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ABSTRACT

This paper presents a research study that explored the nature of the cognitive preferences of school administrators. It offers insight into the school administrators' mode of information processing. The first of three sections concerns the informational centrality of school principals. Citations from the literature are used to present the ways administrators handle information. The second section gives background and discussion on cognitive preferences. The work of Heath (1964) and the development and modification of the Cognitive Preference Test provide the starting point for the study. The third section concerns the study of school principals' cognitive preferences. Discussed is the development of a Management Cognitive Preference questionnaire, its internal consistency, and its validation. The test was administered to 134 school administrators in Israel. The results were compared to those of previous studies to highlight similarities in the interrelationships among the different cognitive preferences. Tables include demographic information, the differences in cognitive preferences among school principals according to different role categories, intercorrelations of scores in cognitive preferences, and varimax factor analysis. Conclusions are tentative as the study is the first conducted with school administrators. (Contains 32 references.) (RR)

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THE COGNITIVE PREFERENCES OF SCHOOL PRINCIPALS

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### The Cognitive Preferences of School Principals\*

The purpose of this study is to explore the nature of the cognitive preferences of school administrators, thus opening up a new line of inquiry which may provide a base for future studies on administrative behavior. In particular it offers an insight into the school administrators' mode of information processing and thus may add explanations to the way schools operate and for the possible static nature of schools and holds implications for the preparation of school administrators.

The discussion will be elaborated as follows: First, analyzing the central role of school principals as an information nerve center. Second, elaborating the roots of the "cognitive preference" idea. Third, describing, analyzing and discussing an explorative study of school principals' cognitive preference, ending with some orientations for future studies.

### The Informational Centrality of School Principals

There is a strong belief that school principals hold a crucial position in influencing educational processes and in generating school effectiveness (Pitner, 1988). Different approaches to study the mechanism by which such influence operates have been developed. Pitner (1988) summarized five models of relating the school principal or the school administrator to the various characteristics of school

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effectiveness -- the direct effect model, the moderate effect model, the antecedent effect model, the reciprocal causation model and the mediating effect model.

One of the common denominators of the five models is the perception of the key position that the school principal or administrator holds as a coupling agent between the environment and the school on the one hand, and between the inner school components, such as school climate, teachers' behavior, and students' work and achievements on the other. The importance of this position can be better understood in viewing the school system as a loosely coupled system (Weick, 1976). This can be seen, for instance, in Bossert et al.'s (1982) model of school principal's influence which places the principal management behavior between personal characteristics, such as intelligence, skills, orientations, and preparation, between environmental characteristics, such as rules, policies, community expectations, and program requirements, and the inner school components of school climate, instructional organization and student learning. In this model the personal and environmental characteristics precede the school principal management behavior. Similarly, Ellet and Walberg (1979) place the school principal perception, intent and behavior as the major variables in their linking reciprocal model. In both models the school principal has a major role in mediating outside information through personal attributes.

School principals, in their boundary-spanning or linking agent role (Scott, 1981), interact with the environment in two major modes, by linking strategies that forge connection between the organization

and the environment, and by buffering strategies which close the organization artificially from perceived outside disturbances and uncertainties (Scott, 1981). Most interestingly, one of the major buffering strategies is through information processing (Hallinger and Murphy, 1986; Goldring, 1990). The school principal as a boundary spanner becomes responsible for the flow of information into the organization.

This strategy clearly parallels Mintzberg's (1973) metaphorical view of the administrator position as an organization information nerve center. This metaphor emphasizes the central position school administrators are engaged in in receiving, processing, and moving information. More specifically, Mintzberg (1973) distinguishes among three informational roles: the monitor role, in which the administrator receives or seeks information, the disseminator role, in which the administrator regulates and passes information into the organization, and the spokesperson role, in which the administrator transmits information from the school outside. Therefore, the way administrators perceive and treat information - their cognitive preference of information - the way information is selected, regulated, processed and transmitted into the school becomes of major importance. How do school principals confront information? Do they relate to it as knowledge to be remembered, or do they refer to it according to its applicability? Do they try to look for the principles behind knowledge? Or do they question or criticize information? Furthermore, are there differences in these respects among school principals according to personal variables as age,

gender, experience and education?

### Cognitive Preferences - Background and Discussion

The conceptualization of the term cognitive preferences was first introduced by Robert Heath in 1964 in *Educational and Psychological Measurement* (Heath, 1964) as an innovative means to measure and evaluate the achievements of the new curriculum reforms in science that had been initiated in the 1960s. Heath's underlying assumption was that what is important is not only whether the student can identify correct and incorrect information but also what he/she is likely to do with information intellectually. The differing modes attending to information he termed cognitive preferences (op. cit., p. 241).

Heath differentiated among four modes of cognitive preferences: a) relating and recalling information without considering its implications, practicabilities, or limitations; b) relating to information according to its practical applications in various connections and situations; c) posing critical questions about the information's validity, its generalizeability, completeness, or limitations; d) relating to information according to the fundamental principles, concepts, or relationships it represents. These were termed "memory for specific facts or terms" (R), "practical application" (A), "questioning" (Q), and "fundamental principles" (P) (op cit., p. 243).

To test the idea of the different cognitive preferences, an instrument was developed called the Cognitive Preference Test, which

consisted of twenty-four option multiple choice items. Each of the four options represented one of the cognitive preference modes. All the alternatives were factually correct, and the students were clearly told so. The instructions were to "choose the option that has the most appeal or is most satisfying to you" (op cit., p. 242). An example of an item follows:

The pressure of a gas is directly proportional to its absolute temperature.

- A) The statement, as given above, fails to consider effects of volume changes and changes of state.
- B) Charles' or Gay-Lussac's Law.
- C) The statement implies a lower limit to temperature.
- D) This principle is related to the fact that overheated automobile tires may "blow out."

The selection of alternative A represents a Questioning preference, B will contribute to the score on Memory, C stands for student's Fundamental Principle preference, and D will add a point to the Practical Application score. Each student received four scores, one score for each of the preferences. Each of these four scores represents the sum of scores of the various items. The profile of all four scores constitutes the preference pattern of the student.

Since the inception of the cognitive preference construct in 1964, as was discussed by Tamir's meta-analysis, over 100 studies have been conducted (Tamir, 1985). Most of them focused on comparing various cognitive preferences of high school students as related to

different curriculum orientations, mainly in science. A few, however, compared cognitive preference of students to those of their teachers (Tamir, 1977, 1979), and some expanded the scope to include older students, such as college students (Tamir and Kempa, 1977) or medical school teachers (Tamir and Cohen, 1980).

Different researchers developed their own tests according to the specific subject matter, where the number of items ranged between 20-40. In some cases the scoring method was changed when those tested were asked to choose the most and the least preferred alternative, or to rank the preferences (Kempa and Dube, 1973). When ranking is used the four scores in the test are interdependent, or ipsative (Cattell, 1944; Baurenheind, 1962; Hicks, 1970) and certain statistical treatments are precluded. The advantage of this procedure is that "all responses appearing in an item contribute to a student's overall cognitive preference profile, unlike in the normal procedure of response selection where rejected options are treated as equally unattractive" (Kempa and Dube, 1973, p. 281). Different researchers followed different patterns, and the debate as to whether to prefer ipsative or the normative response design has not been resolved (Brown, 1975; Tamir and Lunetta, 1977; Williams, 1975).

The question to what degree do cognitive preferences differ or add to the classical treatment of cognitive styles was debated as well, when the main argument was that cognitive styles presuppose relative stability over time, and to a large extent are independent from the information content (Siegel and Siegel, 1965; Witkin et al., 1967). The reactive argument, summarized by Kempa and Dube



(1973) and Tamir (1977), was that studies have found distinct differences in thinking styles to emerge from various curricula treatments, and that cognitive preferences are pervasive across disciplines, possessing consistent patterns of interrelationships.

The major question of the validity of the construct itself was challenged by several researchers (Brown, 1975; Jungwirth, 1978; Rost, 1983; Van den Berg, 1979). Several studies concentrating on empirical validation were conducted over the years (Tamir 1981; Van den Berg et al., 1982), providing answers to specific questions. A comprehensive meta-analysis (Tamir, 1985) offered the following conclusion: the results of the meta-analysis "indicate that the cognitive preference construct demonstrates a reasonable level of validity, (and) that cognitive preferences make significant contribution to learning" (p. 13). This has been the starting point for this study.

#### The Study of School Principals' Cognitive Preferences

The study was carried out in Israel, but as an exploratory study the emphasis was to explore the possibilities in adopting the cognitive preferences idea to administrative behavior rather than to diagnose Israeli school administrators.

A Management Cognitive Preference questionnaire was developed. To the best of our knowledge, with the exception of medicine, this is the first time that the study of cognitive preferences was adapted outside the realm of school subjects, such as biology or chemistry. Undoubtedly, this poses serious problems in developing a suitable

instrument, since we are moving from relatively "tame" issues to "wicked" issues (Rittel and Webber, 1973), which are less defined and do not have a clear and unequivocal set of evaluative categories.

One of the trends that educational administration as a field of inquiry appears to be moving toward is the increased awareness of the complexity and comprehension of educational administration as a subject and of the school administrator as a role (Willower, 1988). In building the questionnaire an attempt was made to differentiate among the variety of components which comprise the school principal's role. The categorization was based on three components: pedagogical, human relations, and administrative (Caspi and Inbar, 1979; Inbar 1980). This categorization is a conjunction of several distinct analytical frames developed by various scientists in the field: Katz's (1955) three-skill analysis (technical, human, and conceptual skills); Griffiths' (1956) tridimensional framework of the job, the person, and the social setting, when the job is classified into improving educational opportunities, developing personnel, community relationships, and maintaining funds and facilities; Mintzberg's (1973) three categories of managerial role activities, the interpersonal, the informational, and the decisional; Gorton and McIntyre's (1978) role classification used in NASSP's study on secondary school principals (statesperson, educational, supervisory, organizational, administrative, and team role); Miklos' (1980) approaches to school administration emphasizing different administrative processes, task areas, and school principal activities (school program, student population, staff, community relations,

physical facilities, and management); and Sergiovanni's (1987) forces of educational leadership (the technical force, human force, educational force, symbolic force, and cultural force). Obviously there is no claim that this categorization is absolute; other and different ones can and should be tested as well in future studies. Since each of the three categories consists of only nine to ten items, the differential analysis by subtests should be treated cautiously, focussing more on the total score analysis.

The first questionnaire developed contained 38 items and, after a pilot test, ten items were eliminated, either because their scores did not have any distribution or because they caused problems in understanding. The questionnaire was constructed according to Heath's original style. It was based on a statement with four multiple choice answers, when each of the four options represented one of the cognitive preferences. As in all cognitive preference questionnaires, all the options were correct, and the subjects were asked to "choose the answer that has the most appeal or is most satisfying to you." Four sample items follow:

One of the social theories assumes that common activities will increase the possibility of group crystallization.

- a) By initiating more common activities the school principal can crystallize the teachers as a team. (Application)
- b) Group crystallization is increased by common activities of its members. (Recall)
- c) This statement implies that inner group identification increases as a function of common activities. (Principle)

- d) The statement as given above fails to consider the possibility that common activities might sharpen disagreements. (Questioning)

Leadership behavior influences the group behavior it operates on.

- a) The ability of the leader to influence derives from group agreement to accept his/her influence. (Principle)
- b) It is possible to influence group behavior by replacing the leader. (Application)
- c) It is still important to know in what circumstances will group behavior differ from the leader's expectations. (Questioning)
- d) There is a connection between leader behavior and group behavior. (Recall)

Sociometry is an instrument that can assist the teacher in measuring interpersonal relationships in the classroom.

- a) Sociometry helps the teacher to understand the relationships among the classroom pupils. (Recall)
- b) Is it possible to rely only on sociometric tests to diagnose classroom interrelationships? (Questioning)
- c) Sociometry measures forces of attraction and rejection that are operating among pupils in the classroom. (Principle)
- d) Sociometry can facilitate the teacher's group work in the classroom. (Application)

Every organization should enforce some control on its members.

- a) It would be interesting to know what types of control the organization can exert on its members. (Questioning)

- b) The need for control is derived from the organizational hierarchical structure. (Principle)
- c) Through control of information it is possible to control the members of the organization. (Application)
- d) Control over organization members is part of organization responsibility. (Recall)

The classification into cognitive preference modes was judged by a group of ten experts, and every option which had not been agreed upon by at least 90 percent of the judges was rewritten. Then the categories were tested for internal consistency, as will be shown below. However, the classification of answers to four predesignated modes needed further validation. Hence, our results were compared to the results of previous studies in order to bring to light similarities in the interrelationships among the different cognitive preferences.

We adopted in this study Kempa and Dube's (1973) approach by asking those tested to arrange the options within an item in an order of preference by allotting four votes to the most preferred option, three votes to the next preferred, two to the next one, and one vote to the least preferred response. As an exploratory study the advantage of this procedure is its broader range and that all responses appearing in an item contribute to the overall cognitive preference profile of the school administrator.

The test was administered to 134 school administrators in Israel: 35 senior school administrators as department chairs and 99

school principals and vice principals, characterized by the following distribution:

|                               |                                 |       |
|-------------------------------|---------------------------------|-------|
| Gender: 26% men<br>74% women  | Age: <35                        | 13.3% |
|                               | 36-40                           | 26.5% |
|                               | 40-45                           | 25.8% |
|                               | 46-50                           | 20.3% |
|                               | 50>                             | 14.1% |
| Experience in teaching:       | up to 10 years                  | 29.5% |
|                               | 11 to 20 years                  | 19.0% |
|                               | 21 to 30 years                  | 43.9% |
|                               | 31 years and above              | 7.6%  |
| Experience in administration: | up to 5 years                   | 43.5% |
|                               | 6 to 10 years                   | 26.7% |
|                               | 11 to 20 years                  | 26.0% |
|                               | 21 years and above              | 3.8%  |
| Level of education:           | only teaching certificate       | 14.9% |
|                               | B.A. degree                     | 59.0% |
|                               | M.A. degree                     | 26.1% |
| Type of school:               | 1-6 grade elementary schools    | 38.8% |
|                               | 1-8 grade elementary schools    | 27.6% |
|                               | special schools for handicapped | 5.2%  |
|                               | middle (junior high) schools    | 11.9% |
|                               | high schools                    | 16.4% |

The relatively high percentage of women reflects the high proportion of elementary schools in the study, which have a greater number of female principals. Age and experience are grouped here, but in the analysis itself they are computed as continuous variables. Although the 134 school administrators are distributed along the variables, thus reflecting the general school administrator distribution in Israel, most of them came from the Jerusalem area. Hence, they are not necessarily a representative sample of Israeli school administrators.

The questionnaires were collected by two methods. The first group of 24 questionnaires were collected during a Jerusalem school

administrators' meeting in which 30 administrators attended. (The rate of return was thus 80 percent.) The second group of 110 questionnaires were collected by visiting most of the schools in the Jerusalem district and 8 schools outside the district. This personal approach yielded full cooperation and only a handful of school administrators did not return the questionnaire. (The rate of return was 92 percent.)

It has to be reemphasized that the purpose of this study was to explore the possibilities inherent in the cognitive preference idea rather than to classify the Israeli school administrators according to their preferences.

#### Cognitive Preference Profiles

As an exploratory study which for the first time employs the cognitive preference construct to school administrators, when the importance of reliability and of consistency in results are of major importance, it seems to be necessary to present the results in comparison with other major results, mainly those where adults (medical school teachers and college students) were the focus of the study, as well as with the meta-analysis outcomes, all of which might strengthen its theoretical construct.

Table 1: Differences in Cognitive Preferences among School Principals According to Different Role Categories

| Cognitive Preference Mode | Total |     | Administrative |     | Human Relation |     | Pedagogical |     | Medical School Teachers* |     |
|---------------------------|-------|-----|----------------|-----|----------------|-----|-------------|-----|--------------------------|-----|
|                           | X     | SD  | X              | SD  | X              | SD  | X           | SD  | X                        | SD  |
| R                         | 2.68  | .32 | 2.72           | .43 | 2.62           | .39 | 2.68        | .45 | 2.47                     | .40 |
| A                         | 2.55  | .24 | 2.45           | .33 | 2.70           | .30 | 2.52        | .46 | 2.63                     | .47 |
| Q                         | 1.82  | .44 | 1.90           | .50 | 1.75           | .51 | 1.78        | .51 | 2.23                     | .50 |
| P                         | 2.93  | .27 | 2.92           | .34 | 2.91           | .42 | 3.03        | .38 | 2.67                     | .61 |

\*Tamir and Cohen (1980)

Two major findings can be derived from this table. First, the strongest preference of school administrators is the Principle mode, most notably with regard to pedagogy. The higher Principle preference in pedagogical issues may be an indication that in such issues various statements are looked upon as value based principles to follow. This, of course, should be taken only as a suggestion for further investigation. The second important result is the low preference of Questioning, which implies the acceptance of information with relatively little critical consideration of its completeness, general validity or limitations. If this, indeed, reflects the way school administrators relate to information, the implication this has on those who translate information into action is far-reaching. It implies a situation in which information is considered normative knowledge, and highly unquestioned. It may be argued that if one does not question the validity of information, or does not approach it more critically, and stresses the importance of



information that is perceived to be close to one's fundamental principles or value system, such configuration would yield a conservative approach, which underscores continuity rather than change, indeed an interesting line to follow.

A striking result to be seen in Table 1 is the similar preference profiles found among school administrators and those of medical school teachers (Tamir and Cohen, 1980). In other studies dealing with adults, it turned out that science teachers were found to be "high P, Q, A, low R," and college students "medium R, P, low Q, high A" (Tamir, 1985, p. 8). Israeli students were found to have a mean score of P much higher than the other three scores (Rogel, 1974; Tamir, 1975). To what degree are the results influenced by the school administrators' background variables?

#### Background Variables and Cognitive Preferences

Generally speaking no significant differences were found among cognitive preferences according to the background variables. In an overall correlation coefficient matrix a few correlations were found statistically significant, as will be presented below. However, in computing so many intercorrelations this may be expected to occur by chance.

Since, in one of the few studies which reported gender differences, it was found that among high school students, "females possess a higher preference for P while males have a higher preference for Q and A" (Tamir, 1975, p. 245), it was interesting to notice some small differences in the gender category which were

statistically significant. In the overall analysis women tended to score higher in the Principle cognitive preference than men, while in the subtests analysis -- the pedagogical and the human relation categories -- men scored higher in Application. No differences were found in the administrative category. One wonders whether the tendency for women to favor the Principle preference more than men may be attributed to cultural or gender-related socialization. But, again, this is far too early to address this issue which needs a more direct study with different sampling.

Another finding is that school administrators with less experience -- fewer years in administration -- tend to be higher in Critical Questioning than older ones, particularly in the pedagogical category. No difference was found between school principals and other school administrators. But again, for all the differences, since no real pattern has emerged in preferences, these findings should be considered only as preliminary clues for further studies. Because of the overall low correlations between background variables and cognitive preferences, no regression or analysis of variance were conducted.

#### Internal Structure of School Principals' Cognitive Preference

Table 2 presents the intercorrelations of the four preference modes, again compared to those obtained in two other studies -- Kempa and Dube (1973) and Tamir and Kempa (1977) who studied college students -- and in the meta-analysis of 54 studies on cognitive preferences (Tamir, 1985). The interpretation of the correlation

coefficients requires some caution, since, as Kempa and Dube (1973) mentioned in their correlation analysis, "it must be realized that the ipsative nature of the cognitive preference test would per se result in a low negative correlation between scores in one area and those in the remaining areas (for a random score distribution over all areas, r-values of  $-.33$  would be expected)" (p. 283). Hence, the normal procedure of estimating significance levels cannot be applied to the present correlation coefficients, and the proper approach will be to consider the magnitude of the deviation from the expected theoretical values (Tamir, 1975).

Table 2: Inter-correlations of Scores in Cognitive Preferences (compared with other studies)  
(N=134)

|                 | R    |                                  | A    |                                  | Q                                       |
|-----------------|------|----------------------------------|------|----------------------------------|---|
| Recall (R)      |      |                                  |      |                                  |   |
| Application (A) | -.17 | (-.17*)<br>(-.48**)<br>(-.23***) |      |                                  |   |
| Questioning (Q) | -.68 | (-.71*)<br>(-.55**)<br>(-.63***) | -.31 | (-.22*)<br>(.24**)<br>(-.15***)  |   |
| Principles (P)  | .09  | (-.44*)<br>(-.09**)<br>(-.07***) | -.18 | (-.65*)<br>(-.57**)<br>(-.33***) | -.58<br>(.24*)<br>(-.45**)<br>(-.28***) |

- \* Kempa and Dube (1973)
- \*\* Tamir and Kempa (1977)
- \*\*\* Tamir's meta-analysis (1985)

It seems that two strong relationships exist among the four cognitive preference modes as measured in this study: Recall scores appear highly and negatively correlated with the Critical Questioning scores, as do Principles scores with those of Critical Questioning. We notice the Q-R negative correlation was found in all previous studies as well. The strong negative correlation between A-P which is found in several other studies is weaker, though, among the school administrators, and a new interrelationship of Q-P appears.

The relationships suggested by the correlation analysis were further examined by Varimax factor analysis of the cognitive preference scores. Kempa and Dube (1973) were the first to suggest that cognitive preferences are predominantly oriented along two, independent, bipolar axes, the Recall----Critical Questioning, and the Application----Fundamental Principles, which were termed as the Curiosity Scale and the Utilization Scale respectively. In this study only the first scale, the Curiosity Scale, as suggested by Kempa and Dube (1973), can be identified among the school administrators, and this scale is different since the pole opposite to Critical Questioning is loaded not only with R but also with P (see Table 3). If we apply this categorization to school principals' orientations toward information, one could argue for the distinction between a Challenging Scale and Acceptance Scale, or between the distinction of Change and Maintenance, something along the line of conservatism as discussed above.

school principals' role categories, an interesting picture was revealed. Again, because of the small number of items in each category, the results should be interpreted cautiously (see Table 4).

Table 4: Results of Varimax Factor Analysis of Cognitive Preference Scores According to Role Categories

|                        | Administrative Category |              | Human Relation Category |              |            | Pedagogical Category |              |              |
|------------------------|-------------------------|--------------|-------------------------|--------------|------------|----------------------|--------------|--------------|
|                        | Factors                 |              | Factors                 |              |            | Factors              |              |              |
|                        | I                       | II           | I                       | II           | III        | I                    | II           | III          |
| Recall (R)             | <u>.84</u>              | -.04         | -.08                    | <u>.99</u>   | -.12       | <u>.96</u>           | -.29         | -.07         |
| Application (A)        | .14                     | <u>.84</u>   | -.05                    | -.07         | <u>.99</u> | -.19                 | <u>.97</u>   | -.14         |
| Questioning (Q)        | -. <u>97</u>            | .05          | -. <u>71</u>            | -. <u>59</u> | -.37       | -. <u>66</u>         | -. <u>51</u> | -. <u>55</u> |
| Principles (P)         | .24                     | -. <u>79</u> | <u>.98</u>              | -.15         | -.16       | -.02                 | -.14         | <u>.99</u>   |
| Percentage of Variance | 43.8                    | 32.2         | 41.0                    | 30.1         | 28.8       | 41.8                 | 33.1         | 25.1         |

It is still too early to develop a theoretical construct to explain the differences of factors across the subtest categories, although one is tempted to do so. Nevertheless, some observations can be presented. The first and striking observation is the appearance of the "classical" two bipolar axes, as was developed by Kempa and Dube (1973), the Recall---Critical Questioning and the Application---Fundamental Principles, i.e., the Curiosity Scale and the Utilization Scale in the Administrative category. Second, the Curiosity Scale appears in all categories, all of which might strengthen the universality of this scale, on the one hand, and the validity of the Management Cognitive Preference questionnaire, on the

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|------------------------|-------------------------|-------------|-------------------------|-------------|------------|----------------------|-------------|-------------|
|                        | Factors                 |             | Factors                 |             |            | Factors              |             |             |
|                        | I                       | II          | I                       | II          | III        | I                    | II          | III         |
| Recall (R)             | <u>.84</u>              | -.04        | -.08                    | <u>.99</u>  | -.12       | <u>.96</u>           | -.29        | -.07        |
| Application (A)        | .14                     | <u>.84</u>  | -.05                    | -.07        | <u>.99</u> | -.19                 | <u>.97</u>  | -.14        |
| Questioning (Q)        | <u>-.97</u>             | .05         | <u>-.71</u>             | <u>-.59</u> | -.37       | <u>-.66</u>          | <u>-.51</u> | <u>-.55</u> |
| Principles (P)         | .24                     | <u>-.79</u> | <u>.98</u>              | -.15        | -.16       | -.02                 | -.14        | <u>.99</u>  |
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other. In relating these outcomes to those observed in Table 1, where the school administrators scored relatively high in Recall (R) and very low in Questioning (Q), which means that they do not seek to extend the initial information and they do not call explicitly or implicitly for the information to be questioned or extended beyond its original confines, one might suggest that school principals tend to be low in the Curiosity Scale, which supports the inference that school principals have a conservative approach to their work. It would be premature at this point to go beyond these basic observations.

Discussion

Caution should be used in any discussion of the results. As can be seen in the following table the reliability in some categories is low, and in the Application category it falls behind the general reliability of the commonly used student tests:

Table 5: Alpha Cronbach Internal Consistency Coefficient  
 (as compared with other tests)  
 N= number of items

| Cognitive Preference Mode | Current test | Tamir and Kempa (1977) | Tamir and Cohen (1980) |      | Tamir's Meta-analysis (1985) |         |
|---------------------------|--------------|------------------------|------------------------|------|------------------------------|---------|
|                           | N=28         | N=30                   | N=18                   | N=18 | N=20 or less                 | N=21-40 |
| R                         | .67          | .78                    | .72                    | .55  | .68                          | .75     |
| P                         | .57          | .58                    | .54                    | .51  | .55                          | .67     |
| Q                         | .85          | .81                    | .71                    | .58  | .57                          | .76     |
| A                         | .38          | .60                    | .68                    | .79  | .61                          | .67     |

As mentioned above, without external validity the importance of reliability and of consistency in results are of major importance. Since this is the first study conducted with school administrators in a different subject matter, it was important to compare results to previous studies, even though they were focused on science.

It has been suggested (Tamir, 1975) that cognitive preference styles consist of three elements: first, a general characteristic of the individual, which may by itself consist of two components, an inherited component and a component acquired through experience; second, a broad discipline-related element, which was up to now reflected mostly in the natural sciences; and, third, a specific subject matter area. Consequently, the results of this study should be viewed with all three dimensions in mind.

The distribution of cognitive preferences obtained here is thus a function of individual differences according to personal characteristics and experience, and of the actual subject matter of the study. Furthermore, the differences revealed according to the various role categories of school administrators -- the pedagogical, the human relations, and the administrative -- strengthens the assumption of differences in cognitive preference occurring according to specific subject matter in the same disciplinary realm. Only with the accumulation of results of many studies may it be possible to differentiate the weight of the individual and the subject matter components.

To what degree do cognitive preferences reflect an inner pattern beyond individual and subject matter differences? The meta-analysis



of the last twenty years of studying cognitive preferences (Tamir, 1985) clearly shows interrelationships beyond individual differences and specific subject matter. Kempa and Dube (1973) have suggested a consistent inner pattern by assuming that "cognitive preferences are predominantly oriented along two independent bipolar axes : Recall---Critical Questioning, and Application---Fundamental Principle" (p. 287). Is this assumption, as well as the interrelationships revealed through the meta-analysis, consistent only with cognitive preferences in the realm of natural science? For the reliability of this study it is a critical question.

The finding of the Curiosity Scale (the Recall---Critical Questioning axis) in the total score analysis in this study and the appearance of the bipolar axes in the subtests analysis by different role category is thus of major importance for two reasons. First, it strengthens the validity of the questionnaire developed and employed in this study, and second, it lays down the theoretical ground that at least the Curiosity Scale is a basic cognitive preference attribute beyond disciplines. Since a high positive score on this scale (Q-R) assumes willingness to acquire more and to question existing knowledge, while a low score implies "intrinsic satisfaction with knowledge already gained" (Tamir, 1975, p. 245) it might be of great interest in understanding school principals' behavior. Given the current pressure to critically appraise the low rate of change in school organization and school practices (Cuban, 1984), this study might supply a different way of challenging the problem.

### Summary

As an exploratory study this is only the beginning, a springboard for studies to follow. It opens a new way of looking at the relationships between information processing and decision making, and perhaps offers a new and interesting insight into managerial behavior. There is still a long way to go.

There are many questions unanswered, for instance, to what degree are preferences in managerial issues reactions to specific sets of items, i.e., to a particular content, or do they represent a relatively stable style of cognitive behavior? Are there relationships between different modes of cognitive preferences and different processes of decision making, or types of solutions, and if so, what are they? Furthermore, do different cognitive preferences relate to different managerial behaviors? Is being high or low on the Curiosity Scale related to the differentiation between leadership and management (Inbar, 1987)? Are such differences related to different organizational climates? As may be seen, we are proposing here a clear agenda for future studies.

If, as has been shown previously in many studies, teaching might change students' cognitive preference profiles, this may have direct application to the development of new school principals' training programs, to be involved in professional development activities which would particularly challenge them to engage in critical questioning and inquiry. In our opinion the results of this exploratory study demonstrate the potential of this approach in understanding managerial information processing, and perhaps even management behavior, thus justifying encouragement to be given to studies in this direction.

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