# "AN ANALYSIS OF TEACHER AND PRINCIPAL PERCEPTIONS OF PRINCIPALS' ADMINISTRATIVE AUTHOITY BASES IN A SELECTED NEWFOUNDLAND SCHOOL DISTRICT".



JAMES J. RYAN

# AN ANALYSIS OF TEACHER AND PRINCIPAL PERCEPTIONS OF PRINCIPALS' ADMINISTRATIVE AUTHORITY BASES IN A SELECTED NEWFOUNDLAND SCHOOL DISTRICT

by

JAMES J. RYAN, B.P.E., B.Ed.

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Faculty of Education
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ABSTRACT

The study was conducted to investigate teacher and principal perceptions of administrative authority bases in schools in Newfoundland and Labrador. Whereas Isherwood (1973) confirmed the existence of formal and informal authority, questions regarding the unique nature of his finer components remained. This study sought to explore this issue and in doing so gave priority to the development of an instrument.

Two versions of the original instrument utilized by Isherwood (1973) were sent to 192 teachers and 21 principals of a selected school district in Newfoundland and Labrador. The final response rate was 70 percent.

Upon exploration of a number of techniques designed to determine the best number of factors, it was decided that four would produce optimum results. Factor analysis facilitated the identification of four bases of authority designated as: authority of administrative skills; deferent authority; legal-positional authority; and charismatic authority. Although this model did not match that of Isherwood (1973), there were many similiarities. As well, elements of components identified here were evident throughout the literature.

Pair-wise T-tests were employed to diagnose any differences that teachers or principals attached to the effectiveness of the respective authority bases in eliciting teacher compliance. Both teachers and principals perceived authority of administrative skills to be most effective in eliciting teacher compliance. Whereas teachers

perceived deferent authority as least effective, there was no statistically significant differences between their perceptions of the effectiveness of legal-positional and charismatic authority. No statistically significant differences were found to exist between principal perceptions of the effectiveness of legal-positional, charismatic and deferent authority.

Recommendations for action suggested that attention be accorded human relations and technical expertise by administrators and those responsible for the training of administrators. A number of areas for further research in the area of authority were suggested as well.

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# Chapter I

## INTRODUCTION

Authority is an elusive term, regardless of the context in which it is used. Whereas Webster's Dictionary (1971) cites eight complete definitions, Peabody (1964) simplifies the matter when distinguishing between authority used in everyday language and as a more-or-less precise, technical concept. Authority is frequently used in a social context and, more specifically, within organizational settings.

As in all formal organizations, the question concerning motivations for accepting directions is present in the school. Teachers and students accept or reject the suggestions of their superiors. Is it possible that unique features of the school organization have an effect on the grounds for acceptance of these directions? If this is the case, it is essential that administrators be aware of the implications this might have for authority relations within the school. In an attempt to explore this question, this study investigated principals' bases of authority, as classified by Isherwood (1973), in Newfoundland and Labrador schools.

## STATEMENT OF THE PROBLEM

The major problem of this study was to examine bases of administrative authority as perceived by teachers and principals in a Newfoundland school board. More specifically, this study attempted to

answer the following questions:

(1) Do the components (bases) of authority as identified by Isherwood (1973) — traditional, legal, charismatic, human relations skills, expertise and normative — represent distinct value orientations that legitimate the exercise of school control?

(2) Is there a distinction among these bases of authority such that they can be classified as either formal or informal authority?

(3) Which administrative authority bases do teachers perceive as most effective for ensuring compliance?

(4) Which administrative authority bases do principals perceive as most effective for ensuring compliance?

## THEORETICAL FRAMEWORK

Our society is an organizational society (Presthus, 1962). Although organizations can vary considerably with respect to structure, all possess common elements.

Tannenbaum (1968) elaborates upon what he believes to be an integral part of every organization:

> Organization implies control. A social organization is an ordered arrangement of individual human interaction. Control processes help circumscribe idiosyncratic behaviors and keep them conformant to the rational plan of the organization.... It is the function of control to bring about conformance to organizational requirements and achievement of the ultimate purposes of the organization. (p. 3)

According to Baratz and Bachrach (1963) control exists when one party gains compliance from another in an interactional setting. Compliance, then, may be arrived at either involuntarily when power or force is required, or voluntarily, through persuasion or authority (Spady, 1977). As theoretical concepts, each is a relatively separate entity. In a practical sense, distinctions can be obscure. Peabody (1964), however, believes "The fact that authority relations are never found in pure form is not a valid objection to attempts at developing more precise, analytical distinctions, nor does it alleviate the need to work toward operational definitions of these concepts." (p. 3). Blau and Scott (1962) state that authority must be distinguished from power on the one hand, and persuasion and other kinds of influence on the other. When recognized as separate entities, it is possible to identify the attributes and shortcomings of each as a form of control.

Spady (1977) notes that in a power relationship compliance is achieved when "the dominant party is perceived to be capable of controlling or manipulating a monopoly of critical resources in such a way that the other party believes he cannot sustain his present state of affairs (such as employment, reputation or physical well-being) without enduring some intolerable loss" (p. 362). According to Etzioni (1964) when compliance is achieved through the use of power, the subject is likely to become alienated. Blau (1970) affirms that a power relationship can only inhibit motivation within an organization:

> ...both effective leadership and sanctioning power can become sources of an authority structure, but sanctioning power does so at the cost of diverting the incentive system, at least in part, from its major function of encouraging optimum performance by using it to affect obedience. (p. 139)

While persuasion, on the other hand,

> ...like power compels the subordinate party to select among available alternatives, the choice is based on the superordinate's ability to convince the subordinate of the inherent advantages of selecting certain alternatives without constraining the choice process by threatening to use negative sanctions. In effect then, the subordinate's choice is voluntary and is based on the inherent attractiveness of certain options, rather than the implied negative consequences of choosing others. (Spady, 1977, p. 363)

Although persuasion eliminates some of the negative elements implied in the use of power and thereby facilitates more cooperative and positive relations, it can be a highly unstable mechanism when used exclusively. Perpetual negotiation and uncertainty are likely to ensue. (Spady, 1977). McGregor, after observing and working with top executives as an advisor in a number of organizations, attempted to guide his charges in a rather "laissez-faire" manner with the following consequences (McGregor, cited in Bennis, 1959):

> I believed that a leader could operate successfully as a kind of advisor to his organization. I thought I could avoid being a "boss" ... I couldn't have been more wrong. It took a couple of years, but I finally began to realize that a leader cannot avoid the exercise of authority any more than he can avoid responsibility for what happens to his organization. (p. 261)

Authority, then, is an attractive alternative to the exclusive use of power and persuasion as a control mechanism. Unlike power,

compliance is voluntary and, unlike persuasion, the subordinate is expected to obey the wishes of the superordinate (Simon, 1957). Authority is voluntary in the sense that subordinates willingly comply with directives of a superior when they perceive those directives to be legitimate (Blau and Scott, 1962). It follows then, that the effectiveness of authority can be measured in terms of the subordinates' willingness to comply with directives of a superior.

Weber (1947), Simon (1957) and others discuss another dimension of authority — the kinds of value orientations that legitimate the exercise of control, commonly referred to as the bases of authority. Isherwood (1973) cites two major bases: formal and informal authority. Blau and Scott (1962) maintain that formal authority is legitimated by values that have become institutionalized in legal contracts and cultural ideologies, and the social constraints that demand compliance pervade the entire society. Isherwood (1973) breaks down formal authority into traditional and legal authority. Traditional authority is the authority extended to an organizational role by society-at-large, and a given community in particular. Role incumbents receive deference by their occupancy of a particular position within the school that is held in high esteem by community members. Legal authority, on the other hand, is the authority within a school that is derived from a contractual agreement between the individual and the school system. The contract specifies employee rights and duties, and delineates a hierarchy of offices to which subordinates are to defer.

Informal authority is legitimated by the common values that emerge in a group to the extent that group norms and sanctions enforce

compliance (Blau and Scott, 1962). Isherwood (1973) cites four informal authority bases: charismatic, expertise, normative and human relations skills. Charismatic authority is the authority granted an individual because of his/her unique personality qualities and is based on the devotion of one to another and the desire to merit approval. Authority of expertise is the deference one individual gives another because of the former's knowledge emanating from a combination of experience and formal training, that enables the person to perform the job at an instrumental rather than affective level. Normative authority is the authority granted a superior when he/she is able to accrue obligations from a subordinate by providing the latter with services, advice or aid, particularly if these services are outside that normally expected of the superior. In addition, normative authority can be the manifestation of a supportive group norm. Human relations skills is the authority a superior has over a subordinate when he/she is able to exhibit tact, understanding and empathy rather than formality, persuasion or force in interactions. This breakdown of authority bases provides a useful framework for examining the authority of principals in Newfoundland and Labrador.

When examining authority, an investigator must be concerned with the perceptions of those involved. Perceptions of the individual, as well as the group, influence behavior since the individual reacts to a situation in a way that reflects what he believes to be a correct assessment of the circumstances. "The organism reacts to the field as it is experienced and perceived. The perceptual field is, for the individual, 'reality'" (Rogers, 1951).

Legitimacy of the bases of authority is dependent upon

perceptions of subordinates:

> The basis of legitimacy, therefore, lies in the members perceptions. If the member perceives his leader's authority to be legitimate on the basis of laws, the leader's authority then, in fact does have a legal basis. Likewise if the member is willing to contribute to the organization because of loyalty, respect, admiration, or for any other reason personally associated with the leader, then charisma is the legitimate basis of the leader's authority... The basis of legitimacy of the superior's authority is whatever the subordinate perceives it to be. (Scott, 1978, p. 44)

It follows, then, that the authority of an administrator can be gauged in terms of subordinate perceptions. Peabody (1964) notes that "perceptions of authority depend on the unique personality and experience of the participants in the authority relationship, the kind of organization in which these relationships take place, and the level in the hierarchy from which authority is viewed" (p. 91).

Etzioni (1964) alleges that authority relations in non-professional and professional organizations differ:

> In organizations whose goal is non-professional (i.e. profit making), it is considered desirable to have the major (line) authority because they direct major goal activity ... In full fledged professional organizations the staff-professional and the line-administrator correlation, insofar as such distinctions apply at all, is reversed. (p. 81)

The fact that authority relations in professional organizations tend to be more diffuse can be attributed to: (1) the high level of technical expertise of the professional; and (2) the unlikely prospect that the administrator possesses the knowledge of professionals in the organization. The level of hierarchy from which authority is viewed may also be of consequence. It is possible that neither subordinate nor superior in an organization share the same perceptions concerning

authority. If this is the case, conflict is likely to ensue.

The school is a formal organization and, as in any formal organization, the principal as administrator must exert some form of control on teachers if he/she wishes to achieve school goals. "Educational administration is a technology of control" (Bates, 1980, p. 1).

Sergiovanni and Starrat (1979) observe that administrators are constantly working to increase reliability in behavior of teachers, as well as students:

> ... as administrators and supervisors attempt to increase control over achievement of the school's goals, they frequently work to increase reliability in decision-making processes and in behavior of teachers and students. This is often accomplished by instituting and implementing policies, standard operation procedures, rules and regulations to guide behavior within the human organization. Uniformity of behavior is seen as a powerful means to move large numbers of people toward goals, with a minimum amount of confusion and conflict. (p. 46)

Although there is some uncertainty with respect to categorization of the school as a professional organization, it is evident that the school is more professional than non-professional in nature, especially in view of recent increases in the complexity and diversification of knowledge being transmitted by teachers. In view of these changes, it may be that authority relations within the school are in a process of change, as Sergiovanni and Starrat (1979) suggest:

> Authority bases for those who administer our nation's schools are changing, shifting and in many cases, diminishing. Particularly susceptible to change is the principal's position ... As the technical structure (the teaching and education program structure) increases in complexity and diversification, teachers by virtue of competence and person authority have assumed more responsibility for these areas. This increase in educational sophistication

> has required administrative arrangements beyond the definition of the principal's role. (p. 138)

The principal needs to be able to diagnose and cultivate the most effective bases of authority in a quest for achievement of school goals within a continuously changing society.

To summarize, authority can be considered a preferred mechanism for maintaining control within the school organization. Teachers willingly follow the directions of an administrator when those directions are perceived as legitimate. Weber (1947), Simon (1957) and others discuss the kinds of value orientations that legitimate this exercise of control, commonly referred to as the bases of authority. Isherwood (1973) cites two major bases - formal and informal authority which he breaks down into traditional, legal, human relations, expert, normative and charismatic authority. Teacher perceptions of these authority bases dictate the extent to which teachers are likely to follow directions of principals. The effectiveness of authority, therefore can be measured in terms of teachers' willingness to comply with principals' directives. Peabody (1964) states that perceptions of authority depend, among other things, on the hierarchical level from which authority is viewed. It may be that principals' and teachers' views of effective authority bases differ. If principals are able to diagnose their most effective bases of authority, measured in terms of teacher perceptions, non-compliance of teachers may be avoided.

## DELIMITATIONS

This study is delimited to an investigation of organizational authority relations between teachers and principals in one school district in Newfoundland and Labrador. Authority as a social relation

will be examined and not span of control or decision-making jurisdictions.

It is acknowledged that many variables other than authority relations may have an effect on organizational behavior. It is the intent of this study, however, to concentrate on authority relations as they relate to behavior in the school. Whereas the unique personality of an individual contributes to the perceptions held of authority, unique personality traits will not be explored.

## LIMITATIONS

Any conclusions or limitations arising from the results of this study must be considered with regard to the following limitations:

1. Pure authority relations are analytical abstractions that are rarely found, if at all, in concrete situations (Blau and Scott, 1962).
2. The dirth of Canadian research in this area.
3. The non-consideration of unique personality traits in respondents.
4. The size of the sample may restrict generalizability to province as a whole.
5. A specification of the nature of principal directives has not been considered.
6. The limitations of the factor analytic process.

## SIGNIFICANCE OF THE STUDY

This study should have significance for the following reasons:

1. No extensive research has been done concerning the authority of principals in Newfoundland and Labrador.
2. Results should be of interest to teachers, administrators and educational interest groups such as the Newfoundland Teachers' Association.
3. Changes in teachers, the external environment and the school organization make it essential that principals be able to diagnose and cultivate their most effective bases of authority in order to achieve school goals.
4. This study should serve as a basis for more extensive research into one or more of the principal's bases of authority.

## DEFINITION OF TERMS

Authority The legitimate exercise of control that rests on the willing compliance of subordinates with the directives of their superior. (Blau and Scott, 1962)

Formal Authority The authority legitimated by values that have become institutionalized in legal contracts and cultural ideologies. (Blau and Scott, 1962)

Informal Authority The authority legitimated by the common values that emerge in a group. (Blau and Scott, 1962)

Traditional Authority The authority extended to an organizational role by society, and a given community in particular. (Isherwood, 1973)

Legal Authority The authority derived from a contractual agreement between an individual and an organization. (Isherwood, 1973)

Charismatic Authority The authority attributed to a person because of unique personality traits. (Isherwood, 1973)

Authority of Expertise The authority attributed to a person because of his/her knowledge accruing from experience and formal training. (Isherwood, 1973)

Normative Authority The authority based on (1) the ability to mediate rewards and (2) the manifestation of supportive group norms. (Isherwood, 1973)

Human Relations Skills The authority a superior has over a subordinate because of the means the former employs in their interactions. (Isherwood, 1973)

Compliance The adaption of a subordinate's behavior to the wishes of a superordinate.

Control The application of policies and procedures designed for directing, regulating and coordinating activities and resources (humans and non-human) to achieve the objectives of an organization.

Influence The capacity of a superior to change of maintain the viewpoint or behavior of a subordinate.

Legitimacy The appropriateness or acceptability of a superordinate's right to influence a subordinate.

Perceptions An individual's concepts which represent preferential biases developed out of experience. (Katz and Kahn, 1968)

Persuasion The exercise of control that rests on the ability of a superordinate to convince a subordinate of the inherent advantages of a particular course of action without constraining the choice process by threatening use of sanctions.

Power The exercise of control that rests on the ability of the superordinate to impose his will on the subordinate despite resistance.

Subordinate An office incumbent subject to control by a higher office. In this study a subordinate is the teacher.

Superordinate/Superior/Administrator An office incumbent who exerts control on a lower office. In this study a superordinate/superior/administrator is the principal.

Effectiveness of Authority The degree to which teachers willingly comply with the directives of principals.

Chapter II

# REVIEW OF THE LITERATURE AND RELATED RESEARCH

## INTRODUCTION

Whereas research in the area of authority has not been as extensive as in other areas of educational administration, it is necessary to review literature and related research associated with organizational authority in general, in the hope that findings will shed light on the educational perspective. This review lends support to the theoretical basis of the study and is organized under the following headings: (1) approaches to the concept of authority; (2) authority bases; (3) perceptions of authority bases in various types of organizations; (4) administrator-subordinate perceptions of authority; and (5) perceptions of principals' authority bases.

## APPROACHES TO THE CONCEPT OF AUTHORITY

In an attempt to reach a better understanding of control and compliance mechanisms and a clearer conception of the complexity of organizations, writers use the term authority to describe a set of behaviors associated with control and compliance. Problems arise, however, when assigning a unique definition to this concept for the following reasons: (1) although authority may be analytically distinguished from concepts such as influence and power, in any organizational setting it is inextricably fused with these related concepts; (2) the concepts (authority, influence, power, etc.) are unavoidably segmented, and exaggerated notions of an elusive reality (Peabody, 1964). It is not

surprising that "Although numerous definitions of authority exist in the literature of administration, management, and organizational behavior, a review of these writings reveals considerable contrast, vagueness, and ambiguity in the use of the concept" (Peabody, 1964, p. 8).

Inevitably, a writer's view of authority is a reflection of his approach to organizational analysis. The traditional or structural approach, the human relations approach and the behavioral science or "converging" approach each typically produce their own unique conceptions of authority.

> Generally speaking, those who view authority as a property inherent in office have tended to emphasize the formal, rational, impersonal, and control-from-the-top aspects of authority and organization ... Conversely those who conceptualize authority as a relationship have tended to emphasize the informal, nonrational, subjective, and acceptance-by-the-subordinate aspects of authority and organizational behavior. (Peabody, 1964, p. 13)

| The Conventional Approach | | The Human Relations Approach |
|---|---|---|
| Property or Attribute | ——— | Relationship |
| Formal | ——— | Informal |
| Rational | ——— | Non Rational |
| Impersonal | ——— | Subjective |
| Control from the top | ——— | Acceptance by the Subordinate |

Figure 1. Series of continua that are characteristic of major approaches to authority. (From Authority by Robert Peabody. New York: Atherton Press, 1964)

Weber (1947) a "structuralist", had considerable impact on organizational theory. In his concept of bureaucracy, power structures

operate in a quasi-judicial fashion: rational values legitimate them, trained experts run them and the principle of hierarchy gives them shape. Weber examines the status of administrator (the office), attributes authority to this unit, and explains the effective exercise of authority mainly in terms of other attributes of the office or in terms of attributes brought to it by officials (Hopkins, 1965). Weber defines authority as the probability that a command with a given specific content will be obeyed by a given group of persons and implies a degree of voluntary compliance.

Gulick (1937) and Urwick (1937) approach authority from the standpoint that it is a property of management that has the right to require action of others. On the other hand Peabody (1964) infers that the ultimate authority for Taylors scientific-management movement is the techniques of scientific work performance.

The human relations movement as represented by Follet (1937), Mayo (1937) and others may, in part, be a reaction to the structuralist approach, and as a result depart from the conventional view of an organization. In contrast to the conventional treatment, this approach defines authority in relational terms and stresses its informal, non-rational and subjective aspects. "The hierarchy of authority is virtually turned upside down." (Peabody, 1964, p. 23)

A third movement, referred to as the behavioral science phase attempts to reconcile the conventional and human relations approach. Its first proponent, Barnard (1938), examines the role relation (channel of communication), attributes authority to communications (which have become more or less authoritative), and explains effectiveness in terms

of other attributes of communication or in terms of other attributes of role relations that transmit communications (Hopkins, 1965). Barnard's view of authority follows:

> Authority is the character of a communication (order) in a formal organization by virtue of which it is accepted by a contributor or "member" of the organization as governing the action he contributes. (p. 163)

Barnard states that a person can and will accept authority under four conditions: (1) when he understands the communication; (2) he believes it to be consistent with organizational purposes; (3) he believes it to be consistent with his own personal interests; and (4) he is able mentally and physically to comply with it.

An essential component of Barnard's conception of authority, the "zone of indifference", is present within each individual wherein orders are accepted without conscious questioning. This zone is capable of being constricted or expanded, meaning that the recipicent of a directive, depending upon the degree to which he perceives the inducements to exceed the sacrifices, accepts a varying range of commands (without question). This range is indicative of the effectiveness of authority.

Simon (1957) attempts to incorporate both the conventional and human relations approach into his concept of authority. On one hand, he epitomizes the structuralists. "Authority may be defined as the power to make decisions which guide the action of others" (p. 125). At the same time, Simon (1957) adopts a more subjective approach to authority.

> A subordinate is said to accept authority when he permits his behavior to be guided by the

> decision of a superior, without independently examining the merits of that decision. (p. 11)

Peabody (1964) notes that "According to Simon's conception, authority may be examined from several perspectives; (1) in terms of the subordinate's subjective reaction and subsequent behavior, (2) in terms of the superior as to whether in fact he makes decisions which guide the actions of others, and (3) in terms of the relationship between two people who are involved" (p. 30).

In response to charges that his concept of authority did not account for the degrees of acceptance, and that his definitions were neither operational nor defined in purely objective and behavioral terms (Peabody, 1964), Simon (1957) produces a subsequent elucidation that he labels a definition and not an emperical statement about behavior.

> An individual accepts authority when he sets himself a general rule that permits the comunicated decision of another to guide his own choice (i.e. to serve as the premise of that choice) independently of his judgement of the correctness or acceptability of the premise. (p. 103)

Presthus (1960) professes that if organizations are to achieve their goals, they must motivate and direct members in order to overcome the members' individual goals. He sees authority as a crucial element, especially if it is designed to include reward and reciprocity.

> Authority can be defined as the capacity to evoke compliance in others ... The process by which authority is accepted may be called legitmation, which is roughly synonymous with "sanctioned" or "validated". (p. 86)

Robert Peabody (1964) attempts to clarify the concept of authority by "casting a large net rather than a small one". He

identifies five defining characteristics of organizational authority: its relational, hierarchial, organizational, temporal and normative aspects.

With respect to the relational aspect:

> The central idea in authority relations is that of the reciprocal control and reinforcement behavior of two persons ... While the subordinate is subject to the commands of the superior, the superior depends on the subordinate to get the job done. (p. 134)

However, in view of the sanctions which support the respective roles, this relationship cannot be said to be equally interdependent.

Hierarchy is Peabody's second dimension of authority. Authority relations take place between persons or positions of differing ranks, and rank is invariably a function of an organization. A third dimension, temporal includes: authority and its relation to change; authority in a time of crisis; and authority relations associated with continuing and recurring organizational activities. With respect to the normative aspect of authority, Peabody (1964) adds:

> Authority in and of itself is neither good nor bad; the exercise of authority is not necessarily democratic or undemocratic. Authority becomes good or bad only in particular situations and on the basis of our normative judgements as to the consequences of its exercise. (p. 138)

Blau and Scott (1962) cite two criteria of their conception of authority:

> Two criteria, then, are voluntary compliance with legitimate commands, and suspension of judgement in advance of command. (p. 28)

These characteristics of the authority relation result largely from social constraints exerted by a collectivety of subordinates and not primarily from the influences the superior himself can bring to bear upon them. The group willingly obeys because its members consider it legitimate for this source to control them.

The difficulty in coming to grips with a definition of authority is apparent. However, if a "definition" is recognized as a choice of words and not an empirical statement, the problem at hand, although not vanishing altogether, is not quite so insurmountable. Blau and Scott (1962) provide a "definition" that accommodates many of the elements common to writings on authority.

> Authority is the exercise of control that rests on the willing compliance of subordinates with the directives of their superior. (p. 143)

This definition has been adopted by Allison (1982), Isherwood (1973) and Hoy and Miskel (1978). Hoy and Miskel's characteristics of authority in the school are extracted from Blau and Scott:

> ...(1) a willingness of subordinates to comply; (2) a suspension of the subordinates criteria for making a decision prior to a directive; and (3) a power relationship legitimized by the norms of a group. (p. 78)

The problem of the interrelationship of power and authority remain and can be attributed to: (1) the abstract nature of the concepts; and (2) the uncertainty on the part of subordinates as to whether they are complying because they fear sanctions or because they trust the judgement of their superiors. An effort to extract and identify the elements of power as they operate about the sphere of authority will not

be attempted. It is acknowledged that power is inextricably fused with authority.

Authority Bases

Although there is relatively little consensus on the nature of the set of behaviors attributed to authority, a higher level of agreement is apparent concerning the specification of circumstances under which such behaviors are exhibited (Peabody, 1962). These circumstances reflect the major kinds of value orientations that legitimate this exercise of control and are referred to as types, modes, motivations and bases of authority.

Weber (1947) introduces three types of authority: charismatic, traditional and rational-legal. Charismatic authority rests on the devotion of followers to an extraordinary individual whose personal qualities and inspirational leadership allow him/her to serve the needs of those followers. Disciples willingly comply with the wishes of a charismatic leader because they believe his/her mission to be inspired by divine or supernatural powers.

Traditional authority rests on the belief in the sanctity of tradition. Obedience is owed to the traditionally sanctioned position of authority and the person who occupies the position inherits the position by custom.

Rational-legal authority rests on the existence of a formally established body of social norms designed to organize conduct for the rational pursuit of specified goals. Members abide by this legally constituted order because they believe it to be the best way to accomplish goals in which they believe in.

Barnard (1938), despite his emphasis on the subjective aspect of authority, recognizes authority of position and authority of leadership. Communications may originate from a position or from a person who possesses superior knowledge and understanding.

Simon (1957) identifies four motivations for acceptance of authority: authority of rewards and sanctions, authority of legitimacy, authority of social approval and authority of confidence.

Authority of rewards and sanctions refers to the potential of the superior to impose rewards and sanctions on the subordinates for the purpose of gaining their compliance:

> Authority is accepted because the person exercising it can attach pleasant or unpleasant consequences to action through the system of rewards and sanctions. The most important sanctions of managers over workers in industrial organizations are (a) power to hire and fire, (b) power to promote and demote, and (c) incentive rewards. (p. 104)

Authority of legitimacy refers to the internalization of a set of attitudes that prompt members to identify with the organization. Authority of social approval rests on the willingness of members to accept authority in order to enhance their acceptance in a group by the members of that group. Finally, authority of confidence refers to subordinate compliance on the basis that subordinates perceive the superior to possess superior technical skills.

Bennis (1959) alludes to the expert dimension of authority (and indirectly, the person dimension), and subdivides it into two distinct sections; knowledge of technical skills and knowledge of administrative skills. Knowledge of administrative skill entails human

relations skills, and as a result overlaps with a person-based authority.

Presthus (1960) identifies four bases of legitimation: technical expertise, formal role, rapport and a generalized deference to authority. Authority by rapport refers to the legitimation of authority "on the basis of interpersonal skill and the work climate that executives and supervisors maintain" (p. 89). A generalized deference to authority is regarded by Presthus as a process of socialization in which members "respect" the directives that enimate from a formal position.

Peabody (1962) synthesizes and categorizes the literature concerning bases of authority into four broad areas: authority of legitimacy — a legally constituted order; authority of position, including the sanctions inherent in position; authority of competence including both technical skills and leadership; and authority of person including leadership and human relations skills. In addition he distinguishes between formal and informal authority.

> ... the basis of formal authority, legitimacy and position need to be distinguished from sources of functional authority, — technical competence and human relations skills — which support and often compete with formal authority. (p. 463)

Blau and Scott (1962) identify and distinguish between formal and informal authority.

> Formal authority is legitimated by values that have become internalized in legal contracts and cultural ideologies, and the social constraints that demand compliance pervade the entire society. Informal authority, on the other hand, is legitimated by the common values that emerge in a group, particularly by the loyalty the superior commands among group members, and group norms and sanctions enforce compliance. (p. 144)

Isherwood (1973), investigates the authority of principals, and establishes an empirical distinction between formal and informal authority and their respective components. Whereas informal authority is comprised of charismatic authority, normative authority, authority of expertise and human relations skills, the components of formal authority include traditional authority and legal authority.

Spady (1977) identifies four bases of legitimation: Weber's traditional, charismatic and legal dimensions as well as an expert base. His conception of the charismatic base is fairly elaborate.

> There are three things then, that are implied in charismatic authority: one, the ability to "deliver the goods" that meet the constituents' needs; two, the stimulating, exciting, extrordinary manner in which this is done; and three, being sensitive and empathetic to the needs of the clientele so that the right goods get delivered. (p. 365)

Spady (1977) goes even further to identify two aspects of empathy, essential in student-teacher interaction within the classroom: (1) awareness, sensitivity and insight as to what is really happening; and (2) supportive and appropriate response to those occurences.

French and Raven (1960) establish and discuss the bases of power (as opposed to bases of authority). Although their concept of power appears to be broader in scope than authority, there are similarities: both focus on reasons for subordinate acceptance of superordinate directives.

Five bases of social power are identified: reward, coercive, legitimate, referent and expert. Sergiovanni and Carver (1980) cite these forms of power as they exist within a school setting.

1. Reward - subordinates perceive the school executive can withhold, permit or increase rewards.
2. Coercive - subordinates perceive the school executive can distribute punishment (e.g. dismissal, undesirable assignments). Coercion at one extreme would involve physical force.
3. Legitimate - subordinates perceive that the school executive, by virtue of position and status within a duly constituted hierarchy, has the right to expect what is expected.
4. Referent - subordinates perceive the school executive as a desirable and appropriate human model and want to be perceived reciprocally - thus demands are accepted.
5. Expert - subordinates perceive the school executive to possess relevant expertise.

(pp. 192-193)

## PERCEPTIONS OF AUTHORITY BASES IN VARIOUS TYPES OF ORGANIZATIONS

Peabody (1962) examines authority relations in a county welfare department, a police department and an elementary school. The investigation supports the four authority bases — position, legitimate, competence and personal — developed by this researcher from the literature. Considerable importance is attributed to legitimacy and position as bases of authority in all three organizations, particularly the welfare department. Whereas police officers single out authority of person more frequently than either authority inherent in position or authority derived from superiors, welfare organization members attach more importance to legitimacy and position than to technical competence and experience as sources of authority.

Skein and Ott (1962) investigate attitudes of labour leaders,

students, managers on course and managers tested on the job toward the legitimacy of organizational influence in specified areas of behavior. Results show a high level of concensus among the groups concerning legitimate and non-legitimate areas of influence. Nevertheless, each group with the exception of one, differs significantly from one another in the mean amount of influence, as measured on an index, that it considers to be legitimate. Labour leaders are lowest on this index followed, in order, by students, managers on course and managers on the job.

Bachman, Bowers and Marcus (1968), utilizing French and Raven's social power bases as a framework seek to determine why the subordinates in a national sales firm, liberal arts colleges, insurance company, appliance manufacturing firms, and a utility company comply with the requests of superiors. Results indicate that legitimate or expert power bases were the two most important reasons given for complying with superiors' requests. Subordinates in four of the five organizations (the utility company is the exception) rank coercive power as least important. Whereas respondents in liberal arts colleges regard an expert power base as the most effective in gaining compliance, the preferred power bases in sales firm branch offices are legitimate and expert, respectively.

Ivancevich (1970) explores the relationship between control, power bases utilized and satisfaction in thirty-four branches of a life insurance company. While legitimate, expert and referent power bases were utilized most by managers, correlations between power bases used and the measures of satisfaction were significantly positive for referent and expert bases only.

## ADMINISTRATOR-SUBORDINATE PERCEPTIONS OF AUTHORITY

Skein and Lippit (1966) study the differences of opinion among superiors concerning the number of areas in which they felt it was appropriate to influence subordinates with respect to rank in an organization, length of employment and type of organization. Managers of supermarkets, police chiefs, military personnel directors, personnel directors of government agencies, sales managers, fiscal offices and middle level managers from three large companies are the subject of investigation.

Results indicate that areas regarded as legitimate significantly relate to rank. Managers whose role demands close supervision and a high degree of centralization of responsibility regard more areas as being legitimate than other managers. Supermarket managers and police chiefs ranked highest in terms of legitimate areas of influence. On the other hand, managers whose subordinates have more visible roles and who deal with outside members reflect a lower range of legitimate influence.

Clear and Seager (1971) investigate perceptions of school administrators and teachers concerning the legitimacy of administrative influence. Findings reveal that administrators have a greater desire to exercise influence than teachers are willing to accept. Their zones of desired influence are consistently greater than teachers' zones of acceptance.

Inbar (1977) analyzes elementary school principals' perception of their own levels of authority and responsibility, and compares this perception with other people filling educational roles.

Results indicate that although perceived levels of elementary school principals' authority are lower than perceived levels of their responsibility, principals' own perceptions of their level of authority are higher than that of other groups.

## PERCEPTIONS OF PRINCIPALS' AUTHORITY BASES

Peabody (1962) investigates authority in an elementary school as it relates to the administrative bases of legitimacy, position, competence and person. Whereas forty-five percent of teachers reported authority of competence as important, only fifteen percent indicate that person authority is significant.

Egner (1968) explores school administrators' perceptions of their authority bases and concludes that principals have a high dependence on position and legal designation of authority. While more than fifty percent perceive the basis of their authority as formal, resulting from position, twenty-eight percent perceive a functional base derived from competence and personal qualities to be most important.

Hornstein (1968) compares rankings of the bases of principals' power with three other factors obtained from 325 elementary school teachers in fourteen schools, representing two school systems. Hornstein reveals that reliance on expert power is associated with (1) more favourable evaluation of the school system, (2) greater satisfaction with the principal and (3) a tendency to perceive students to be more satisfied with their teachers.

Clear (1969) attempts to measure authority of position and authority of knowledge by examining teacher perceptions of principal and

department head influence on instruction. No significant differences in the degree of influence exerted by the respective groups is reported.

Isherwood (1973) examines authority bases of secondary principals and relates the use of various bases to teacher loyalty, job satisfaction, and sense of powerlessness. Whereas findings indicate significant positive relationships between teacher loyalty and job satisfaction, and the use of informal authority, respective correlations with the use of formal authority are negative. Teachers' sense of powerlessness is positively related to the use of formal authority and negatively correlated to the use of informal authority.

# Chapter III

## METHODOLOGY

### SAMPLE

The population of this study consisted of 250 teachers and principals of primary, elementary and secondary schools in a school district of Newfoundland and Labrador. Whereas the particular nature of this research lends itself to selection of only one school district, this population was selected because of the comparatively large teacher population of the district. In order to extend anonymity to those who participated in the study, the school system will remain unnamed.

### INSTRUMENT

Isherwood (1973) combines Weber's (1947) and Peabody's (1964) authority bases with French and Raven's (1960) social power bases to test the principal's authority. The instrument utilized in this study varies slightly from the original questionnaire adopted by Isherwood. Where Isherwood attempts to measure teacher perceptions of principals' authority, this study endeavors to examine teacher perceptions of effective authority, and principal perceptions of effective authority. To measure these items, two versions of the original instrument were formulated. Whereas each of the individual items measuring bases of authority remained essentially intact, respondent directions were altered slightly. In addition, sixteen items were formulated to

supplement the original twelve.

The first section, completed by teachers only, examined teacher perceptions of a principal's most effective authority base(s). Given a unique set of conditions, teachers were to indicate on a five point scale the extent to which they would likely comply with the directives of a principal.

The second section, completed by principals only, determined principals' perceptions of their most effective authority base(s). Given a unique set of conditions, principals were to indicate on a five point scale the extent to which they felt teachers would likely comply with a principal's directives.

The two versions of the instrument are contained in Appendix A.

## INSTRUMENT VALIDATION

To ensure face and content validity of the instrument, appropriate measures were taken. First, it was assumed that face and content validity was present in the original format of the instrument as used by Isherwood in his 1973 study. To measure the six variants of authority, Isherwood formulated twenty-three Likert-type items and submitted them to three professors of education for validation purposes. From these twenty-three items, fourteen were chosen by these individuals and were administered to twenty-two teachers who rated their principal's authority. Two items were selected from the fourteen to measure the traditional, legal, charismatic, expertise, and normative aspects of authority, while

one item was selected to represent the human relations aspect of authority.

To further ensure validity, the instrument with new items included was submitted to six professors and graduate students in the Faculty of Education at Memorial University. These individuals were asked to match each of the items with the appropriate definition for the respective authority types. They were also asked to comment on its clarity, precision and appropriateness. A number of valuable suggestions were offered and subsequently acted upon.

## INSTRUMENT RELIABILITY

Isherwood (1973) took the following measures to ensure the reliability of his instrument. When the pilot questionnaires were returned, an inter-item correlation (Pearson product-moment) was utilized to establish the degree of internal consistency. The results can be seen in Table I.

TABLE I

PRINCIPAL STAFF AUTHORITY INVENTORY (PSAI)

| Authority Variants | Items | Inter-Item r |
|---|---|---|
| Traditional | 7-9 | .85 |
| Legal | 2-4 | .91 |
| Charismatic | 3-8 | .86 |
| Espertise | 6-11 | .92 |
| Normative | 1-5 | .83 |
| Human Relations Skills | 10 | -- |
| **Coercion Variant** | | |
| Coercion | 12 | -- |

Source: Isherwood G. Personal communication, March 11, 1983. Reprinted by permission.

After conducting the study, Isherwood determined mean teacher scores for each variant of authority. When these means were correlated (Pearson) and factor analyzed, two clusters of authority variables were evident, which he identified as formal and informal authority. The factor analysis results can be seen in Table 2.

TABLE 2

VARIMAX ROTATION OF AUTHORITY TYPES

| Authority Type | Factors I | II | III | Final Communality |
|---|---|---|---|---|
| Traditional | .32 | 52* | .31 | .206 |
| Legal | .18 | 60* | .02 | .040 |
| Charismatic | .78* | 12 | .24 | .602 |
| Expertise | .89* | 13 | .06 | .795 |
| Normative | .76* | 21 | .14 | .576 |
| Human Relations Skills | .64* | 14 | .19 | .406 |
| Eigen Value | 2.52 | .71 | .19 | |
| Percent of the total variance | 42 | 9 | 2 | |

n = 15

*Assignment of authority type to a factor

Source: From "The Principal and His Authority" by G.B. Isherwood, The High School Journal, 1973, 56, 291-303.

Because of the abstract nature of the concept of authority, priority was given to development of the instrument. Factor analysis was employed to enhance instrument reliability in the quest for identification of authority bases.

## ANALYSIS OF DATA

All data was analyzed using the Statistical Package for Social Sciences (1970). Whereas the bases of authority lie with subordinates' perceptions (Scott, 1978), items from the Teacher Questionnaire were factor analyzed in the hope that patterns in the data might enable dimensions of authority to be identified.

Items twelve, sixteen, twenty, and twenty-four measuring coercion were dropped since analysis of this variable was deemed to be outside the realm of the study. Remaining items were coded and each response given a weight from one to five, where one represented the highest level of compliance and five the lowest. This scale was pronounced to be interval, wherein the intervals between weighted responses were regarded as consistent.

Means were calculated for the items representing each base of authority for each of the respondents. Pair-wise T-tests were utilized to uncover significant differences existing among teacher and principal perceptions regarding importance of respective authority bases. In view of the fact that the probability of random error increases with the number of T-tests, appropriate measures were taken to guarantee accuracy.

## ADMINISTRATION OF THE QUESTIONNAIRE

A request to conduct the study was sent to the superintendent of the school district. When an affirmative reply was received it was decided to conduct the study within that district.

All schools with a teacher population of greater than one were chosen to participate in the study. Principals were contacted by mail in mid-May and requested to distribute letters of explanation and questionnaires to teachers who were expected to complete their questionnaires and mail the self-addressed envelope back to the source. Principals were also requested to fill out a questionnaire and return it.

In schools where the teacher population was less than twelve, all were asked to complete the items. Principals were requested to distribute materials to the first six and last six on an alphabetically arranged teacher roster. In schools with a teacher population of greater than one. Overall, 192 teachers and 21 principals were selected for the study.

After two weeks had elapsed, follow-up letters were mailed to principals who were asked to pass them on to appropriate individuals. Further, telephone calls were placed to a number of principals four weeks after the initial correspondence was mailed. All questionnaires received up to June 22, 1983 were included in the study. Table 3 presents the number and percentage of returns for teachers and principals.

Keeping in mind the circumstances surrounding school closures this year and the extra work load that teachers were faced with at the end of the year, the return rate was considered to be quite respectable. With the exception of one school from which no questionnaires were received, (it was assumed that they were not distributed) the response from most schools was consistent with the norm.

Speculation as to reasons for non-response would be risky. It is assumed that the exclusion of these non-respondents did not bias this study to any great extent.

All correspondence in this matter is contained in APPENDIX B.

TABLE 3

NUMBERS AND PERCENTAGE OF RETURNS

| Group | Total Number | Number of Returns | Percentage of Returns |
|---|---|---|---|
| Teachers | 192 | 131 | 68.3 |
| Principals | 21 | 17 | 80.7 |
| Total | 213 | 148 | 69.5 |

Chapter IV

# ANALYSIS OF THE DATA

The chapter outlines the factor analysis procedure and its application to this particular study. Due to circumstances surrounding this particular area of research, priority was given to development of the instrument. Only after the instrument was developed were questions central to the study addressed. Following interpretation of factor analysis results, questions one to four are attended to.

## DEVELOPMENT OF THE INSTRUMENT

### Introduction

Drawing from literature in this area, Isherwood (1973) classifies authority as either formal or informal. Formal authority is broken down into traditional and legal, while informal authority comprises human relations skills, charismatic, expert and normative authority. Utilizing factor analysis, he found that formal and informal components of authority can be classified as separate categories. He did not, however, establish whether or not the same things hold for the finer components of authority. Whereas Thurstone (1947) suggested that three items per factor are sufficient, it was hoped that by increasing the number of items designed to measure each component to four, factor analysis would uncover a definite pattern or

regularity in the data. This would be the basis for establishing these finer authority bases as unique entities.

Since factor analysis is central to the study, the process is reviewed. Various alternatives available with respect to the number-of-factors issue, initial factoring models and rotary techniques will be discussed. Special attention will be accorded problems associated with these areas and steps to deal with these difficulties outlined. Finally an interpretation of the factors will be provided .

Factor Analysis

> It is the faith of all science that an unlimited number of phenomena can be comprehended in terms of a limited number of concepts or ideal constructs. Without this faith no science could ever have any motivation (Thurstone, 1947, p. 51).

In response to his statement, Thurstone (1947) and others have developed factorial methods primarily for the purpose of identifying the principle dimensions or categories of mentality. Factor analysis provides a mathematical model which can be used to describe certain areas of nature.

Factor analysis begins with a set of observations obtained from a given sample of classifiable categories which can be described and measured. The factorial process analyzes this set of observations to determine whether or not the variations represented can be accounted for adequately by a number of basic categories (dimensions) smaller than that with which the investigation was started. To accomplish this task a series of measures are intercorrelated to determine the number of dimensions these measures (items) occupy, and

to identify these dimensions in terms of traits or other general concepts. Interpretations are accomplished by observing which items fall on a given dimension and inferring what these tests have in common that is absent from tests not falling on the dimension (Fruchter, 1954). Items correlate to the extent that they measure common traits. By observing and analyzing the pattern of intercorrelations, existence of one or more underlying traits or other sources of common variance is inferred.

Factor analysis is not a unitary process, but a variety of related methods subsumed under one term. Various alternatives are available at each of the customary steps: (1) preparation of the correlation matrix; (2) extraction of initial factors; and (3) rotation to the terminal solution.

The initial step involves calculation of measures of association among variables that are deemed relevant to the study. Most factor analyses require a product-moment correlation coefficient.

The second step, extraction of initial factors, involves reduction of data by expressing variables in terms of reference factors on the basis of their interrelationships. In geometrical terminology, this involves the initial penetration of dimensions by linear constructs. Although quite a number of factor models are available, attention will be accorded three models that have a bearing on this study: (1) the principal component model; (2) the principal factor model and; (3) Rao's canonical model. Each will be explicated in greater detail in another section.

The final step in a factor analysis procedure is rotation

to the terminal solution. When initial factoring penetrates each dimension, the reference axis is arbitrarily located within that dimension. Axes must be rotated in order to move them from the arbitrary location determined by the method of extraction to a position useful for interpretation of factors. Methods of rotation can be classified as oblique or orthogonal. Whereas orthogonal factors are uncorrelated and simpler, oblique factors are correlated and more realistic.

In areas of social sciences, as well as in many other areas of research, factor analysis has proven to be a valuable asset in the pursuit of knowledge as Rummel (1970) suggests:

> Factor analysis can be — and is being — so generally applied and the factor model is so amenable to structuring our social knowledge and theories ... Knowledge is, after all, method applied to our perceptions and constructs of reality and the method of factor analysis enhances the ability of the social scientist to create new knowledge and theoretical integration. (pp. 4-5)

There are many problems, however, associated with factor analysis. Difficulties centre around the principal component factor model, composition of matrix diagonals, extraction of an appropriate number of factors and the interpretation process. The state of the art is such that answers to many of these problems remain a mystery. In view of these circumstances a skilled factor analyst must proceed with caution and at the same time view his findings with an appropriate amount of skepticism.

Number of Factors

The number-of-factors issue has posed problems for factor analysts over many years. Central to this problem is identification of trivial factors as opposed to those that may be considered significant. What is the criterion for designating a factor as important? Where does one draw the line? When sensitivity of rotation to the number of factors is considered, selection of the appropriate number of factors for rotation becomes of paramount importance. Whereas the number of factors has little effect on the unrotated solution, rotation can have distorting consequences if insufficient attention is given to the selection process. Rummel (1970) is only one of many who address this problem:

> Whereas in the unrotated case the decision to accept or reject the factors accounting for the smaller variance has no effect on the factor structure delineated by the larger factors, in the rotation the inclusion or exclusion of one smaller factor may change the rotated factor structure. In other words the loading and interpretation of all rotated factors may differ for the same data, preliminary solution, and rotation criteria by virtue of the different numbers of factors rotated. Due to this sensitivity of rotation a very careful consideration of the best number of factors for rotation is crucial regardless of whether the intent of the analysis is descriptive inference or generalization. (p. 135)

The number-of-factors problem, however, has no general solution. In fact, a great deal of uncertainty exists with respect to a number of alternative identification procedures. Whereas extraction of an appropriate number of factors is crucial to this study, various methods for identifying significant factors will be reviewed, evaluated,

and subsequently acted upon.

The maximum likelihood method associated with canonical factoring is a statistical test designed to identify factors contributing to significant variation in the data. Canonical factor analysis estimates common factors that have maximum canonical correlation with common segments of the data. Factor significance is decided by testing each common factor against the null hypothesis that subsequent factors are too small to be credited to anything but chance. A common factor is judged to be significant when it has a greater than chance probability of existing for the population from which the sample was selected. However, it must be emphasized that any significance test is dependent on sample size. As a result, significant and interpretable factors may be discarded when small samples are used, and retained in larger samples where they would otherwise be considered trivial. Humphreys and Montanelli (1975) find that in most cases, when this technique is adopted, too many factors are extracted:

> It is not surprising that maximum likelihood $X^2$ statistics indicate the presence of more factors than the number of major factors actually present, because the minor factors do indeed contribute to significant variation. (p. 203)

The residual method can be utilized with centroid and principal axis factor techniques. Factors are successively subtracted from the original correlation matrix until no residual is considered high enough to be significant. Again, significance of factors is dependent upon sample size.

The following method is referred to by Cattel (1978) as the

K-G method with reference to the foremost advocates of the technique, Kaiser and Guttman. Criterion for significance of a factor is an eigenvalue (variance accounted for by factor) of greater than one. The method is applied in conjunction with a principal component factor solution where "unities" are placed in the diagonal. It may be noted, however, that rotation of the axes can change the eigenvalues to such an extent that values less than one before rotation can increase to values greater than one after rotation. The reverse is also true. Consequently, Cattel (1978) finds that this method consistently overestimates the number of factors when there are many variables and regularly underestimates the number when few variables are present.

A comparatively recent technique for establishing the number of factors, pioneered by Horn (1965), Linn (1968), Humphreys and Ilgen (1969) and others, is known as parallel analysis or the Monte Carlo approach. This technique requires construction of a second correlation matrix from normally distributed random numbers using the same number of variables and observations. Squared multiple correlations are inserted in the diagonals, and matrices are factored. Eigenvalues of both methods are plotted and the point at which the curves cross indicates the number of factors. This method is based on the idea that a researcher would not be interested in a factor which does not account for more variance than the corresponding factor obtained from distributions of random numbers. (Humphreys and Montanelli, 1976). Cattel (1978) has found, however, that this method tends to overlook the random error variance, and as a result the risk of overfactoring is great.

The scree test, developed and refined by Cattel (1978), is similar to the Monte Carlo approach in so far as it involves the plotting of eigenvalues. To use the scree test, one puts "unities" in the diagonal and factors with as many factors as there are variables. Eigenvalues of successive factors are then plotted. Typically this plot line shows a distinct break between the "chute" of the larger factors and a much more gently sloping straight line that runs to the final factor. The latter runs at a constant angle, like the scree of rock debris at the foot of a mountain; hence, the present name (Cattel, 1978). Difficulty with this method originates with its subjective nature.

Interpretability or meaningfulness of a factor must be included as criteria for accepting or rejecting a factor. A factor analyst with a substantial grounding in the subject area can "screen" a factor by weighing its interpretability, its consonance with other research findings, the configuration of its loadings and its proportional factor variance before deciding whether or not to accept or reject the factor (Rummel, 1970). However, evaluation of a factor in this manner can be a very subjective process.

When attempting to evaluate comparative effectiveness of each of the methods, one must review studies that compare the number of factors: (1) determined by various methods; (2) with factors extracted in previous studies on the same data; and (3) in cases where the number of factors is known by a physical example (Plasmodes).

Linn (1968), Cattel (1978) and others find that the Monte Carlo method and scree test compare quite favourably with each other,

and with previous factor analytic studies. In addition, Horn (1965) finds that the break in the curve corresponds to the crossing of the random data curve with the real data curve. Whereas the scree test is the only one that has been extensively tested with plasmodes, it compares quite favourably in this respect (Cattel, 1078). On the other hand the maximum likelihood and K-G methods were found to be fairly inconsistent with the prediction of factors (Linn, 1968; Cattel, 1978). Whereas the maximum likelihood method may be appropriate for determining an upper limit for the number of factors, it is unsuitable for setting a lower limit. Cattel (1978) finds fault with the K-G method:

> The K-G method is in error about five times as frequently as the scree and the average magnitude of the miss is perhaps ten times greater. (p. 62)

Ideally, a researcher would attempt to utilize as many techniques as possible and find that each registers the same decision. In an operational sense this rarely occurs. In determining the number of factors to be utilized in this study it was decided, on the basis of research findings, to utilize the maximum likelihood for an upper limit only, view the K-G method with appropriate skepticism and concentrate on the Monte Carlo and scree methods. It was hoped that results obtained from these methods would lead to conclusions that would be interpretable. Interpretability, therefore, must be the major criterion for acceptance or rejection of factors. As Rummel (1970) suggests:

> ...this may well be the wisest course. It appears foolish to allow an analytic decision criterion to override a research sense of the data. (p. 357)

Montanelli and Humphreys (1976) developed a method for predicting the size of eigenvalues from random matrices based on sample size and number of variables. They found the following equation to be accurate in predicting the size of the eigenvalues ($\lambda$) from the random correlation matrix:

$$\log \lambda_i = a_i + b_i \log (n-1) + b_{ni} \log \left[ \frac{n(n-1)}{2} - (i-1)n \right]$$

where i is the ordinal position of the eigenvalue, $b_{Ni}$ and $b_{ni}$ are regression coefficients and "a" is the intercept.

Execution of this technique proved to be unsuccessful. The random curve generated from the preceding equation did not intersect with the data curve. A plot of the curves, and the table for regression and intercept points is provided in Appendix C.

The researcher with limited experience in the area can only speculate as to the failure of this method. It was noted, however, that the latter portion of the equation $\left[ \frac{n(n-1)}{2} - (i-1)n \right]$ only permitted the use of half as many factors as variables. If one was to calculate the numerical value for any factors over half, the result would be a negative number (resulting in the log of a negative number). This would seem to indicate that this formula would be applicable only to cases where eigenvalues of half the number of factors as variables exceeded zero. In the case at hand it is possible that twenty-three factors can exceed zero (there are twenty-four variables). The eigenvalues of twenty-four possible factors are provided in Appendix C.

With the failure of the Monte Carlo method to provide an

indication of the best number of factors, a heavier reliance was placed on the scree test. The correlation matrix was factored with "unities" in the diagonal and the number of factors produced was equivalent to the number of variables (twenty-four). Eigenvalues of successive factors were plotted on a graph. As Figure 2 illustrates, there is a noticeable break in the curve after the fourth factor and a lesser break after the eighth factor. Judging from the slope of the curve it was concluded that there were two screes. The first scree consists of all factors after the eighth. They are pronounced to be substantive but trivial and in part produced by specific factors common to the sample (but not the population). Factors five to eight form the second scree, and as well are produced in part by specific factors common to the sample in addition to uncorrelated errors of measurement (Cattel, 1978). The end of this scree marks the end of the significant substantive factors. This method would seem to indicate that four factors are significant.

A further step was necessary to ensure interpretability of factors. Different numbers of factors were extracted and subjected to various factor and rotary techniques. It was found that the number of factors amenable to interpretation (four) coincided with the number specified by the scree test. (Appendix D)

A further precautionary measure was undertaken. Whereas Rao's canonical factoring technique (eventually confirmed as the method to be utilized in this study) has a built-in significance test for factors that have shown to be effective for establishing the upper limit for the number of factors, it was decided to test the

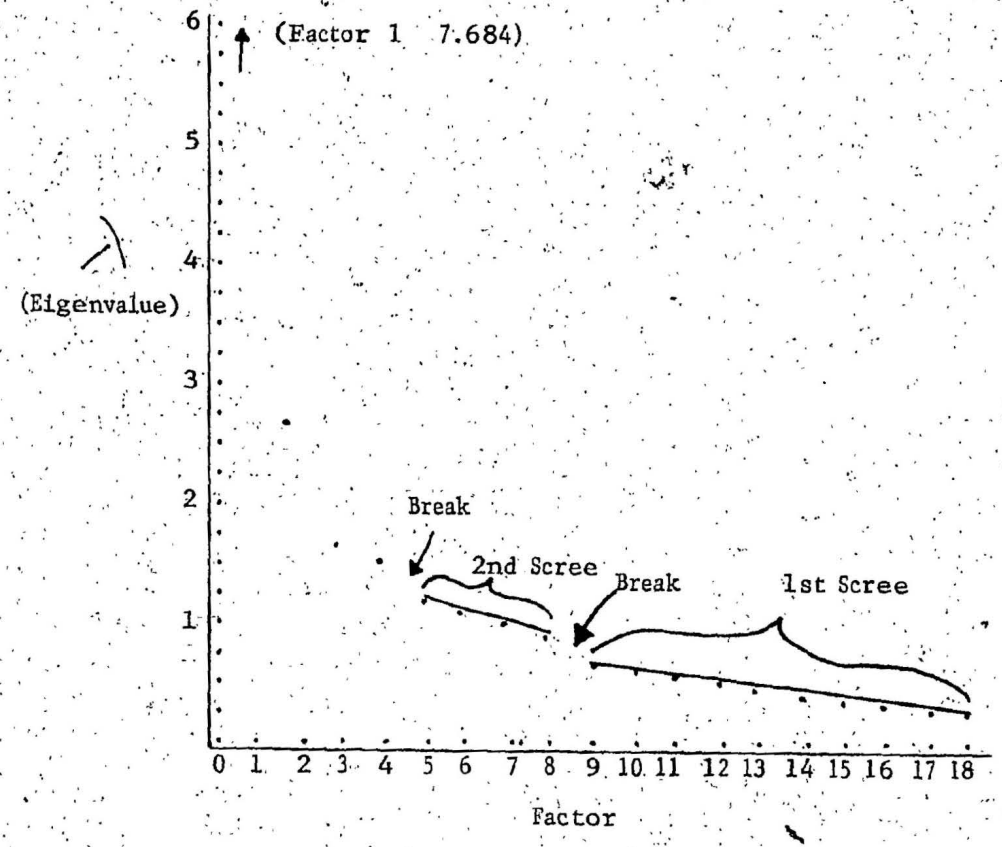


Figure 2. Scree Test

TABLE 4

EIGENVALUES AND PERCENTAGE OF VARIANCE FOR 24 FACTORS
USING PRINCIPAL COMPONENT FACTORING

| FACTOR | EIGENVALUE | PCT OF VAR. |
|---|---|---|
| 1 | 7.684 | 32.0 |
| 2 | 2.722 | 11.3 |
| 3 | 1.632 | 6.8 |
| 4 | 1.524 | 6.4 |
| 5 | 1.203 | 5.0 |
| 6 | 1.091 | 4.5 |
| 7 | 0.987 | 4.1 |
| 8 | 0.897 | 3.7 |
| 9 | 0.669 | 2.8 |
| 10 | 0.659 | 2.7 |
| 11 | 0.603 | 2.5 |
| 12 | 0.551 | 2.3 |
| 13 | 0.465 | 1.9 |
| 14 | 0.439 | 1.8 |
| 15 | 0.409 | 1.7 |
| 16 | 0.396 | 1.7 |
| 17 | 0.357 | 1.5 |
| 18 | 0.325 | 1.4 |
| 19 | 0.299 | 1.2 |
| 20 | 0.298 | 1.2 |
| 21 | 0.235 | 1.0 |
| 22 | 0.206 | 0.9 |
| 23 | 0.176 | 0.7 |
| 24 | 0.162 | 0.7 |

significance of the four factors. As illustrated in Table 5 all four were confirmed to be significant at the .001 level.

Table 5

FACTOR SIGNIFIGANCE

| Factor | Eigenvalue | PCT. of VAR | Chi-Square | Degrees of Freedom |
|---|---|---|---|---|
| 1 | 16.519 | 57.2 | 822.430 | 252* |
| 2 | 6,210 | 21.5 | 548.847 | 229* |
| 3 | 3,242 | 11.2 | 450.567 | 207* |
| 4 | 2.927 | 10.1 | 355.746 | 186* |

* $p < .001$

Whereas the number-of-factors question was crucial to this study, it was necessary to meet reliable criteria standards in order to extract the appropriate number of factors. On the basis of subsequent investigation it was decided to extract four factors for rotation.

The Process

Factor analysis does not refer to a single method, but a variety of related methods subsumed under the one heading. A description of techniques and procedures taken that have a bearing on the final solution will be outlined.

The first step is the generation of a correlation matrix. (Tables 6-8). Out of the relationships exhibited in the matrix, factors

TABLE 6

CORRELATION MATRIX – Q1 to Q13 with Q1 to Q13

| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q1 | 1.00 | | | | | | | | | | | |
| Q2 | .16 | 1.00 | | | | | | | | | | |
| Q3 | .22 | .30 | 1.00 | | | | | | | | | |
| Q4 | .21 | .57 | .28 | 1.00 | | | | | | | | |
| Q5 | .29 | .31 | .40 | .41 | 1.00 | | | | | | | |
| Q6 | .18 | .18 | .31 | .38 | .45 | 1.00 | | | | | | |
| Q7 | .15 | .31 | .36 | .22 | .22 | .29 | 1.00 | | | | | |
| Q8 | .11 | .35 | .48 | .33 | .48 | .29 | .29 | 1.00 | | | | |
| Q9 | .08 | .37 | .32 | .39 | .36 | .29 | .52 | .52 | 1.00 | | | |
| Q10 | .28 | .29 | .33 | .26 | .45 | .31 | .02 | .52 | .34 | 1.00 | | |
| Q11 | .12 | .16 | .36 | .28 | .31 | .39 | .11 | .40 | .33 | .45 | 1.00 | |
| Q13 | .26 | .13 | .24 | .21 | .29 | .41 | .07 | .23 | .10 | .36 | .45 | 1.00 |
| Mean | 1.67 | 2.23 | 1.94 | 2.37 | 1.94 | 1.68 | 2.90 | 2.44 | 2.83 | 1.65 | 1.69 | 1.80 |
| Standard Deviation | .81 | L.03 | .86 | 1.02 | .91 | .75 | 1.13 | 1.16 | 1.01 | .71 | .69 | .61 |

TABLE 7

CORRELATION MATRIX - Q14 to 28 with Q1 to Q13

| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q14 | .35 | .14 | .43 | .20 | .24 | .22 | .11 | .34 | .23 | .59 | .50 | .57 |
| Q15 | .13 | .47 | .15 | .45 | .31 | .12 | .33 | .25 | .50 | .29 | .16 | .09 |
| Q17 | -.06 | .30 | .18 | .35 | .35 | .25 | .33 | .28 | .38 | .30 | .20 | .21 |
| Q18 | -.04 | .27 | .26 | .30 | .45 | .24 | .45 | .36 | .49 | .30 | .16 | .15 |
| Q19 | .07 | .19 | .38 | .19 | .39 | .16 | .27 | .39 | .39 | .34 | .23 | .27 |
| Q21 | .22 | .17 | .38 | .19 | .31 | .12 | .04 | .36 | .26 | .44 | .46 | .46 |
| Q22 | .19 | .14 | .28 | .10 | .14 | .13 | .08 | .22 | .22 | .33 | .46 | .40 |
| Q23 | -.03 | .34 | .16 | .41 | .31 | .24 | .19 | .18 | .29 | .23 | .33 | .29 |
| Q25 | -.17 | .25 | .24 | .34 | .21 | .19 | .25 | .22 | .27 | .19 | .19 | .06 |
| Q26 | .06 | .10 | .32 | .16 | .27 | .30 | .08 | .28 | .27 | .44 | .52 | .42 |
| Q27 | .12 | .23 | .50 | .21 | .22 | .13 | .16 | .39 | .17 | .38 | .39 | .24 |
| Q28 | .07 | .23 | .40 | .21 | .10 | .08 | .21 | .25 | .22 | .25 | .25 | .03 |

TABLE 8

CORRELATION MATRIX - Q14 to Q28 with Q14 to Q28

| | Q14 | Q15 | Q17 | Q18 | Q19 | Q21 | Q22 | Q23 | Q25 | Q26 | Q27 | Q28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q14 | 1.00 | | | | | | | | | | | |
| Q15 | .18 | 1.00 | | | | | | | | | | |
| Q17 | .24 | .52 | 1.00 | | | | | | | | | |
| Q18 | .15 | .50 | .65 | 1.00 | | | | | | | | |
| Q19 | .39 | .26 | .44 | .49 | 1.00 | | | | | | | |
| Q21 | .65 | .22 | .22 | .17 | .44 | 1.00 | | | | | | |
| Q22 | .50 | .16 | .23 | .18 | .17 | .54 | 1.00 | | | | | |
| Q23 | .22 | .43 | .56 | .49 | .16 | .34 | .37 | 1.00 | | | | |
| Q25 | .08 | .31 | .45 | .53 | .37 | .10 | .00 | .48 | 1.00 | | | |
| Q26 | .58 | .17 | .26 | .29 | .47 | .65 | .46 | .32 | .24 | 1.00 | | |
| Q27 | .39 | .04 | .15 | .18 | .43 | .45 | .20 | .12 | .30 | .39 | 1.00 | |
| Q28 | .31 | .24 | .24 | .22 | .35 | .29 | .18 | .30 | .21 | .31 | .49 | 1.00 |
| Mean | 1.65 | 2.99 | 2.54 | 2.88 | 2.51 | 1.88 | 1.67 | 2.43 | 2.83 | 1.64 | 2.34 | 2.47 |
| Standard Deviation | .68 | .96 | .92 | .98 | .98 | .73 | .66 | .88 | .99 | .67 | .97 | 1.03 |

accounting for these patterns were extracted.

The initial factoring process wherein tentative factors are identified, is the second stage of factor analysis. Whereas three methods have a bearing on the final solution, all will be discussed and their potential contribution evaluated.

The principal component factoring model, or component analysis as it is referred to by many (Rummel, 1970), transforms a given set of variables into a set of principal components which are unrelated to each other. The first principal component is the best linear combination of variables that would account for more of the variance in the data as a whole than any other linear combination of variables. The second principal component is the second best linear combination of variables not accounted for by the first component. Subsequent components are extracted until all variance in the data is accounted for. The principal component model may be expressed as:

$$S_j = a_{j1}F_1 + a_{j2}F_2 + \ldots a_{jn}F_n$$

where $S_j$ = score of variable

$a_{ji}$ = standardized multiple regression coefficient of variable j on factor i (factor loading)

Fi = hypothetic factors

Whereas the correlation matrix is factored with unities in the diagonal, implications for this model are far reaching. The assumption is made that variance of all variables is accounted for by common factors. No provision is made for the possibility that unique factors may contribute to the variance of each variable on an

independent basis. Consequently, no uniformity of the data is assumed and an identical number of factors as variables is expected to account for the total variance.

Whereas the principal component model assumes that common factors account for all the variance, the principal factor model requires the aid of specific factors to account for the variance of the variables. It is assumed that there is an underlying regularity in the data and that common variance can be accounted for by a fewer number of factors than variables. To facilitate this supposition estimates of communality (common variance of a variable that is accounted for by common factors) are inserted in the diagonal. Difficulties with this model originate with the estimation of communalities. A common practice is to insert multiple square correlations of the variable with the remaining variables into the diagonal as initial estimates of commonalities.

This model extracts factors in a similar manner to the principal component model. The initial factor is the best linear combination of variables accounting for more of the common variance in the data than any other linear combination; the second factor is the second best, and so on. It may be expressed as follows:

$$S_j = a_{j1}F_1 + a_{j2}F_2 + \ldots a_{jm}F_n + d_jU_j$$

where $S_j$ = score of variable j

$a_{ji}$ = standardized multiple regression coefficient of variable j on factor i (factor loading)

$F_i$ - hypothetical factor

$U_j$ - unique factor for variable j

dj = standardized regression coefficient of variable j on unique factor:

The final model pertinent to this study is Rao's canonical factoring technique. Like any other true factoring model it accounts for common variance only, and as a result estimation of communalities poses difficulties. Just as the principal component and principal factoring methods produce linear combinations that account for declining degrees of variance, canonical factoring produces linear combinations of variables that account for progressively declining degrees of correlation. The first pair of canonical variates selected have the highest intercorrelation possible given the particular variables involved. A second set of canonical variates is then selected to account for a maximum amount of the relationship left unaccounted for by the first set of variates, and so on.

The principal component model raises serious questions regarding the validity of this method. The insertion of "unities" in the diagonal for factoring purposes denies the existence of unique factors. This has led many factor analysts to denounce the model on the strength that it has little relevance to the real world. Cattel (1978) is only one of many who recommend the use of other models.

> The analysis cannot be treated, as the components model seeks to do, as a complete self explaining system. Each variable is likely to be affected by some influences not covered by its companion variables in the matrix ... we now reject the component analysis approach as not having any necessary relation to the model of stable identifiable influences or determiners across the natural world. (p. 68)

On the strength of this evidence the principal components

model was rejected as the initial factoring method to be utilized in this study. It was necessary, however, to use this model for the scree test and the eigenvalues are produced in Table 4.

Upon rejection of the principal component model, the principal factor model was adopted, first, for use in the Monte Carlo method for determining the number of factors and second, as the second step in the factor solution. Eigenvalues for twenty-four possible factors are illustrated in Appendix C. Despite reasonable interpretations of factors with this method, another factor technique was experimented with. In the final analysis, Rao's canonical factoring technique proved to be the most effective in producing a solution most amenable to interpretation. Consequently, this factor technique was adopted in the second stage of analysis.

The initial factor matrix is illustrated in Table 10. High loadings on factor one indicate high correlation between the first pair of variates. Loading on subsequent factors tend to decrease progressively as sets of variates account for previously unaccounted for interrelationships.

The final step in factor analysis is the rotation to a terminal solution. There are mixed feelings in the field regarding attributes and shortcomings of both the orthogonal and oblique rotary techniques. Whereas Ferguson (1981) considers the varimax orthogonal rotation as the most widely accepted rotary procedure, Cattel (1978) recommends an oblique solution. The varimax procedure is simpler by definition. On the other hand an effective oblique rotation requires considerable skill and experience, attributes that

TABLE 9

INITIAL FACTOR MATRIX USING RAO'S CANONICAL FACTOR

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|
| Q 1 | .224 | -.251 | .282 | .304 |
| Q 2 | .455 | .269 | .245 | .291 |
| Q 3 | .570 | -.127 | .354 | -.106 |
| Q 4 | .511 | .268 | .186 | .364 |
| Q 5 | .576 | .126 | .222 | .113 |
| Q 6 | .432 | .040 | .152 | .222 |
| Q 7 | .388 | .343 | .246 | -.059 |
| Q 8 | .603 | .009 | .368 | -.040 |
| Q 9 | .583 | .273 | .209 | .030 |
| Q10 | .631 | -.202 | .116 | .078 |
| Q11 | .588 | -.289 | -.023 | .135 |
| Q13 | .504 | -.340 | -.126 | .203 |
| Q14 | .655 | -.493 | -.045 | .041 |
| Q15 | .514 | .406 | -.040 | .196 |
| Q17 | .604 | .431 | -.245 | -.040 |
| Q18 | .619 | .509 | -.107 | -.189 |
| Q19 | .627 | .029 | .074 | -.433 |
| Q21 | .660 | -.445 | -.147 | -.032 |
| Q22 | .502 | -.324 | -.269 | .157 |
| Q23 | .573 | .290 | -.409 | .226 |
| Q25 | .457 | .408 | -.118 | -.201 |
| Q26 | .651 | -.335 | -.224 | -.153 |
| Q27 | .517 | -.241 | .224 | -.285 |
| Q28 | .445 | -.025 | .065 | -.184 |

this novice researcher does not possess. Nevertheless, with interpretability as the foremost criterion, both oblique and varimax rotations were executed. As expected, results from the varimax rotation proved to be more meaningful and this rotary procedure was confirmed as the technique to be adopted for the final stage. Results of the oblique solution are illustrated in Appendix D. The varimax solution can be seen in Table 10 and Table 11. Interpretation of factors is derived from this matrix on the basis of inferences drawn from respective loadings.

Interpretation of the Factors

Interpretation of factors has been and continues to remain a comparatively nebulous area, since the nature of hypothetical factors rests, for the most part, on the subjectively of the researcher. Fruchter (1974), however, suggests that until techniques which more adequately account for observed data appear, researchers must make the most of existing methodologies.

> The interpretations of the results of factor analysis, as is true of all scientific interpretations are tentative. Just as the theory of relativity has replaced neutonian physics as an interpretation of observable facts so may present theories based on factorial results be superceded by other interpretations, if they more adequately account for the data. Factors are not eternal variates, they merely serve to represent the fundamental underlying sources of variation operating in a given set of scores or other data observed under a specific set of conditions. (p. 4)

By inferring what the tests with high loadings on a factor have in common that is present to a lesser degree in tests with moderate loadings, and absent from tests with zero loadings and near zero

TABLE 10

VARIMAX ROTATED SOLUTION

| | Factor I | Factor 2 | Factor 3 | Factor 4 | Communality |
|---|---|---|---|---|---|
| Q 1 | .249 | -.245 | .400 | .058 | .286 |
| Q 2 | .058 | .257 | .588 | .095 | .424 |
| Q 3 | .267 | .040 | .348 | .531 | .477 |
| Q 4 | .131 | .302 | .625 | .037 | .501 |
| Q 5 | .200 | .253 | .476 | .281 | .409 |
| Q 6 | .219 | .138 | .425 | .111 | .260 |
| Q 7 | -.100 | .326 | .349 | .307 | .332 |
| Q 8 | .206 | .135 | .446 | .492 | .501 |
| Q 9 | .096 | .378 | .452 | .320 | .459 |
| Q10 | .485 | .105 | .339 | .312 | .459 |
| Q11 | .583 | .080 | .256 | .190 | .448 |
| Q13 | .620 | .043 | .193 | .056 | .427 |
| Q14 | .748 | -.006 | .163 | .299 | .676 |
| Q15 | .099 | .534 | .417 | .026 | .469 |
| Q17 | .173 | .729 | .187 | .126 | .612 |
| Q18 | .045 | .748 | .194 | .302 | .690 |
| Q19 | .246 | .360 | .032 | .629 | .587 |
| Q21 | .746 | .090 | .069 | .295 | .656 |
| Q22 | .656 | .128 | .083 | .011 | .454 |
| Q23 | .364 | .655 | .220 | -.148 | .631 |
| Q25 | .016 | .601 | .088 | .243 | .429 |
| Q26 | .675 | .218 | -.033 | .325 | .610 |
| Q27 | .327 | .021 | .106 | .581 | .456 |
| Q28 | .224 | .200 | .100 | .370 | .237 |
| Eigenvalue | 16.519 | 6.210 | 3.242 | 2.927 | |
| Percentage of Variance | 57.2 | 21.5 | 11.2 | 10.1 | |

n = 128

TABLE 11

VARIMAX ROTATED SOLUTION

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Communality |
|---|---|---|---|---|---|
| Q10 | X | | o | o | .459 |
| Q11 | X | | | | .448 |
| Q13 | X | | | | .426 |
| Q14 | X | | | | .676 |
| Q21 | X | | | | .656 |
| Q22 | X | | | | .454 |
| Q26 | X | | | o | .610 |
| Q15 | | X | o | | .469 |
| Q17 | | X | | | .612 |
| Q18 | | X | | o | .690 |
| Q23 | o | X | | | .631 |
| Q25 | | X | | | .429 |
| Q 2 | | | X | | .424 |
| Q 4 | | o | X | | .501 |
| Q 5 | | | X | | .409 |
| Q 9 | | o | X | | .459 |
| Q 3 | | | o | X | .476 |
| Q 8 | | | o | X | .501 |
| Q19 | | o | | X | .587 |
| Q27 | o | | | X | .456 |
| Q 1 | | | o | | .286 |
| Q 6 | | | o | | .260 |
| Q 7 | | o | o | | .332 |
| Q28 | | | | o | .237 |

X = Factor loadings greater than .45

o = Factor loadings from .30 to .45

loadings, a researcher attempts to identify the nature of that hypothetical factor. For the purposes of this study and to coincide with standard research practice that would point to significance of loadings greater than .30, factor loadings will be classified on the following basis: (1) loadings over .45; (2) loadings between .30 and .45 and; (3) loadings below .30. Particular attention will be accorded highest loadings, since the key to accurate interpretation is likely to rest with items in this category. Factor loadings in the second category will be delegated a significant but lesser role in the identification of factors. Although these items may not be a direct link to the true nature of a factor, an understanding as to why they would load on a particular factor can provide valuable clues toward this end. Therefore, a rationale for the location of all items that load in this range will be provided.

Authority is essentially a unitary concept. Authority bases are distinct entities in an analytical sense only (Peabody, 1962). It is understandable that each item would tend to load on all four factors when one considers that all four factors measure the same concept. In addition, there are only five slightly negative loadings. In view of this fact, when one takes the error factor into account caution must be displayed when attempting to account for factor loadings in the lowest range. Therefore, attention will be focused on the upper two ranges.

Inevitably any credible solution must have a basis in the literature, as Kim and Muller (1978) suggest.

> Given the complexity as well as the uncertainties inherent in the method, the final judgement has to rest on the reasonableness of the solution on the basis of current standards of scholarship in one's own field. (p. 45)

Factor One - Administrative Skills

Factor one was the most significant factor comprising 57.2 per cent of the total common variance. Items loading significantly on this factor in order of magnitude are:

| Item # | Factor Loading | Content |
|---|---|---|
| Q14 | .748 | When a principal displays through interactions with me that he/she is genuinely concerned about my personal well being. |
| Q21 | .746 | When I perceive that my principal takes time to ensure that he/she is able to relate well to me. |
| Q26 | .675 | When a principal makes it easy for me to communicate with him/her and talks to me on an equal person to person basis. |
| Q22 | .656 | When a principal exhibits skill with respect to timetabling, supervision of teachers, and other areas related to administration that contribute to the smooth running of the school. |
| Q13 | .619 | When a principal has shown good judgement regarding educational matters in the past and is likely to do so in the future. |
| Q11 | .583 | When a principal's past experience is evident in the way he/she runs the school; he/she knows what he/she is doing. |
| Q10 | .485 | When a principal is very tactful and understanding in dealings with me. |

These items seem to reflect (1) a concern for the well-being of staff members exhibited through skillful interpersonal abilities and

(2) expertise in areas pertaining to school administration.

The following items range in factor loadings from .30 to .45:

| Item # | Factor Loading | Content |
|---|---|---|
| Q23 | .364 | Because I recognize that the way to achieve school goals is to follow the rules, one of which specifies that I comply with the wishes of a principal. |
| Q27 | .327 | When a principal possesses such an array of admirable qualities that I would hope to emulate him/her in one way or another. |

The preceding items suggest (1) a desire to achieve goals and (2) the possession of admirable qualities.

Factor one was designated Administrative Skills Base of Authority and was defined as the authority attributed to principals on the basis of their (1) concern for teachers exhibited through skillful human relations abilities and (2) knowledge of technical skills associated with the running of the school. Items ten, eleven, thirteen, fourteen, twenty-one, twenty-two and twenty-six contribute directly to the factor. A moderate loading of item twenty-three, a desire to achieve goals, on this factor would seem to indicate that teachers may associate the achievement of school goals with the skillful (technical and human relations) performance of a principal. It is also conceivable that teachers would affiliate human relations skills and admirable qualities as indicated by the loading of item twenty-seven on this factor.

Much of the literature tends to classify technical expertise and human relations skills under separate headings. Peabody's (1962) authority of competence, Prethus'(1960) authority of technical expertise, Simon's (1957) authority of confidence, French and Raven's (1960)

expert "power" all refer to authority granted a superordinate on the basis of technical expertise. On the other hand, Peabody's (1962) person authority, Presthus' (1960) authority of rapport and French and Raven's (1960) referent "power" depict an authority granted an individual on the strength of personal qualities including human relations skills.

The alliance of these two elements will come as no surprise to the student of educational administration, however, who has decreed that a skillful principal possesses human relations skills as well as technical skills. Bennis (1959) as well, classifies these two elements under one category.

> The issue gets increasingly complicated when we assert that technical knowledge or expertise must be differentiated into at least two elements: knowledge of performance criteria (such as production, marketing, and so on) and knowledge of the human aspects of administration (such as co-ordination, communication and so on). (p. 289)

Sergiovanni and Carver (1980) appear to be right on target when speculating on the low priority given to person based authority in Peabody's (1962) study of an elementary school.

> By way of footnote to the Peabody findings, it is surprising that only 15 per cent of teachers mentioned authority of person as important. It is surprising in view of the widespread concern of school executives for personal characteristics. We can only speculate that certain of the person qualities deemed so important to success in educational administration (i.e. interpersonal relations) are perceived as competencies rather than personal qualities. (p. 191)

The bond between these two elements of administrative skill cannot be overstated. In the process of arriving at a final solution

the data was subjected to various initial factor techniques and rotary techniques with different numbers of factors. As a result, factor loadings were considerably distorted and items were subject to various cluster patterns. Regardless of the number of factors, the initial factor technique, or the rotary method, this bond remained intact and the respective factor loadings varied little. On the basis of this evidence it must be concluded that human relations skills and technical skills are perceived as a single entity by teachers. Various terminal solutions are illustrated in Appendix D.

Factor Two - Deferent Authority

Factor two accounts for 21.5 per cent of the total common variance. Items loading significantly on this factor in order of magnitude are: (I do the things a principal suggests or wants:)

| Item # | Factor Learning | Content |
|---|---|---|
| Q18 | .748 | When fellow staff members feel that a principal's directives should be followed. |
| Q17 | .729 | When I recognize the directions of a principal as rules and feel that rules should be obeyed. |
| Q23 | .655 | Because I recognize the way to achieve school goals is to follow the rules, one of which specifies that I comply with the wishes of a principal. |
| Q 25 | .601 | Because I have been brought up to believe that the wishes of a superior, in this case a principal, should be respected. |
| Q15 | .534 | Because societal norms dictate that I comply with the wishes of a superior. |

These items suggest compliance with principal directives on the grounds that it is ethical, proper, a duty, etc. This seems to point to some sort of ethical code in the broadest sense of the word brought about by the process of socialization wherein other human beings contribute to the internalization of these norms.

The following items load from .30 to .45 on this factor:

| Item # | Factor Loading | Content |
|---|---|---|
| Q9 | .378 | When members of the school community expect me to honour his/her wishes. |
| Q19 | .360 | When a principal is such a dynamic person that I would want his/her opinion of me to be a positive one. |
| Q7 | .325 | When the parents of my students want me to follow his/her directions. |
| Q4 | .301 | Because a principal is my boss and consequently I do as he/she says. |

These items suggest compliance on the basis of others' influence, position and personal characteristics.

Factor two was designated Deferent Authority and defined as the authority attributed to a principal because of teachers' respect for an intangible set of ethical norms in the broadest sense of the meaning, accruing from the process of socialization wherein other human beings contribute to the internalization of these norms. Presence of items eighteen, seventeen, twenty-three, twenty-five and fifteen contribute directly to this factor. Items nine and seven are fairly similar to the preceding items, although reference seems to be made to a more concrete set of norms. It is understandable that item four, compliance to a position, may be associated with this factor in light of Peabody's (1962) statement:

> But whether used in the broad or narrow sense, authority of legitimacy is inextricably fused in reality with a second source or base frequently discussed in the literature, that is, authority of position. (p. 463)

Item nineteen refers to compliance on the basis of a principal's admirable qualities. Although this item may be indirectly related to this factor, it has a closer relationship to position authority which will be explicated later on.

Reference to this type of authority in the literature confines itself to what is known as a legitimate sort of authority, which in the broadest sense reflects the process of individual socialization, and in the narrower sense, ethical sanctification (Peabody. 1962). Whereas Weber's (1947) legal-rational authority and Peabody's (1962) legitimate authority represent a narrower sense of a legally constituted order, Simon's (1957) authority of legitimacy and social approval which makes reference to a higher law, Presthus (1960) deference for authority and French and Raven's (1960) legitimate "power" seem to duplicate the findings here. Presthus (1960) speaks of the process of socialization:

> ... the individual is trained from infancy to defer to the authority of parents, teachers, executives and leaders of various kinds. He develops over time a generalized deference to authority based upon such socialization and its compensations. (p. 90)

French and Raven (1960) also allude to this process:

> The feeling of "oughtness" may be an internalization from his parents, from his teachers, from his religion or may have been logically developed from some idiosyncratic system of ethics. He will speak of such behaviors with expressions like "should", "ought to" or "has a right to". (p. 129)

Factor Three - Legal Positional Authority

Factor three constitutes 11.2 per cent of the total common variance, considerably less than factor one and moderately less than factor two. The following items load significantly on factor three: (I do the things a principal suggests or wants)

| Item # | Factor Loading | Content |
|---|---|---|
| Q4 | .629 | Because a principal is my boss and consequently I do as he/she says. |
| Q2 | .588 | Because my contract with the school system requires me to carry out a principal's request. |
| Q5 | .476 | When other teachers and staff members are highly supportive of a principal and I share their feelings. |
| Q9 | .452 | When members of the school community expect me to follow his/her directions. |

These items seem to indicate compliance to a position created by specific legal norms which dileniate a hierarchy of offices that is adhered to and supported by members of that organization and the immediate periphery.

The following items have loadings on factor three in the range from .30 to .45:

| Item # | Factor Loading | Content |
|---|---|---|
| Q8 | .446 | When a principal sets such a fine example for others that I just want to be counted among his/her followers. |
| Q6 | .425 | When a principal is knowledgeable in school matters to the extent that he/she is able to develop programs that meet the needs of all students. |

| | | |
|---|---|---|
| Q15 | .417 | Because societal norms dictate that I comply with the wishes of a principal. |
| Q1 | .400 | When a principal goes out of the way even beyond the requirements of his/her job to help me yet expects little in return. |
| Q7 | .349 | When the parents of my students want me to follow his/her directions. |
| Q3 | .348 | When I admire a principal for his/her personal qualities and want to act in a way that merits his/her respect and admiration. |
| Q10 | .339 | When a principal is very tactful and understanding in dealings with me. |

These items seem to reflect compliance on the basis of a principal's admirable traits, human relations skills, the ability to provide services for others and a respect for regulations.

Factor three has been designated Legal-Positional Authority and is defined as the authority attributed to a principal by virtue of the position created by legal norms that delineate a hierarchy of offices that is adhered to and supported by members of the organization and the community. Items two, four, five, and nine contribute directly to the factor.

Items three, eight and ten represent potential characteristics of a principal. It may be expected that teachers would associate personal qualities with the position itself, for it is often difficult to separate the person from the position as Skils (1965) indicates:

> ...charismatic authority may not only be legitimized by virtue of the incumbent's personal attributes, but also through the process of institutionalization. That is, by associating the leader with the overall authority of the institution,

> the subordinate fails to make the distinction between the incumbent and his office. -(p. 206)

Items one and six may be classified under services rendered. It is conceivable that teachers would associate the inclination to provide services with the position, for principals in their position would be in an ideal location to provide services to teachers. Item seven is closely associated with the four significant items in this category. Item fifteen refers to a broader set of norms and its relationship with this factor has previously been discussed.

Whereas Weber's (1947) legal-rational authority appears to be somewhat related, Peabody's (1962) positional authority and Simon's (1957) legitimation by formal position come even closer to replicating this category. Peabody (1962) elaborates on his position base of authority:

> That is to say, when a person becomes a member of an organization he is already predisposed to accept orders given to him by persons acknowledged to be his superiors by their position in the formal organizational chart. (p. 469)

Factor four - Charismatic Authority

Factor four constitutes 10.1 per cent of the total common variance only marginally less than factor three. Items that loaded significantly on this factor are listed in order of magnitude:

(I do the things a principal suggests or wants:)

| Item # | Factor Loading | Content |
|---|---|---|
| Q19 | .629 | When a principal is such a dynamic person that I would want his/her opinion of me to be a positive one. |
| Q27 | .610 | When a principal possesses such an array of admirable skills that I would want to emulate him/her in one way or another. |
| Q3 | .531 | When I admire a principal for his/her personal qualities and want to act in a way that merits his/her respect and admiration. |
| Q8 | .492 | When a principal sets such a fine example that I would want to be counted among his/her followers. |

These items seem to reflect compliance on the basis of a principal's unique personality and the desire of teachers to merit their principal's approval.

The following items load moderately on factor four:

| Item # | Factor Loading | Content |
|---|---|---|
| Q28 | .370 | When a principal doesn't hesitate to reward me for my successes. |
| Q26 | .325 | When a principal makes it easy for me to communicate with him/her and talks to me on an equal person to person basis. |
| Q9 | .320 | When members of a school community expect me to honour his/her wishes. |
| Q10 | .312 | When a principal is very tactful and understanding in dealings with me. |
| Q18 | .302 | When fellow staff members feel a principal's directives should be followed. |

These items seem to represent human relations skills, ability to reward, and supportive gestures.

Factor four has been designated as Charismatic Authority and is defined as the authority attributed to principals on the basis of their unique personality traits and the desire of their teachers to merit their approval. Items nineteen, twenty-seven, three and eight are a reflection of this particular classification of authority.

Items twenty-six and ten represent human relations skills indicating that teachers would likely associate human relations skills with charismatic personality. Item twenty-eight reflects an inclination and ability to reward. It is obvious that teachers would expect rewards from a principal with admirable personality traits. Whereas items nine and eighteen point to supportive feelings, it is understandable that teachers would associate charisma with support, for a principal with outstanding qualities would likely accrue the support of others.

Weber's (1947) charismatic authority, Presthus' (1960) legitimation by rapport, French and Raven's (1960) referent "power" and Peabody's (1962) person authority appear to be related to the type of charismatic authority revealed in this study. Whereas Presthus (1960) and Peabody (1962) put an emphasis on the human relations component, human relations is not of major importance in charismatic authority as delineated in this study. Charismatic authority appears to be a combination of Weber (1947) who emphasizes the personality aspect and French and Raven (1960) who make reference to the identification of a subordinate with a superior.

After a thorough exploration of identification techniques it was determined that the appropriate number of factors to be extracted

was four. Close examination of the respective configuration of factor loadings enabled the researcher to identify these hypothetical constructs. Factor analysis produced four distinct bases of authority: authority of administrative skills, deferent authority, legal-positional authority and charismatic authority, each of which had a substantial base in the literature. Peabody's (1962) categorization of authority bases, competence, legitimate, position and person comes closest to replicating the bases revealed in this study. Despite minor differences, the findings of both studies are remarkably similar.

It must be stressed that interpretation of factors is a fairly subjective process. However, until more precise techniques are operationalized, researchers must be prepared to live with their conclusions. In the case at hand it is hoped that a firm grounding in the area of research provided suitable insights necessary for credible conclusions.

## QUESTION ONE

(1) Do the components (bases) of authority as identified by Isherwood (1973) - traditional, legal, charismatic, human relations skills, expertise and normative - represent distinct value orientations that legitimate the exercise of school control?

Development of the instrument provided means by which the problem posed by this question could be answered. Although it was established that the bases of authority could be classified into categories finer than two major dimensions (formal and informal), the model did not correspond totally to Isherwood's (1973) despite many similarities. Having established the significant number of factors to be four, any thought of replicating the Isherwood model was put aside. Nevertheless, the prototype that was established resembled the original model in a number of ways. Similarities and differences will subsequently be discussed.

Factor one has been identified as an administrative skills authority base and is comprised of technical skills and human relations skills. Isherwood's authority of expertise and human relations skills apparently have combined to form this category. Seven of the eight items originally defined as expert and human relations components loaded significantly on this factor.

Deferent authority, defined as respect for an unwritten code, was established as the second category. Isherwood's traditional authority appears to be related. Although no reference is made of a "divine law", an intimation of the like is present.

Legal-positional authority is the authority extended to a

principal because of his/her position accruing from a legal contract which delineates a hierarchy of offices. Isherwood's legal authority replicates this component to such an extent that the two are virtually indistinguishable.

The final base established in this study was identified as charismatic authority, defined as the authority attributed to a person because of outstanding personal qualities and a desire of a subordinate to merit that person's approval. This component is identical to the original established by Isherwood. All four items originally constructed to measure charismatic authority loaded significantly on factor four, and were the only ones to do so.

Isherwood's normative base of authority comprised of a reward and a support component did not align itself with any one particular factor, but instead was spread over three factors. Items one and twenty-eight are reflective of a principal's inclination to reward teachers, and loaded moderately on factor three (legal-positional) and factor four (charismatic) respectively. This would seem to indicate that the inclination or ability of a principal to reward or provide services to teachers is associated by teachers with the position itself or with the admirable qualities possessed by such an individual rather than be classified as an entity unto itself. Items five and eighteen represent a supportive dimension and load significantly one factor two (deferent) and factor three (legal-positional) respectively. Closer examination of item eighteen reveals the word "should" which may have, in the eyes of respondents, shifted the original focus of the question. However, it would appear that if others feel something "should" be done it may be

part of the process of socialization which was addressed earlier. Item five indicates that support of the group is associated with formal position.

Although the basic structure of the model of authority bases differs from Isherwood, many similarities do exist. Expert and human relations skills combine to form an alliance; traditional authority resembles deferent authority; legal and charismatic closely parallel their counterparts, while normative authority is spread over three components.

QUESTION TWO

(2) Is there a distinction among these bases of authority such that they can be classified as either formal or informal authority?

It was originally intended to investigate the possibility of further classification of categories into formal and informal authority. This was based on the assumption that categories identified in the study would correspond to Isherwood's (1973) components. Isherwood based his formal and informal components on Blau and Scott's (1962) typology of authority. With this model as a framework and after a persusal of the literature, he broke down the major components into finer components. In the case at hand, factor analysis has produced a slight shift in these finer components. As a result the respective categories must be examined again to determine whether or not they are consistent with the previous definitions attributed to formal and informal authority.

Blau and Scott (1962) define informal authority as "authority

legitimated by the common values that emerge in a group" (p. 144). An inconsistency arises if one is to equate supportive tendencies with the previous definition. This is illustrated by the fact that the items that supposedly reflect group support load significantly on those factors (deferent, legal-positional) that are usually classified as formal. The questions arise—what is formal authority? What is informal authority? How do the components produced here relate to them? Answers to these questions are deemed to be beyond the scope of this study.

Nevertheless, if one was to eyeball the data, similarities between deferent authority and legal-positional authority are evident. This is illustrated by the common factor loadings of item four, seven, nine and fifteen on both factor two and three. However, items that load significantly on charismatic authority also load on legal-positional, which in turn, complicates matters even further.

A bond between administrative skills and charismatic authority is evident from their common factor loadings. Futher, items loading significantly on the factor identified as administrative skills do not tend to load to any great extent on factors representing deferent and legal-positional authority. Despite common loadings over all factors, however, it appears that charismatic and administrative authority are affiliated with a person dimension, while deferent and legal-positional authority may be considered to be representative of a role dimension.

It is evident that each factor as a hypothetical construct may be considered a separate entity. In a practical sense, however,

these distinctions can become obscure. Although it appears that distinctions with respect to formal and informal dimensions may be apparent, an attempt at this classification is beyond the scope of the study.

## QUESTION THREE

(3) Which administrative authority bases do teachers perceive as most effective for ensuring compliance?

The instrument was comprised of items designed to measure the importance teachers attribute to a given set of circumstances that could potentially elicit compliance. This instrument was subjected to factor analysis which delineated clusters of items. This developmental process produced four authority bases — administrative skills, deferent authority, legal-positional authority and charismatic authority.

A further step in the exploration of authority was to investigate the possibility that teachers attached more importance to one or more of the authority bases established here. Again, a certain degree of "looseness" can be associated with factor analysis at this juncture. However, this is unavoidable. In view of the fact that priority has been given to instrument development, the testing of authority bases in this manner must be regarded as a secondary function of the study.

Items that loaded at .45 or higher on a factor were selected to represent that factor. Whereas these items were the key to unlocking the true nature of the hypothetical factors, it was decided that these variables represented the factors adequately. A criterion

level of .45 may be considered somewhat stringent. However, because of the difficulty of separating these concepts in a practical sense, many items loaded moderately on more than one item. Although items that loaded from .30 to .45 can be considered significant, their contribution to the factor is considerably less than items in the higher bracket. It was felt that inclusion of items in the moderate range with items loading as high as .78 might not lead to an accurate representation of factors, assuming that all items were given the same weight.

Although factor score coefficients can be utilized as regression weights to estimate factors scores, it was not considered feasible to employ composite scales of this nature for the purposes at hand. Whereas a decision to set the criterion level at .45 may be considered arbitrary by some, it is felt that in each case items over .45 will give a true indication of the nature of that factor.

Means were computed for all items representing each component for each respondent. Paired T-tests were executed utilizing the Statistical Package for Social Sciences (1970). Means and standard deviations of each component can be seen in Table 12. Lower scores are indicative of a more compliant attitude. Higher scores indicate an unwillingness to comply. Table 13 depicts the results of the paired T-tests among authority types. Whereas the probability of random error increases with the number of T-tests, appropriate adjustments have been made.

Significant differences were found to exist between all components with the exception of positional-legal and charismatic authority. Teachers perceived that the administrative skills base of authority was the most effective in eliciting their compliance. Although

TABLE 12

TEACHER MEAN SCORES FOR AUTHORITY BASES

| Authority Base | Mean | Standard Deviation |
|---|---|---|
| Administrative Skills | 1.724 | .515 |
| Charismatic Authority | 2.336 | .728 |
| Legal-Positional Authority | 2.358 | .747 |
| Deferent Authority | 2.750 | .768 |

Peabody's (1962) competence base of authority is narrower in scope than administrative skills, he also found that teachers perceived competence as the most important authority base.

At the other end of the spectrum, deferent authority was perceived as the least effective means of gaining compliance. Perhaps this may be an indication of the waning respect for authority that society as a whole is experiencing.

Both charismatic authority and legal-positional authority were perceived as being significantly less important than administrative skills and significantly more important than deferent authority. It may come as a surprise to some that charismatic authority is rated on a par with legal-positional authority. Findings here seem to indicate that teachers would not be any more likely to comply with the directions of a charismatic personality who did not also possess administrative skills than they would a principal on the strength of the position alone.

Limitations of the assignment of items to factors notwithstanding, the administrative skills authority base was found to be

TABLE 13

IMPORTANCE OF AUTHORITY BASES AS PERCEIVED BY TEACHERS

| Base | Number of Cases | Mean | Standard Deviation | Standard Error | T-Value | Degrees of Freedom | 2-tailed Probability |
|---|---|---|---|---|---|---|---|
| Skill | 128 | 1.7243 | 0.515 | 0.046 | -16.17 | 127 | 0.000* |
| Deferent | | 2.7500 | 0.726 | 0.064 | | | |
| Skill | 127 | 1.7278 | 0.516 | 0.046 | -10.07 | 126 | 0.000* |
| Posit Legal | | 2.3583 | 0.747 | 0.066 | | | |
| Skill | 128 | 1.7243 | 0.515 | 0.046 | -11.45 | 127 | 0.000* |
| Charismatic | | 2.3359 | 0.768 | 0.068 | | | |
| Deferent | 127 | 2.7480 | 0.730 | 0.066 | 6.88 | 126 | 0.000* |
| Legal | | 2.3583 | 0.747 | 0.066 | | | |
| Deferent | 128 | 2.7500 | 0.728 | 0.064 | 5.90 | 127 | 0.000* |
| Charismatic | | 2.3359 | 0.768 | 0.068 | | | |
| Legal | 127 | 2.3583 | 0.747 | 0.066 | 0.31 | 126 | 0.754 |
| Charismatic | | 2.3386 | 0.771 | 0.068 | | | |

*P < .001

significantly more effective in eliciting compliance of teachers than charismatic, legal-positional and deferent authority. On the other hand, the deferent authority base was found to be significantly less important than administrative skills, charismatic legal-positional bases of authority. No significant differences were found between charismatic and legal-positional authority with respect to their effectiveness in eliciting teacher compliance.

## QUESTION FOUR

(4) Which administrative authority bases do principals perceive as most effective for ensuring compliance?

Principal perceptions were analyzed in the same manner as teacher perceptions. Mean scores were computed for each base of authority for each of the principals. Mean scores and standard deviations can be seen in Table 14. Low scores represent a willingness to comply while high scores indicate a reluctance to comply.

TABLE 14

PRINCIPAL MEAN SCORES FOR AUTHORITY BASES

| Authority Base | Mean | Standard Deviation |
|---|---|---|
| Administrative Skills | 1.874 | .342 |
| Charismatic | 2.574 | .648 |
| Legal-Positional | 2.721 | .134 |
| Deferent | 2.900 | .155 |

Paired T-tests were employed using the Statistical Package for Social Sciences (1970) and the results are illustrated in Table 15. Although the sample size is considerably smaller than the former group,

TABLE 15

IMPORTANCE OF AUTHORITY BASES AS PERCEIVED BY PRINCIPALS

| Base | Number of Cases | Mean | Standard Deviation | Standard Error | T-Value | Degrees of Freedom | 2-tailed Probability |
|---|---|---|---|---|---|---|---|
| Skill | 17 | 1.8739 | 0.342 | 0.083 | -6.86 | 16 | 0.000* |
| Deferent | | 2.9059 | 0.641 | 0.155 | | | |
| Skill | 17 | 1.8739 | 0.342 | 0.083 | -4.69 | 16 | 0.000* |
| Legal | | 2.7206 | 0.551 | 0.134 | | | |
| Skill | 17 | 1.8739 | 0.342 | 0.083 | -3.88 | 16 | 0.001** |
| Charismatic | | 2.5735 | 0.648 | 0.157 | | | |
| Deferent | 17 | 2.9059 | 0.641 | 0.155 | 1.49 | 16 | 0.156 |
| Legal | | 2.7206 | 0.551 | 0.134 | | | |
| Deferent | 17 | 2.9059 | 0.641 | 0.155 | 1.53 | 16 | 0.144 |
| Charismatic | | 2.5735 | 0.648 | 0.157 | | | |
| Legal | 17 | 2.7206 | 0.551 | 0.134 | 0.83 | 16 | 0.421 |
| Charismatic | | 2.5735 | 0.648 | 0.157 | | | |

* P < .001
** P < .01

results are similar to teacher perceptions. Whereas principals perceive that administrative skills are more important than deferent, legal-positional, and charismatic authority, there are no significant differences among the latter components. Because the sample size was relatively small, it was difficult to obtain statistically significant differences. The fact that administrative skills were perceived as most important at 0.001 and 0.01 significance levels, may be an indication of the high priority principal's attribute to this area.

These findings, however, are contrary to Egner (1968), who found that more than fifty per cent of principals tested perceived their basis of authority as positional as opposed to twenty-eight per cent who perceived a functional base derived from competence and personal qualities. The recognition on the part of principals as to the importance of administrative skills may be attributed to their cognizance of the increasing technical structure of school programs.

> Authority bases for those who administer our nation's schools are changing, shifting and in some cases, diminishing. Particularly susceptible to change is the principal's position. As the technical structure (the teaching and education program structure) increases in complexity and diversification, teachers by virtue of their competence and person authority have assumed more responsibility for those areas. This increase in educational sophistication has required administrative arrangements beyond the definition of the principal's role. (Sergiovanni and Starrat, 1979, pp. 137-138)

It remains to be seen whether the consistency with respect to teacher and principal perceptions of authority bases results in greater

teacher compliance. The ideal can often be worlds away from reality. Nevertheless, consistencies between teacher and principal in any domain have the potential to satisfy both parties.

In conclusion, principals perceived administrative skills to be significantly more important than deferent, legal-positional and charismatic authority in gaining teacher compliance. No significant differences were found among the latter three.

# Chapter V

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter contains a summary of the purpose of the study, methodology, and findings emenating from the data. General conclusions are presented along with recommendations for further study and action.

### PURPOSE OF THE STUDY

This study was conducted to investigate teacher and principal perceptions of administrative authority bases in schools in Newfoundland and Labrador. Whereas Isherwood (1973) confirmed the existence of formal and informal authority bases, questions regarding the unique nature of his finer components - legal, traditional, charismatic, human relations skill, expert and normative - remained answered.

The focus of this study was centred around the development of an instrument to measure teacher and principal perceptions of authority bases as perceived by teachers. Once the instrument was developed, questions central to this study were addressed.

### METHODOLOGY

From a population of 192 teachers and 21 principals in a school district of Newfoundland and Labrador, 131 teachers and 17 principals returned questionnaires (69.5 per cent).

The raw data was coded for use in computer programs and factor analysis was employed as the technique for delineating the dimensions of authority. Pair-wise T-tests were conducted to diagnose differences teachers and principals attached to the respective dimensions.

## RESULTS

The study produced the following results:

1. Procedures utilized to identify an appropriate number of factors indicated that the best number of factors to retain for rotation to a terminal solution was four.
2. Upon rotation and interpretation of the factors, four bases of authority were identified - authority of administrative skills, deferent authority, legal-positional authority and charismatic authority.
3. Teachers perceived authority of administrative skills to be more effective in eliciting their compliance than deferent, legal-positional or charismatic authority.
4. Teachers perceived deferent authority to be less effective in gaining their compliance than administrative skills, legal-positional and charismatic authority.
5. No statistically significant differences were found between teacher perceptions of the effectiveness of legal-positional authority and charismatic authority.

6. Principals perceived authority of administrative skills to be more effective in gaining teacher compliance than deferent, legal-positional or charismatic authority.
7. No statistically significant differences were found between principal perceptions of the effectiveness of deferent, legal-positional and charismatic authority.

## CONCLUSIONS

Although the dimensions of authority revealed in the study did not precisely duplicate those finer components as identified by Isherwood (1973), there were many similarities. Further, there was considerable support for the bases identified in this study throughout the literature. The study came closest to duplicating a study by Peabody (1962), whose exploration uncovered four somewhat similar bases of authority.

Perhaps the most striking feature of the study was the alliance of human relations skills and technical skills under a single dimension. Although speculation as to this possibility exists in the literature, no research to date had uncovered this evidently strong bond.

The importance teachers attached to administrative skills of a principal will come as a surprise to few. Somewhat unexpected was the extremely low ranking of deferent authority — perhaps an indication or reflection of the waning respect for authority that society as a whole is experiencing. The comparable rankings of legal-positional and charismatic authority would seem to point to a

reluctance of teachers to comply with the directions of charismatic principals if they possess few administrative skills.

Findings of this study in contrast to Egner (1968), revealed that principals attached greatest importance to administrative skills. This would seem to indicate that principals are aware of the increasing technical sophistocation infiltrating the schools and of the implications these changes hold for them. The fact that no statistically significant differences were found between the latter three authority bases, can be attributed to the sample size. If distinctions between the importance attached to these three dimensions is to be uncovered, it is mandatory that a larger sample be adopted.

## RECOMMENDATIONS FOR ACTION

1. It is suggested that principals seek formal training in administration and all areas that relate to the operation of the school.
2. It is suggested that principals make an attempt to show an interest in, and communicate effectively on, a person-to-person basis with their teachers.
3. It is suggested that principals not attempt to rely on teachers' respect for authority or teachers' respect for the position of principal, in seeking optimum compliance with their directions.
4. It is suggested school districts and other institutions affiliated with the preparation of administrators provide in-service for administrators in the areas of human relations and technical tasks on a regular basis.

## RECOMMENDATIONS FOR FURTHER STUDY

The following are recommended as areas for further investigation:

1. The relationship between dimensions of authority as revealed in this study and formal and informal authority.
2. The relationship of the nature of principal directives and teacher compliance.
3. An examination of alternate influences on teacher compliance.
4. The relationship between formal training and teacher compliance.
5. A longitudinal study examining the changing nature of authority relationships.
6. The relationships between principal self-concept and teacher compliance.
7. The relationship between respective authority bases and other variables associated with school management.
8. A similar study undertaken with larger samples of teachers and principals.

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# APPENDICES

# APPENDIX A

## INSTRUMENTATION

TEACHER'S COPY

Indicate by means of a check mark (✓) the extent to which you would be likely to do the things A PRINCIPAL suggests.

I DO THE THINGS A PRINCIPAL SUGGESTS OR WANTS:

1. When a principal goes out of the way, even beyond the requirements of his/her job to help me, yet expects little in return.

   a. ____ Always
   b. ____ Often
   c. ____ Sometimes
   d. ____ Rarely
   e. ____ Never

   (NORMATIVE)
   (Authority type included for the benefit of the reader)

2. Because my contract with the school system requires me to carry out a principal's requests.

   a. ____ Always
   b. ____ Often
   c. ____ Sometimes
   d. ____ Rarely
   e. ____ Never

   (LEGAL)

3. When I admire a principal for his/her personal qualities and want to act in a way that merits his/her respect and admiration.

   a. ____ Always
   b. ____ Often
   c. ____ Sometimes
   d. ____ Rarely
   e. ____ Never

   (CHARISMATIC)

4. Because a principal is my boss and, consequently, I do as he/she says.

   a. ____ Always
   b. ____ Often
   c. ____ Sometimes
   d. ____ Rarely
   e. ____ Never

   (LEGAL)

5. When the other teachers and staff members are highly supportive of a principal and I share their feelings.

   a. ____ Always
   b. ____ Often
   c. ____ Sometimes
   d. ____ Rarely
   e. ____ Never

   (NORMATIVE)

6. When a principal is knowledgeable in school matters to the extent that he/she is able to develop programs and services that meet the needs of all students.

a. ____ Always
b. ____ Often (EXPERT)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

7. When the parents of my students want me to follow his/her direction.

a. ____ Always
b. ____ Often (TRADITIONAL)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

8. When a principal sets such a fine example for others that I just want to be counted among his/her followers.

a. ____ Always
b. ____ Often (CHARISMATIC)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

9. When members of the school community expect me to honour his/her wishes and directions.

a. ____ Always
b. ____ Often (TRADITIONAL
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

10. When a principal is very tactful and understanding in dealings with me.

a. ____ Always
b. ____ Often (HUMAN RELATIONS)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

11. When a principal's past experience and training are evident in the way he/she runs the school; he/she knows what he/she is doing.

a. ____ Always
b. ____ Often (EXPERT)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

12. When a principal uses threats to ensure that directions are followed:

a. ____ Always
b. ____ Often (COERCION)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

13. When a principal has shown good judgement regarding educational matters in the past and is likely to do so in the future.

a. ____ Always
b. ____ Often (EXPERT)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

14. When a principal displays through interactions with me that he/she is genuinely concerned about my personal well-being.

a. ____ Always
b. ____ Often (HUMAN RELATIONS)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

15. Because societal norms dictate that I comply with the wishes of a principal.

a. ____ Always
b. ____ Often (TRADITIONAL)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

16. When a principal is likely to penalize me for non-compliance with his/her wishes.

a. ____ Always
b. ____ Often (COERCION)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

17. When I recognize the directions of a principal as rules and feel that rules must be obeyed.

a. ____ Always
b. ____ Often (LEGAL)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

18. When fellow staff members feel that a principal's directives should be followed.

a. ____ Always
b. ____ Often (NORMATIVE)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

19. When a principal is such a dynamic person that I would want his/her opinion of me to be a positive one.

a. ____ Always
b. ____ Often (CHARISMATIC)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

20. When a principal makes me "pay" for not following his/her wishes.

a. ____ Always
b. ____ Often (COERCION)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

21. When I perceive that my principal takes time to ensure that he/she is able to relate well to me.

a. ____ Always
b. ____ Often (HUMAN RELATIONS)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

22. When a principal exhibits skill with respect to timetabling, supervision of teachers, and other areas related to administration that contribute to the smooth operation of the school.

a. ____ Always
b. ____ Often (EXPERT)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

23. Because I recognize that the way to achieve school goals is to follow the rules, one of which specifies that I comply with the wishes of a principal.

a. ____ Always
b. ____ Often (LEGAL)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

24. When a principal subtly or blatantly threatens to make things difficult for me to ensure that his/her wishes will be carried out.

a. _____ Always
b. _____ Often
c. _____ Sometimes (COERCION)
d. _____ Rarely
e. _____ Never

25. Because I have been brought up to believe that the wishes of a superior, in this case a principal, should be respected.

a. _____ Always
b. _____ Often (TRADITIONAL)
c. _____ Sometimes
d. _____ Rarely
e. _____ Never

26. When a principal makes it easy for me to communicate with him/her and talks to me on an equal person to person basis.

a. _____ Always
b. _____ Often (HUMAN RELATIONS)
c. _____ Sometimes
d. _____ Rarely
e. _____ Never

27. When a principal possesses such an array of admirable qualities that I would hope to emulate him/her in one way or another.

a. _____ Always
b. _____ Often
c. _____ Sometimes (CHARISMATIC)
d. _____ Rarely
e. _____ Never

28. When a principal doesn't hesitate to reward me for my successes.

a. _____ Always
b. _____ Often (NORMATIVE)
c. _____ Sometimes
d. _____ Rarely
e. _____ Never

PRINCIPAL'S COPY

Indicate by means of a check mark (✓) the extent to which you feel teachers would be likely to follow the directions of their principal.

TEACHERS DO THE THINGS THEIR PRINCIPAL SUGGESTS OR WANTS:

1. When their principal goes out of the way, even beyond the requirements of his/her job to help them, yet expects little in return.

   a. ____ Always
   b. ____ Often
   c. ____ Sometimes (NORMATIVE)
   d. ____ Rarely
   e. ____ Never

2. Because a teacher's contract with the school system requires them to carry out their principal's request.

   a. ____ Always
   b. ____ Often (LEGAL)
   c. ____ Sometimes
   d. ____ Rarely
   e. ____ Never

3. When teachers admire their principal for his/her personal qualities and want to act in a way that merits his/her respect and admiration.

   a. ____ Always
   b. ____ Often
   c. ____ Sometimes (CHARISMATIC)
   d. ____ Rarely
   e. ____ Never

4. Because their principal is their boss and consequently, they do as he/she says.

   a. ____ Always
   b. ____ Often (LEGAL)
   c. ____ Sometimes
   d. ____ Rarely
   e. ____ Never

5. When other teachers and staff members are highly supportive of the principal, and they share their feelings.

   a. ____ Always
   b. ____ Often
   c. ____ Sometimes (NORMATIVE)
   d. ____ Rarely
   e. ____ Never

6. When their principal is very knowledgeable in school matters to the extent that he/she is able to develop programs and services that meet in the needs of the students.

a. ____ Always
b. ____ Often
c. ____ Sometimes (EXPERT)
d. ____ Rarely
e. ____ Never

7. When the parents of their students want them to follow their principal's directions.

a. ____ Always
b. ____ Often (TRADITIONAL)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

8. When their principal sets such a fine example for others that they just want to be counted among his/her followers.

a. ____ Always
b. ____ Often (CHARISMATIC)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

9. When members of the school community expect them to honour their principal's wishes and directions.

a. ____ Always
b. ____ Often
c. ____ Sometimes (TRADITIONAL)
d. ____ Rarely
e. ____ Never

10. When their principal is tactful and understanding in his/her dealings with teachers.

a. ____ Always
b. ____ Often (HUMAN RELATIONS)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

11. When their principal's past experience and training are evident in the way he/she runs the school; their principal knows what he/she is doing.

a. ____ Always
b. ____ Often
c. ____ Sometimes (EXPERT)
d. ____ Rarely
e. ____ Never

12. When their principal uses threats to ensure that directives are followed.

a. ____ Always
b. ____ Often
c. ____ Sometimes (COERCION)
d. ____ Rarely
e. ____ Never

13. When their principal has shown good judgement regarding educational matters in the past and is likely to do so in the future.

a. ____ Always
b. ____ Often
c. ____ Sometimes (EXPERT)
d. ____ Rarely
e. ____ Never

14. When their principal displays, through interaction with them, that he/she is genuinely concerned about their personal well-being.

a. ____ Always
b. ____ Often (HUMAN RELATIONS)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

15. Because societal norms dictate that they comply with the wishes of their principal.

a. ____ Always
b. ____ Often (TRADITIONAL
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

16. When a principal is likely to penalize them for non-compliance with his/her wishes.

a. ____ Always
b. ____ Often (COERCION)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

17. When they recognize the directions of their principal as rules and feel that rules must be obeyed.

a. ____ Always
b. ____ Often
c. ____ Sometimes (LEGAL)
d. ____ Rarely
e. ____ Never

18. When their fellow staff members feel that a principal's directives should be followed.

a. ____ Always
b. ____ Often (NORMATIVE)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

19. When their principal is such a dynamic person that they would want his/her opinion of them to be a positive one.

a. ____ Always
b. ____ Often (CHARISMATIC)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

20. When a principal makes them "pay" for not following his/her wishes.

a. ____ Always
b. ____ Often
c. ____ Sometimes (COERCION)
d. ____ Rarely
e. ____ Never

21. When they perceive that their principal takes time to ensure that he/she is able to relate well to them.

a. ____ Always
b. ____ Often
c. ____ Sometimes (HUMAN RELATIONS)
d. ____ Rarely
e. ____ Never

22. When their principal exhibits skill with respect to timetabling, supervision of teachers, and other areas related to administration that contribute to the smooth operation of the school.

a. ____ Always
b. ____ Often
c. ____ Sometimes (EXPERT)
d. ____ Rarely
e. ____ Never

23. Because they recognize that the way to achieve school goals is to follow the rules, one of which specifies that they comply with the wishes of their principal.

a. ____ Always
b. ____ Often (LEGAL)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

24. When their principal subtly or blatantly threatens to make things difficult for them to ensure that his/her wishes will be carried out.

a. ____ Always
b. ____ Often
c. ____ Sometimes (COERCION)
d. ____ Rarely
e. ____ Never

25. Because they have been brought up to believe that the wishes of a superior, in this case their principal, should be respected.

a. ____ Always
b. ____ Often
c. ____ Sometimes (TRADITIONAL)
d. ____ Rarely
e. ____ Never

26. When their principal makes it easy for them to communicate with him/her and talks to them on an equal person-to-person basis.

a. ____ Always
b. ____ Often (HUMAN RELATIONS)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

27. When their principal possesses such an array of admirable qualities that they would hope to emulate him/her in one way or another.

a. ____ Always
b. ____ Often
c. ____ Sometimes (CHARISMATIC)
d. ____ Rarely
e. ____ Never

28. When their principal doesn't hesitate to reward them for thrir successes.

a. ____ Always
b. ____ Often (NORMATIVE)
c. ____ Sometimes
d. ____ Rarely
e. ____ Never

# APPENDIX B

Correspondence

May 17, 1983

Mr. James Ryan
Dept. of Educational Administration
Memorial University
ST. JOHN'S, NF
A1B 3X8

Dear Mr. Ryan:

Approval is given for you to carry out research in our district for a study on the authority bases of principals.

Best wishes.

Sincerely yours,

Gerald P. Fallon
SUPERINTENDENT OF EDUCATION

/bc

MEMORIAL UNIVERSITY OF NEWFOUNDLAND
St. John's, Newfoundland, Canada A1B 3X8

*Department of Educational Administration*

*Telex: 016-4101*
*Telephone: (709) 737-7647/8*

9 May, 1983

Mr. Gerald Fallon
P.O. Box 368
Corner Brook, Newfoundland
A2H 6G9

Dear Mr. Fallon:

We are writing to you at this time to request your permission to allow Mr. James Ryan, a graduate student in Educational Administration at Memorial University, access to your district so that he might carry out research for a study he is conducting on the authority bases of principals.

A number of principals and teachers will be requested to complete brief questionnaires and return them to the source. Although questionnaires will be coded for purposes of analysis, anonymity of all participants will be guaranteed.

We realize that this is a very busy time of the school year and emphasize the fact that the time required to complete the items should not exceed ten minutes. In addition, this study does not require access to the classroom and need not take up valuable instructional time.

It would be appreciated if you could respond to this letter as soon as possible. It is hoped that this study will be able to proceed by mid-May. If you should require any additional information, please contact Jim Ryan (737-8615) or Dr. Dennis Treslan (737-7651). A copy of the study is included for your perusal.

Thank you for your help in this matter.

Yours sincerely,

Jim Ryan

Dr. Dennis Treslan
(Thesis Supervisor)

# Roman Catholic School Board — Humber St. Barbe

Renouf Crescent
P. O. Box 368
Corner Brook
Newfoundland A2H 6G9
Canada

Telephone: 634-5052
634-5892
634-2801
634-4233

May 17, 1983

Mr. James Ryan
Dept. of Educational Administration
Memorial University
ST. JOHN'S, NF
A1B 3X8

Dear Mr. Ryan:

Approval is given for you to carry out research in our district for a study on the authority bases of principals.

Best wishes.

Sincerely yours,

Gerald P. Fallon
SUPERINTENDENT OF EDUCATION

/bc

Dear Principal:

I am a graduate student in the Department of Educational Administration at Memorial University and am currently engaged in research concerned with administrative authority. The enclosed questionnaires are designed to provide information on teacher and principal perceptions of authority bases. Your cooperation in this endeavour would be greatly appreciated. Please be assured that individual responses will be held in the strictest confidence.

Enclosed you will find ☐ self-addressed envelopes and ☐ questionnaires. Please complete the questionnaire entitled PRINCIPAL'S COPY, place it in the self-addressed envelope and see that it is mailed. In addition, please distribute the remaining ☐ questionnaires that are entitled TEACHER'S COPY along with the self-addressed envelopes to ☐ members of your staff such that the first ☐ and last ☐ on your teacher roster are selected. Instructions on the TEACHER'S COPY indicate that each teacher is to fill out the questionnaire, place it in the envelope that is provided and see that it is mailed.

The enclosed questionnaire is quite brief and can be completed within ten minutes. I realize that this is a very busy time of the school year but do hope you will find time to complete this questionnaire.

Thank you for your cooperation.

Sincerely,

Jim Ryan

Dear Teacher,

I am a graduate student in the Department of Educational Administration at Memorial University and am currently engaged in research concerned with administrative authority. The following questionnaire will provide information on teachers perceptions of authority bases. Your cooperation in this endeavour would be greatly appreciated. Please be assured that individual responses will be held in the strictest confidence.

The questionnaire is fairly brief and can be completed within ten minutes. I realize that this is a very busy time of the school year, but do hope that you will find time to complete these items. As you complete the questionnaire, place it in the envelope provided and see that it is mailed.

Thank you for your cooperation.

Sincerely,

Jim Ryan

Dear Teacher:

Approximately two weeks ago, questionnaires concerning administrative authority were sent to your school. The questionnaires are an integral part of a study which is being conducted exclusively within your school district. In order to achieve any meaningful results because of the relatively small sample size, it is critical that virtually all questionnaires be returned. I realize that this is a busy time of the school year and emphasize that it should only take approximately ten minutes to complete the items. A speedy return of your questionnaire would be greatly appreciated.

If you should require another questionnaire or return envelope, these can be obtained from your principal.

I have no way of knowing whether you have already returned your questionnaire. If you have mailed your response, please disregard this letter.

Thank you for your support and cooperation.

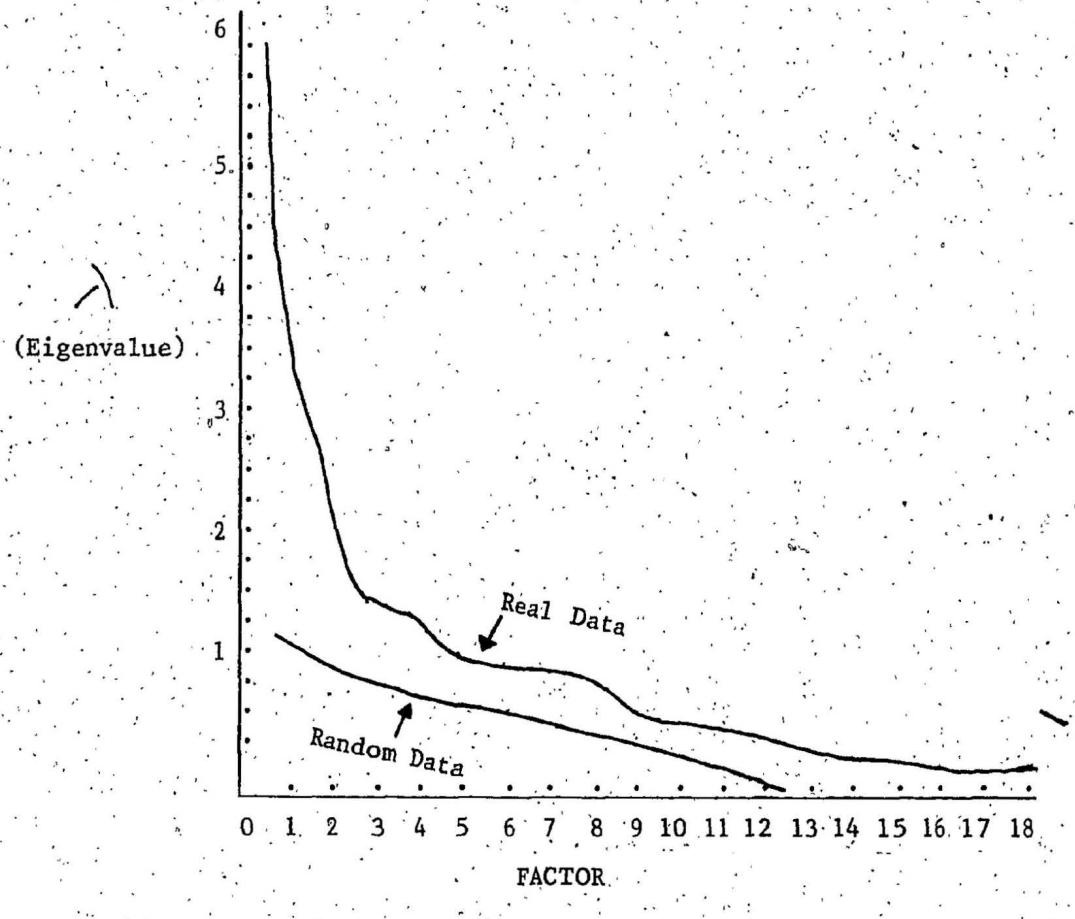
Sincerely,

Jim Ryan

# APPENDIX C

## Monte Carlo Procedure

MONTE CARLO TEST



EIGENVALUES FOR 24 FACTORS USING
PRINCIPAL FACTOR METHOD

| FACTOR | EIGENVALUE |
|---|---|
| 1 | 7.488 |
| 2 | 2.534 |
| 3 | 1.400 |
| 4 | 1.319 |
| 5 | 0.974 |
| 6 | 0.890 |
| 17 | 0.791 |
| 8 | 0.644 |
| 9 | 0.474 |
| 10 | 0.488 |
| 11 | 0.388 |
| 12 | 0.310 |
| 13 | 0.226 |
| 14 | 0.223 |
| 15 | 0.198 |
| 16 | 0.177 |
| 17 | 0.159 |
| 18 | 0.131 |
| 17 | 0.108 |
| 20 | 0.066 |
| 21 | 0.018 |
| 22 | 0.008 |
| 23 | 0.001 |
| 24 | -0.004 |

SMOOTHED REGRESSION COEFFICIENTS

| Root | $\underline{a}$ | $\underline{b}_N$ | $\underline{b}_n$ | R |
|---|---|---|---|---|
| 1 | .460 | -.613 | .356 | .9984 |
| 2 | .248 | -.613 | .415 | .9971 |
| 3 | .168 | -.620 | .439 | .9977 |
| 4 | .143 | -.624 | .441 | .9984 |
| 5 | .046 | -.627 | .470 | .9975 |
| 6 | .001 | -.629 | .477 | .9983 |
| 7 | -.105 | -.637 | .486 | .9986 |
| 8 | -.064 | -.647 | .506 | .9974 |
| 9 | -.078 | -.649 | .507 | .9981 |
| 10 | -.094 | -.649 | .509 | .9981 |
| 11 | -.105 | -.654 | .518 | .9970 |
| 12 | -.173 | -.656 | .531 | .9987 |
| 13 | -.174 | -.066 | .532 | .9987 |
| 14 | -.187 | -.666 | .532 | .9977 |
| 15 | -.187 | -.668 | .532 | .9986 |
| 16 | -.173 | -.673 | .528 | .9991 |
| 17 | -.164 | -.688 | .528 | .9985 |
| 18 | -.135 | -.690 | .525 | .9985 |
| 19 | -.129 | -.695 | .525 | .9988 |
| 20 | -.110 | -.708 | .526 | .9973 |
| 21 | -.097 | -.713 | .526 | .9974 |
| 22 | -.080 | -.715 | .518 | .9971 |
| 23 | -.097 | -.715 | .525 | .9951 |
| 24 | -.103 | -.714 | .525 | .9962 |
| 25 | -.081 | -.718 | .510 | .9985 |
| 26 | -.081 | -.718 | .510 | .9983 |
| 27 | -.081 | -.718 | .510 | .9977 |
| 28 | -.081 | -.718 | .510 | .9964 |
| 29 | -.118 | -.744 | .464 | .9943 |
| 30 | -.195 | -.712 | .536 | .9989 |

Source: From "Latent roots of random data correlation motices with squared multiple correlations on the diagonal: A Monte Carlo study by R. Montanelli and L. Humphrey's, Psychometrika, 1976, 41, 341-348.

# APPENDIX D

## Experimental Analyses

VARIMAX ROTATED FACTOR MATRIX
(RAO FACTORING)

| | Factor 1 | Factor 2 | Factor 3 | Communality |
|---|---|---|---|---|
| Q 1 | .231 | -.160 | .329 | .187 |
| Q 2 | .049 | .355 | .436 | .318 |
| Q 3 | .342 | .100 | .575 | .458 |
| Q 4 | .107 | .403 | .412 | .344 |
| Q 5 | .218 | .329 | .494 | .400 |
| Q 6 | .201 | .211 | .367 | .219 |
| Q 7 | -.064 | .384 | .433 | .340 |
| Q 8 | .265 | .206 | .640 | .522 |
| Q 9 | .124 | .449 | .507 | .475 |
| Q10 | .516 | .166 | .407 | .460 |
| Q11 | .583 | .123 | .276 | .432 |
| Q13 | .599 | .080 | .128 | .382 |
| Q14 | .784 | .031 | .250 | .679 |
| Q15 | .085 | .600 | .241 | .425 |
| Q17 | .188 | .760 | .105 | .625 |
| Q18 | .094 | .762 | .248 | .652 |
| Q19 | .364 | .361 | .339 | .378 |
| Q21 | .785 | .103 | .170 | .655 |
| Q22 | .632 | .143 | .218 | .420 |
| Q23 | .312 | .668 | -.027 | .544 |
| Q25 | .063 | .597 | .138 | .379 |
| Q26 | .721 | .209 | .110 | .576 |
| Q27 | .428 | .046 | .400 | .346 |
| Q28 | .289 | .215 | .255 | .195 |
| Eigenvalue | 15.402 | 5.874 | 3.021 | |
| Percentage of Variance | 63.4 | 24.2 | 12.4 | |

VARIMAX ROTATED FACTOR MATRIX
(PRINCIPAL FACTORING)

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Communalty |
|---|---|---|---|---|---|
| Q 1 | .251 | -.235 | .435 | .003 | .307 |
| Q 2 | .035 | .304 | .509 | .135 | .371 |
| Q 3 | .241 | .044 | .382 | .555 | .514 |
| Q 4 | .117 | .346 | .562 | .058 | .452 |
| Q 5 | .236 | .232 | .548 | .165 | .437 |
| Q 6 | .254 | .141 | .460 | .037 | .297 |
| Q 7 | -.100 | .318 | .392 | .258 | .331 |
| Q 8 | .214 | .152 | .475 | .432 | .481 |
| Q 9 | .092 | .403 | .478 | .257 | .465 |
| Q10 | .495 | .114 | .359 | .263 | .456 |
| Q11 | .583 | .104 | .238 | .212 | .452 |
| Q13 | .647 | .036 | .229 | -.006 | .473 |
| Q14 | .750 | -.005 | .188 | .288 | .682 |
| Q15 | .081 | .557 | .384 | .020 | .465 |
| Q17 | .177 | .731 | .180 | .104 | .609 |
| Q18 | .060 | .728 | .238 | .237 | .646 |
| Q19 | .247 | .337 | .126 | .539 | .481 |
| Q21 | .723 | .098 | .071 | .323 | .642 |
| Q22 | .635 | .127 | .064 | .034 | .426 |
| Q23 | .345 | .673 | .131 | -.059 | .593 |
| Q25 | .001 | .602 | .058 | .287 | .449 |
| Q26 | .670 | .221 | -.012 | .328 | .605 |
| Q27 | .288 | .020 | .095 | .701 | .584 |
| Q28 | .169 | .210 | .063 | .485 | .312 |
| Eigenvalue | 7.189 | 2.249 | 1.085 | 1.007 | |
| Percentage of Variance | 62.3 | 19.5 | 9.4 | 8.7 | |

OBLIQUE FACTOR PATTERN
(RAO FACTORING)

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Communality |
|---|---|---|---|---|---|
| Q 1 | .184 | -.373 | .013 | .402 | .286 |
| Q 2 | -.050 | .094 | .004 | .632 | .424 |
| Q 3 | .140 | .099 | .495 | .279 | .477 |
| Q 4 | .033 | .130 | -.078 | .669 | .501 |
| Q 5 | .092 | .101 | .196 | .462 | .409 |
| Q 6 | .147 | .008 | .029 | .425 | .260 |
| Q 7 | -.213 | .223 | .274 | .363 | .332 |
| Q 8 | .065 | -.023 | .441 | .402 | .504 |
| Q 9 | -.020 | .238 | .243 | .445 | .459 |
| Q10 | .415 | -.027 | .221 | .263 | .459 |
| Q11 | .555 | -.027 | .086 | .171 | .448 |
| Q13 | .628 | -.042 | -.054 | .113 | .427 |
| Q14 | .730 | -.104 | .200 | .028 | .676 |
| Q15 | .043 | .424 | -.090 | .442 | .469 |
| Q17 | .150 | .675 | .010 | .161 | .612 |
| Q18 | -.018 | .687 | .216 | .166 | .690 |
| Q19 | .164 | .307 | .601 | -.084 | .587 |
| Q21 | .746 | .019 | .194 | -.076 | .656 |
| Q22 | .696 | .077 | -.105 | -.011 | .454 |
| Q23 | .396 | .598 | -.309 | .202 | .631 |
| Q25 | -.025 | .572 | .184 | .061 | .429 |
| Q26 | .686 | .178 | .234 | -.084 | .610 |
| Q27 | .238 | -.058 | .568 | -.006 | .456 |
| Q28 | .167 | .143 | .335 | .029 | .237 |
| Eigenvalue | 16.519 | 6.210 | 3.242 | 2.927 | |
| Percentage of Variance | 57.2 | 21.5 | 11.2 | 10.1 | |

VARIMAX ROTATED FACTOR MATRIX
(RAO FACTORING)

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Communality |
|---|---|---|---|---|---|---|
| Q 1 | .263 | -.250 | .381 | -.022 | .151 | .300 |
| Q 2 | .027 | .199 | .350 | .200 | .557 | .513 |
| Q 3 | .262 | .066 | .390 | .495 | .108 | .482 |
| Q 4 | .107 | .239 | .361 | .132 | .601 | .578 |
| Q 5 | .241 | .272 | .554 | .070 | .139 | .463 |
| Q 6 | .248 | .135 | .405 | -.013 | .195 | .282 |
| Q 7 | -.073 | .349 | .414 | .160 | .085 | .331 |
| Q 8 | .228 | .162 | .547 | .330 | .091 | .494 |
| Q 9 | .129 | .387 | .512 | .134 | .152 | .469 |
| Q10 | .500 | .111 | .405 | .206 | .075 | .474 |
| Q11 | .519 | .068 | .185 | .217 | .173 | .451 |
| Q13 | .642 | .033 | .196 | -.015 | .071 | .457 |
| Q14 | .755 | -.005 | .237 | .236 | -.009 | .683 |
| Q15 | .107 | .995 | .304 | -.011 | .332 | .459 |
| Q17 | .194 | .711 | .187 | .049 | .134 | .599 |
| Q18 | .082 | .801 | .335 | .099 | -.027 | .771 |
| Q19 | .269 | .402 | .336 | .428 | -.232 | .583 |
| Q21 | .739 | .085 | .101 | .301 | .022 | .654 |
| Q22 | .658 | .115 | .015 | .033 | .094 | .456 |
| Q23 | .360 | .623 | -.101 | .001 | .456 | .736 |
| Q25 | -.001 | .606 | .025 | .312 | .159 | .491 |
| Q26 | .674 | .227 | .074 | .282 | -.085 | .599 |
| Q27 | .278 | .031 | .133 | .747 | .035 | .655 |
| Q28 | .180 | .197 | .004 | .558 | .166 | .409 |
| Eigenvalue | 18.050 | 6.839 | 3.692 | 3.340 | 2.704 | |
| Percentage of Variance | 15.1 | 19.8 | 10.7 | 9.6 | 7.8 | |

VARIMAX ROTATED FACTOR SOLUTION
(RAO FACTORING)

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Factor 6 | Communality |
|---|---|---|---|---|---|---|---|
| Q 1 | .264 | .050 | .025 | .240 | -.391 | .155 | .309 |
| Q 2 | .042 | .240 | .209 | .673 | .028 | .075 | .562 |
| Q 3 | .259 | .241 | .521 | .160 | -.076 | .237 | .484 |
| Q 4 | .094 | .210 | .155 | .629 | .128 | .301 | .580 |
| Q 5 | .227 | .445 | .125 | .211 | -.006 | .400 | .470 |
| Q 6 | .184 | .188 | .028 | .121 | .047 | .746 | .643 |
| Q 7 | -.056 | .500 | .151 | .199 | .032 | .160 | .343 |
| Q 8 | .236 | .417 | .373 | .205 | -.115 | .235 | .478 |
| Q 9 | .158 | .586 | .127 | .318 | -.004 | .127 | .501 |
| Q10 | .496 | .289 | .243 | .169 | -.090 | .195 | .463 |
| Q11 | .555 | .041 | .243 | .131 | .081 | .333 | .498 |
| Q13 | .614 | .043 | .021 | .033 | .014 | .356 | .508 |
| Q14 | .765 | .140 | .245 | .061 | -.125 | .080 | .691 |
| Q15 | .156 | .525 | -.068 | .534 | .154 | -.113 | .626 |
| Q17 | .210 | .556 | .009 | .211 | .444 | .058 | .598 |
| Q18 | .101 | .744 | .077 | .090 | .418 | .097 | .762 |
| Q19 | .298 | .560 | .418 | .098 | .083 | .001 | .593 |
| Q21 | .772 | .114 | .288 | .088 | .008 | -.066 | .705 |
| Q22 | .671 | .048 | .014 | .116 | .081 | -.011 | .473 |
| Q23 | .353 | .179 | -.046 | .399 | .650 | .095 | .750 |
| Q25 | -.022 | .330 | .301 | .126 | .573 | .124 | .560 |
| Q26 | .670 | .180 | .265 | -.077 | .165 | .117 | .598 |
| Q27 | .272 | .063 | .780 | .041 | .051 | .065 | .696 |
| Q28 | .202 | .122 | .500 | .200 | .171 | -.098 | .385 |
| Eigenvalue | 19.257 | 7.316 | 3.904 | 3.728 | 2.976 | 2.760 | |
| Percentage of Variance | 48.2 | 18.3 | 9.8 | 9.3 | 7.5 | 6.9 | |