluation of policies, perhaps assigning a specific role to each group member, and encouraging the expression of diverse points of view. A range of opinions is more likely to be elicited if the leader refrains from critical evaluation and acts merely to guide the discussion (Thibaut and Kelley, 1959). Although this procedure can work if the leader is committed to ensuring critical appraisal of all alternatives, it is difficult for most organizational members to overcome traditional hierarchical norms of deference to the leader. If one group or individual is intent on pleasing the leader, the evaluation process can be subverted.

Open criticism in debates can lead to damaged feelings if members are carried away in their roles as critical evaluators. "Feelings of rejections, depression, and anger might be evoked so often when this role assignment is put into practice that it could have a corrosive effect on morale and working relations within the group" (Janis, 1972:210). Impartiality by the leader in a discussion may also be a drawback. An organization may be deprived of the services of one of its best decision-makers. The result may be a lower quality decision than would have resulted if the leader had participated. There is also the danger that nondirection by the leader may result in a decision that is completely unacceptable to him. The proper role of the leader lies somewhere between the two extremes.

Critical evaluation and the exploration of a wide range of policy alternatives is a time-consuming process. A firm may not have the time to adopt such procedures. During crises, decisions must be reached very quickly to head off disaster. High levels of stress felt by decision-
makers at this time also contribute to reduced cognitive abilities. Increased generation and evaluation of alternatives can contribute to information overload, which in turn increases the probability of information distortion.

Critical evaluation of alternatives can be promoted by inviting the opinions of outside experts, seeking opinions from associates in the organization, and generating alternatives through brainstorming, synectics, and other creative problem-solving techniques (Arnold, 1962; Stein, 1974). These techniques may prevent premature closure on a particular alternative, but they also substantially increase the probability of information overload. Janis (1972) noted that while the use of outside experts and trusted associates provides a decision-making group with fresh perspectives, there is always the danger of a breach of security or an information leak in an expanded group. In highly competitive situations this is most undesirable and potentially damaging to the organization. If expert assistance is to be used effectively, assistants must be consulted early in the decision process before convergence on a particular alternative starts.

Special effort should be made by the leader to ensure that a long-range perspective is introduced early into the deliberations by assigning special responsibility to certain members for developing such a focus. Incremental decisions made for short-term expediency may have severe consequences on future policies and negotiating positions.

Reducing Tendencies Toward Excessive Risk-Taking

While it is often necessary and desirable for corporations to take higher risks during crises, dysfunctions in the risk posture component of the decision process may promote excessive risk-taking. The effects of stress and individual biases can contribute to this tendency. The
propensity to take high risks can be alleviated in part by thorough indoctrination and training in corporate objectives and the level of risk allowable to achieve those objectives. We have noted previously the debilitating effects of stress on decision-makers and its role in intensifying any underlying personality tendencies. For example, if an executive normally is a risk-taker, under extreme pressure he may take even higher risks. Clearly, it is important to select executives in stressful positions not only on the basis of their technical competence, but also on their ability to handle stress.

A variety of stress-reducing techniques can be incorporated into the daily routine of appropriate executives. Techniques such as meditation, and progressive relaxation are currently in vogue. Key decision-makers may also undergo behavioural modification treatment to raise their tolerance for stress. Another possibility is to rotate decision-makers or temporarily replace them with individuals selected and trained for high-stress situations (this is of course not feasible at the most senior levels of a corporation).

Personal biases and inaccurate stereotypes of competitors are major factors that contribute to increased risk propensity during crises. Role playing and psychodrama are techniques developed by psychologists that may help to overcome the influence of stereotypes and to increase understanding of competitors. Scenario building is another technique that promotes understanding of a rival and enables decision-makers to predict responses to their actions more accurately (Janis, 1972).

Role playing can be expanded to include general crisis training for a number of hypothetical events. This has the secondary effect of reducing stress on managers when a real crisis develops. The cost of techniques
such as role playing, however, may be prohibitive since they are so time consuming. Ideally these techniques should be developed as part of a package of precrisis training.

Reducing Decision-Making Dysfunctions

There is evidence in the literature that organizations often engage in behaviour that threatens the quality of decision-making. For example, Janis (1972) and Janis and Mann (1977) have documented dysfunctions resulting from group dynamics and manifested by symptoms of groupthink. Solutions to group problems such as the propensity to take increased risks can be found by focusing on an individual's responsibility for decisions. In this manner, a group-induced shift toward greater risk taking can be avoided (Wallach, Kogan, and Bem, 1964). Techniques such as building 'worst outcome' scenarios will aid in realistically evaluating the seriousness of proposed outcomes and will reduce the propensity of decision-making groups to favour high-risk alternatives.

Since decision-making groups that are subject to groupthink try to rationalize warnings and other disturbing information requiring a re-evaluation of policy, it is necessary to ensure that all alternatives are fully evaluated. The use of a 'devil's advocate' ensures that both good and bad aspects of a proposal are examined. The technique is based on the premise that conflict is the best means of exposing hidden assumptions. The dialectical approach is another, more formal technique, that uses structured debate to bring forth alternative world views. The use of dialectics also exposes hidden assumptions allowing an organization to develop a new conceptualization of a problem and possible solutions.
Organizations can reduce pressures on decision-makers to conform to majority opinions by the use of techniques that allow for the anonymous expression of dissenting opinions and questioning. A Kantian Delphi, for example, is a structured technique that elicits diverse points of view from individuals with different backgrounds (Mitroff and Pondy, 1974). The purpose of the technique is to enlarge the information base, relative to a decision situation, beyond that possessed by any one individual. The technique is particularly good for poorly-structured problems and it serves to protect minority viewpoints.

Information distortion is another threat to the quality of decision-making that can reduce coping abilities during crises. Information overload is a serious problem for decision-makers during crises given the requirements of increased information flows, the debilitating effects of heightened stress, and shortened time horizons. More information does not necessarily mean better information. Improved scanning techniques and monitoring devices of the information environment and presentation of information in special formats can help ensure that the information received by decision-makers is of the proper quality as well as a manageable quantity.

Special information systems can be developed that include extraordinary channels of communication to cut through the organizational hierarchy and, in some instances, to utilize direct links with the environment or more than one source of the same information (Downs, 1967). These techniques will also help reduce the effects of time delays, isolation of decision-makers, and screening processes at various levels of the hierarchy as information is filtered upward. In terms of resources, however, such systems can be costly for an organization. In many instances, personnel
are diverted from their regular pursuits to participate in these systems, sometimes at the expense of the day-to-day functioning of other parts of the organization. Most certainly there are costs of system development that must be incurred. Expansion of organizational systems also has the drawback of making the firm more unwieldy, especially in its ability to affect coordination. The proliferation of new departments promotes an increased danger of empire building, that can lead to intra-organizational conflict and bargaining. This in turn will affect a firm's ability to implement decisions.
7. METHODOLOGICAL OVERVIEW AND PLANS FOR CONTINUED RESEARCH

The objectives of the study were four-fold:

1) to integrate theories of crisis behaviour into a conceptual model of crisis management to provide a basis for empirical research,

2) to test specific hypotheses concerning crisis behaviour, susceptibility to crises, and coping abilities in the context of business organizations,

3) to develop managerial tools for diagnosing organizational strengths and vulnerabilities in coping with crises,

4) to develop prescriptions for improving crisis coping abilities and for preventing crises.

This chapter reviews the success of the thesis in terms of achieving these four objectives and it diagnoses the weaknesses of the study. On the basis of this analysis proposals are made for future research.

A conceptual model was developed (Figure 1) that provided a means for studying decision-making and implementation processes during crises. The analysis was streamlined by focussing on the elements of the model and identifying 'principal actors' in the decision process. In this study, senior executives were selected as subjects; their cognitive abilities, behavioural preferences, and managerial styles were examined.

The selection of senior executives as the focus of the study was justified on the basis that during crises, decision processes tend to centralize and shift to the top of an organization when goals central to the organization are threatened (Hermann, 1972). Other decision-making centers within an organization were studied in terms of their behavioural alignment with the principal actors on certain variables, for example, communications patterns and response times.
Although the conceptual framework permitted identification of a specific target for the empirical study (senior executives), nevertheless, this focus provided only a 'first cut' in the analysis. Some important aspects of crises that are not centered at the top of the hierarchy are not dealt with by the model. For example, one must focus on the total organization to assess the impact of structure and inter-unit relationships upon crisis management patterns. Similarly, communications systems and the evolution of organizational norms can only be analyzed in the context of the total firm.

As a tool for empirically testing the theory, the study must be regarded primarily as a pilot. It explored areas showing promise and meriting investment in more rigorous research designs. The study identified underlying patterns in the data that were then used to further describe behaviour during crises. These patterns also were used to test the effectiveness of theoretical concepts as principals for organizing data.

Smallest Space Analysis (SSA) was the technique used to identify these latent dimensions. SSA was first applied to data representing behavioural programs during a crisis. Two dimensions were found to be important in delineating behaviour. The first dimension was entrepreneurship versus defensiveness, and the second dimension was "fire-fighting" versus long-term investment. SSA was also applied to data concerning decision-making structures. Two dimensions were identified. One axis represented quality of decision-making (rationality), and the second axis represented the degree of exposure to uncertainty during decision-making. The findings of the Smallest Space Analysis supported the theoretical constructs.
The results derived from testing specific hypotheses suffered primarily from two methodological shortcomings: a) response effects, and b) conclusiveness of findings. Cozby (1977) and Sudman and Bradburn (1974) have reviewed the problem of response effects on validity. An important response effect is the problem of self-presentation in survey research. People tend to try and make as good an impression on other people as possible. "The social desirability response set leads the individual to answer in the most socially acceptable way -- the way he thinks most people respond or the way that reflects most favorably on him ... if a survey asked people to admit to behavior they may consider undesirable, the results may be considered suspect" (Cozby, 1977:49).

In gathering data on senior executives' attitudes and behaviour during crises there was a danger that subjects would respond in a manner they perceived to be 'good management' practice. The findings, however, were considered to be quite robust for two reasons. First, since self-administered questionnaires are anonymous, they seem to be less subject to the biases of self-presentation than face-to-face interviews (Sudman and Bradburn, 1974: 40). Secondly, this study sought only to examine the relationships between variables in crisis situations, not to determine absolute levels of performance.

The second methodological shortcoming results from the fact that tests of hypotheses were based upon observed associations. Although the conclusiveness of the results may be questioned for this reason, the shortcoming is a general problem in non-experimental organizational research. Without using an appropriate experimental design, or at least a quasi-experimental design, the findings of the study are inconclusive. At best,
they can be regarded only as supportive evidence for the theory, and the quality of this evidence is not explicitly specified.

There are several difficulties, however, in attempting to study crisis behaviour experimentally. Laboratory experiments, while feasible, are highly constrained by ethical considerations. Much of the interesting phenomena of crisis behaviour centers around reactions to intense stress generated by threats. One must question whether an experimenter could justify subjecting participants to stressful experiences. Without simulating the stressful effects of a crisis, however, the threats to external validity are magnified.

Field experiments, in contrast, may be valid, but are rarely feasible. It would be most difficult to find an organization willing to deliberately generate crises or stress for itself. The third option, quasi-experimental designs (Campbell, 1969) also has difficulties. The problem here is one of gaining access to relevant information. Organizations in crisis no doubt would be reluctant to give access to their files for reasons of security and self-representation.

The third objective of the study was to develop managerial tools for diagnosing strengths and weaknesses. Diagnostic functions were constructed that predicted vulnerabilities to crisis on the basis of executive and organizational attributes. Discriminant analysis was used to derive the predictive functions and their powers of discrimination generally were high. Such functions, however, should be used for screening purposes only, since they are not based upon causal models, but only upon patterns of association. The discriminant functions derived in this study could be improved by enlarging significantly the sample size. This would reduce the probability of discriminating on
the basis of criteria specific to the sample of subjects, but irrelevant to the total population under study. One could also use the discriminant functions as inputs to a diagnostic simulation model to test alternative design propositions (Smart, Thompson, and Vertinsky, 1978).

The fourth major objective of this study was to develop prescriptions for improving crisis coping abilities and for preventing crises. The prescriptions developed tended to concentrate on specific aspects of the conceptual model of crisis (Figure 1). For example, to reduce crisis susceptibility improved scanning and monitoring techniques were suggested to help temper the impacts of an uncertain environment. On a more major scale, basic modifications in organizational structure were proposed to improve performance in crises, for example, dual decision-making structures.

Prescriptions for improving coping abilities during crises focussed on components of the decision-making process derived from the Smallest Space Analysis. These included suggestions to reduce the effects of bureaucratization, implementation and evaluation dysfunctions, and excessive risk-taking. The prescriptions were of a type that would increase general management capabilities, for example, expanding the repertoire of standard operating procedures, improving the motivation of line units, and making procedural modifications in the decision-making process to use techniques such as a devil's advocate, dialectics, and scenario building.

The development of prescriptions is itself an act of judgment based upon current knowledge. Although many of the prescriptions suggested may be effective in preventing crises or reducing their impacts, future studies should include an evaluation of the proposals. Initially, this could be accomplished, in part, by means of experiments using artificial laboratory organizations in simulated environments.
To conclude, future research should:

1. Generate alternative theoretical perspectives to enrich the domain of analysis.

2. Expand the sample space to include participants from different organizational hierarchical levels as well as more diverse organizations (e.g. cross-cultural studies).

3. Improve the conclusiveness of findings by employing quasi-experimental designs.

4. Evaluate prescriptions.
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Appendix 1

Letter of Invitation and
Crisis Questionnaire
Conventional wisdom suggests that during crises men are capable of drawing upon hidden reservoirs of strength to perform extraordinary feats of creative decision-making. There is, however, growing evidence to call into question the premise that during crises men always 'rise to the occasion'. Indeed, there are times when corporate performance is so impaired that a major fiasco results.

The Corporate Crisis Study Group at the University of B.C. was formed to study how corporations and managers working within those corporations respond to the challenges and demands of a business crisis. Since crisis decision-making is primarily a function of senior management and particularly of the chief operating officer, we are asking your assistance in our study of crisis phenomena.

Enclosed is a brief questionnaire that is designed to learn about the attitudes and decision-making styles of senior executives in crisis situations. General information about your corporation and its environment is also requested. Would you please give us approximately thirty minutes of your time and complete the questionnaire. Similar information is being requested from a sample of the chief operating officers of the top 400 corporations in Canada and the U.S.

We wish to stress that responses to the questionnaire will be kept confidential and that it will not be possible to identify responses with individuals or specific corporations. Although the study will be financed by Canadian and international agencies, no agency has control over the direction of the study or over the information received. No individual responses will be released to any agencies or other persons and the results of the study will be published openly in professional journals.
If your time schedule is such that you cannot assist us, would you please pass the questionnaire to another senior executive in your company to complete. We stress that this is a study of senior management not middle management. Please return the questionnaire in the enclosed envelope within three weeks.

To obtain the most information from the study, your personal participation is very important to us. We will offer you a copy of the results of the study; these should be available early next spring. Since the corporations that participate in the study will be anonymous, we cannot send the results to you automatically. If you are interested, please write to us and we will send you the information. The Corporate Crisis Study Group also has recently published some more general material on crisis management that we would be pleased to send if you so request.

Thank you very much for your cooperation.

Yours truly,

Ilan Vertinsky,
Professor of Policy Analysis.

Carolyne Smart,
Project Director.

IV/ee

Encl.
CORPORATE CRISIS QUESTIONNAIRE

For the purpose of this questionnaire, a crisis is defined as an unexpected event that seriously threatens major corporate goals and presents a restricted time in which a response can be made.

Section 1
Please examine the following statements describing some specific operating strategies that an organization may use to help it deal with an unexpected critical decline in profits. Without any further information, indicate how useful you think these strategies would be in relieving a financial crisis in a typical firm in your industry. Please circle the number on the scale that represents your evaluation.

1. To reduce a financial crisis, a company should develop an aggressive marketing strategy to increase sales.
   (very useful) 1 2 3 4 5 6 7 (very damaging)

2. During a financial crisis, a company should cut back the operating budgets of all divisions and departments.
   (very useful) 1 2 3 4 5 6 7 (very damaging)

3. To reduce a financial crisis, a company should impose across-the-board cuts in the operating budgets of all divisions or departments.
   (very useful) 1 2 3 4 5 6 7 (very damaging)

4. Management should try to enlist the support of unions in a joint effort to improve productivity during a financial crisis.
   (very useful) 1 2 3 4 5 6 7 (very damaging)

5. During a financial crisis, staff should be reduced.
   (very useful) 1 2 3 4 5 6 7 (very damaging)

6. During a financial crisis, new products that are still only marginally profitable should be eliminated to reduce costs.
   (very useful) 1 2 3 4 5 6 7 (very damaging)
7. During a financial crisis, a company should increase capital expenditures on more efficient equipment to try and reduce production costs.

(very useful) 1 2 3 4 5 6 7 (very damaging) (19) __

8. Research and development activities should be expanded to help a company maintain its competitive position during a crisis.

(very useful) 1 2 3 4 5 6 7 (very damaging) (21) __

9. During a crisis, a company should cut back on expense items such as long distance calls, photocopying, entertainment allowances, and travel.

(very useful) 1 2 3 4 5 6 7 (very damaging) (23) __

10. During a financial crisis, the authority of field managers and department heads should be reduced.

(very useful) 1 2 3 4 5 6 7 (very damaging) (25) __

11. A company should increase its information gathering activities during a financial crisis.

(very useful) 1 2 3 4 5 6 7 (very damaging) (27) __

12. During a crisis, managers whose divisions have poor performance should be fired.

(very useful) 1 2 3 4 5 6 7 (very damaging) (29) __

13. A company should introduce management by objectives and profit incentive programmes to help reduce a financial crisis.

(very useful) 1 2 3 4 5 6 7 (very damaging) (31) __

14. Major organizational reforms should be undertaken to reduce the effects of a crisis.

(very useful) 1 2 3 4 5 6 7 (very damaging) (33) __
Section 2

In this section of the questionnaire we are interested in learning about attitudes and behaviours that may affect decision quality and organizational performance during a crisis. Please indicate by circling a number on the scale whether you agree or disagree with the following statements. Base your replies on your own beliefs, expectations, and values.

1. During a crisis, it is important for employees to understand the decisions made by management.
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (35) ___

2. It is important for individuals who are responsible for implementing a decision to be involved in making the decision during crises.
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (37) ___

3. During a crisis, top management should become involved in day-to-day operating decisions, by-passing middle managers if necessary.
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (39) ___

4. To develop team spirit during a crisis, it is helpful if managers think of themselves as being in a competition with the environment as an aggressive opponent.
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (41) ___

5. During a crisis, it is important for employees to agree with the decisions made by management.
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (43) ___

6. During a crisis, it is important for managers to follow standard operating procedures and to use official communications channels.
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (45) ___

7. During a crisis, lower level managers should transmit only important information to their superiors.
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (47) ___

8. It is often more important to reach a decision that is acceptable to certain interest groups within the organization than to reach the 'best' decision to reduce a crisis.
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (49) ___
9. During a crisis, executives who disagree with proposed policies should keep their reservations to themselves.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (51)___

10. To avoid wasting time during a crisis, it is best to consider only two or three alternative solutions to the company's problems.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (53)___

11. During a crisis, preference should be given to strategies of lower risk even if they may be less effective than higher risk strategies.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (55)___

12. Decision-makers should concentrate on the short term effects of a proposed policy and forget about long range outcomes during a crisis.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (57)___

13. During a crisis, it is important for an executive committee to minimize conflict within itself and to be loyal to the chief operating officer.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (59)___

14. During a crisis, it is particularly desirable to have a very strong leader who can provide solutions to the company's problems and push through decisions.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (61)___

15. The negative aspects of all proposed solutions to a crisis should be explicitly emphasized.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (63)___

16. Executives need to make decisions quickly and decisively during a crisis to maintain corporate confidence in their leadership.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (65)___

17. During a crisis, executives should seek the aid of many people both inside and outside the company to help evaluate a proposed course of action.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (67)___

18. When faced with a critical situation, managers should adopt innovative strategies even if they are very risky.

(strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (69)___
Section 3
The following statements describe certain aspects of managerial style. Please indicate whether or not you think these are appropriate behaviours for a manager (a) during crisis periods, (b) during non-crisis periods. Please circle the number on the scale that represents your opinion.

1. It is important for a manager to encourage and maintain organizational harmony.
   a) during crisis periods:
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree)
   b) during non-crisis periods:
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree)

2. A manager should make unilateral decisions and announce them to his subordinates.
   a) during crisis periods:
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree)
   b) during non-crisis periods:
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree)

3. Guidance of subordinates should be limited to general processes of problem solving rather than to specific task direction.
   a) during crisis periods:
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree)
   b) during non-crisis periods:
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree)

4. A manager should do his best to ensure that subordinates achieve a high level of job satisfaction.
   a) during crisis periods:
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree)
   b) during non-crisis periods:
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree)
5. When faced with a problem, a manager should encourage the contributions of all employees to solve the problem.
   a) during crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (23) __
   b) during non-crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (25) __

6. A manager should regard the organization as a means to achieve production goals not meet the social needs of employees.
   a) during crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (27) __
   b) during non-crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (29) __

7. Directions given to subordinates always should be accompanied by explanations.
   a) during crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (31) __
   b) during non-crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (33) __

8. A manager should place equal weight on productive efficiency and high employee morale.
   a) during crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (35) __
   b) during non-crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (37) __

9. Employees should be highly programmed; procedures need to be spelled out and 'the rules' enforced.
   a) during crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (39) __
   b) during non-crisis periods:  
      (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (41) __
10. A manager should encourage the search for new ideas as long as organizational traditions are not violated.
   
a) during crisis periods:
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (43)  
b) during non-crisis periods:
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (45)  

11. A manager should encourage subordinates to make their own decisions and to act independently.
   
a) during crisis periods:
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (47)  
b) during non-crisis periods:
   (strongly agree) 1 2 3 4 5 6 7 (strongly disagree) (49)
Section 4

This section of the questionnaire is concerned with collecting information about your organization's external environment, for example, client groups, markets, suppliers, government agencies and other organizations. Please indicate your agreement or disagreement with each statement as it applies to your firm by circling the appropriate number on the scale.

1. The environment of your firm is in a continual process of change.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (51)

2. Your firm's predictions of environmental changes are usually accurate.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (53)

3. Your organization is prepared to alter both its structure and goals to respond to a changing environment.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (55)

4. Your firm relies to a large extent upon other organizations within its environment for growth and survival.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (57)

5. The environment is a source of threat to your organization.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (59)

6. The environment of your firm is generally predictable.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (61)

7. Your organization has a pool of people and resources that allows it to make quick adjustments to new situations caused by unanticipated environmental changes.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (63)

8. The problems generated by your firm's environment generally can be characterized as routine and can be dealt with by established corporate procedures.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (65)

9. There are only a small number of components in your organization's environment and these are somewhat similar to one another.
   (strongly agree)  1  2  3  4  5  6  7  (strongly disagree)  (67)
Section 5

Following is a list of events that an organization may encounter. How would you rate the ability of your organization to cope with each of them. Please circle the appropriate number on the scale.

1. A sudden and substantial drop in total sales of your company after a long period of increasing sales.
   (very high) 1 2 3 4 5 6 7 (very low)

2. The death of three key senior executives in an air disaster.
   (very high) 1 2 3 4 5 6 7 (very low)

3. A steady state environment with zero real sales growth potential.
   (very high) 1 2 3 4 5 6 7 (very low)

4. A major technological breakthrough with the potential for your company to double its sales within two years.
   (very high) 1 2 3 4 5 6 7 (very low)

5. A major natural disaster that destroyed 30% of your company's operations.
   (very high) 1 2 3 4 5 6 7 (very low)

6. A gradual long term decline in market share of your products.
   (very high) 1 2 3 4 5 6 7 (very low)

7. 'Boom or bust' market conditions that can be predicted.
   (very high) 1 2 3 4 5 6 7 (very low)
Section 6

Following is a list of factors which are present in many crisis situations. Please indicate what factors in your opinion are the three most important ones in defining a crisis situation. Please select the three factors by placing 1, 2, or 3 in the appropriate space (1 = the most important).

A threat to high priority organizational goals or values. (21)

An element of surprise in the occurrence of a threatening event. (23)

A restricted amount of time in which to make a decision. (25)

A high degree of uncertainty in the possible outcomes of decisions. (27)

The failure of standard operating procedures to deal with an event. (29)

The feeling on the part of decision-makers that they are under a great deal of stress. (31)

In this section of the questionnaire we are interested in your opinion about the possible role of governments in aiding corporations undergoing a financial crisis. Please examine each statement and circle the number that represents your opinion of each action.

When a corporation is undergoing a financial crisis, an appropriate role for governments may be to:

1. Buy common shares in the troubled corporation to increase equity financing.
   (no role) 1 2 3 4 5 6 7 (active role) (33)

2. Provide market information to the corporation.
   (no role) 1 2 3 4 5 6 7 (active role) (35)

3. Provide direct subsidies to the corporation if needed.
   (no role) 1 2 3 4 5 6 7 (active role) (37)

4. Make direct loans to the corporation.
   (no role) 1 2 3 4 5 6 7 (active role) (39)
5. Provide management consultation in specific areas.
   (no role) 1 2 3 4 5 6 7 (active role) (41) ___

6. Provide temporary tax relief.
   (no role) 1 2 3 4 5 6 7 (active role) (43) ___

7. Provide guarantees for loans made to the firm.
   (no role) 1 2 3 4 5 6 7 (active role) (45) ___

8. Give preference to the firm in awarding government contracts as a means of temporary relief.
   (no role) 1 2 3 4 5 6 7 (active role) (47) ___

9. Initiate mergers and rationalization.
   (no role) 1 2 3 4 5 6 7 (active role) (49) ___

10. Restrict foreign competition by enacting quotas and higher tariffs on directly competing imports.
    (no role) 1 2 3 4 5 6 7 (active role) (51) ___

11. Buy up excess inventories of the financially troubled firm.
    (no role) 1 2 3 4 5 6 7 (active role) (53) ___

12. Intervene directly in labour markets and other resource markets to assure supplies when needed.
    (no role) 1 2 3 4 5 6 7 (active role) (55) ___

13. Relax anti-combines legislation to allow mergers and rationalization.
    (no role) 1 2 3 4 5 6 7 (active role) (57) ___
Section 7
To help us in the statistical analysis of the data, may we please have the following information about your corporate and personal status.

1. Title of your present position in your company

2. In which functional area have you spent the majority of your career?
   ___ Production
   ___ Sales, Marketing, or Advertising
   ___ Finance or Accounting
   ___ Personnel, Training, or Industrial Relations
   ___ Purchasing
   ___ Research and Development
   ___ General Administration
   ___ Other (please specify):

3. Age (check one)
   ___ 20-29,   ___ 30-39,   ___ 40-49,   ___ 50+

4. Formal education (check the highest level completed)
   ___ Some High School
   ___ High School Diploma
   ___ Some University
   ___ Technical Certificate
   ___ University Degree
   ___ Advanced Degree

5. Please indicate the approximate size of your company's sales in 1977 fiscal year (check one)
   
   Size group ($000s)
   ___ less than 49,999
   ___ 50,000-99,999
   ___ 100,000-249,999
   ___ 250,000-499,999
   ___ 500,000-999,999
   ___ 1,000,000-4,999,999
   ___ greater than 5,000,000

6. In what industry is your firm?
7. How many levels of management are there above your position? (give the number)

(21) 

8. Which description best fits the competitive situation in your industry? (check one)

____ One large firm dominates the market
____ A few firms dominate the market
____ Many firms in market but none dominate

(23) 

9. Does your company own or have control over its sources of raw materials? (please circle appropriate position on the scale)

(complete control) 1 2 3 4 5 6 7 (no control) 8 n/a

(25) 

10. When making decisions, do you feel you gather more or less information than other managers in your company? (please circle the number on the scale)

(very much less) 1 2 3 4 5 6 7 (very much more)

(27) 

11. Does your organization have any formal plans to deal with potential crises?

_____ yes _____ no

If yes, what kind?

(29) 

12. How would you assess the probability of a major crisis occurring in an average firm in your industry within the next five years? (please circle the number closest to your evaluation)

0.0 .25 .50 .75 1.0
(very improbable) (with certainty)

(33) 

13. How would you assess the probability of a major crisis occurring in your company within the next five years?

0.0 .25 .50 .75 1.0
(very improbable) (with certainty)

(35) 

THANK YOU VERY MUCH FOR YOUR COOPERATION
Appendix 2

The Kolmogorov-Smirnov Test for a Normal Distribution
The Kolmogorov-Smirnov Test for a Normal Distribution

To determine which statistical tests are appropriate for analyzing the questionnaire data, it is essential that we consider the nature of the population from which the sample was drawn. The Kolmogorov-Smirnov one-sample test was used to test whether or not the sample data could reasonably have come from a population that was normally distributed. The Kolmogorov-Smirnov test is sensitive to any differences between the sample distribution and a specified theoretical distribution, in this case a normal distribution. It tests, for example, the degree of skewness and kurtosis. The test involves specifying the cumulative frequency distribution that would occur with a normal distribution and comparing this with the observed cumulative frequency distribution. A statistic $D$ is computed that is the point of maximum deviation between the two distributions. This statistic is compared to a critical value from a standard Kolmogorov-Smirnov table. The larger the value of $D$, the less likely the observed (sample) distribution is normal.

$$D = \max |F_0(X) - S_n(X)|$$

where $F_0(X) =$ the theoretical cumulative frequency distribution

$S_n(X) =$ the observed cumulative frequency distribution of a random sample of $n$ observations

(Siegel, 1956:48)

All pertinent variables in the data set were tested for normality. Of the 70 variables tested, only 21 initially were distributed normally. Since we wished to use parametric statistics in the data analysis, it was necessary to perform distributional transformations to try and achieve
normality. Rummel (1970:284) discusses a number of transformations that may be used to normalize and reduce outliers, and in some cases to improve the homoscedasticity of the distributions.

Depending upon the distributions of the sample variables, a number of different transformations were attempted. Three transformations were applied to variables with right skew distributions; these were $\log x_i$, $(x_i)^{\frac{1}{2}}$, and $\frac{1}{x_i}$. Four transformations were applied to variables with left skew distributions; these were $(x_i)^2$, $\log x_i/l - x_i$, $\frac{1}{2}\log 1 + x_i/l - x_i$, and arcsin $(x_i)^{\frac{1}{2}}$. After transformations, the distributions were again tested for normality.

An additional 21 variables in the data set were transformed to achieve normality, bringing the total to 60% of the sample variables. However, the remaining variables were found to have primarily J-shaped or reverse J-shaped distributions. Rummel (1970:286) notes that for these types of distributions there is no simple nongrouping transformation that will normalize the distribution.
Appendix 3

Smallest Space Analysis
Smallest Space Analysis

SSA belongs to the class of techniques subsumed under the term of 'multidimensional scaling'. These techniques have been developed "for inferring multidimensional metric structure from non-metric ordinal data" (Press, 1972: 400). Despite the diversity of multidimensional scaling techniques, they all have a unifying purpose of "somehow getting hold of whatever pattern or structure may otherwise lie hidden in a matrix of empirical data and ... of representing that structure in a form that is much more accessible to the human eye -- namely, as a geometrical model or picture" (Shepard, 1972:1). SSA differs from a traditional factor analysis in that the technique provides a visual presentation of the dimensions. Also, most factor analytic methods lead to representations of such high dimensionality that it is often difficult to identify and interpret the underlying structures.

SSA is a nonmetric analysis developed by Guttman (1968). Although it is a method of rigorous multivariate analysis, it requires no special assumptions. The technique requires as input, data in the form of a measure that expresses an observed relationship between pairs of variables, for example, correlation coefficients or conditional probabilities. In the present study the Kendall correlation matrix was used as input. Generally, fewer dimensions are needed to reproduce order information than to reproduce metric information (for example, as in a factor analysis). To reproduce order information, one requires a simpler and more direct representation of the data; this in turn facilitates the interpretative process. "If our interest is in patterns or configurations, the most natural concept for revealing them is order and the appropriate method for analysis is one which focuses on monotonic transformations" (Lingoes, 1972:52).
The algorithm employed in the SSA programs seeks a mathematically unique configuration of n points in some given type of coordinate space. Two conditions must be satisfied. The first condition is that of monotonicity.

To an acceptable degree of approximation, interpoint distances are related to interpoint proximities in the sense that

\[ d_{ij} < d_{kl} \quad \text{when} \quad s_{ij} > s_{kl} \]

where \( d_{ij} \) denotes the distance between the points \( A_i \) and \( A_j \) in the desired space, and \( s_{ij} \) denotes the proximity between the points \( A_i \) and \( A_j \). The second condition is that the monotonicity condition must be satisfied in as few dimensions as possible (Guttman, 1968).

SSA determines the smallest space (in terms of the fewest number of dimensions) in which the body of data may be adequately represented. The criterion of visualizability is the most important factor in smallest space analysis. For this reason, the representation of the data should be confined when possible, to two or at most, three spatial dimensions. However, the user of SSA must be aware of the trade-off required between visualizability and goodness of fit. A coefficient of alienation is calculated for each analysis that assessing the goodness of fit. The smaller the coefficient, the better the fit. As the number of dimensions increases, goodness of fit also increases, but at the expense of visualizability. Shepard (1972:10) notes "certainly it is contrary to the whole spirit and purpose of this approach to data analysis to focus exclusively on goodness of fit ... and, so, to go for a representation of so many dimensions that the structure is no longer accessible to the human eye".

The following rule of thumb has been suggested to determine whether or not a representation is adequate in terms of goodness of fit. For a number
of dimensions m, if when m = 2 the coefficient of alienation is much smaller
than for when m = 1, and not much larger than when m = 3, the 2-space solu-
tion would be adequate (Bloombaum, 1970:411).

Interpretation of the spatial representation may occur in a number of
ways. First, the researcher may look for directionality along the axes. For
example, as one moves further in one direction through the space, the data may
possess more of a particular property. Second, one can look at the way data
points cluster into homogenous groups throughout the space. Third, the manner
in which data points are ordered in simple structures such as triangles or
circles may offer interesting insights (Degerman, 1972). One prime advantage
of SSA, is that a researcher can look for interpretable representations with­
out having to specify in advance exactly the form this representation must
take (Shepard, 1972:4).

Bloombaum (1970:415) provides a summary of the salient features of
SSA:

1) a multivariate technique suitable for fairly large numbers
of variables;
2) geometric output to render the structure of a body of data
easily comprehensible;
3) no special assumptions with respect to level of measurement,
linearity of data, etc.;
4) gives the fewest number of dimensions;
5) analyzes any matrix of observed relationships within computer
size limitations;
6) provides a measure of "goodness of fit";
7) results remain invariant under rotation;
8) eliminates the necessity of choosing between orthogonal
and oblique solutions;
9) no communalities to estimate;
10) output may be checked directly against input table;

11) available as part of a standard library of computerized programs.

Guttman and Lingoes have developed three sets of programs in the SSA series that allow for data input from square, rectangular, and partitioned matrices. Each type of program is designed to accommodate either different mathematical models or different contingencies of data collection (see Lingoes, 1973).