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PERFORMANCE AND COGNITIVE STYLE IN A SAMPLE OF
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THE RELATIONSHIP BETWEEN IN-BASKET
EXERCISE PERFORMANCE AND COGNITIVE STYLE
IN A SAMPLE OF MALE MASTER'S LEVEL STUDENTS
ENROLLED IN ADMINISTRATION



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requirements for the degree of
MASTER OF SCIENCE
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ABSTRACT

The Relationship Between In-Basket Exercise Performance and Cognitive Styles in a Sample of Male Master's Level Students Enrolled in Administration.

J. June Fukushima

May 1984

The main purpose of this study was to examine the relationships between cognitive styles proposed by Keen (1973) and Witkin et al. (1962), and In-Basket Exercise performance. Relationships between the cognitive styles proposed by Witkin et al. (1962) and Keen (1973), among managerial interest areas and the cognitive styles, and among managerial interest areas and In-Basket Exercise performance were also examined.

Forty-four male administration students, aged 21 to 48 ($M=28$), from Halifax, Nova Scotia participated in the study. Subjects completed eight tests: the Haxtian In-Basket Exercise, Scrambled Words, Paper Folding, Choosing a Path, Identical Pictures, Hidden Words, Closure Flexibility (Concealed Figures), and the Group Embedded Figures Test.

Each subject was classified as having the following thinking styles: Articulated or Global, Systematic or Non-Systematic, Preceptive or Switcher. A Receptive thinking style was not identified in the sample. A Stepwise Multiple Regression revealed that style ca-

legorization did not account for a significant proportion of the variance in any of the six In-Basket Exercise dimension scores.

In-Basket scores for the cognitive style groups were compared using an Analysis of Variance procedure. No significant differences were found between Articulated and Global thinkers, between Systematic and Non-Systematic thinkers, or between Preceptive and Switcher thinkers.

The correlation between Keen's cognitive styles and Witkin's cognitive styles was low and non-significant, suggesting that the two theorists' styles may be independent of each other. Chi-Square analyses showed only the Systematic thinkers to have a preference for quantitative managerial studies opposed to qualitative managerial studies, $p < .05$. No relationships were found between managerial interest areas and In-Basket Exercise performance.

This study provided a base for further investigations regarding the impact of cognitive style on In-Basket Exercise performance. Post-hoc analyses revealed that with a re-categorization of cognitive styles, the Switcher and Receptive thinking styles did affect In-Basket Exercise scores. Therefore, it appears that the re-categorized styles may be useful in

explaining administrative ability, and, thus, deserve further attention. Overall, the Hakstian In-Basket proved to be of superior quality since scores were not affected by age, experience, cognitive styles, or managerial interest areas.

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THE RELATIONSHIP BETWEEN IN-BASKET PERFORMANCE
AND COGNITIVE STYLES IN A SAMPLE OF MALE MASTER'S LEVEL
STUDENTS ENROLLED IN ADMINISTRATION

In the 1950's, Frederiksen, working with the Educational Testing Service (ETS) developed the idea of a situational test that would directly reflect managerial behaviours, and thus provide a behavioural measure of future performance (Lopez, 1966, p. 17). The test was named the In-Basket Exercise. Essentially, it was a basket full of memos, letters, work schedules, that constituted the type of material a manager would have to handle in the daily routine of work. The most obvious quality of the Exercise was its face validity which offered two advantages: selection officers accepted the instrument more readily because it looked suitable; and test-takers responded positively to the Exercise because it seemed directly related to the position of a manager.

However, a measure needs more than face validity to be valid for use in selection purposes. Fortunately, the In-Basket technique has demonstrated predictive validity and is considered to be a statistically significant contributor to selection batteries (Thornton and Byham, 1982). Meyer (1970) even reported a coefficient as high as .40.

In their review of predictors of job success, Asher and Sciarrino (1974) found that verbal work sample tests including the In-Basket Exercise correlated highly and positively with job performance. Validity coefficients higher than .50 were found in 21% of the studies, coefficients of .40 or higher in 41%, and coefficients of .30 or higher in 60%.

In a review of traditional methods used for predicting managerial success, Norton and Edinger (1978) found the intelligence test to be the best predictor, reporting a validity coefficient of .20 for first line managers. However, the coefficient decreased as the level of management increased. Norton and Edinger suggest this was due to restriction in range of intelligence test scores. Their conclusion was that managerial success can not be adequately predicted by traditional methods, such as the intelligence test, and that other measures such as the In-Basket Exercise, should be used.

What does the In-Basket measure? Researchers feel that this exercise is the best available measure of administrative skill (López, 1966). If this is the case then one may well ask: "What is administrative skill?" Unfortunately administrative skill is an abstract construct that can not easily be defined without the reli-

ance on scoring keys and interpretations from the test results. Since Frederiksen's initial In-Basket Exercise, all scoring keys for In-Baskets have used the same basic scoring criteria. Consistent results using similar scoring criteria, show administrative skill to encompass, the ability to make decisions or plan to make decisions, to have good inter-personal working relationships with peers and subordinates, and to be able to produce a high output of work (Lopez, 1966).

To broaden our understanding of administrative skill, research efforts have been directed at finding other measures that correlate well with scores on the In-Basket Exercise. These studies have found that high scorers on the In-Basket tend to be better educated, educated in the liberal arts and social sciences, aggressive, enterprising and employed in areas of personnel management (See Lopez, 1966 for a complete review of these studies).

No published studies in the literature report examining style of approach to the In-Basket Exercise. Although, Denning (1980 cited in Thornton and Byham, 1982) found a relationship between cognitive complexity, cognitive simplicity and In-Basket performance. This suggested that cognitive style may have had an effect on In-Basket performance. Pinder and Pinto (1974)

were able to identify different managerial styles from the responses given on the In-Basket Exercise, but unfortunately, did not examine if the managerial styles correlated with managerial performance. Style of approach to the In-Basket Exercise and resulting answers definitely differ among test-takers, although only anecdotal evidence suggests that stylistic differences may be related to actual managerial behaviours on the job (Lopez, 1966, p. 105).

It is the intent of the present investigation to examine the relationships among two different theories of cognitive style and administrative ability as measured by the In-Basket Exercise. Since the In-Basket Exercise is an unstructured task on which the test-taker must impose his or her own structure, it is useful to ask how subjects organize the materials. Do superior performers use similar methods of processing the information and consequently coming to decisions? Does having a certain cognitive style enable more efficient analysis of the information? Does the manner of approach to the Exercise have an effect upon test scores? For instance, if one's thinking style is to gather all information before making decisions, then this style should show in the score for how well the candidate prepares for decision making. If one prefers

to impose structure upon the data set, and look at details rather than deal with the data set as inter-related items, then this style should affect how the materials are organized, and the type of answers that are given. If a person lacks the ability to organize the data, or choose relevant information from the data set, then by the nature of the scoring keys for the In-Basket Exercise, test scores will be low. Clearly there is limited information linking cognitive style and In-Basket performance; none of the preceding questions have been addressed in the literature pertaining to In-Basket Exercises or cognitive styles.

Cognitive style is defined as "the characteristic, self-consistent mode of functioning which individuals show in their perceptual and intellectual activities" (Witkin, Oltman, Raskin & Karp, 1971). Cognitive style research has cut across diverse psychological domains from purely perceptual ability to differentiation in career choice. Primarily, this research has investigated whether stylistic consistency can predict behaviours in various domains (Witkin & Goodenough, 1981; Witkin, Moore, Oltman, Goodenough, Friedman, Owen & Raskin, 1977). Our knowledge about cognitive style has grown largely through the pioneering work of Witkin who identified two major types of thinking styles: Global

and Articulated. Keen (1973), studying at the Harvard Business School, investigated cognitive style as it applies to decision making behaviour. Keen based his investigation on work done by McKenney who suggested that problem solving, which includes decision making behaviours, could be analyzed as a two part function. The first process is information gathering and the second process information evaluation (McKenney & Keen, 1979). Keen found that individuals had different cognitive styles called Receptive and Preceptive in their approach to information gathering, and different styles called Systematic and Intuitive in their approach to information evaluation. These styles were based on a theoretical conceptualization of thinking styles proposed by Keen. Certain types of problems appeared to be solved more easily by those using a particular cognitive style (Keen, 1973). For instance, individuals identified as having a Systematic cognitive style preferred and performed better at program-type problems that were straight forward in nature. In contrast, the Intuitive subjects preferred and performed better at open-ended problems allowing for ingenuity or opinion to solve the problem (Keen, 1973). Keen further suggested that types of managerial work could be differentiated on the basis of the type of problems to be

solved, and that managers with a related cognitive style were best suited to that particular managerial work.

If Keen and McKenney's theories are correct, then the problems that are involved in the In-Basket Exercise may require specific cognitive processing to enable the test-taker to complete the items quickly and efficiently. Since In-Basket Exercise performance is directly related to on-the-job-performance, a relationship between a person's cognitive style and score on the In-Basket Exercise would suggest that cognitive style is important in determining the ability of a manager's administrative skill. As mentioned earlier, it is this relationship between cognitive style and In-Basket Exercise performance that is the concern of this research question.

If a particular cognitive style can be identified to be related to In-Basket performance, then the implication is that In-Basket Exercise results are biased in favor of those with a certain cognitive style. If this is found to be true, then two assumptions can be made: The In-Basket Exercise is measuring an additional construct other than purely administrative ability, and that managerial success may be partly due to a prevalent thinking style. If no relationship is found,

then the implication is that the In-Basket Exercise used in this study does not favor the use of the identified cognitive styles for its successful performance.

In this section I have presented the research problem and an introduction to the two domains of psychological research that I am attempting to bridge. The following sections will include, a summary of the existing studies regarding the In-Basket test, a summary of the research on cognitive style as proposed by Witkin and his colleagues, and by McKenney and Keen, the specific research questions to be explored, the method for testing the hypotheses, the results of the study, and a discussion of the findings including the implications for future studies.

A REVIEW OF THE RELATED LITERATURE PERTAINING TO
IN-BASKET EXERCISES AND COGNITIVE STYLES.

THE IN-BASKET EXERCISE

The early literature on In-Basket Exercises has been well documented by Lopez (1966) in Executive Decision Making. This book thoroughly covers the initial research done in this area. Much of what is presented in this section is from the Lopez review.

The In-Basket Exercise is a type of solitary management game that presents a realistic managerial situation. Simulations of management work have traditionally involved a group of participants acting out roles as a team, or solitary games where the participant must solve problems (Wickert & McFarland, 1967). An advantage the In-Basket Exercise has over other managerial simulation games is that actual behaviour is judged rather than intentional behaviour: therefore, there is a higher probability of obtaining a more accurate appraisal of the participant's managerial behaviours. Also, In-Basket Exercises lend themselves to be scored objectively, with validated scoring keys.

In comparison to other assessment procedures, such as intelligence, personality, and managerial knowledge tests, advantages of the In-Basket Exercise include the following considerations:

- 1) It measures recall and insight as well as recognition.
- 2) The participant is required to use higher mental processes of analytical and critical thinking, logical reasoning, and problem solving.
- 3) The participant has the opportunity to demonstrate originality and creativity.
- 4) It can measure how well a participant judges situations accurately, and deals with social subtleties or technicalities.
- 5) It is not contaminated by comments or actions by others since it is a solitary effort. (Lopez, 1970, p. 207)

What does the In-Basket Exercise Measure?

Several different interpretations have been made regarding the question of what the In-Basket Exercise measures. Frederiksen who first designed the In-Basket Exercise, intended it to reflect decision making ability (Lopez, 1966, p.17). Meyer (1970) felt the In-Basket Exercise performance was most closely related to the planning and administrative aspect of the many responsibilities in a managerial job. The Sears Executive Study concluded that "a successful executive who does well on the In-Basket has the appropriate perso-

nalinity and intellectual ability to allow a flow of ideas to be directed effectively at many facets of each problem; and at the same time be sensitive to the need for attending to social and human aspects of a problem" (Ward cited in Lopez, 1966, p. 102). Lopez describes the In-Basket Exercise as measuring analytical ability, knowledge of managerial principles, and skill in decision making (Lopez, 1966, p. 34). Although the interpretations differ, there appears to be commonality in the reports, suggesting that the In-Basket Exercise measures administrative ability defined as decision making, dealing effectively with people, and applying managerial principles in an accurate manner.

Individual Differences on In-Basket Exercise Performance

On what dimensions do participants differ when completing the In-Basket? Several studies have shown similar results, suggesting that construct validity of the In-Basket Exercise is evident. A summary of these findings follows.

Ward, the director of the Bell Executive Study, found significant differences between management trainees and experienced managers on an In-Basket Exercise. The trainees were "wordier, less likely to take action on the basis of the importance of the problem;

saw fewer implications for the organization as a whole in the various problems; tended to make more final decisions and to take final action; and were less considerate in their dealings with others" (Lopez, 1966, p. 89). Ward urged more research be done on the In-Basket, suggesting that more information regarding other behavioural characteristics of In-Basket performance be investigated.

He later examined In-Basket performance of Master's degree students at the Harvard Business School, using a different In-Basket than the one used in the Bell Executive Study. He looked at various possible correlates, such as entrance examination scores, course grades, and starting salaries upon graduation (Lopez, 1966, p. 92-93).

Ward's major finding was that total word production for each answer on the In-Basket was the most critical component of all other scoring categories, suggesting that the more verbose the respondent was, the better would be the score received. Productivity of words correlated positively with quantitative scores on the admissions tests, and with grades in commercial and business administration courses (Lopez, 1966, p. 93). This suggested that the scoring key had to be changed to prevent verbal ability from interfering with

the detection of administrative ability.

Frederiksen, continuing his research into In-Basket Exercises, designed a quantitative scoring key that was the prototype for future scoring methods. Using this key, he identified three factors on which his subjects differed: preparation for action, amount of work completed, and seeking guidance (Frederiksen, 1962). High scorers were more likely to defer decisions, prepare for decisions by obtaining more information, produce more work in the time limit, and discuss decisions with supervisors (Frederiksen, 1962).

Frederiksen's In-Basket and scoring key, and three other In-Basket Exercises were used to assess administrative skill in elementary school principals, at the Teachers College Staff at Columbia University (Hemphill, Griffiths, & Frederiksen, 1962). A factor analysis of the scoring components revealed two second order factors which were identified as: (1) preparation for decision making and taking final action, and (2) total amount of work completed (Lopez, 1966, p. 92).

Meyer administered an In-Basket Exercise to managers at General Electric. He found that high scorers, and correspondingly better managers, covered more work in the allotted time, involved subordinates more in de-

cision making processes, took leading action on problems, spent more time in preparing for decisions, and showed a more systematic approach as indicated by scheduling meetings at definite times, following established procedures or initiating new procedures when needed (Meyer, 1970).

Pinder and Pinto (1974) identified three types of managers from an In-Basket Exercise that they administered to a wide range of managers. They categorized the managers in their study into three groups: Impulsive/Autocratic, Courteous/Efficient, and Consultative/Thoughtful. The titles reflected the type of managerial behaviours displayed by the group members. Unfortunately, no attempt was made to investigate the relationship among the types of managers and job performance. However, Pinder and Pinto's (1974) findings are important because they found managerial styles correlated with age. The Impulsive/Autocratic was found to be in the age range of 20 to 29; Courteous/Efficient in the 40 to 55 age range; and Consultative/Thoughtful in the 30 to 39 age range. This suggested that a manager's behaviours differ at various stages of life, and that previous studies may have confounded the results by not examining the effects of age.

Brass and Oldham (1976) validated an In-Basket test using scoring keys based on Oldham's Leadership activities. They found that four leadership activities identified from the scoring key correlated with performance ratings of the managers. These activities were: being personally rewarding, being personally punishing, setting goals, and placing personnel. They suggested that the manager who displayed better inter-personal skills was a better overall manager.

The studies reported thus far have indicated that the In-Basket Exercise can identify different types of managerial behaviours or styles and that some styles are better suited for managerial success. Consistent findings indicate that better managers excel at: making decisions when appropriate, deferring decisions when more information is needed, using a systematic and organized approach to problems, and displaying concern for superiors, peers, and subordinates.

The Relationship Between In-Basket Exercise Performance and Other Variables

In-Basket Exercise performance has been correlated with many variables such as: Career choice, Education, Intelligence, Age and Experience. The purpose of studying the relationship between In-Basket performance and other variables is to gain a better understanding

of what In-Basket Exercises measure. Although the literature pertaining to In-Basket correlates is not comprehensive, interesting relationships do exist with many psychological and demographic variables. An important consideration in understanding these relationships is that not all In-Basket Exercises are identical, and consequently, relationships with variables may not necessarily be consistent across all In-Basket Exercises. A summary of these relationships is presented.

Career Choice

Hemphill, et al. (1962) correlated Strong Vocational Interest Blank profiles with In-Basket Exercise scores. Small, but positive, associations were found between In-Basket Exercise performance and occupations such as Psychologist, Personnel Manager, and Public Administrator, and small, but negative, associations were found between In-Basket Exercise performance and occupations such as Production Manager, Purchasing Agent, and Policeman.

Scores on the In-Basket Exercise used in the Port of New York Authority Study, (Lopez, 1966), were correlated with results from the Vocational Preference Inventory. High In-Basket scorers were found to have higher intellectual and enterprising interests, whereas

low In-Basket scorers had interests in realistic, conventional, social and artistic areas (Lopez, 1966, p. 116). Candidates employed in personnel administration and general administration had better scores on the In-Basket than other candidates from fields of specialization such as technical work, finance and accounting, general management, production or operations, or engineering (Lopez, 1966, p. 157). Unfortunately, no mention was made of the statistical contribution of the correlates in accounting for the total variance in In-Basket scores.

Pinder and Pinto (1974) examined the relationship between three managerial styles, identified from the responses on an In-Basket Exercise, and career choice. The Impulsive/Autocratic group was mostly from the Sales and Finance divisions; the Courteous/Efficient group held jobs in areas of Operations, Research and Development, and General Administration; and the Consultative/Thoughtful group was made up of those in other areas of business such as Personnel and Purchasing.

Thus, In-Basket factors may not only predict managerial success, but may be correlated with the type of managerial position, or the setting in which the manager may be best suited to work. Therefore it is im-

portant to identify broad interest areas and managerial interest areas that correlate with specific In-Basket Exercises before using the test for selection purposes.

Education

Research has linked In-Basket scores to students' education and course studies in college. The Ama Company Inc. In-Basket Exercise was administered to prospective facility and administrative services managers working for the Port of New York Authority (Lopez, 1966, p. 79). Correlational data showed that candidates who had attended college and whose major was in the liberal arts, social sciences, accounting, finance, or physical sciences performed better than those who had majors in medicine, agriculture, physical education, engineering, business administration, or law (Lopez, 1966, p. 157).

Implications of the Relationships between In-Basket Performance and Career Choice and Education

The research showing In-Basket performance differences for those with differing career interests and differing scholastic interests presents two questions: Have these results occurred because of the general nature of the In-Basket Exercise, or have these results occurred because of the specific In-Basket Exercise used in the individual studies? It is very possible

that the In-Basket Exercises used in these studies may have been better suited for certain types of managers, and not for all managers in general. This latter conclusion is desirous, since, if In-Basket Exercises discriminate against those with certain types of interests, then the usefulness of the In-Basket as a selection technique is questionable. More research must be done to identify specific In-Basket Exercise correlates, and to see if consistent correlates occur for various In-Basket Exercises.

In-Basket Exercise and Intelligence

Research has shown that intelligence contributes only partially to In-Basket performance. Correlations between In-Basket factors and intelligence while positive, are low. Meyer (1970) correlated In-Basket criteria with scores on an intelligence test and found correlations ranging from .02 - .34. The Port of New York Authority study showed a positive correlation between mental ability tests and the total In-Basket score (Lopez, 1966, p. 157). Correlations between mental ability tests and In-Basket performance from the Hemphill et al. (1962) study were positive but modest; stronger correlations were found between In-Basket performance and scores on tests measuring professional and general knowledge. Performance on the Sears Roebuck

In-Basket produced small correlations with mental ability tests (Lopez, 1966, p. 104).

The Effects of Experience and Age

The amount of experience and the age of the candidate have been of concern when analyzing In-Basket scores. The findings, with regard to these factors, have not been consistent. The inconsistencies in the findings suggest that the effect of age and or experience may be specific to the In-Basket Exercise used in each study.

Ward (cited in Lopez, 1966) found significant differences on In-Basket scores between trainees and practising managers. He assumed that the differentiation was due to experience. However, this assumption was not verified independently through performance appraisals or other independent measures. It remains unclear whether experience, age, or skill affected the In-Basket Exercise scores to produce the group differences found in the Ward study.

Other studies have not found the experience-In-Basket performance relationship. Hemphill et al. (1962, pp. 264 - 265) found no relationship between age and In-Basket scores, or between experience levels and In-Basket scores. Meyer (1970) showed that the In-Basket factors correlated positively

with job performance ratings even when age and experience were held constant. Crooks and Slivinski (1976) compared In-Basket scores given to a group of experienced government employees to scores from a group of Master of Business Administration students, assumed to be inexperienced managers. No significant differences were found between groups. Further evidence to suggest that experience may not be an important factor in In-Basket performance is contained in the Pinder and Pinto (1974) study that found age, and not business experience contributed to the variance in In-Basket scores.

Summary of the Research Linking

In-Basket Performance and Age, and Experience

Until In-Basket Exercises become standardized in format and in scoring criteria, it will not be clear whether a relationship exists between age and In-Basket performance, or between experience and In-Basket performance. Therefore, researchers and practitioners should be alert to possible differences of In-Basket scores that may be due to age and or experience.

Summary of the In-Basket Exercise Literature

The preceding section has dealt with the use of the In-Basket Exercise, what it measures, stylistic differences, and a review of correlates of In-Basket

performance. Generally, it has been found that the In-Basket Exercise can identify critical components of managerial behaviours that other tests can not. Behaviours resulting from decision making ability, organizational ability, and inter-personal skills are measurable by the In-Basket Exercise in a reliable and valid fashion (Meyer, 1970). Most importantly, the In-Basket has helped define what types of administrative skill is necessary for managerial success. This may be the most fruitful outcome of this research since the more that is known about administrative skill, the better equipped psychologists will be at finding measures to predict managerial success. Unfortunately, there is a dearth of information regarding stylistic differences when completing In-Basket Exercises or research addressing the relationship between cognitive style and In-Basket Exercise performance. The consequence of the limited research in this area is the need for the present study.

COGNITIVE STYLES

Since the purpose of this study is to examine the relationship between cognitive style and In-Basket Exercise performance, study results which suggest such a relationship exists will be reviewed. Particular attention will be given to information on cognitive

styles identified by Witkin et al. (1962) and Keen (1973).

The Witkin Approach

Cognitive style is a consistent mode of functioning used in both perceptual and intellectual problems. Witkin's approach to identifying cognitive style was based on the degree of differentiation needed in perceiving the world as discrete and structured, and the degree of differentiation needed in perceiving one's self as different from others. The concept of cognitive style stemmed from studies involving perceptual problems and has developed to encompass many psychological constructs such as personality and intellectual functioning.

Witkin used the terms "field independent" and "field dependent" to describe two styles of approach subjects demonstrated in locating the upright position of their body or a figure (Witkin & Goodenough, 1981, p. 7). "Field Independent" subjects attended to tactile, vestibular, and kinesthetic senses to locate the upright position. "Field Dependent" persons, on the other hand, relied on the visual field and used the framework around them to locate the upright position (Witkin & Goodenough, 1981, p. 14). Three tests were used to measure a person's style: the Rod and Frame

Test and the Body Adjustment test, both designed so subjects must orient themselves in a tilted room, and the Rotated Room test where the visual field was kept congruent with the subject's placement by altering the direction of the frame around the body (Witkin & Goode-nough, 1981, p. 9). While subjects were internally self-consistent, they differed at the ease and skill of completing the tests. "Field independence-dependence was conceived to be a perceptual-analytical ability manifesting itself pervasively throughout an individual's perceptual functioning" (Witkin & Goode-nough, 1981, pp. 13 - 15).

Further investigation of the field independence/dependence concept led Witkin and others to investigate whether persons differed in their perception of problems where orientation toward the upright in space was not involved. To test this notion, they developed the Embedded Figures Test (Witkin & Goodenough, 1981, p. 15). In this situation, the subject's task is to "disembed" a figure which is contained within a larger one. Individual differences occurred in disembedding ability. Those identified as field independent by tests such as the Rod and Frame and Body Adjustment, were best at the disembedding task (Witkin & Goode-nough, 1981, p. 15).

Witkin and Goodenough (1981) believed that the disembedding ability was an important ability in problem solving. Field-independent persons, or those good at disembedding, were able to "take an element critical for solution of the problem out of context in which it is presented and restructure the problem material so the element is used in a different context" and consequently to solve the problem (Witkin & Goodenough, 1981, p. 17). Field dependent persons lacked this ability, and, thus, did less well on problems requiring disembedding. With this change in understanding of what was being measured, Field-independence/dependence no longer appeared to be a perceptual ability. Therefore, Witkin renamed this construct "Articulated Field Approach" versus "Global Field Approach" (Witkin et. al. 1971). In a study by Frederiksen, Jensen and Beaton (1972, cited in Gruenfeld & MacEachron, 1975), the level of field articulation among civil service administrators was the best predictor of task productivity, use of deferred judgment, and conceptual analysis in a simulated administrative problem solving task. Clearly, cognitive style was an important factor in determining skill at problem solving.

Pervasive cognitive styles used to solve problems in the Embedded Figures Test and in other measures

carry over to other psychological domains. Inter-personal behaviour differs between Articulated and Global thinking persons. Articulated, or field-independent, persons exhibit less information seeking from other sources when dealing with ambiguous social tasks (Witkin & Goodenough, 1981, p. 38). Global, or field-dependent, persons tend to favour situations that increase social contact with others, and attend more to social cues than Articulated persons (Witkin & Goodenough, 1981, p. 43).

Correlates of Articulated and Global persons further indicate large differences between people with either cognitive style. Articulated persons are more autonomous in inter-personal relations, show higher autonomy scores on personality tests, show greater initiative, report greater risk-taking, have greater self-reliance, and think on their own more than Global persons (Witkin & Goodenough, 1981, p. 39). In comparison, Global persons have higher scores on measures indicating personal warmth, affection, tact, accommodation to others, non-evaluative nature, and acceptance of others (Witkin & Goodenough, 1981, p. 44).

Research also has shown that Global persons prefer "people" oriented professions while Articulated persons prefer typically science and math related professions

(Witkin, Moore, Oltman, Goodenough, Friedman, Owen, & Raskin, 1977). Choice of college major and career choice appear to correlate with cognitive styles. Table 1 summarizes the findings in the literature regarding cognitive style and its relationship to career choice.

Witkin, Moore, Goodenough et al. (1977), also suggest that not only is cognitive style related to one's interest and career choice, but that it is also related to achievement in specialized areas of a particular career. Eight studies give support to the finding that Articulated students appeared to perform significantly better in mathematics, the sciences, engineering, and architecture (Witkin, Moore, Goodenough et al. 1977). Cognitive style appears to be an important factor in choosing and being successful in a career. Witkin and Goodenough (1981) suggest that a person's cognitive style affects the activities in which a person will participate. For example, if it is easier for a person to deal with people, and to seek social contacts because of the reinforcing nature of the activity, then these characteristics of a Global cognitive style may steer the person into choosing a career that involves social contact, such as Personnel or Clinical Psychology. The same is true for persons who enjoy and excel

TABLE 1

CAREER CHOICE CORRELATES OF GLOBAL AND ARTICULATED THINKERS

GLOBAL OR FIELD DEPENDENT COGNITIVE STYLE

Clinical Psychologist
Psychiatric nursing
Psychiatric practice favouring inter-personal relations
Business personnel director
Business education teacher
Social Studies teacher
Elementary school teacher
Art students with informal art style

ARTICULATED OR FIELD INDEPENDENT COGNITIVE STYLE

Experimental Psychologist
Surgical nursing
Psychiatric practice favouring impersonal form of therapy
Business production manager
Natural science teacher
Industrial arts teacher
Art students with formal art style

(As presented in Witkin, Moore, Goodenough et al. 1977)

in impersonal, analytical work characteristic of an Articulated cognitive style. The reinforcing nature of the work may lead the person into professions less socially oriented, and more detail or fact oriented, such as Experimental Psychology or Production Management.

Witkin and Goodenough (1981, p. 63) also suggest that some people may have equal adeptness at using both styles. This "mobile" style may be more adaptive and conducive to performing many tasks. A mobile cognitive style as opposed to a fixed style (Articulated or Global) may have fewer restrictions for a person, and therefore utilization of either style may allow for greater ability in dealing with a wider range of problems.

Harvard Business School Studies

Keen (1973), studying under the direction of McKenney at the Harvard Business School, examined the relationship among cognitive style and problem solving and decision making behaviour. He based his work on Witkin's premise that people rely on specific strategies to solve problems and make decisions. These strategies become differentiated through experience, and thus form a style. Keen hypothesized that patterns in problem solving and consequently decision making,

would differ across cognitive styles. Keen (1973) mentioned Witkin et al.'s (1962) cognitive styles, but chose not to examine these styles as possible variables related to problem solving ability. Keen falsely criticized Witkin's model on the basis that it involved a good-bad dichotomy. Thus, Keen rejected Witkin's model, and set out to identify cognitive styles that would best suit the different functions of two stages McKenney (cited in Keen, 1973) observed were part of problem solving behaviours. McKenney (cited in Keen, 1973) described problem solving strategies to be a two part process, information gathering and information evaluation.

The Information gathering stage consisted of two styles: Preceptive and Receptive. A Preceptive style characterized individuals who tried to fit the presenting information into previously formed precepts, focusing on relationships between items, and looked for deviations from, or conformities with, their expectations (McKenney & Keen, 1979, p. 32). In contrast, a Receptive style of thinking characterized individuals who "focused on detail rather than relationships, and tried to derive the attributes of the information from direct examination of the problem instead of by putting the information into precepts" (McKenney & Keen, 1979,

pp. 32-33).

Information evaluation consisted of two styles: Systematic, and Intuitive thinking. A Systematic style of information evaluation characterized individuals who structured the problems by some method which led to a likely solution (McKenney & Keen, 1979, p. 33). An Intuitive style characterized individuals who used a trial and error method. Individuals using the trial and error style avoided committing themselves to any one method of evaluating the information. They chose instead to use various methods of evaluation, often jumping from one method to another. Table 2 presents a summary of the main characteristics identified by those exhibiting the different cognitive styles.

Keen proposed that both continua of style intersect, creating four quadrants, each characterized by a particular dominant cognitive style. These styles were: Systematic/Preceptive; Systematic/Receptive; Intuitive/Preceptive; and Intuitive/Receptive.

To test his theory of cognitive styles, Keen administered twelve cognition tests to a sample of Master of Business Administration students. Each test had previously been judged to elicit behaviours consistent with the theorized Systematic, Intuitive, Preceptive, and Receptive styles. Test performances on the cogni-

tive tests differed within and between individuals. A factor analysis of test scores identified four factors which matched Keen's theory. The weakest loading was on the Intuitive scale.

Keen then used MBA students who had clearly identified cognitive styles. He had these subjects choose five problems to solve from a menu of sixteen. The results showed that Systematic thinkers preferred and performed better at straight-forward problems, requiring little ingenuity. On the other hand, Intuitive thinkers preferred and performed better at open-ended problems requiring ingenuity and opinion (Keen, 1973).

Keen and McKenney (1979) also examined the relationship between cognitive style and career choice. Using the original sample of students used in Keen's 1973 study, they looked at career choices of 82 of the original 107 subjects. Systematic thinkers produced career profiles which highlighted interests in administrative careers, the military, and occupations involving production, planning, control, and supervision. The Intuitive group had careers in less restrictive business functions, psychology, advertising, library science, teaching and the arts (McKenney & Keen, 1979, pp. 38-39). The combination styles identified as one of the four quadrants listed earlier did not hold up to

expectations. Factor analysis of career choices favored the two continua of cognitive styles rather than the four quadrants of cognitive styles.

Keen (1973) also hypothesized that a person could have either both Receptive and Preceptive abilities, or both Systematic and Intuitive abilities. Persons having both abilities on either dimension were named "Switchers". Although the "Switcher" style was not addressed in his dissertation, Keen did comment that the "Switcher" would be better suited to solve a variety of problems. The "Switcher" is analagous to what Witkin et al. (1971) proposed as a "Mobile" thinker.

There has been no subsequent research to investigate the relationship between cognitive style and success or proficiency within occupations using the Keen styles. However, subsequent work by Keen supports the use of the Myers Briggs Type Indicator (MBTI) as a more suitable instrument to measure cognitive style and for explaining occupational specialization (Keen & Bronsema, 1981).

The MBTI was not used in this study because this researcher was interested in identifying cognitive styles relatively independent of personality traits. Since the MBTI measures Jung's types, it was felt to be inappropriate for the purposes of this study.

TABLE 2

CHARACTERISTICS OF FOUR COGNITIVE STYLES

SYSTEMATIC THINKERS

- Look for a method and make a plan for solving a problem
- Conscious of approach
- Defend the quality of a solution largely in terms of method
- Define the specific constraints of the problem early in the process
- Discard alternatives quickly
- Move through a process of increasing refinement of analysis
- Conduct an ordered search for additional information
- Complete any discrete step in analysis that they begin

INTUITIVE THINKERS

- Keep the overall problem continuously in mind
- Re-define the problem frequently as they proceed
- Rely on un verbalized cues, even hunches
- Defend a solution in terms of fit
- Consider a number of alternatives and options simultaneously
- Jump from one step in the analysis or search to another and back again
- Explore and abandon alternatives very quickly

RECEPTIVE THINKERS

- Suspend judgment and avoid pre-conceptions
- Are attentive to detail and to exact attributes of data
- Insist on a complete examination of a data set before deriving conclusions

PRECEPTIVE THINKERS

- Look for clues in the data set
- Focus on relationships
- Jump from one section of a data set to another, building a set of explanatory precepts

(McKenney & Keen, 1977, p. 36)

Although Witkin and Keen used a different theoretical basis for their studies, it appears that the construct they are measuring is important not only in perceptual or problem solving behaviours, but in career choice and career success as well. One theoretical premise that both researchers share is the idea that the Mobile person that Witkin identifies, and the Switcher that Keen proposes may have the advantage over those with a prevalent, or fixed cognitive style. Keen suggests that a cognitive style emerges because other unused strategies atrophy over time, and that specialization of one strategy becomes prominent (Keen, 1973). Therefore, the Mobile person, or the Switcher, has access to all cognitive styles, and can utilize either style. This advantage implies that a person showing skill at using both styles should excel at, and be interested in, problems and careers that require adaptable cognitive processing. Neither Witkin nor Keen considered this relationship.

A Summary of the Cognitive Style Literature

The implications of having a certain cognitive style include differing interpersonal behaviour, interest differences, career choice differences, success in career differences, and differences in problem solving strategies. Further differences occur within

career domain choices. For instance, Witkin, Moore, Goodenough et al. (1977) reported that clinical psychologists differed from experimental psychologists. Clinicians tended to be more Global in their cognitive style. Keen also found differences within the career domain of management. Managers involved in production tended to be more Systematic; whereas managers involved in the advertising field were more Intuitive. Keen explains the relationship between cognitive style and career choice: "A manager will gravitate to positions and functional areas that suit his style; if he lacks capacity in and comfort with a methodical, inductive mode of problem solving required for planning, one would anticipate that he would not make his career in production management" (Keen, 1973).

Unfortunately, Witkin and Keen both have cognitive style theories that are tested by different measures, purport to measure different styles, yet describe the same construct of cognitive style. Both theories add considerably to the understanding of cognition in problem solving of perceptual tasks and verbal tasks. More importantly, they suggest that cognitive style has a large role in both the types of problems we gravitate towards and the resulting success of solving these problems.

HYPOTHESES

The purpose of this study was to investigate the relationship between cognitive style and In-Basket Exercise performance. The In-Basket Exercise used in this study measures six dimensions:

- 1) Organization
- 2) Productivity
- 3) Preparation for Action
- 4) Decisiveness
- 5) Interaction with People
- 6) Content

The cognitive style dimensions examined were:

- 1) Global/Articulated
- 2) Systematic/Non-Systematic
- 3) Preceptive/Receptive/Switcher

The relationships between interest areas of management and cognitive style, and between interest areas and In-Basket performance were also considered. A secondary purpose was to investigate the relationship between Witkin et al.'s (1962) cognitive styles and Keen's (1973) cognitive styles. Witkin's styles involve the degree to which a specific method of restructuring data is used in problem solving. Keen's styles involve general methods of gathering and evaluating in-

formation in problem solving.

The following hypotheses are based on the findings from the cognitive style literature that suggest thinking styles affect the way in which people structure problems, form decisions, and choose career paths (Keen, 1973; Witkin & Goodenough, 1981; Witkin, Moore, Goodenough et al. 1977).

Hypothesis One

The categorization of cognitive style scores can account for a significant amount of variance in In-Basket Exercise dimension scores.

The premise tested is that the variability in performance on the In-Basket dimensions may be affected by the way in which information is perceived, analyzed and evaluated in order to formulate an appropriate answer. While there are no reports of this relationship having been tested before, there is support for the prediction that cognitive style affects problem solving ability (Frederiksen et al. 1972, cited in Gruenfeld & MacEachron, 1975).

Hypothesis Two

A relationship will be found between the In-Basket dimension scores and the cognitive style dimensions of Articulated and Global. Specifically, the Interaction with People dimension score on the In-Basket Exercise

should be higher for Global thinkers than for Articulated thinkers. Scores on the Organizational and Decisiveness dimensions on the In-Basket Exercise should be higher for Articulated thinkers than for Global thinkers.

These hypotheses are based on previous findings that Articulated persons tend to be greater risk-takers, can take relevant information out of context and restructure the problem material, and are self-reliant (Witkin & Goodenough, 1981). In comparison, the Global cognitive thinker should have higher Interaction with People scores since people who are Global in nature tend to be more people oriented, demonstrate tact, show accommodation to others, and show personal warmth (Witkin & Goodenough, 1981).

Hypothesis Three

Persons with a Systematic cognitive style will have significantly higher In-Basket dimension scores compared to those persons not displaying this style.

The notion that a Systematic style of evaluating information may enhance the quantity and quality of the answers to the In-Basket Exercise is tested. Since efficiency and accuracy are needed to do well on this Exercise, it is felt that persons imposing structure, as Systematic thinkers do, will be better able to perform

on the In-Basket Exercise than those who do not use this style.

Hypothesis Four

Persons identified as having a "Switcher" cognitive style will score higher on the In-Basket Exercise than those with a predominant Preceptive or predominant Receptive cognitive style.

This hypothesis is proposed on the understanding that the "Switcher" has an advantage over those with a fixed Preceptive or Receptive thinking style because of the ability to use either style where it is appropriate. Again, since speed and accuracy is called for in completing the In-Basket Exercise, those who show this ability to "switch" should do better.

Hypothesis Five

There will be a positive correlation between the scores indicating the cognitive styles identified by Witkin et al. (1973). A significant correlation will be interpreted as indicating convergent validity for both sets of cognitive style.

Hypothesis Six

Performance on each of the In-Basket Exercise dimensions will differ for subjects according to their concentration of management studies in five different managerial interest areas of:

- 1) Marketing
- 2) Accounting/Finance
- 3) Personnel/Organizational Behaviour
- 4) Management Science/Administration
- 5) Other.- which includes International Business
and Transportation interests

The Lopez (1966) review reports that total In-Basket Exercise performance relates to interest areas. Hypothesis Six has been proposed to investigate whether or not the dimensions measured by the In-Basket Exercise being used in this study are related to the interest area of the test-taker. Apparently, no previous studies have examined the relationships among interest areas and specific dimensions of managerial ability.

Hypothesis Seven

A relationship will be found between the five areas of management in which subjects are concentrating their studies and the six cognitive styles. Specifically, those with a Global cognitive style should prefer managerial interest areas that are people oriented, such as Personnel, Organizational Behaviour, and possibly Marketing. The literature supports these predictions indicating that cognitive styles can affect career choice (see Witkin, Moore, Goodenough et

al. 1977). Specific relationships expected among the keen cognitive styles and the managerial interest areas are not predicted.

METHOD

Subjects

Seven male undergraduate Psychology students from Saint Mary's University volunteered to participate in the pilot study. They were promised a 3% credit towards their Introductory Psychology Course if they completed the study.

Forty-four male students enrolled in Administration at the Master's degree level in the Halifax, Nova Scotia area participated in the study. Male students were used exclusively because a comparable sample of female administration students was not available. Subjects were solicited by the researcher through direct contact in classrooms. A lottery was implemented to encourage participation: subjects from each school were offered the chance to win \$50.00. Thirty-one subjects volunteered from Saint Mary's University; thirteen volunteered from Dalhousie University. The participants' ages ranged from 21 to 48 ($M=28$ years; standard deviation=6 years). Subjects

were asked if they had ever supervised at least five people in a managerial capacity. Fifty-four per cent of the sample had no years of experience in this capacity. The remaining forty-six per cent of the sample had between one and twenty-three years of experience managing five or more subordinates. The majority of the group with this type of managerial experience reported less than six years.

Experimental Procedures

A pilot study was conducted to gain experience in administering the tests, to establish the approximate time for completing the experiment, and to identify any problems with the test directions.

No problems were encountered with the procedures used in the Pilot Study and no changes in experimental procedures were made between the Pilot Study and the Main Study.

Data, from the Main study, were collected in 28 sessions between November 1983 and March 1984. All sessions were conducted by this experimenter except for the first three sessions in which a research assistant conducted the experiment to gain experience in administration. After the first three sessions, the research assistant was no longer needed, and therefore all subsequent sessions were conducted by this researcher.

Each session lasted two and one half hours. Sessions were divided into two sections which were separated by a short break. One section involved the completion of all the timed tests which measured cognitive styles. The other section involved the completion of the In-Basket Exercise. The presentation of sections was counterbalanced to guard against order effects. Due to the time required to complete the session, the cognitive style tests were presented in a random order to minimize the effects of fatigue and practice effects.

Instruments

An In-Basket Exercise designed by Dr. Ralph Hakstian, Department of Psychology, the University of British Columbia, was selected for use in this study. The Hakstian In-Basket Exercise has been designed for selection of first-line managers in a large corporation. It has a one hour limit and consists of twenty-two items. No reliability or validity data are available, although this information is expected in the near future. Six dimensions are purportedly measured by this In-Basket:

- 1) Organization, - how subjects organize the materials in order to deal with items that are of more importance and require immediate attention.

- 2) Productivity - the total number of items completed, and the number of words written per answer.
- 3) Preparation for Action, - the ability to recognize that more information is needed before decisions can be made, and thus requires delegating someone to make the pertinent information available upon the manager's return.
- 4) Decisiveness, - the ability to make final decisions.
- 5) Interaction with People - the inter-personal skills needed to deal with problems involving public relations and worker concerns.
- 6) Content - the appropriateness of the answers given.

Each dimension was scored with an objective scoring key designed by Hakstian. Percentage points were awarded by calculating the points received out of the total points possible for each dimension. The Hakstian In-Basket Exercise is, in this researcher's opinion, superior in quality to other In-Basket Exercises available for general use because of the objective scoring key designed for the exercise. Two other In-Basket Exercises, the Consolidated Fund In-Basket and a practice In-Basket (Jaffee, 1968) do not have scoring keys. Neither are there reports of data sufficient to consider these Exercises as appropriate measures of adminis-

trative ability. It should be noted that the Hakstian In-Basket is not generally available; this researcher was allowed to use it for experimental purposes only.

Articulated and Global cognitive styles were measured by the Group Embedded Figures Test. This 20 minute test, designed by Witkin and his colleagues, has a reported reliability coefficient of .82 for college males (Witkin et al. 1971). The determination of style is based on the cut-off scores presented in the manual for the Group Embedded Figures Test. Subjects receiving a standard score of three or four were considered Articulated; subjects receiving a standard score of one or two were considered Global. The criterion cut-off scores are presented in Appendix A.

Keen's cognitive styles were determined by five tests from the Kit of Factor-Referenced Cognitive Tests (1976), and an additional test, Closure Flexibility (Concealed Figures), from the London House Management Consultants. The specific tests from the Kit of Factor-Referenced Cognitive Tests were:

- Scrambled Words
- Four Letter Words or Hidden Words
- Choosing a Path
- Paper Folding
- Identical Pictures

Reliability data are available for all but the Scrambled Words test. For the remaining four tests reliability coefficients are high, ranging from .77 to .87 (Ekstrom, French & Harman, 1976). The Closure Flexibility (Concealed Figures Test) has a reliability coefficient of .94 (Manual for the Concealed Figures Test).

To study the impact of the cognitive styles proposed by Keen (1973), this study identified Keen's styles with the same tests used in his 1973 dissertation, the same scoring criteria, and the same system for determining cognitive styles. (These criteria are presented in Appendix A). Unfortunately, the original Verbal Puzzles test could not be obtained from the publisher, and therefore, the Intuitive cognitive style could not be examined. Also, the Systematic style, which is opposite to the Intuitive style, was not determined using the Keen (1973) method.

As can be seen in Appendix A, Keen's (1973) calculations for determining cognitive styles are based on test scores from all four tests. A percentage is calculated by comparing the relative strength of two sets of test scores in the following way:

$$\text{TEST A} + \text{TEST B}$$

$$\text{STYLE AB} = \frac{\text{TEST A} + \text{TEST B} + \text{TEST C} + \text{TEST D}}{\text{TEST C} + \text{TEST D}}$$

$$\text{TEST A} + \text{TEST B} + \text{TEST C} + \text{TEST D}$$

$$\text{TEST C} + \text{TEST D}$$

$$\text{STYLE CD} = \frac{\text{TEST C} + \text{TEST D} + \text{TEST A} + \text{TEST B}}{\text{TEST C} + \text{TEST D}}$$

$$\text{TEST C} + \text{TEST D} + \text{TEST A} + \text{TEST B}$$

The Systematic cognitive style was determined by summing the two standard scores from two tests used in the Keen (1973) study to identify the Systematic thinker. This score was then divided by the total possible standard score of 14. If the percentage was greater than 60%, then the person was categorized as showing a Systematic thinking style. As a result of these changes in scoring, the Systematic cognitive style identified in this study may not be exactly the same as the Systematic style identified by Keen in his dissertation. The method for calculating the Systematic cognitive style score is described in Appendix A.

RESULTS

Four different statistical analyses were used to test the seven hypotheses proposed by this study: The

Stepwise Multiple Regression technique, the one-way Analysis of Variance, the correlation analysis, and the Chi-Square analysis (Minitab, Penn State Univ, 1982).

The Stepwise Multiple Regression technique is designed to identify variables with F-statistics in descending order of magnitude, independent of the order the variables were entered into the model. The procedure first removes variables with small F-statistics, leaving the variable with the largest F-statistic in the equation. If no variable can be removed, the procedure adds variables. The variable with the largest F-statistic is added, which is equivalent to choosing the variable with the largest partial correlation. In each step, the variable's F-statistic must exceed the default value of 4 (Ryan, Joiner, & Ryan, 1982).

The analysis of variance procedure was performed using the Aovoneway procedure (Ryan, Joiner, & Ryan, 1982). This procedure accounts for unequal cell sizes by assuming equal variance between the two populations and pooling the variance to provide the estimated standard deviation. In a 1x2 experimental design, the Aovoneway procedure automatically performs a t-test using the pooled standard deviation. The t-test procedure is called Twosample with the Pooled subcommand (Ryan, Joiner, & Ryan, 1982).

The correlational analysis, performed by Minitab, calculates Pearson product-moment coefficients (Ryan, Joiner, & Ryan, 1982).

Hypothesis One

Stepwise Multiple Regression analyses were calculated to test Hypothesis One. Response scores on each In-Basket dimension were analyzed separately using the three cognitive style dimensions, Global, Articulated, Systematic, Non-Systematic, Preceptive, Switcher, as predictor variables. No variables were statistically significant and could not be removed or entered into the model. Thus, none of the cognitive style dimensions could, apparently, account for the variance in In-Basket dimension scores.

Hypothesis Two

Subjects were classified as having either Global or Articulated thinking styles. Twenty-eight subjects were identified as Articulated, sixteen were identified as Global. In-Basket Exercise scores for each group were compared. It was hypothesized that the Global thinker would have higher Interaction with People scores on the In-Basket. Using a 1X2 (scores by group) experimental design, a one-way analysis of variance procedure was used to test this Hypothesis. No significant difference was found between the Global group

($\bar{M}=64.6$), and the Articulated group ($\bar{M}=56.1$), on the Interaction with People dimension, $F(1,42)=.72, p>.05$.

The Articulated thinkers were hypothesized to have significantly higher In-Basket scores on two dimensions: Organization and Decisiveness. One-way analysis of variance procedures were conducted. Articulated thinkers did not have significantly higher scores on the Organization dimension ($\bar{M}=57.1$), in comparison to Global thinkers ($\bar{M}=55.6$), $F(1,42)=.14, p>.05$. Articulated thinkers did not have significantly higher scores on the Decisiveness dimension ($\bar{M}=64.6$), than the Global thinkers ($\bar{M}=56.1$), $F(1,42)=1.6, p>.05$.

Hypothesis Three

Subjects were classified as Systematic or Non-Systematic. Seventeen subjects were identified as having a Systematic cognitive style, and twenty-seven subjects were classified as not having a Systematic cognitive style. It was hypothesized that people with a Systematic cognitive style would have significantly higher In-Basket dimension scores in comparison to those without this style. Each In-Basket dimension was analyzed using a 1x2 (scores by group) experimental design. There were no significant differences between the group scores on any of the six In-Basket dimensions. (See Table 3, Appendix B for means, standard

deviations and F values).

Hypothesis Four

The "Switcher" cognitive style group were expected to have higher In-Basket dimension scores in comparison to the cognitive style groups of pure Preceptives and pure Receptives. Since the true Receptive group was not identified in this sample, a comparison was made among the Switcher and Preceptive thinkers. Twenty-seven subjects were identified as having a Switcher style, and seventeen subjects were identified as having a Preceptive thinking style. Each In-Basket dimension was compared through one-way analysis of variance procedures. The results showed that the Switcher group scores were not significantly different than the Preceptive group scores on any of the six In-Basket dimensions. (See Table 4, Appendix B, for means, standard deviations, and F values).

Hypothesis Five

Standard scores from the Group Embedded Figures Test, which were used to identify the Articulated and Global thinkers, were correlated with percentage scores obtained from the tests used to identify the cognitive styles of Systematic/Non-Systematic, and Receptive/Preceptive. A positive correlation was expected between the scores indicating the Witkin cogni-

live style dimension of Articulated/Global and the Keen cognitive style dimensions of Systematic, and Receptive/Preceptive. Correlations were low and non-significant. The correlation between Systematic scores and Articulated scores was .36; the correlation between Receptive and Articulated scores was .3; and the correlation between Preceptive and Articulated scores was -.3. The direction of the coefficients are the opposite for correlations with the Global style. (See Table 5, Appendix B).

Hypothesis Six

Hypothesis Six was tested by conducting six independent one-way analysis of variance procedures which compared the In-Basket dimension scores of five groups defined by their interest area in managerial courses. The five areas of managerial interest were: Marketing; Accounting or Finance; Personnel or Organizational Behaviour; Managerial Science or Administration; and an Other category which included Transportation and International Business. No significant differences were found when group scores on all of the In-Basket dimensions were compared. (See Table 6, Appendix B, for means, standard deviations, and F values).

Hypothesis Seven

Chi-square analyses were conducted to test Hypothesis Seven which proposed that a relationship exists between the area of managerial interest and the individual's cognitive styles. An initial analysis was conducted comparing the five areas of managerial interest between the cognitive styles. However, due to the small sample size, over 20% of the cells had an expected frequency less than 5, and, thus, the Chi-Square analyses results were not acceptable. It was decided to collapse the five managerial groups into two: Quantitative and Qualitative managerial studies. The Quantitative managerial interest group included: Finance, Accounting, Managerial Science, and Administration. The Qualitative managerial interest group included: Marketing, Organizational Behaviour, Personnel, International Business, and Transportation.

Articulated thinkers did not differ from Global thinkers, $\chi^2(1, N = 44) = 1.6$, $p > .05$. Switchers did not differ from Preceptive thinkers, $\chi^2(1, N = 44) = 2.56$, $p > .05$. However, Systematic thinkers had a greater preference for Quantitative managerial studies while Non-Systematic thinkers had a greater preference for Qualitative managerial studies, $\chi^2(1, N = 44) = 4.7$, $p < .05$. (See Table 7, 8, and 9, for the Chi-Square

Analyses contingency tables and p values).

Post Hoc Analysis

Upon analyzing the scores and considering the procedure for determining the styles as Keen (1973) suggested in his dissertation, it became apparent that his method led to the inaccurate classification of many subjects. The theoretical basis of the cognitive styles proposed by Keen suggests that proficiency on the specific tests can be used to identify the specific cognitive styles. However, by using Keen's method of determining styles, those with overall low performance were being classified in the same group as those with overall high performance. The method does not consider how well each subject did on an absolute level; instead, it considers how well the subject does in comparison to performance on other tests. The result of this ratio-percentage method of categorizing subjects was the classification of many subjects in the Switcher category who were not proficient on all four tests.

To overcome this problem, a different method for determining cognitive styles was developed. Independent percentage calculations were first determined from the performance on the two tests used to identify the Preceptive thinker and the two tests used to identify the Receptive thinker. If the percentage

scores were greater than 60% for both styles, then the person was identified as a Switcher. If the Preceptive test scores were greater than 60%, and the opposite test scores of the Receptive style had a score less than 60%, then the person was identified as purely Preceptive. If the Receptive test scores were greater than 60% and the Preceptive test scores were less than 60%, the person was identified as purely Receptive. Using this method, three subjects were identified as purely Receptive, eight were identified as purely Preceptive; twelve subjects were identified as having both Preceptive and Receptive thinking styles, and were classified as Switchers. (See Appendix A for an example of the percentage determined calculations). Hypotheses One and Four were again tested using the new categories of cognitive styles.

Hypothesis One

Stepwise Multiple Regression analyses were conducted for each of the six In-Basket dimension scores using the cognitive style dimensions of Articulated, Global, Systematic, Non-Systematic, and Receptive, Preceptive, Switcher, as predictor variables. The analyses showed the Receptive cognitive style to account for 10.5% of the variance in the Decisiveness dimension scores, 10.3% of the variance in the Interaction with

Table 7.

Chi-Square Contingency Table and Chi-Square ValueFor Articulated and Global Thinkers'Preferences of Managerial Studies

	Qualitative	Quantitative	Total
Global			
Observed	8	8	16
Expected	8.4	7.6	
<hr/>			
Articulated			
Observed	15	13	28
Expected	14.6	13.4	
<hr/>			
Total	23	21	44
<hr/>			

$$\chi^2 = 1.16$$

Table 8

Chi-Square Contingency Table and Chi Square
Value For Systematic and Non-Systematic thinkers
Preference of Managerial Studies.

	Qualitative	Quantitative	Total
Systematic			
Observed	7	10	17
Expected	10.4	7.6	
<hr/>			
Non-Systematic			
Observed	20	7	27
Expected	16.6	10.4	
<hr/>			
Total	27	17	44
<hr/>			

$$\chi^2 = 4.7^*$$

*p < .05

Table 9

Chi-Square Contingency Table and Chi-Square Value
For Switcher and Preceptive Thinkers' Preference
Of Managerial Studies.

	Qualitative	Quantitative	Total
Switcher			
Observed	12	15	27
Expected	14.7	12.3	
<hr/>			
Preceptive			
Observed	12	5	17
Expected	9.3	7.7	
<hr/>			
Total	24	20	44
<hr/>			

$$\chi^2 = 2.56$$

People dimension scores, and 22.2% of the variance in Content dimension scores. Table 10 presents the results from these analyses.

Hypothesis Four

Hypothesis Four proposed that the Switcher cognitive group would have higher In-Basket dimension scores in comparison to the Receptive and Preceptive groups. A one-way Analysis of Variance was conducted to compare the In-Basket scores on each dimension using the three stylistic groups as dependent variables. Two significant differences were found: the Switcher group ($M=77.3$) performed significantly better than the Receptive ($M=46.3$) and Preceptive ($M=54.5$) groups, on the Decisiveness dimension $F(2,20) = 6.48, p < .01$; and the Receptive group ($M=77.7$) performed significantly better on the Interaction with People dimension in comparison to the Switcher ($M=53.3$) and Preceptive ($M=39.6$) groups, $F(2,20)=3.6, p < .05$. Caution must be taken in accepting the F value as significant in these latter comparisons because of the possibility of these being Type I errors and in the latter comparison, an underlying assumption to the F-statistic, homogeneity of variance, was violated. (See Table 11 for means, standard deviations, and F values).

Table 10.

Variance Accounted For by the Receptive Cognitive Style
in Three In-Basket Dimensions.

Dimension	Predictor Variable Entered
<hr/>	
Decisiveness	Rec ($R^2 = 10.5$)
Interaction with People	Rec ($R^2 = 10.3$)
Content	Rec ($R^2 = 22.2$)

Rec = Receptive Thinking Style

Table 11

Group Means, Standard Deviations, and F Values For
Re-categorized Groups of Switcher, Receptive
and Preceptive Thinkers For Six In-Basket
Exercise Dimensions

I-B. Dimensions	Cognitive Styles			F Values df, 2, 20
	Switch n=12	Rec n=3	Prec n=8	
Organization	60.0 SD=12.1	43.3 SD=11.6	58.8 SD=14.6	2.1
Productivity	42.4 SD=42.4	51.7 SD=7.4	46.1 SD=16.7	.81
Preparation Action	27.7 SD=27.5	47.0 SD=24.3	37.5 SD=31.8	.65
Decisiveness	77.3 SD=14.7	46.3 SD=19.2	54.5 SD=19.6	6.48**
Interaction With People	53.3 SD=19.3	77.7 SD=4.6	39.6 SD=26.3	3.6*
Content	52.8 SD=18.3	58.7 SD=14.4	41.9 SD=15.7	1.4

*= $p < .05$

**= $p < .01$

No overall main effects were found when comparing the scores on the Organization, Productivity, Preparation for Action, or Content dimensions. (See Table 11 for means, standard deviations, and F values).

Additional Post-Hoc Analyses

The relationship between In-Basket Exercise performance and age has been examined in previous studies (Meyer, 1970, Pinder & Pinto, 1974). To test whether the Hakstian In-Basket is affected by age of the test-taker, scores on each In-Basket dimension were compared using Pinder and Pinto's (1974) age categorizations of 20 to 29 years of age; 30 to 39 years of age; and 40 years of age and over. No statistical differences among the age groups were found on any of the six In-Basket Exercise dimensions using a 1X3 (scores by age groups) experimental design. (See Table 12, Appendix B, for means, standard deviations, and F values).

The impact of experience on In-Basket Exercise performance has also been studied (Crooks & Slivinski, 1976; Meyer, 1970; Pinder & Pinto, 1974; Ward cited in Lopez, 1966). To test whether years of managerial experience with more than five subordinates or age of

the test taker affected In-Basket performance, a Stepwise Multiple Regression analysis was conducted entering both age and experience as predictor variables. The variance in the subjects' ages and the variance in the subjects' amount of experience was not significant; it would seem that neither age nor experience accounted for the variance in any of the six In-Basket Exercise dimension scores.

DISCUSSION

The intent of this study was to examine the relationship between thinking styles and In-Basket Exercise performance. Using the cognitive styles identified in the sample, no relationship was found among thinking styles and In-Basket performance, or among In-Basket performance and interest areas in management. Witkin et al.'s (1962) cognitive styles and Keen's (1973) cognitive styles did not correlate significantly. This finding suggests that the styles are relatively independent of each other. Or it is possible that the measures used in this study to identify the cognitive styles were unreliable, and, consequently the correlations were low. A relationship was found between a cognitive style dimension and interest areas within the management domain where Systematic thinkers had different preferences in comparison to Non-Systematic

thinkers. Despite the theoretical problems and practical limitations in identifying Keen's cognitive styles, the results show promising implications for future research. The implications of this study are addressed in the following section.

Cognitive Style and In-Basket Performance

Despite the results from previous studies which suggested that a relationship may exist between In-Basket performance and cognitive style, this relationship was not found in this study. The lack of a relationship supports the construct validity of the In-Basket Exercise, since the In-Basket Exercise should not discriminate against persons with a particular style of thinking, but between those with varying administrative skill levels. These results suggest that the cognitive styles identified in this study, Articulated, Global, Systematic, Preceptive, Switcher are not critical for performing well on the In-Basket Exercise used in this study. But, further research should be conducted to support these findings, since the post-hoc analyses revealed that with a re-categorization of styles, relationships did exist between the Receptive and Switcher cognitive styles and In-Basket Exercise performance.

The post-hoc analyses' results should be consi-

dered to be only tentative relationships due to statistical considerations regarding sample size and the problems inherent in multiple comparisons.

Myers (1979) advocates large sample sizes when using a stepwise multiple regression analysis because of inherent problems such as, the higher probability of a large error rate per family (Type I error), problems of variables being highly correlated, and the sampling variability being high. Since the sample size for the post-hoc analyses was 23, the significant contribution of the Receptive thinking style may be inaccurate.

The significance of the analysis of variance comparing the Receptive, Preceptive and Switcher groups may also be false. Kirk (1968) states that "as the number of independent comparisons increases, the probability of at least one spuriously significant result also increases." Therefore, the significant result may have occurred because of the large number of comparisons made in this study.

Caution must be taken in concluding that the re-categorized styles are actually the cognitive styles Keen (1973) proposed as Preceptive and Receptive. At present, the percentage calculation used in the post-hoc analyses seems correct, but must be validated before a definite conclusion can be made that these

scores indicate the degree of a person's cognitive style.

In-Basket Exercise Performance and Managerial Interests

The absence of a relationship between In-Basket performance and managerial interest areas suggests that the performance on the In-Basket Exercise used in this study does not depend on a priori interests. This is a positive finding, since the implication is that this test can be used in a variety of managerial selection situations, be it for Accounting, Finance, Marketing, or Personnel.

Cognitive Style and Managerial Interest Areas

It was expected that the Global thinkers would have greater interest in qualitative managerial areas than quantitative managerial areas. The literature has suggested that Global thinkers prefer "people" oriented careers, such as Personnel, or teaching (Witkin, Moore, Goodenough et al. 1977); rather than, but, this relationship was not found. No differences in managerial interest areas were found between the Articulated and Global thinkers. It is possible that these results have occurred because "people" orientation and test scores indicating a Global thinking style is no longer a valid relationship. Or it is possible that quantitative managerial interest areas such as Finance, or Ac-

counting are as much "people" oriented managerial areas as qualitative managerial interest areas such as Personnel or Organizational Behaviour.

Preceptive and Switcher thinkers did not show differences in their preferences for either Quantitative or Qualitative managerial studies. This suggests that neither Quantitative nor Qualitative studies require the specific use of Preceptive thinking, or an adaptable method of using a Switcher style.

Only Systematic thinkers differed in their preference for managerial studies. They preferred Quantitative studies in comparison to Qualitative studies. The Systematic thinkers may enjoy quantitative studies because the studies require a Systematic method of information evaluation such as, an ordered search for information or a set method for solving the problem. These relationships should be further tested to see if there is consistency between different samples to support the present findings. If there is consistency in the findings, then this information showing a relationship between the styles and career interest areas can be useful for career planning and counselling.

In-Basket Performance and Other Factors

In this study, neither age nor experience contributed to In-Basket performance. The implication of

this finding is that the In-Basket Exercise used in this study appears to be free of the effects of age and experience. However, because the sample was comprised of predominantly young prospective managers with little managerial experience, it is suggested that further research be done to support the present findings by employing a larger, more varied sample.

Limitations of the Study

Due to the inaccuracy in identifying the cognitive styles proposed by Keen, this study can only act as a preliminary analysis of the relationship between In-Basket Exercise performance and cognitive style. In fact, Keen's (1973) cognitive styles should be clarified before use in any subsequent research. In support of this criticism, Keen and Bronsema (1981) in an unpublished manuscript suggested that the MBTI may be a better test of the Keen (1973) styles rather than the cumbersome battery of tests used in the original study.

It was hoped that all thinking styles of interest would be represented in the sample. However only six of the seven styles were identified. Every attempt was made to identify the Keen styles, but this proved to be a difficult task. For example, the Verbal Puzzles test is not available in the form used in Keen's 1973 study. A persistent attempt was made to locate the Verbal Puz-

zles test but the test, as used in the Keen dissertation, was not available in the original form. A test similar to the Verbal Puzzles test is available from Sheridan Psychological Services. This test, the Associations IV, was not similar enough to the sample test items supplied by Keen (1973), and could not be used in this study. The result of not locating the original test was that the Intuitive style, as identified by Keen, was not determined, and the Systematic cognitive style had to be identified using an adapted method.

There was also some difficulty in understanding how scores were determined in the Keen dissertation, since scoring directions from the actual tests did not fit with the scoring criteria presented in the Keen (1973) dissertation. For instance, most of the cognitive style tests, Closure Flexibility (Concealed Figures), Paper Folding Test, Choosing a Path, and Identical Pictures, indicated that wrong answers would be subtracted from total test scores. However, in using the Keen method for determining standard scores, it was evident that wrong answers could not be deducted without reducing scores to very low levels. Thus, wrong answers were not subtracted from totals on any of the cognitive style test scores used in this study. Another example of the ambiguity in determining scores

was in the Hidden Words Test. It appeared that Keen (1973) determined the score by counting the number of lines correctly completed on the Hidden Words Test, rather than total number of words found, despite the directions on the test which inform the subject that he or she is to identify the maximum number of words in the entire test, not the maximum number of words per test line. Even though the Keen scoring method is contradictory to the directions on the Hidden Words test, it was used in order to employ the same criteria for converting raw scores to standard scores. Due to Keen's (1973) omission in supplying complete directions for scoring the tests, this researcher had to "second guess" the procedures used in Keen's (1973) study. Although an attempt was made to identify all of the Keen (1973) styles, it was obvious that a true replication of his study was impossible. It is suggested that further research use the present study's methods of determining the cognitive styles proposed by Keen (1973), to replicate the styles of Systematic, Preceptive, Receptive and Switcher.

The use of the Scrambled Words test presented yet another problem. This test, used to identify the Receptive thinker, was done well by all subjects. Nearly all the subjects received the highest possible standard

score of 7 on this test which made these results useless as a discriminating measure of Preceptive thinking ability in this study. This raises the question whether this test is generally useful as a measure of Preceptive thinking ability. It is possible that with a larger sample, non-Preceptive thinkers would be found. But as the variability in the Hidden Words Test was found, it would seem that the sample of subjects used in this study was not unique. Perhaps the Scrambled Words test is not generally useful as an indicator of the Preceptive thinking style. Other evidence which suggests the Scrambled Words test was not discriminating is anecdotal. When viewing subjects it was apparent that some subjects completed the test quickly, and with great ease, while others struggled over items, and used the full time limit to complete the test. The consequence of the lengthy time limit was that subjects encountering difficulties were not penalized for their slow pace, and all subjects received very high scores. It is recommended that the administration of this test be revamped and the time limit decreased to increase the difficulty of the test and to generate the variation in scores.

The generalizability of the results in this study to other In-Basket Exercises is problematic because

subjects were students, not applicants for a managerial position. These subjects probably felt less pressure to perform optimally because promotion or other rewards were not contingent upon their performance. This difference may have resulted in In-Basket Exercise scores not representative of potential managers' scores.

Caution must also be taken in ~~in~~ inferring that cognitive style is unrelated to administrative ability since the In-Basket used in this study does not yet have proven ability.

SUMMARY

This study found that Witkin et al.'s (1962) cognitive styles, Articulated and Global, did not affect performance on a test of administrative ability called the In-Basket Exercise. It also showed that cognitive styles proposed by Keen (1973) were not easily identified, and that problems in categorizing subjects as Preceptive, Receptive, and Switcher arose when using a ratio calculation. The true Receptive style was not identified in the sample when using Keen's method of classification, and some subjects were falsely classified as Switchers. The Systematic style, determined by an adapted method different to that of Keen's (1973) method, did not affect performance on the In-Basket Ex-

ercise. The styles of Preceptive and Switcher also did not affect performance on the In-Basket Exercise. A post-hoc analysis, using a different categorization method for the Switcher, Receptive and Preceptive cognitive styles, did show a relationship with In-Basket performance. The Receptive style accounted for small but significant amounts of variance in three In-Basket dimensions: Decisiveness, Interaction with People, and Content. However, due to the small Receptive group size, these findings should be considered as tentative indicators of a relationship between test scores on cognition tests and In-Basket performance. It was also found that subjects with a Switcher cognitive style did better than those with purely a Preceptive or Receptive cognitive style on the Decisiveness dimension of the In-Basket Exercise. It was suggested that further research be undertaken to validate this method of identifying the cognitive styles of Systematic, Receptive, Preceptive and Switcher.

The absence of a relationship between Witkin et al.'s (1962) cognitive style dimension of Articulated/Global and In-Basket performance was a promising indication that the In-Basket used in this study does not require either thinking style to be answered successfully. Other findings suggest the

In-Basket Exercise used in this study is of a superior quality. For example, interest areas, age, and experience had no effect upon the scores for any of the six dimensions of administrative ability measured on the In-Basket Exercise.

An interesting relationship was found between the Systematic cognitive style and managerial interest areas grouped as Qualitative or Quantitative. Systematic thinkers preferred quantitative managerial interest areas, and Non-Systematic thinkers preferred qualitative managerial interest areas. It was suggested that further research might contribute to the area of career planning and counselling.

Ideas for Future Research

Given the limitations and methodological problems in this study, some noteworthy relationships were found. Further research might be done to understand the relationship between cognitive style and administrative ability, as measured by the In-Basket Exercise. This study should be replicated using female managers, or potential female managers in order to identify any sex differences. Other studies should be conducted by employing practising managers, since differentiation in using a particular cognitive style may be more pronounced once people are working at a particular job.

Attention might also be given to the examination of relationships among other cognitive style dimensions and In-Basket performance. For instance, the MBTI styles are considered by Keen and Bronsema (1981) to be the most useful construct in understanding the relationship between cognitive style and management information systems and, therefore, may be useful in understanding the relationship between cognitive style and In-Basket performance.

More research incorporating the two domains, measurement of managerial behaviour and cognitive styles, is encouraged because it is felt that the information derived from these studies will most certainly add to our understanding of what makes a good manager, and may add to our understanding of what predicts managerial success.

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APPENDIX A

Scoring Criteria for the Determination of Cognitive Styles

WITHIN COGNITIVE STYLES

Group Embedded Figures Test - Determination of
Global and Articulated
Thinkers

QUARTILES	SCORE
1	0 - 9
2	10 - 12
3	13 - 15
4	16 - 18

(From Table 6, Manual for the Group Embedded Figures
Test, 1971).

Those scoring in the bottom two quartiles were
considered to have a Global cognitive style. Those
scoring in the top two quartiles were considered to
have an Articulated cognitive style.

KEEN COGNITIVE STYLES

Determination of Keen's (1973) cognitive styles used the following cut-off scores, and equations.

	Standard Scores						
	1	2	3	4	5	6	7
CAP	1-9	11	12	14	15	17	18+
PF	1-9	11	12	14	15	16	17+
SW	1-12	15	20	22	25	33	34+
IP	1-61	71	76	79	83	91	92+
CF	1-45	48	53	59	64	71	72+
HW	1-20	23	27	29	32	37	38+

CAP=Choose a Path

PF= Paper Folding

SW= Scrambled Words

IP= Identical Pictures

CF= Closure Flexibility (Concealed Figures)

HW= Hidden Words

Equations used to Determine Cognitive Styles

Systematic Thinking Style

$$CP + PF$$

$$= \frac{\quad}{\quad}$$

$$CP(max) + PF(max) \text{ or } 14$$

Receptive Thinking Style

$$IP + CF$$

$$= \frac{\quad}{\quad}$$

$$IP + CF + SW + HW$$

$$= >60\% \text{ and Preceptive } <60\%$$

Preceptive Thinking Style

$$SW + HW$$

$$= \frac{\quad}{\quad}$$

$$SW + HW + IP + CF$$

$$= >60\% \text{ and Receptive } <60\%$$

Switcher Thinking Style

$$\text{Receptive Thinking Style } >60\% \text{ and}$$

$$\text{Preceptive Thinking Style } >60\%$$

RE-CATEGORIZED STYLES USED IN POST-HOC ANALYSES

Preceptive Thinking Style

$$SW + HW$$

$$SW(max) + HW(max) \text{ or } 14$$

$$= >60\% \text{ and Receptive } <60\%$$

Receptive Thinking Style

$$IP + CF$$

= -----

$$IP(max) + CF(max) \text{ or } 14$$

$$= >60\% \text{ and Preceptive } <60\%$$

Switcher Thinking Style

$$\text{Preceptive } >60\% \text{ and}$$

$$\text{Receptive } >60\%$$

APPENDIX B

Table 3

Group Means, Standard Deviations, and F Values
For Systematic and Non-Systematic Thinkers On
Six In-Basket Exercise Dimensions

I-B Dimension	Cognitive Styles		F Values df, 1,42
	Systematic n=17	Non-Systematic n=27	
Organization	55.3 SD=14.2	57.4 SD=12.0	.28
Productivity	40.4 SD=9.4	45.0 SD=12.6	1.7
Preparation For Action	27.5 SD=27.3	29.2 SD=25.1	.04
Decisiveness	58.5 SD=22.2	63.5 SD=21.2	.56
Interaction With People	49.8 SD=22.3	45.5 SD=26.7	.3
Content	46.3 SD=16.1	41.2 SD=17.0	.98

*= $p < .05$ **= $p < .01$

Table 4

Group Means, Standard Deviations, and F Values For
Switchers and Preceptive Thinkers on Six
In-Basket Exercise Dimensions

I-B Dimension	Cognitive Styles		F Values df, 1,42
	Switchers n=27	Preceptive n=17	
Organization	55.6 SD=12.5	58.2 SD=13.3	.46
Productivity	43.9 SD=9.9	42.3 SD=14.0	.19
Preparation For Action	29.1 SD=24.7	27.7 SD=27.9	.03
Decisiveness	64.7 SD=19.3	56.3 SD=24.4	1.52
Interaction With People	52.5 SD=22.3	38.7 SD=27.1	3.41
Content	45.0 SD=17.8	40.3 SD=14.6	.82

*= $p < .05$

**= $p < .01$

Table 5

Correlational Matrix Comparing Witkin's
Cognitive Styles and Keen's Cognitive Styles

Witkin's Cognitive Style	Keen's Cognitive Styles		
	Systematic	Preceptive	Receptive
Articulated	.36	-.30	.30
Global	-.36	.30	-.30

Table 6

Group Means and F Values For Five
Managerial Interest Groups On Six
In-Basket Exercise Dimensions

I-B Dimensions	Managerial Interest Areas					F Value df, 4, 39
	Mark n=12	Acc/Fin n=12	Pers/Ob n=7	Man Sc n=9	Other n=4	
Organization	52.5 SD=8.4	59.2 SD=9.2	62.9 SD=20.6	51.1 SD=11.7	62.5 SD=15.0	1.6
Productivity	46.5 SD=14.4	44.4 SD=10.8	38.4 SD=9.3	44.3 SD=10.3	36.0 SD=9.3	.99
Preparation For Action	29.1 SD=27.0	33.4 SD=27.2	21.2 SD=21.2	34.2 SD=26.5	12.5 SD=25.0	.74
Decisiveness	62.5 SD=20.7	57.0 SD=24.4	72.7 SD=22.0	55.8 SD=18.3	65.8 SD=22.9	.8
Interaction With People	52.6 SD=23.5	38.8 SD=24.1	45.3 SD=25.6	61.4 SD=22.4	61.4 SD=28.5	2.05
Content	39.0 SD=11.9	38.8 SD=16.1	54.4 SD=19.8	46.0 SD=17.5	42.5 SD=20.8	1.3

Mark = Marketing
 Acc/Fin = Accounting, Finance
 Pers/Ob = Personnel, Organizational Behavior
 Man Sc. = Management Science
 Other = International Business, Transportation
 * = $p < .05$
 ** = $p < .01$

Table 12

Group Means, Standard Deviations, and F ValuesFor Three Age Groups of In-Basket ExerciseTest Takers on Six In-Basket Exercise Dimensions

I-B Dimensions	Age Groups			F Value df 2,41
	20 - 29 n=30	30 - 39 n=12	40+ n=2	
Organization	55.3 SD=10.7	57.5 SD=16.6	70.0 SD=14.2	1.3
Productivity	43.6 SD=11.4	44.8 SD=11.1	28.5 SD=10.6	1.8
Preparation For Action	30.3 SD=27.0	21.3 SD=22.1	46.5 SD=19.1	1.0
Decisiveness	61.9 SD=20.3	65.0 [*] SD=24.1	36.0 SD=9.9	1.6
Interaction With People	48.3 SD=23.5	49.2 SD=28.4	18.5 SD=2.1	1.4
Content	43.1 SD=16.2	45.7 SD=18.7	29.5 SD=3.5	.8

*= $p < .05$ **= $p < .01$