

SOME FACTORS AFFECTING PROBLEM SOLVING
EFFECTIVENESS IN BUSINESS.

A STUDY OF MANAGEMENT CONSULTANTS

BY



PETER F. WADE

A thesis submitted to the Faculty of Graduate Studies and Research of
McGill University in partial fulfilment of the requirements for the
degree of Doctor of Philosophy.

Faculty of Management
McGill University

October, 1981



Some factors affecting problem solving effectiveness

Peter F. Wade
Ph.D.
Management

Acknowledgments

My prime debt is to my wife and family who have provided moral and tangible support during the many years I have been occupied with this project. David, my son, was my research assistant..

Next I must acknowledge the efforts of the 250 consultants who spent hours carefully completing the questionnaire and their firms who have provided steady encouragement for the project. In particular, I am indebted to the firm, Currie, Coopers & Lybrand Ltd. and J.E. Daccord, the managing partner, for their help.

I would also like to acknowledge the assistance provided by my committee, H. Mintzberg (chairman), J. Gratwick and R. Kanungo. Their ideas, encouragement and patience were much valued.

This project received financial support from the Canadian Association of Management Consultants, The Institute of Management Consultants of Quebec and The Institute of Management Consultants of Ontario, for which I am grateful.

Abstract

Previous research has concluded that individuals develop relatively invariant problem solving 'styles' which cause them to be more comfortable and effective in certain task environments.

This study of management consultants, employing a self description questionnaire, found that fifteen measured attributes clustered onto three factors: a line/staff orientation, a grounded/ungrounded approach to problem conceptualization, and a rational/instinctive approach to conclusion drawing. Attributes were analyzed by functional area, consulting firm, task effectiveness, potential to become a partner, etc. Task performance ratings and personality assessments were provided by supervisors.

It was found that many of the attributes studied did not correlate with task effectiveness ratings, but did with other assessments made by the supervisors. Many predicted behavioural characteristics were confirmed. Certain attributes were found to cluster by function and firm. Some claims made for the Myers-Briggs Type Indicator and Kolb Learning Style Inventory were confirmed.

Résumé

Des recherches antérieures ont permis de conclure que les individus développent, en général, des styles consistants pour résoudre des problèmes; ceci les amène à se sentir plus à l'aise et efficaces dans des contextes de travail spécifiques.

Cette étude, qui porte sur les conseillers en gestion et emploie un questionnaire descriptif de la personne, a permis de constater que les quinze attributs mesurés peuvent être résumés sous trois dimensions: orientation opérationnelle/de soutien, approche systématique/non systématique de la formulation de problèmes et approche rationnelle/intuitive pour arriver à une conclusion. Les attributs ont été analysés par fonction, par cabinet de consultation, par niveau d'efficacité, par potentiel à devenir un associé, etc. Les taux de performance et les évaluations de la personnalité ont été fournis par les superviseurs.

Il a été constaté que plusieurs des attributs ne semblaient pas affecter les taux d'efficacité mais semblaient coïncider avec d'autres caractéristiques que les superviseurs avaient perçues. Plusieurs des caractéristiques de comportement prédites ont été confirmées. Certains attributs furent regroupés par fonction et par cabinet. Certaines analyses faites pour le Myers-Briggs Type Indicator et Kolb Learning Style Inventory furent confirmées.

Table of Contents

ACKNOWLEDGMENTS	i
ABSTRACT	ii
PREFACE	vii
CHAPTER I. INTRODUCTION	I.1
CHAPTER II. REVIEW OF THE LITERATURE	II.1
A. Summary of Findings	II.2
B. Methodology Employed in Research Studies	II.4
C. Characteristics of Business Problems	II.6
D. Measuring PS Effectiveness	II.7
E. Some Task Taxonomies	II.9
F. The PS Process	II.12
G. PS Styles and Pathologies	II.14
CHAPTER III. EXPERIMENTAL FRAMEWORK AND STATEMENT OF THE PROBLEM	III.1
A. Model of the Problem Solving Process	III.1
B. Measures of PS Effectiveness	III.14
C. Task Variables to be Considered	III.16
D. Personal Attributes to be Measured	III.19
E. Problem Statement	III.21
CHAPTER IV. METHODOLOGY	IV.1
A. General Approach	IV.1
B. Development of the Questionnaires	IV.2
C. Selection of the Sample	IV.4
D. Conduct of the Survey	IV.5
E. Processing of Questionnaire Data	IV.6
CHAPTER V. RESULTS AND ANALYSES	V.1
A. Characteristics of the Sample	V.1
B. Consistency of Supervisor Assessments	V.3
C. Correlations Between Supervisor and Consultant Ratings of Attributes and Performance	V.4
D. Supervisor Task Requirement Constructs	V.4
E. Validity and Inter-correlations of Instruments	V.14
F. Distribution of Performance Ratings and Attribute Scores	V.15
G. Development of Composite Factors for Attributes	V.24
H. Correlation Between Attribute Measures and Task Performance	V.37
I. Analysis of Consultant Attributes by Function	V.44
J. Analysis of Consultant Attributes by Consulting Firm	V.48
K. Analysis of Consultant Attributes by Education	V.50
L. Analysis of Consultant Attributes by Sex	V.50
M. Correlation Between Consultant Attributes and Age	V.52

Table of Contents (continued)

CHAPTER VI: CONCLUSIONS	VI.1
A. Tests of Hypotheses	VI.1
B. Contribution to Methodology of PS Research	VI.4
C. Factors Affecting PS Effectiveness	VI.16
D. Implications for Consulting Firms	VI.18
E. Implications for Other Areas	VI.24

BIBLIOGRAPHY

APPENDICES

Appendix A. A Summary of PS Research Methodologies
Appendix B. A Discussion of Analytic vs Intuitive Thinking
Appendix C. Steps in a Consulting Assignment
Appendix D. Details of Instruments Used in the Study
Appendix E. Some Observations About Man's Ability to Assess Uncertainty
Appendix F. Instructions to Survey Coordinators
Appendix G. Supervisor-consultant Correlations
Appendix H. Validity and Inter-correlations of Instruments Used in the Study
Appendix I. Correlations Between Factors and Consultant Attitudes and PS Behaviour
Appendix J. A Comparison of Attributes Related to Task Performance - Self Assessed vs Supervisor Assessed
Appendix K. Correlations Between Age, Attributes and Attitudes
Appendix L. Author's Attribute Profile
Appendix M. Coding Details
Appendix N. Questionnaire #1. "Questionnaire on Management Consulting and Personal Approaches to Problem Solving"
Appendix O. Questionnaire #2. "Consultant Effectiveness Assessment"
Appendix P. Questionnaire #3. "The Supervisor's Views and Background"

List of Tables

<u>Table</u>		<u>Page</u>
V.1	Inter-supervisor Differences When Assessing Same Consultant	V.3
V.2	Differences Between Supervisor's Assessment and Consultant's Self-assessment	V.5
V.3	How Supervisors Appear to View the Ten Tasks in Terms of Problem Phase Component and Personal Attributes Required	V.11
V.4	Summary of Performance Assessments Made by Supervisors	V.22
V.5	Comparison of Portrait Results vs Factor #1 Scores	V.29
V.6	Task Performance vs Consultant Attributes	V.38
V.7	Consultant Attributes Summarized by Functional Specialty	V.45
V.8	Functional Groupings - Rank of Group Scores by Attributes	V.46
V.9	Expected vs Observed Attribute Profile by Functional Specialty	V.47
V.10	Consultant Attributes Summarized by Consulting Firm	V.49
V.11	Consultant Attributes Summarized by Education	V.51
V.12	Consultant Attributes Summarized by Sex	V.53
VI.1	F Values from Group Analyses Corresponding to Factor Scores and Scores on Myers-Briggs and Kolb's LSI Instruments	VI.9
VI.2	Factor Correlations Relevant to Interpretation of Terms 'Intuitive' and 'Analytic'	VI.11-VI.13
VI.3	Table of Factors Thought to Influence Consultant Effectiveness and Adaptation	VI.21

Preface

When I started work on this topic seven years ago, I had been a management consultant for 15 years having a strong quantitative orientation that resulted from my Maths and Physics education and six years as an applied statistician.

I had found that in the business environment my clients and colleagues showed little interest in, or understanding of, the methodology and language which had become so much a part of my thinking and problem solving processes. What was the reason? Was it in fact just a lack of education which would be overcome with the new generation of managers or was it something deeper - a genuine mismatch of some sort, where perhaps the methodology did not in fact meet real needs or where it was too difficult for many people to internalize the approach, to absorb the language of probability into their day-to-day thinking processes, especially without any strong motivation on their part?

By 1973, others had become concerned about the subject and a body of literature was starting to emerge on the topic of implementation difficulties experienced by operations researchers and decision support scientists. I prepared a summary of the reasons advanced for these difficulties. In general, few doubts¹ were expressed about the usefulness of the approach of the management scientist. The problem lay, it was claimed, with such factors as the position of the project sponsor in the organization (was he powerful enough to give it enough support?). Was the management scientist arrogant in his approach? Did he communicate well? Did he attend to the political demands of his job? At the same time there was a continuing debate started by Churchman and Schainblatt (1965) about who (the researcher or manager) should make the effort to

¹Grayson (1973) was a notable exception.

understand the other's needs and thought processes.

My second literature search then started on the subject of differences in values, personality and outlook of managers and management scientists. I found that management scientists not surprisingly had many characteristics in common with the natural scientists (for example, they were oriented to abstractions and things rather than people); whereas managers were not so easily classified. The environment of the latter was consistently 'wicked'--dynamic, unstructured, 'soft'--but managers were a diverse group and adjusted to this environment with a wide variety of styles. Ranking styles by effectiveness was a difficult task.

By this time it was evident to me that the problems experienced by management scientists bore a striking similarity to those experienced by individuals in management advisory services. This parallel was also recognized in the "Guidelines for the Practice of Operations Research" (Operations Research Society of America, 1971).

Consequently, my third literature search concerned management consultants and management advisers in general. How did advisers obtain a position of trust and credibility? What were the characteristics of successful advisers? What kind of problems had been identified in interpersonal relationships? Were certain manager types better served by certain adviser types? This got me involved in the subject of communication and persuasion and I was diverted for some time by the experiments of Hovland and others (1957) on changing attitudes through the use of specific strategies in subject presentation:

Some conclusions on these matters were summarized in a paper "Interpersonal Factors Contributing to the Success or Failure of a Consulting Engagement", 1977. Briefly, I was unable to find more than a dozen relevant research studies. There was no shortage of speculation and opinion. While I got few answers, I was beginning to develop some ideas about my research project. Also, in observing myself and my colleagues at work with clients, I was struck by how little we really seemed to know explicitly about our craft. I noticed that each consultant appeared to have his own approach to fact finding, conclusion drawing and

prescription. Differences in approach between a consultant and his supervisor were the most likely to surface, especially where there was a conscientious attempt to develop and adhere to a work plan. What caused these differences: education, previous work experience, personality? This lead me to the final subject for a literature search: Problem Solving Behaviour in Business.

I should have known better than to tackle such a broad and diffuse topic. There is no single discipline associated with this subject of enquiry. It is a matter of interest for philosophers, psychologists, management researchers, sociologists and behavioural scientists, to name a few.

I started with the early philosophers and their views on the thinking process and proceeded from there. The purpose of the review was to gain a general familiarity with research into this domain: What theories or models have been developed? What methodology has been employed? What findings and conclusions have been produced to date? What are considered to be the major difficulties in research approaches?

The findings are summarized in a paper, "Problem Solving Behaviour in Business - A Notebook", which I completed in April 1979. In the paper I developed the framework for the research carried out for this thesis.

The present study explores a number of aspects of problem solving behaviour in business and attempts to synthesize some of the findings of other researchers.

The areas in which this study may be considered to make an original contribution to PS research are:

- (a) the experimental framework which included the identification of personal attributes with potential for affecting PS behaviour, and instruments to measure them;
- (b) the development of conclusions concerning the relevance of the attributes measured and their effect on task effectiveness in a real life environment;

- (c) the eliciting of task dimensions important to consultant supervisors in staff deployment;
- (d) the development of scores and their inter-correlations for two standard instruments (Myers-Briggs Indicator and Kolb's Learning Style Inventory) administered to a group of professionals.

Previous research which I consider of particular relevance to the study was that conducted by Keen (1973) on cognitive styles, by Duncan (1971) on the adaptation of beginning consultants, by Daccord (1967) on consultant effectiveness, and by Mitroff, Barabba and Kilmann (1977) on applications of the Myers-Briggs Indicator.

To alert the reader to possible areas of bias in this thesis, I have included Appendix L which documents the author's own scores on the instruments used in the study.

Chapter I

Introduction

This research project will deal with the topic of problem solving (PS) behaviour by individuals in business. Problem solving in this context includes the process of problem finding and formulation, the development of solution alternatives, the eventual choice of a solution and its implementation. While the term decision making seems to be used in the literature to refer more to the process of choice from a set of alternatives which have been presented, we will use the two terms synonymously.

Decision making (DM) in various forms is one of the chief activities in business and professional life, yet little is known about how differences in individual PS styles and organizational climate influence DM effectiveness.

The need to gain a greater understanding of business decision making becomes even more important with the trend to larger and larger organizations, since:

- the consequences of a decision can be greater;
- a poor decision can be less easily rectified;
- the chief executive finds it more difficult to determine what is happening in his organization;
- more of the decision making is delegated.

Also, because of increasing specialization, managers must rely to a greater extent on the opinion of staff men and outside experts. Final decisions are thus based more and more on 'uncommitted thinking' (thinking that is not internalized but taken on faith from creditable authorities). De Brabander and Edstrom (1977) call this 'agreement without conviction' (p. 193).

In the past 20 years, two developments were heralded as offering a major contribution to organizational decision making: management science and computer technology. Results, however, have been disappointing, since many of the promised dramatic improvements have not materialized. In the past few years, three groups, management scientists, accountants, and data processing workers, have shown concern over this lack of progress and have added their efforts to those of management researchers and cognitive psychologists toward gaining insight into the thinking and problem solving process.

While the benefits from research of this nature are more speculative than realized at this point, it would seem conceivable that, eventually, results from such studies could be used to:

- train individuals to be more effective problem solvers;
- provide criteria to enable individuals to be matched more effectively with functional areas and tasks;
- contribute to the development of an improved climate and motivation for problem solving activities;
- improve computerized decision support systems for problem finding and problem solving;
- help to explain why some people work well together;
- improve communications between individuals with different thinking styles and thus improve the process of task delegation and the use of management advisers.

It is also likely that the findings will be transferable to other areas where judgment plays an important role, e.g., clinical medicine.

We have limited the scope of the research to an examination of individual rather than group problem solving. This was based on a belief that reality can be maintained (many consultants, for example, act as individual problem solvers), while involving fewer variables and interactions. In organizational life, while many decisions are group decisions, fact finding, model building, and alternative generation are frequently performed by an individual. Evaluation and acceptance are usually group processes at least covertly if not overtly.

Scope of the Research

Most of the research to date on the problem solving behaviour of individuals in business has involved laboratory environments. Subjects (frequently students) were observed while performing simulated or puzzle-like tasks. Often the task, unlike a business problem, had a correct answer. Rarely were the tasks ego-involving nor were there severe time constraints. There has thus been some concern over the validity of generalizations from such studies to real life.

For our project, we were interested in (a) learning more about problem solving behaviour under real conditions, and (b) testing some of the conclusions which have been made to date.

The kinds of questions we wanted to explore were:

- Do individuals have certain personality attributes and/or PS styles which make them more effective for certain tasks?
- What factors (e.g., education and business experience) can account for the relevant personality attributes and/or PS styles?
- Do individuals categorized by instruments such as the Myers-Briggs Type Indicator really exhibit the PS behaviour that has been attributed to them?

It was decided to use management consultants as subjects in the study for the following reasons:

1. They work on a range of assignments which are, we believe, representative of a large segment of business problems.
2. Many work as a team of one on a project and conceptualization and prescription are performed in most cases by the consultant himself although the degree of autonomy normally accorded the consultant will vary with the individual supervisor and the experience of the consultant.
3. Consultants are usually objective in the sense that they are not directly involved in the outcome of the solution and are therefore not unduly motivated by self-serving considerations. Consequently, a good solution for them will be assumed to be one that is 'good' for the client in some objective sense.

4. They normally work under rigid time constraints.
5. There is high uncertainty in their working environment.
6. They are used to developing work plans where the PS approach to be followed is documented.
7. The author was familiar with the consulting environment.

A major constraint on the modus operandi of the research methodology was that the author was employed by one of the major Canadian consulting firms, which could not easily be left out of the study. This created two problems:

- the requirement for absolute anonymity of the participants since delicate personal assessments would be made of fellow consultants;
- the need to avoid any appearance of requesting proprietary information from individuals from competing consulting firms (even though all research data would be kept confidential).

Because of the above, it was decided to ask the consultants to complete a questionnaire rather than use personal interviews or direct observation. PS performance would be evaluated by one or more supervisors by means of a questionnaire.

Before the questionnaires could be developed, several steps had to be completed:

- A set of prototype tasks had to be developed. This would involve:
 - finding a meaningful set of underlying dimensions on the basis of which to differentiate the tasks to be used;
 - developing a set of tasks along the continuum or at the extremes of the underlying dimensions, subject to the constraint that they must not be function-specific since consultants from all functional areas would be involved.
- An instrument to measure effectiveness had to be developed.
- The key personality/cognitive attributes to be measured had to be identified and instruments found or developed.
- Profiles characterizing behavioral types had to be developed.
- Some background information on the consultant, the evaluating supervisor and the working environment had to be compiled to help to explain the findings.

The study will be discussed under five headings:

Chapter II - Review of the Literature

Chapter III - Experimental Framework and Statement of the Problem

Chapter IV - Methodology

Chapter V - Results and Analyses

Chapter VI - Conclusions

Chapter II

Review of the Literature

The processes of thinking, judgment and problem solving have been the subject of speculation for centuries. However, when the methods of empirical science were being applied to all aspects of human life at the end of the 19th century, one of the last areas to be examined was the human mind and human behaviour. There are, of course, reasons for this: the scientific method, heavily dependent on observation, controls, experimental designs, and measurements, runs into trouble when it has to deal with 'inconsistent' humans and invisible thought processes. While the early researchers concentrated on the learning process, working with animals and children, the problem solving behaviour of adults attracted more interest in the late 1930's and has received strong stimulus from those working on managerial behaviour. Unfortunately there is still no single discipline which concerns itself with problem solving behaviour and is the sole authority for screening related conclusions and theories. As a result, researchers from many disciplines have attempted to penetrate the mysteries of the subject with methods which lack uniformity. The quality and validity of published work is consequently uneven and difficult to synthesize.

In this chapter we will review work to date on PS styles under the headings:

- A. Summary of Findings
- B. Methodology Employed in Research Studies
- C. Characteristics of Business Problems
- D. Measuring PS Effectiveness
- E. Some Task Taxonomies
- F. The PS Process
- G. PS Styles and Pathologies

A. Summary of Findings

What do we know about thinking and decision making styles?

- Do people over time develop a distinctive style? If so, how can such styles be characterized? What can account for them?
- Can such styles be altered?
- Do these styles have any impact on an individual's effectiveness in different situations?

These are the questions which we wanted to explore.

Different thinking styles or PS types have been identified by philosophers and other observers over the century. We see references to doers vs thinkers, analytics vs intuitives (Morris, 1967), similarity people vs difference people (Mathes, 1969), satisficers vs optimizers (Simon, 1957). In most cases the terms are used without operational definitions and yet in some way we think we know what is meant.

In the past 10-15 years attempts have been made to define these constructs more precisely, frequently by the development of an instrument or procedure to characterize individuals (e.g., Huysmans, 1970; Zmud, 1979; Keen, 1973). Such attempts are usually empirical in nature, trying to develop a classification for the varieties of styles which have been observed among individuals. Studies have indicated, however, that there is relatively little correlation among instruments developed for the same attribute or style (Zmud, 1978; Vasarhelyi, 1973).

Few theories have been advanced to explain why one individual should have one style and another individual a different style. Jung, the psychologist, developed a theory for psychological types which required four dimensions and these dimensions, measured with the Myers-Briggs Type Indicator, have been widely used (Jung, 1923). Das et al. (1979) are working on studies of parallel vs sequential thinking styles. After his Ph.D. research on cognitive styles (1970), Doktor found that the portion of the brain used by an individual to do his thinking can help to differentiate him as an 'analytic' vs an 'intuitive' (Doktor and Bloom, 1977).

Most researchers feel that culture (e.g., Ornstein, 1972) and education (Doktor, 1970; Altemeyer, 1966) have the greatest influence in shaping our PS predispositions. Once we reach the work place, our predispositions must meet the particular demands of the environment. Of those individuals finding a significant mismatch, some will adapt by modifying their style, some will move to a more compatible atmosphere and some will remain, uncomfortably, without major adaptation. Rarely will the general climate of the work place be altered to accommodate the predisposition of the incumbents (O'Reilly, 1977).

How stable are PS styles and can they be altered by special training? There seems to be disagreement on this. Researchers like Keen (1973) have maintained that the habits become ingrained after university graduation and are difficult to change. On the other hand, Chervany and Dickson (1978) claim that PS style changes with the demands of the task. Possibly both are true and some individuals are less flexible than others. We will explore this.

Finally, regarding the impact of style on effectiveness, there is more speculation than actual experimental data. Much of this is due to the measurement difficulties which are inherent in the assessment of effectiveness. Time taken is usually the measure adopted. We can compare the performance of two individuals in this manner when a correct solution is known, but what do we do when the solution produced in each case is different along some, if not many, dimensions? Even more realistic is the situation where the time to be taken is imposed and the objective is to produce the 'best' solution feasible under the constraints.

If we look at other measures for effectiveness for problems with 'correct' solutions, there seems to be a certain acceptance of the notion that an 'analytical' approach to an 'unstructured' problem can end up 'way off the mark' (Peters et al, 1974).

Analysis and rationality are great but only under appropriate conditions (Roberts, 1980). Even here we seem to slip into the mire of ambiguity

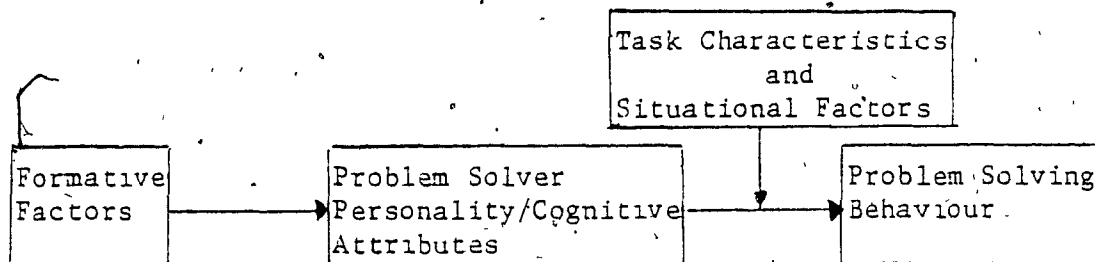
because one is not sure whether everyone is talking about the same thing. Is it 'analytic thinking' or 'the use of analytic techniques' that is at issue (Leavitt, 1975)? We cannot resolve the matter here. All we can say is that the jury is still out on the matter of effectiveness.

What other areas may different PS predispositions affect? There would seem to be at least three: the type of working environment with which the individual feels compatible (Kilmann and Mitroff, 1976); the effectiveness with which he can communicate his ideas to another (Doktor and Hamilton, 1973; Huysmans, 1970); and the kinds of decision aids which he finds most useful (Lucas and Nielsen, 1980; Benbasat, 1974). Only the first has any direct relevance to our study since we will be looking at the similarity of PS predispositions by functional group and consulting firm.

In the remainder of this chapter we will look at some of the topics raised above in more detail.

B. Methodology Employed in Research Studies

A number of frameworks have been proposed for conducting or summarizing business PS research (e.g., Chervany, Dickson and Kozar, 1972; Lucas, 1973; Mock, 1973). The one that we found most useful for our survey (shown below) is similar in many respects to that of Chervany, Dickson and Kozar.



Major Components in Studies of Individual PS Behaviour

The various research studies have had as their objective:

- categorizing individual PS behaviour
- determining the stability of PS behaviour for an individual across time and task
- determining the effect of situational factors
- assessing the effectiveness of different PS approaches
- correlating the approaches with the individual's personality/ cognitive attributes and/or formative factors

Research on PS in business must face all of the normal problems encountered in the social sciences plus the need to enlist the cooperation of business managers and organizations for field studies. Since time is a scarce commodity, and executives in the past have not been convinced of the usefulness of such research, most studies have been conducted under laboratory conditions.

The various techniques used in PS research to record or elicit the individual's behaviour are summarized in Appendix A. Most of them take the form of visual observation or a trail of his thought processes as he works through some task (obtained from tape recordings, computer session records, or memos and reports).

Some specific limitations of the research conducted to date are summarized below:

- It is difficult to make statements concerning the effectiveness of PS styles, there usually being no single correct answer to a business problem.
- There are too many models, most of which are unrelated. Keen (1973) calls the field 'disturbingly fragmented' (p. 1.12). Consequently:
 - There is no agreement regarding which personality attributes/ behavioural characteristics are most appropriate for describing a style.
 - There are no standard instruments to describe such attributes as 'tolerance for ambiguity', and 'analytic/intuitive' predisposition. As a result, there is no definitive meaning for a term

such as 'intuitive'. This leads to confusion.

- There are no standard tasks (real life or otherwise) which can be used to compare styles. There is even no agreement on the dimensions which should differentiate such tasks. Until recently, there has been an almost total preoccupation with problems falling into a relatively small number of categories. The main foci of cognitive theory and research have been manipulative (usually visual) problems, verbal problems (e.g., three-term series problems, anagrams, etc.) and computer simulated problems.
- Many of these have a single correct answer and a short ($\frac{1}{2}$ -2 hour) time duration.

- Many of the conclusions conflict.

Given the above, and the fact that most studies have been carried out under artificial conditions, it has been considered hazardous to try to generalize their conclusions to the business environment.

C. Characteristics of Business Problems

A problem is said to exist when information necessary for the attainment of a goal is lacking (Nelson, 1973; Mayer, 1977; Pounds, 1969; Simon, 1960). It is important to note that, as Johnson (1971) points out: "A problem is a personal thing. It is not a characteristic of a situation." (p. 63). It can be created, for example, by a change in the individual's expectations, as well as by a change in the environment (or his perception of the environment).

There are certain characteristics of most business problems which differentiate them from well-defined mathematical problems which have solutions:

1. The problem initially is frequently not well defined. The task may be to determine: Do we have a problem and, if so, what is it (i.e., diagnosis)? (Reitman, 1964).
2. The scope of the problem, as presented, may be artificially bounded, due to such factors as the sponsor's area of jurisdiction (e.g., "Don't look at the costing system because I can't do anything about

that.").

3. The problem must be solved within available time and resource constraints (e.g., "I need the answer before the end of the month. It's year-end.").
4. It is frequently difficult to state in advance what will be considered an acceptable solution (Minsky, 1963; Reitman, 1964). Two factors may help to account for this:
 - What is acceptable may be governed by what is feasible under the circumstances. As Reitman (1964) says: "One may solve one's problems not only by getting what one wants but also by wanting what one gets." (p. 305).
 - The criteria which are used to evaluate alternatives are frequently implicit and multi-dimensional.
5. The elapsed time for the study may extend over days or weeks.
6. Final evaluation and/or acceptance may be a group process thus diluting decision accountability.
7. It is difficult to evaluate a solution 'after the fact'. Most situations are dynamic: people move, conditions change. Even if a solution does not work as planned, it is difficult to determine whether a more effective solution could have been developed at the time and under the prevailing conditions.

For these reasons and the general complexity of business problems, it is usually accepted that most problems have no single 'right' answer. In other words the objective is to come up with a workable solution within the time and resource constraints.

D. Measuring PS Effectiveness

Given the above, it is easy to understand why the problem solving scoreboard in most corporations stands empty. Instead, individuals develop a reputation, a non-objective 'track record' which can be manipulated. Good performance is sometimes achieved more by staying out of trouble than by achieving notable successes--since failures seem to be difficult to erase from the minds of others.

Greenwood (1969) offers some quotes regarding executive views of DM success.

"I'd say that 300 is a good batting average in our business."

"The difference between a successful executive and an unsuccessful one is the difference between being right 52% and only 43%." (p. 47)

In our review of the literature concerning management consultants (Wade, 1977; p. 30), we found that clients rated their performance as being satisfactory or better somewhere in excess of 50% of the time.

In other areas involving professional judgment, such as the medical profession, there are reports which also reflect a rather modest score (Goldberg, 1968; Slovic, 1972). The Ottawa Journal (April 13, 1978; p. D.5) reported that in a review of psychiatric outpatients, it was found that one-third of the 2070 patients were incorrectly diagnosed.

Because of the foregoing, some researchers (e.g., Rosenberg, 1972) have concluded that, not only is there no such thing as a single 'right' answer to most business problems, but that one cannot even compare solutions in a normative sense (i.e., is one 'better' than another?). This seems rather extreme.

In view of the difficulties to be faced by researchers, why study business activities? The answer is that there would seem to be great potential for improvement. For example, Kepner and Tregoe (1965) state: ". . . the cost of unsystematic and irrational thinking by managers is undeniably enormous." (p. 1). One impediment may be the reluctance of managers (and others) to accept that their skills in areas traditionally seen as judgmental in character can be enhanced through training (Moore, 1977; Pounds, 1969), or are even a suitable topic for study.

In PS research, the usual criteria applied to compare PS approaches are the following: time taken for the decision, the degree of optimality of the decision (for mathematical-type tasks), the confidence of the decision maker in his solution, and the cost of resources consumed (e.g., information purchased) in the decision making process (see Benbasat, 1974; Green, 1967).

E. Some Task Taxonomies

A recognized deficiency in PS research has been the absence of a workable classification scheme for business problems (Chervany and Dickson, 1978; Buckley et al, 1976). As Keen (1973) concludes: "There is a need for a taxonomy that includes the individual's response to the problem state." (p. 1.21).

We were searching for a taxonomy that would apply to a wide range of business problem situations and would permit us to formulate and test hypotheses related to individual personality and PS behaviour characteristics.

It would appear desirable that the classification of a problem not require any knowledge of the individual who would be solving the problem. (Reitman, 1964, does not agree with this. He believes a problem consists of the overt features of the problem situation coupled with those aspects of the problem solver's cognitive structure which are present "only for the duration of the particular problem.")

Also, it must be recognized that different 'communities' of problem solvers may classify a task in a different way, given the same classification scheme (Reitman, 1964). However, an acceptable taxonomy would be expected to generate a high level of agreement from any given community.

In PS research, it is unlikely that a standard set of tasks applicable across the board will ever be developed because the dimensions of the task taxonomy adopted in any instance must be related to the variables under study. In our case the key variables of interest are those personality/cognitive attributes of the problem solver which are thought to influence his effectiveness and PS behaviour.

We will now examine existing task taxonomies to see how they conform to our requirements.

The most popular one-dimensional classification schemes are:

- structured/unstructured (Mitroff and Emshoff, 1979; Bartlett, 1958)
- well-defined/ill-defined (Reitman, 1964; Minsky, 1963)
- programmed/non-programmed (Simon, 1960)
- tactical/strategic (Mitroff et al, 1977; Raiffa, 1968).

The common attribute on which all of these classifications would appear to be based is the degree of ambiguity, uncertainty or risk inherent in the task.

While researchers (March and Simon, 1958; Mason and Mitroff, 1973; Yankelovich, 1977) have attempted to differentiate between uncertainty and risk, other authors (Eilon, 1969; Edwards, 1967) have claimed that such definitions are not helpful in practice since they do not include all of the situations which may arise.

In general, the distinction made is that there is risk if the relationship between the decision variables and the outcome is known (and probabilistic), whereas there is uncertainty when we have no confidence that we know which variables are going to affect the outcome. However, these definitions are too restricting because they do not encompass other real life sources of 'uncertainty'. For example:

- i) uncertainty may stem from our not being sure about objectives, evaluation criteria, and trade-off functions;
- ii) we may be uncertain about the validity of the information provided to us;
- iii) we may not have identified the most promising alternatives;
- iv) perhaps we are concerned about what the future will bring (which scenarios will apply?);
- v) on the other hand, we may have a fair idea of which scenarios are possible, but their probability (and/or causal factors) may not be known;
- vi) we may not know which performance dimensions are affected by the alternatives;
- vii) finally, we may know the dimensions but we may not know the magnitude of the effect (even in the form of a probability distribution).

Subjective uncertainty is difficult to quantify. Even if individuals were capable of developing subjective estimates which could be related to those based on relative frequency concepts - and apparently they are not (Moore, 1977; Hogarth, 1975; Cohen, 1957; Edwards, 1967) - these estimates would vary widely depending on past experience. In practice, one rarely

sees a business proposal with any quantitative assessment of the uncertainty involved. Moore (1977) has shown that even probability words such as probable have a surprising range of interpretation. Appendix E documents a number of other conclusions concerning humans and uncertainty.

It seems to be generally agreed (e.g., Mintzberg, 1973a; Ackoff, 1974) that strategic decisions are characterized by great ambiguity, complexity, and open-endedness and are hence 'wicked' or unstructured. Operating-type decisions which are repetitive are frequently considered structured or programmable. Argyris (1961) found that most of the activities in the organizations he studied were programmable.

A number of two-way taxonomies were reviewed to see if they could add anything for our purposes.

McKenney (1973)

- relevant data are known/unknown
- mental operations and analyses required are known/unknown

Harrison (1975)

- structure (programmable/non-programmable)
- problem solving approach which is appropriate (reliance upon rules/ reliance on judgment)

Thompson (1964)

- beliefs about causation (certain/uncertain)
- preference about possible outcomes (certain/uncertain)

Buckley et al (1976)

- quality of the data (objective/subjective)
- nature of decision variable relationships (simple/complex)

With the exception of Thompson's variables which are not attributes of the problem itself but rather the individual, the taxonomies reflect an underlying attempt to try to define the uncertainty aspect more specifically.

Zand (1974) defined structured/ill-structured for productivity problems using eight dimensions. Most of these classifications are difficult to apply to real life problems, there being no anchor points.

Of all the above definitions for the structured/unstructured

categories, that of McKenney seems to be the most appropriate for our study, since the detail and flexibility inherent in a consultant's work plan is a good measure of the degree of structure he imparts to the task. However, since structure is a subjective measure depending on the perceptions of the individual problem solver, we will have to develop other task dimensions, which are objective and which will enable us to discriminate among consultants based on their personality/cognitive attributes.

F. The PS Process

Researchers have suggested a variety of models when describing the PS (decision making) process (e.g., Haywood, 1954; Bieri, 1971; Kolb and Frohman, 1970; Drucker, 1967; Simon, 1960; Myers and Marquis, 1969; Mintzberg, 1973a; Rosenberg, 1972; Mitroff, 1975).

Cognitive theorists consider decision making in terms of the types of the cognitive processes involved (i.e., those strategies, programs or other transformation processes which mediate PS behavior). Bieri (1971) has defined these as:

- selective processes (filtering information)
- organizing processes (finding patterns or integrating selected information)
- moderating or controlling processes (e.g., motives)
- adapting processes (overcoming situational constraints).

Regarding consulting, Kolb and Frohman (1970) present a general model of the 'Organizational Development' approach:

- scouting (matching the skills of the consultant with the needs of the client organization)
- entry (ensuring his legitimacy within the client organization, i.e., building credibility)
- diagnosis (identifying what change is appropriate)
- planning (deciding how to go about it)
- action (implementing the change)
- evaluation (deciding if the change is progressing as required)
- termination (picking the right time to leave)

Drucker (1967) looks at the process from the manager's standpoint, presenting the following stages:

- classification of the problem (Is it generic?)
- definition of the problem (What are we dealing with?)
- specifications which the answer must satisfy (What are the boundary conditions?)
- identification of the right alternative (not necessarily that which is 'acceptable')
- preparation and implementation of action plan (What does the action commitment have to be?)
- feedback (How is the decision being carried out?)

Simon (1960), Rosenberg (1972), Myers and Marquis (1969), and Mintzberg (1973a) all take a somewhat similar view to the preceding but specify a different number of phases.

<u>Simon</u>	<u>Rosenberg</u>	<u>Myers and Marquis</u>	<u>Mintzberg</u>
		Recognition	Problem Recognition
Intelligence	Conceptualization	Idea Formulation	Diagnosis
Design	Design	Problem Solving	Design (alternative search/screen)
Choice		Solution	Evaluation/Choice
			Authorization
	Implementation	Utilization and diffusion	

A strong thread of similarity pervades all of the foregoing: some form of conceptualization (model formulation), then an attempt to identify alternatives and finally choice. This kind of representation of the PS process is, of course, an analytical view.

In practice, there may be no such division into discrete phases. For example, the attribute classification or rote approach classifies the problem on the basis of certain attributes (symptoms) and, using

conventional 'cures' or 'trial and error', comes up with a solution without prior analysis or justification. Sometimes this can be a case of trying to solve the problem before defining it (Kepner and Tregoe, 1965; Bonge, 1972).

In the next chapter we will describe the model for the PS process that was adopted for our study. It consists of four phases:

- problem finding
- conceptualization
- prescription (alternative generation and choice)
- implementation

G. PS Styles and Pathologies

In this section we will look at some style classifications or PS strategies which have been studied by researchers. We will conclude with a description of some pathologies which have been identified. Before looking at PS strategies, we should consider the variety of specific dimensions which have been used to characterize PS behaviour. These are summarized below.

a) Conceptualization

- speed of closure (speed with which the problem solver classifies the problem and/or becomes mentally committed to a solution)
- amount of formal planning employed in fact finding
- nature of the information sought (e.g., qualitative or quantitative)
- amount of detail and variety of information sought
- the value attached to it by the problem solver
- sources used for fact finding
- sequence in which facts are gathered (e.g., progressive deepening vs linear)
- flexibility exhibited in departing from plans and previous concepts
- use of quantitative techniques
- methods of verification employed for facts obtained or conclusions developed.

b) Prescription

- number of alternatives considered
- source of alternatives (self, others and whether solutions are off-the-shelf or tailor-made)
- explicitness of criteria and rules used in evaluation
- range of state variables considered
- degree to which risk is recognized and quantified.

c) Overall

- logic and comprehensiveness of argumentation
- inventiveness introduced in some stage of the PS process
- the degree of confidence in and commitment to his conclusions, and how this confidence evolved.

In developing a PS style or strategy, most researchers have limited themselves to a few of the above possible dimensions, presumably as a result of what they have observed in field studies. We will discuss these strategies starting with some very general categories and concluding with styles which are supported by instruments.

There would appear to be at least five overall approaches which an individual might adopt in reaching a solution to a problem.

1. Ask an expert.
2. Adopt a solution which works for a 'similar' problem (the off-the-shelf approach).
3. Use the 'trial and error' approach.
4. Specify a solution without any explicit rationale or overt fact finding and analysis (sometimes called the 'intuitive' approach).
5. Through fact finding and analysis, develop a solution. In this case an explicit rationale can usually be presented to support the proposed solution (the tailor-made approach).

Where the approach is not articulated, approaches 2, 3, and 4 may be indistinguishable.

1. In the 'expert' approach, the sponsor of the project looks to others for the solution. His acceptance is frequently based more on the credibility of the expert than his understanding of the arguments advanced. There are at least four ways of using experts:

- the single opinion
- multiple opinions
- the 'straw man' approach
- the devil's advocate

With the single opinion: usually there is a single recommendation which the decision maker must decide to accept or reject.

With multiple opinions: the decision maker must make a choice based on the persuasibility or credibility of the individual expert. One version of this is the dialectical inquiry approach based on Hegelian logic and advocated by researchers such as Churchman (1971) to aid in strategic planning problems. This requires a solution and a counter solution, representing opposing opinions (Mitroff, 1971).

With the 'straw man' approach: a hypothetical solution is constructed by an analyst and offered for evaluation by relevant managers and technical experts. Those aspects of the solution evoking serious adverse reactions are modified and the process recommences until a 'generally acceptable' solution is found.

The devil's advocate approach offers one solution plus a searching critique of that solution.

2. In the case of packaged solutions, the decision maker has slotted his problem and adopted with little or no modification the solution developed by him (or someone else) for a 'similar' situation. While it may not be innovative, a pre-packaged solution properly applied has the advantage that there is less risk that it won't work and the time factor (and hence the cost) for design and possible implementation will be significantly reduced.
3. With trial and error, solutions are proposed and tested with very little attempt at prior theoretical justification. When one is found which gives acceptable results it is selected and the process stops. The implication is that there is little or no understanding of the situation.
4. With the intuitive solution approach, a solution is offered with very little explicit justification other than the decision maker's

statement that: given the facts, this must be the answer. (No validation is possible except in retrospect.) To some extent, this could be viewed as being related to the packaged solution approach or trial and error.

5. The explicit model approach is rational and relies on methodology.

There are two stages: model development and prescription.

Model development (conceptualization): an attempt is made to identify all major factors and on the basis of theory, experiment or past observation, an explicit model is formulated. This describes the interrelationships of factors and permits predictions about the effect of any one operating independently, or in concert, on some defined indicator(s) of performance.

Prescription: alternative solutions are developed and evaluated, using simulation or optimization techniques, then a choice is made. In this approach the reasoning process supporting the solution is articulated.

In the above approaches there may or may not be a distinction between the conceptualization and prescription phases. (Where conceptualization is performed by one individual and prescription by another, there will, of course, be a clear separation between the two phases.) Also, the prescription phase may be carried out in two clearly identifiable steps: the identification (search or design) of alternatives and the evaluation of the alternatives, the latter often being a group process for major decisions.

We will next review some strategies that could apply to individual phases of the PS process:

1. Problem Finding Phase

The main behaviour difference that one might find between individuals in this phase is whether they anticipate problem situations or react to them. Those who anticipate problems may be warned by implicit or explicit signal mechanisms. In the latter case, the explicit signal mechanism may be based on judgmental or objective norms and variance thresholds. Little has been published regarding the relative frequencies

of these behaviour strategies.

2. Conceptualization Phase

Various strategies that have been identified are:

- use of deductive (Kepner and Tregoe, 1965) vs inductive reasoning;
- break the problem into pieces (Simon, 1969) or look at the whole (Wertheimer, 1959);
- rely on method of 'rules of thumb' to develop the model rather than prior experience;
- construct the model by a more and more detailed examination of the situation (progressive deepening) rather than a steady single cut (linear) approach (Newell and Simon, 1972).

One could also look at conceptualization from the viewpoint of the degree of understanding achieved by the individual at the conclusion of this phase. Three different approaches could be envisaged:

- construct a detailed model taking main interrelationships into account (high understanding);
- construct a model consisting only of the key attributes of the problem for purposes of classification (medium understanding);
- take a model 'on trust' from an expert which cannot be related to the individual's own frames of reference (low understanding).

Obviously, a problem solver in the first category should have a greater predictive capability than those in the last two.

In experiments with the concept learning task, Bruher et al (1956) identified four strategies used by subjects:

Successive scanning: the subject tests a single hypothesis at a time, rejecting it and adopting another if results fail to verify it.

Simultaneous scanning: the subject tries to hold all information collected to date in memory thus entertaining a variety of possible solutions. Considerable cognitive strain is involved.

Conservative focus: the subject searches for some positive instance of the concept, then varies a single attribute until all of the possibilities are reduced to one.

Focus gambling: this is a risky strategy, similar to conservative focus except that several attributes are varied at the same time.

The last three might be related to late closure--let the facts tell us the story-- while the first takes the form--let the facts confirm our hypothesis (i.e., early closure).

McKenney (1973) identified two contrasting types of PS behaviour during fact finding and model formulation, which he termed systematic and intuitive.

The systematic: such an individual uses his initial model as a hypothesis to be tested. Thus, information is accumulated for the purpose of confirming or disproving the initial hypothesis, and the kind of information required can be specified in advance. Checklists can be constructed for interviews, etc. When the hypothesis is confirmed to the individual's satisfaction, or when time runs out and the hypothesis has not been disproved, the model is accepted. Should the hypothesis not be supported, he will adopt another, test it, etc. Note that for such an individual, model formulation in a way precedes fact finding and is almost indistinguishable from it.

The intuitive: such an individual uses his initial model merely as a rough frame to 'contain' the fact finding. His objective is to understand the situation, the influencing factors, the interrelationships, etc. Thus, information is accumulated at all levels of detail and apparent relevancy. (No definite conclusions are drawn - judgment is suspended.) Information planning is done at a macro level only. Formal checklists for interviews are not the custom. For the intuitive individual, fact finding usually continues until time runs out. He is an assimilator (Kolb, 1974) and has trouble coming to terms with his data (McKenney and Keen, 1974). At the end of the fact finding step, there is an observable transition point to the next steps--analysis, hypothesis formulation and verification.

From our own observation and discussion with others we have confirmed the existence of these two extreme types among consultants and others. McKenney's descriptions have proved very helpful for the construction of the profiles and self description instrument which we used to distinguish

between systematic/unsystematic PS behaviour during conceptualization.

3. Prescription Phase

The two main approaches which are observable in the prescription phase are the sequential scanning, satisficing approach producing only one acceptable solution and the sequential scanning, multiple solution approach. Cardozo (1968) describes how purchasing agents were found to employ one of the two strategies. Mintzberg (1973a; p. 27) describes how many cases of design are accomplished in a sort of decision tree sequence which he terms nested design and which results in a single solution. Driver and Lintott (1972) also found the single solution/multiple solution dimension as being a significant discriminator in classifying individual PS behaviour and incorporated it as one of two dimensions in their Decision Style instrument.

Taylor (1975a) suggests five general approaches to prescription: prior commitment, selection by hunch, diagnosis generates the solution, parallel search, sequential search.

Behaviour in sub-phases of Prescription

If we look in more detail at behaviour during each of the sub-phases: search, evaluation, choice, we can find a variety of proposed strategies.

Regarding search, Newell and Simon (1972) have identified the following strategies for game situations: scan-search, depth first, breadth first, progressive deepening. To these Mintzberg (1973a) adds:

Memory search: the problem solvers use their own files or those of the organization to locate alternatives.

Trap search: the problem solvers set up a mechanism whereby the alternatives come to them, e.g., they advertise for candidates.

Regarding evaluation and choice, the following strategies have been advanced (it is assumed in most cases that decision criteria, performance dimensions, have been identified):

- evaluate rationally (parallel search for alternatives, simultaneous evaluation using explicit criteria and trade-offs) vs satisfice

(treat goals as constraints, sequential search for and sequential testing of alternatives);

- use the disjointed incrementalism (muddling through) approach (parallel search, simultaneous evaluation using explicit criteria, but compare only along dimensions where alternatives differ) (Lindblom, 1959);
- choice is 'disjunctive' (one performance dimension may be favoured to the exclusion of all the others);
- 'accommodation' (the decision maker evaluates alternatives simultaneously using different 'frames of mind'. When one alternative appears better, the selection is made) (Shepard, 1964).

Operational techniques have yet to be devised to indicate which strategy or combination of strategies is actually being employed by an individual.

There would seem to be some common thread to the successive and simultaneous scanning conceptualization strategies observed by Bruner, the systematic/intuitive approaches to fact finding proposed by McKenney, the successive and parallel search strategies noted by Taylor and Cardozo, the sequential vs parallel thinking processes identified by Das et al and by Doktor and Bloom and the satisficing/optimizing motivation found by Newell and Simon. If in fact there are two basic strategies, an interesting question which has yet to be resolved is: for business problem solving, what determines which of the two strategies is employed; the nature of the task, or, perhaps, an instrumental vs expressive work orientation (Strauss, 1974)?

4. Implementation

Since implementation is less of a conceptual phase and is more concerned with the process of change (motivation and project management), we will not elaborate on it here.

PS Styles

We will now consider five PS approaches or styles for which instruments have been developed. Our own study incorporates some version of the first three.

- The Analytic vs Intuitive Approach

- Kolb's Learning Styles
- Jung's Personality Type Classification
- McKenney and Keen's Cognitive Style Classification
- Driver and Lintott's Decision Style Classification

The Analytic vs Intuitive Approach

While there are many definitions and instruments to classify these two 'opposing' styles, we will attempt to summarize the two stereotypes:

The analytic approach: relies on method, on logical, linear thinking. The problem is broken into small manageable pieces. The emphasis is on facts.

The intuitive approach: is non-rational in that its underlying rationale is a matter of conjecture rather than observation. Conclusions are produced suddenly based on 'gut feel'. The process giving rise to conclusions has variously been explained by the associationist school of thought (the attributes of the problem match a 'similar' remembered situation) (see Mayer, 1977) and the Gestalt school (the problem is considered 'as a whole' rather than a number of pieces) (Wertheimer, 1959).

Lack of operational, accepted definitions for these constructs has created apparent contradictions. For example, according to the Myers-Briggs Type Indicator (SN scale), mathematicians and statisticians are often classed as intuitive.¹ Yet the management scientist who uses these techniques is seen as the embodiment of the analytic approach (e.g., Mintzberg, 1980; Zmud, 1979). Leavitt (1975) offers a possible explanation of the anomaly by claiming that there is a difference between the analytic approach and analytic techniques. Das et al. (1979), in another context, point out that mathematics is a relational activity and therefore one which involves simultaneous information processing (which according to researchers such as Doherty (1976), goes on in the right or intuitive side of the brain). Ornstein (1972) disagrees, (seeing mathematicians as examples of the culturally dominant, linear, verbal-rational mode (p. 39). Pascal himself is supposed to have distinguished between intuitives and mathematicians (Mathes, 1969).

¹ See Manual (Myers, 1962).

A variety of constructs and instruments have been developed to differentiate between analytic and intuitive (sometimes termed heuristic¹) individuals. Some of these are itemized below:

Huysmans (1970) - analytic reasoning reduces problem situations to a core set of underlying relationships which are expressed by a more or less explicit model.

Zmud (1979) - the analytic constructs his models based on theory rather than experience, has a thinking vs feeling orientation and is controlled rather than spontaneous in his approach.

Benbasat (1974) - the analytic is controlled rather than spontaneous (i.e., follows a plan).

Doktor and Bloom (1977) - the analytic uses the left side of the brain.

Jung (1923) - the sensing type relies mostly on concrete facts in conceptualization rather than his imagination (based on the Myers-Briggs instrument). The judging type is controlled rather than spontaneous.

Witkin (1964) - the analytic is 'field independent' (based on the Embedded Figures test).

Studies (e.g., Vasarhelyi, 1973; Zmud, 1978) have shown that few of the above instruments correlate. Clearly some clarification of the constructs is necessary.

Because the stereotypes have received so much attention, we have continued the discussion of the analytic vs intuitive approaches in Appendix B.

¹Taggart et al (1980) point out that the two constructs are not synonymous, heuristics which can be programmed sequentially being a function of the logical left hemisphere of the brain.

In our study we have attempted to synthesize much of the thinking on these two constructs by developing a profile of the systematic and the unsystematic conceptualizer. A self-description instrument was prepared to support these profiles. (See Appendix D.)

Kolb's Learning Styles

Kolb (1974) postulated four different categories for learning (and hence problem solving) behaviour: assimilators, accommodators, convergers, and divergers.

Assimilators prefer a simultaneous scanning strategy (see page II.18) calling for more complex use and interpretation of information and more cognitive strain (Grochow, 1973). They excel in inductive reasoning, in assimilating disparate observations into an integrated explanation. They are less concerned with the practical use of theories, more in ensuring that the theory is sound and precise. Their strengths lie in abstract model building.

Accommodators prefer a successive scanning strategy calling for little complexity in use and interpretation, little inference from the data and little cognitive strain in assimilating information (Grochow, 1973). Their greatest strength lies in doing things, in carrying out plans and in implementation. They tend to be risk takers.

Convergers are unemotional, preferring to deal with things rather than people. They are doers, using hypothetical deductive reasoning to focus their knowledge on specific problems. They do best where there is a single correct answer. Their strength lies in the practical application of ideas, in the evaluation of solution consequences, and in solution selection.

Divergers are the opposite of convergers. They tend to concrete thinking rather than abstraction, and thinking rather than doing. Their strengths lie in problem finding.

The instrument used to classify individuals is the Kolb Learning Style Inventory (LSI), a short self-description questionnaire. There are two bipolar scales; abstract/concrete, and active/reflective. Kolb quotes two studies in which the PS behaviour predicted by the instrument was actually observed (Grochow, 1973; Stabell, 1973).

(Freedman and Stumpf, 1979, have expressed some skepticism regarding the reliability of the instrument, claiming that they found low test-retest reliability. They also question the use of the bipolar scales.)

Jung's Personality Type Classification

Of all the classifications supported by a single instrument, the Jung classification (Jung, 1923) has been the most widely used in business PS research (e.g., Kilmann and Mitroff, 1976; Henderson and Nutt, 1980; De Waele, 1978; Keen, 1973; Kaiser, 1979; Zmud, 1979; Campbell, 1971). There are four dimensions:

Introvert/extrovert: the introvert type is more interested in ideas than people and things. He relates the external world to himself rather than himself to the external world.

Sensing/intuition: in fact finding and model formulation (termed perceiving by Jung), the sensing type relies on concrete facts and details rather than speculation and imagination.

Thinking/feeling: in evaluation and choice, the judging phase, the thinking type relies on logic and impersonal modes of reasoning rather than emotion or 'gut feel'.

Judging/perceiving: the judging type has a predisposition to judging (coming to a conclusion), whereas the perceiving type is more interested in continuing the model formulation phase. A judging type likes to plan his work and follow the plan, whereas the perceiving type likes to remain flexible. This dimension is similar to our construct of early vs late closure which is described in Appendix D.

The Myers-Briggs Type Indicator (Myers, 1962) was developed to measure these dimensions. A number of internal and longitudinal validity checks have been made and the instrument is considered reasonably reliable (Lake, Miles and Earle, 1973; Buros, 1970).

The Myers-Briggs Manual claims that the four dimensions are orthogonal except for a correlation between the sensing/intuitive and judging/perceiving dimensions.

Kilmann and Mitroff (1976) found that when individuals were grouped

into four categories based on the sensing/intuition, thinking/feeling scales, there was a strong similarity within a category regarding the climate of an organization they considered ideal. Going further, Mitroff (1975) suggested that an individual's categorization on the same basis could determine his suitability for various stages in the PS process (conceptualization, model building, model solving, and implementation). MacKinnon (1962) notes that the majority of creative writers, mathematicians and architects are intuitive in their perception style and prefer the perception to the judging mode, i.e., tend to late closure in our terminology.

Keen (1973) notes that high academic achievement is consistently associated with intuition, introversion, judging.

McKenney and Keen's Cognitive Style Classification

McKenney and Keen (1974) developed a two-dimensional bipolar classification scheme for problem solvers. The dimensions are:

- information gathering (receptive/preceptive)
- information evaluation (systematic/intuitive)

They describe these categories as follows:

Information gathering

Receptive/preceptive: in fact finding, preceptive individuals bring to bear concepts to filter data; they focus on relationships between items and look for deviations from or conformities with their expectations. Their precepts act as cues for both gathering and cataloguing the data they find. Receptive thinkers are more sensitive to the stimulus itself. They focus on detail rather than relationships and try to derive the attributes of the information from direct examination of it instead of from fitting it to their precepts.

Information evaluation

Systematic/intuitive: in model building and prescription, systematic individuals tend to approach a problem by structuring it in terms of some method which, if followed through, leads to a likely solution. Intuitive thinkers usually avoid committing themselves in this way. Their strategy is more one of solution testing and trial and

error. They are much more willing to jump from one method to another, to discard information, and to be sensitive to cues that they may not be able to identify verbally.

The instrument used to categorize individuals comprises a battery of twelve tests (Keen, 1973):

	<u>Type of Problem</u>
- Gestalt Completion Test	Visual
- Scrambled Words	Visual
- Insight Problems	Visual, verbal, numeric
- Figure Classification	Visual
- Object Naming	Visual
- Choosing a Path	Visual
- Controlled Associations	Verbal
- Four-letter Words	Verbal
- Concealed Figures	Visual
- Paper Folding	Visual
- Verbal Puzzles	Verbal
- Identical Pictures	Visual

No information was available regarding the validation of this battery nor its correlation with cognitive style tests other than the Myers-Briggs.

While Keen (1973) suggests that a cognitive style is different from a personality type, on the surface his construct would appear to have a lot in common with Myers-Briggs sensing/intuition and thinking/feeling dimensions.

Keen (1973) reports that he found:

- no significant correlation between any of the four Myers-Briggs dimensions and the twelve McKenney and Keen tests;
- some correlation between systematic style and thinking type and hence between intuitive style and feeling type;
- a more modest correlation between systematic style and introversion type and hence between intuitive style and extroversion type.

Our own reaction to the development of the McKenney and Keen cognitive style construct is that McKenney's earlier construct (described on page II.29 of this thesis) was realistic and could be given a behavioural definition. The construct described here has no useful

operational definition and is dependent on an instrument for the classification of individuals.

Driver and Lintott's Decision Style Classification

Driver and Lintott (1972) developed a decision style classification with two dimensions:

- the amount of information used to make a decision (minimal/maximal)
- focus on one solution or many solutions.

Two psychometric measures were used to determine decision style (Alawi, 1973);

- the APSE (a business problem which the individual solves, after which he indicates how he used the data). In the laboratory, this has been found to predict decision speed, use of data, use of contingencies, amount of creativity, and type of group process (Driver, 1972; Raynolds, 1972). In field studies, it has shown an association with level of management, area of business specialization, use of information search and screening, age and education (Alawi, 1973; Boulgarides, 1973).
- the CXSD (a self-description questionnaire which assesses both style and values). Results in both laboratory and field studies parallel those of the APSE.

Some correlation might be expected between the information use dimension and the judging/perceiving dimension of the Myers-Briggs Indicator; however, the authors of this instrument have not made available much information concerning it.

PS Pathologies

Certain PS habits have been classified by cognitive researchers as pathologies which inhibit PS effectiveness. Some of these are described below:

Functional fixedness: the inhibition in discovering an appropriate use of an object owing to the subject's previous use of the object in a function dissimilar to that required by the present situation (Duncker, 1945). This may inhibit originality in the generation

of decision alternatives (Taylor, 1975b; p. 27). It is partially correctable through training, Taylor claims.

Problem set (Einstellung): the effect of the problem solver's experiences just prior to and during the problem solving situation.

This "creates a mechanized state of mind, a blind attitude towards problems; one does not look at the problem on its own merits but is led by a mechanical application of a used method." (Luchins, 1942; p. 15).

Psychological set: more permanent than problem set. This is the PS perspective imposed by the problem solver's background (which affects the way he looks at problems) and the PS habits he has developed through training and application (Taylor, 1975b; p. 23).

Dogmatism: lack of receptiveness to information which conflicts with the problem solver's pre-existing beliefs. The inability to listen to new ideas (Rokeach, 1954).

Rigidity: the inability to produce novel or changed responses (Rokeach, 1960; p. 200).

Information overload: the information demands of the decision environment exceed the information processing capacity of the decision maker (e.g., Chervany and Dickson, 1974; Gigch, 1970).

Cognitive strain: a breakdown of a decision maker's cognitive process when he is subjected to a state of information overload. Causes bounded rationality (e.g., Taylor, 1975a; Simon, 1957).

Bounded rationality: limitations of human cognitive ability and the availability of vast amounts of information have imposed severe restrictions upon rational decision making. So "rationality is exhibited, but only within the constraints of the problem solver's simplified representation (model) of the problem" (Taylor, 1975a; p. 409).

Lack of transitivity: failure to conform to rules of logic when making preference statements, e.g., an individual prefers A over B and B over C, but C over A.

Conservatism: when exposed to additional information the decision maker revises his subjective probability estimates in the direction

indicated by the information but the revision is too small
(Taylor, 1975a; p. 417)

Pattern bias: individuals tend to deduce patterns from their observations even when they know they are dealing with a random process (Feldman, 1963).

Premature closure: premature classification of a stimulus pattern.

In Chapter II, we have reviewed the work of researchers concerning PS behaviour from the point of view of methodology, task taxonomies, and PS strategies and styles. We started this chapter with three questions. After having examined them in more detail, what can be said?

1. Do people over time develop distinctive cognitive and behavioural PS styles and if so how can they be measured?

The evidence seems to point to some attribute, call it cognitive style, which is the resultant of one's experience over the years and which creates a predisposition in an individual to approach:

- the same problem the same way on different occasions (but under similar conditions of stress, motivation and resource availability)
- 'similar' problems the same way (but we are not sure how to define similar)
- all problems from a certain perspective (less pronounced but still observable. This could be motivated for example by a strong doing vs thinking orientation).

Earlier in the paper, we have argued that a 'problem' is a personal rather than absolute concept. Judgment (influenced heavily by values and experience) is a factor influencing all of the stages of the PS process:

- is there a problem?
- what kind of problem is it?
- which alternatives will be considered?
- which will be selected (or recommended)?

Consequently there is much scope or opportunity for the development of personal habits (or styles).

There does seem to be evidence that certain dimensions of style are strongly affected by both pre-university and undergraduate training. It seems safe to speculate that subsequent business experience in the same discipline would reinforce these predispositions whereas experience in a variety of fields would weaken them.

The kinds of problem in which the individual has gained experience (i.e., the degree of structure, the magnitude of the 'people' component, etc.) should also have a major influence on his approach.

Finally, the familiarity of the individual with quantitative methods will determine if he is able to incorporate this special language and approach into his conceptualization processes whether he is developing his own solutions or evaluating those developed by others.

No strong front runners have emerged as instruments or taxonomies to classify cognitive style:

- Doktor worked closely with McKenney and Keen for many years trying to develop such measures. This work has been reported in some detail here (pages II.26-II.27). Yet few researchers seem to have adopted their conventions.
- Benbasat (1974) classified subjects in his dissertation research using a modification of the Minnesota Analytic/Heuristic Questionnaire. However, recently the validity of this instrument has come under attack (Zmud, 1978).
- While Witkin's 'Embedded Figures Test' has been used by Lusk (1973) and Doktor and Hamilton (1973), its relevance to business problem solving has not been clearly established.
- The Learning Style Inventory (LSI) used by Kolb and Stabell gave rise to results which seem intuitively satisfying. However, the test itself seems very sensitive to semantic interpretation.
- Huysmans' Hat (pitcher and coin) and Atlas tests for analytic/heuristic tendency are interesting. Results on the Atlas test, however, would be strongly influenced by the individual's familiarity with quantitative methods since regression coefficients are referred to in the discussion.

- The Myers-Briggs Type Indicator (see pages II.25 and II.26) has been used extensively by Mitroff and his co-workers and seems to cover at least some of the style dimensions relevant to business problem solving.

Thus the Learning Style Inventory of Kolb, Huysmans' Hat and Atlas tests, and the Myers-Briggs Indicator appear to be the best candidates of existing instruments for measuring an individual's 'cognitive style'. They are limited, in some respects, since they do not seem to reflect:

- the individual's predisposition to seek structured vs unstructured problems
- any tendency to shrink or expand the scope of the problem
- the number and nature of the cues he uses to characterize the problem
- his fact gathering behaviour (the nature and source of the information, how much is enough?)
- his problem solving behaviour in the face of stress and risk
- his approach to premise formulation (implicit or explicit)
- his predisposition to seek non-standard vs standard solutions.

Further work is obviously necessary here to clarify: (a) which attributes are important in PS behaviour in practice, (b) the extent to which they are independent, (c) which instruments can be used to measure each.

It would appear that for some individuals there is a definite dichotomy between conceptualization (what is the problem) and evaluation (what is the best thing to do about it). The first is a subject which is amenable to certain systematic approaches. The second seems much more judgmental.

2. Can PS styles be altered?

There does not seem to be enough evidence to answer this question; however, researchers such as Taggart et al (1980) are designing programs with this objective.

3. What impact do styles have on PS effectiveness?

To date most discussion regarding different approaches to problem solving has centred on the 'analytic' vs the 'intuitive' approach. It is usually hypothesized that an 'analytic' approach is more successful with 'structured' problems, whereas an 'intuitive' approach is more applicable to 'unstructured' problems.

In view of the lack of operational definitions for analytic/intuitive and structured/unstructured, it is difficult to assess the universality of this conclusion.

Before we can properly answer the question, it will be necessary to develop a model of the problem solving process and identify the task dimensions which are relevant. Also some method for assessing effectiveness will have to be found. These matters are considered in Chapter III.

Chapter III

Experimental Framework and Statement of the Problem

In this chapter we will develop a general framework for the research work. This will include a model of the PS process and a description of the personal attributes which we will examine in our study for their influence on PS behaviour and effectiveness. The discussion will identify any factors which may limit the generality of our conclusions because of the special characteristics of management consultants.¹

The topics will be discussed under the following headings:

- A. Model of the Problem Solving Process
- B. Measures of PS Effectiveness
- C. Task Variables to be Considered
- D. Personal Attributes to be Measured
- E. Problem Statement

A. Model of the Problem Solving Process

We needed a model which would permit us to describe the PS process at a level of detail facilitating the detection of identifiable differences in the PS behaviour of individuals. Mintzberg's model described in Chapter II with slightly different labels was considered suitable.

He suggested that for strategic decisions there were the following steps:

- Problem recognition
- Diagnosis
- Design (alternative search/screen)
- Evaluation/choice
- Authorization

¹ See Appendix C for a brief description of the consulting process.

We will use the word conceptualization rather than diagnosis because of the more limited connotation ascribed to the latter term.

Search/design, evaluation and choice will be grouped into one phase, prescription, because the process of searching for acceptable alternatives frequently ends up with only one (Mintzberg, 1973a; Bower, 1970).

We have added an implementation phase. While this is less dependent for success on the individual's conceptual attributes, it is an identifiable phase in consulting work.

Our four-phase model then becomes:

1. Problem Finding (usually performed by the client)
 - problem identification
 - decision to act
2. Problem Conceptualization
 - initial problem formulation for the consultant
 - fact finding
 - reformulation of the problem including hypothesis formulation and verification
3. Prescription
 - generation of alternatives (search or design)
 - evaluation, and choice of alternative
4. Implementation

This model seems to accommodate much of the PS research which is currently in progress as well as provide a basis for global hypotheses regarding individual PS behaviour.

Care must be taken not to interpret the model too literally. Problems and situations vary widely. Thus the emphasis devoted to each phase (and even the sequence of phases) will depend on the situation and the individual. There will be iteration (Mintzberg, 1973a). For some PS styles there will be a noticeable transition point between phases,

for others two or more phases may be indistinguishable (McKenney, 1971; Witte, 1972), and may even run concurrently (Cyert et al, 1956). The formulation of the model (i.e., conceptualization) may be a hybrid of implicit (subjective) and explicit models. Also the phases are not independent and are hard to understand in isolation from one another (Mitroff, 1975).

Of the four macro phases identified in the model, we will describe (briefly) interesting behavioural aspects of the first three: problem finding, conceptualization and prescription. Implementation was considered to depend more on interpersonal than conceptual skills so was assumed to involve different behavioural patterns.

In our model we have suggested that conceptualization and prescription are two macro phases in the PS process that are frequently distinguishable, especially when an explicit analytic approach is employed by the problem solver. A visible transition point will not always be present, however. In the case of implicit solving, the problem solver often appears to go straight from problem classification to solution. In other situations, the problem solver emerges from the diagnosis stage firmly committed to a specific solution (Armstrong, 1979).

1. Problem Finding Phase

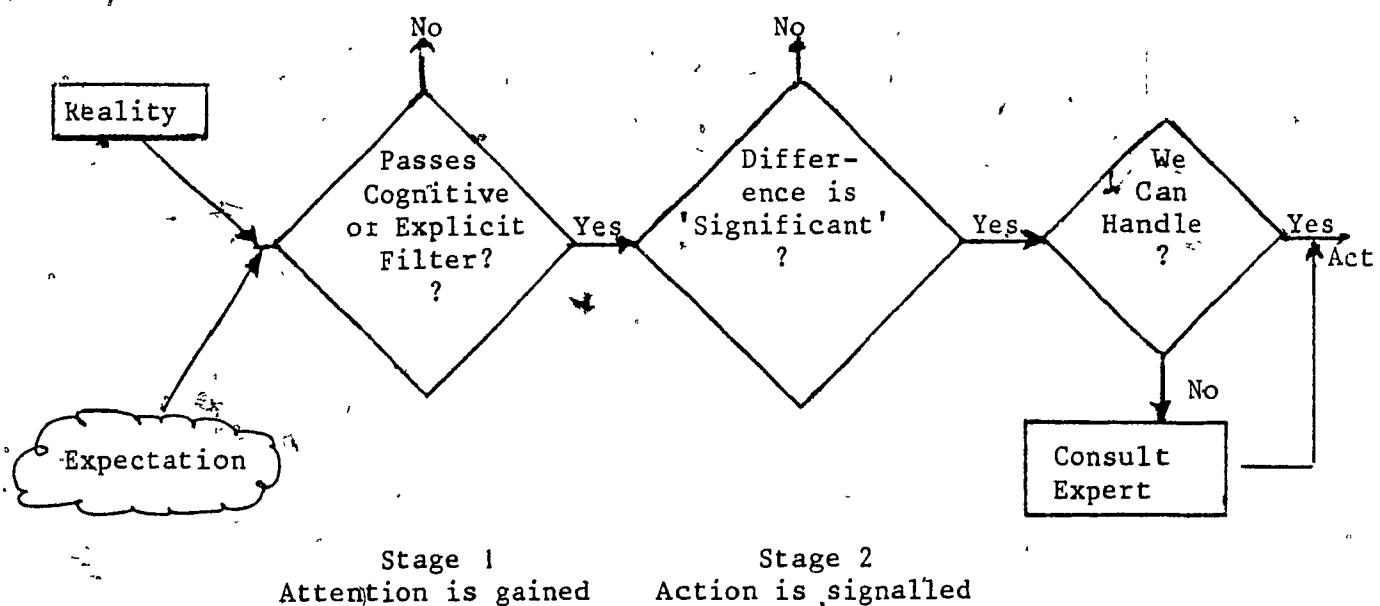
Problem finding does not seem to be a systematic activity in business. It is seldom that one finds an information scanning and filtering network resembling the military early warning systems. Pounds (1969) writes: "Rarely, if ever, do managers analyze or understand the sources of their problem." (p. 1).

A different situation is created when an outsider is called in to perform an audit of some sort (perhaps a search for opportunities). He can devote his time and energies to the single objective of looking for problems. However, as management consultants know, this is usually considered a more difficult type of assignment because (a) it starts without a perceived need on the part of the client and (b) the consultant must proceed with his own set of criteria and norms as he examines the

workings of the organizational unit. These may not coincide with the criteria and norms of his client.

What are the circumstances or stimuli that can lead to the identification of a 'problem'? As noted previously, it has been generally agreed that a problem exists if a significant difference is perceived to exist between 'reality' and some expectation. Festinger, a cognitive theorist, would call this cognitive dissonance (1963). An opportunity is created when there is some change in the environment (technology, competition, economy) such that a new potential exists for increasing the company's return (Bonge, 1972; p. 45).

Mintzberg, (1973a; p. 18a) depicts problem recognition as a filter into which data enter. Where thresholds are exceeded, a decision to take action is the output. We are suggesting a more detailed model which pinpoints some of the influence factors involved.



A Model for Problem Finding

There are two stages in the model: attention is gained and a decision is taken to act.

How might we expect individual behaviour to vary? Some differences among individuals might be expected regarding:

- which attributes of the environment the individual monitors
- the sources of the information (e.g., people or reports)
- (Duncan, 1974)
- whether the individual uses explicit filters (Mintzberg, 1973a) and/or models
- the basis of the norms used
- whether the individual anticipates problems or reacts to them
- the kinds of problems that give rise to action for an individual
- whether action is taken or not under a specific set of conditions.

Leavitt (1975; p. 10) writes that problem finding is a process that has "strong imaginative, emotive and value overtones."

Obviously motivational factors will be among the most important. They will determine what the individual considers important and the cues he is going to respond to. Norms will be affected by the corporate environment and the individual's background and level of aspiration. The information resources available will influence what data he is able to gather. His knowledge of, and confidence in, explicit filters and models will influence the use he makes of these aids. The individual's workload and the discipline he exercises in time management will affect how much effort he is able to devote to problem finding.

Livingston (1971) refers to the work of Mackworth (1969) which states: "the distinction between the problem solver and the problem finder is vital. Problem finding is more important than problem solving and involves cognitive processes that are very different from problem solving and much more complex." The most gifted problem finders, he has discovered, rarely have outstanding scholastic records, and those who do excel academically rarely are the most effective problem finders. Managers need to be able not only to analyze data in financial statements and written reports, but also to scan the business environment for less concrete clues that a problem exists. Crucial to managerial success are the perceptual skills needed to identify problems long before evidence of them can be found by even the most advanced management information system, he claims. (While this may be true in theory, in practice most managers seem to react to problems which have already developed, perhaps because of other demands on their time.)

2. Conceptualization Phase

The objectives of the conceptualization phase will differ with the problem type. For example, conceptualization may be devoted to goal clarification in the case of strategic decisions, criteria definition in the case of warehouse location problems and symptom/cause identification (diagnosis) when some component of an organization is not functioning as it 'should'. For purposes of illustration, we will discuss conceptualization in terms of diagnosis.

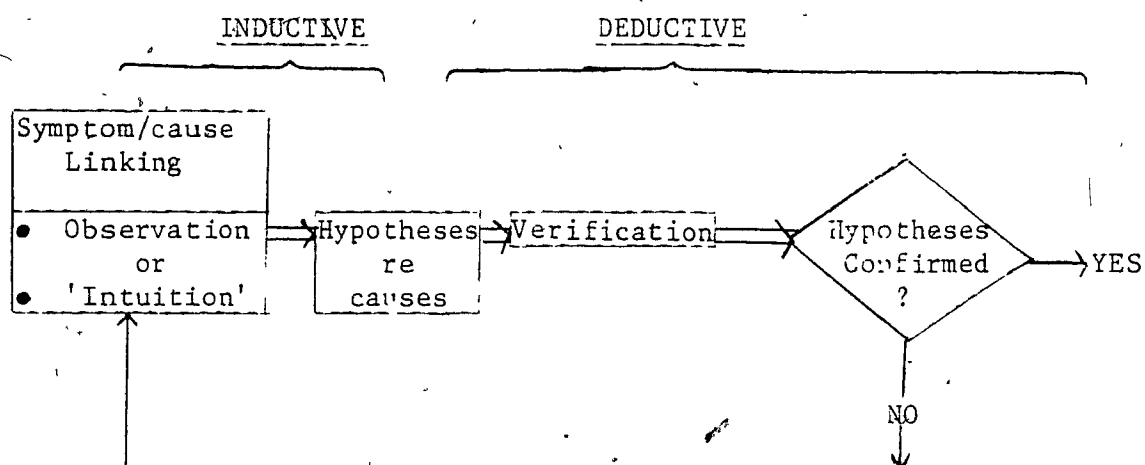
We will define diagnosis as the identification of the cause(s) giving rise to the difference between what was perceived and what was expected.

This differs somewhat from Bonge's (1972) medical definition: "diagnosis is the art or the act of recognizing the presence of a disease from its symptoms, signs and laboratory findings" (p. 50). The medical definition implies that a situation was satisfactory (? normal) once, but it has changed (for the worse) and by a process of deduction the disease is identified. Knowledge of the disease brings with it (one hopes) information regarding possible cures.

The definition we have chosen is not so restrictive. It permits the identified difference to arise from a change in expectation (goal) or a change in perception in addition to a change in the actual condition of the unit of the organization under observation. In fact the new expectation may not be realistic, nor the new perception accurate. In such cases, diagnosis would consist of identifying this fact.

Note that diagnosis consists of both inductive (hypothesis formulation) and deductive (hypothesis testing) reasoning, whereas prescription is essentially deductive. The former attempts to explain; the latter to predict. Von Wright (1971) points out that explaining a phenomenon and understanding it (i.e., being able to predict) are two different processes. The two only approach one another in scientific rigour when the explanation (hypothesis) is tested (Popper, 1968).

This in turn implies prediction (Bunge, 1967; Vol. 2)..



Model of Diagnosis Process

There are three possible discrete steps to the conceptualization phase:

- a) Initial problem formulation
- b) Fact finding
- c) Reformulation of the problem

Step (a) - Initial problem formulation

"A question well-put is a question half-answered."

Johnson (1971; p. 146)

It was suggested in the section on problem finding that during that phase, the problem is defined and categorized by the problem finder to the extent necessary to estimate the consequences of not taking any action. (We will refer to this as an early-stage model.) Sometimes an estimate has also been made of the cost of solving the problem. (This involves the evaluation of some solution alternatives.) Thus, as Pounds (1969; p. 16) points out, problem formulation cannot precede the construction of some form of model (mental or explicit).

Problem formulation is essentially the development and formalization of what has started in the problem finding phase. The formalization (in the form of Terms of Reference) is necessary if company resources have to be authorized and/or the work is being turned over to an analyst or

consultant. In the majority of cases this is the transfer point where the sponsoring manager delegates to another the responsibility for carrying out certain steps of the PS process. Communication and a host of interpersonal factors determine the effectiveness of the transfer but these matters have been addressed elsewhere (e.g., Wade, 1977; Tilles, 1960; Rosenberg, 1972) and will not be discussed here.

This is a most important step for a number of reasons:

- When 'experts' are used, this formulation is the specification of the service to be performed. Experience has indicated that one of the major causes of assignment failure is due to a difference between consultant intentions and client expectations. (Our respondents confirmed this.)
- Boundaries are imposed (Bishop, 1972).
- The extent of the resources allocated at this stage will determine the level of effort to be devoted. A problem solver will frequently 'cut the suit to fit the cloth' when deciding how deeply to go into the problem.

Reitman (1964) differentiates between open constraints (i.e., attributes of the problem which are not specified) and closed constraints (specified attributes). He suggests that for an ill-defined problem most constraints are open initially but they are closed by the problem solver as conceptualization proceeds.

If we ignore the sponsor-consultant transfer problems, the major differences that might be expected between individuals at this step relate to their perceptions of:

- the nature of the problem (e.g., key attributes and symptoms)
- the PS approach considered appropriate
- possible solutions and benefits
- norms for expected performance
- criteria to be used when selecting a solution.

Step (b) - Fact finding.

Starting with an initial model embodying his view of the problem (and possibly also the solution), the problem solver commences to accumulate information.

Individual approaches might be expected to differ along the following dimensions:

- the nature of the information gathered
- the level of detail
- the amount of information collected
- the sequence in which it is collected (e.g., from general to detail [progressive deepening] vs starting with detail)
- the value attached to it
- the sources consulted
- the degree of structure imposed beforehand on the fact finding process (e.g., where are the hypotheses generated?) (Armstrong, 1979) and the flexibility of this structure in the light of new information
- how the information is verified.

McKenney (1971) identified two extreme composite approaches to fact finding which he termed systematic and intuitive. These have been discussed on page II.19.

Step (c) - Reformulation of the problem

This is the step in which the problem solver considers the relevant facts and refines his initial view of the problem situation. What are the key issues? What caused it? What are impediments to resolution? This model can then be used for diagnosis and prescription.

As suggested previously, the model can evolve as an entity from architect's sketch toward photographic detail (the Gestalt view--embodied in the progressive deepening approach) or it may be constructed methodically, detailed analysis of one part incremented by detailed analysis of another (the analytical approach). For some, the end of the fact finding step signals also the termination of model building and sometimes the termination of the prescription phase. For others, reformulation of the problem is a discrete step comprising some or all of the following: analysis, hypothesis formulation, hypothesis verification, and synthesis.

Where the objective of the project is the design of a system, the output from this step is a set of specifications.

The following are possible dimensions along which individuals might differ in this step:

- the nature of the analysis (e.g., use of numbers and use of statistical techniques quantifying relationships)
- the reasoning process used in selecting and verifying the model (hypotheses)
 - trial and error vs seek understanding first
 - look for differences or similarities
 - break into pieces or look at whole
 - rely on method rather than a knowledge of content
 - use 'rules of thumb' and traditional credos.
- the nature of the model (hypotheses)
 - is it explicit or implicit; if explicit, how complex are the relationships described?
 - how does it deal with stochastic elements in the problem?
 - how much change between this model and initial formulation?
- the nature and extent of the verification performed
- the degree of confidence in the model exhibited by the problem solver

Examples of quantitative models for diagnosis are discussed in Goldberg (1971), Betaque and Gorry (1971), and DeRivera (1980).

Personal attributes which might be expected to influence PS behaviour during conceptualization are:

- relevant task knowledge
- intelligence
- ability to conceptualize
- level of aspiration
- tolerance for ambiguity
- freedom from problem set (see pathologies, page II.29)
- analytic/intuitive style or equivalent
- familiarity with quantitative methods
- early vs late closure

3. Prescription Phase

There are two possible discrete steps in the prescription phase:

- (a) Generation of alternatives (search or design)
- (b) Evaluation of alternatives and choice

Step (a) - Generation of alternatives

Design and search will be discussed separately:

(i) Design

Let us consider the case of design first. Consulting projects which involve design (e.g., systems design) usually consist of three phases: the conceptualization phase which develops the conceptual design, the detailed design phase (corresponding to the prescription phase) and implementation which involves the actual programming of the system, its testing and implementation. Usually only one conceptual design is produced.

(ii) Search

The nested design process described by Mintzberg (1973a), a decision tree process, seems to represent the behaviour of many individuals during this step. If an individual has become committed to a solution during conceptualization, there will be no search (Witte, 1972). Sometimes alternatives are clearly identified at the outset and the Terms of Reference limit the project to a study of these alone. The search step in such cases is bypassed. Dickson (1970) has developed a model for decisions of this nature.

Where the problem can be expressed in the form of a quantitative model, the 'best' alternative may be found by experimentation or optimization (e.g., in the case of a linear programming model). (Frequently this precise solution is not adopted because of nonquantifiable considerations.)

Where the two cases described above do not apply and there is a search for alternatives, one of the strategies discussed in Chapter II may be employed. The two main approaches used are the sequential, satisficing approach producing only one

acceptable alternative and the parallel search/simultaneous evaluation approach.

Other dimensions for comparing approaches during search/design are:

- The degree to which an individual tends to design (i.e., tailor make) his solutions rather than select one 'off-the-shelf'.
- The degree of innovation exhibited during the search/design step.

Step (b) - Evaluation of alternatives and choice

Up to this point we should have accumulated the following: a set of general objectives for the project; some ideas of the performance measures, i.e., the dimensions for describing the consequences of each alternative; a conceptual model of the problem (implicit and/or explicit in nature); one or more alternatives to be evaluated; and some idea of the states of nature, i.e., uncontrollable variables for which the solution must be effective. (This latter item is often overlooked, the assumption being made that the status quo will prevail in the future.)

We will assume that some form of parallel search has preceded the choice process. The decision maker is faced with the problem of choosing from a number of alternatives, each of which has to be evaluated in some manner. (As noted earlier, many problem solving situations seem to produce only one viable alternative. Argyris [1970], for example, claims that 65-75% of the choice activity takes place in the data generating activity. The single alternative may be the net result from a series of sequential decisions [e.g., a decision tree], each of which more precisely delineates the solution. If the single solution is considered acceptable, the problem is solved. If not, the acceptance criteria may have to be relaxed.)

The choice process may be rational or non-rational, implicit or explicit. Where choice is rational, explicit performance criteria and selection rules are usually developed. Implicit evaluation and choice may be based on tradition, imitation of others or the individual's own 'judgment'.

Where an 'expert' is involved, the presence of objectives unstated by the client can obviously lead to recommendations which the client

considers unsatisfactory. Apart from this aspect, however, there are pros and cons for making the criteria explicit early in the PS process (see Mintzberg, 1973a; p. 44). In practice they may be identified at the start, during conceptualization, during alternative search/design or during justification.

Some dimensions for comparing approaches are:

- the degree to which the rationale for choice (criteria, rules and trade-off functions) are explicit and based on logic
- the stage in the process where criteria are specified
- the range of states of nature (future operating conditions) considered
- the degree to which premises (assumptions underlying the prediction of outcomes) are made explicit and the kind of evidence which is provided
- whether uncertainty is considered in an explicit and quantitative manner.

Personal attributes which might be expected to influence a consultant's PS behaviour during prescription are:

- relevant task knowledge
- predisposition to use of logic rather than 'gut feel' in evaluation
- degree of empathy possessed by consultant
- attitude to role (technician vs adviser)
- risk taking propensity
- degree of inventiveness in developing solutions
- tendency to use 'off-the-shelf' as opposed to 'tailored-to-measure' solutions.

4. Implementation Phase

This phase is concerned with the implementation of change in organizations which is a field with its own body of literature. It will not be discussed in detail here.

One particular observation, however, would appear to be relevant,

namely that of Mitroff (1975), that the characteristics of an individual who is a good implementer or project leader are different from those of a conceptualizer or model builder.

B. Measures of PS Effectiveness

As discussed in Chapter II, business problems are typically characterized by the fact that there is no single correct solution. A problem is a personal construct. To characterize a problem, it is not sufficient just to describe the externals of a situation, internal factors such as goals, values and perceptions are involved. Almost every individual will then have a unique view of a problem situation depending on his involvement, his level of aspiration, his background, his skills, his personality, etc.

When a problem solver is not the problem possessor, as in the case of the consultant/client situation, major difficulties can be created by differences in perceptions regarding what the problem is and which solutions will be considered acceptable. The consultant and his supervisor may also differ.

A second characteristic of business problems is that most require a solution within some fairly restricted time frame which may or may not relate to the complexity of the problem. In the case of consulting work, the time frame is usually set by the supervisor but must take into account what the client is prepared to accept in terms of elapsed time, consulting fees and client involvement.

A third characteristic is that it is very difficult to evaluate a solution 'after the fact'. A failure may be attributed to the disappearance of the sponsor, or changing conditions rather than a poor job on the consultant's part.

For our study, effectiveness will be assessed by one or more of his supervisors. It will then be some measure of the individual's ability to come up with a solution with surface plausibility and client acceptability within the time limits which have been set (with the qualification that the projected benefits are obtained by the client for the projected costs, should his supervisor be able to confirm this).

In the case of a single sponsor, client acceptance will depend on whether the consultant's recommendation falls within some cost/benefit boundaries (often fuzzy and poorly articulated). Frequently, the real criteria figuring in the client's cost/benefit calculations are not made explicit by the client, making it difficult for the supervisor to evaluate acceptability.

How valid is a supervisor's estimate of consultant effectiveness? There seems to be some difference of opinion on this. One school of thought maintains that since the client is paying for the work, in the final analysis it is his opinion which should have the most weight. Tilles (1960) has suggested that success is a general and subjective notion strongly linked to the degree of satisfaction felt (but not necessarily communicated by) the client at the end of the engagement. Others disagree, claiming that the client is not really in a position to know what is 'best' (see Tilles, 1960; p. 213). The key measure of success, they claim, is that the consultant is able to gain client acceptance for his solution (Churchman, 1975). From this perspective, it is the opinion of the 'consultant' (not the client) which should have the greatest weight.

The matter would be of no significance if the opinions of the two parties coincided. However, it seems to be generally agreed (e.g., Carlsson, 1961; Argyris, 1970; Ginzberg, 1979; Lippit et al, 1958) that consultants and clients use different criteria for evaluating success.

In any case, whatever its shortcomings, we will be using the supervisor's assessment of effectiveness since in our opinion it is probably the most objective assessment possible under the circumstances and will reflect client feedback.

In addition to client satisfaction, some of the other factors which will likely influence a supervisor's assessment of a consultant's performance are:

- the similarity of the consultant's approach to his own
- the consultant's ability to adhere to the work plan
- his ability to work on his own
- his utilization during the engagement (were there periods for which he could not charge his time?)

- the absence of time/cost budget overruns
- the absence of problems in client relations
- the absence of problems requiring undue effort on the part of the supervisor (e.g., in writing the report)
- the generation of further work for the consulting firm.

As a consequence, when asked to assess a consultant's PS effectiveness, there is a good chance that the supervisor will put a significant weight on non-conceptual attributes, such as interpersonal skills, which were not the main object of this research. The supervisor's assessment instrument was prepared so that the effects of this tendency could be measured.

Marquis and Straight (1966) in their study of large R&D organizations found that, for technical studies, the three most important criteria used by the research firms to assess the success of their efforts were:

- technical performance
- meeting delivery schedules (a poor second)
- achievement of target costs

Client satisfaction came further down on the list. For technical projects it was doubtless easier to determine the level of performance of the recommended solution than for most consulting projects.

C. Task Variables to be Considered

From Chapter II, we know that the most frequent classification applied to task situations is the bipolar structured/unstructured dimension. In this regard there is some agreement that repetitive tasks (e.g., credit risk assessment and inventory replenishment decisions) are at the structured end of the scale, whereas strategic decisions are at the unstructured end.

In our study we attempted to identify significant personal performance determinants for three different task classification schemes. The first, with a single dimension, structured/unstructured; the second with two dimensions: degree of technical competence required and degree of 'people' skill required; and the third with one dimension, namely the

stage of the problem solving process into which the task fits (problem finding, conceptualization, etc.).

1. Structured/unstructured

Tasks would be classified on a single bipolar scale structured/unstructured where structure is given the following definition:

The degree of structure the task has for an individual problem solver is reflected by the extent to which he 'knows' what to do.

It is obvious that this is a subjective measure which will be influenced by the following factors:

- the degree of autonomy granted the problem solver (i.e., the extent to which he is told what to do)
- his uncertainty re goals and values (objectives, evaluation criteria, trade-off functions)
- his uncertainty re influence factors and related outcomes (i.e., his conceptual model of the problem) or how to build such a model (resource requirements, etc.)
- his uncertainty re future scenarios or states of nature
- his uncertainty about the existence of workable alternatives and/or adequate resources to develop them.

The magnitude of the uncertainty variables should be inversely proportional to his prior experience with similar situations. His confidence that he knows what to do on the other hand, may be valid or invalid, since uncertainty may not exist for him when it should and vice versa.

The degree of structure perceived by the consultant is difficult to assess by an observer. However, one measure is the ability and willingness of the consultant to specify in advance how he will go about resolving the problem (say by a work plan--see below) and his confidence that the plan will be adhered to. The workability of the plan can be assessed in retrospect by the results, and the extent that the plan was adhered to.

For most consulting assignments, a work plan is prepared detailing the proposed approach and describing client and consultant roles and

involvement. The plan is usually prepared by the individual who has carried out the preliminary survey. It may be the consultant but it is more frequently the supervisor. Where the supervisor develops the work plan himself, it is customarily prepared without any particular consultant in mind who will carry out the work, and consequently reflects the supervisor's own approach. While this statement may be contested, the fact is that work plans are rarely altered when the consultant originally slated for the assignment turns out to be unavailable. (Author's experience.)

2. Technical/people Content

Tasks would be classified on two bipolar scales:

- people content (high/low)
- technical content (high/low)

Tillès (1960) has suggested that these dimensions are orthogonal, for he writes:

"In general the focus of a consulting assignment is primarily technical and impersonal, or primarily personal and emotional . . . dealing with these two aspects of a problem requires two quite different skills." (p. 228)

At one time, management consulting was considered to have a technical content of less than 40% (Tatham, 1964) but the increased role of the computer in business and the development of quantitative techniques (included engineered standards) has changed this. For management consultants, a 'technical' assignment would likely therefore involve either computers or quantitative techniques of some sort. (This assumption must be tested.) It is possible that the work of a specialist such as a psychologist is also viewed as 'technical'.

3. Stages of the PS Process (see Section A)

The third task taxonomy to be used is the stage of the PS process into which the task might fit, i.e.,

- problem finding
- conceptualization

- prescription
- implementation

It is customary to find consulting assignments identified as preliminary survey, diagnostic survey, detailed design and implementation. Usually, however, prescription is not authorized as a separate phase but is considered to be an integral part of the diagnostic survey. We include it as a phase in our study because we are interested in seeing whether supervisors view it as a separate activity.

We have adopted these somewhat limited dimensions for tasks because our previous attempts to elicit task dimensions from consultant supervisors by such means as Kelly's Repertory Grid (Kelly, 1955) proved unsuccessful. (This lack of success was predicted by behavioural science researchers asked to comment on the research design.) Perhaps the reason for this inability to articulate a variety of task dimensions which are used in selecting staff is due to the tendency for consulting firms to classify individuals into stereotypes. For example, a consultant becomes an inventory specialist or a data base expert.

D. Personal Attributes to be Measured

The work of researchers in the field has identified the following characteristics of individuals as being those which should significantly affect his PS behaviour and effectiveness.

Personality and cognitive-related measures

- intelligence
- memory capacity and retention
- ** • ability as abstract reasoner
- * • logical/intuitive conceptualizer
- * • systematic/unsystematic conceptualizer
- * • early/late closure
- ** • flexibility/rigidity
- level of dogmatism
- * • tolerance for ambiguity
- * • logical/'gut feel' evaluator
- ** • creativity

Orientation and values

- level of aspiration
- ** ● generalist/specialist orientation
- ** ● line/staff orientation
- * ● values
- * ● need for autonomy
- * ● introvert/extrovert orientation
- * ● preferred roles (e.g., expert/facilitator/teacher)
- * ● career goals

PS behaviour

- ** ● predisposition to prepare and adhere to work plan
- * ● behaviour when short of time
- * ● source of solutions
- * ● use of packaged solutions
- * ● behaviour when out of technical depth
- * ● ability to work autonomously

Other (socio-demographic and experience)

- ** ● task knowledge/credibility
- * ● use of quantitative methods (QM)
- * ● age
- * ● sex
- * ● post-secondary education
- * ● previous business experience

In our study we addressed those characteristics identified with asterisks. The others were either considered too difficult to assess, given the nature of the experimental approach adopted, or no suitable instruments could be devised. An asterisk in column one signifies that a self-descriptive instrument was used. An asterisk in column two signifies that the consultant was rated for the characteristic by his supervisor(s).

In addition, since PS effectiveness was going to be evaluated by a supervisor who was unlikely to distinguish between a consultant's PS effectiveness and his over-all effectiveness as a change agent, we added the following attributes which are considered important for consultants:

Managerial and interpersonal skills

- ** • supervisory skills
- ** • spoken and written communication
- ** • tactical ability
- ** • persuasion
- ** • empathy

In Appendix D, we have reviewed briefly the main personality/ cognitive constructs to be measured. The following topics are covered there: the definition of the construct, available instruments, suggested effects of the attribute on PS effectiveness, and likely correlations with other attributes.

E. Problem Statement

Our study was to examine correlations between certain personality and behavioural characteristics of management consultants and their problem solving (PS) effectiveness (as perceived by supervisors who have worked with them).

A key assumption underlying this research is that an individual develops specific habits or 'approaches' for resolving problem situations. The extent to which these approaches vary with problem 'type' and situational variables (such as time constraints) is not known and remains to be studied.

It was postulated that the study would demonstrate that certain individuals would be regarded as being more effective for certain of the hypothetical assignments than other individuals (who, in turn, would have their own particular forte[s].)

We were interested in determining if this effectiveness could be traced to specific personality or cognitive attributes of the individual (call these the relevant personality characteristics). If we were successful in this, we would then examine the effect of various formative factors (e.g., education and functional area of work experience) to determine which have the greatest degree of association with the relevant characteristics of the individual.

A

Conclusions were also required regarding:

- the degree of consensus exhibited by supervisors in assessing consultant performance
- the degree of similarity exhibited by consultants in general along certain personality dimensions
- corroboration of certain research findings from other studies on management consulting
- any distinctive and repetitive clustering of individual characteristics to form a PS 'style', which might conform to styles identified by other researchers.

Results from this study should be of interest in a number of areas:

- To cognitive and management researchers in view of the methodology adopted and the hypotheses studied.
- To management consultants and other business problem solvers for:
 - the consistency (or lack thereof) in the perceptions of supervisors regarding the effectiveness of their staff;
 - ramifications of the findings in terms of consultant selection, training, deployment and evaluation;
 - implications for staff/supervisor matching.

Hypotheses¹ to be Tested

The hypotheses outlined below were ~~to~~ be made more specific as the test instruments were selected and tested.

1. Hypothesis la:- Certain consultants who are rated high for one type of assignment can be rated less effective for others.

Hypothesis lb:- There is a significant degree of consensus when more than one supervisor evaluates the same consultant for the same assignment.

Hypothesis lc:- There is a significant correlation between the individual's own assessment of his effectiveness on a specific assignment and the assessment made by the supervisors.

¹ It is recognized that, strictly speaking, these are not hypotheses but more general propositions. They have been put in this form to help to organize the analysis of the results from our exploratory study.

2. Hypothesis 2a:- There will be strong correlations among the various attributes measured (e.g., an intolerance of ambiguity may be associated with early closure [MacDonald, 1970; p. 792]). The latter could then be reduced by factor analysis to a limited number of composite personality/cognitive dimensions. (A number of positive and negative correlations found by other researchers relating to the original dimensions will also be tested.)

Hypothesis 2b:- The personality/cognitive characteristics of the individuals studied will tend to cluster about some limited number of profiles based on the composite dimensions.

Hypothesis 2c:- These profiles will tend to be similar within a functional area, and also a consulting firm.

Hypothesis 2d:- There will be a significant tendency for certain personality dimensions to be associated with effectiveness on certain assignments. (Call these the relevant personality/cognitive attributes.)

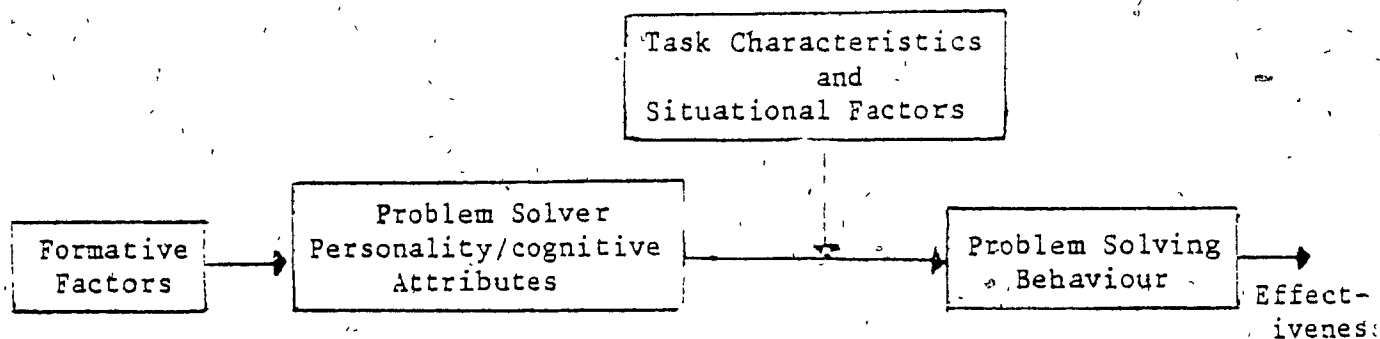
Hypothesis 2e:- There will be some correlation between the PS styles identified in this study and those described by other researchers (e.g., Driver and Mock, 1975).

3. Hypothesis 3a:- There will be significant correlations between areas of functional experience and personality/cognitive attributes.

Hypothesis 3b:- There will be significant correlations between course concentration and personality/cognitive attributes.

Hypothesis 3c:- Correlations between effectiveness and formative factors will be less pronounced, except where they influence task knowledge.

The scope of this research is indicated by reference to the research framework presented in Section II, page 4 and is summarized on the next page.

SCOPE OF RESEARCH

- background information obtained from questionnaire

- subjects limited to management consultants

- personality/cognitive attributes obtained from psychometric instruments in questionnaire

- assignment preferences obtained from questionnaire

- attitudes to consulting obtained from questionnaire

- limited to 15 consulting tasks or stages of consulting projects

- certain situational factors (eg, organizational climate and available resources) are implied in the assignment description

- PS behaviour obtained from self description questionnaire and supervisor's ratings

- effectiveness assessed by one (or two) supervisors

Chapter IV

Methodology

The approach followed in the study, including details of the development of new instruments will be described in this chapter under the headings:

- A. General Approach
- B. Development of the Questionnaires
- C. Selection of the Sample
- D. Conduct of the Survey
- E. Processing of Questionnaire Data

A. General Approach

As discussed earlier, it had been decided to use management consultants as our subjects to identify personal attributes contributing to PS effectiveness. Each consultant in the sample was given a self description questionnaire to complete. At least one supervisor who was familiar with the work of the consultant was asked to fill out two documents: a 'Consultant Effectiveness Assessment' and a 'Supervisor Views and Background'.

When the questionnaires were returned, they were coded, transcribed to a computer file and edited. Computer programs were prepared to evaluate the consistency of the supervisor evaluations, to score the standard instruments used and to refine the new instruments. SPSS and other statistical packages were then used to identify the key attributes influencing effectiveness.

Finally an analysis was made to see how the consultants' socio-demographic characteristics were related to the key attributes.

3. Development of the Questionnaires

There were three documents:

1. The main questionnaire supplied to the consultants, titled 'Management Consulting and Personal Approaches to Problem Solving' (see Appendix A).
2. The 'Consultant Effectiveness Assessment' supplied to the supervisors (see Appendix O). One was completed for each consultant evaluated by the supervisor.
3. The 'Supervisor's Views and Background' completed by each participating supervisor (see Appendix P).

1. Management Consulting and Personal Approaches to Problem Solving

This questionnaire, which took at least three hours to complete, was divided into six sections:

- Section I - Management Consulting as a Profession
- Section II - Characteristics of Your Personal Style
- Section III - Consulting Tasks
- Section IV - Approach to Problems
- Section V - The Work Environment
- Section VI - Personal Background

The measures of personal attributes consisted mainly of Likert and semantic differential scales. The questions relating to work orientation, personal background and working environment were a combination of Likert-type scales and open-ended questions. Four standard instruments were incorporated:

- The Myers-Briggs Type Indicator (Myers, 1962)
- The Allport Vernon Lindzey Study of Values (reduced) (Allport et al, 1960)
- The Kolb Learning Style Inventory (Kolb, 1974)
- The Raudsepp Creativity Test (modified) (dispersed through the material in Sections II and III) (Raudsepp, 1930)

The material included in the questionnaire to serve as a basis for the new instruments was prepared by the author using items directly from the sources quoted below or based on ideas generated by them.

- MacDonald's Scale for Ambiguity Tolerance (MacDonald, 1970)
- Stanford-Gough test for flexibility (Rokeach, 1960)
- Rokeach Dogmatism Test (Rokeach, 1960)
- The Semantic Differential Test used by Mitroff and Mason (1974) in their study of moon scientists
- The Pelz and Andrew's Measure of Approach to Work Styles (Morse and Gordon, 1974)
- Duncan's study of beginning consultants (1971)
- Daccord's study of consultant effectiveness (1967)
- Analytic/heuristic instruments developed by Benbasat (1974), and Zmud and Cain (1979)
- Maccoby's (1976) book The Gamesman. (In particular we were interested in the categories developed there, e.g., craftsman, gamesman.)

The consultant was also asked to evaluate himself using identical items to those included in the supervisor's assessment.

The personal attributes to be measured and the instrument(s) to be used for each are shown in Appendix D.

The questionnaire was distributed to several consultants as a pre-test for clarity.

2. Consultant Effectiveness Assessment

There were seven sections to this document:

- An indication of the supervisor's depth of familiarity with the consultant's work
- An assessment of the consultant's effectiveness:
 - as over-all problem solver
 - for 10 hypothetical consulting assignments
 - for 5 possible phases in the PS process
- An assessment of the consultant's potential to become a partner
- An evaluation of the consultant along a number of performance dimensions (e.g., communications skill)

- A set of semantic differential scales regarding the consultant's personal attributes (e.g., logical/intuitive)
- A set of four profiles for PS behaviour against which the consultant was to be matched
- A measure of the similarity between PS approaches advocated by the consultant and those of the supervisor.

There were two areas which received particular attention: the definition of the hypothetical tasks and the performance dimensions.

The tasks had to be located at different positions on the structured/unstructured and technical/people content dimensions and yet not be function specific. This is hard to accomplish and the ten tasks we defined could probably be improved on. However, they did serve their purpose. The performance dimensions we used came from formal criteria used by some management consulting firms and the list developed by the Association of Consulting Management Engineers (1971) document on Personal Qualifications of Management Consultants.

To test the evaluation instrument, three partners were asked to complete it for a consultant of their choice and then provide comments regarding clarity of the wording and applicability of the measures.

3. The Supervisor's Views and Background

The third document contained information to be used, if necessary, to test for congruence of attitudes and PS approach between the supervisor and the consultant. The background material requested was a curtailed version of that included in the consultant questionnaire. The original document was some seven pages longer than that actually used. The pages were removed to accommodate a request from the consulting firms to reduce the time required from their senior staff.

C. Selection of the Sample

The population of subjects was the approximately 1200 management consultants working for the 18 member firms of the Canadian Association of Management Consultants (CAMC). A submission was prepared for the Board of Directors of the CAMC regarding the research study, outlining the objectives and asking for their cooperation. The Board, comprising

senior executives from the member firms, agreed to ask 125 consultants to participate and passed a motion supporting the research. We sought a minimum of 80 respondents requiring a response rate of 64%, very high for such a long questionnaire combined with participants who are under severe time pressures.

One hundred and twenty-five questionnaires were distributed plus 250 supervisor sets, the proportion going to each consulting firm being related to the number of professional staff. For control purposes and to maintain anonymity, each firm appointed a project coordinator. This individual, a key contributor to the success of the study, assigned numerical codes to consultants and supervisors, monitored the returns and resolved problems which arose.

Participation was on a voluntary basis, however the individuals were selected following certain criteria (e.g., at least one year's consulting experience). A range of consultant effectiveness was sought. (A copy of the instructions supplied to the coordinators is included in Appendix F.)

Participants put their questionnaires in sealed envelopes immediately after completion thereby keeping their replies confidential from other members of their firm. It was consequently hoped that these answers would not be biased by pressures to give the 'right' answers.

D. Conduct of the Survey

The survey was conducted between May 1 and June 30, 1980. Every Monday during this period, we provided each coordinator with a summary of the returns received from his (her) firm and a tabulation of over-all returns. As might be expected, returns were slow at first. By cut-off time we had received 79 consultant replies and 127 relevant supervisor evaluations (making 1.6 evaluations per consultant).

We had been concerned that the length of the questionnaire and sensitivity of some of the questions might result in large uncompleted sections or careless answering. Such did not appear to be the case. While one consultant stopped half way through and two more left the back-

ground section blank, the remainder obviously devoted great care to their replies. In most of the questionnaires, comments covered each page. While there were some comments (justified) concerning the length and repetition of the material, there were more expressing interest and support for the study.

After the cut-off date, the data coding and transcription started. Even though returns received after this date would not be used in the thesis research but saved for later analysis, we continued with our follow-up. By the end of August there were an additional 30 consultant returns.

E. Processing of Questionnaire Data

A vast amount of information had to be analyzed. For example, after coding there were approximately 900 items for each of 79 consultants plus 100 items for each of 127 assessments. All data were put on punched cards and verified.

1. Transcription of consultant questionnaire data

The 900 items in the questionnaire resulted in 16 cards per consultant.

2. Transcription and consistency check for evaluation data

The evaluation data occupied 2 cards per assessment. 63% of the consultants received two assessments. These were compared for diversity of assessment (see Chapter V, page v.3) and averaged.

3. Transcription of supervisor views and background data

Since one supervisor sometimes prepared an assessment for more than one consultant, there were fewer views and backgrounds than assessments. These data were not used in the study but were reserved for future analysis.

4. Refinement of Instruments

Instruments had to be refined for the following attributes:

- Flexibility/rigidity
- Tolerance for ambiguity
- Systematic vs unsystematic approach to conceptualization
- Progressive deepening vs linear approach to fact finding
- Need for autonomy
- Line/staff orientation
- Specialist/generalist orientation

The items included in questionnaire #1 to measure each attribute were subjected to a statistical analysis based on the 79 replies.

Primarily, they were checked for internal consistency and a reliability (Spearman Brown) of .7 or higher. Since the primary objective of the study was not to produce instruments but to explore concepts, we often left an item in an instrument if it had face validity, even if its correlation with the remaining items was not statistically significant.

Appendix D shows the items comprising each instrument after the pruning, together with the computer printout of inter-item correlations.

5. Supervisor constructs

Using the data contained in the assessments, a correlation analysis was made of the supervisor's perceptions of consultant performance attributes and task effectiveness measures. This gave insight into the supervisor's perception of the consultant attributes he considered important for the prototype tasks as well as the meaning attributed to such terms as innovation and generalist.

6. Consultant attributes vs task effectiveness

The consultant attributes reflected by the self description instruments were then correlated with the task effectiveness measures supplied by the supervisors.

A description of the various analyses performed and the results obtained is given in the next chapter.

Chapter V

Results and Analysis

In this chapter we will present the results from the survey under the headings:

- A. Characteristics of the Sample
- B. Consistency of Supervisor Assessments
- C. Correlations Between Supervisor and Consultant Ratings of Attributes and Performance
- D. Supervisor Task Requirement Constructs
- E. Validity and Inter-correlations of Instruments
- F. Distribution of Performance Ratings and Attribute Scores
- G. Development of Composite Factors for Attributes
- H. Correlations Between Attribute Measures and Task Performance
- I. Analysis of Consultant Attributes by Function
- J. Analysis of Consultant Attributes by Firm
- K. Analysis of Consultant Attributes by Education
- L. Analysis of Consultant Attributes by Sex
- M. Correlations Between Attribute Measures and Age

A. Characteristics of the Sample

By the survey deadline we had received 79¹ completed consultant questionnaires together with their associated supervisor assessments. Two assessments were received for 50 consultants or 63% of the sample. Two consultants received no assessments.

The average age of the respondents was 34. Forty-six percent of the sample were between 31 and 35 years of age. Fourteen percent were over 40.

¹ There were few 'no answers'; therefore the following critical values may be used when assessing the significance of quoted correlation coefficients: $r(80;.10) = .18$) (Critical values for 77 degrees of freedom [i.e. $n-2$] were not tabulated.)
 $r(80;.05) = .22$)
 $r(80;.01) = .28$)

Regarding experience as an external consultant, 29% had two years or less, 24% had over six years. Forty percent had been with their present firm for two years or less.

The breakdown by functional area of specialization is given below. Figures showing CAMC revenues for the same categories for 1979 are shown in the same table. As can be seen, General Management is under-represented in the sample while Operations Management and Economic and Operations Research are over-represented.

FUNCTIONAL AREA OF SPECIALIZATION

	<u>Percent of Respondents</u>	<u>Percent CAMC Revenues</u>
Data Processing	30	29
General Management	11	19
Financial Services	11	12
Executive Search	18	11
Personnel Services		9
Operations Management	13	8
Economic and Operations Research	13	7
Marketing	<u>4</u>	<u>5</u>
	100	100

Fifteen percent of the respondents were female, 42% of whom worked in the Executive Search/Personnel Services area.

Fifteen CAMC firms out of a possible 18 responded by the survey deadline. Two firms accounted for 42% of the consultant respondents.

Since the sample consisted of volunteers rather than a random selection of individuals, it is conceivable that conclusions from the study may not be valid when applied to the whole population of CAMC consultants. However, the relatively large proportion of the population included in the sample (7%) and the agreement between the specialty areas of the respondents and the distribution of CAMC revenues by specialty area gives some assurance that the results can be generalized to a reasonable degree.

B. Consistency of Supervisor Assessments

One of our concerns was that the assessments made by different supervisors for the same consultant might differ markedly, indicating that our measures of task effectiveness (based on only one or, at most, two supervisors) would be so imprecise that the validity of the study would be compromised. Our analysis of the consistency between ratings for different sections of the supervisor's assessment is given below.

TABLE V.1
INTER-SUPERVISOR DIFFERENCES WHEN ASSESSING SAME CONSULTANT
Based on 50 pairs of evaluations

Sect.	Supervisor Assessment Question	Description	Difference between assessments				No Ans. ¹
			<u>0</u> -- % of evaluations	<u>1</u>	<u>2</u>	<u>2+</u>	
1	904-909	Performance on stages of PS process	41	43	6	2	8
2	936-945	Performance on hypo- thetical tasks	45	41	6	-	8
3	933	Overall PS performance	53	43	2	2	-
4	910-932	Skills and credibility	42	42	7	1	8
5	946-968	Semantic differential	27	41	21	11	-
6	969-971	Behaviour profiles	42	30	16	3	9
7	972	Similarity of approach	27	33	22	16	2
8	935	Potential to be partner	35	53	2	-	10
9	976-981	Composite scales based on combinations of the foregoing	50	41	8	-	1

¹ Indicates that one or both supervisors did not give a response to the item.

The above results provide assurance that the precision of the supervisors' assessments for the key effectiveness ratings (sections 1-4) is relatively good.

C. Correlations Between Supervisor and Consultant Ratings of Attributes and Performance

The agreement between a consultant's self-rating for an attribute and the rating of his supervisor (the average in the case of two supervisors) for the same attribute was of interest and is shown in Table V.2.

The agreement seems reasonably good except in the case of the semantic differential scoring. This latter discrepancy was not unexpected. The only indication of any significant bias was the fact that consultants rated themselves almost one rating point higher than did their supervisors for overall PS performance (section 3).

Appendix G gives the correlation coefficient between consultant and supervisor corresponding to each of the items in the assessment. It is interesting to note which items gave rise to a strong, positive correlation, e.g., ability to manage or evaluate candidates. Interpersonal skills seem to be more difficult to get any agreement on (e.g., ability to get client cooperation). For other personal attributes such as critical/uncritical, there seems to be a significant disagreement.

D. Supervisor Task Requirement Constructs

If we use the set of attributes which are highly correlated with performance in each problem phase to distinguish between similar and different phases, we end up with four phases for which supervisors seem to envisage different sets of desirable personal attributes. These are shown in the diagram on page V.6. Table V.3 on page V.11 shows the similarity of the correlation profiles for the conceptualization and prescription phases for organizational and technical tasks.

TABLE V.2

DIFFERENCES BETWEEN SUPERVISOR'S ASSESSMENT AND CONSULTANT'S SELF-ASSESSMENT

Section	Supervisor Assessment Question	Consultant Question	Description	Extent of Difference				No Ans*	Average Bias (Supervisor- Consultant)
				0 --%	1 % of questionnaires	2	2+		
1	904-909	594-599	Performance on stages of PS process	46	40	8	2	4	-.1
2	936-945	626-635	Performance on hypo- thetical tasks	39	42	9	1	9	-.1
3	933	639	Overall PS performance	24	52	19	0	5	-.8
4	910-932	603-625	Skills and credibility	41	44	8	3	4	-.1
5	946-968	varied	Semantic differential	22	33	22	20	3	n/a
6	969-971	725-727	Behavioural profiles	37	34	18	6	5	n/a
7	972	784	Similarity of approach	17	40	18	5	20	-.1

* Indicates that either the supervisor, the consultant, or both did not give a response to the item.

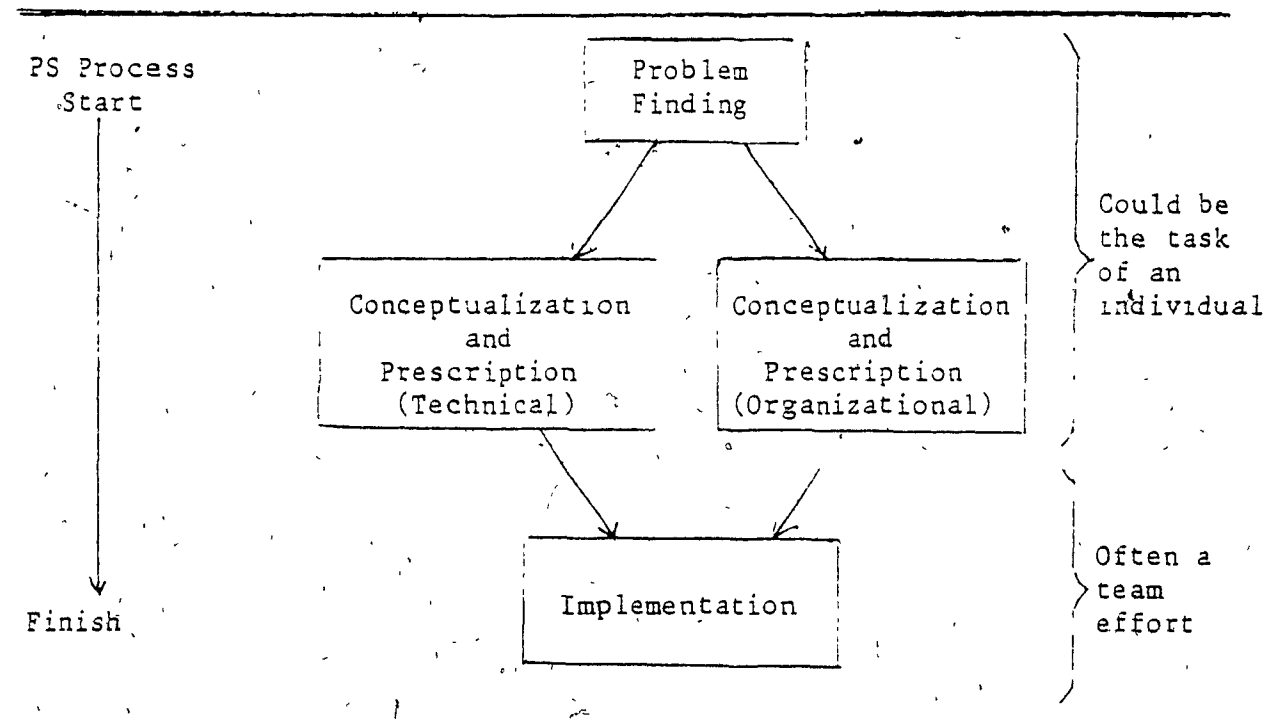


FIGURE V.1

FOUR COMPONENT MODEL USED BY SUPERVISORS TO DISTINGUISH TASKS

Before discussing the specific consultant attributes considered important by the supervisor for each category, we will examine briefly two interesting aspects of the classification scheme which they apparently adopted:

- a) Why were conceptualization and prescription compressed into a single phase (or at least were considered to have similar attribute requirements)?
 - b) What meaning was given to the term 'technical'?
- a) There are at least two possible explanations for the fact that conceptualization and prescription were considered indistinguishable by the supervisors.
- The first is that they consider that the diagnosis is in fact performed in the brief initial survey carried out by the supervisor at the

beginning of the assignment before the preparation of the Terms of Reference and the work plan. If this is the case the consultant would be expected to adopt the supervisor's model.

- The second is that for many consultants the two aspects of problem solving may be melded in such a way that there is no distinction between model building and solution finding. (Lundberg, 1962, calls the combined activity "doing something with information", p. 172.) If such is the case we might expect only one solution to emerge for presentation to the client. This would seem to be the case in practice for many assignments.

If there is a predisposition for consultants to treat conceptualization and prescription as indivisible this may be a characteristic coupled to our culture. Apparently the Japanese, for example, make a clearer distinction between the two phases.

- b) What is meant by 'technical'? The meaning ascribed to this term is difficult to pin down. Tatham (1964) suggested that less than 40% of consulting work was technical, the remainder being concerned with understanding and motivating people. Daccord (1967) in his study of PS effectiveness found that the more effective consultants put higher emphasis on 'people' rather than 'systems' issues.

Applications of the computer and quantitative techniques (e.g., for controlling inventory and forecasting sales) have changed this to some extent, introducing a different breed of individual into a hitherto somewhat 'seat-of-pants' environment. In fact, data processing and economic-study assignments now account for 35% of CAMC billings.

In our study we asked for agreement or disagreement regarding the statement:

Most management consulting work is not technical in nature but requires a basic knowledge of people and how organizations function. (Q78)

Fifty-five percent agreed, 38% disagreed, 7% had no opinion.

This was followed up by a second statement:

An intelligent, capable, MBA with 5 years of good business experience can handle most management consulting assignments. (Q79)

Forty-four percent agreed, 45% disagreed, 11% had no opinion.

Those who disagreed in both cases were mostly from the 'technical' specialty areas of data processing and economics and OR studies.

It would appear from the above that there are still many who consider consulting work to be mainly non-technical in nature.

Our research data confirm that the word 'technical' is used by supervisors to relate strongly, if not exclusively, to tasks involving some form of quantitative methods or computer technology (such as hardware selection or programming). Curiously, the term 'innovative' was closely associated with technical competence, the implication being that consultants on organizational matters were unlikely to exhibit 'innovative' behaviour.

We found we could divide the personal attributes included in our study into three groups:

Basic personal attributes such as:

- ambition

People skills such as:

- supervisory
- communications skill
- tactical
- persuasive

Technical and reasoning skills such as:

- technical competence in some area
- strong conceptual skills

The attribute requirements perceived by the supervisors for each of the four task categories is given below. The correlation coefficient between the attributes and the category is given in parentheses.

1. Problem Finding (believed to include a major element of diagnosis)

This was the most demanding category requiring both 'people' and 'technical' capabilities. The top ten attributes (based on correlation coefficients) were:

Q928 Innovative solutions	(.58)
Q916 Client credibility	(.54)
Q930 Technical competence	(.52)
Q923 Strong conceptual skill	(.51)
Q960 <u>Precise/vague</u>	(.51)
Q927 Empathetic	(.49)
Q917 Supervisory	(.48)
Q926 Able to operate without supervision	(.48)
Q914 Tactician	(.47)
Q955 Persuasive	(.46)

2. Conceptualization and Prescription-Technical

Technical attributes were considered most important, with people skills given less emphasis. The top six attributes were:

Q930 Technical competence (colleague credibility)	(.58)
Q929 Client credibility	(.53)
Q928 Innovative solutions	(.49)
Q960 <u>Precise/vague</u>	(.47)
Q923 Strong conceptual skills	(.45)
Q926 Able to operate without supervision	(.40)

3. Conceptualization and Prescription-Organizational

Not surprisingly, people skills were considered most important for this group of tasks. The top six attributes were:

Q917 Supervisory skills	(.53)
Q914 Tactician	(.53)
Q927 Empathetic	(.53)
Q909 Persuasive (sell recommendations)	(.48)
Q921 Obtain client cooperation	(.46)
Q926 Able to operate without supervision	(.46)

4. Implementation (Q936)

In this case a different set of skills were considered important. The top six attributes were:

Q925 Ability to work to a detailed plan	(.38)
Q914 Tactical	(.32)
Q917 Supervisory skills	(.32)
Q928 Ability to come up with different practical solutions	(.31)
Q912 Interact well with groups	(.30)
Q924 Ability to meet deadlines	(.30)

Characteristics of the ten prototype tasks

Table V.3 shows how the ten tasks were apparently viewed by supervisors in terms of the first three components of the model just discussed. The results make sense; tasks which could well have a high technical component (according to the description of the task) such as 'a complex task within his specialty' or 'expert witness' have a high correlation coefficient vis-à-vis the technical diagnosis and prescription items. In terms of problem finding (which we interpret to mean a requirement for a strong degree of preliminary investigative fact finding), the tasks 'structured interviews' and 'evaluate candidates' have only a weak correlation.

The tasks with the highest 'people' or organizational component were the assignment with 'sensitive political aspects' and the one to 'resolve conflicting opinion'.

In the right hand section of the same table, we have recorded correlations between selected personal attributes and the ten tasks. Some measures of the variability (test error) inherent in this method of analysis is shown by the two measures for persuasion, Q909 and Q955. The agreement between these two is quite remarkable.

TABLE V.3

HOW SUPERVISORS APPEAR TO VIEW THE TEN TASKS IN TERMS OF
PROBLEM PHASE COMPONENT AND PERSONAL ATTRIBUTES REQUIRED

(Shows correlation coefficients between assessments of two different proficiencies)

N = 79

Task	Phase					Personal Attributes							
	Problem Finding	Diag./Prescription Organizat.			Technical	Ability to Oper. Autonom.	Concept. Skill	Per-suasion	Super-visory	Tact-ical	Get Client Coop.	Empathy	
	Q904	Q906/Q908		Q905/Q907	Q926	Q923	Q909/Q955	Q917	Q914	Q921	Q927		
Q936 Implement a package	.21	--	.23	.27 .26	.22	.45	--	--	.32	.22	.23	.35	
Q937 Manage a large project team	.37	.42	.43	.26 .21	.52	.25	.51	.53	.81	.60	.39	.46	
Q938 Assignment with sensitive political aspects	.35	.53	.50	--	.41	.27	.46	.44	.52	.49	.48	.48	
Q939 Evaluate candidates for senior executive pos.	--	.47	.40	--	.24	.20	.30	.23	.35	.42	.39	.49	
Q940 Structured interviews	--	--	--	.23	.27	.27	--	--	--	--	.20	.29	
Q941 Line capacity	.30	.20	.22	--	.32	.26	--	.26	.41	.20	--	.20	
Q942 Expert witness	.38	.22	--	.25 .38	.44	.32	.42	.42	.29	.26	.30	.37	
Q943 Resolve conflicting opinion	.36	.50	.40	--	.41	.46	.44	.43	.49	.47	.38	.44	
Q944 Sophisticated complex within his specialty	.42	--	.20	.38 .38	.47	.55	.37	.37	.57	.47	.32	.56	
Q945 Non-technical diagnosis where consultant has no direct experience	.35	.42	.47	--	.52	.59	.40	.40	.54	.51	.37	.32	

4:11

From the table we conclude the following:

1. Using correlations with Q926, the consultant's ability to operate autonomously (i.e., without supervision) as a measure of the lack of structure in the task as perceived by the supervisor, we see that the three most structured areas
 - implement a well-tested package .22
 - evaluate executive candidates .24
 - structured interviews .27

The only surprising result is the fact that executive placement should be considered a structured task. There is some corroboration for this in Table V.7 on page V.45 where individuals in the human resource area indicate a low tolerance for ambiguity. Whether structure is imposed artificially or is in fact a characteristic of such work is a question which must be left to others to decide.

The most unstructured task in our set of ten is Q943, a 'difficult diagnostic survey in an area in which the consultant has had no direct experience'. The underlining was not present in the questionnaire but is done here to emphasize the implied lack of structure to the task.

2. Conceptual skill requirements are low for 'executive placement', the 'line position', the 'political assignment' and the 'structured interviews', but high for the 'difficult non-technical diagnosis' and the 'complex assignment within his specialty'. Again, this makes sense.
3. Persuasive skill requirements seem to be relatively uniform except in the case of 'package implementation' and 'structured interviews' where the requirements are lower. This seems reasonable.
4. The other ratings based on supervisory ability, tactical skill and empathy (an ability to identify client needs) contain no surprises.

Personal attributes for overall PS effectiveness

Based on the level of correlation coefficient between the attribute and Q933 (overall PS effectiveness), the top attributes were identified and ranked as follows:

Q916 Contributor to firm's reputation (? implies general credibility) (.75)

Q928 Ability to come up with different (practical) solutions (.67)

Q917 Supervisory ability (.66)

Q930 Technical competence as assessed by colleagues (.66)

Q927 Empathy (identification of client needs) (.64)

Q914 Tactician (.61)

Q923 Strong conceptual skills (.55)

The relatively low importance attached to 'strong conceptual skill' and the high importance of 'supervisory ability' were unexpected; otherwise, the ranking seems reasonable.

Personal attributes for partnership potential

The top six attributes were:

Q917 Supervisory ability (.68)

Q933 Overall problem solving skill (.64)

Q926 Ability to work with little supervision (.62)

Q960 Precise/vague (.57)

Q916 Contributor to firm's reputation (.56)

Q955 Persuasive (.55)

It should be noted that because most of the consultants in the study were relatively junior, selling, one of the most important activities of a partner, was not an expected attribute. The other characteristics, in the main, reflect required attributes.

It was not clear what was implied by the term precise. The word pair precise/vague was taken from a scale used by Mitroff and Mason (1974) in a study of moon scientists and found by them to be a useful discriminator. It is highly correlated in the supervisor's ratings with such attributes as ability to: meet deadlines and adhere to a work plan, communicate in writing, and be logical.

The perceived requirements for partnership would appear to conform with reality since a partner's main role is developing a practice. This involves selling, supervising and maintaining good client relations. As in other areas of business, career progression implies the adoption of a heavier managerial role.

E. Validity and Inter-correlations of Instruments

After the instruments were developed, tests for validity were made. Appendix H summarizes the correlations obtained between the results from the instruments, and other ratings of the consultant attributes made by the supervisor and the consultant himself. Validity tests are identified in column 3. The last column in the table shows significant inter-instrument correlations and indicates whether they were expected or not.

The most important findings were:

- An encouraging number of the instruments gave scores for the consultants which correlated with the supervisor's assessment of the same, or a similar, attribute construct. These were:
 - ability to reason abstractly
 - fact-anchored/imaginative conceptualizer
 - early vs. late closure
 - creative
 - specialist/generalist
 - line/staff
 - need for autonomy
 - introvert/extrovert

At the .05 level of significance.

- The only case where a comparison was possible and the correlation was not significant was:

- flexibility

- In some cases there was no comparable supervisor rating. These include:

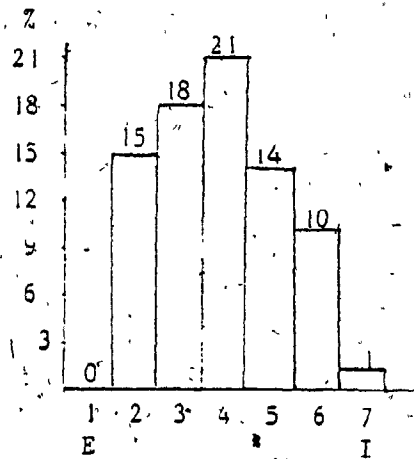
- tolerance for ambiguity
- the five values: theoretical, economic, aesthetic, social and political.

~~Because of the strong inter-relationships exhibited by the instruments, a~~ factor analysis was carried out to see if they could be consolidated. This is discussed in section G of this chapter.

F. Distribution of Performance Ratings and Attribute Scores

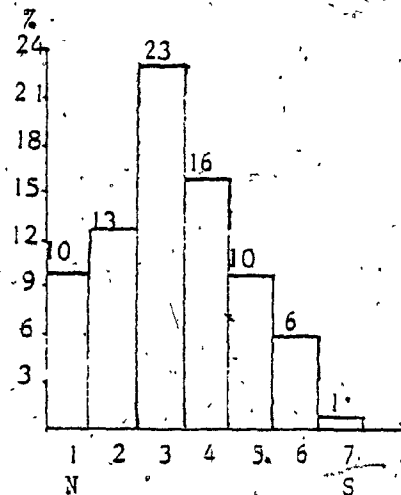
The distribution of consultant scores along each of the main attributes measured is given below:

1. Myers-Briggs IE (Q322)

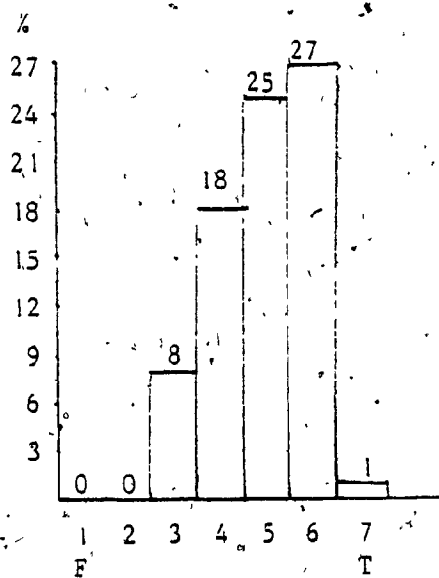


$$\bar{X} = 3.9 \quad \sigma = 1.4$$

2. Myers-Briggs SN (Q323)

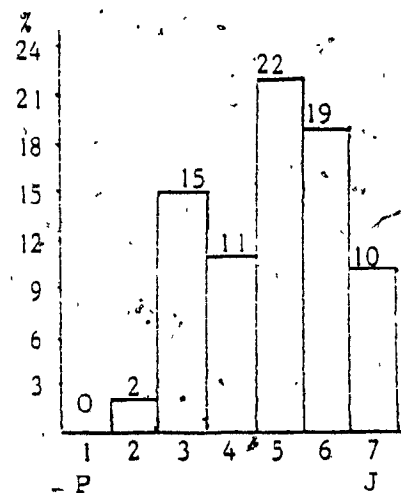


$$\bar{X} = 3.3 \quad \sigma = 1.5$$

3. Myers-Briggs TF (Q324)

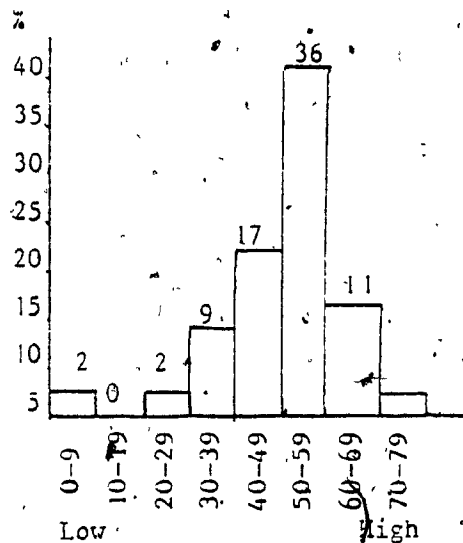
$\bar{X} = 5.0$

$\sigma = 1.0$

4. Myers-Briggs JP (Q325)

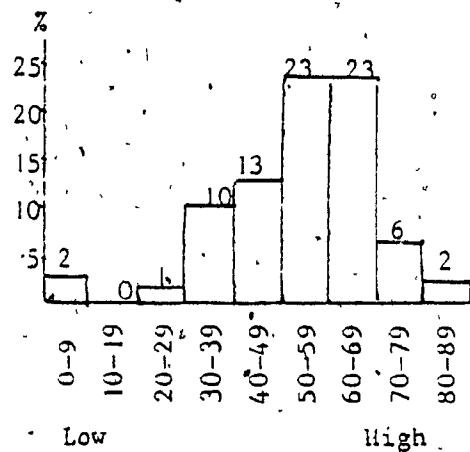
$\bar{X} = 4.9$

$\sigma = 1.4$

5. Theoretical Values (Q380)

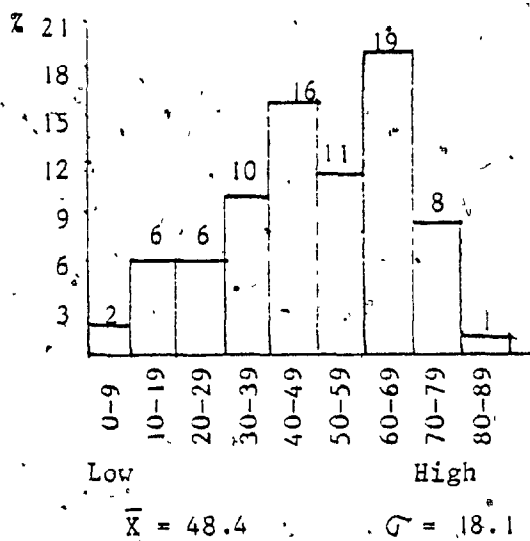
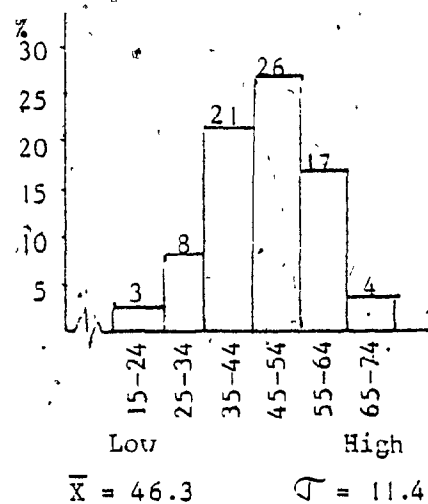
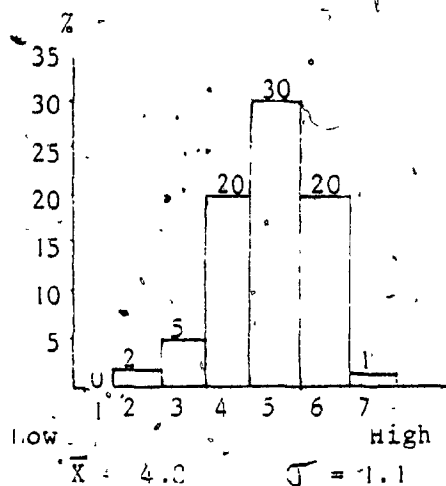
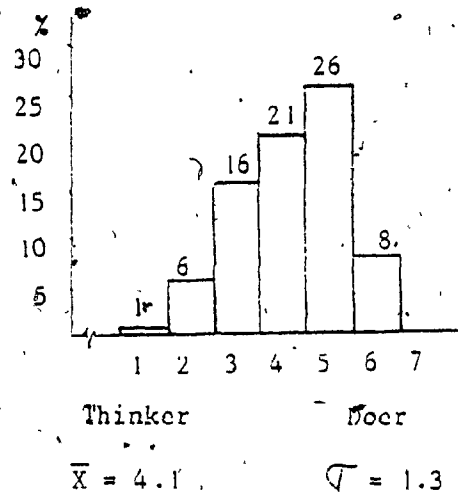
$\bar{X} = 51.1$

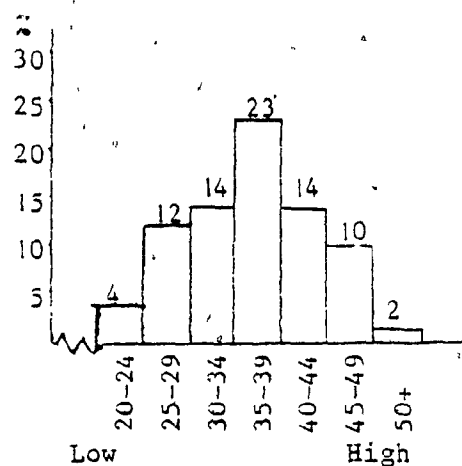
$\sigma = 12.7$

6. Economic Values (Q381)

$\bar{X} = 53.9$

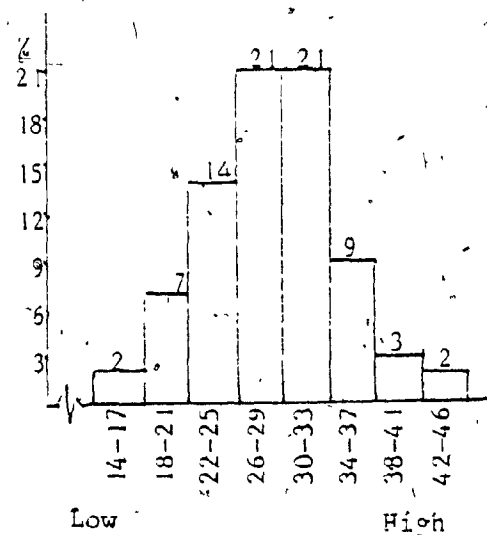
$\sigma = 14.6$

7. Aesthetic Values (Q382)8. Social Values (Q383)9. Abstract Reasoner (Q556)10. Doer/thinker (Q557)

11. Creative (Q509)

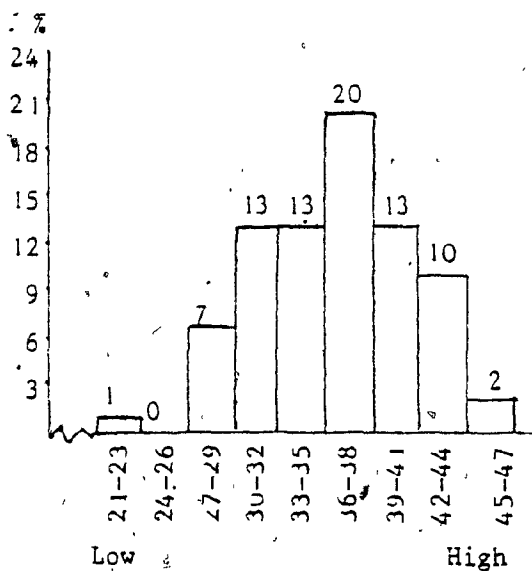
$$\bar{X} = 36.5$$

$$\sigma = 7.5$$

12. Need for Autonomy (Q510)

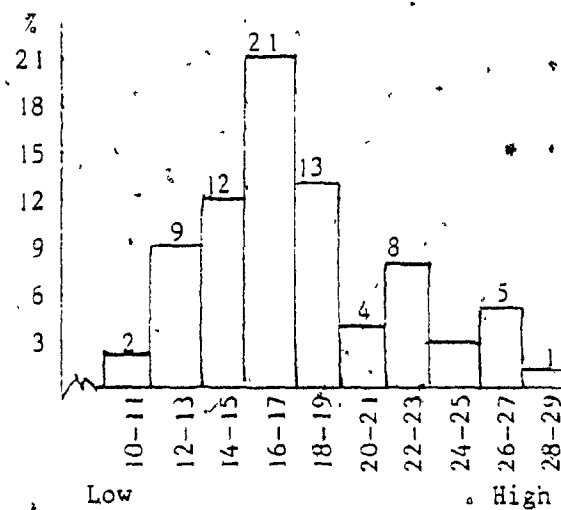
$$\bar{X} = 28.5$$

$$\sigma = 5.3$$

13. Tolerance for Ambiguity (Q511)

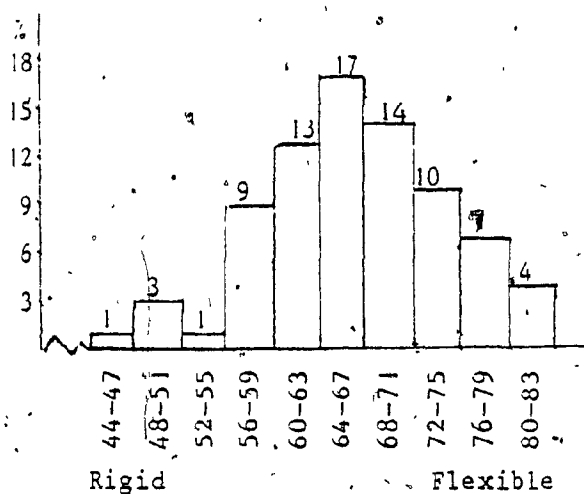
$$\bar{X} = 36.0$$

$$\sigma = 4.9$$

14. Use of Quantitative Methods (Q513)

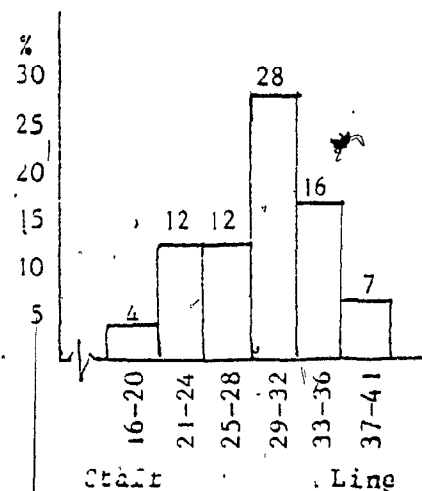
$$\bar{X} = 17.9$$

$$\sigma = 4.2$$

15. Flexibility (Q514)

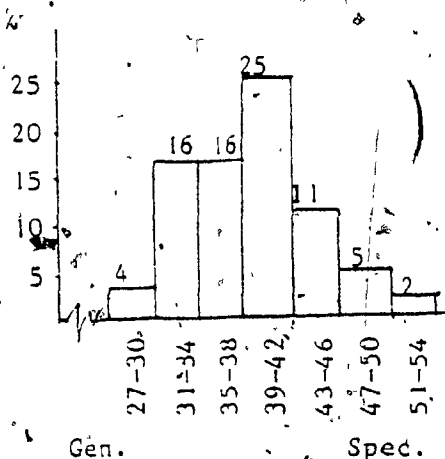
$$\bar{X} = 66.4$$

$$\sigma = 7.9$$

16. Line/staff (Q515)

$$\bar{X} = 30.0$$

$$\sigma = 5.1$$

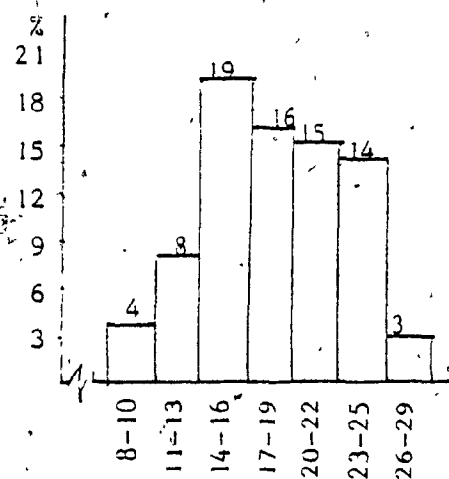
17. Specialist/generalist (Q895)

Gen.

Spec.

$$\bar{X} = 38.7$$

$$\sigma = 5.2$$

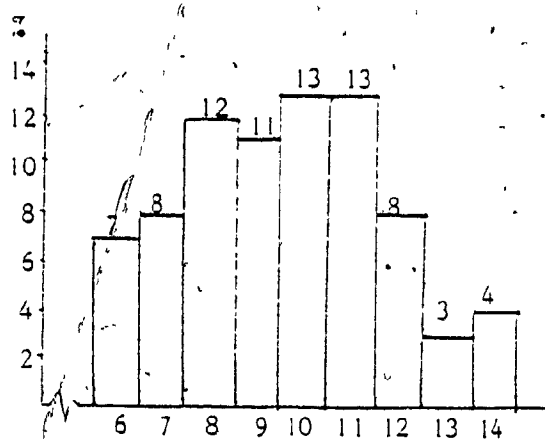
18. Supervisory Ability (Q889)

High

Low

$$\bar{X} = 18.1$$

$$\sigma = 4.6$$

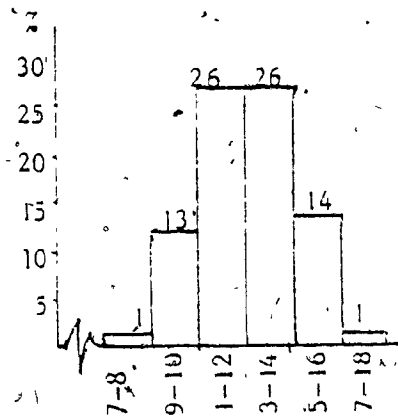
19. Persuasion (Q890)

High

Low

$\bar{X} = 9.6$

$\sigma = 2.2$

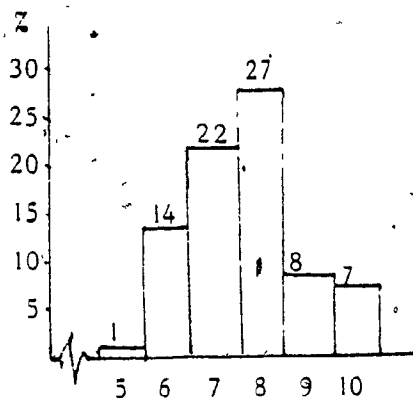
20. Empathy (Q891)

Low

High

$\bar{X} = 12.4$

$\sigma = 2.0$

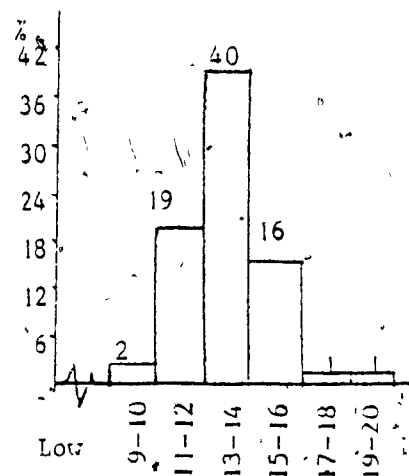
21. Tactical Skills (Q892)

Low

High

$\bar{X} = 7.6$

$\sigma = 1.3$

22. Ability to Meet Deadlines (Q893)

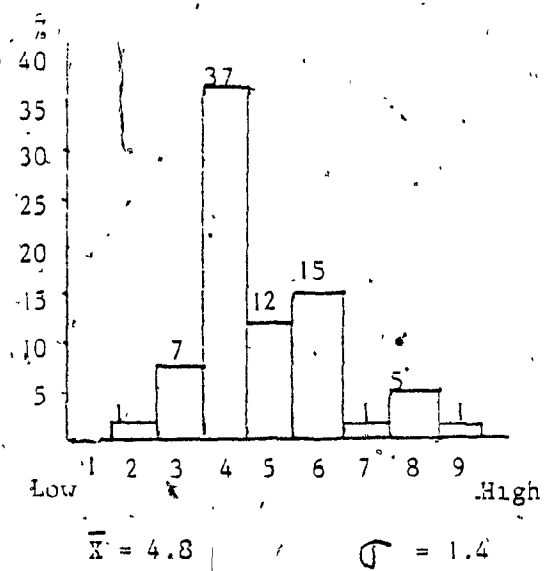
Low

High

$\bar{X} = 13.5$

$\sigma = 1.7$

23. Business Development (Q894)



In most cases (with the exception of line/staff, use of Q.M., SN, JP and TF, the measures seem to have a near normal distribution. The bimodal nature of the JP scores for the Myers-Briggs Test is attributed to the large proportion (30%) of data processing consultants in the sample who constituted the second (high J) population by themselves.

Table V.4 shows the distribution of performance ratings. In general they tend to clump within three scale points. 'No answers' averaged about 5%. The ratings for overall effectiveness as a management consultant (Q933) are distributed over a more limited range and correlations with this variable will likely prove inconclusive. There was a widespread degree of correlation among the assessments (i.e., the individual was good for most tasks or poor). This was more pronounced for certain firms.

The 'easiest' task (i.e., that with the highest average) was 'collect information through structured interviews' (Q940) followed by 'implement a well tested package' (Q936). (Using the same criteria technical diagnosis and prescription were considered easier than organizational diagnosis and prescription.) The remainder of the tasks with the exception of Q941, 'act in a line capacity' all qualify as difficult.

TABLE V.4

SUMMARY OF PERFORMANCE ASSESSMENTS MADE BY SUPERVISORS

Quest. No.	Description	No Ans.	Rating					No. of cons. who prefer this task
			(low)		(high)			
			1	2	3	4	5	
---% of evaluations---								
<u>(a) For Stages of Task</u>								
904	Identifying problems not speci- fied in Terms of Reference	3	1	1	29	60	6	*
905	In diagnosing problems - tech.	4	0	4	27	55	10	*
906	In diagnosing problems - organ.	3	0	8	41	43	3	*
907	In prescribing (developing work- able sol'ns) - technical aspects	5	0	1	25	60	9	*
908	In prescribing (developing work- able sol'ns) - organizational	3	0	9	41	46	1	*
<u>(b) For 10 Hypothetical Tasks</u>								
936	Implement a well tested and docu- mented package in his area	4	0	0	35	61		12
937	Manage a large project team comprising client and consultant staff	5	7	26	40	21		40
938	Handle an assignment which has sensitive political aspects	6	5	26	44	19		27
939	Evaluate candidates for a senior executive position	7	0	31	43	14		10
940	Collect information through structured interviews	3	0	0	25	72		18
941	Act in a line capacity for a period to help a client overcome a staffing problem	5	1	14	39	41		22
942	Act as an expert witness in a court case	6	6	20	45	23		11
943	Help to resolve conflicting opinions	3	2	32	48	15		33
944	Work with sophisticated staff on a complex assignment within spec.	3	0	14	46	37		38
945	Carry out a diagnostic survey in a non-tech. area where he has no direct experience	3	3	26	48	20		24

* Results invalid because of unclear instructions.

continued...

TABLE V.4
SUMMARY OF PERFORMANCE ASSESSMENTS MADE BY SUPERVISORS

(continued)

Quest. No.	Description	No Ans.	Rating					No. of cons. who prefer this task
			(low)				(high)	
			1	2	3	4	5	
---% of evaluations---								
<u>(c) For Overall Effectiveness</u>								
933	How would you assess his overall effectiveness as a management consultant change agent	4	0	3	30	54	9	n/a
935	Do you believe that he is a potential partner?	4	4	23	41	28	n/a	n/a (1)

Table of Averages

	Question No.	\bar{X}
<u>Stages</u>	904	3.7
	905	3.7
	906	3.4
	907	3.8
	908	3.4
<u>Tasks</u>	936	3.6
	937	2.8
	938	2.8
	939	2.8
	940	3.7
	941	3.3
	942	2.9
	943	2.8
<u>Overall Effectiveness</u>		
	933	3.7
	935	3.0

Scores as shown are reversed. 'Don't know' is grouped with 'No answer'.

The most preferred task was 'managing a large project team' (Q937) with 'working with sophisticated staff' (Q944), a close second. Least preferred were Q939, 'evaluate senior executive candidates', Q942, 'act as expert witness' and Q936, 'implement a well tested package'. In other words the 'simplest' tasks were the least preferred.

G. Development of Composite Factors for Attributes

Factor analysis was used to transform fifteen of our personality/cognitive dimensions to a more limited number of factors. Certain attributes were not included in the factor analysis because we wanted to be able to examine their effect independently. These were: political (power) values (Q384); specialist/generalist (Q895) and use of quantitative methods (Q513).

We used the method which calculates orthogonal factors with initial commonality estimates based on the multiple R^2 of the given variable on all other variables in the matrix (Guilford, 1954). Four factors were developed. A varimax rotation was made.

The loading of the four factors on each of the fifteen attributes is given below, although only three factors¹ have been interpreted in the ensuing discussion:

<u>Attribute</u>	<u>Factor</u>			
	1.	2	3	4
Q322 - <u>introvert/extrovert</u>			<u>-.43</u>	
Q323 - <u>fact-anchored/imaginative concept.</u>	<u>-.72</u>			
Q324 - <u>logical/gut feel</u> evaluator	<u>-.23</u>	<u>-.57</u>		
Q325 - <u>early/late closer</u>	<u>-.57</u>	<u>-.36</u>		
Q380 - theoretical values			<u>-.37</u>	
Q381 - economic values				<u>.42</u>
Q382 - aesthetic values		<u>.48</u>		
Q383 - social values	<u>-.29</u>	<u>.24</u>	<u>-.22</u>	
Q556 - abstract reasoner		<u>-.63</u>		
Q557 - <u>doer/thinker</u>			<u>.60</u>	
Q509 - creativity	<u>.58</u>			<u>-.38</u>
Q510 - need for autonomy	<u>-.20</u>		<u>-.30</u>	<u>-.36</u>
Q511 - tolerance for ambiguity	<u>.73</u>			
Q514 - flexibility		<u>.38</u>		
Q515 - <u>line/staff</u>	<u>-.34</u>		<u>.55</u>	
Relative importance	51%	23%	18%	11%

The highest loading (absolute value) in each row is underlined.

Factor Loadings on Attributes

¹The fourth factor could not be easily interpreted. When the factor analysis was re-run with only 3 factors there was little change in the loadings. See Appendix D, pages 51-52.

The constructs represented by the factors are relatively clear. Each factor represents a bipolar dimension. They are orthogonal.

Factor #1 and Factor #2 are related to problem solving, the first describing the approach to conceptualization and fact gathering, the second describing the approach to conclusion drawing, i.e., prescription.

Factor #3 can be interpreted as representing a line (doing) orientation at the high end and a staff (thinking) orientation at the other.

(a) Factor #1. The grounded/ungrounded approach to conceptualization

The first factor loads heavily on four¹ attributes:

Q323 - fact-anchored/imaginative conceptualizer (M-B SN type)

Q325 - early/late closer (M-B JP type)

Q509 - (low) creative (modified Raudsepp)

Q511 - (low) tolerance for ambiguity

(We have reversed the polarity of the scale from that shown in the loading table so that the high end corresponds to the grounded category. The underlining shows the direction of the correlations with this end of the scale.)

At the high end of the bipolar scale we have the fact-anchored conceptualizer who has a low tolerance for ambiguity, is not particularly 'creative' and who is an early closer (i.e., selects an hypothesis early in the process and proceeds to test it methodically). We will call this individual the grounded conceptualizer.

At the low end of the scale we have the creative, 'intuitive' individual who has a high tolerance for ambiguity and who suspends judgment until he has the facts. We will call this individual the ungrounded² conceptualizer.

During fact gathering and conceptualization, the individual's perception of the situation, i.e., his model, is either (a) confirmed or revised in the case of an early closer, or (b) gradually developed in the case of the late closer. (For our purposes, we may consider a model to be a bundle comprising the individual's thoughts about the problem,

¹Since social values (Q383) was present in all factors at a relatively low loading value it was ignored.

²It has been suggested that the term 'suspended' would be more appropriate.

i.e., symptoms, causes, criteria for resolution, and possible solutions.) Input may come externally from discussions, reports and observation, or internally from ideas and recollections. External input is influenced by the individuals selective attention, and his cognitive filter which, in turn, is affected by his previous experience and aspirations (Broadbent, 1971; Miller, 1969; Cherry, 1957).

Witkin (1962) and his co-workers concluded that a person's manner of perceiving does not easily change and represents an ingrained feature of his psychological being—his perceptual style.

Regarding the creative generation of ideas, Popper (1968; p. 32) claims there is no logical method for guaranteeing the process; however, some techniques such as Morphological Analysis (Ayers, 1969) have been used for the purpose.

In Appendix I, we have listed significant and/or expected correlations between Factor #1 and items in the assessment and self-description questionnaires. The implications are summarized below.

Supervisors view those with a highly grounded approach as being: conventional (Q950), cautious (Q956), precise (Q960), on time (Q967), concentrating on facts rather than ideas (Q962) and able to work to a detailed plan (Q925).

Such individuals see themselves as being: conventional (Q937, Q429), cautious (Q411), realistic (Q403, Q399) and uncomplicated (Q423), concentrating on hard rather than soft data (Q425) and more people than concept oriented (Q392). They tend to be line oriented (Q409) and team members (Q414, Q613). They are present rather than future oriented (Q474, Q508). They tend to find checklists useful (Q701), structure their interviews (Q693) and use packaged solutions (Q718). They strive for practical rather than ingenious solutions (i.e., satisfice) (Q650) and treat each problem by itself rather than looking for general principles to apply elsewhere (Q658). They do not often change the model of the problem with which they started (Q666), they believe there is a right and wrong approach to any problem (Q681) and disclaim any reliance on inspiration or intuition (Q475, Q652, Q682). They work steadily rather than in 'fits and starts' (Q670) and give more weight to financial

data than to their feelings about company management (Q455). When they give repeated presentations they tend to stick to the same script rather than vary the approach used (Q501). They prefer 'cold war' rather than 'creative' collaboration while working with a team (Q796-Q798) and claim that in their role as a consultant they rarely introduce new ideas or novel ways of doing things (Q101). They do not attach particular importance to listening to experienced consultants in their fields (Q459) and they believe their background is similar to that of others in the firm (Q749) and their PS approach similar to that of colleagues (Q785) and clients (Q786).

By inference, individuals with an ungrounded approach are the reverse.

'Grounded' individuals would appear to be grounded in a number of ways: they work to a plan, they are realistic and disciplined and they stick to facts and frequently their initial conception of the problem. Conversely, the 'ungrounded' individual does not work well with a detailed plan, is idealistic and undisciplined, relies more on 'soft' data and often changes his initial model.

There seems to be some parallel between this dimension and the diverger/converger scale (Hudson, 1968). Kolb's (1974) definition of converger and diverger are similar to Hudson's but add a concrete/abstract dimension.

McKenney and Keen developed a receptor/preceptor classification for fact finding. There may be some relationship between their receptor (inductive, sequential, concentrate on detail) category and our grounded conceptualizer style and between their preceptor (deductive, simultaneous processing, concentrate on pattern) category and our ungrounded conceptualizer style. (See page II.26 of this thesis.)

Independently of the factor analysis of cognitive attributes, we had developed a verbal portrait of McKenney's systematic and intuitive conceptualizers described on page II.19, accompanied by a second set of portraits representing a linear vs. progressive deepening approach. We had hoped that these PS behaviour styles might in some way match up with one of the cognitive styles resulting from the factor analysis. Con-

sultants were asked which, if any, of these portraits described their PS behaviour. Supervisors were asked if these portraits matched the PS behaviour of each consultant. Also an instrument (Q888) was developed from the items in the supervisors' assessment which was intended to validate the classification of the consultant for behaviour during fact gathering (see Appendix D, page 48).

Consultants were divided into three groups on the basis of their scores on Factor #1. The top and bottom groups were analyzed for the results of portrait matching (self-evaluated and supervisor evaluated). The results are given in Table V.5 accompanied by the supervisor's assessment of similarity in approaches (Q972) and the consultant's score on Q888, the supervisor's composite scale to validate the systematic/unsystematic classification.

There is no significant association between the consultant's score on Factor #1 and the portraits. However, from Appendix I we see that Q888 is correlated ($r = .27$) with Factor #1, the systematic approach relating to the grounded approach as it should. The lack of correspondence between Factor #1 scores and the portraits is disappointing but we intend to confirm this with further analysis.

(b) Factor #2. Rational/instinctive conclusion drawing

The second factor loads on four attributes:

Q556 - (high) abstract reasoner (Kolb's LSI)

Q324 - logical/'gut feel' evaluation (M-B TF type)

Q382 - (low) aesthetic values (modified Allport, Vernon, Lindzey scale)

Q514 - (low) flexibility

(We have reversed the polarity of the scale from that shown in the loading table (pg. V.24) so that the high end corresponds to the rational category. The underlining shows the direction of the correlations with this end of the scale.)

At the high end of this bipolar scale we have the information evaluator who consistently uses a logical approach for analyzing the 'facts' and drawing conclusions. Such an individual places low value on aesthetic (?right hemisphere) considerations, relies on abstract (detached) reasoning

TABLE V.5

COMPARISON OF PORTRAIT RESULTS vs FACTOR #1 SCORES

Cons. Score F#1	Self Rated		Supervisor #1 ⁵				Supervisor #2 ⁵				Score ⁶ Q888
	A/B ¹ Q725	C/D ² Q727	A/B ³ Q969	C/D ⁴ Q971	Perceived Similarity of Approach Q972	A/B ³ Q969	C/D ⁴ Q971	Perceived Similarity of Approach Q972			

Ungrounded Consultants Should Correspond to Profile B

9	A	3	3	3	5	3	3	5	28
10	3	C	A	C	5	A	C	6	27
6	3	C	A	3	4	0	Q	0	22
4	A	C	3	C	4	-	-	-	41
5	0	0	A	D	0	A	D	4	23
5	3	C	A	C	2	B	C	4	27
10	A	C	3	3	4	-	-	-	27
4	A	C	B	3	0	A	D	5	32
5	3	C	0	C	5	3	C	5	41
7	4	C	B	C	4	A	C	4	28
9	3	3	A	3	2	-	-	-	19

 $\bar{X} = 28.6$ Grounded Consultants Should Correspond to Profile A

32	A	C	A	C	6	A	3	3	17
32	B	D	A	D	6	A	0	4	24
34	A	C	B	C	6	3	0	4	32
30	A	C	3	3	4	A	C	5	25
41	A	C	A	D	3	A	3	4	25
34	A	D	A	3	5	3	3	4	25
33	4	C	A	4	5	3	3	4	22
33	3	3	A	3	4	-	-	-	30
36	A	C	A	D	6	A	D	4	27
32	4	4	A	C	4	3	C	4	25

 $\bar{X} = 25.2$ Answers for complete sample%

N=78

(1) Q725 Portrait A vs B (self evaluated)

- A - Systematic approach fits me
- B - Unsystematic approach fits me
- 3 - Believe I can use either
- 4 - Don't recognize my approach as either
- 0 - No answer = (1)

51

9

31

9

100

Continued...

TABLE V.5 (Continued)

Answers for complete sample(2) Q727 Portrait C vs D (self evaluated)

%
N=78

C - Progressive deepening approach fits me	58
D - Linear approach fits me	10
3 - Believe I can use either	26
4 - Don't recognize my approach as either	6
0 - No answer = (1)	
	100

(3) Q969 Portrait A vs B (supervisor evaluated)

N=124

A - Systematic approach fits him	63
B - Unsystematic approach fits him	13
3 - Believe he can use either	20
4 - Don't recognize his approach as either	4
0 - No answer = (3)	
	100

(4) Q971 Portrait C vs D (supervisor evaluated)

N=122

C - Progressive deepening approach fits him	35
D - Linear approach fits him	20
3 - Believe he can use either	35
4 - Don't recognize his approach as either	10
0 - No answer = (5)	
	100

(5) Q972 Supervisor's assessment of similarity of consultant's approach with his

N=116

1 - Almost always different	0
2 - Often more different	7
3 - More different than similar	8
4 - More similar than different	48
5 - Often more similar than different	29
6 - Almost always similar	8
0 - No answer = (11)	
	100

(6) Q888 Supervisor's assessment of consultant's predisposition to a systematic or unsystematic approach

N=77

Score	
Value	
7-9 high systematic	8
10-12	29
13-15	17
16-18	23
19-21	14
22-24	5
25-27	3
28-30 high unsystematic	1
No answer = (2)	
	100

 $\bar{x} = 15.3$ $\sigma = 4.6$

and thus tends to operate with sequential (left hemisphere) information processing but with parallel evaluation of alternatives when in an explicit mode. We will call this individual the rational evaluator.

At the low end of the scale we have the individual who evaluates information in a flexible, unsystematic (probably implicit) manner, relying on his feelings, and 'concrete',¹ i.e., people-related considerations. We will call this individual the instinctive² evaluator.

Referring to Appendix I,³ we note that supervisors view those with a rational approach as being: scheduled (Q961), ambitious (Q958), precise (Q960) and logical (Q948). There is a positive correlation with every one of the characteristics covered by the items Q910 to Q932 which are those normally considered important for consultants. The items with the strongest correlations are: developers of new packages (Q922), strong conceptual skills (Q923), tactician (Q914) and developers of new business (Q915).

Such individuals see themselves as being specialists rather than generalists (Q400, Q895), logical (Q388), precise (Q398), methodical (Q396), disciplined (Q421) and realistic (Q403). They are interested in the business development side (Q446), believe that dollar return is the main criterion for motivating change in the private sector (Q677), and think that problems should be solved without any emotional involvement (Q683). They prefer to supervise rather than operate (Q445), use checklists for interviews (Q693) and do not rely on first impressions (Q496). In communicating they are impatient with those who have not thought through their ideas (Q506). They agree with the statement that if mathematical techniques were better understood by managers, higher quality solutions could be developed (Q689) and claim that their reports make extensive use of numbers (Q685). They are deliberate, preferring to stop and think before acting on even trifling matters (Q471). They believe that their approach to problems is different from that of supervisors (Q784) and clients (Q786) and they feel they have adapted well to the job (Q640).

¹Refers to Kolb's (1974) use of the term where he defines 'concreteness' as the "immersion in and domination by one's immediate experiences" (p. 28)

²We have purposely avoided use of the term 'intuitive' because of its present wide use unaccompanied by any operational definition.

³Because of the volume of data, only a sample of the items referred to in the description of Factor #2 and #3 are detailed in Appendix I.

McKenney and Keen developed the systematic/intuitive dimension for information evaluation. Keen (1973) describes evaluation as referring to the processes subsumed under the term 'problem solving'. Systematic individuals structure their approach in terms of some method (heuristic), whereas the intuitive has a trial and error approach, jumping from one method to another. If Keen is using the term problem solving to refer to prescription as we have defined it, then his systematic/intuitive and our rational/instinctive constructs are probably very similar even if the instruments he uses are quite different.

* * * * *

Using these first two dimensions, we can define four possible cognitive 'styles' as shown below:

		<u>Information Processing</u>	
		<u>Rational</u>	<u>Instinctive</u>
<u>Fact</u> <u>Gathering</u>	<u>Grounded</u>	Style 1	Style 2
	<u>Ungrounded</u>	Style 3	Style 4

We were unable to develop the style concept further since our data are limited to management consultants and therefore we cannot locate the axes relative to a general population.

Our two dimensions are very similar to the Myers-Briggs SN and TF dimensions (which are components). The main difference is that the JP scale (early/late closure), which we found highly correlated with both the SN and TF scales, is incorporated in the factors and disappears as an independent third dimension.

As discussed, McKenney and Keen's cognitive style classification (see page II.26) is similar having two dimensions, one referring to information gathering and the other to information processing. However, it is based on sample tasks rather than a self descriptive questionnaire.

Driver and Lintott's Decision Style classification is, we believe, less comparable. It has two dimensions, the first of which is related to the

amount of information collected, while the second refers to a focus on one or more solutions (see II.28).

Factor #3. A line (doing) orientation vs a staff (thinking) orientation

The third factor loads on five of the personality/cognitive attributes, namely:

- Q557 - doer/thinker (Kolb's LSI)
- Q515 - line/staff orientation
- Q322 - introvert/extrovert (M-B IE type)
- Q510 - (low) need for autonomy²
- Q380 - (high) theoretical value²

At the high end of this bipolar scale we have the line oriented doer, an extrovert, with a low need for autonomy. We will call this a line orientation. At the low end we have the staff man, the thinker, an introvert with a high need for autonomy. We will call this a staff orientation.

The line manager bears some resemblance to Duncan's (1971) high adapter in his study of beginning consultants.

Referring to Appendix I, we note that supervisors view the line oriented individual as being: line oriented (Q968) and on time (Q967). With the exception of Q915 (developer of new business) and Q922 (developer of new packages), there is a negative correlation with every one of the characteristics covered by the items Q910 to Q932 which are those normally considered important for consultants. Otherwise they see little of a distinctive nature about him.

However, the individual himself is very emphatic about his characteristics. There is a significant correlation between Factor #3 and 22 of the 46 word pair adjectives covered by items Q386 to Q431. The line oriented individual sees himself as active (Q386, Q415), people oriented (Q392), confident (Q387), outspoken (Q391), practical (Q390, Q399), precise (Q398), assertive (Q402), decisive (Q408), impulsive (Q411), persistent (Q416), uninhibited (Q431) and social (Q422). He has decided opinions, believes there is a right and wrong approach to every problem (Q681), frequently ends up a survey with the same view of the problem he started with (Q666). Like the grounded fact gatherer he disclaims any reliance on intuition (Q652,

¹This line orientation measure was developed independently (see Appendix D).

²This high orientation to theoretical values for the doer is the reverse of what was expected. No explanation was found.

Q682). He works steadily rather than in 'fits and starts' (Q670) and finds checklists very helpful (Q701).

The staff oriented individual is considered to have the opposite characteristics of those just described.

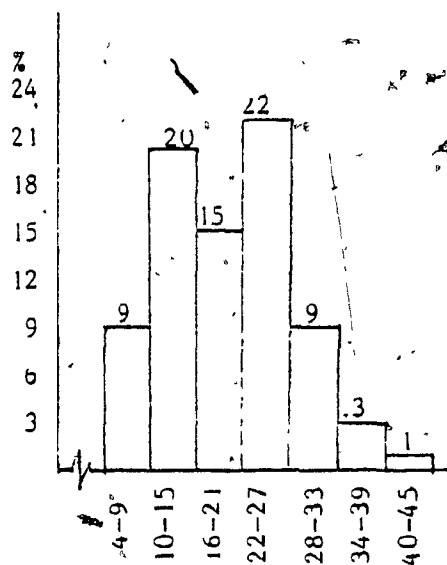
In many respects, Factors #2 and #3 correspond to the two dimensions of Kolb's Learning Style Inventory, Factor #2 relating to the abstract/concrete scale ($r = .76$) and Factor #3 relating to the active/reflective scale ($r = .73$).

Distribution of factor scores

The factor score distribution and the corresponding distribution for the Myers-Briggs and Kolb instruments are shown below.¹

Factor #1 - Grounded/ungrounded Approach to Conceptual

Myers-Briggs SN Type (Q323)

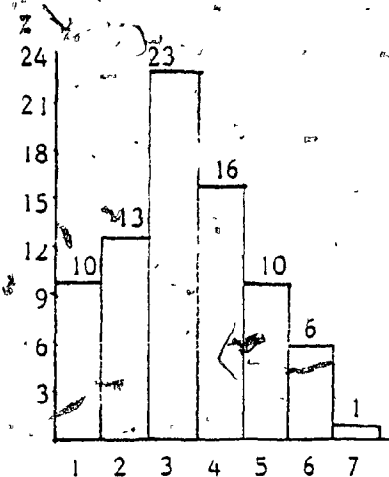


Ungrounded

$\bar{X} = 19.5$

Grounded

$\sigma = 8.5$



N

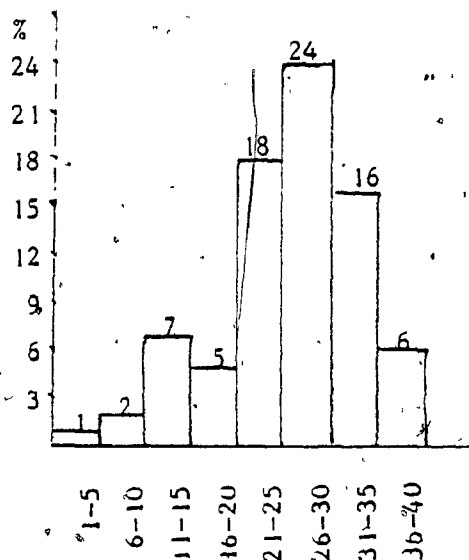
S

$\bar{X} = 3.3$

$\sigma = 4.5$

¹ Note that strong correlations between the variables are also present.

Factor #2 - Rational/instinctive
 Approach to Conclusion
 Drawing (Q982)



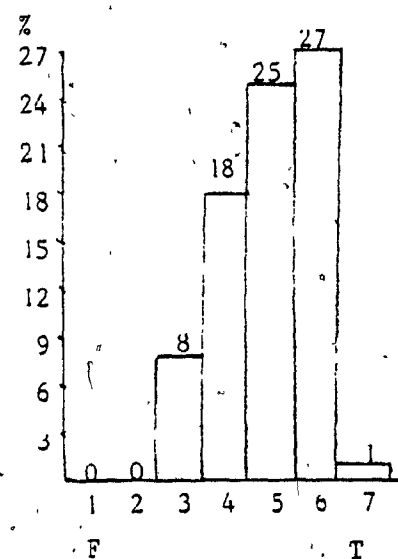
Inst.

 $\bar{X} = 25.4$

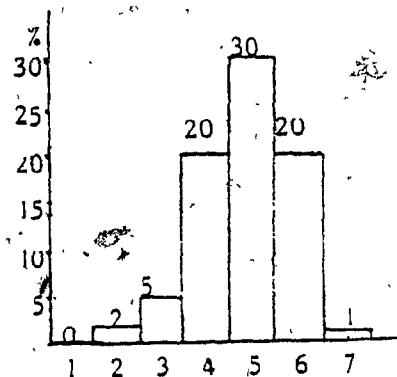
Rat.

 $\sigma = 7.8$

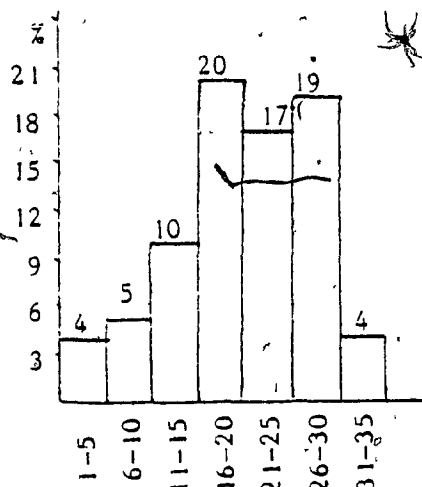
Myers-Briggs TF Type (Q324)

 $\bar{X} = 5.0$ $\sigma = 1.0$

Kolb's Abstract/concrete (Q556)

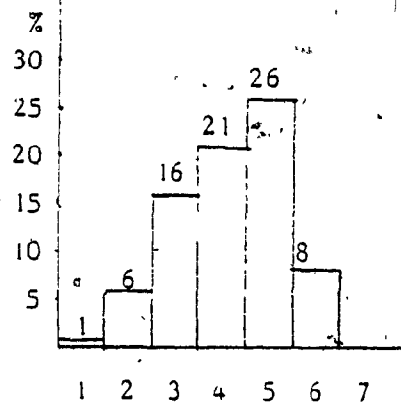
High
ConcreteHigh
abstract $\bar{X} = 4.8$ $\sigma = 1.1$

Factor #3 - Line/staff Orientation
(Q983)



Staff $\bar{X} = 20.4$ Line $\bar{X} = 7.5$

Kolb's Active/reflecting
(Q557)



reflecting Active

$\bar{X} = 4.1$

$\bar{X} = 1.3$

Myers-Briggs

	N	<u>6</u>	<u>25</u>
Perceiving	66%	13	53
		<u>1</u>	<u>15</u>
	34%	2	32
S-	15%		85%
	F		T
	Judging		

Kolb

	<u>Accommodator</u>	<u>Diverger</u>
High Concrete	<u>14</u>	<u>14</u>
	36%	18
AC-CE	<u>Converger</u>	<u>Assimilator</u>
	<u>29</u>	<u>22</u>
	64%	36
High Abstract	54%	46%
	High Doing	High Thinking
	AE-RO	

Note: The figures underlined indicate the counts of category extremes only.

H. Correlation Between Attribute Measures and Task Performance

Table V.6 shows significant or nearly significant correlation coefficients relating attributes (self perceived) and task performance ratings. (We used the self assessments rather than the supervisor's assessments for the attribute ratings for two reasons: first, we had the more complex instruments to draw on and, secondly, we were seeking performance predictors which could be used by individuals in career planning or by firms at recruiting time. The latter precluded the use of supervisor's assessments.) The table is relatively sparse and correlations are generally weak. This was not unexpected considering that the observations were generated by 79 consultants and 127 supervisors from 15 different consulting firms and that the scales were not anchored.

We list the significant attributes below, in descending order of importance (based on the number of tasks to which they relate):

- Q513 use of quantitative methods
- Q830 age
- Q510 need for autonomy
- Q322 introvert/extrovert
- Q895 specialist/generalist
- Q889 supervisory ability
- F#2 rational/instinctive evaluator
- Q556 abstract reasoner.

There are a few puzzling questions generated by the foregoing: Why does the 'use of quantitative methods' appear to be so universally important when in fact experience suggests that quantitative methods are not used so widely in practice? Why should an introvert do so well on problem finding? Why do cognitively related attributes play such an unimportant role?

From questionnaire #2 (Supervisor Assessment) we have learned that the use of quantitative methods is associated in the supervisors' minds with such consultant attributes as:

- innovation (r = .38)
- strong conceptual skills (r = .21)

TABLE V.6

TASK PERFORMANCE VS CONSULTANT ATTRIBUTES

(page-1 of 2)

	F1	F2	F3	Line/staff orientation	Introvert/extrovert	Fact-anchored/imaginative conceptualizer	Logical/gut feel evaluator	Early/late closer	Theoretical value	Economic value	Aesthetic value	Social value	Political (power) value	Abstract conceptualizer	Doer/thinker	Creative	Need for autonomy	Tolerance for ambiguity	Use of qualitative methods	Flexibility	Line/staff	Specialist/generalist
904 Prob. finding																						
905 Diag.-technical																						
906 Diag.-organiz.																						
907 Presc.-technical																						
908 Presc.-organiz.																						
-936 Well-tested pack.																						
937 Project team		.23																				
938 Sensitive polit.																						
939 Eval. candidates																						
940 Struct. interviews																						
941 Line capacity																						
942 Expert witness																						
943 Resolve conflict																						
944 Sophist., spec.																						
945 Non-tech. diag.																						
933 Overall PS effect.																						
935 Partner potential																						

TABLE V.6

TASK PERFORMANCE vs CONSULTANT ATTRIBUTES (continued)

(page 2 of 2)

	Supervision	Persuasion	Empathy	Tactician	Meet deadlines	Business development	Age
	889	890	891	892	893	894	830
904 Prob. finding					.28	.22	
905 Diagnosis - technical							
906 Diagnosis - organizational							
907 Prescription - technical							-.18
908 Prescription - organizational							
936 Well tested package							
937 Project team	.24						
938 Sensitive political							.23
939 Evaluate candidates					.23		.21
940 Structured interviews							-.26
941 Line capacity	.22						
942 Expert witness	.19						
943 Resolve conflict	.23						.27
944 Sophisticated, specialist	.30				.19		
945 Non-technical diagnosis		-.30			.19		
933 Overall PS effectiveness			-.18 ?		.21	.23	
935 Partner potential			-.27 ?				-.18

- developer of new packages ($r = .23$)
- the ability to produce different (practical approaches to problems ($r = .31$))

It is conceivable then that 'use of quantitative methods' is a surrogate for words like innovative, strongly conceptual, etc. If true, this would answer two of the questions just posed, including that relating to the apparent lack of emphasis on cognitive qualities.

Regarding the correlation coefficient of 0.4 between introversion and problem finding, we are more at a loss. Either it is spurious, due perhaps to the rather concentrated distribution of ratings for 'problem finding' or it may be due to the strong correlations between introversion, staff orientation and specialist orientation. (Note Factor #3 is also correlated with problem finding.) Jung himself seems to have considered introversion/extroversion to be one of the main, if not the main, dimension of the four he developed (Jung, 1923). Perhaps in relating problem symptoms to his subjective norms, the introvert is less influenced by the client's own preconceptions than is the extrovert. The introversion/extroversion measure gave rise to another anomaly since there is a significant positive correlation ($r = .24$) with social values (Q383) (see Appendix H). The latter has been defined as love of people in a selfless or altruistic sense (Tagliuri, 1965). This we cannot explain.

There are some other interesting results:

- Individuals with a high need for autonomy (Q510) do well in many task situations but appear to fall down in structured interviews. A similar phenomenon was observed for older individuals. In both cases there would appear to be an inability, or an unwillingness, to pursue a closely prescribed line of questioning.
- Flexibility (Q514) seems to be a disadvantage, if anything. Flexible individuals were given low performance ratings for:
 - project management (Q937)
 - sensitive, political tasks (Q938)
 - resolution of conflicting opinions (Q943)

It is easy to understand why too much flexibility in project management could be undesirable; however, the other two items are more difficult to interpret. An unyielding attitude in a sensitive,

political task might be the only way to get agreement (e.g., "You simply have no alternative but to hire an outside general manager!"). Similarly, in the resolution of conflicting opinion, an inflexible protocol might be called for.

-- In many respects the same argument developed for flexibility could be applied to tolerance for ambiguity which has a lesser but still negative influence on performance for the high 'people' tasks.

In Section D, we deduced the attributes which the supervisors considered desirable for the ten hypothetical tasks and the four phases of the PS process. Did these correspond in any way with the significant self assessed attributes?

To answer this, we first used step-wise linear multiple regression analysis to identify the most influential self assessed attributes corresponding to performance on each task. We then compared the two sets of attributes. The independent variables which were submitted to the regression analysis were:

- Factor #1
- Factor #2
- Factor #3
- Age (Q830)
- Power (Q384)
- Specialist/generalist (Q895)
- Supervisory orientation (Q889)
- Persuasion (Q890)
- Empathy (Q891)
- Tactical skills (Q892)
- Ability to meet deadlines (Q893)
- Business development (Q894)

The dependent variable was the task performance rating.

In view of the relatively weak correlation coefficients, a value of 1. was used for the threshold level of F permitting entering variables. Consequently little validity can be attached to the late entering variables. However, since a certain overall consistency was observed among the results, all entering variables in order of entry are presented in Appendix J. The corresponding attributes from Section D are presented beside them.

A few general observations can be made about the regression analysis but, in view of the poor fit, it does not seem worthwhile to try to draw too detailed conclusions.

1. The results make sense, to a degree. For example, the parallel regressions for the two cases, problem resolution, technical and organizational, reflect reasonable agreement. The 'use of quantitative methods' figures prominently as we expected from the correlation coefficients and most important of all, there is some agreement in the two columns of attributes.
2. Factors #1, #2 and #3 are frequently present but do not seem to play the major rôles.
3. Factor #2, representing the rational/instinctive approach to information evaluation, is present twice (i.e., for Q937 - manage a large project and Q939 - evaluate senior candidates). In the first case it has a positive sign suggesting the need for rationality. In the second it has a negative sign indicating an instinctive approach is more desirable.
4. Factor #1 appears in three instances, all with a positive sign indicating the grounded approach is preferable. In the first two, Q936 - implement a well tested package, and Q937 - manage a large project, there would not appear to be scope for much conceptualization. Certainly ungrounded or imaginative conceptualization would be out of place.
In the third, Q941 - act in a line capacity, the variable is a late entry and therefore devoid of much significance. However, one's acceptance of the presence of this variable would depend on the extent to which line functions are thought to be associated with grounded conceptualization. In our sample, Factors #1 and #3 are orthogonal, but there was a correlation coefficient of .43 between variables Q515 (line/staff) and Q324 (M-B SN) suggesting that line individuals are fact-anchored using the Myers-Briggs construct.
5. Factor #3 appears with both a positive (line) and negative (staff) sign. The line orientation seems to be valuable for Q905 - problem

resolution phase - technical, whereas the staff orientation is important for: Q904 - problem finding phase, and Q906 - problem resolution phase - organizational. (Only the more significant occurrences were noted.)

A very tentative conclusion, based on the above results coupled with the occurrences of the specialist/generalist variable, is that the construct 'generalist', at the low end of the specialist/generalist dimension, does not refer to a particular people or organizational competence. This skill may be more implicit in the 'staff' category of Factor #3 or in the influence of age.

6. We do not seem to have captured the key attributes which affect consultants' effectiveness on organizational tasks, since tasks Q906, Q908, Q938 and Q945 all have a very small R^2 .
7. Inconsistencies in the role of supervisory skill indicate that the supervisor and consultant may not agree in their assessments regarding this particular characteristic. This assumption is confirmed by reference to Appendix G where it is seen that the correlation coefficient between these assessments is -0.06.
8. Similarly, consultants' views of their strengths in the areas of empathy and tactical skills do not seem to coincide with the views of their supervisors ($r = 0.02$ and -0.02 respectively).
9. The attributes appearing for 'overall PS effectiveness' (Q933) and 'potential to become a partner' (Q935) are a mixture and not too revealing. Possibly 'ability to meet deadlines' implies some degree of autonomy (i.e., ability to work without close supervision) in which case there is a modicum of correspondence between consultant and supervisor sets of important attributes.

To summarize our findings on correlations between self assessed consultant attributes and performance, we would conclude that there is sufficient evidence to warrant continuing this line of enquiry but not enough to enable us to make any definite conclusions on which specific

attributes are perceived to be most influential in determining effectiveness for certain kinds of tasks.* Factors #1, #2 and #3 all seem to affect task effectiveness to some extent.

I. Analysis of Consultant Attributes by Function

Table V.7 displays the averages for all of the consultant attributes by each of the seven functional specialties included in the study. Table V.8 shows the same data converted into ranks. From the F values shown in Table V.7, it is apparent that few of the between-function differences reach statistical significance at the .10 level, even though many of the differences are of a magnitude and direction that are explainable by conventional wisdom. We calculated the variance for each attribute for a group of five data processing consultants within one firm. These variances were appreciably smaller than the pooled 'within firm' variation (significant for most attributes at the .05 level or better). This confirms the existence of some function-related clustering.

We have summarized in Table V.9 our expectations and our findings regarding attribute averages by functional specialty. (Individuals in the functions covered may take exception to our hypotheses, for which we offer apologies.) For five of the seven categories, we were reasonably close; however, for Finance and Human Resources there were significant discrepancies. The surprises for Finance were the higher than expected values for creativity and tolerance for ambiguity and the conceptualizer classification of imaginative rather than fact anchored. A possible explanation is that we are talking less about accounting than we are about the more unstructured area of profitability, projected interest rates, government regulations, etc.

For Human Resources it was surprising to find the situation was almost the reverse. It was expected that dealings involving humans would require a high tolerance for ambiguity and high creativity. Instead we found that respondents from this area were low in these two attributes.

Possible explanations range from 'invalid instruments' and 'unrepresentative sample' to the intriguing thought that humans are so unpredictable that only those with a low tolerance for ambiguity can work

* Two of the composite factors, however, were significant at the .10 level.

TABLE V.7

CONSULTANT ATTRIBUTES SUMMARIZED BY FUNCTIONAL SPECIALTY

Specialty	n	Grounded/ungrounded conceptualizer F ₁	Rational/instinctive eval. F ₂	Line/staff orientation F ₃	Introvert/extrovert 322	Fact-anchored/imaginative conceptualizer 323	Logical/'gut feel' evaluator 324	Early/late closer 325	Theoretical values 380	Economic values 381	Aesthetic values 382	Social values 383	Political (power) value 384	Abstract reasoner 556	Doer/thinker 557	Creative 509	Need for autonomy 510	Tolerance for ambiguity 511	Use of quantitative methods 513	Flexibility 514	Line/staff 515	Specialist/generalist 895
Data process.	24	20	30	20	3.8	3.3	5.2	5.2	48	55	47	47	49	5.3	4.1	35	31	36	17	64	30	39
General mgmt.	9	18	22	22	3.7	3.0	4.6	4.7	50	56	48	47	50	4.6	4.7	39	32	37	19	63	33	36
Finance	9	13	24	15	4.0	2.9	4.9	4.6	51	56	53	50	48	4.6	3.3	38	31	38	19	65	26	38
Human resources	14	20	22	22	4.1	3.7	4.8	4.9	53	50	56	45	53	4.2	4.8	34	34	35	16	69	30	40
Production	10	25	28	21	4.1	4.0	5.0	5.6	57	57	47	48	48	4.6	4.0	36	29	34	18	67	30	36
O.R. & economics	10	15	28	22	3.5	2.7	5.2	4.3	54	52	40	41	50	5.2	3.8	39	31	37	23	70	29	41
Marketing	3	13	21	19	3.3	2.7	4.0	3.7	52	51	50	47	23	4.7	3.3	39	33	40	18	71	29	36
Average		19	26	20	3.8	3.3	5.0	4.9	51	54	48	46	49	4.8	4.1	36	31	36	18	66	30	39
Within group	6	9.3	8.2	2.7	1.4	1.5	1.0	1.3	13	15	18	12	14	1.0	1.1	74	5.8	4.9	3.9	7.7	5	5.5
F (between groups)		1.9	2.3	0.9	0.3	1.1	1.1	1.6	0.7	0.4	1.0	0.5	1.8	2.6	2.3	1.0	0.9	1.5	3.6	1.4	1.4	1.2
F(6,72;.10) = 1.9																						
Areas in which DP function was homogeneous		*	*			*	*		*	*				*	*	*				*		*

TABLE V.8

'1' indicates the highest average score

TABLE V.9

EXPECTED vs OBSERVED ATTRIBUTE PROFILE BY FUNCTIONAL SPECIALTY

	Data Proc.		General Mgmt.		Finance		Human Resources		Production		O.R. & Economics		Marketing	
	Exp.	Fnd.	Exp.	Fnd.	Exp.	Fnd.	Exp.	Fnd.	Exp.	Fnd.	Exp.	Fnd.	Exp.	Fnd.
	n=24		n=9		n=9		n=14		n=10		n=10		n=3	
Q323 <u>fact-anch/imaginat.</u> conceptualizer	imag.	mid	fact	<u>imag.</u>	fact	<u>imag.</u>	fact	x	fact	x	imag	x	imag	x
Q324 <u>logical/'gut feel'</u> evaluator	logic	x	logic	mid	logic	x	'gut'	mid	logic	x	logic	x	'gut'	x
Q325 <u>early/late</u> closer	early	x	early	mid	early	mid	late	mid	early	x	late	x	late	x
Q556 abstract concept.	high	x	low	mid	high	mid	low	x	low	mid	high	x	low	mid
Q515 <u>line/staff</u>)	staff	x	line	x	staff	x	staff	<u>line</u>	line	mid	staff	x	staff	x
Q557 <u>doer/thinker</u>)														
Q509 creative	high	<u>low</u>	high	x	low	<u>high</u>	high	<u>low</u>	low	x	high	x	high	x
Q510 need for autonomy	high	mid	low	mid	low	mid	?	high	low	x	high	mid	high	x
Q511 tolerance for ambig.	low	mid	high	mid	low	<u>high</u>	high	<u>low</u>	low	x	high	mid	high	x
Q513 use of QM	var.	low	low	mid	mid	x	low	x	high	<u>low</u>	high	x	low	x
Q514 flexibility	low	x	high	<u>low</u>	low	x	high	x	low	mid	low	<u>high</u>	high	x
Q895 <u>specialist/gener.</u>	spec.	x	gen.	x	gen.	mid	gen.	<u>spec.</u>	gen.	x	spec.	x	gen.	x
F#1 <u>grounded/ungrounded</u> conceptualizer		mid		mid		low		mid		high		low		low
F#2 <u>rational/instinctive</u> evaluator		high		low		mid		low		high		high		low
F#3 <u>line/staff</u> orientation (composite)		mid		high		low		high		high		high		mid

1 Difference due perhaps to staff nature of consulting work

2 May be due to presence of psychologists

Findings completely opposite to expectations are underlined.

Exp. = Expected; Fnd. = found; var. = varied

'x' indicates that the expected attribute was found.

comfortably in this area, presumably by applying structured approaches. Some confirmation of this latter possibility is provided by the fact that the hypothetical task (Q939) 'evaluate senior executive candidates' was not considered by supervisors in general to be a demanding assignment (i.e., it was low on all measured attributes in Table V.3). The fact that a line rather than a staff orientation was exhibited by Human Resources respondents may be due to the similarity of requirements between the job of a line manager and that of a human resource specialist.

When interpreting the data it must be remembered that the respondents were consultants (i.e., individuals operating primarily in a staff capacity). While this qualifier might not restrict severely the generality of findings regarding the data processing area, findings regarding consultants in the general management function should probably not be extended directly to operating executives.

We were hoping to be able to evaluate previous research which indicated that mathematicians and management scientists gather their data in an 'intuitive' mode. We found that out of the 22 consultants who claimed a medium or high familiarity with QM concepts (Q866) and who showed a pronounced tendency toward one end or the other of the Myers-Briggs SN scale, 64% were in the N (intuitive) category. Since 66% of the consultants showing a pronounced S or N tendency also fell in the N category, we can make no special inferences about management scientists. (We did not use our Factor #1 for the calculation because, as noted earlier, we have no origin for our scale.)¹

J. Analysis of Consultant Attributes by Consulting Firm

Since six replies was taken arbitrarily as the lower limit for inclusion in the analysis of variance of attributes by firm, there are only five firms shown in Table V.10.

Some tentative conclusions may be drawn from this data. The firms would appear to differ. For example, the individuals in firm D are more creative (Q509), more 'ungrounded' (F#1), and have a higher tolerance for ambiguity (Q511) than the others. On the other hand, individuals in firm K are less 'rational' (F#2), later closers (Q325), have higher political (power) values (Q380), are the lowest abstract reasoners (Q556), the highest generalists

¹ Note, however, that there is a significant correlation ($r=.26$) between use of quantitative methods (Q513) and an ungrounded approach (Factor #1).

TABLE V.10

CONSULTANT ATTRIBUTES SUMMARIZED BY CONSULTING FIRM

Firm Id.	n*	<u>F₁</u>	<u>F₂</u>	<u>F₃</u>	<u>322</u>	<u>323</u>	<u>324</u>	<u>325</u>	<u>380</u>	<u>381</u>	<u>382</u>	<u>383</u>	<u>384</u>	<u>556</u>	<u>557</u>	<u>509</u>	<u>510</u>	<u>511</u>	<u>513</u>	<u>514</u>	<u>515</u>	<u>895</u>
D	16	25	19	4.1	3.0	4.9	4.9	51	54	46	45	47	4.8	3.8	38	33	43	17	64	29	40	
I	24	27	21	3.3	3.8	4.7	5.6	49	54	51	47	46	5.0	4.2	33	30	37	16	61	32	41	
C	17	25	21	4.3	3.7	5.0	4.8	48	56	55	49	48	4.3	4.0	36	31	39	18	72	27	38	
P	24	31	16	5.2	3.8	5.4	4.4	48	61	56	43	47	5.4	3.8	33	34	39	16	61	31	36	
K	17	19	27	3.7	2.8	4.3	4.3	55	53	56	41	58	4.2	5.2	37	32	36	19	69	31	35	
Average	19	26	20	4.0	3.3	4.8	4.9	50	55	50	45	48	4.8	4.1	36	32	40	17	64	30	39	
Within group σ^2	10.3	8.7	8.6	1.4	1.6	1.0	1.4	1.3	11.9	18.5	12.5	15.5	0.9	1.2	2.3	5.6	5.3	3.8	7.6	5.0	5.5	
F (between group)	1.4	1.4	1.2	2.0	0.8	0.9	1.2	0.3	0.4	0.7	0.4	0.7	1.7	1.6	1.1	0.8	2.8	0.5	3.1	1.2	1.9	

F(4,45; .10) = 2.1

* Value omitted to protect anonymity of firms ($6 \leq n \leq 21$)

(Q895), the highest users of quantitative methods (Q513) and yet have the lowest tolerance for ambiguity (Q511) compared to all of the others.

Another interesting observation is that for our sample, individuals from firm K showed a remarkable homogeneity for line/staff orientation (Q515). It was almost as if cloning had taken place.

With the information on hand, we can go no further in investigating these differences. If the firms involved would like to proceed further by discussing hiring, training and reward practices, we might be able to develop explanations.

K. Analysis of Consultant Attributes by Education

The education groups were based on courses in which the consultants majored during graduate (if any) and undergraduate study. It was difficult to establish 'pure' groups on a fact-anchored/'soft' dimension because individuals frequently took a mixed combination of courses. We were successful in constructing only three groups of any magnitude, namely: engineering, mathematics and business. The attribute scores for these are shown in Table V.11. As can be seen, the only attribute with a nearly significant 'between group' variance was Q384 (political (power) values). In this case a business background seemed to be associated with a higher power orientation.

L. Analysis of Consultant Attributes by Sex

Although one female respondent claimed that we were sexist in the formulation of our questions, we found few differences in the scores on the attribute scales when consultants were grouped by male and female (see Table V.12).

While conventional wisdom holds, or used to hold, that females are intuitive and impulsive (Leavitt, 1975), our findings showed no significant differences on the SN and TF scales of the Myers-Briggs Indicator or our Factors #1 and #2. Recent research cited in the Toronto Globe and Mail, March 6, 1979, pages 1 and 3, suggests that the right and left hemisphere differences usually quoted may apply only to

TABLE V.11

CONSULTANT ATTRIBUTES SUMMARIZED BY EDUCATION

Education	n	Grounded/ungrounded conceptualizer			Introvert/extrovert	Fact-anchored/imaginative conceptualizer	Logical/gut feel eval.	Early/late closer	Theoretical value	Economic value	Aesthetic value	Social value	Political (power) value	Abstract reasoner	Doer/thinker	Creative	Need for autonomy	Tolerance for ambiguity	Use of quantitative methods	Flexibility	Line/staff	Specialist/generalist
		F ₁	F ₂	F ₃																		
Engineering	18	19	27	21	4.3	3.4	5.1	5.2	51	55	48	49	43	4.8	3.8	37	33	37	18	65	30	38
Mathematics	18	19	25	19	4.3	3.2	4.8	4.8	49	50	52	50	44	5.2	4.5	37	31	36	18	66	29	38
Business	25	21	25	21	3.6	3.5	5.0	4.6	52	53	46	44	53	4.6	4.1	36	32	35	17	67	30	38
Average		20	25	20	4.0	3.4	5.0	4.8	51	52	48	48	48	4.8	4.1	36	32	36	17	66	30	38
Within group		10.0	9.4	8.4	2.3	1.5	1.0	1.4	14	15	19	11	15	1.1	1.1	7.3	5.2	5.0	4.8	8.1	5.4	5.1
F(between group)		0.2	0.6	0.8	2.3	0.2	0.5	0.9	0.2	0.5	0.6	1.9	3.0	1.8	1.7	0.1	0.5	0.5	0.4	0.4	0.6	0.0
F(2,58; .10) = 3.2																						

men, verbal and spacial abilities being distributed more evenly between the two sides of a woman's brain.

Two attributes were found to have significant 'between group' differences at the 0.10 level: Female consultants showed a higher tolerance for ambiguity (Q511), while males were more 'creative' (Q509). (It should be noted, however, that the scoring for the TF scale of the Myers-Briggs Indicator differs slightly for males and females.)

M. Correlations Between Attribute Measures and Age

'With age comes experience', so in many respects the effects of the two variables will be difficult to separate in our study.

- It would seem reasonable to postulate that, with age, an individual:
 - has the opportunity for more learning experiences and is thus more likely to have relevant or near-relevant task experience and improved judgment (Slovic [1972] found this was not true in certain cases);
 - becomes less open to new ideas (i.e., more confident in his own experience);
 - develops a more consistent PS style (consistent with his personality and background);
 - is less comfortable with abstract and quantitative reasoning (assuming he has not exercised this facility after having gained it) (Doktor and Hamilton, 1973);
 - is less inclined to risk taking (on the grounds he has less to gain and more to lose at this point in his career);
 - has more trouble remembering things;
 - is more likely to become technically out-of-date.

One might also expect that when an individual is faced with a problem that is similar to one he was exposed to previously, he would be faster and more effective in developing a solution. On the other hand if he considered the first solution inadequate he might actually take longer the second time as he addressed the unresolved issues. Duncan (1971) concluded that there was a difference in behaviour in this regard between high and low adapters (to consulting). High adapters, he claimed, tended to live with failure and work on success; low adapters

CONSULTANT ATTRIBUTES SUMMARIZED BY SEX

TABLE V-12

CONSULTANT ATTRIBUTES SUMMARIZED BY SEX																						
Sex	n	F ₁	F ₂	F ₃	322	323	324	325	380	381	382	383	384	556	557	509	510	511	513	514	515	895
Male	67	20	26	20	4.0	3.3	4.9	4.9	5.2	5.4	4.9	4.6	4.8	4.9	4.1	33	32	36	18	66	30	39
Female	12	19	24	21	3.4	3.2	4.7	4.9	4.7	5.6	5.1	4.6	5.0	4.6	4.3	29	30	41	17	67	30	39
Average	20	26	20	3.9	3.3	4.9	4.9	5.1	5.4	4.9	4.6	4.9	4.9	4.1	32	31	37	18	66	30	39	
Within group σ^2	9.7	8.6	8.5	1.3	1.5	1.1	1.4	1.3	14.5	17.9	11.4	5.4	1.0	1.2	6.0	7.8	5.0	4.2	7.8	5.1	5.6	
F (between groups)	0.0	1.2	0.4	1.7	0.1	0.6	0.0	1.2	0.2	0.2	0.0	0.1	0.9	0.5	5.3	1.2	10.4	1.2	0.0	0.1	0.0	
F(1,77; .10) = 2.8																						
																		</				

tended to live with, or take for granted, success and work on failure (pp. VIII.10 - VIII.11).

Keen (1973, p. 1.24) suggests that, for consultants, a particular problem situation is viewed in a quite different light when encountered for the second time.

Consultants, because of the nature of their work, tend to see variations of the same problem over and over again. Solutions become packaged (or programmed) so that they can be implemented by others in the firm. Reduction in project time after several occurrences could vary from 2:1 to 4:1. Sometimes when the problem is very complex, it is possible to experience reductions of 10:1. Quality may improve marginally after several implementations have been completed (author's unsubstantiated conclusions).

Taylor (1975a) concludes that prior success leads to an increase in aspiration while failure may lead to a decrease in standards set for future tasks.

Some individuals (e.g., intuitive types on the Myers-Briggs Indicator) dislike doing the same thing over and over again. Thus, prior experience in a problem area may cause them to avoid such problems and seek greater variety.

The correlations of age (Q830) with task performance are given in Table V.6. Significant correlations with consultant attributes and other items in the questionnaire are shown in Appendix K.

We will summarize our findings below.

Compared to their younger counterparts, older consultants were perceived by supervisors to be more conventional (i.e., less innovative) (Q950), less flexible (Q952), more cautious (Q956), more staff oriented (Q968), and having more credibility with clients (Q929) and more recognition from fellow professionals (Q931).

Older consultants see themselves as having definite opinions (Q303), being persistent (Q416) and painstaking (Q401), pragmatic (Q390) and trusting (Q428).

They believe that they are more effective on most of the tasks, except a well tested package (Q626) where performance is not correlated with age. There is a strong negative correlation, however, between their performance on a task involving structured interviews (Q630) and age. This agrees with the supervisor's perceptions (see Table V.6). It also agrees with the fact that need for autonomy is positively correlated with age. Other attributes which are correlated with age are: aesthetic values (increase), power values (decrease), abstract reasoning power (decrease), doing/thinking orientation (more doing), tolerance for ambiguity (decrease), flexibility (decrease), use of quantitative methods (decrease), persuasive skills (increase), empathy (increase).

While there are no significant correlations between age and the three factors, PS behaviour of older consultants tends to that of the grounded individual. They dislike structured interviews (Q693), believe inspiration has nothing to do with successful solutions (Q467), do not rely on hunches (Q682) and believe there is a right and wrong approach for any problem (Q681). They do not feel that business problems should be solved more scientifically (Q655, Q689) and they prefer to spend their time building on their successes rather than analyzing their failures (Q694).

The above results are interesting but they must be interpreted in the light of the fact that older individuals in the sample tended to be those who had not succeeded, if success is defined by achieving partnership. Thus it is conceivable that older consultants who were partners might have provided different results.

Despite the qualifier, most of the attributes changed with age in the predicted direction with the possible exception of technical currency. It is interesting to note that while supervisors perceived older consultants as being viewed as experts by clients and fellow professionals, they felt that colleagues had a different opinion. Another, not altogether surprising, finding was that regarding the 'preferred role of the supervisor' (Q772-Q781). older consultants gave a lower score to Q775, 'provide technical guidance'.

* * * * *

In the foregoing we have reported the analyses which were planned for this phase of our study, leaving many unanswered questions for future exploration. In the next chapter we will summarize our conclusions.

Chapter VI

Conclusions

To date, much of the research on PS behaviour in business has been (a) largely propositional, (suggesting relationships, not testing them (Henderson and Nutt, 1980) or (b) based on artificial task situations (e.g., simulations, short duration puzzles). In this study we explored PS effectiveness under real life conditions. A number of personality/ cognitive attributes were measured for a sample of management consultants, using standard instruments in some cases and instruments we developed in others. PS performance was evaluated by supervisors.

In discussing our conclusions we will first relate our findings to our initial hypotheses and then explore their implications for management consulting firms and other areas.

The topics for this chapter are:

- A. Tests of Hypotheses
- B. Contribution to Methodology of PS Research
- C. Factors Affecting PS Effectiveness
- D. Implications for Consulting Firms
- E. Implications for Other Areas

A. Tests of Hypotheses

1. Hypotheses relating to task effectiveness measures

Hypothesis 1a: Certain consultants who are rated high for one type of assignment can be rated less effective for others. Confirmed. While there was a tendency for a supervisor to rate a consultant at the same end of the effectiveness scale for all of the tasks, a certain degree of discrimination (or range of performance) was exhibited by the supervisors.

~~ratings for individual task performance.~~

The main task dimensions which seemed to influence the classification of an individual's performance were: (1) whether the task was 'structured' or not and (2) whether it was an 'organizational' or 'technical' matter.

Hypothesis 1b: There is a significant degree of consensus when more than one supervisor evaluates the same consultant for the same assignment.

Confirmed. See Table V.1. Ratings rarely differed by more than one scale division. For example, 96% of the ratings for overall PS performance differed by one scale division or less.

Hypothesis 1c: There is a significant correlation between the individual's own assessment of his effectiveness on a specific assignment and the assessment made by the supervisors. Confirmed. See Table V.2. Over 80% of the assessments agreed within one scale division. There were no significant biases for the task ratings; however, consultant assessments were higher than supervisor assessments by 0.8 for 'overall PS performance'.

2. Hypotheses relating to composite attribute dimensions

Hypothesis 2a: There will be strong correlations among the various attributes measured. The latter can then be reduced by factor analysis to a limited number of composite personality/cognitive dimensions. Both statements confirmed. Three composite factors were developed.

Hypothesis 2b: The personality/cognitive characteristics of the individuals studied will tend to cluster about some limited number of profiles based on the composite dimensions. We were unable to confirm or disprove this, due to the absence of any anchor points for our orthogonal scales. However, a moderate amount of skewness in the distribution of scores on the factor dimensions ~~do~~ cause individuals to be unevenly distributed among the four style boxes shown on page V.32. If we consider only the 49 individuals with a pronounced tendency to one end or the other of the first 2 factor dimensions, we find the following

distribution:

<u>Factor #1 Type</u>	<u>Factor #2 Type</u>	<u>%</u>
ungrounded	instinctive	30
grounded	rational	28
ungrounded	rational	21
grounded	instinctive	21

We would emphasize that the scale divisions for these styles are relative and would most likely be shifted if based on a more general population of individuals. For example, if we consider the consultant scores on the Myers-Briggs SN and TF scales (page V.36) to reflect the distribution by styles, we see that 53% of the consultants in the sample were NT types. This may seem surprising to some who assume that a fact anchored approach normally accompanies rational evaluation.

Hypothesis 2c: These profiles will tend to be similar within a functional area and also a consulting firm. Confirmed for functional groupings. Reference to Table V.7 showed that the functional groups differed significantly regarding their Factor #1 and Factor #2 scores. The corresponding differences between consulting firms were not significant at the 0.10 level.

Hypothesis 2d: There will be a significant tendency for the composite dimensions to be associated with effectiveness on certain assignments (tasks). Partially confirmed. See Table V.6. However, the associations were relatively weak and gave a low degree of fit (R^2) when incorporated into a regression equation. Factor #2 (rational/instinctive conclusion drawing) seemed to be the most influential (see discussion page VI.17).

3. Hypotheses relating to formative factors

Hypothesis 3a: There will be significant correlations between areas of functional experience and personality/cognitive attributes. Not tested. We believed that the extent of previous business experience in specific functional areas (e.g., production; marketing) would be influential in the development of an individual's cognitive/personality attributes. We had hoped to encounter relatively 'pure' backgrounds in this regard, so

that simple correlation coefficients could be used to test the relationship. However, backgrounds were often 'mixed', requiring a more complicated analysis for the detection of relationships and this was not undertaken.

Hypothesis 3b: There will be significant correlations between course concentration and personality/cognitive attributes. Not confirmed. See Table V.11. Only a limited number of pure educational backgrounds were found. These grouped into: engineering, mathematics and business. The only attribute for which the 'between group' differences approached significance (0.10 level) was Q384, political (power) values.

Hypothesis 3c: Correlations between effectiveness and formative factors will be less pronounced except where they influence task knowledge. This was confirmed to some degree by the significant correlation between age and task effectiveness and age and the attribute scores. Otherwise there was no clear evidence of strong associations between the formative factors studied and the other measures studied.

B. Contribution to Methodology of PS Research

There were four topics which we felt might interest other researchers in this area: the method of deducing relevant task dimensions, the constructs and instruments developed for individual personality/cognitive attributes, the confirmation of claims made for existing instruments, and the usefulness of our new three factor instrument. Findings relating to these subjects are summarized below.

1. The method of deducing task categories

We asked supervisors to evaluate individual consultants for two classes of attributes: (a) effectiveness on hypothetical tasks and stages in the PS process and (b) strength or weakness on a number of interpersonal and personal skill dimensions. As discussed on pages V.4-V.14, this information enabled us to deduce that consulting assignments could be grouped into four categories, based on the skills possessed by 'effective' individuals. These categories were: problem finding

(initial problem scoping); problem resolution - organizational emphasis; problem resolution - technical emphasis; implementation. It was interesting to note that there was no clear distinction between the stages of problem conceptualization and prescription.

We concluded that a secondary categorization of tasks was based on the degree to which the task was 'structured'. The strength of the correlation between the rating: 'able to operate without close supervision', and task effectiveness was used as a measure of the degree of structure embodied in the task.

2. Constructs and instruments developed for individual attributes

Definitions for the fifteen key attributes used in the study were formulated, and new instruments were developed for five of these:

- need for autonomy
- tolerance for ambiguity
- flexibility
- specialist/generalist orientation
- line/staff orientation

Reliability coefficients in most cases exceeded 0.7 and consistency and validity checks were developed. See Appendix H. With some refinement, these instruments may prove of use to others in similar studies.

3. Confirmation of claims made for existing instruments

The Myers-Briggs Type Indicator, Kolb's Learning Style Inventory, Raudsepp's Creativity Test and the Allport Vernon Lindzey Study of Values were used in the study, the latter two with modification to reduce the number of items. Inter-instrument correlations were calculated and validity and consistency checks were made. These are reported in Appendix H.

As an example of the kind of verification performed, we will take three claims made for the Myers-Briggs Indicator by Hellriegel and Slocum (1975) based primarily on descriptions in the Myers-Briggs Manual (Myers, 1962).

- (a) The introvert may have trouble developing empathy with his clients. (p. 31)

We checked the correlation of Q322 (IE) with:

Q927 ability to identify client needs (supervisor's assessment)	.26
Q909 performance in obtaining client acceptance (supervisor's assessment)	.22
Q672 I have relatively little difficulty putting myself in the client's place when deciding if an action is worth taking (A/D)	.11

There are conflicting views here. The supervisor believes that the introvert has empathy, whereas the introvert himself tends to disagree (in line with the claim).

- (b) Sensation types "dislike new problems unless there are standard ways to solve them"
and The intuitive type "likes solving new problems, dislikes doing the same things over and over again . . ." (p. 33)

We checked the correlations of Q323 (SN) with:

Q441 I enjoy working on complex and ill-defined problems (A/D)	.48
Q436 I get more pleasure working in unfamiliar situations than I do from working in situations I am used to (A/D)	.27
Q435 I have trouble applying myself to problems which I find repetitive or uninteresting. (A/D)	.26
Q511 tolerance for ambiguity measure	.50

It would certainly appear from the above that the claims are correct. The sensation type is very definite ($r = .48$) about his likes and dislikes, and has a low tolerance for ambiguity (i.e., finds unstructured tasks threatening). Since the intuitive type is at the other end of the scale, we can conclude that he is equally strong in his interest in new and ill-defined problems.

- (c) "The routine and structured role enjoyed by a sensation type is likely to be performed poorly by an intuitive type" (p. 33)

We took the three most structured tasks according to the measure discussed on page V.12 and found how intuitive types performed (self and supervisor assessments).

	Supervisor Assessment	Self Assessment
	<u>r</u>	<u>r</u>
(a) implement a well tested package	.03	-.06
(b) evaluate candidates for a senior executive position	-.09	.07
(c) collect information through structured interviews	-.02	.07

In this case the claim does not seem to be confirmed.

While we obviously could not verify every claim made for the four instruments we have mentioned, we found generally that the Myers-Briggs Indicator, Kolb's LSI and Raudsepp's Creativity Test performed and inter-correlated as we had been led to expect. The Study of Values was a slightly different matter. The 'aesthetic' and 'political' scales gave results which seemed to fit. However, we never really felt comfortable with the 'theoretical', 'economic' and 'social' scales. Perhaps this was due to unusual homogeneity in our sample regarding these measures or maybe we somehow unbalanced the instrument with our modifications.

4. Usefulness of three factor instrument

Before it could be considered for further use, this instrument requires testing and refinement. There are undoubtedly redundant and inappropriate items which require elimination, and the weights should be reexamined.

To place the significance of the new instrument in perspective, we will briefly review the steps involved in its development:

1. We prepared a list of the 15 most significant personality/cognitive attributes, thought to affect PS behaviour and/or effectiveness.
2. We found or developed instruments to measure as many of these as we could. (We did not have measures of intelligence or dogmatism.)
3. We incorporated the 15 measures into a large questionnaire which was administered to 79 consultants, with feedback from supervisors regarding consultant personality and performance.
4. On the basis of inter-correlations we reduced the number of dimensions via factor analysis to three. These three seem closely associated with two standard tests: the Myers-Briggs Indicator and Kolb's LSI.

Our first conclusion is that the Myers-Briggs Indicator and Kolb's LSI appear to be very useful for application in the PS area, even though they were not originally developed for this purpose.

To determine whether our new instrument has something additional to offer, we will apply the following three criteria:

- (a) Does the instrument facilitate the identification, in practice, of types or styles representing recognizable patterns of characteristics?
- (b) Does the instrument discriminate more effectively than other instruments between individuals, regarding their fit with certain environments?
- (c) Is the instrument easier to use, more reliable, more easily validated, etc.?

While we cannot, at this point, answer these questions conclusively, we will comment briefly on each.

(a) With the descriptors that we have been able to develop in this study, our three factors (or at least the first two) are dimensions covering characteristics that are easily discernible in practice.

(b) In terms of ability to discriminate between individuals grouped by functional specialty, consulting firm, education and sex, our three factors appear to be only marginally better than the four scales of the Myers-Briggs Indicator and equivalent to the two scales of Kolb's

LSI. (Kolb's dimensions are more limited on their scope and in their association with task effectiveness.) This conclusion is based on the data in Table VI.1 below which was compiled from Tables V.7, V.10, V.11 and V.12. The magnitude of the 'between group' F value from these tables was taken to reflect the degree of 'between group' discrimination exhibited by each attribute scale.

TABLE VI.1

F VALUES FROM GROUP ANALYSES CORRESPONDING TO FACTOR SCORES
AND SCORES ON MYERS-BRIGGS AND KOLB'S LSI INSTRUMENTS

	Critical F(.10)	F1	F2	F3	Myers-Briggs				Kolb's LSI	
					IE (Q322)	SN (Q323)	TF (Q324)	JP (Q325)	Abst./ Conc. (Q556)	Doing/ thinking (Q557)
Functional specialty	1.9	1.9*	2.3*	0.9	0.3	1.1	1.1	1.6	2.6*	2.3*
Firm	2.1	1.4	1.4	1.2	2.0	0.8	0.9	1.2	1.7	1.6
Education	3.2	0.2	0.6	0.8	2.3	0.2	0.5	0.9	1.8	1.7
Sex	2.8	0.0	1.2	0.4	1.7	0.1	0.6	0.0	0.9	0.5

*significant at .10 level.

(c) Since our instrument incorporates the other two it is obviously longer than either. After further refinement it might improve its relative position on this criterion.

From the above it is seen that our instrument would still appear to be in contention.

Interpretation of our constructs

On the basis of our findings, we conclude that individuals do develop habitual approaches to problem formulation and resolution which we can call cognitive styles or orientations.

Such styles have been recognized over the years by observers who have referred to them by such terms as analytic and intuitive. Previous research has led to the development of instruments such as the Myers-Briggs Indicator, and McKenney and Keen's Receptor/Preceptor Test to

measure these cognitive predispositions. Both of these instruments have a dimension related to perception or problem formulation (we might even say the source of ideas), and one related to information evaluation (call it conclusion drawing).

Our research, based on 79 management consultants, has deduced that cognitive styles do exist and that they can be described (along three dimensions in our case). Two of these dimensions resemble the constructs underlying the two instruments just mentioned. The third dimension concerns the individual's orientation to thinking vs. doing.

We believe that this agreement between instruments is significant because it reinforces the notion that an individual's approaches to (a) problem formulation and (b) conclusion drawing are valid dimensions for describing cognitive style.

How do these dimensions relate to 'analytic' and 'intuitive' constructs? On the surface, it would seem reasonable to postulate the following relationship between our factor categories and the 'analytic' and 'intuitive' type stereotypes (call these modes):

		<u>Stereotype categories or modes</u>	
		<u>'intuitive'</u>	<u>'analytic'</u>
Factor #1	Approach to conceptualization/perception	ungrounded	grounded
Factor #2	Approach to conclusion drawing/evaluation	instinctive	logical

We see that there are two possible types using the first two factors from our instruments which could correspond to the 'intuitive' stereotype or mode.

The first is the ungrounded conceptualizer, who in fact finding does not follow a plan but 'his nose' instead. Ideas and courses of action flash into his mind.

The second is the instinctive evaluator who eschews a heavy use of numbers and logic in conclusion drawing.

To further clarify the matter, we then prepared Table VI.2 of correlation-coefficients involving the three factors, and items from the questionnaire connected with common interpretations of the 'intuitive' and 'analytic' constructs. Correlations involving these items and the Myers-Briggs dimensions most closely corresponding to the three factors are given in brackets.

TABLE VI.2
FACTOR CORRELATIONS RELEVANT TO INTERPRETATION
OF TERMS 'INTUITIVE' AND 'ANALYTIC'

(All ratings are self-assessed except where indicated. See questionnaire for exact phrasing of items.)

Group 1 - correlation patterns: strong-strong-weak ¹	F#1	F#2	F#3
	<u>grounded/</u> <u>ungrounded</u> <u>perception</u> (SN)	<u>rational/</u> <u>instinctive</u> <u>evaluation</u> (TF)	<u>line/staff</u> <u>orientation</u> (EI)
Q425 <u>Hard data/Soft data</u>	.32 (.32)	.33 (.24)	.05 (-.02)
Q618 Ability to work to a plan	.37 (.25)	.19 (.21)	.00 (-.10)
Q442 Less interested in problems decided on basis of opinion (A/D)	-.19 (-.20)	-.23 (-.10)	-.08 (-.04)
Q718 Use packaged solutions	.19 (.13)	.19 (.17)	.00 (-.14)
Q888 <u>Systematic/Unsystematic</u> (supervisor assessment)	.28 (.23)	.24 (.21)	-.08 (.29)
Group 2 - correlation patterns: strong-weak-strong			
Q652 Most problems are first solved intuitively (A/D)	.34 (.37)	.15 (.17)	.28 (.30)
*Q682 I rely on intuitive hunches (A/D)	.33 (.23)	.14 (.03)	.32 (.18)
Q666 I frequently end up a survey with a different assessment of the problem (A/D)	.34 (.27)	.05 (.07)	.24 (.11)
Q670 I work in 'fits and starts' (A/D)	.29 (.14)	.08 (.05)	.30 (.22)
Q701 I find checklists helpful (A/D)	-.18 (-.04)	-.06 (-.05)	-.35 (-.11)

*item included in instrument on creativity.

¹relates to columns F#1-F#2-F#3

TABLE VI.2 (continued)

(Continued) Group 2 - correlation pat- terns: <u>strong-weak-strong</u>	F#1	F#2	F#3
	<u>grounded/ ungrounded perception</u> (SN)	<u>rational/ instinctive evaluation</u> (TF)	<u>line/staff orientation</u> (EI)
*Q455 I would give more weight to financial analysis than feelings after interviewing man- agement (A/D)	-.26 (-.21)	.05 (-.03)	-.18 (-.03)
Group 3 - correlation pat- terns: <u>weak-strong-strong</u>			
Q693 For most interviews I find it helpful to prepare a list of questions (A/D)	-.12 (-.21)	-.31 (-.19)	-.21 (-.18)
Group 4 - correlation pat- terns: <u>strong-weak-weak</u>			
*Q441 I enjoy working on complex and ill- defined problems (A/D)	.62 (.48)	-.05 (.17)	-.08 (-.14)
*Q495 I occasionally voice opinions that seem to turn some people off (A/D)	.45 (.30)	-.01 (.22)	-.12 (-.14)
*Q500 Things that are obvious to me are not so obvious to others (A/D)	.33 (.25)	.05 (.19)	-.02 (-.02)
Q501 When I repeat the same presentation, it rarely comes out the same (A/D)	.27 (.27)	-.01 (.02)	-.04 (-.16)
Q513 Use of quantitative methods	-.26 (-.23)	.05 (.00)	.03 (.16)
*Q474 I am more interested in what could be than what is (A/D)	.25 (.17)	-.01 (.05)	.10 (.04)
*Q475 I sometimes feel that ideas come to me from some external source (A/D)	.20 (.14)	.01 (.04)	.09 (.07)

* item included in instrument on creativity

TABLE VI.2 (continued)

		F#1	F#2	F#3
<u>Group 5 - correlation patterns: weak-strong-weak</u>		<u>grounded/ ungrounded perception (SN)</u>	<u>rational/ instinctive evaluation (TF)</u>	<u>line/staff orientation (EI)</u>
Q506	I convey impatience when ideas not well thought out (A/D)	-.03 (-.05)	-.36 (-.32)	-.07 (.04)
Q388	Logical/Intuitive	.12 (.14)	.35 (.23)	.04 (-.02)
*Q496	I tend to rely more on my first impressions and feelings when making judgments than on detailed analysis (A/D)	.16 (.02)	.24 (.22)	.05 (-.03)
Q948	Logical/Intuitive (supervisor assessed)	.06 (-.05)	.19 (-.05)	.07 (.01)
Q866	Knowledge of quantitative methods	-.10 (-.09)	.19 (.05)	-.02 (.05)
<u>Group 6 - correlation patterns: weak-weak-strong</u>				
Q690	I prefer to map out the broad features of an assignment leaving the detail and implementation to others (A/D)	-.08 (.07)	-.07 (-.16)	.24 (.01)
Q651	The way to understand complex problems is to be concerned with their larger aspects instead of breaking them into pieces (A/D)	.12 (.12)	-.07 (-.03)	.21 (.16)

* item included in instrument on creativity

Reference to Table VI.2 indicates that more of the intuitive-related items are strongly correlated with Factor #1 than Factor #2, but Factor #2 still seems relevant. There are also strong correlations between certain of the items and Factor #3.

A further complication is the fact that there are many¹ mode

¹ In our sample of 79 consultants, 55% consisted of mixed types, or mode switchers (53% NT; 2% SF).

switchers. Because our factor scales are not anchored it is perhaps better to use the Myers-Briggs scales (SN, TF) which correspond to Factor #1 and Factor #2 to illustrate the point.

There are two mixed types;

NT which corresponds to an intuitive perceiver/thinking evaluator

SF which corresponds to a sensing perceiver/feeling evaluator,

using the Myers-Briggs terminology.

In our terminology, NT corresponds to an imaginative conceptualizer/logical evaluator and SF corresponds to a fact-anchored conceptualizer/'gut feel' evaluator.

Since these mixed types together make up 55% of our sample we might ask which, if either, might be classed as 'intuitive' or 'analytic' in the popular sense of the term? This is difficult to answer. We suspect that intuitive and analytic in the popular interpretation are not opposite ends of a single dimension. It is conceivable that analytic refers more to the behaviour of an individual during evaluation, whereas intuitive refers more to the generation of ideas and problem conceptualization. Under this premise, it is possible for an individual to be both intuitive and analytic.

Further evidence for this conclusion comes from the fact that statisticians and management scientists are generally considered as exemplars of the 'analytic' type (see discussion on page II.22). Researchers using the Myers-Briggs Indicator have found that mathematicians and statisticians are frequently NT types (Myers, 1962). In our study we found functional specialists in the OR and economic study area to be NT types with scores in the ungrounded and rational direction (see Table V.7). The implication of this regarding the roles of the right and left hemisphere of the brain are not clear.

The main conclusion here is that 'intuitive' and 'analytic' are not simple constructs and that the terms should be carefully defined in an

operational sense if they are to be meaningful.

Before leaving the topic of mode switching we would mention a hypothesis we have regarding a possible connection between mode switching and whether, and when, an individual might display a perceptible transition between the two stages:

(1) an emphasis on perceiving (absorbing information about the problem) and

(2) an emphasis on evaluation

as described in McKenney's intuitive classification (page II.22). One possibility, which we have not confirmed in any way, is that there is a more definite transition for those individuals who switch modes, e.g., an individual who shifts from ungrounded perception to rational evaluation. We believe there may be some validity to this observation but can offer no evidence.

We have discussed two activities, perceiving and evaluation, and two possible modes for each. We have also suggested, as does Jung, that an individual can have a predisposition to favour one mode for each activity.

Jung suggests a third dimension which we have called early/late closure. The concept of closure is an intriguing one. To what extent is an individual concerned with verifying an existing concept (model) and to what extent is he seeking to add to his knowledge and create new models? This question is undoubtedly tied to orientation. Is the individual governed by instrumental or expressive drives, for example? In general, business problems are so complex that there is really no end to the amount of information which could be collected. However, time runs out. Results with the Myers-Briggs Indicator have demonstrated that early closure is associated with a 'grounded' (our term) mode of perception.

While it would appear that individuals can switch modes of information processing, we do not believe that they can easily switch from early to late closure depending on whether the activity is perception or

evaluation. We repeated the factor analysis without this variable (see Appendix D, page D.52). The loadings for the other variables were relatively unaffected, thus tending to confirm the findings of Myers (1962) regarding the independence of the early/late closure attribute.

These arguments will have to be more fully explored but we believe that the constructs measured by the Myers-Briggs Indicator and which form the main components of our instrument are useful and can be applied in practice. Regardless of the instrument used, however, it seems to be clear that the terms analytic and intuitive involve complex constructs and are not necessarily opposite poles of the same dimension. Some additional work appears necessary before our instrument can be considered to be in operational form.

C. Factors Affecting PS Effectiveness

In Table V.6 we have summarized the correlations between attributes (and factor scores) and task performance. The detailed findings are discussed on pages V.37 to V.44. The main conclusions are the following:

1. We do not appear to have captured in our study the major consultant characteristics affecting PS effectiveness as evaluated by supervisors.
2. As we surmised, for many of the tasks, the cognitive related attributes are considered by supervisors to be less important than certain interpersonal skills.
3. For staff deployment purposes, supervisors would appear to have four main categories of tasks: problem finding (initial survey), problem resolution - organizational, problem resolution - technical, implementation. The required attributes differ for each. The degree of structure of the task will determine the extent to which inexperienced staff can be assigned. No distinction seems to be made between the stages of diagnosis and prescription.

Of the three factors, F #2 appeared to have the greatest relevance, for consultant recruitment since the rational end of the scale

correlated positively with most of the personal attributes considered important by consulting firms. It also correlated with task effectiveness in several cases and with partner potential.

The impact of the three factor dimensions is shown in the table below (from section H in Chapter V).

<u>Factor</u>	<u>Type</u>	<u>Tasks for which performance influenced positively</u>	<u>r.</u>
F#1	grounded	Q936 implement a well tested package ¹	
Approach to conceptual.		Q937 manage a large project team ¹	
F#2	rational	Q937 manage a large project team	.23
Approach to evaluation		Q943 resolve conflicting opinions	.25
		Q935 partner potential	.21
	instinct.	Q939 evaluate senior candidates	.21
F#3	line	Q905 problem diagnosis - technical ¹	
<u>Line/staff orientation</u>	staff	Q904 problem finding	-.26
		Q906 problem diagnosis - organizational	-.26

Other observations are:

- Both increasing age and high need for autonomy lead to poor performance on structured tasks.
- High flexibility leads to poor performance on tasks with high organizational components, such as Q938 (sensitive, political task) and Q943 (help to resolve conflicting opinion).
- The use of quantitative methods figures prominently as a desirable attribute. We have interpreted this to mean that 'use of Q.M.' serves as a surrogate for 'strong conceptual skills', 'innovative', etc.

¹See Appendix J, page 1.

Since most consulting work is carried out under tight time constraints, one might have postulated that the 'loose' approach of the ungrounded individual would have earned him high negative marks. This was not apparent in the supervisor's ratings. However, ungrounded individuals tended to feel out of place. (See page VI.22.)

How do we explain the relatively low influence on task performance of the attributes studied? The main reason, we believe, is that the assessment process involved unanchored scales, and 79 consultants and 127 supervisors from 15 different firms. This in itself is enough to obscure most underlying correlations.

Other possible reasons are:

- Cognitive-related attribute differences and even radically different behavioural styles may not in fact materially influence PS effectiveness.

- PS effectiveness may be so elusive a concept that it cannot be assessed other than to say some subjective minimum threshold of acceptability must be exceeded.

We believe that the latter rather than the former is true. Perhaps the omission of a measure for intelligence has had a significant impact.

Although other researchers have concluded that different styles do not affect PS effectiveness, we think that this is a questionable conclusion when applied to business tasks. It is quite conceivable that our present methods of evaluating PS effectiveness are so imprecise and the matter so complex that the differences we were looking for did not materialize. One might draw a parallel between our findings and those of Mullen (1965) who studied the effectiveness of different leadership styles. Even though these styles were significantly different, no important differences in department productivity were detected.

D. Implications for Consulting Firms

Duncan (1971) describes management consulting as "an institution in which people are very different, change is their product and complex-

ity is their task." (p. X-43)

One of the objectives of our study was to identify the characteristics of the individuals who have chosen this work environment, and those who do well. Our conclusions are the following:

While consultants have been found by others (e.g. Duncan, 1971) to have a high need for autonomy and a high tolerance for ambiguity (Appendix D, pages 17 and 22), we were unable to confirm these findings because our scales were not anchored. We can, however, use the Kolb LSI and Myers-Briggs Indicator to relate consultants to different groups of individuals for these dimensions, since these are standard tests.

Kolb used his LSI to identify four types of individuals. The distribution of our respondents into these type categories is shown below:

	<u>Our Sample</u>	<u>Comparable groups</u>
Converger	36%	Engineers
Assimilator	28	Mathematicians & economists
Accommodator	18	Businessmen & marketing
Diverger	<u>18</u>	Psychologists
	100	

Engineers are supposed to be highly abstract and doers, so the classification fits to some extent. Daccord (1967) had concluded that successful consultants had a high orientation to people (rather than system or technical factors). Since people are at the concrete end of Kolb's scale, our findings may indicate that there has been a trend since 1967 toward a more technical approach to consulting or it may mean that consulting firms are hiring individuals who are highly abstract.

The Myers-Briggs Indicator is also a standard test. The distribution of respondent scores over the four types defined by the SN and TF scales is:

NT	53%
ST	32
NF	13
SF	2
	100

The interesting results here are the very high percentage of NT types (intuitive perceivers, thinking evaluators) and the fact that over 80% of our sample are thinking types, who evaluate alternatives based on logic rather than emotion.

Regarding the educational background of our sample, we found the following:

Business-related courses	56%*
Maths, physics, or computer science	32
Behavioural science or psychology	23
Engineering	21
MBA degree	36

*There is some overlap in these figures.

Majors relating to the 'people' side are relatively few unless one counts the business-related courses.

Our findings regarding effectiveness are discussed in detail on pages V.37 to V.44 and are summarized in this chapter on pages 16 to 18. They will not be repeated here except to compare them, where possible, with findings of Duncan and Daccord.

Duncan (1971) had found that high adapters (those who adapted well to the consulting environment) had a lower tolerance for ambiguity¹ than low adapters, identified with the values and operating styles of superiors, did not resent accepting a superior's approach, and were methodical. The low adapters, who he termed 'creative rebels', were at the

¹Duncan's instrument for measuring tolerance for ambiguity was different from ours.

other end of these bipolar dimensions. Daccord (1967) found that more effective consultants tended to be younger and to have had more line experience prior to their consulting work.

We have prepared a table to summarize our results with regard to these conclusions. Our three factors and Q895, specialist/generalist, were included.

TABLE VI.3
TABLE OF FACTORS THOUGHT TO INFLUENCE
CONSULTANT EFFECTIVENESS AND ADAPTATION

		<u>Supervisor Ratings</u>		<u>Self Ratings</u>	
		(Q933)	(Q935)	(Q640)	(Q639)
		Overall	Potential	Sense of	Effectiveness
		PS Effect.	Partner	Adaptation	as Consultant
		r, correlation coefficients			
Duncan Q511	Tolerance for ambiguity	.00	-.10	.15	.09
Duncan Q510	Need for auton.	.23	-.01	.05	.02
Duncan Q694	I prefer to spend time building on successes (A/D)	.13	.14	.13	-.05
Daccord Q832	No. of years in line position	.09	-.05	-.19	.03
Daccord Q830	age	.04	-.18	-.15	.11
Factors	Q981 grounded/ungr.	-.02	.11	.04	-.12
	Q982 rational/inst.	.09	.21	.20	.09
	Q983 line/staff orientation	-.07	.03	.10	.03
	Q895 spec./generalist	.11	.03	.22	.28

Duncan used the same measure (Q640), sense of adaptation, in his research. From the above table it is seen that we found support for none of his contentions. If we use the column, potential for partnership, to assess Daccord's conclusions, we find confirmation that age is inversely related with effectiveness (as an operating consultant). The importance of line experience is not confirmed. Our dimension Factor #2

shows up as a useful measure of both 'potential for partnership' and 'sense of adaptation'. Specialists (Q895) feel well adapted and believe they are effective as consultants—but these opinions are not strongly shared by supervisors.

We feel that our study has demonstrated the existence among management consultants of certain PS styles which are based on personality/cognitive attributes.

Our findings suggest that:

- these styles are recognizable by supervisors and have some influence on perceived effectiveness and potential to become a partner
- certain styles seem to be more appropriate for particular task situations, although not strongly so
- different firms and functional areas seem to be more homogeneous with respect to certain personality/cognitive attributes.

We also discovered that certain individuals (i.e., those with an ungrounded approach) felt out of place both with regard to their background and their approach as compared to supervisors and colleagues. Further, it appears that where there is such a mismatch, the consultant experiences discomfort. For example:

- individuals who found that their approach differed from that of their supervisor felt tension (Q460) and were considered by supervisors to be poor tacticians (Q914), generate low client acceptance (Q921) and have low empathy (Q927);
- individuals who scored low on Factor #2, the main dimension relating to effective consulting, felt a low degree of adaptation.

We believe that there is much to be gained by a general discussion within a consulting firm of the issue raised by this study in the interests of reducing staff turnover and improving the internal working climate.

There are at least three areas where use can be made of our findings:

- consultant recruitment
- consultant training
- consultant deployment (supervisor/consultant and task/consultant matching).

Consultant recruitment

Two applications are suggested:

If the findings regarding important personal attributes are considered valid, they can be discussed with prospective candidates to give them a greater insight into the requirements of consulting work.

Some instruments were identified in Chapter V, Section H, which gave measures predicting 'on the job' performance. With further testing and refinement, such instruments may be helpful in candidate screening and in determining the task environment for which the candidate is best suited.

Consultant training

By using the tests to identify, in advance, problem areas likely to be experienced by the consultant (such as report writing and work planning), efforts can be directed to giving him special preparation. Role playing exercises might be developed to help supervisors and consultants deal with situations where there is a disagreement on the approach to be adopted.

Consultant deployment

If the PS predispositions of individuals in the firm are formally identified, it should be possible to use this information to avoid severe task/consultant and supervisor/consultant mismatches.

* * * * *

In summary, we feel that the issues discussed here have great importance for the management consulting profession.

E. Implications for Other Areas

The increasing importance which is now being attached to the effective utilization of human resources in organizations should confirm the relevance of our findings to other areas. Personality/job matching is now a subject of much interest (e.g., Greenberg and Greenberg, 1980; O'Reilly, 1977; Driver and Rowe, 1978). The matching concept can be applied to organizational units as well as individuals. For example, suppose it is decided to develop a management science unit. Where should it be located? If we put aside who is the sponsor, the first thought, based on current practice, would be to add the unit to the Information Systems Department. If the findings from our study are valid, this could be a serious mistake, assuming that individuals must have similar predispositions to work well together. We found that individuals in OR/Economic Studies and those in Data Processing are at opposite ends of the scale for 'flexibility' and 'theoretical' orientation and 'creativity'. They differ moderately for 'tolerance for ambiguity' and 'early/late closure'. They are similar for 'need for autonomy' and 'abstract reasoning'.

Other areas to which our findings might be applied are management training (to recognize, and perhaps try to modify, types of approaches to problems), and research related to the design of information and decision support systems. In the latter case we are less optimistic because we feel that many of the implementation problems which have been experienced are due more to a lack of management experience on the part of the designer and a poor 'numbers sense' on the part of the manager, than to difference in cognitive style.


* * * * *

This stage of our research is almost complete. During the process we gained much insight into the practice of consulting and the infinite variety of personal characteristics. We found evidence which supports the conclusions of other researchers that individual problem solving approaches ((cognitive styles) can usefully be classified along two cognitive-related dimensions: perception (or conceptualization) and

evaluation (analysis and conclusion drawing). For our sample, there was a third relevant dimension, namely the orientation of the individual to doing vs. thinking. We explored the relevance of these constructs to the adjectives analytic and intuitive which have been used with a variety of connotations.

A number of interesting areas emerged for future study. There seemed to be a tendency for individuals in certain functional areas to exhibit similar cognitive predispositions. Why? Cognitive style mismatches between an individual and his colleagues seemed to create discomfort under certain conditions. To what extent is this true and what are the implications? We could detect no overriding relationships between PS approach and PS effectiveness although there were indications that certain tasks seemed to be better matched to certain approaches. Finally, there is the intriguing suggestion that individuals in an area which is one of the most unstructured (Human Resource consulting) have the lowest tolerance for ambiguity. Is this frequently true? We look forward to searching for the answers.

BIBLIOGRAPHY

- ACKOFF, R.L. (1960), "Unsuccessful Case Studies and Why", Operations Research, VIII, pp. 259-263 .
- _____ (1974), Redesigning the Future, A Systems Approach to Societal Problems, Wiley, New York .
- ALAWI, H. (1973), Cognitive, Task and Organizational Complexities in Relation to Information Processing Behavior of Business Managers, Ph.D. Dissertation, GSBA, University of Southern California
- ALLPORT, G.W., VERNON, P.E. & LINDZEY, G. (1960), Study of Values, Boston: Houghton Mifflin
- ALTEMEYER, B. (1966), Education in the Arts and Sciences: Divergent Paths, Ph.D. Dissertation, Dept. of Psychology, Carnegie Inst. of Technology, Pittsburgh
- ARGYRIS, C. (1961), "Explorations in Consulting-Client Relationships", Human Organization, Fall, pp. 121-133
- _____ (1970), Intervention Theory and Method: A Behavioral Science View, Addison-Wesley, Reading, Mass.
- ARMSTRONG, J. S. (1979), "Advocacy and Objectivity in Science", Management Science, May, pp. 423-428
- ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC., 230 Park Ave., New York
- AYRES, R.U. (1969), Technological Forecasting and Long Range Planning, McGraw-Hill, New York
- BARRETT, M.J. (1973), "Information Processing Types and Simulated Production Decision Making", Management Information Systems Research Center, Working Paper Series 73-02, University of Minnesota, Minneapolis, Minn.
- BARTLETT, F.C. (1958) Thinking, Basic Books, New York
- BENBASAT, I. (1974), An Experimental Evaluation of the Effects of Information Systems and Decision Maker Characteristics on Decision Effectiveness, Ph.D. Thesis, University of Minnesota, Minneapolis, Minn.
- _____ and TAYLOR, R.N. (1978), "The Impact of Cognitive Styles on Information Systems Design", Management Information Systems Quarterly, June, pp. 43-54
- BETAQUE, N.E. and GORRY, G.A. (1971), "Automating Judgmental Decision Making for a Serious Medical Problem", Management Science, Vol. 17, No. 8, April, pp. B-421- B434
- BIERI, J. (1971), "Cognitive Structures in Personality" in Personality Theory and Information Processing by H. M. Schroder and P. Suedfeld, (eds.), Ronald Press, New York, pp. 178-208
- 

- BISHOP, B.C. (1972), "A Contribution to a Discussion on the Methodology of Operational Research", Operational Research Quarterly, Vol. 23 No. 3, pp. 251-260
- BLAU, J.R. and MCKINLEY, W., (1979), "Ideas, Complexity and Innovation", Administrative Science Quarterly, June, pp. 200-219
- BONGE, J.W. (1972), "Problem Recognition and Diagnosis", Journal of Business Policy, Vol. 2, No. 3, pp. 45-53
- BOULGARIDES, J.P. (1973), Decision Style, Values and Biographical Factors in Relation to Satisfaction and Performance of Supervisors in a Government Agency, Ph.D. Dissertation, GSBA, University of Southern California, Los Angeles
- BOWER, J.L. (1970), Managing the Resource Allocation Process, Graduate School of Business Administration, Harvard University, Boston
- BOWMAN, E.H. (1963), "Consistency and Optimality in Managerial Decision Making", Management Science, January, pp. 310-321
- BRIGHTMAN, H.J. and URBAN, T.F. (1974), "The Influence of the Dogmatic Personality upon Information Processing: A Comparison With a Bayesian Information Processor", Organizational Behavior and Human Performance, Vol. 11, pp. 266-276
- BROADBENT, D.E. (1971), Decision and Stress, Academic Press, New York
- BRUNER, J.S. (1957), "Going Beyond the Information Given", in Cognition: A Symposium at University of Colorado, 1955, Harvard University Press
- _____, (1962), On Knowing, Harvard University Press, Cambridge
- _____, GOODNOW, J.J. and AUSTIN, G.A. (1956), A Study of Thinking Wiley & Sons, New York
- BRUNSWIK, E. (1956), Perception and the Representative Design of Experiments, University of California Press, Berkeley
- BUCKLEY, J.W., BUCKLEY, M.H. & CHIANG, H.F. (1976), Research Methodology and Business Decisions, Monograph prepared for The Society of Industrial Accountants & The National Association of Accountants
- BUDNER, S. (1962), "Intolerance of Ambiguity as a Personality Variable", Journal of Personality, pp. 29-50
- BUNGE, M. (1967), Scientific Research/The Search for System, Vol. 1 and 2, Springer-Verlag, New York
- BUROS, O. (Ed.) (1970), Mental Measurement Yearbook, Gryphon Press, Highland Park, New Jersey
- CAMPBELL, J. (1971), The Portable Jung, The Viking Press, New York

CARDOZO, R.N. (1968), "Segmenting the Industrial Market", AMA Conference Proceedings, Fall, pp. 433-440

CARLSON, E. D. and SUTTON, J.A. (1974), "A Case Study of Non-Programmer Interactive Problem Solving", IBM Research Report, RJ 1382, 1974

CARLSON, R.O. (1961), "High Noon in the Research Marketplace", Public Opinion Quarterly, Fall, pp. 331-341

CARTER, E.E. (1971), "The Behavioral Theory of the Firm and Top-Level Corporate Decisions", Administrative Science Quarterly, pp. 413-428

CHAKRAVARTI, D. et al (1979), "Judgment Based Marketing Decision Models", Management Science, March, pp. 251-263

CHERRY, C. (1957), On Human Communication, A Review, A Survey, and A Criticism, J. Wiley & Sons, New York

CHERVANY, N.L. and DICKSON, G.W. (1978), "On the Validity of the Analytic-Heuristic Instrument Utilized in 'The Minnesota Experiments': A Reply", Management Science, Vol. 24, No. 10, June, pp. 1091-2

_____ (1974), "An Experimental Evaluation of Information Overload in a Production Environment", Management Science June, pp. 1335-1344

_____ & KOZAR, K.A. (1972), "An Experimental Gaming Framework for Investigating the Influence of Management Information Systems on Decision Effectiveness", MIS Research Centre Working Paper 71-12, University of Minnesota, Minneapolis, Minn.

CHURCHMAN, C.W. (1964), "Managerial Acceptance of Scientific Recommendations", California Management Review, Fall, pp. 31-38

_____ (1971), The Design of Inquiring Systems, Basic Books, New York, London

_____ (1973), "Reliability of Models in the Social Sciences", Interfaces, Vol. 4, No. 1, November, pp. 1-12

_____ (1975), "Theories of Implementation" in Implementing Operations Research/Management Science, by R.L. Schultz and D.P. Slevin (Eds.), American Elsevier, New York pp. 23-30

_____ and SCHAINBLATT, A.H. (1965), "The Researcher and the Manager: A Dialectic of Implementation", Management Science, February pp. B-69-87

CLARKSON, G.P.E. (1964), Portfolio Selection: A Simulation of Trust Investment, Prentice-Hall, Englewood Cliffs, N.J.

COHEN, J. (1957), "Subjective Probability", Scientific American, November pp. 129-138

- CUNNINGHAM, J.M. (1952), "Problems of Communication in Scientific and Professional Disciplines", American Journal of Orthopsychiatry, pp. 445-456
- CYERT, R.M., SIMON, H.A. & TROW, D.B. (1956), "Observation of a Business Decision", Journal of Business, pp. 237-248
- DACCORD, J.E. (1967), Management Consultants: A Study of the Relationship Between Effectiveness and Several Personal Characteristics, M.Sc. Thesis, Sloan School of Business, MIT, Cambridge
- DAS, J.P., KIRBY, J.R. & JARMAN, R.F. (1979), Simultaneous and Successive Cognitive Processes, Academic Press, New York
- DAVEY, N.G. (1971), The External Consultant's Role in Organizational Change, Graduate School of Business Administration, Michigan State University, East Lansing, Michigan
- DEARBORN, D.C. and SIMON, H.A. (1958), "Selective Perception: A Note on the Departmental Identification of Executives", Sociometry, pp. 140-4.
- DE BRABANDER, B. and EDSTROM, A. (1977), "Successful Information System Development Projects", Management Science, October, pp. 191-199
- DE RIVERA, D.P.S. (1980), "A Decision Analysis Model for a Serious Medical Problem", Management Science, July, pp. 707-718
- DERMER, J.D. (1973), "Cognitive Characteristics and the Perceived Importance of Information", Accounting Review, July, pp. 511-519
- DE WAELE, M. (1978), "Managerial Style and the Design of Decision Aids", Omega, pp. 5-13
- DICKSON, G.W. (1970), "A Generalized Model of Administrative Decisions: An Experimental Test", Management Science, September, pp. 35-47
- DOKTOR, R. (1970), The Development and Mapping of Certain Cognitive Styles of Problem Solving, Doctoral Dissertation, Graduate School of Business, Stanford University, Stanford
- _____ (1976), "Cognitive Style and the Use of Computers and Management Information Systems", Management Datamatics, No. 2, Vol. 5, pp. 83-88
- _____ and BLOOM, D.M. (1977), "Selective Lateralization of Cognitive Style Related to Occupation as Determined by EEG Alpha Asymmetry", Psychophysiology, pp. 385-7
- _____ and HAMILTON, W.F. (1973), "Cognitive Style and the Acceptance of Management Science Recommendations", Management Science, April, pp. 884-894
- DRAKE, J.D. (1975), "Communications - the Art of Getting Through to People" Planning Review, Vol. 3, No. 2, March, pp. 1-4, May 1975, pp. 10-11

DRIVER, M.J. (1972), Decision Style and Decision Speed, (unpublished manuscript), Graduate School of Business Administration, University of Southern California, Los Angeles

_____ and LINTOTT, J.T. (1972), Managerial Decision Diagnostics, Graduate School of Business Administration, University of Southern California, Los Angeles

_____ and MOCK, T.J. (1975), "Human Information Processing, Decision Style Theory and Accounting Information Systems", Accounting Review, pp. 490-508

_____ and ROWE, A.J. (1978), "Decision-Making Styles: A New Approach to Management Decision Making" in Behavioral Problems in Organizations by C.L. Cooper (Ed.), Prentice Hall, Englewood Cliffs, New Jersey

DRUCKER, P.F. (1967), "The Effective Decision", Harvard Business Review, January-February, pp. 92-8

DUNCAN, J.W. (1971), The Beginning Management Consultant: A Study of Individual Adaptation to Complexity, DBA Thesis, Harvard University

DUNCAN, W.J. (1974) "Transferring Management Theory to Practice", Academy of Management Journal, December, pp. 724-738

DUNCKER, K. (1945), "On Problem Solving", Psychological Monographs, Whole #27

EDWARDS, W. (1967), "The Theory of Decision Making" in Decision Making W. Edwards and A. Tversky (Eds.) Penguin Books, Baltimore, pp. 13-64

EILON, S. (1969), "What is a Decision?", Management Science, December, pp. B-172 - B189

FELDMAN, J. (1963), "Simulation of Behavior in the Binary Choice Experiments" in Computers and Thought by E.A. Feigenbaum and J. Feldman (Eds.) McGraw-Hill, New York, pp. 329-346

FESTINGER, L. (1963), "The Theory of Cognitive Dissonance", in The Science of Human Communication by W. Schramm (Ed.), Basic Books, New York

FREEDMAN, R.D. and STUMPF, S.A. (1979), The Learning Style Theory: Less Than Meets the Eye, Working Paper, Graduate School of Business Admin., New York University

FREIDSON, E. and RHEA, B. (1965), "Knowledge and Judgment in Professional Evaluations", Administrative Science Quarterly, June, pp. 107-124

FRENCH, J.W., EKSTROM, R.B. & PRICE, L.A. (1963), Manual for Kit of Reference Tests for Cognitive Factors, Educational Testing Service, Princeton, New Jersey

FULENWIDER, M.C. (1967), Perceptual Styles of Effective Management Consultants, M.Sc. Dissertation, Sloan School of Business, MIT, June

- GARRATT, L.J., McCLURE, R. & SCHNITZER, R. (1967), "Computer Simulation of Learning and Decision Processes in Poker" in The Psychology of Management Decisions by G. Fisk (Ed.), CWK Gleerup Pub., Lund, Sweden, pp. 196-208
- GIGCH, J.P. van (1970), "Applications of a Model Used in Calculating the Mental Load of Workers in Industry", Canadian Operations Research Society Journal, November, pp. 176 - 184
- GINZBERG, M.J. (1979), "A Study of the Implementation Process" in The Implementation of Management Science by R. Doktor, R.L. Schultz & D.P. Slevin (Eds.), North Holland Pub., New York, pp. 85-102
- GOLDBERG, L.R. (1968), "Simple Models or Simple Processes? Some Research on Clinical Judgments", American Psychologist, pp. 483-496
- _____ (1971), "Five Models of Clinical Judgment", Organizational Behavior and Human Performance, pp. 458-479
- GOLDSTEIN, K. and SCHEERER, M. (1941), "Abstract and Concrete Behavior: An Experimental Study with Special Tests", Psychological Monographs 53, Whole No. 239, Vol. 53, No. 2
- GORE, W.J. (1964) Administrative Decision Making, A Heuristic Model, Wiley, New York
- GORRY, G.A. (1971), "The Development of Managerial Models", Sloan Management Review, Winter, pp. 1-16
- GRAYSON, C.J. (1973), "Management Science and Business Practice", Harvard Business Review, July-August, pp. 41-48
- GREEN, P.E. (1967), "A Behavioral Experiment in the Economics of Information" in The Psychology of Management Decisions by E. Fisk (Ed.), CWK Gleerup Pub., Lund, Sweden, pp. 170-185
- GREENBERG, H.M. and GREENBERG, J. (1980), "Job Matching for Better Sales Performance", Harvard Business Review, September-October, pp. 128-133
- GREENWOOD, W.J. (Ed.) (1969), Decision Theory and Information Systems, South-Western, Cincinnati
- GRINNELL, S.K. (1968), The Development of Creative Interprofessional Collaboration. A Social Psychological Theory, Case Western Reserve Univ.
- GROCHOW, J. (1973), Cognitive Style as a Factor in the Design of Interactive Decision-Support Systems, Ph.D. Thesis, MIT, Sloan School of Management, Cambridge
- GUILFORD, J. (1954), Psychometric Methods, McGraw-Hill, New York
- HARRISON, E.F. (1975), The Managerial Decision-Making Process, Houghton Mifflin, Boston

HARVEY, A. (1970), "Factors Making for Implementation Success and Failure", Management Science, Vol. 16, No. 6, February, pp. B-312 - B321

HAYWOOD, O.G. (1954), "Military Decision and Game Theory", Operations Research, November, pp. 365-385

HELLRIEGEL, D. and SLOCUM, J.W. (1975), "Managerial Problem-solving Styles", Business Horizons, December, pp. 29-37

HENDERSON, J.C. and NUTT, P.C. (1980), "The Influence of Decision Style on Decision Making Behavior", Management Science, April, pp. 371-386

HOGARTH, R.M. (1975), "Cognitive Processes and the Assessment of Subjective Probability Distributions", Journal of the American Statistical Association, June, pp. 271-294

HOVLAND, C.I. et al (1957), The Order of Presentation in Persuasion, Yale University Press, New Haven, Conn.

HOWSON, H.R. (1977), A Study of the Effects of Differential Feedback on Learning and Transfer of a Judgmental Task, Ph.D. Dissertation, Syracuse University, New York

HUDSON, L. (1966), Contrary Imaginations, Methuen, London

(1968), Frames of Mind, Methuen, London

HUYSMANS, J.H.B.M. (1970), The Implementation of OR, Wiley, New York

JOHNSON, D.M. (1971), The Psychology of Thought and Judgment, Greenwood Press, Westport, CT

JUNG, C.G. (1923), Psychological Types, Routledge & Kegan Paul, London

KAISER, K.M. (1979), "Personality Characteristics of Information Systems Designers", Working Paper, Faculty of Management, McGill Univ. Montreal

KEEN, P.G.W. (1973), The Implications of Cognitive Style for Individual Decision Making, DBA Thesis, Harvard University, Cambridge

KELLY, G.A. (1955), The Psychology of Personal Constructs, Norton, New York

KEPNER, C.H. and TREGOE, B.B. (1965), The Rational Manager, A Systematic Approach to Problem Solving and Decision Making, McGraw-Hill, New York

KILMANN, R.H. and MITROFF, I.I. (1976), "Qualitative vs Quantitative Analysis for Management Science: Different Forms for Different Psychological Types", Interfaces, February, pp. 17-27

KOLB, D.A. (1974), "On Management and the Learning Process", in Organizational Psychology, by Kolb, Rubin & McIntyre, Prentice-Hall, Englewood Cliffs, New Jersey, pp. 27-41

- KOLB, D.A. and FROHMAN, A.L. (1970), "An Organization Development Approach to Consulting", Sloan Management Review, Fall, pp. 51-65
- LAKE, P.G., MILES, M.B. & EARLE, R.B. (1973), Measuring Human Behavior, Teachers College Press, New York
- LEAVITT, H.J. (1975), "Beyond the Analytic Manager", California Management Review; Spring, pp. 5-12; Summer, pp. 11-21
- LINDBLOM, C.E. (1959), "The Science of Muddling Through", Public Administration Review, Vol. 19, pp. 79-88
- LIPPITT, R., WATSON, J. & WESTLEY, B. (1958), Dynamics of Planned Change, Harcourt, Brace & World, New York
- LIVINGSTON, J.S. (1971), "Myth of the Well-Educated Manager", Harvard Business Review, January-February, pp. 79-89
- LUCAS, H.C. (1973), "A Descriptive Model of Information Systems in the Context of the Organization", Data Base, Winter, pp. 27-39
- _____ and NIELSEN, N.R. (1980), "Impact of the Mode of Information Presentation", Management Science, October, pp. 982-993.
- LUCHINS, A.S. (1942), "Mechanization in Problem Solving", Psychological Monographs, Whole No. 248
- LUNDBERG, C.C. (1962), "Administrative Decisions: A Scheme for Analysis", Journal of Accounting Management, August, pp. 165-178
- LUSK, E. (1973), "Cognitive Aspects of Annual Reports: Field Independence/Dependence", Empirical Research in Accounting: Selected Studies
- LYLES, M.A. and MITROFF, I.I. (1980), "Organizational Problem Formulation: An Empirical Study", Administrative Science Quarterly, March
- MACCOBY, M. (1976), The Gamesman, Bantam Books, New York
- MacCRIMMON, K.R. and TAYLOR, R.N. (1976), "Decision Making and Problem Solving", in Handbook of Industrial Psychology by Dunnette, M.D. (Ed.) Rand, McNally, Skokie, IL
- MacDONALD, A.P. (1970), "Revised Scale for Ambiguity Tolerance: Reliability and Validity", Psychological Reports, Vol. 26, pp. 791-8
- MacKINNON, D.W. (1962), "The Nature and Nurture of Creative Talent", American Psychologist, pp. 484-495
- MACKWORTH, N.H. (1969), "Originality", in The Discovery of Talent by D. Wolfle (Ed.), Harvard University Press, Cambridge, Mass.
- MARCH, J.G. (1964), "Business Decision Making", in Readings in Management by H.J. Leavitt and L.R. Pondy, University of Chicago Press, Chicago, pp. 447 - 456

- MARCH, J.G. and SIMON, H.A. (1958), Organizations, Wiley, New York
- MARQUIS, D.G. and STRAIGHT, D.M. Jr. (1966), "Organizational Factors in Project Performance" in Research Program Effectiveness: Proceedings by M.C. Yovits et al (Eds.), Gordon and Breach, New York, pp. 441-458
- MASON, R.O. and MITROFF, I.I. (1973), "A Program for Research in Management," Management Science, Vol. 19, No. 5, pp. 475-487
- MATHES, R.C. (1969), "'D' People and 'S' People," Letter in Science, Vol. 164, May 9, p. 630
- MAYER, R.E. (1977), Thinking and Problem Solving: An Introduction to Human Cognition and Learning, Scott, Foresman, Glenview, IL
- McCLELLAND, D.C. (1969), "The Role of Achievement Orientation in the Transfer of Technology," in Factors in the Transfer of Technology, by W.H. Gruber and D.G. Marquis (Eds.), MIT Press, Cambridge, Mass.
- McKENNEY, J.L. (1971), "A Cognitive Approach to Decision Making as a Basis for Designing Man-Machine Decision Systems," Working Paper, Harvard University
- (1973), "A Taxonomy of Problems," Working Paper, Harvard University
- and KEEN, P.G.W. (1974), "How Managers' Minds Work," Harvard Business Review, May-June, pp. 79-90
- MEDNICK, S. (1962), "The Association Basis of the Creative Process," Psychological Review, Vol. 69, pp. 220-232
- MESSER, S.B. (1976), "Reflection-Impulsivity: A Review," Psychological Bulletin, pp. 1026-1052
- MILLER, G.A. (1969), The Psychology of Communications, Penguin Books, Baltimore
- MINSKY, M. (1963), "Steps Toward Artificial Intelligence," in Computers and Thought, by E.A. Feigenbaum and J. Feldman (Eds.), McGraw-Hill, New York, pp. 406-450
- MINTZBERG, H. (1973a), "The Making of Strategic Decisions," Working Paper, Faculty of Management, McGill University, Montreal
- (1973b), The Nature of Managerial Work, Harper & Row, New York
- (1980), "Beyond Implementation: An Analysis of the Resistance to Policy Analysis," INFOR, May, pp. 100-138
- MITROFF, I.I. (1971), "A Communication Model of Dialectical Enquiring Systems--A Strategy for Strategic Planning," Management Science, Vol. 17, No. 10, June, pp. B-634- B648

MITROFF, I.I. (1972), "Who Looks at the Whole System?" in Decision Making, by Brinkers, Ohio State University Press

____ (1975), "Toward a Theory and Measure of Total Problem Solving Performance", in Proceedings of a Conference on Implementation of Computer-Based Decision Aids, by P.G.W. Keen (Ed.), Center for Information Systems Research, MIT, Cambridge, Mass.

____, BARABBA, V.P. & KILMANN, R.H. (1977), "The Application of Behavioral and Philosophical Technologies to Strategic Planning", Management Science, September, pp. 44-58

____ and EMSHOFF, J.R. (1979), "On Strategic Assumption-Making: A Dialectical Approach to Policy and Planning", Academy of Management Review, January, pp. 1-12

____ and MASON, R.O. (1974), "On Evaluating the Scientific Contribution of the Apollo Moon Missions via Information Theory: A Study of the Scientist-Scientist Relationship", Management Science, Vol. 20, No. 12, August, pp. 1501-1513

MOCK, T.J. (1973), "A Longitudinal Study of Some Information Structure Alternatives", Data Base, Winter, pp. 40-9

____, ESTRIN, T.L. & VASARHELYI, M.A. (1972), "Learning Patterns, Decision Approach and Value of Information", Journal of Accounting Research, Spring, pp. 129-153

MOORE, P.G. (1977), "The Manager's Struggles with Uncertainty", Journal of Royal Statistical Society, Series A, Part 2, pp. 129-165

MORRIS, P.A. (1977), "Combining Expert Judgments: A Bayesian Approach", Management Science, March, pp. 679-693

MORRIS, W.T. (1967), "Intuition and Relevance", Management Science, Vol. 14, No. 4, December, pp. B-157- B-165

MORSE, E.V. and GORDON, G. (1974), "Cognitive Skills: A Determinant of Scientists Local Cosmopolitan Orientation", Academy of Management Journal, December, pp. 709-723

MOSTELLER, F. and NOGEE, P. (1967), "An Experimental Measurement of Utility", in Decision Making by W. Edwards and A. Tversky. (Eds.), Penguin Books, Baltimore

MULLEN, J.H. (1965), "Differential Leadership Modes and Productivity in a Large Organization", Academy of Management Journal, Vol. 8, No. 1 March, pp. 107-126

MYERS, I.B. (1962), The Myers-Briggs Type Indicator Manual, Consulting Psychologists Press, Palo Alto, California

MYERS, S. and MARQUIS, D.G. (1969), Successful Industrial Innovators (A Study of Factors Underlying Innovation in Selected Firms), National Science Foundation, NSF 69-17

- NELSON, K.H. (1973), "A Bibliography of Cognitive Style Research" Working Paper, Harvard Business School, Harvard University, Boston
- NEWELL, A. and SIMON, H.A. (1972), Human Problem Solving, Prentice-Hall, N.J.
- OPERATIONS RESEARCH SOCIETY OF AMERICA (ORSA) (1971), "Guidelines for the Practice of Operations Research", Operations Research, September, pp. 1125-1258
- O'REILLY, C.A. (1977), "Personality-Job Fit: Implications for Individual Attitudes and Performance", Organizational Behavior and Human Performance, Vol. 18, pp. 36-46
- ORNSTEIN, R.E. (1972), The Psychology of Consciousness, Freeman & Co. San Francisco
- _____ (1973), "Right and Left Thinking", Psychology Today, May, pp. 87-92
- PETERS, J.T., HAMMOND, K.R. & SUMMERS, D.A. (1974), "A Note on Intuitive vs Analytic Thinking", Organizational Behavior and Human Performance, Vol. 12, pp. 125-131
- POLYA, G. (1957), How to Solve It, Doubleday Anchor, Garden City, NY
- POPPER, K.R. (1968), The Logic of Scientific Discovery, Harper & Row, New York
- POUNDS, W.F. (1969), "The Process of Problem Finding", Industrial Management Review, Fall, pp. 1-19
- RADNOR, M., RUBENSTEIN, A.H. & TANSIK, D.A. (1970), "Implementation in Operations Research and R&D in Government and Business Organizations", Operations Research, November-December, pp. 967-991
- RAIFFA, H. (1968), Decision Analysis, Addison-Wesley, Reading, Mass.
- RAISINGHANI, D.H. (1971), Toward Programming of Unstructured Decisions, MBA Thesis, McGill University, Montreal
- RAUDSEPP, E. (1980) described in "The Creative Spark" in Dun's Review, January, pp. 33-38, by N. Howard
- RAYNOLDS, P. (1972), "Cognitive Style, Self Perceptions and Effective Creativity Training", given at Symposium of American Psychological Association, Honolulu
- REED, J.P. (1969), "The Lawyer-Client: A Managed Relationship?", Academy of Management Journal, March, pp. 67-79
- REITMAN, W.R. (1964), "Heuristic Decision Procedures, Open Constraints, and the Structure of Ill-defined Problems", in Human Judgments and Optimality by M. Shelley and G. Bryan (Eds.), Wiley, New York, pp. 282-315

- ROBERTS, J. (1980), "More on 'The Hyper-rationality' Trap", Infor, Vol. 18, No. 1, February, pp. 80-81
- ROKEACH, M. (1954), "The Nature and Meaning of Dogmatism", Psychological Review, Vol. 61, pp. 194-204
- _____ (1960), The Open and Closed Mind, Basic Books, New York
- ROSENBERG, Y. (1972), Consulting for a City Government, Ph.D. Dissertation, Sloan School of Management, MIT, Cambridge, June
- ROSENBLUM, J. (1972), General Managers and Technical Advisors, Ph.D. Dissertation, Harvard Business School, Harvard University, Boston
- SAVAGE, L.J. (1967), "Historical and Critical Comments on Utility" in Decision Making by W. Edwards and A. Tversky (Eds.), Penguin Books
- SCHEIN, E.H. (1969), Process Consultation, Addison-Wesley, Reading, Mass.
- SCHRODER, H.M. and SUEDELD, P. (1971), Personality Theory and Information Processing, Ronald Press, New York
- SHEPARD, R.N. (1964), "On Subjectively Optimum Selections Among Multi-attribute Alternatives" in Human Judgments and Optimality, Wiley
- SHYCON, H.N. (1976), "Perspectives on MS Applications" Interfaces, November, pp. 47-50
- SIMON, H.A. (1957), Administrative Behavior, Macmillan Co., New York
- _____ (1960), The New Science of Problem Solving, Harper & Row, New York
- _____ (1969), The Sciences of the Artificial, MIT Press, Cambridge
- SLOVIC, P. (1972), "Psychological Study of Human Judgment: Implications for Investment Decision Making", Journal of Finance, September, pp. 779-799
- SOELBERG, P.O. (1967), "Unprogrammed Decision-Making", Sloan Management Review, Spring, pp. 19-29
- SPERRY, R. (1974), "Messages from the Laboratory", Engineering and Science, January, pp. 29-32
- STABELL, C. (1973), "The Impact of a Conversational Computer System on Human Problem Solving Behavior, unpublished working paper, Sloan School of Management, MIT
- STEELE, F. (1975), Consulting for Organizational Change, University of Massachusetts Press, Amherst
- STRAUSS, G. (1974), "Worker's Attitudes and Adjustments" in The Worker and the Job by J.W. Rosow (Ed.), Prentice-Hall, Englewood Cliffs, NJ pp. 73-98

- SYLVAN, D.A. and THORSON, S.J. (1979), "Measuring Cognitive Style at a Distance" presented at ORSA/TIMS meeting, Milwaukee, October
- TAGGART, B., ROBEY, D. & TAGGART, W. (1980), "Decision Science Course: Decision Styles and Personal Effectiveness", Working Paper, School of Business and Organizational Science, Florida International University, Miami, Florida, June
- TAGIURI, R. (1965), "Value Orientations and the Relationship of Managers and Scientists", Administrative Science Quarterly, June, pp. 40-51
- TATHAM, L. (1964), The Efficiency Experts, Business Publications Ltd., London
- TAYLOR, R.N. (1975a), "Psychological Determinants of Bounded Rationality: Implications for Decision Making Strategies, Decision Sciences, Vol. 6, No. 3, pp. 409-429
- _____ (1975b), "Perception of Problem Constraints", Management Science, Vol. 22, No. 1, September, pp. 22-9
- THOMPSON, J.D. (1964), "Decision-Making, the Firm, and the Market" in New Perspectives in Organizational Research, by W. Cooper et al, (eds.), Wiley, New York, pp. 334 - 348
- TILLES, S. (1960), An Exploratory Study of the Relationship Between Executives of Small Manufacturing Companies and Consultants, Ph.D. Dissertation, Graduate School of Business, Harvard University, Boston
- _____ (1961), "Understanding the Consultant's Role", Harvard Business Review, November-December, pp. 87-99
- TOREN, N. (1976), "Bureaucracy and Professionalism: A Reconsideration of Weber's Thesis", Academy of Management Review, July, pp. 36-46
- VAN HORN, R.L. (1973), "Empirical Studies of Management Information Systems", Data Base, Winter, pp. 172-182
- VASARHELYI, M.A. (1973), Man-Machine Planning Systems: A Behavioral Examination of Interactive Decision Making, Ph.D. Thesis, University of California at Los Angeles, June
- von WRIGHT, G.H. (1971), Explanation and Understanding, Cornell University Press, Ithaca
- WADE, P.F. (1974), "The Use of Quantitative Methods in Business", Working Paper, Faculty of Management, McGill University, Montreal, November
- _____ (1975), "The Manager/Management Scientist Interface", Working Paper, Faculty of Management, McGill University, Montreal, January

WADE, P.F. (1976), "Anatomy of a Consulting Assignment", Working Paper, Faculty of Management, McGill University, Montreal

_____ (1977), "Interpersonal Factors Contributing to the Success or Failure of a Consulting Engagement", Working Paper, Faculty of Management, McGill University, Montreal, October

_____ (1979), "Problem Solving Behaviour in Business - a Notebook", Working Paper, Faculty of Management, McGill University, Montreal, April

WALLACH, M.A. and KOGAN, N. (1961), "Aspects of Judgment and Decision Making: Interrelationships and Changes with Age", Behavioral Science, pp. 23-6

WATSON, G. and GLASER, E.M. (1965), "What We Have Learned About Planning For Change", Management Review, November, pp. 34-46

WERTHEIMER, M. (1959), Productive Thinking, Harper & Row, New York

WHITING, C.S. (1958), Creative Thinking, Reinhold, New York

WILCOX, J.W. (1972), A Method for Measuring Decision Assumptions, The MIT Press, Cambridge, Mass.

WILENSKY, H.L. (1967), Organizational Intelligence, Basic Books, New York

WITKIN, H.W. (1964), "Origins of Cognitive Style" in Cognition: Theory, Research, Promise by M. Schœerer (Ed.), Harper & Row, New York, p.172

_____ et al (1962), Psychological Differentiation, Wiley & Sons, New York

WITTE, E. (1972), "Field Research on Complex Decision Making Processes, The Pace Theorem", International Studies on Management and Organization, pp. 156-182

YANKELOVICH, D. (1977), "Managing in an Age of Anxiety", Industry Week, October 24, pp. 55-8

ZAND, D.E. (1974), "Collateral Organization: A New Change Strategy", Journal of Applied Behavioral Science, Vol. 10, No. 1, pp. 63-89

ZMUD, R.W. (1978), "On the Validity of the Analytic-Heuristic Instrument Utilized in the 'Minnesota Experiments'", Management Science, Vol. 24, No. 10, June, pp. 1088-1090

_____ (1979), "An Information Processing Conceptualization of the Systematic-Heuristic Cognitive Style", Working Paper, Georgia State University, Atlanta

_____ and CAIN, D.D. (1979), "Development and Evaluation of a Systematic-Heuristic Instrument", Working Paper, Georgia State University, Atlanta

APPENDIX A

A SUMMARY OF PS RESEARCH METHODOLOGIES

Research studies may be classified as field studies or laboratory studies. In the social sciences the definition of a field study is somewhat different from work in the natural sciences.

- A field study is the description of natural events that have taken place without any intervention from the researcher.
- A laboratory study is distinguished, not by the setting, but by the fact that knowledge was acquired under conditions that were separate and distinct from those leading to the normal operational goals of the organization (Van Horn, 1973). Thus a laboratory study need not be restricted to a non-organizational environment.

A selection of studies taken from the literature is given below to show the range of subjects covered.

Field Studies

(a) Multi-individual

- OR implementation factors (Radnor et al, 1970)
- How strategy formulated (Mintzberg, 1973a)
- Analysis of a business decision (Cyert et al, 1956)
- Study of 6 decisions in a company (Carter, 1971)
- Study of decisions in Kansas fire department (Gore, 1964)

(b) Focussed on the individual

- Investment decision making (Clarkson, 1964; Stabell, 1973)
- Purchasing agent decisions (Catdozo, 1968)
- Use of computer terminal (Carlson and Sutton, 1974)
- Design of a fugue (Reitman, 1964)
- Selecting a job offer (Soelberg, 1967)
- Production scheduling decisions (Bowman, 1963)

Laboratory Studies

- Business game (Barrett, 1973; Benbasat, 1974; Green, 1967; Huysmans, 1970)
- Competitive bidding in a poker game (Garratt et al, 1967)
- Chess playing (Newell and Simon, 1972)
- Proficiency with a compendium of tasks (Keen, 1973)
- Betting exercises (Savage, 1967; Mosteller and Nogee, 1967)
- Concept learning task (Bruner, Goodnow and Austin, 1956)
- Judgemental task with feedback (Howson, 1977)
- Written case (Daccord, 1967)

The following techniques have been used to observe or deduce PS behaviour (Johnson, 1971; Bartlett, 1958; Schroder and Suedfeld, 1971):

- (a) The problem solver articulates the main issues of the problem (e.g., Daccord, 1967; Dearborn and Simon, 1958) or describes problems which he thinks may be similar (Polya, 1957).
- (b) The problem solver gives a verbal account of what he is doing (Keen, 1973), or leaves an audit trail of scratch sheets (e.g., Newell and Simon, 1972) or computer records (Howson, 1977).
- (c) The observer documents the subject's actions and communications during the PS process. (How facts are accumulated, the nature of analyses, etc.) (Cardozo, 1968; Barrett, 1973)
- (d) The observer tries to elicit the problem solver's reasoning process. (How do you see it now?) (Reitman, 1964)
- (e) Electrodes (EEG) are attached to the problem solver's head while he is solving the problem. (This indicates which side of the brain is being used.) (Doktor and Bloom, 1977)
- (f) The observer uses written material such as reports to deduce the PS process (e.g., content analysis can be employed). If this technique does not indicate the PS process, it will at least identify the individual's style of communication which is closely related. (Drake, 1975; Sylvan and Thorson, 1979)

- (g) By means of interviews or questionnaires, the researcher elicits from the problem solver, in retrospect, some description of the problem solving process (Mock et al, 1972; Barrett, 1973).
- (h) During the process, the researcher tries to extract from the problem solver some measure of the value he attaches to various decision aids. This may be achieved in several ways:
 - sell him the aids (Driver and Mock, 1975; p. 499; Green, 1967)
 - ask him to comment on the value of the aids (Driver and Mock, 1975; p. 495); however, it was found that the answers provided to such questions are not always consistent with the PS behaviour of the subject.
 - watch what he uses or pays attention to.
 - study eye movements (Newell and Simon, 1972, p. 316; Messer, 1976)
- (i) The researcher elicits the main constructs (or cues) which the problem solver considers relevant to the problem. (Kelly, 1955; Wilcox, 1972; Gorry, 1971)
- (j) The researcher presents the problem solver with a series of cue sets whose attributes are categorized according to some rule (unknown to the subject) involving a given dependent variable. After a few trials with feedback, the problem solver is asked to categorize each new set as presented. At the conclusion, his learning strategy is deduced. (Bruner et al, 1956; Howson, 1977)
- (k) The problem solver's implicit model is deduced by considering the outcome of his decisions (or choices) together with the facts available to him (usually multi-dimensional). (Bowman, 1963; Chakravarti, 1979; Goldberg, 1971; Slovic, 1972; Shepard, 1964)
- (l) The researcher presents the problem solver with two different presentations, each designed to appeal to a different cognitive style, and records which the problem solver prefers (or bases his decision on). (Lusk, 1973; Doktor and Hamilton, 1973; Huysmans, 1970; Churchman, 1964)

- (m) The problem solver's subjective probabilities, utility curve or risk propensity are extracted by presenting him with various alternatives.
(Edwards, 1967; Moore, 1977; Wallach and Kogan, 1961)
- (n) The problem solver is presented with a compendium of tasks each designed to highlight a different PS attribute (e.g., conceptual skill). His performance is correlated with his characteristics or background.
(Keen, 1973; Doktor, 1970)

APPENDIX B

A DISCUSSION OF ANALYTIC VS INTUITIVE THINKING

Probably the most widely referred to PS style categorization is the analytic/intuitive or analytic/heuristic dichotomy.

Doktor (1976) states: Psychologists have identified two modes of information processing or cognitive styles:

"The first is characterized by words like analytic, sequential, linear, verbal symbolic, field independent, sharpener and converger. The second by words like intuitive, heuristic, non-linear, global, holistic, pictorial, spatial leveling and divergent." (p. 83)

While the above description is picturesque, it is not particularly helpful in terms of providing an operational definition for the process. Given an account of an individual's PS behaviour and his rationale for the preferred solution, is there some way that we can classify his approach as being analytic or intuitive? Perhaps, but it is not clear. In fact most of the terms used by Doktor refer to categorizations based on different psychological tests; converger/diverger refers to Hudson's tests (1966); field dependent/independent refers to categories attached to Witkin's Embedded Figures Test (1962).

How do others define the term?

About intuitive reasoning, Morris (1967) writes:

"One might mean by intuitive thinking, that kind of thinking which the subject cannot verbalize. Intuition suggests the immediate leap to a decision rather than a process involving careful well defined conscious steps. The intuitive thinker is unable to report what aspects of the situation his perceptual processes have selected, what portions of the contents of his memory he is using nor the inferential methods which lead him from these inputs to a decision. He responds somehow to a total conception of the problem, his thoughts moving in seemingly illogical fashion through all kinds of shortcuts to a decision. The mode of thought is obscure, inarticulate and scarcely formulated." (p. B-158)

Morris then goes on to say that "however satisfying this way of expressing the idea of intuition may be, it is subject to some familiar difficulties in application:" For example:

- Does he lack the language to express relationships between variables, or feelings of uncertainty?
- Does he dislike introspection and view such articulation with impatience?
or
- Does he not wish to articulate perhaps because by being explicit he becomes pinned down?

Morris suggests that a more useful and interesting way to define intuition would be in terms of some observable behaviour on the part of the manager. For example his willingness to delegate part of the PS process to another. Bruner (1962) does not add much to clarify the concept when he writes: "Intuition implies the act of grasping the meaning or significance or structure of a problem without explicit reliance upon the analytic apparatus of one's craft." (Cited in Peters et al, 1974; p. 125.)

Both Ornstein (1972; p. 69) and Bruner (1962) suggest that verbalization (explicitness) is necessary to develop or refine intuitive thinking. For example:

"It is the intuitive mode that yields hypotheses quickly, that produces interesting ideas before their worth is known. It precedes proof; indeed it is what the techniques of analysis are designed to test and check." (Cited in Peters et al, 1974; p. 125.)

Leavitt (1975) is a little more specific. He differentiates between analytic thinking and analytic techniques. He claims that in management education, we have tried to nurture analytic thinking by teaching analytic techniques.

"By analytic thinking I mean more than a set of specific techniques; I mean a style of thinking that is difficult to characterize completely but includes a preference for the language of numbers, a propensity to divide problems into components, to search for operational decision rules, and to search also for convergence - that is, for an answer...

"Perhaps Wertheimer's (1959) list of the characteristics of logical-analytic thinking will help. This type of thinking, he asserts, is characterized by emphasis on generalizations, conceptual hierarchies, formation of class concepts, formation of syllogisms, and comparison processes - as opposed to intuitive synthetic emphasis on association,

acquiring connections, trial-and-error behaviour, and responding to the frequency and recency of stimuli." (p. 6)

Peters et al (1974; p. 126) summarize the situation by concluding that "Unfortunately, descriptions of intuitive and analytic processes are rarely accompanied by experimental evidence which justified the distinction." They refer to work by Brunswik (1956) as being a notable exception. Brunswik's contribution is the notion that the intuitive mode involves the use of intersubstitutable probabilistic cues and is therefore uncertainty geared. As a result intuitive thinking should yield performance characterized by a preponderance of approximately correct responses with relatively few responses which are either precisely correct or highly erroneous. Some evidence on simple tasks has supported this. Generalization from this work to business problem solving is risky owing to the completely different nature of business tasks. It is not obvious that an intuitive solution would necessarily be more robust than an analytic solution especially in view of its dependency on the relevance of the manager's previous experience.

Although researchers have had difficulty in defining analytic vs intuitive thinking, there seems to be no reluctance to use the concept.

Some of the instruments used to differentiate subjects along the analytic/intuitive dimension are:

- the Myers-Briggs Indicator (Myers, 1962)
- the Embedded Figures Test (Witkin, 1962)
- Huysmans' pitcher and coin test and Atlas test (Huysmans, 1970)
- the Minnesota analytic-heuristic questionnaire (Benbasat, 1974)
- eight tests (word association, figures classification, etc.) (Doktor, 1970)
- systematic/heuristic test (Zmud, 1979)

Benbasat and Taylor (1978) refer to studies which indicate that the field dependent/field independent measure of Witkin has strong implications for MIS design.

"While both the high-analytic and low-analytic types may possess comparable abilities to differentiate and mentally structure a detailed report, only the high-analytic type perceives patterns of data inter-relatedness or wholeness."

Benbasat and Taylor (op. cit.) also draw a parallel between the categories of Witkin and those of Huysmans:

- Field dependent, being global in approach, is thus similar to the heuristic style which emphasizes looking at the totality of the situation.
- Field independent, separating parts from the totality, may relate in some way to the analytic style which can distinguish the set of underlying causal functions in a problem situation. (p. 46)

Benbasat and Taylor (op. cit.) conclude that:

"Empirical evidence suggests that the use of decision aids or problem solving models is closely associated with the analytic (field-independent)-heuristic (field-dependent) dimensions of cognitive style..."

"Other research studies showed that analytic types prefer reports which have formulas imbedded in the text and are quantitative, although some conflicting results on this point have emerged (Doktor and Hamilton, 1973)..." (p. 47)

"One experimental study in the area of data use and summarization showed that analytics made more use of detail data reports, whereas heuristics were more interested in aggregate reports. The results of this study conflict with other studies which showed that heuristic decision-makers exhibited higher data usage and preferred disaggregated reports..." (p. 49)

"The above discussion shows that implications cannot be comfortably drawn from the experimental results..." (p. 49)

Doktor and Hamilton (1973) discuss differences between the concepts developed by Huysmans and those developed by Witkin (1964). They find that although "they are related, they are not identical".

"Witkin's field-independent cognitive style closely parallels Huysmans' analytic way of reasoning. However field dependence as defined by Witkin differs from what Huysmans terms the heuristic way of reasoning. Heuristic implies that one exhibits a propensity to reason by means of broad rules of thumb, attempting to synthesize and transfer from one experience to the next; field dependence merely implies that one has

little capacity in what Witkin defines as the analytic cognitive style." (p. 886)

Kilmann and Mitroff (1976) consider Jung's sensing/thinking and thinking/feeling dimensions to be useful when studying PS behaviour. They find the Jung dimensions

"appear to highlight not only the important differences between qualitative and quantitative analysis, but the relationship between the two, and in fact, how the two even oppose one another at times. They chose the Jungian typology for two main reasons:

- (1) the dimensions of the Jungian typology can be directly related to different managerial and organizational styles; as a result, the system helps to shed light on a wide variety of organizational and managerial phenomena;
- (2) the Jungian typology does not prescribe one of the four major personality types (using the first two dimensions)¹ as superior or better than any of the others, but instead points out that each type has major strengths as well as weaknesses." (p. 18)

The authors suggest that the ST (sensing/thinking) type has become

"the epitome of the industrial revolution, bureaucracy, and rigorous scientific investigations. That is, the ST type emphasizes precision, control, specificity, impersonal (objective) analysis, logical and orderly reasoning (etc.). Thus, the ST approach represents quantitative analysis in the extreme because one can clearly specify variables, their interrelationships, and their precise measurement under controlled conditions. In fact, some might argue that the objective of management science as well as other sciences is to eventually conceptualize and/or discover theories, methods and measures such that the phenomena of interest can be so quantified." (p. 19)

Inter-correlations

Vasarihelyi (1973) administered several analytic/intuitive tests to a group of undergraduates for comparison. These were:

- the coin and pitcher tests developed by Huysmans
- the Myers-Briggs Type Indicator
- a heuristic-analytic questionnaire (?the Minnesota instrument)
- a self-evaluation instrument.

¹ SN and TF dimensions

Factor analysis showed relatively independent factors tapped by the various tests.

Zmud (1978) carried out a similar study. Two tests (the analytic-heuristic questionnaire and the Myers-Briggs Type Indicator) were administered to 48 MBA students. The results indicated that the questionnaire related to the Myers-Briggs Indicator only on the judging/perceiving dimension.

Regarding the validity of his tests (Atlas, coin and pitcher), Huysmans (1970; p. 111) speculated about correlations between these tests and others. He expected a high correlation between his test and

- the Thurstone-Gotteschaldt's Embedded Figures Test
- the Myers-Briggs Indicator. In particular he hypothesized that there would be an association between his analytic dimension and sensing and thinking types, and his heuristic dimension vs intuitive and feeling types
- Allport Vernon Lindzey test (1960) analytic vs theoretical, economic, social and political; heuristic vs religious and aesthetic.

Right and left thinking

References by Ornstein (1973) and Doktor (1976) describe current research which classifies a thought process as intuitive or analytic depending on which side of the brain processes it.

Essentially these styles relate to the manner in which an individual proceeds from problem to solution. The analytic mode implies a logical systematic approach. It also implies that the reasoning will be explicit. (Because of the limitations of working memory, complex problems will generally create the need to verbalize and to record.)

During thinking there is electrical activity in the brain which can be traced through an electroencephalograph (EEG) machine.

Recent work (e.g., Sperry, 1974) on the right and left hemispheres of the brain has ascribed a different thinking role to each.

For right handed people, the left hemisphere is predominantly involved with analytic thinking, especially language and logic. This hemisphere seems to process information sequentially which is necessary for logical and mathematical thought since logic depends on sequence and order. The right hemisphere is believed to be primarily responsible for our orientation in space, artistic talents, body awareness and recognition of faces. It processes information more diffusely than the left hemisphere does, and integrates material in a simultaneous, rather than linear, fashion.

It is postulated that for most people spatial problems are processed in the right hemisphere; verbal tasks in the left.

However, over-specialization can cause violations of this rule. For example, in research by Doktor and Bloom (1977), three PhD's with training in analytic fields showed a relative propensity to perform all of the verbal tests in their left hemispheres (as expected) as well as 67% of the spatial ones, whereas seven chief executives showed a relative propensity to perform all of the spatial tests in their right hemispheres (as expected) as well as 75% of the verbal tests.

This supported an observation made by Doktor and Hamilton in an earlier paper (1973), in which they noted that the capacity to reason analytically has been shown to decrease over time in the absence of highly structured tasks.

Another inference which may be valid is that a different portion of the brain is used when we are speaking, writing or reasoning (thinking in a linear, 'logical' mode), than when we are day-dreaming, or problem solving by flipping through our mental files searching for relevant knowledge. This latter type of thinking has been called intuition.

APPENDIX C

STEPS IN A CONSULTING ASSIGNMENT¹

The table below lists in chronological sequence the steps which take place in a typical consulting project.

<u>CONSULTING PHASE</u>	<u>FUNCTION</u>	<u>DESCRIPTION OF ACTIVITY</u>	<u>FORMAL DOCUMENTATION PREPARED</u>
Proposal (initial survey)	1. Set objectives for assignment	<ul style="list-style-type: none">• Preliminary fact-finding in order to:<ul style="list-style-type: none">a) Set scope of study & objectives to be met i.e., constraints, alternatives to be studied, evaluation criteria (if explicit)b) Describe the consultant's approach to the problemc) Identify the roles of client and consultant and define the resources requiredd) Present a work plan	Request for tender (client) Terms of Reference (consultant)
Survey	2. Diagnosis	<ul style="list-style-type: none">• Gather facts about problem & organizational needs• Draw conclusions about causes	
	3. Prescribe	<ul style="list-style-type: none">• Review alternatives• Predict outcomes from alternatives• Recommend solution• Prepare work plan for implementation	Report (consultant)
Implementation	4. Implement	<ul style="list-style-type: none">• Implement solution (or perform service)	Procedures and/or Summary Report

¹ For a more detailed description, see:
Management Consulting, M. Kubr, (ed.)
International Labour Office, Geneva, 1977

These steps are discussed below with the object of emphasizing aspects which are considered to be important or contentious. Since the word client is often used in the collective sense, we will use the term "sponsor" as that individual in the client organization who is sponsoring the project.

1. IDENTIFY PROBLEM

a) Sponsor

In most cases the sponsor identifies the problem or has it identified for him by someone else within the organization. He, thus, recognizes the need for a change (or some action) and initiates the project.

(Sometimes a consultant will make the first step and interest a client in initiating a project. However, such projects constitute a relatively small proportion of the workload for most consulting firms.)

b) Consultant

During the initial survey the consultant supervisor must obtain an understanding of two key issues: what is the problem and what are the sponsor's objectives. Since these are somewhat different topics, we will consider them separately.

i) What is the problem?

Assuming the problem described by the client is the real one bothering him, we must try to assess its boundaries. This is not easy. Ackoff (1960) listed this as one of the unsolved problems of the Operations Research worker. Watson and Glaser (1965) are of the same mind for they state: "The things we complain about are not necessarily the things that trouble us." They also point out that the greater the pressure, the greater the tendency to over-emphasize symptoms and ignore underlying causes.

Success in getting a realistic 'first cut' appreciation of the nature of the problem depends on the experience of the consultant, the insight which the client possesses about the problem and his ability to articulate it.

Steele (1975; p. 150) refers to "the withholding or distortion of information which is vital to an understanding of the problem situation."

ii) What are the sponsor's objectives?

Failure to identify the sponsor's objectives can cause the project to founder early in its life, yet this may be one of the most difficult tasks the consultant faces especially if he is inexperienced or lacks familiarity with:

- The specific organizational climate; and
- The general nature of managerial pressures (demands on them, their motivation, etc.).

Churchman (1973) writes: "It is not realistic to ask the manager to spell out his objectives."

Shycon (1976) discusses "hidden agenda".

Carlson (1961) refers to unspoken motives which often underlie the engagement of a consultant, namely the wish to: delay decisions, spread responsibility, legitimize actions clearly agreed on, use the outsider as a hatchet man. Since the sponsor is in the position where he is free to reveal as much or as little about himself and his problem as he pleases, the consultant must do his best to determine:

- What is the real concern of the client?
- What type of solution will he consider acceptable?

While the answer to the second question will be more useful in step 3 (prescription), it can help the consultant to "size" the project (what is achievable? What is the assimilation rate of the organization for change?) before he commits himself in the Terms of Reference.

Should the consultant disagree with the client's formulation of the problem to be tackled, he will probably not raise the issue at this stage in the engagement if he feels there is a reasonable chance of bringing the client around later on. "Sell him what he wants - give him what he needs" is the credo. However, serious differences in concept will normally be brought to light before the assignment starts.

The Terms of Reference are usually viewed as a contract and contain the following:

- The consultant's understanding of the problem, the factors to be considered, constraints, objectives, and approach to be adopted.
- The work he contracts to carry out (in sufficient detail so that the client knows what he expects to get and whether he got it).
- Expected benefits.
- An estimate of consulting fees (sometimes a sum which the consultant commits not to exceed).
- Other details such as: expected duration of project, reporting arrangements, client participation, the roles of consultant and client and a work plan.

It is rarely possible (Tilles, 1961) to prepare Terms of Reference that are unambiguous because of the difference in "frames of reference" between the

consultant and the client. All that can be said is that the consultant is likely to know what he means, and another consultant (of similar background) will have a fairly similar interpretation (conditioned by the time allowed for the work).

Where possible, the project will be divided into two phases: the survey (diagnosis/prescription) phase and the implementation phase.

2. DIAGNOSIS

What does the client need and what can the organization absorb? The objectives of this phase are to:

- Determine what the problem was that caused the client to initiate the project.
- Put the problem in its environmental context.
- Identify underlying causes.
- Determine if client staff accept the fact that improvement is desirable.
- Assess the capability of the staff for doing their present work and for absorbing technical changes.
- Assessing the social structure of the organization, reward system, spheres of influence, etc.

Schein (1969) writing on the subject of process consultation (OD consulting) makes a strong plea for joint diagnosis where the sponsor works closely with the consultant. Schein also cautions against too early diagnosis because:

- the consultant may be wrong,
- even if he is right, the client may be defensive and not listen, or misunderstand and argue.

We would add two others:

- the client may feel embarrassed that someone was called in when the problem could be identified so quickly.
- the client may feel that that diagnosis was too hasty and therefore the conclusions were superficial.

During the diagnostic process, facts are gathered through reading of documents, interviews and discussions. The manner in which consultants go about diagnosis has not been well documented. Certainly in most firms, diagnosis is work reserved for the most senior members of the staff. In our experience, there are two extremes in the formality of the approaches adopted:

- At one extreme the consultant prepares a list of information to be gathered and methodically sets about collecting it.
- At the other extreme, the consultant follows every clue as it appears, in an apparently haphazard manner.

There has been little study on the effectiveness of the two approaches. Presumably this varies depending on the type of problem and environment with which the consultant is faced.

To what extent will different consultants agree on a diagnosis given the same situation?

Again, we can only offer opinion rather than experimental evidence. Consulting firm executives we spoke to claimed that they would expect experienced management consultants regardless of their specialist background to agree on their diagnosis. Against this largely untested conclusion there are the following research results which may or may not be directly relevant:

- In a study by Cunningham (1952) it was found that people from different specialist backgrounds recorded markedly different facts when summarizing the same video tape interview.
- Slovic (1972) has discussed the accuracy (or lack thereof) of judgments made by clinical psychologists, physicians and radiologists. In reviewing several studies he found:
 - the accuracy of the diagnosis was not closely related to length of professional training or experience.
 - that while the confidence of the clinician increased with more diagnostic information, the accuracy of the diagnosis did not (remaining at about the same level).

He concludes that one must never take for granted the reliability and accuracy of human judgment no matter how experienced the individual.

While consulting firms can, and have, identified individuals who have particular strengths for diagnostic work, little formal research has been carried out to explore the relevant personal characteristics supporting this skill.

3. PRESCRIPTION

"Business is not, at least not yet, an exact science. There is no single demonstrably right answer to a business problem."

Source unknown

What are the alternative solutions and which is the right one for the client organization?

The objectives for this step are to:

- Identify alternative courses of action (if not supplied)
- Develop criteria for evaluation (if not supplied)
- Compare alternatives and select one
- Develop an implementation plan
- Present findings and secure agreement.

The prescription process may require a search for alternatives or the alternatives may be specified in the initial project definition.

Where alternatives have not been specified beforehand, a consultant will not always consciously formulate alternatives and select from them. Often a solution will be constructed in his mind (possibly through an unconscious acceptance/rejection procedure). The danger with this process is that 'off-the-shelf' solutions may be selected without proper evaluation.

In support of the use of pre-packaged solutions (those which have been applied elsewhere) one can note:

- there is less risk that they won't work, and
- the time factor, and hence the cost, is significantly reduced.

Davey (1971), for example, was forced to reject his hypothesis that projects would be more effective when "the consultant develops his recommendations for organization change on the basis of his investigation of organizational problems and needs, rather than where he supplies the organization with a standardized pre-packaged program".

An interesting controversy arises over whether or not a client is happy to be presented with only a single alternative by the adviser. Rosenblum (1972) claims "no". Rosenberg (1972), speaking about government clients, claims "yes". In our experience most clients prefer only one alternative on the grounds that it is the consultant's job to do the selection. Perhaps this is just as well since there is some evidence (Raisinghani, 1971) that problem solvers produce only one solution anyway. Mitroff (1975) believes that there is much to be gained from having at least two opposing solutions presented by different experts since the client will have the opportunity to hear the case for different sides.

An experienced consultant is usually very much on his own in developing a proposed solution. His supervisor (should there be one) will usually assess the recommendations from the aspect of what may not work (a check for reasonableness) rather than what could have been achieved. It is the consultant's own professional motivation which will impel him to 'reach' while at the same time complete the project within budget. Generally there is little time for research or experimentation. (Rosenberg, 1972; McClelland, 1969)

Results and conclusions are usually summarized in a written report which is given to the client a week or so in advance of a formal presentation and discussion.

To what extent will consultants agree on a prescription, given the same diagnosis?

Little formal research work exists to answer this question. Mitroff et al (197) claim that different analysts will come up with the same formulation and/or solution if the problem is well structured.

There are several aspects where judgments could differ:

- i. the nature of the solution itself;
- ii. the resources required to implement;
- iii. the time frame within which change can be achieved; and
- iv. probably most important of all, are the benefits worth the cost?

The consultant's assessment of what is an appropriate solution will depend significantly on his own experience, area of expertise, and value system (what is important).

His experience in implementation will govern his approach to estimating (ii) and (iii).

Regarding item (iv), this is where the consultant must put himself in the sponsor's position when making the recommendation. Where intangible benefits tip the scales, the decision to proceed or not is a very personal one. (Tilles, 1960; p. 85).

In the absence of other criteria some consultants have a rule of thumb for recommending courses of action, e.g., proceed if the tangible (dollar) return for the project will repay one-time costs within two years.

4. IMPLEMENTATION

Implementation consists of the detailed planning and installation of the change (be it a control system or a new way of scheduling production).

The following list includes some of the activities covered in this phase:

- Preparation of plan and timetable
- Preparation of client staff
- Detailed design
- Refinement of design
- Development of procedures
- Validation and acceptance
- Training
- Installation
- Follow-up and tuning.

The implementation program, should there be one, will usually involve the consultant, perhaps in a guidance capacity since both he and the client are interested in ensuring that projected benefits are obtained.

Not all consultants, however, believe that they should participate in implementation (Tilles, 1960).

Sometimes the client will choose to implement on his own in which case the consultant is unable to guide, nurture and otherwise assist in the development of his proposed solution.

Implementation may be postponed or rejected for a number of reasons which are outside a consultant's control, such as:

- the situation changes and the problem no longer has top priority
- the sponsor changes jobs
- the company hits a recession and no longer has the resources for the project.

EVALUATION

The success of a project is assessed almost 100% on client reaction, e.g., the recommendations were implemented and the client was satisfied with the results. (Daccord, 1967; Harvey, 1970)

There are five points in the process when client satisfaction can be evaluated.

1. Client accepts Terms of Reference.
2. Client accepts diagnosis.
3. Client accepts solution.
4. Client decides to implement (i.e., cost/benefit ratio is acceptable).
5. Implementation is completed.

Most of the failures described in the literature on 'unsuccessful implementation' take place prior to implementation.

Generally, a few months of operation are required to determine whether projected benefits are forthcoming. Since the consulting project has usually ended by this time, a follow-up visit (audit) must be carried out by the consultant if he is to get feedback on his effectiveness.

In general, the consulting firm is satisfied with the quality of the work if the client pays the bill without complaint. Clients are not asked for a formal evaluation of the work done nor, as a rule, are follow-up visits scheduled to see if benefits were achieved. The consultant, however, may keep in touch with the client informally and hear of any problems. Most reputable consulting firms have a policy of immediate response (on a no-fee basis) to rectify any deficiencies resulting from alleged consultant shortcomings.

APPENDIX D

DETAILS OF INSTRUMENTS USED IN THE STUDY

	<u>Page</u>
(a) <u>Personality/cognitive Related Attributes</u>	
(i) <u>Standard Instruments</u>	
Q322 introvert/extrovert	2
Q323 fact anchored/imaginative conceptualizer	3
Q324 logical/'gut feel' evaluator	4
Q325 early/late closer	5
Q380 theoretical value	7
Q381 economic value	7
Q382 aesthetic value	7
Q383 social value	7
Q384 political (power) value	7
Q556 abstract reasoner	9
Q557 doer/thinker	11
(ii) <u>Modified or New Instruments</u>	
Q509 creative	13
Q510 need for autonomy	17
Q511 tolerance for ambiguity	21
Q513 use of quantitative methods	27
Q514 flexibility	30
Q515 line/staff	35
Q895 specialist/generalist	38
<u>Fact Finding Style Profiles</u>	41
(b) <u>Interpersonal skills</u>	45
Q889 supervisory skills	46
Q892 tactical	46
Q893 ability to work to deadlines	46
Q894 business development	47
Q890 persuasion	47
Q891 empathy	47
(c) <u>Validity Check on Grounded/ungrounded Scoring of Consultant (Factor #1) Using the Supervisors' Assessments (Q888)</u>	48
(d) <u>Technical Aspects of the Factor Analysis</u>	51

The numbers prefixed by a "Q" (e.g., Q322) were used to identify the test scores in the computations and have no other significance.

Introvert/extrovert (Q322)

We have used the IE scale of the Myers-Briggs Type Indicator (Form G)¹, to measure this construct, which is described by the manual (Myers, 1962) as follows:

Introversion in the sense given it by Jung, who formulated the term and the idea, is one of two mutually valuable orientations to life. The introvert's main interests are in the inner world of concepts and ideas, while the extravert's main interests are in the outer world of people and things. Therefore, when circumstances permit, the introvert directs both perception and judgment upon ideas, while the extravert likes to direct both upon his outside environment.

No one, of course, is limited exclusively to either the inner or the outer world. A well-developed introvert can deal ably with the world around him when necessary, but he does his best work inside his head, in reflection. A similarly well-developed extravert can deal effectively with ideas, but he does his best work externally, in action. In either case the instinctive preference remains, like a natural right- or left-handedness (p. 57).

We were not sufficiently familiar with this construct to develop many hypotheses. The items on the scale seem to relate to the word pair sociable/unsociable.

¹ The standard scoring procedures were used and the results were transformed to a seven-point scale.

Fact-anchored/imaginative Conceptualizer (0323)

While we have changed the labels, we have used the Myers-Briggs SN perception scale to measure this construct. This is described in the Myers-Briggs Type Indicator Manual (Myers, 1962) as follows:

"A basic difference in the use of perception arises from the fact that, as Jung points out, mankind is equipped with two distinct and sharply contrasting ways of perceiving. There is not only the familiar process of sensing, by which we become aware of things directly through our five senses. There is also the process of intuition which is indirect perception by way of the unconscious, accompanied by ideas or associations which the unconscious tacks on to the perceptions coming from outside. These unconscious contributions range from the merest masculine "hunch" or "woman's intuition" to the crowning examples of creative art or scientific discovery.

"Undoubtedly all persons make use of both sorts of perception. But most individuals from infancy up, enjoy one way of perceiving more than the other. When people prefer sensing, they find too much of interest in the actuality around them to spend much energy listening for ideas out of nowhere. When people prefer intuition, they are too much interested in all the possibilities that occur to them to give a whole lot of notice to the actualities. For instance, the reader who confines his attention strictly to what is said here on the page is following the habit of the people who prefer sensing. One who reads between the lines and runs ahead to the possibilities which arise in his own mind is illustrating the way of the people who prefer intuition." (p. 51)

Because of its construction, this instrument would be expected to correlate with creativity and tolerance for ambiguity. Also it has been found in practice to correlate with the JP scale which we have termed early/late closer (Myers, 1962; p. 11).

Logical/'gut feel' Evaluator (Q324)

We used the TF scale of the Myers-Briggs Type Indicator (Form G) to measure this construct, but changed the labels. The manual (Myers, 1962) describes the construct as follows:

"A basic difference in the use of judgment arises from the existence of two distinct and sharply contrasting ways of coming to conclusions. One way is by the use of thinking, which is a logical process, aimed at an impersonal finding. The other way is by the use of feeling, which is a process of appreciation, equally reasonable in its fashion, bestowing on things a personal, subjective value.

"Everyone undoubtedly makes some decisions with thinking and some with feeling. But each person is almost certain to like and trust one way of judging more than the other. If, when one judges these ideas, he concentrates on whether or not they are true, that is thinking-judgment. If one is conscious first of like or dislike, of whether these concepts are sympathetic or antagonistic to other ideas he prizes, that is feeling-judgment." (p, 52)

According to the manual (p. 11), this scale is independent of the SN scale (our fact anchored/imaginative conceptualizer), the JP scale (our early/late closer) and the IE scale (our introvert/extrovert)..

Early vs Late Closer (Q325)

A measure of the individual's predisposition to focus on a single solution or model early in the PS process. (Armstrong, 1979)

Speed of closure relates to how quickly a person commits himself to a specific model for the problem situation, where model and solution are inseparable, commitment is made to a solution at the same time.

Lyles and Mitroff (1980) use the same concept in comparing Leibnitzian and Lockean reasoning.

Early closure would appear to have much in common with an 'intolerance for ambiguity', which could manifest itself in a desire to control circumstances, to force the problem into some preconceived mold.

When decision making has to be made under pressure, Wilensky (1967) claims that there is a marked reliance on precedents and trial and error reaction to feedback. There will be less search for information and alternatives. Preconceptions and bias will be strongly apparent. We would conclude from this that one might expect individuals with a predisposition to early closure to suffer less discomfort when having to make decisions under stress.

The success of an early closure approach to unstructured problems will obviously depend heavily on the extent of the individual's relevant experience.

Available Instruments

The judging/perceiving dimension of the Myers-Briggs Indicator would appear to measure this attribute. As the manual notes, "in order to come to a conclusion, perception must be shut off for the time being. The evidence is all in. Anything more is incompetent, irrelevant and immaterial. One now arrives at a verdict and gets things settled." (p. 58)

Another measure which might be associated, is the second dimension of Driver and Lintott's Decision Style Classification (Driver and Lintott, 1972). We were unable to obtain details on this instrument, however.

The Gestalt Test for Speed of Perceptual Closure (French, Ekstrom, and Price, 1963) may be another measure of this attribute.

The degree of correlation which has been observed between the judging/perceiving and the sensing/intuitive dimensions of the Myers-Briggs Indicator suggest that early closure is related to an intuitive rather than fact-based approach to model building.

There should also be a strong correlation between early/late closure, tolerance for ambiguity and dogmatism. (The latter characteristic was not measured in this study.) (Driver and Rowe, 1978; p. 140)

We used the judging/perceiving dimension of the Myers-Briggs Indicator.

Values (Q380-Q384)

We wanted to have some relative measure of the individual's values, so included a version of the Allport Vernon Lindzey "Study of Values" Questionnaire (Allport, Vernon and Lindzey, 1960). This is based on a typology proposed by the philosopher Edward Spranger who hypothesized that there were six primary types of men, the theoretical, the economic, the aesthetic, the social, the political and the religious. For our study, we revised the instrument to remove the religious category since it appeared irrelevant.

Tagiuri (1965) prepared the following descriptions of what each of the five scales purports to measure.

"1. Theoretical. Theoretical man is primarily interested in the discovery of truth, in the systematic ordering of his knowledge. In pursuing this goal, he typically takes a 'cognitive' approach, looking for identities and differences, with relative disregard for the beauty or utility of objects, seeking only to observe and to reason. His interests are empirical, critical, and rational. He is an intellectualist. Scientists or philosophers are often of this type.

"2. Economic. Economic man is primarily oriented toward what is useful. He is interested in the practical affairs of the business world, in the production, marketing, and consumption of goods, in the use of economic resources, and in the accumulation of tangible wealth. He is thoroughly practical and fits well the stereotype of the American businessman.

"3. Aesthetic. Aesthetic man finds his chief interest in the artistic aspects of life, although he need not be a creative artist. He values form and harmony. He views experience in terms of grace, symmetry or harmony. Each single event is savored for its own sake.

"4. Social. The essential value for the social man is love of people, the altruistic or philanthropic aspect of love. The social man values people as ends, and tends to be kind, sympathetic, and unselfish. He finds those who have strong theoretical, economic and aesthetic orientations rather cold. He regards love as the most important component of human relationship. In its purest form the social orientation is selfless and approaches the religious attitude.

"5. Political. Political man is characteristically oriented toward power, not necessarily in politics, but in whatever area he functions. Most leaders have a high power orientation. Competition plays a large role in all life, and many writers have regarded power as the most universal motive. For some men, this motive is uppermost, driving them to seek personal power, influence, and recognition." (p. 40-1)

Since a high theoretical orientation is related to a discovery of 'truth' in the scientific sense, we would not expect many of our respondents to exhibit this, perhaps only the management scientists or economists.

A high economic orientation might be reflected by (a) high empathy with private sector clients, (b) a fact-anchored (i.e., pragmatic) and satisfying rather than imaginative approach, and (c) a line rather than staff orientation.

A high aesthetic orientation might be associated with a low abstract (i.e., high concrete) score on Kolb's LSI and a high feeling score on the Myers-Briggs TF scale.

Regarding social values, some positive correlation might similarly be expected with the F score on the TF scale and with the extrovert score.

The possible influence of the political (power) value dimension on approaches to problem solving is not evident. Perhaps a highly competitive individual will be more motivated to ensure that his recommendations are adopted without modification. Conceivably, introverts are less competitive.

MacKinnon (1962) found that 'creatives' scored highest on the theoretical and aesthetic scales. Tagiuri (1965) compared the scores of scientists in industry with those of executives. As expected, he found that scientists had a higher theoretical orientation.

	<u>Theoretical</u>	<u>Economic</u>
Scientists	51	40
Executives	44	45

We will not be able to compare the results from our study with others using the "Study of Values Questionnaire" because we modified the instrument by eliminating the religious dimension.

Abstract Reasoner (Q556)

The tendency of the individual to think in concrete vs abstract terms, where concreteness represents the immersion in, and domination by, one's immediate experiences' and abstractness 'permits an individual to detach his ego from the outer world or from inner experience.' (Goldstein and Scheerer, 1941; p. 4)

The dimension abstract/concrete is related to an individual's ability for generalizing.

Many individuals approach each problem as it arises as if it were a unique case. Yet as Drucker (1967; p. 93) points out - most of the problems that come up in the course of an executive's work are generic - where each occurrence is only a particular case. Inconsistent behaviour, superficiality and lost time can result from a failure to develop and apply generic solutions where they are appropriate. The same is even more true for consultants. (At the other extreme, there is the 'expert' who treats all problems exhibiting 'similar' symptoms as if they were the same, thus leading to incorrect diagnosis. We consider this phenomenon to be pathological, resulting from improper motivation, poor judgment, a shortage of time or other factors contributing to stress.)

"• The person who is high in concreteness deals with information or events in terms of their own specific identity and does not tend to genericize what is learned.

"• The abstract attitude is one in which the individual can not only tear himself away from the given, but actually may not deal with the given save as an exemplar of more generic categories."

(Bruner, 1957; p. 53)

It has been suggested that the ability to generalize starts with the coding structure on the basis of which knowledge or new experience is filed away in memory.

'Rote' learning tends to store concrete facts which are less easily generalized, whereas 'insightful' learning emphasizes principles. Bruner notes:

"Learning often cannot be translated into a generic form until there has been enough mastery of the specifics of the situation to permit the discovery of lower-order regularities which can then be recombined into higher-order, more generic coding systems."

(p. 60)

When a new problem arises, it is characterized by certain dimensions or cues which the problem solver identifies. These cues are used to categorize it, after which properties of the class (including potential solutions) are automatically applied to it.

It has been concluded (e.g., Bartlett, 1958) that it is more difficult to detect patterns of similarity than patterns of difference between data (cue) sets. "To the untutored, observed differences make a far more immediate impression than likenesses." (Bartlett, 1958; p. 94).

Almost every problem has some unique aspect. What is important is: Does a new problem differ from a known problem to a significant degree along relevant dimensions? There are two notions to consider, the first is that only some of the dimensions are relevant and the second is that the difference must be significant. From the foregoing, it can be seen that it is easier to conclude that there is a 'difference' than that there is a 'similarity', especially if the inference is to be rationalized. In this case some form of analysis will likely be necessary.

Schroder and Suedfeld (1971) found that the abstract decision maker is able to process more information in a complex decision environment and to make decisions more effectively when there is inadequate information.

Available Instruments

The abstract/concrete dimension of Kolb's Learning Style Inventory (LSI) instrument (Kolb, 1974) is designed to measure this attribute and was used.

It was hoped that this measure would correlate with the supervisor's rating of strong conceptual skill and the logical evaluator (Q324).

Doer/thinker (Q557)

Individuals are frequently classified as doers or thinkers, managers or planners. We wanted some measure of this particular predisposition. While not designed for this purpose, the AE-RO (active experimentation--reflective observation) scale of Kolb's LSI appeared to suit our purposes. According to Kolb (1974):

"As growth occurs, thought becomes more reflective and internalized, based more on the manipulation of symbols and images than overt actions. The modes of active experimentation and reflection, like abstractness/concreteness, stand in opposition to one another. Reflection tends to inhibit action and vice versa... Kagan (1964) has found...that very active orientations toward learning situations inhibit reflection and thereby preclude the development of analytic concepts. Herein lies the second major dialectic in the learning process - the tension between actively testing the implications of one's hypotheses and reflectively interpreting data already collected." (p. 29)

It was hypothesized that 'doers' might tend to a satisficing 'instrumental' (Strauss, 1974) approach whereas 'thinkers' might fall more into the 'craftsmen' category (Maccoby, 1976) and have an 'expressive' approach to tasks (Strauss, 1974).

The standard scoring procedure was used and the results were transformed to a seven-point scale.

(a) Personality/cognitive Related Attributes (continued)

(i) Modified or New Instruments

In this section we will describe the instruments used to measure the following attributes:

- creativity
- need for autonomy
- tolerance for ambiguity
- use of quantitative methods
- flexibility
- line/staff orientation
- specialist/generalist

These instruments have not been thoroughly tested and should be used with caution. A description of each target construct is given together with a list of items comprising the instrument and a table of inter-item correlations.

Creativity (Q509)

The creative process is that mental process in which past experience is combined and recombined, frequently with some distortion, in such a fashion that one comes up with patterns, new configurations, new arrangements that better solve some need of mankind. (Whiting, 1958; p.2)

Whiting (1958) differentiates between original and creative thinking, claiming that a creative idea must be useful and satisfy some need.

The ability to be creative is closely associated with the ability to generalize.

In creative problem solving there are at least three kinds of creativity:

- that associated with the identification of relevant solutions which had previously been experienced in another context.
- that which gives rise to new solutions. (This assumes that the problem solver has the relevant functional knowledge.)
- that which discovers problems and opportunities.

How is a creative solution found? Popper (1968) claims: "There is no such thing as a logical method of having new ideas, or a logical reconstruction of this process." (p. 32)

Johnson (1971) believes that "many creative ideas seem to arise during the relaxed period of walking." (p. 263)

Bungé (1962) and Taylor (1975b) refer to findings that the results from group brainstorming are inferior to those coming from individuals working in isolation.

In studies of English students by Hudson (1966) of a related construct, converger/diverger, it was found that convergers (low in imagination) were more likely to:

- approve of being obedient
- accept expert advice
- be intolerant of ambiguity in intellectual matters
- have set opinions
- less likely to recall dreams
- conform more to social conventions

However, as Hudson noted, a sharp improvement in the fluency of convergers followed a change in instructions.

"The converger in other words is not so much the boy who cannot think divergently, as the one who thinks fluently only when told unambiguously to do so." (p. 57)

When Hudson's work was extended to adults, it was found that:

Convergers tend to prefer to work on manageable, well-defined problems for which there exists a single 'best' answer. Out of a set of many possible alternatives, they tend to converge on one and develop it in elaborate detail.

Divergers tend to prefer to work on (and invent) vague and ill-defined problems for which there exist many alternative approaches... From a single stimulus they produce many divergent responses. Divergers are synthetic; they are 'whole systems' oriented. (Mitroff, 1972; p. B-617)

Available Instruments

Tests which have been suggested to measure this attribute are:

- the converger/diverger test (Hudson, 1966)
- the Mednick and Guilford test (Mednick, 1962)
- Raudsepp's Creativity test (Raudsepp, 1980)

Regarding correlations with other instruments, MacKinnon (1962) found that the majority of creative writers, mathematicians and architects are intuitive (Myers-Briggs SN scale) and tend to late closure (Myers-Briggs JP scale).

We would also expect high creatives to have a high need for autonomy, relate to the diverger category of Kolb (those who tend to the concrete and reflective ends of the two dimensions) and tolerance for ambiguity.

We used the Raudsepp instrument but reduced the number of items. We have been unable to obtain any information on the validity or reliability of Raudsepp's test.

Scoring

The creativity scores were developed by summing the items with the weights shown on the next page.

CREATIVITY

Based on Raudsepp's Creativity Test (Raudsepp, 1980)

Question No.	Seq. No.	Question	Weights					
			Scores:	5	4	3	2	1
			No Ans.					
II.D.4	452	Get a kick out of breaking rules	2			1		0
II.D.7	455	Place more weight on careful analysis	-2			1		2
II.D.10	458	Get along better with same social class	-1			0		1
II.D.13	461	Last one to give up trying something	2			0		-1
II.D.19	467	Inspiration has nothing to do with solving a problem	-2			0		2
II.D.20	468	Important to have a place for everything	-1			0		1
II.D.26	474	More interested in what could be than what is	2			1		0
II.D.27	475	Feel ideas come from an external source	2			0		-1
II.D.28	476	It is wise not to expect too much of others	1			0		-1
II.D.36	484	Always learning new things and changing beliefs	2			1		0
II.D.39	487	No respect for people who are uncertain	-1			0		2
II.D.46	494	Concentrate harder than other people	3			0		-1
II.D.47	495	Sometimes voice opinions that turn people off	2			0		-1
II.D.48	496	Rely on first impression rather than analysis	1			0		-1
II.D.49	497	Don't allow people to get ahead in a line	2			1		0
II.D.50	498	Rather work things out instead of being shown	1			0		-1
II.D.51	499	Often desired to be alone during my youth	2			0		-1
II.D.52	500	Find things more obvious to you	2			1		0
III.C.10	441	Enjoy working out complex problems	2			1		0

Agree

II.C.2	387	Confident	1
II.C.4	389	Involved	2
II.C.5	390	Pragmatic	0
II.C.9	394	Persuasive	0
II.C.10	395	Open-minded	1
II.C.11	396	Methodical	0
II.C.12	397	Innovative	2
II.C.16	401	Painstaking	1
II.C.17	402	Retiring	0
II.C.18	403	Realistic	0
II.C.23	408	Cautious	0
II.C.28	413	Flexible	2
II.C.29	414	Independent	2
II.C.37	422	Social	0

Need for Autonomy (Q510)

A need to determine one's own course of action, to be independent.

A need for autonomy implies a need to be able to work things out by oneself, a discomfort about being told what to do. This attribute is regarded as being a core element of a professional orientation (Toren, 1976). It is conceivable that this attribute will be accompanied by a strong desire to work by one's self rather than on a team.

Available Instruments

Duncan (1971) used 7 items from an instrument developed by Lorsch and Morse. He described his construct as: high autonomy implies a need for high independence in relationships and a need for freedom and autonomy, the lower the score the more the indication of wanting dependency relationships and of being comfortable in being controlled.

Duncan (1971) gave the following comparison of consultants and three other groups using his measure for independence (p. VI-24):

	<u>Need for Independence</u>
Beginning consultants	19.3
Harvard MBAs (first year)	19.1
Researchers and scientists	19.8
Managers (containers & auto assembly)	15.2

As can be seen, consultants had much higher need for independence than managers, approaching that of scientists and researchers.

It is expected that there will be a strong positive correlation between creativity and need for autonomy as well as perhaps tolerance for ambiguity and need for autonomy. One might also expect a dislike of being tied down by a detailed work plan.

NEED FOR AUTONOMY

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
III.99	289	In any of the ordinary emergencies of everyday life, would you rather (A) take orders and be helpful, or (B) give orders and be responsible?	1-2	(1) reverse
III.105	295	In solving a personal problem, do you (A) feel more confident about it if have asked other people's advice, or (B) feel that nobody else is in as good a position to judge as you are?	1-2	(1) reverse
II.13.29	414	Independent/team member	1-7	as shown
II.14.3	451	I really resent it when people try to tell me what to do	1-5	as shown
II.14.4	452	I sometimes get a kick out of breaking the rules and doing things I'm not supposed to do.	1-5	(2) as shown
II.16.32	480	I definitely prefer to work under conditions where I am my own boss	1-5	as shown
II.18.50	498	I usually work things out for myself rather than get someone to show me	1-5	(2) as shown
IV.2.5	654	Before learning how others have resolved a problem, I like to think it through myself	1-5	as shown
IV.3,14	665	Most superior consulting work results from a <u>team</u> rather than an <u>individual</u> approach	1-5	reverse
V.7.10	791	Do you prefer to work by yourself or with other consultants (Check one.) 1. alone 2. with others	1-2	as shown

Note: As constituted, high scores indicate a low need for autonomy. For the study the scores were reversed.

NEED FOR AUTONOMY

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
V.10.11	816	Importance of the degree of autonomy you are given on your assignments		
		(Assign a rank of "1" for the most important to "9" for the least important)	1-9	as shown

- (1) Myers-Briggs Indicator (but not included in Myers-Briggs scoring)
 (2) Raudsepp Creativity Test

Note: As constituted, high scores indicate a low need for autonomy. For
 the study the scores were reversed.

INTER-ITEM CORRELATIONS FOR
NEED FOR AUTONOMY

Total												
Item	Less	Item Number										
No.	Item	289	295	414	451	452	483	493	654	665	791	816
289	.23		.16	.13	.33	.13	-.21	.23	.35	.16	.13	-.34
295	.23			.13	.16	.32	-.33	.27	.13	.13	.17	.36
414	.32				.45	.31	.21	.15	.15	.35	.35	.27
451	.31					-.32	.23	.37	.29	.33	.31	.34
452	.11						.23	.26	.13	.23	-.33	-.33
483	.27							.17	.33	.13	.43	.16
493	.35								.37	.19	.17	.12
654	.33									.43	.33	.14
665	.36										.32	.25
791	.34											.22
816	.16											

N = 79

SPEARMAN-BROWN = .72

Tolerance for Ambiguity (Q511)

An intolerance for ambiguity may be viewed as a general tendency to perceive ambiguous situations as threatening, where an ambiguous situation is one which cannot be adequately structured or categorized by the individual. (MacDonald, 1970; p. 791)

MacDonald (1970) speculates that persons having a high tolerance for ambiguity will:

- seek out ambiguity
- enjoy ambiguity
- excel in the performance of ambiguous tasks

Driver and Mock (1975) suggest that "Some people seek uncertainty and manipulate ambiguity or risk with ease. Others shy away from uncertainty and even distort data to avoid risk or ambiguity." (p. 495).

We might expect then this attribute to influence an individual's problem solving behaviour during problem finding and conceptualization. An intolerance for ambiguity could cause an individual to try to avoid unstructured problems, or, if unsuccessful, to attempt to define its boundaries (i.e., eliminate ambiguity) early in the process.

Regarding an individual's ability to assess uncertainty, research has indicated that:

1. intuitive notions of probability do not seem to conform to mathematical probability theory (Cohen, 1957)
2. many business decision makers just ignore uncertainty, at least explicitly (Hogarth, 1975)

Certainly, one rarely observes indices indicating the risk or degree of confidence attached to conclusions in business reports.

Moore (1977) concludes that managers tend to believe that they are more certain than they really are.

Because of their relevance to our topic we have included in Appendix E a number of conclusions concerning a human's performance at estimating uncertainty.

In a study relating tolerance for ambiguity to the amount of information perceived to be important by the decision maker, Dermer (1973) found a negative correlation existed (as might be expected). The information itself was viewed as ambiguous if it referred to future time periods or to behavioural (as opposed to financial) data.

Duncan (1971) conducted a study of beginning consultants. In the course of his research he compared the tolerance for ambiguity of these consultants with others (p. VI-24):

	<u>Tolerance for Ambiguity</u>
Beginning consultants	21.1
Harvard MBA's (first year)	21.1
Researchers and scientists	20.4
Managers (containers & auto assembly)	18.0

Note that the average tolerance of his sample of consultants was much higher than that of the managers referred to. Interestingly, when comparing consultants who adapted well compared to those who adapted poorly, he found that adaptability to consulting increased as tolerance for ambiguity decreased.

Other conclusions regarding uncertainty and PS behaviour are:

- Individuals who are psychologically equipped to deal with uncertainty are more able and willing to deal with complex and frequently unsolvable problems than individuals who are generally averse to uncertainty.
(Harrison, 1975; p. 153)
- Man is a very conservative information-processor who tends in a Bayesian manner to be very reluctant to give up concepts that served him in the past and to demand a greater weight of evidence than classical statistics would require to convince him that something unusual is occurring.
(Savage, cited by Keen, 1973; p. 3.33)

- The accommodative learning style (Kolb's classification) is more appropriate than the other three for high risk, high pressure tasks. (Kolb, 1974)

Available Instruments

Instruments frequently used to measure this attribute are the Ambiguity Tolerance Scale developed by MacDonald (1970) and Budner's Intolerance of Ambiguity Measure (Budner, 1962).

Duncan (1971) used an instrument developed by Lorsch and Morse to measure tolerance for ambiguity.

Dogmatism has been defined (Rokeach, 1960) as the extent to which an individual receives, analyzes and synthesizes information relative to pre-existing beliefs. Brightman and Urban (1974) note that dogmatism seems to be related to a need for uncertainty reduction.

One might expect tolerance for ambiguity and dogmatism therefore to be correlated with the early/late closure measure, those with high tolerance tending to the late closure end of the dimension.

People with a low tolerance for ambiguity might seek more information than others.

We designed a new instrument which included a number of items from MacDonald's test.

TOLERANCE FOR AMBIGUITY

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
I.8	197	Are you more successful: (A) At dealing with the unexpected and seeing quickly what should be done, or (B) at following a carefully worked out plan?	1-2	as shown
III.77	267	When something new starts to be the fashion, are you usually (A) one of the first to try it, or (B) not much interested?	1-2	reversed
III.82	272	Is it harder for you to adapt to: (A) routine, or (B) constant change?	1-2	as shown
III.95	285	Do you find the more routine parts of your day: (A) restful, or (B) boring?	1-2	as shown
III.5.3	434	I prefer assignments which permit me to concentrate in a few selected areas	1-5	as shown
III.5.4	435	I have trouble applying myself to problems which I find repetitive or uninteresting	1-5	reverse
III.5.5	436	I get more pleasure working in <u>unfamiliar situations</u> than I do from working in situations I am used to.	1-5	reverse
III.6.10	441	I enjoy working on complex and ill-defined problems	1-5	reverse ³
II.14.5	453	I can more easily cope with set routine than constant change in my work	1-5	as shown

TOLERANCE FOR AMBIGUITY

(continued)

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
II.15.14	462	I am uncomfortable in a situation where I do not know the rules of the game	1-5	as shown
II.15.17	465	Vague and impressionistic pictures have little appeal for me	1-5	as shown ²
II.15.21	469	The most interesting life is subject to rapidly changing conditions	1-5	reverse
III.2.5	572	What kind of variety do you encounter in your assignments? (In terms of the nature of the problem) (Check one.)		
		1. Very little variety		
		2. Little		
		3. Moderate		
		4. Great variety		
		5. Very great variety	1-5	as shown

¹From Myers-Briggs Indicator²From the AT-20 Scale (MacDonald, 1970)³Also included in Raudsepp's Creativity Test

INTER-ITEM CORRELATIONS FOR
TOLERANCE FOR AMBIGUITY

Total Item Less No. Item	Item Number													
	137	272	267	265	434	435	436	441	453	462	465	463	572	
137 .46		.35	.16	.23	-.25	.33	.43	.33	.16	.21	.35	.33	.31	
272 .53			.21	.31	.19	.21	.22	.17	.56	.11	.13	.52	.34	
267 .18				.16	.32	-.21	-.22	.25	.12	-.32	.22	.34	.34	
265 .36					.32	.39	.13	.31	.26	-.37	.21	.27	.21	
434 .13						-.34	.35	.31	.13	.17	.13	.15	-.37	
435 .27							.33	.17	.34	-.32	.34	.17	.33	
436 .42								.36	.16	.12	.33	.36	.11	
441 .33									.33	.24	.22	.23	.21	
453 .33										.29	.36	.33	.11	
462 .14											-.32	.37	.13	
465 .23												.14	.35	
463 .43													.38	
572 .13														

N = 73

SPEARMAN-BROWN = .71

Use of Quantitative Methods (Q513)

This instrument gives some indication of the individual's predisposition to quantification.

Traditional thinking suggests that structured problems will respond best to the use of quantitative methods.

USE OF QUANTITATIVE METHODS

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
IV.7.34	685	Most of my reports include extensive use of numbers either in the form of graphs or tables.	1-5	reverse
IV.7.38	689	If mathematical techniques were better understood by managers, higher quality solutions could be developed.	1-5	reverse
IV.13.5		To what extent do you use quantitative methods in your work.		
	719	- regression analysis	4-1	as shown
	720	- linear programming	4-1	as shown
	721	- statistical forecasting	4-1	as shown
	722	- other statistical packages	4-1	as shown
	723	- simulation	4-1	as shown
	724	- financial modelling	4-1	as shown

INTER-ITEM CORRELATIONS FOR
USE OF QUANTITATIVE METHODS

Item No.	Total Less Item	Item Number							
		635	667	713	720	721	722	723	724
635	.33		-.33	.25	.27	.29	.22	.26	.23
667	.39			.15	.23	-.27	-.25	.33	.13
713	.45				.40	.35	.49	.43	.37
720	.60					.52	.47	.42	.43
721	.50						.65	.48	.48
722	.59							.44	.36
723	.57								.53
724	.56								

N = 73

SPEARMAN-BROWN = .76

Flexibility/rigidity (Q514)

Rigidity has been defined as the inability to produce novel or changed responses. (Rokeach, 1960; p. 200)

Rigidity may then be considered as reliance on habit and rules, a tendency to be stubborn, to insist on order and, perhaps, an inclination to tunnel vision.

Rokeach distinguishes between rigidity and dogmatism. Dogmatism, he defines, as lack of receptiveness to information which conflicts with the problem solver's pre-existing beliefs, an inability to listen to new ideas.

One might expect rigidity to be correlated with age and perhaps those disciplines with unyielding procedures such as data processing and accounting.

Available Instruments

The Gough-Sanford Rigidity Scale (Rokeach, 1960) was designed to measure this attribute. We were not satisfied with this instrument for our purposes so augmented the Gough-Sanford items with some of our own. The items comprising the instrument are shown on the next page.

Regarding correlations with other instruments, one might expect a negative relationship with early closure and perhaps a positive relationship with tolerance for ambiguity.

FLEXIBILITY

<u>Question No.</u>	<u>Seq. NO.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
II.113	303	On most matters, do you: (A) have a pretty definite opinion, or (B) like to keep an open mind?	1-2	as shown ¹
II.13.28	413	Flexible/single-minded	1-7	reverse
II.14.10	458	I can get along more easily with people if they belong to about the same social and business class as myself	1-5	as shown ⁵
II.15.13	461	I am often the last one to give up trying to do a thing	1-5	as shown ²
II.15.15	463	I often become so wrapped up in something I am doing that I find it difficult to turn my attention to other matters	1-5	as shown ²
II.15.16	464	I usually arrange the bills in my wallet in denomination order	1-5	as shown
II.15.18	466	Nothing important gets accomplished in this world unless someone sticks his neck out	1-5	as shown
II.15.20	468	It is important for me to have a place for everything and everything in its place	1-5	as shown ⁵
II.15.22	470	I have always felt that there is a clear difference between right and wrong	1-5	as shown
II.16.23	471	I prefer to stop and think before I act on even trifling matters	1-5	as shown ²
II.16.29	477	I have never done anything dangerous just for the thrill of it	1-5	as shown ²
II.16.30	478	I believe that punctuality is a very important personal characteristic	1-5	as shown ³

Note: Agree = low

FLEXIBILITY

(continued)

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
II.16.33	481	I usually check more than once to be sure that I have locked a door, put out the light or something of the sort	1-5	as shown ²
II.16.34	482	I use a fixed rule for tipping	1-5	as shown
II.17.35	483	By digging and digging the truth is discovered	1-5	as shown
II.17.38	486	I always finish tasks I start even if they are not very important	1-5	as shown ²
II.17.39	487	People who seem unsure and uncertain about things lose my respect	1-5	as shown ⁵
II.17.40	488	Organizations never seem to learn. It only takes a few years after an assignment for them to revert to their former way of doing things	1-5	as shown
II.17.43	491	Obedience and respect for authority are the most important virtues children should learn	1-5	as shown ⁴
II.17.45	493	Nowadays, more and more people are prying into matters that should remain personal and private	1-5	as shown ⁴
II.18.56	504	I dislike going grocery shopping without a list	1-5	as shown
IV.6.30	681	In every problem there is a right way and a wrong way to go about resolving it.	1-5	as shown ³

¹From Myers-Briggs Indicator (not included in Myers-Briggs scoring)

²From Gough-Sanford Rigidity Scale

³From Gough-Sanford Rigidity Scale but modified

⁴From California F Scale

⁵From Raudsepp Creativity Test

Item No.	Total Less Item	Item Number													
		303	413	458	461	463	464	466	468	473	471	477	478	481	482
303	.15		.15	.25	.20	.33	-.25	.28	-.39	.37	-.38	.12	.04	.32	-.35
413	.12			.38	.13	-.39	.19	-.13	-.03	.10	-.02	-.34	.26	.21	.05
458	.37				.15	-.11	-.38	.17	.34	.20	-.13	-.02	.14	.20	-.03
461	.16					.16	.26	.33	.18	.15	.21	-.13	.11	-.02	-.33
463	.11						.17	.13	.13	.19	-.38	.38	.26	.19	.37
464	.23							.12	.41	.32	.11	-.35	.18	-.33	.34
466	.23								.37	-.23	.28	.32	-.37	.15	-.12
468	.49									.26	.22	.21	.25	.21	.21
473	.13										.35	.01	.36	-.34	.32
471	.15											.31	-.12	.32	.32
477	.12												-.31	.29	.19
478	.23													.11	.11
481	.38														.37
482	.29														

INTER-ITEM CORRELATIONS FOR

FLEXIBILITY

Continued....

INTER-ITEM CORRELATIONS FORFLEXIBILITY

Item No.	Total Less Item	Item Number							
		423	486	437	483	431	493	534	681
333	.15	.12	-.11	.24	-.25	.38	.33	.19	.12
413	.12	.28	-.25	-.33	-.33	-.31	-.33	.13	.36
456	.37	.13	-.37	.13	.15	-.25	.45	-.32	.39
461	.16	.10	.17	.39	-.31	-.11	-.23	.31	.26
463	.11	-.28	-.33	.11	-.33	-.33	.13	-.21	.33
464	.22	-.23	.33	-.33	-.34	.12	.33	.21	.36
466	.23	-.34	.31	.32	.39	.23	.23	.18	-.31
468	.49	-.26	.29	.23	.15	.32	.13	.31	.38
473	.13	-.33	.13	.25	.11	.15	-.35	-.37	-.26
471	.15	-.21	.13	.13	.17	.23	-.35	.18	-.25
477	.12	.36	.34	-.38	.12	.23	.12	.34	.14
478	.23	.13	.38	.33	-.32	.38	-.32	.14	.35
481	.36	.22	.15	.15	.29	.17	.14	.12	.11
482	.29	.38	.22	.32	.33	.25	.19	.21	.13
483	.14		-.21	.15	.13	-.26	-.33	.13	.27
486	.23			.34	.21	.29	.18	.24	.24
487	.26				-.24	.17	.11	.13	.12
488	.34					.31	.39	.25	.11
491	.32						-.21	.31	-.18
493	.18							.32	.25
534	.36								.11
681	.24								

N = 79

SPEARMAN-BROWN = .65

Line/staff Orientation (Q515)

A line orientation is related to the extent to which the individual is a doer rather than a thinker.

Propensity to action rather than reflection (see Kolb, 1974)

This attribute was included for two reasons:

- It might help to identify characteristics which distinguish effective management consultants in general.
- It was believed that an individual with a line orientation might perform more effectively on project management or implementation tasks, and less effectively on tasks involving a high degree of conceptualization skill.

Available Instruments

The second dimension of the Kolb Learning Style Inventory is designed to measure an active/reflective predisposition. Also the Myers-Briggs IE dimension between the Introvert who lives in the world of ideas and concepts and the Extrovert who lives in a world of action and objects (Myers, 1962, p. 57).

There may be some relationship between doing/thinking and predisposition to abstract thinking. Also a doing orientation would likely be associated with an instrumental rather than an expressive task orientation being more interested in getting the job done than in learning from the experience. There may be a relationship also with the Allport Vernon Lindzey theoretical and economic value scales.

We decided to develop a new instrument to compare with the Kolb LSI dimension to determine if the latter represented this construct.

LINE/STAFF ORIENTATION

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
II.12.1	386	Active/reflecting	1-7	reverse
II.12.5	390	Academic/pragmatic	1-7	as shown
II.12.7	392	People oriented/concept oriented	1-7	reverse
II.12.14	399	Theoretical/practical	1-7	as shown
II.12.24	409	Line/staff	1-7	reverse
III.5.9	440	If I were in business I would prefer a <u>staff</u> to a <u>line</u> position (A/D)	1-5	as shown
III.10.f	631	Act in a line capacity for a period to help a client over a staffing problem (above average = high)	4-1	as shown

(A/D) = agree/disagree

INTER-ITEM CORRELATIONS FOR

D.37

LINE/STAFF ORIENTATION

Total Item Less		Item Number						
No.	Item	336	337	332	339	423	442	631
336	.42		.16	.25	.41	.32	.19	.36
337	.32			.26	.43	.12	.15	-.37
332	.31				.31	.13	.16	-.16
339	.46					.31	.37	-.13
423	.43						.41	.26
442	.33							.23
631	.25							

N = 73

SPEARMAN-BROWN = .61

Specialist/Generalist Orientation (Q895)

A specialist orientation is related to the extent to which the individual concentrates on a particular field of application (functional or industrial)

This attribute was included because it was felt that it might have some relationship to performance on structured and unstructured tasks.

Available Instruments

A self-descriptive instrument detailing business experience is used.

SPECIALIST/GENERALIST

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
I.2.8	32	How many journals do you read regularly each month? Technical (related to your specialty)	()	as shown
I.11.1a	96	I find myself in situations where: I use my specialized knowledge in the solution of problems (often/seldom)	1-5	reverse
II.12.15	400	Generalist/specialist	1-7	as shown
III.5.1	432	I mainly refer problems which will help increase my technical experience and reputation	1-5	reverse
III.7.1. b.i.	595	Assess your performance for the following stages of an assignment: in diagnosing complex problems, technical aspects	5-0	as shown
III.7.1. c.i.	597	: in prescribing (developing workable solutions), technical aspects	5-0	as shown
III.9.3a	622	How do you view yourself on the technical level: clients see you as an expert in your field	1-5	reverse
III.9.3b	623	colleagues view you as being up-to-date in your field	1-5	reverse
III.9.3c	624	you are respected by fellow professionals in your specialty (outside the firm)	1-5	reverse
III.9.3d	625	you have contributed to advancements in your field	1-5	reverse
III.10.4g	632	Assess suitability: act as an expert witness in a court case	4-1	as shown

Scoring for journals:

<u>No. of journals</u>	<u>score</u>
0	1
1-5	1+1
6+	7

INTER-ITEM CORRELATIONS FOR

D.40

SPECIALIST/GENERALIST

Item No.	Total Less Item	Item Number										
		32	36	432	535	537	622	623	624	625	632	
32	.13		.23	.11	.37	.15	.21	.13	.25	.24	-.37	-.28
36	.31			.22	.32	.23	.13	.43	.27	.16	.29	.13
432	.36				.33	.23	.25	.26	.34	.16	.13	.11
535	.13					.22	-.23	.34	-.32	.37	.23	
537	.45						.72	.23	.21	-.23	.12	.23
622	.46							.23	.32	.36	.28	.15
623	.53								.50	.24	.35	.22
624	.57									.45	.36	.27
625	.26										.33	.12
632	.32											.23

N = 73

SPEARMAN-BROWN = .71

Fact Finding Style Portraits

Two sets of fact finding style portraits were developed, based on our observations of consultant on the job behaviour.

(a) Systematic vs Unsystematic Approach

This bipolar construct uses McKenney's systematic/intuitive fact finder construct (discussed on page II.19) as a pattern.

(b) Progressive Deepening vs Linear Approach

These terms were used by Newell and Simon (1972). We have applied them to two contrasting approaches which seem to be used on various occasions. We hypothesized that the linear approach was more likely to be used in structured situations and to be more closely related to the systematic rather than intuitive approach above.

Consultants were asked to determine if they recognized themselves among these portraits. Supervisors were asked if the portraits applied to the consultant or themselves.

The version shown below is that which was included in the supervisor's assessment of the consultant.

Two approaches to a diagnostic survey are given below. You are asked to decide if either (or both) in some way describe(s) the approach he uses.

Approach A

The individual with approach A is able to prepare and follow a detailed work plan which defines the nature of the information sought, the source of the information, and the order in which it will be gathered.

Such an individual has often made an initial classification of the problem (and the likely range of solutions) which he will retain unless subsequent information causes him to discard it. In the latter case, he will select a new model, revise the work plan and continue in an iterative fashion. In the process he gives early attention not only to the formulation of the problem but to the criteria (implicit or explicit) which will determine a "satisfactory" outcome.

He frequently uses checklists and carries out structured, rather than unstructured, interviews. One of the features of this approach is a fairly clear appreciation, at any time of:

- the information remaining to be gathered, and
- the conclusions which the individual feels are warranted at that stage.

These are usually advanced with relative confidence.

The process of fact-finding (and analysis) is terminated when a conclusion has been formulated satisfying the initial criteria or time runs out. There are rarely any major surprises in the final conclusions and any overruns of time are foreseen relatively early in the process.

Approach B

The individual with approach B resists a detailed work plan. He may prepare one if asked to but afterwards he pays little attention to it. He is usually unable to articulate the schema or model he is following when fact gathering. To an outside observer, he appears to operate by evaluating the information as it comes in before deciding what to do next. His mode is acquisitive, as he seeks to collect a wide range of data, from seemingly meaningless detail to important facts.

He does not often use checklists and his interviews are generally unstructured. During the survey, if questioned on his work plan, he will describe the need to get a "feel" for various aspects of the problem (which he may be unable to define very clearly). While a variety of conclusions may be beginning to emerge, he does not appear to have a strong commitment to most of them.

Finally, when the deadline approaches, he stops collecting information and switches to data sifting and analysis. Not all of the data will be used. Conclusions and confidence are built up rapidly. Unforeseen conclusions or solutions may surface and fairly significant overruns may develop, on occasion, which were not anticipated.

Check only one.

1. He frequently adopts an approach similar to A above. ()
2. He frequently adopts an approach similar to B above. ()
3. I believe that he can use either approach (A or B) depending on the circumstances. ()
4. I don't recognize his approach as being either A or B. ()

Comments:

- b) Does the amount of time that has been budgeted for the survey in any way affect which approach he might use?

1. Yes ()
2. No ()

If so, how?

- c) Two approaches to a complex diagnostic survey are described below. You are again asked to decide if either (or both) in some way describe(s) the approach he might use.

Approach C

This individual carries out his fact-finding in "passes" of progressively greater detail.

- Pass #1 gives him an idea of the various components of the problem, or process, and how they generally fit together.
- Pass #2 adds more details about each:

- Fact-finding continues in this fashion until the individual feels that he understands the operation and is in a position to assemble and test his conclusions.

Approach D

The individual with approach D divides the problem (or process) into components (e.g. functional areas). He then proceeds to assess each component thoroughly and independently, one after the other, conclusions being developed regarding each separately. His findings are then assembled into a coherent whole.

The difference between the two approaches described above is perhaps best demonstrated by an example.

Suppose you have been asked to study a finished goods inventory management problem in a manufacturing firm. The four functional areas concerned are: production planning, sales forecasting, order processing, and warehouse replenishment.

The work plan for approach C might consist of three separate levels of fact-finding:

- The first, allocating 1-2 days to each of the four areas to gain an appreciation of the scope of the activities, the practices employed and the inter-relationships between the areas.
- The second, allocating perhaps 2-3 days to each, to obtain more details.
- The third, of up to a week in each for a complex situation, going into the level of detail required to understand the operation to the extent necessary to locate problems and anomalies.

The work plan for approach D might consist of four separate two-week segments. In each, the component, such as production planning, would be explored in detail. After the eight weeks, the findings would be tied together into a coherent whole.

In a complex diagnostic survey: (Check only one.)

1. He frequently adopts an approach similar to C. ()
2. He frequently adopts an approach similar to D. ()
3. I believe that he can use either approach (C or D). (☒)
4. I don't recognize his approach as being either C or D. ()

(b) Interpersonal Skills

While it was not our intention to examine interpersonal skills in this study, certain skills known to be important in management consulting were cursorily measured to determine if they had a major influence on the supervisors' assessments of the consultant's task performance. These skills were:

Supervisory ability	Q889
Tactical	Q892
Ability to work to deadlines	Q893
Business development ability	Q894
Persuasion	Q890
Empathy	Q891

INTERPERSONAL SKILLSSupervisory (Q889)

Question No.	Seq. No.	Question	Scale	Scored
I.12	111	I am engaged to manage important projects (often-seldom)	1-5	as shown
III.6	445	For most projects, I would prefer to supervise other consultants rather than do the work myself	1-5	as shown
III.4.8	587	<u>Supervising the assignment.</u> Demands of the task are very clear/are not at all clear in most instances	1-7	as shown
III.8.2e	610	What is your assessment of your effectiveness in the following capabilities: supervisor or project leader	5-1	reverse
III.10.4b	627	Assess your suitability for: manage a large project team comprising client and consultant staff	4-1	reverse
V.10.9.8	813	The extent to which you have supervisory authority and responsibility (most/least important)	1-9	as shown

Tactical (Q892)

III.8.2b	607	Tactician (able to anticipate and overcome potential client objections)	5-1	as shown
III.8.2i	614	Ability to get client acceptance and co-operation	5-1	as shown

Deadlines (Q893)

III.9.2i	617	Ability to meet deadlines, stay within budget, etc.	5-1	as shown
III.9.2m	618	Ability to work to a detailed work plan	5-1	as shown
III.9.2n	619	Ability to operate with little supervision	5-1	as shown
IV.6.29	680	I usually wait until the last minute before trying to meet a deadline	1-5	reverse

INTERPERSONAL SKILLS

(Continued)

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
<u>Business Development (Q894)</u>				
III.5.7	438	If given a choice, I would prefer to give a technical talk to a group of colleagues rather than a more general address to a group of business managers	1-5	as shown
III.6.15	446	For me, the business development side of consulting is one of its more interesting aspects	1-5	as shown
<u>Persuasion (Q890)</u>				
I.11.1c	98	I use my skills at persuading the client to adopt some specific point of view or course of action (often/seldom)	1-5	as shown
II.12.9	394	Persuasive/unconvincing	1-7	as shown
III.6.13	444	I enjoy trying to convince a client that my course of action is better than the one he favours	1-5	as shown
III.7.1d	599	Assess your general performance for the following stages of an assignment: in obtaining acceptance for your recommendations	5-1	reverse
<u>Empathy (Q891)</u>				
III.9o	620	Ability to identify client needs	5-1	as shown
IV.4.21	672	I have relatively little difficulty putting myself in the client's place when deciding if an action is worth taking	1-5	reverse

(c) Validity Check on Grounded/ungrounded Scoring of Consultant (Factor #1)
Using the Supervisors' Assessments (Q888)

A number of relevant items were combined from the supervisors' assessments to form an independent measure of the consultant's grounded/ungrounded predisposition. We have termed this a systematic/unsystematic predisposition to avoid confusing the scales.

SUPERVISORS' ASSESSMENT OF CONSULTANT'S GROUNDED/UNGROUNDED PREDISPOSITION

<u>Question No.</u>	<u>Seq. No.</u>	<u>Question</u>	<u>Scale</u>	<u>Scored</u>
III.7.15	960	Precise/vague	1-7	as shown
III.7.16	961	Unplanned/scheduled	1-7	reverse
III.7.17	962	Facts/ideas	1-7	as shown
III.7.19	964	Undisciplined/disciplined	1-7	reverse
III.7.22	967	Last minute/on time	1-7	reverse

Note: A high value on this instrument is equivalent to the ungrounded category.

INTER-ITEM CORRELATIONS FORSUPERVISORS' ASSESSMENT OF CONSULTANT'S GROUNDED/UNGROUNDED PREDISPOSITION

Item No.	Total- Less Item	Item Number				
		362	361	362	364	367
362	.69		.62	.23	.53	.55
361	.77			.27	.75	.61
362	.18				.21	-.34
364	.73					.73
367	.62					

N = 79

SPEARMAN-BROWN = .01

(d) Technical Aspects of the Factor Analysis

A number of checks were made to confirm the validity of the factor analysis reported in Chapter V.

In particular: a scree test (Cattell, 1966)¹ was made to determine the number of significant factors. (Result - three to four)

: factor loadings were obtained, assuming three orthogonal factors (in addition to the four factor loadings reported in the table on page V.24).

: factor loadings were obtained for an oblique as well as orthogonal rotation, assuming four factors.

: two separate statistical computational programs were used to compute three orthogonal factors (varimax rotation).

All of these calculations used an initial commonality estimate based on the multiple R^2 of the given variable on all other variables in the matrix. The loadings are reported in the table on the next page.

Following the discussion in Chapter VI (page VI.16) regarding the independence of the early/late closer variable, a fifth run was made. This was a three factor varimax calculation using only 14 variables, i.e., omitting the early/late closer variable.

As can be seen, the loadings seem to be very stable across these different calculations. This increases the degree of confidence that can be placed on their composition.

The scores used were those calculated by the computer program (i.e. using coefficients from all of the variables not just those which were significant) for the 4-factor orthogonal varimax run. Since research indicates that it is better to include too many factors rather than too few, we could not eliminate the fourth factor just because we could not easily interpret it.

¹ The Scree Test for the Number of Factors, R.B. Cattell, Multivariate Behavioral Research, April, 1966, pp. 245-276.

TABLE SHOWING LOADINGS FOR FIRST THREE FACTORS CORRESPONDING TO RUNS WITH A VARIETY OF PARAMETERS

Variable	Run No.:	Factor #1 grounded/ungrounded conceptualizer					Factor #2 rational/instinctive conclusion drawing					Factor #3 line/staff orientation				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Q322 <u>introvert/extrovert</u>												-.43	-.39	-.47	-.45	-.46
Q323 <u>fact-anchored/imag. concept.</u>		.72	.69	.74	.76	.76										
Q324 <u>logical/'gut feel' evaluator</u>							.57	.55	.61	.65	.63					
Q325 <u>early/late closer</u>		.57	.53	.57	.57	X	.36	.31	.35	.33	X					
Q380 theoretical values												.37	.38	.33	.32	.33
Q381 economic values																
Q382 aesthetic values							-.48	-.48	-.50	-.49	-.53					
Q383 social values		.30	.36	.28	.25	.31	-.24	-.26	-.26	-.26	-.24	-.22	-.22	-.28	-.28	-.27
Q556 abstract reasoner							.63	.65	.60	.60	.58					
Q557 <u>doer/thinker</u>												.60	.66	.56	.57	.57
Q509 creativity		-.58	-.54	-.62	-.63	-.61										
Q510 need for autonomy												-.30	-.20	-.35	-.26	-.34
Q511 tolerance for ambiguity		-.73	-.73	-.71	-.72	-.63										
Q514 flexibility							-.38	-.40	-.32	-.29	-.28					
Q515 <u>line/staff</u>		.34	.28	.38	.39	.40						.55	.52	.53	.52	.53

The signs of the loadings have been adjusted to be consistent with the factor labels. This has resulted in the polarity being reversed for the factor #1 and #2 loadings shown on page V.24

Description of Runs

Run No.	No. of Factors	No. of Variables	Type of Rotation	Computer Program Used
1	4	15	Orthogonal	Statistical System ¹ (same as on pg. V.24)
2	4	15	Oblique	Statistical System
3	3	15	Orthogonal	Statistical System
4	3	15	Orthogonal with iteration	SPSS
5	3	14 ²	Orthogonal	Statistical System

¹ Developed by W.E. Gustafson, Greeley, Colorado

² The early/late closer variable (Q325) was removed.

APPENDIX E

SOME OBSERVATIONS ABOUT MAN'S ABILITY TO ASSESS UNCERTAINTY

Further conclusions regarding man's intuitive statistical abilities are given by Hogarth (1975):

- Man abhors randomness and compulsively seeks patterns in information supplied to him (p. 273);
- He is better at guessing averages than measures of dispersion (p. 274);
- He is weak in assessing the extent to which variables are correlated (p. 275);
- People tend to discount conflicting evidence (p. 276);
- They frequently overestimate the importance of minor cues (p. 276);
- Important cues acquire greater salience as their variability increases (p. 276);
- Increases in the amount of information given to a decision maker decreases the consistency of his judgment (p. 276);
- For the most part, forecasters do not 'think' in probabilistic terms (p. 276).

Moore (1977) in his paper 'The Manager's Struggle with Uncertainty' concluded that:

- Groups tend to produce decisions that are riskier than those produced by individuals (p. 146);
- "One is left with the feeling that the aim of many decision makers is not so much to optimize as to satisfy and to this end the maximin approach is used, perhaps unconsciously." (p. 147)
- Managers tend to relate their executive decisions more to their personal planning horizons than to those of their organization. (p. 147)
- Managers tend to believe that they are more certain than they really are. The consequence is that, taken in conjunction with the risk-averse attitudes displayed through their utility functions, managers are not likely to act as coherently as would be expected. (p. 147)
- Managers are loathe to accept that their skills in areas traditionally seen as being judgmental in character can be enhanced through training for the good of all concerned. (p. 147)

Morris (1967) suggests that the suppression of uncertainty is connected with the lack of a readily available language for expressing it.

APPENDIX F

INSTRUCTIONS TO SURVEY COORDINATORS

May 1, 1980

Instructions to Survey Coordinator

Your role is very important for the successful completion of the survey. I am therefore giving a detailed description of the steps to be performed. Should a question arise, please call me at (514) 866-3721 - Peter Wade.

1. The first step is to identify the participating consultants and supervisors from your firm. Guidelines for selection are given in the attachment. The most important factor, of course, is that the individual is prepared to take the time. (While the questionnaire does seem imposing, I might add that those who have filled it out so far have found it quite engrossing once they got into it.)
2. Each participating individual (consultants and supervisors) should then be assigned a two digit code which is unique for your firm. This should be applied to all documents related to the individual (There is a place for the code on the front page of each questionnaire).
3. When the questionnaires are distributed to the individuals, the date, name and code should be entered on a log sheet similar to the one I have provided.
4. Finally - somehow you must encourage, cajole (bribe?) or whatever, the individuals to conscientiously complete the questionnaires.

When they have filled out the questionnaires, they have been asked to let you know before they return them directly to me in the envelope provided. You can then note this information on your log.

Should the mail strike appear imminent, I have suggested that the envelopes be delivered to the nearest Currie, Coopers & Lybrand office which will make

sure that I receive them. For this reason, I have not put postage on the envelopes. If you will accumulate any expenses connected with the survey, I will reimburse you at the end of the project.

Regarding the deadline for receipt of completed questionnaires:

- I would naturally like to get them back as soon as possible.
- If the matter drags on too long, it will become an aggravation to everyone.
- I must start my analysis no later than June 30 - so this is the absolute latest date for inclusion in the study.

I suggest you develop your own deadline strategy with the participants, bearing the above points in mind.

I will be checking with you periodically to make sure that I am receiving what has been sent from your office.

You should retain the log sheet so that the confidential reports that I will be preparing this summer can be returned to each participant. Since I do not know the names, I can identify each envelope with only a code.

INSTRUCTIONS FOR
SURVEY OF
MANAGEMENT CONSULTANTS

Selecting the Sample

There are two different samples of individuals:

- i. The participating consultants
- ii. The participating supervisors.

i. The Participating Consultants

We are looking for individuals with the following characteristics:

Vital

- Have been consulting (either internally or externally) for at least 1 1/2 years.
- Have been with your firm for long enough that supervisors have come to 'know' them.
- Have a thorough understanding of written English.

Desirable

- They should have been operating until fairly recently, if they are not operating at present.
- They should be operating in an area where a heavy amount of judgment is required. (Thus programmers (as opposed to systems analysts) are not suitable).
- The longer they have been consulting, the better (although a few consultants with 6 months to one year's experience would be quite acceptable).
- They should, if possible, cover a range of functional areas.
- They should not be all star performers; some relatively average consultants should be included (if you have any).

- The geographical location of the consultant is immaterial to me, although having a few participants from Ottawa, the West or the East would be desirable to make the sample more representative.

(To preserve anonymity, I suggest that we disregard the office code when identifying a participating consultant or supervisor.)

ii. The Participating Supervisors

- If at all possible, two supervisors as a minimum should be found to evaluate each participating consultant. Of course, a specific supervisor may evaluate more than one participating consultant if he is in a position to.

(If you can find more than two supervisors who are prepared to evaluate one or more of the consultants, I would naturally be delighted, as this would increase the validity of the assessment.)

If in a few cases, only one supervisor can be found, such cases should not be discarded for this reason.

- Each participating supervisor is asked to fill out one of the questionnaires 'The Supervisor's Views and Background'. He would then complete one of the Consultant Effectiveness Assessments for each consultant evaluated.
- If he were prepared to do so, there is no reason why an individual could not take the role of an operating consultant and, in addition, evaluate one or more others. In this case, it would not be necessary for him to complete the Supervisor's Views and Background since all of this material is contained in the large questionnaire.

(Note: In the above case, the individual would be identified by the same code in both roles.)

APPENDIX G

SUPERVISOR-CONSULTANT CORRELATIONS

<u>Supervisor Question</u>	<u>Consultant Question</u>	<u>Question</u>	<u>Correlation (r)</u>
<u>Section 1. Performance on stages of PS process</u>			
904	594	Problem finding	-.01
905	595	Diagnosing - technical	.36
906	596	- organizational	.13
907	597	Prescribing - technical	.27
908	598	- organizational	.13
909	599	Accepting recommendations	.06
<u>Section 2. Performance on hypothetical tasks</u>			
936	626	Implement tested package	.23
937	627	Manage project team	.40
938	628	Handle sensitive assignment	.26
939	629	Evaluate candidate for exec. position	.43
940	630	Collect information through interviews	.07
941	631	Act in a line capacity	.32
942	632	Act as an expert witness	.04
943	633	Resolve difference of opinions	.08
944	634	Have complex assignment with large corp.	.13
945	635	Carry out non-technical diagnosis (unstruc.)	.03
<u>Section 3. Overall PS performance</u>			
933	639	Overall PS effectiveness of consultant	.25
<u>Section 4. Skills and credibility</u>			
910	603	Communicator - oral - person-to-person	.11
911	604	- group presentations	.21
912	605	- interact with groups	.26
913	606	- written	.41
914	607	Tactician - overcome client objections	-.02
915	608	Developer of new business	.10
916	609	Contributor to consulting firm's reputation	.16
917	610	Supervisor or project leader	-.06
918	611	Specialist consultant to other consultants	.07
919	612	Developer of consulting staff	-.07
920	613	Team effort on an assignment	.28
921	614	Ability to get client acceptance & coop.	.08
922	615	Developer of new packages	.08
923	616	Use conceptual skills to resolve problems	.08
924	617	Ability to meet deadlines	.41
925	618	Ability to work to a detailed plan	.16
926	619	Ability to operate with little supervision	.28
927	620	Ability to identify client needs	.02

APPENDIX GSUPERVISOR-CONSULTANT CORRELATIONS

(continued)

<u>Supervisor Question</u>	<u>Consultant Question</u>	<u>Question</u>	<u>Correlation (r)</u>
928	621	Come up with different approaches	.17
929	622	Clients see him as expert in field	.25
930	623	Colleagues view him as being up-to-date	.27
931	624	Respected by fellow professionals outside	.43
932	625	Contributed to advancement in field	.10

Section 5. Semantic differential

946	386	Active - reflecting	-.21
947	387	Confident - hesitant	.06
948	388	Logical - intuitive	-.18
949	389	Detached - involved	.10
950	397	Innovative - conventional	.11
951	400	Generalist - specialist	.30
952	413	Flexible - single-minded	-.18
953	414	Team-member - independent	.14
954	390	Academic - pragmatic	.09
955	394	Persuasive - unconvincing	.02
956	411	Cautious - impulsive	.26
957	420	Talker - listener	.26
958	407	Unambitious - ambitious	.23
959		Open - political	n/a
960	398	Precise - vague	.10
961	217	Unplanned - scheduled	.08
962	219	Facts - ideas	.17
963	246	Critical - uncritical	-.24
964	421	Undisciplined - disciplined	.25
965	393	Global - detailed	.31
966	423	Complex - uncomplicated	.05
967	264	Last-minute - on-time	.18
968	409	Line - staff	-.26

Section 6. Behavioural profiles

969	725	What type of approach does he use	-.14
970	726	Time allotted affect approach used	.07
971	727	What approach used in diagnosis survey	.06

Section 7. Similarity of approach

972	784	His approaches similar/different to yours	-.11
-----	-----	---	------

APPENDIX II
VALIDITY AND INTER-CORRELATIONS OF INSTRUMENTS USED IN STUDY

<u>Attribute</u>	<u>Instrument</u>	<u>Validity and Consistency</u>	<u>Correlation with Other Instruments</u>	
				<u>Expected</u>
1. Ability to reason abstractly	Abstract/concrete dimension of Kolb's LSI (Q556)	a) <u>Validity</u> (compare with super rating)	Q324 <u>logical</u> /'gut feel' evaluator	.37 x
		Q923 'strong conceptual skills'	Q325 <u>early/late</u> closer	.27
			Q322 <u>introvert/extrovert</u>	.14
		b) <u>Consistency</u> (other self-desc. items)		
		Q392 <u>people oriented/concept oriented</u>		.19
		Q399 <u>theoretical/practical</u>		.00
		Q390 <u>academic/practical</u>		-.09
2. <u>Fact-anchored/imaginative</u> conceptualizer	<u>Sensing/intuitive</u> dimension of Myers-Briggs Indicator (Q323)	a) <u>Validity</u>	Q324 <u>logical</u> /'gut feel' evaluator	.41
		Q888 <u>Composite systematic/unsystematic</u> check	Q325 <u>early/late</u> closer	.43 x
			Q382 <u>low</u> aesthetic values	.20 x
			Q509 <u>low</u> creative	.50 x
		b) <u>Consistency</u>	Q510 need for autonomy	-.26
			Q511 tolerance for ambig.	-.50 x
		Q425 <u>hard data/soft data</u>	Q513 use of quant. methods	-.23
		Q474 I am more interested in what could be than what is (A/D)	Q515 <u>line/staff</u>	.43
			Q556 <u>abstract reasoner</u>	.18
		Q392 <u>people oriented/concept oriented</u>		.31
		Q442 <u>less interested in problems decided on opinion rather than fact (A/D)</u>		.20

(A/D) = agree/disagree

VALIDITY AND INTER-CORRELATIONS OF INSTRUMENTS USED IN STUDY (continued)

<u>Attribute</u>	<u>Instrument</u>	<u>Validity and Consistency</u>	<u>Correlation With Other Instruments</u>	
		<u>r</u>	<u>r</u>	<u>Expected</u>
3. <u>Early vs late closer</u>	<u>Judging/perceiving dimension of Myers-Briggs Indicator (Q325)</u>	a) <u>Validity</u>	Q323 <u>fact-anchored/imaginat. conceptualizer</u>	.43 x
		Q961 <u>Unplanned/planned</u>	Q324 <u>logical/'gut feel' evaluator</u>	.32
		Q967 <u>last minute/on time</u>	Q509 <u>low creative</u>	.42
			Q510 <u>need for autonomy</u>	-.26
		b) <u>Consistency</u>	Q511 <u>tolerance for ambig.</u>	+.55 x
		Q617 <u>ability to meet deadlines</u>	Q514 <u>low flexibility</u>	.28
		Q680 <u>wait until last/min.</u>	Q556 <u>abstract reasoner</u>	.27
		Q697 <u>wait until have all facts</u>		
		Q411 <u>cautious/impulsive</u>		
		Q666 <u>end up survey with different model than started with (A/D)</u>		
4. <u>Flexibility</u>	<u>New (Q514)</u>	a) <u>Validity</u>	Q325 <u>early/late closer</u>	-.28 x
		Q952 <u>flexible/single minded</u>		
		b) <u>Consistency</u>		
		Q726 <u>flexible in approach</u>		-.10 ?

VALIDITY AND INTER-CORRELATIONS OF INSTRUMENTS USED IN STUDY (continued)

<u>Attribute</u>	<u>Instrument</u>	<u>Validity and Consistency</u>	<u>Correlation With Other Instruments</u>	
			<u>r</u>	<u>Expected</u>
5. Tolerance for ambiguity	New (Q511)	a) <u>Validity</u>	Q323 <u>fact-anchored/imaginat.</u>	
			conceptualizer	.50
		b) <u>Consistency</u>	Q325 <u>early/late closer</u>	.55 x
			Q515 <u>line/staff</u>	.22
6. <u>Logical/gut feel</u> evaluator (information processor)	Thinking/feeling dimension of Myers-Briggs Indicator (Q324)	Q671 I like an accepted theory or framework (A/D)	Q514 <u>high flexibility</u>	.05 x
			Q509 <u>creativity</u>	.42 x
		a) <u>Validity</u>	Q325 <u>early/late closer</u>	.32
			Q382 <u>low aesthetic values</u>	.42 x
		Q948 <u>fact-anchored/imagin.</u>	Q384 <u>high political (power) values</u>	.31
		Q949 <u>detached/involved</u>	Q509 <u>low creative</u>	.23
		b) <u>Consistency</u>	Q556 <u>abstract reasoner</u>	.37
		Q683 problems should be solved with no emotional involvement (A/D)		.35
		Q455 give more weight to financial analysis than feeling (A/D)		.03
		Q442 less interested in problems decided on opinion rather than fact (A/D)		.10
		Q87 wrong for a consultant to let his personal values influence his recommendations (A/D)		-.06

(A/D) = agree/disagree

VALIDITY AND INTER-CORRELATIONS OF INSTRUMENTS USED IN STUDY (continued)

<u>Attribute</u>	<u>Instrument</u>	<u>Validity and Consistency</u>		<u>Correlations with Other Instruments</u>	
			<u>r</u>	<u>r</u>	<u>Expected</u>
7. Creative	New (based on Raudsepp's Creativity Test) (Q509)	a) <u>Validity</u>		Q323 fact-anchored/imagin. conceptualizer	.50 x
		Q950 <u>innovative/conventional</u>	.20	Q324 logical/'gut feel' evaluator	.23
		Q928 ability to come up with a diff. approach	.03	Q325 early/late closer	.43 x
		Q922 developer of new packages	-.07	Q381 low economic values	.24
				Q382 low aesthetic values	.05
				Q510 high need for auton.	.34 x
		b) <u>Consistency</u>		Q511 high tolerance for ambiguity	.42 x
		Q621 ability to come up with a diff. approach	.09	Q513 high use of quantit.	
		Q397 <u>innovative/convent.</u>	.43	Q515 line/staff	.35
		Q429 <u>nonconformist/conform.</u>	.56		
		Q101 I introduce novel ways of doing things (A/D)	.21		
		Q650 I strive for practical rather than ingenious solutions (A/D)	.11		
8. <u>Specialist/generalist orientation</u>	New (Q895)	a) <u>Validity</u>		Q557 <u>doer/thinker</u> (Kolb)	.23
		Q951 <u>generalist/specialist</u>	.33		
		Q942 act as expert witness	.20		
		Q905 technical diagnosis	.42		
		Q907 technical prescript.	.39		
		Q918 specialist consultant to others	.35		
		b) <u>Consistency</u>			

(A/D) = agree/disagree

(nil)

VALIDITY AND INTER-CORRELATIONS OF INSTRUMENTS USED IN STUDY (continued)

<u>Attribute</u>	<u>Instrument</u>	<u>Validity and Consistency</u>		<u>Correlations with Other Instruments</u>		
			<u>r</u>		<u>r</u>	<u>Expected</u>
9. <u>Line/staff orientation</u>	New (Q515)	a) <u>Validity</u>		Q322 introvert/extrovert	.22	
				Q323 fact-anchored/imagin.		
		Q946 active/reflecting	.03	conceptualizer	.43	
		Q968 line/staff	.21	Q509 low creative	.35	
		b) <u>Consistency</u>		Q511 low tolerance for ambiguity	.22	
		Q557 doer/thinker dimen. of Kolb's LSI	.45			
		Q392 people oriented/concept oriented	.55			
10. <u>Values</u>	Allport, Vernon and Lindzey Study (modified)	Q658 look for general principles (A/D)	.27			
		Q380 <u>Theoretical</u>		Q513 use of quantitative methods	.24	x
		a) <u>Validity</u>				
		Q946 active/reflecting	.20			
		Q954 academic/pragmatic	.04			
	Q381 <u>Economic</u>	b) <u>Consistency</u>				
		Q399 theoretical/practical	.02			
		Q392 people/concept orient.	.18			
		Q658 try to find general principles (A/D)	.21			
		Q697 wait for all facts (A/D)	.20			
		a) <u>Validity</u>		Q509 low creative	.24	x
		Q954 academic/pragmatic	.23			

(A/D) = agree/disagree

VALIDITY AND INTER-CORRELATIONS OF INSTRUMENTS USED IN STUDY (continued)

<u>Attribute</u>	<u>Instrument</u>	<u>Validity and Consistency</u>	<u>Correlations with Other Instruments</u>	
		<u>r</u>	<u>r</u>	<u>Expected</u>
10. Values (continued)	Allport, Vernon and Lindzey (modified)			
	<u>Q381 Economic</u>	b) <u>Consistency</u>		
		Q399 theoretical/practical .08		
		Q437 prefer problems with large tangible benefits (A/D) .09		
		Q650 strive for a practical solution (A/D) .13		
		Q677 dollar return is the main criterion for private sector (A/D)		
	<u>Q382 Aesthetic</u>	a) <u>Validity</u>	Q323 fact-anchored/imagin. conceptualizer .20	x
		(nil)	Q324 logical/'gut feel' evaluator .42	x
		b) <u>Consistency</u>	Q556 abstract reasoner -.37	x
		(nil)	Q513 Use of quant. meth. -.36	
	<u>Q383 Social</u>	a) <u>Validity</u>	Q322 introvert/extrovert .24	x
		(nil)		
		b) <u>Consistency</u>		
		(nil)		
	<u>Q384 Political (power)</u>	a) <u>Validity</u>	Q322 introvert/extrovert .33	
		Q958 Unambitious/ambitious .23	Q324 logical/'gut feel' evaluator .31	
		Q968 line/stff .21		

VALIDITY AND INTER-CORRELATIONS OF INSTRUMENTS USED IN STUDY (continued)

<u>Attribute</u>	<u>Instrument</u>	<u>Validity and Consistency</u>		<u>Correlations with Other Instruments</u>	
			<u>r</u>	<u>r</u>	<u>Expected</u>
10. Values (continued)	Q384 <u>Political</u>	b) <u>Consistency</u>			
		Q387 <u>confident/hesitant</u>	.30		
		Q389 <u>detached/involved</u>	.25		
		Q149 <u>need to win</u>	.21		
11. Need for autonomy	New (Q510)	a) <u>Validity</u>		Q322 <u>introvert/extrovert</u>	.21
		Q953 <u>team member/indep.</u>	.02	Q323 <u>Fact-anchored/imagin.</u>	
		Q926 <u>ability to operate with</u>		conceptualizer	.26
		<u>little supervision</u>	.24	Q325 <u>early/late closer</u>	.26
		b) <u>Consistency</u>		Q384 <u>political (power)</u>	
		Q619 <u>ability to operate with</u>		values	.27
		<u>little supervision</u>	.14	Q509 <u>creativity</u>	.34 x
12. <u>Introvert/</u> <u>extrovert</u> <u>orientation</u>	<u>Introvert/extrovert</u> <u>dimension of Myers-</u> <u>Briggs Indicator</u> <u>(Q322)</u>	a) <u>Validity</u>		Q383 <u>social values</u>	.24
		Q949 <u>detached/involved</u>	.08	Q510 <u>need for autonomy</u>	.21
		Q957 <u>talker/listener</u>	.21		
		Q966 <u>complex/uncomplicated</u>	.01		
		b) <u>Consistency</u>			
		Q672 <u>empathetic</u>	.11		
		Q695 <u>client not interested</u>			
		<u>in reasons (A/D)</u>	.20		
		Q389 <u>detached/involved</u>	.23		
		Q392 <u>people/concept orient.</u>	.28		
		Q420 <u>talker/listener</u>	.40		
		Q422 <u>antisocial/social</u>	.47		
		Q426 <u>private/public</u>	.27		
		Q431 <u>inhibited/uninhibited</u>	.23		
		Q885 <u>use of business clubs</u>	.11		

VALIDITY AND INTER-CORRELATIONS OF INSTRUMENTS USED IN STUDY (continued)

<u>Attribute</u>	<u>Instrument</u>	<u>Validity and Consistency</u>		<u>Correlations with Other Instruments</u>	
			<u>r</u>	<u>r</u>	<u>Expected</u>
13. Use of quant. methods	New (Q513)	a) <u>Validity</u>		Q323 fact-anchored/imagin. conceptualizer	-.23
		Q962 facts/ideas	.20	Q325 introvert/extrovert	-.19
		Q946 active/reflecting	-.35	Q380 high theoretical values	.24 x
		(b) <u>Consistency</u>		Q382 low aesthetic values	.36
		Q681 There is a right and wrong way to resolve a problem (A/D)	.32	Q509 high creative	.22
		Q425 Hard data/soft data	-.07		
		Q455 More weight to finan. analysis (A/D)	.25		
		Q667 I tend to collect more data (A/D)	.03		
				Q515 line/staff orientat.	.45 x
14. Doer/thinker orientation	Active/reflective dimension of Kolb's LSI (Q557)	a) <u>Validity</u>			
		Q946 Active/reflecting	.00		
		Q968 line/staff	.06		
		b) <u>Consistency</u>			
		Q515 line/staff orientation	.45		
		Q386 active/reflecting	-.35		

Note: The upper descriptor of a bipolar scale is underlined.

APPENDIX I

CORRELATIONS BETWEEN FACTORS AND CONSULTANT ATTITUDES AND PS BEHAVIOUR

1. Correlations of Factor #1 - grounded /ungrounded approach to conceptualization

More detail is provided for Factor #1 to show the information available. Only significant (at .05 level) or near-significant items will be listed except where an item is of special interest.

(a) With other instruments

Question No.	Description	r
Q322	<u>introvert/extrovert</u>	.16
Q323	<u>fact anchored/imaginative conceptualizer</u>	.81
Q324	<u>logical/'gut feel' evaluator</u>	.28
Q325	<u>early/late closer</u>	.64
Q383	social values	.34
Q509	(low) creative	.67
Q510	(low) need for autonomy	.23
Q511	(low) tolerance for ambiguity	.84
Q513	(low) use of quantitative methods	.26
Q515	<u>line/staff</u>	.39
Q890	(low) persuasion	.28
Q894	business development	.28
Q982	Factor #2	--
Q983	Factor #3	--
Q888	Supervisor validity check	.27

(b) The supervisors' perceptions

Q913	communicate in writing	.15
Q915	(low) develop new business	.20
Q917	supervisory skills	.20
Q924	ability to met deadlines	.18
Q925	ability to work to a detailed plan	.19
Q948	<u>logical/intuitive</u>	.06
Q950	<u>innovative/conventional</u>	.27
Q956	<u>cautious/impulsive</u>	.39
Q960	<u>precise/vague</u>	.20
Q961	<u>unplanned/scheduled</u>	.25
Q962	<u>facts/ideas</u>	.26
Q964	<u>undisciplined/disciplined</u>	.10
Q965	<u>global/detailed</u>	.12 ?
Q967	<u>last minute/on time</u>	.22

$$r(80; .05) = .22$$

APPENDIX I (continued)

<u>Question No.</u>	<u>Description</u>	<u>r</u>
1. <u>Correlations of Factor #1 (continued)</u>		
(c) <u>Self-perceptions</u>		
(i) <u>personal attributes</u>		
Q392	people/concept oriented	.29
Q393	global/detailed	.11
Q396	disorganized/methodical	.18
Q397	innovative/conventional	.52
Q398	vague/precise	.12
Q399	theoretical/practical	.38
Q402	assertive/retiring	.29
Q403	realistic/idealistic	.34
Q408	decisive/cautious	.31
Q409	line/staff	.24
Q410	autocratic/participative	.21
Q411	cautious/impulsive	.22
Q413	flexible/single minded	.00
Q414	independent/team member	.33
Q420	talker/listener	.27
Q421	disciplined/undisciplined	.16
Q423	uncomplicated/complex	.37
Q429	non-conformist/conformist	.56
(ii) <u>task performance</u>		
Q595	technical - diagnosis	-.19
Q626	implement a well tested package	.19
Q627	manage a team	.20
Q633	help to resolve conflicting opinion	-.23
Q635	non-technical diagnostic survey	-.27
(iii) <u>interpersonal skills</u>		
Q603	communication - person-to-person	.30
Q605	communication - interact with groups	-.17
Q606	communication - written	-.28
Q608	developer of new business	-.17
Q613	team effort	.35
Q616	strong conceptual skill	-.37 ?
Q617	ability to meet deadlines	.14
Q618	ability to come up with a different (practical) solution	-.18
(iv) <u>self-perceived PS behaviour</u>		
Q455	I give more weight to financial statements than to my feelings (A/D)	.26
Q472	I would bet on the long shot (A/D)	.14
Q475	ideas sometimes come to me as from some external source (A/D)	.20

APPENDIX I (continued)

Question No.	Description	r
<u>1. Correlations of Factor #1 (continued)</u>		
Q494	I concentrate harder on what interests me than most people (A/D)	.36
Q501	a repeated presentation rarely comes out the same (A/D)	.27
Q650	I strive for practical rather than ingenious solutions (A/D)	.20
Q658	I look for general principles to apply elsewhere (A/D)	.23
Q666	I frequently end up a survey with a different assessment of a problem (A/D)	.34
Q667	I tend to collect more data than others (A/D)	.11
Q669	for complex problems there is insufficient time on a project (A/D)	.04
Q670	I work in 'fits and starts' (A/D)	.29
Q674	I consciously try to assess clients' attitudes to risk (A/D)	.25
Q679	I tend to apply solutions which have proven successful elsewhere (A/D)	.12
Q682	I rely on intuitive hunches when moving towards a solution (A/D)	.33
Q684	I usually leave lots of room in a work plan for flexibility (A/D)	.07
Q685	most of my reports make extensive use of numbers (A/D)	.01
Q690	I prefer to leave detail and implementation to others (A/D)	.08
Q693	for most interviews I prepare a list of questions which I follow closely (A/D)	.12
Q694	I prefer to spend my time building on my successes (A/D)	.15
Q697	I usually wait until I have all the facts before I draw conclusions (A/D)	.16
Q701	I find checklists useful (A/D)	.18
Q718	I use packaged solutions (A/D)	.19
(v) <u>attitudes</u>		
Q72	there is no time for research in consulting (A/D)	.23
Q73	clients should not be treated as guinea pigs (A/D)	.27
Q80	if two consultants disagree it will be about recommendations (A/D)	.16
Q459	there are one or two experienced consultants that I listen to (A/D)	.25
Q474	I am more interested in what could be than what is (A/D)	.25
Q478	punctuality is important (A/D)	.28
Q484	I am always learning new things (A/D)	.29
Q491	obedience and respect for authority are important virtues for children (A/D)	.26
Q652	most problems are first solved intuitively (A/D)	.34
Q675	there is little place in consulting for theory (A/D)	.20

APPENDIX I (continued)

<u>Question No.</u>	<u>Description</u>	<u>r</u>
<u>1. Correlations of Factor #1 (continued)</u>		
Q681	there is a right way and a wrong way to approach problems (<u>A/D</u>)	.08
Q683	problems should be solved with no emotional involvement (<u>A/D</u>)	.23
Q686	I put more weight on the need for experience than others (<u>A/D</u>)	.04
<u>2. Correlations of Factor #2 - rational/instinctive evaluator</u>		
<u>(a) With other instruments</u>		
Q323	<u>fact anchored</u> /imaginative conceptualizer	.23
Q324	<u>logical</u> /'gut feel' evaluator	.71
Q325	<u>early</u> /late closer	.43
Q382	(<u>low</u>) aesthetic values	.59
Q383	(<u>low</u>) social values	.30
Q384	political (power) values	.28
Q556	abstract reasoner	.76
Q514	(<u>low</u>) flexibility	.41
Q895	<u>specialist</u> /generalist	.22
Q888	supervisors' validity check (for grounded/ungroun.)	.24
<u>(b) The supervisors' perceptions</u>		
Q914	tactician	.27
Q915	developer of new business	.25
Q917	supervisory skills	.19
Q919	developer of staff	.23
Q921	client acceptance	.20
Q922	developer of new packages	.30
Q923	strong conceptual skills	.29
Q927	empathy	.15
Q928	different (practical) approaches	.18
Q932	contributes to advances in field	.22
Q948	<u>logical</u> /intuitive	.19
Q958	unambitious/ <u>ambitious</u>	.29
Q960	<u>precise</u> /vague	.22
Q961	unplanned/ <u>scheduled</u>	.34
Q962	<u>facts</u> /ideas	.17
Q964	undisciplined/ <u>disciplined</u>	.20
Q970	time available affects his approach (<u>A/D</u>)	.19
<u>(c) Self perceptions - personal attributes</u>		
Q388	<u>logical</u> /intuitive	.35
Q392	people/ <u>concept</u> oriented	.25
Q396	disorganized/ <u>methodical</u>	.31
Q398	vague/ <u>precise</u>	.40
Q400	generalist/ <u>specialist</u>	.20

APPENDIX I (continued)

Question No.	Description	r
<u>2. Correlations of Factor #2 (continued)</u>		
Q403	<u>realistic/idealistic</u>	.31
Q409	<u>line/staff</u>	.17
Q410	<u>autocratic/participative</u>	.22
Q411	<u>cautious/impulsive</u>	.26
Q415	<u>procrastinating/active</u>	.25
Q417	<u>do-it-yourself/delegating</u>	.28
Q421	<u>disciplined/undisciplined</u>	.34
Q422	<u>anti-social/social</u>	.26
Q425	<u>hard data/soft data</u>	.33
Q427	<u>take charge/follow</u>	.21
<u>3. Correlations of Factor #3 - line/staff orientation</u>		
<u>(a) With other instruments</u>		
Q322	<u>introvert/extrovert</u>	.53
Q325	<u>early/late closer</u>	.22
Q557	<u>doer/thinker</u>	.73
Q380	<u>theoretical values</u>	.38 ?
Q383	<u>(low) social values</u>	.33 ?
Q384	<u>political (power) values</u>	.24
Q510	<u>(low) need for autonomy</u>	.31
Q515	<u>line/staff</u>	.65
Q895	<u>specialist/generalist</u>	.17
<u>(b) The supervisors' perceptions</u>		
Q911	<u>communicator - group presentations</u>	.18
Q912	<u>communicator - interact with group</u>	.24
Q967	<u>last minute/on time</u>	.20
Q968	<u>line/staff</u>	.19
<u>(c) Self perceptions- personal attributes</u>		
Q386	<u>active/reflecting</u>	.51
Q387	<u>confident/hesitant</u>	.42
Q389	<u>detached/involved</u>	.31
Q390	<u>academic/pragmatic</u>	.36
Q391	<u>outspoken/reserved</u>	.40
Q392	<u>people/concept oriented</u>	.44
Q398	<u>vague/precise</u>	.26
Q399	<u>theoretical/practical</u>	.40
Q402	<u>assertive/retiring</u>	.33
Q405	<u>perfectionist/pragmatic</u>	.22
Q407	<u>satisfied/ambitious</u>	.18
Q408	<u>decisive/cautious</u>	.33
Q409	<u>line/staff</u>	.35
Q411	<u>cautious/impulsive</u>	.31
Q412	<u>demanding/undemanding</u>	.20

APPENDIX I (continued)

Question No.	Description	r
3. <u>Correlations of Factor #3 (continued)</u>		
Q414	<u>independent/team member</u>	.38
Q415	<u>procrastinating/active</u>	.51
Q416	<u>persistent/yielding</u>	.34
Q419	<u>tense/relaxed</u>	.24
Q420	<u>talker/listener</u>	.18
Q426	<u>private/public</u>	.25
Q427	<u>take charge/follow</u>	.24
Q431	<u>inhibited/uninhibited</u>	.28

Note: (A/D) = agree/disagree

APPENDIX J

A COMPARISON OF ATTRIBUTES RELATED TO TASK PERFORMANCE

Self Assessed vs Supervisor Assessed

Consultant Attributes (self assessed)
Selected through a Step-wise Regression
Analysis and Ranked in Order of Entry

Consultant Attributes (Supervisor
assessed) Selected by Ranking on
Magnitude of Correlation Coeff.
(See Table V.3 and pages V.8-V.10)

(a) Problem Finding Stage (Q904)

Perf. = F(+ability to meet deadlines
+Use of quantitative methods
- Factor #3
- Power
+ Factor #2
+ Business development
+ Specialist)
($R^2 = .27$)

Innovative solutions
Client credibility
Technical competence
Strong conceptual skills
Empathetic
Supervisory skills
Autonomous

(b) Problem Resolution Stage - Technical (Q905, Q907)

Perf. = F(+ Specialist *
(Q905) + Use of quantitative methods *
+ Factor #3
+ Ability to meet deadlines
+ Supervisory skills)
($R^2 = .28$)

Technical competence
Client credibility
Innovative solutions
Strong conceptual skills
Autonomous

Perf. = F(+ Specialist *
(Q907) + Use of quantitative methods *
+ Business development
+ Empathy)
($R^2 = .29$)

(c) Problem Resolution Stage - Organizational (Q906, Q908)

Perf. = F(- Factor #3
(Q906) - Persuasion
+ Tactical)
($R^2 = .07$)

Supervisory skills
Tactical
Empathy
Persuasive
Autonomous

Perf. = F(+ Power *
(Q908) - Factor #3 *
- Persuasion
+ Tactical
+ Business development
+ Use of quantitative methods)
($R^2 = .18$)

* Indicates coefficient significant at .10 level
(R^2 is the coefficient of multiple determination indicating degree of fit.)

Consultant Attributes (self assessed)
 Selected through a Step-wise Regression
Analysis and Ranked in Order of Entry

Consultant Attributes (superviso
 assessed) Selected by Ranking on
Magnitude of Correlation Coeff.

(d) Implementation Stage (Q936)

Perf. = F(+ Specialist *
 + Use of quantitative methods *
 + Factor #1)
 ($R^2 = .18$)

Ability to work to a plan
 Tactical
 Supervisory skills
 Ability to meet deadlines
 Interact with groups

Manage a Large Project (Q937)

Perf. = F(+ Supervisory skills *
 + Use of quantitative methods *
 - Power *
 + Factor #2 *
 + Factor #1)
 ($R^2 = .21$)

High supervisory skills
 High tactical
 High persuasion
 High autonomy
 Low conceptual skills

Sensitive, Political Assignment (Q938)

Perf. = F(+ age
 + use of quantitative methods)
 ($R^2 = .06$)

High organizational
 High persuasion
 High tactical
 High empathy
 Low conceptual
 Low technical

Evaluate Senior Candidates (Q939)

Perf. = + Ability to meet deadlines *
 - Factor #2 *
 + Age
 - Persuasion
 + Tactical)
 ($R^2 = .16$)

High organizational
 High empathy
 Mid tactical
 Low autonomy
 Low conceptual
 Low technical

Act in a Line Capacity (Q941)

Perf. = F(+ Power *
 + Ability to meet dealines
 + Use of quantitative methods
 + Supervisory skills
 + Factor #1)
 ($R^2 = .17$)

Mid supervisory skills
 Low organizational

* Indicates coefficient significant at .10 level
 (R^2 is the coefficient of multiple determination indicating degree of fit.)

Consultant Attributes (self assessed)
Selected through a Step-wise Regression
Analysis and Ranked in Order of Entry

Consultant Attributes (supervisor
assessed) Selected by Ranking on
Magnitude of Correlation Coeff.

Expert Witness (Q942)

Perf. = F(+ Supervisory skills *
 + Use of quantitative methods *
 + Specialist
 - Factor #3)
 ($R^2 = .15$)

High technical
 Mid conceptual
 Mid persuasion
 Low supervisory

Resolve Conflicting Opinions (Q943)

Perf. = F(+ Factor #2 * (conclusion drawing)
 + Age *
 + Supervisory skills
 - Power)
 ($R^2 = .17$)

High tactical
 High organizational
 High conceptual
 High supervisory
 Mid persuasion
 Mid empathy

Sophisticated, Within his Specialty (Q944)

Perf. = F(+ Supervision *
 + Use of quantitative methods *
 + Ability to meet deadlines *
 + Factor #3
 + Power
 - Age)
 ($R^2 = .22$)

High supervisory
 High technical
 High conceptual
 High empathy
 Mid persuasion

Unstructured, Non-technical (Q945)

Perf. = F(- Persuasion *
 + Use of quantitative methods *
 + Business development
 + Factor #2
 + Tactical)
 ($R^2 = .06$)

High organizational
 High conceptual
 High autonomy
 High tactical

Overall PS Effectiveness (Q933)

Perf. = F(+ Business development *
 + Use of quantitative methods *
 + Ability to meet deadlines *
 - Power)
 ($R^2 = .16$)

Contribution to firm's reput.
 Ability to come up with diff.
 approaches to a problem
 Supervisory ability
 Technical competence
 Empathy
 Tactics

* Indicates coefficient significant at .10 level
 (R^2 is the coefficient of multiple determination indicating degree of fit.)

Consultant Attributes (self assessed)
Selected Through a Step-wise Regression
 Analysis and Ranked in Order of Entry

Potential to Become a Partner (Q935)

Perf. = F(- Empathy *
 + Factor #2 *
 + Use of quantitative methods
 + Ability to meet deadlines)
 ($R^2 = .16$)

Consultant Attributes (superviso
 assessed) Selected by Ranking on
Magnitude of Correlation Coeff.

Supervisory ability
 General PS skill
 Autonomy
 Precise
 Contribution to firm's reput.
 Persuasive

* Indicates coefficient significant at .10 level
 (R^2 is the coefficient of multiple determination indicating degree of fit.)

APPENDIX K

CORRELATIONS BETWEEN AGE, ATTRIBUTES AND ATTITUDES (Only large r values are shown)

Question No.	Description	r
(a) <u>With other instruments</u>		
Q382	aesthetic values	.20
Q384	(low) political (power) values	.23
Q556	(low) abstract reasoner	.13
Q557	doer/thinker	.23
Q510	need for autonomy	.22
Q511	(low) tolerance for ambiguity	.15
Q513	(low) use of Q.M.	.17
Q514	(low) flexibility	.22
Q890	persuasive	.28
Q891	empathy	.20
Q892	tactical	.14
(b) <u>The supervisors' perceptions</u>		
Q923	apply strong conceptual skills	-.14
Q926	ability to operate with little supervision	.00
Q929	clients see him as an expert	.21
Q930	colleagues view him as up-to-date	.08
Q931	fellow professionals respect him	.25
Q932	he has contributed to advancements	.19
Q950	innovative/conventional	.28
Q952	flexible/single minded	.25
Q958	unambitious/ambitious	.18
Q968	line/staff	.29
Q956	cautious/impulsive	.25
(c) <u>Self perceptions</u>		
(i) <u>personal attributes</u>		
Q303	definite opinion/open mind	.22
Q390	academic/pragmatic	.24
Q401	expedient/painstaking	.23
Q407	satisfied/ambitious	.20
Q416	persistent/yielding	.22
Q418	insensitive/considerate	.19
Q428	trusting/distrusting	.30
(ii) <u>task performance</u>		
Q626	well tested package	.01
Q627	manage a project team	.20
Q628	sensitive political assignment	.37
Q629	evaluate senior candidates	.46
Q630	structured interviews	-.31
Q632	expert witness	.26
Q633	resolve conflicting opinion	.20
Q634	work on sophisticated complex problem	.17
Q635	non-technical diagnostic survey	.13

APPENDIX K (continued)

Question No.	Description	r
(iii) <u>interpersonal skills</u>		
Q619	ability to operate with little supervision	.29
Q620	empathy	.25
(iv) <u>self perceived PS behaviour</u>		
Q442	less interested in problems based on opinion (A/D)	.22
Q455	give more weight to financial data (A/D)	.20
Q467	inspiration has nothing to do with successful solutions (A/D)	.25
Q656	get a good appreciation early in assignment (A/D)	.24
Q668	one client problem much like another (A/D)	.29
Q669	there is insufficient time on most complex assignments (A/D)	.37
Q681	right or wrong way to go about it (A/D)	.31
Q682	rely on hunches (A/D)	.20
Q687	no evidence other than 'gut feel' that will work (A/D)	.19
Q692	good idea what problem is before complete survey (A/D)	.25
Q693	like structured interviews (A/D)	.27
Q694	prefer to spend time building on success (A/D)	.33
Q757	freedom to run job	.35
(v) <u>Attitudes</u>		
Q75	most consultants rely on own resources	
	- because of time and budget pressures (A/D)	.22
Q76	- because of a strong feeling of self-confidence (A/D)	.38
Q78	most consulting work is not technical in nature (A/D)	.24
Q98	role: use skills to persuade client (often/seldom)	.37
Q102	role: exchange ideas with client (often/seldom)	.44
Q106	role: take part in making decisions for client (often/seldom)	.40
Q484	I am always learning new things (A/D)	.20
Q487	people who seem unsure lose my respect (A/D)	.20
Q491	obedience and respect for authority are the most important virtues for children (A/D)	.00
Q504	I dislike grocery shopping without a list (A/D)	.27
Q640	(low) adaptation to job	.15
Q653	I feel more comfortable with a human relations problem if I can picture the individual (A/D)	.31
Q655	most business problems ought to be solved more scientifically (A/D)	.20
Q672	I have relatively little difficulty putting myself in the client's place (A/D)	.19
Q689	if mathematical techniques were better understood higher quality solutions would result (A/D)	.26
Q811	important considerations re: remain with firm - degree able to influence firm policy	.37
	degree of autonomy accorded	.19

APPENDIX L

Author's Attribute Profile

It has been said that no man can (dispassionately?) analyze his own culture. Therefore to alert the reader regarding possible areas of bias in this dissertation, the author records below his own scores on the self descriptive instruments which were used in the study.

Question No.	Description	Normalized Score $Z = (x - \bar{x}) / s$
322	Myers-Briggs IE	1.6)
323	SN	-1.6)
324	TF	1.0)
325	JP	-0.6)
380	Theoretical values	1.4
381	Economic values	0.28
382	Aesthetic values	-0.08
383	Social values	0.24
384	Political (power) values	-0.6
556	Abstract reasoner	1.1)
557	Doer/thinker	-1.7)
509	Creative	.87
510	Need for autonomy	2.0
511	Tolerance for ambiguity	1.2
513	Use of quantitative methods	1.8
514	Flexibility	-1.3
515	Line/staff	-2.1
895	Specialist/generalist	-0.1
F1	Grounded/ungrounded conceptualizer	-1.2
F2	Rational/instinctive evaluator	1.0
F3	Line/staff orientation	-2.2

APPENDIX M

CODING DETAILS

Section I.D Desirable Personal Characteristics

Codings: Very important 1
 Somewhat important 2
 Not important 3

Section II.B

Part 1:

Coding: When coding, all answers were doubled.

Section VI Personal Background

<u>Ques.2:</u>	<u>Age</u>	<u>Code</u>
	20-25	1
	26-30	2
	31-35	3
	36-40	4
	41-45	5
	46-50	6
	51+	7

<u>Ques.3a</u>	<u>No. of years</u>	<u>Code</u>
	0	1
	1-2	2
	3-5	3
	6-10	4
	11-15	5
	15+	6

<u>Ques.3b</u>	<u>Functional area</u>	<u>Code</u>
3c	%	
3d	0	1
	1-5	2
	6-10	3
	11-25	4
	26-50	5
	51-75	6
	75+	7

<u>Ques.4</u>	<u>Technical Proficiency</u>	
	None	1
	Low	2
	Medium	3
	High	4

Ques. 5 Supervisory Experience

Size of Staff Multiply 'No. of Years' by

1-5	3
6-25	15
26-100	63
over 100	120

Total the result of the multiplications, and with that number, obtain a code:

	<u>Code</u>
1-10	1
11-25	2
26-50	3
51-100	4
101-200	5
201-500	6
500+	7

Ques. 6 Education (highest degree)

	<u>Code</u>
No university	1
Bachelors	2
Masters	3
PhD other than management	4
PhD in management	5
Post doctorate	6

Have MBA	1
No MBA	2

Majors

Finance and accounting	1
Mathematics	2
Computer science	3
Physiology	4
Engineering	5
Chemistry and physics	6
Humanities and English	7
Psychology, political science, sociology, geography	8
History, marketing	9

Ques. 7 Business Experience Outside Canada

Ques. 8 Education Outside Canada

The same coding scheme was used for Questions 7 and 8 of Section VI:

- Multiply the number of years in a country by the country code (see table 1 below).
- Sum the cross products
- Convert the total using Table 2 below and enter this value as the response.

Table 1 - Country Code

U.K., Carribean, Australia	1
Europe	2
South America	3
Middle East, Asia, Africa	4

Table 2 - Conversion of total score

<u>Total Score</u>	<u>Code</u>
1	1
2	2
3-5	3
6-10	4
11-15	5
16-20	6
21-25	7
26-30	8
31+	9

Ques. 9 Military Experience (years)

None	1
1-2	2
3-5	3
6-10	4
11-15	5
15+	6

Ques.10 Sports

	<u>Code</u>
More than one team sport and no indiv. sport	1
Only one team sport	2
A combination of team and indiv. sports	3
Only one individual sport mentioned	4
More than one indiv. sport and no team sport	5
None	9

Biographical Data

Peter F. Wade

Personal

Born: Toronto, 1929

Marital status: Married, 4 children

Education

Honours B.A. (Math. and physics) - 1952, University of Toronto

M.Sc. (Informatique) - 1970, Université de Montréal

Experience

1952-53	Teacher	King's School, Ambleside, England
1954-56	Research Mathematician	Polymer Corp., Sarnia, Ontario
1956-60	Statistician	Aluminum Co. of Canada, Kingston, Ont.
1960-69	Management Consultant	Price Waterhouse, Montreal, Quebec
1969-71	Director, Information Systems	Chemcell Limited and DGE Systems, Montreal
1971-80	Management Consultant	Currie, Coopers & Lybrand, Montreal
1980-	Professor, Computer Sc.	Bishop's University, Lennoxville, Quebec

Professional Affiliations

Fellow	Royal Statistical Society
Fellow	American Society for Quality Control
Member	Canadian Operational Research Society
	Operational Research Society of Great Britain
	Operations Research Society of America
	Institute of Management Consultants of Quebec
	Institute for Management Sciences

APPENDIX N

Questionnaire No. 1: Questionnaire on Management Consulting
and Personal Approaches to Problem Solving

COLOURED PAPER
PAPIER DE COULEUR

TABLE OF CONTENTS

SECTION I - MANAGEMENT CONSULTING AS A PROFESSION

- A. Role of associations
- B. General views on consulting
- C. Role of consultant
- D. Desirable personal characteristics

SECTION II - CHARACTERISTICS OF YOUR PERSONAL STYLE

- A. Problem solving type
- B. Value preferences
- C. Personal characteristics
- D. Attitudes
- E. Learning Styles

SECTION III - CONSULTING TASKS

- A. Range of tasks encountered
- B. Ambiguity rating
- C. Task preferences
- D. Task effectiveness

SECTION IV - APPROACH TO PROBLEMS

- A. Personal problem solving style - part 1
- B. Personal problem solving style - part 2
- C. Personal problem solving style - part 3
- D. Factors detracting from project success

SECTION V - THE WORK ENVIRONMENT

- A. Workload and home life
- B. Working with others
- C. Performance feedback

SECTION VI - PERSONAL BACKGROUND

Notes and Instructions

1. Unless the instructions for a question specify a particular period of your employment or a particular assignment, please answer each question from an overall impression of your total experience with the firm. This, of course, means generalizing about many cases and combining early with recent experience.
2. Please read the instructions for each question carefully. If you are in doubt about the meaning of a question, answer as well as you can, and pencil in a note on your interpretation.
3. Try to move through the questionnaire at a fairly even pace. If you get bogged down on one question, skip it and move on; but please come back and complete your answer. The reliability of the findings depends heavily on your honestly answering each question.
4. All of your responses are confidential. Any report about prototypical patterns will be confined to composite descriptions and quantitative summaries.
5. Different firms have their own titles for parts of the consulting task and organization. For instance, the term "supervisor" is often used to denote the most immediate supervisor of a consulting team assigned to a clearly identifiable case or client. Whenever the term "consulting team" is used, I refer to the team composed of consultants, not members of the client organization. In other questions, expressions like "practice development", which have clear meaning to one firm, have been expanded with examples to help us get at a common meaning. There are doubtless other expressions which will require your own interpretation and translation.
6. I would appreciate it if you would return the completed questionnaire to me within two weeks in the self-addressed envelope I have provided.

SECTION I

MANAGEMENT CONSULTING AS A PROFESSION

A. Role of associations

1. Are you a member of an Institute or Association for management consultants? Which? 1 3 No of years as member () 2
2 5 No of years as member. () 4

2. How many meetings (other than executive or committee meetings) did you attend of this Institute in 1979? 1 () 6
2. () 7

3. In your view, is management consulting a profession? Yes ()
No () 8

Why? 9
10
11

If you are not a member of an Institute for consultants, skip to question 5.

- 4a. Do Institute exams and certification serve a useful purpose? Yes ()
No () 12

Explain 13
14

- b. What benefits have you derived from your membership in the Institute?

15
16

- c. What benefits do you feel you would like to receive?

17
18

5. Do you believe that there is a "common body of knowledge" which applies to management consulting? _____ If you do, please summarize the content below

19

6. List any other professional associations you belong to:

1	<u>21</u>	No of years	()	<u>20</u>
2	<u>23</u>	No of years	()	<u>22</u>
3	<u>25</u>	No of years	()	<u>24</u>
4	<u>27</u>	No of years	()	<u>26</u>

5. None

7. How many meetings of these associations did you attend (as a member) in 1979?

1	()	<u>28</u>
2	()	<u>29</u>
3	()	<u>30</u>
4	()	<u>31</u>

8. How many journals do you read regularly, each month?

Technical (related to your specialty)	()	<u>32</u>
General management	()	<u>33</u>
Others	()	<u>34</u>

35 9. How many hours did you spend on technical updating in 1979? (In-house or external courses or seminars related to your specialty, only) ()

36 10. How many years have you worked as an external consultant? ()

37 11. How many different consulting firms have you worked for? ()

38 12. How many years have you been with your present firm? ()

39 13. Did you ever operate on your own as a consultant? Yes ()
No ()

40 a. If yes, how old were you at the time? ()

41 b. For how long did you continue? (years) ()

14 Where did you learn the key skills and knowledge you consider valuable to you as a consultant? (Indicate approximate %)

42 a. On the job training () %

43 b. On the job "sink or swim" ()

44 c. Internal seminars ()

45 d. External seminars ()

46 e. At university ()

47 f. Previous business experience ()

48 g. Other (please indicate) _____ ()

Total: 100%

15. Describe the knowledge and skills you consider necessary to be an effective management consultant.

16. Where, and in what manner, should these subjects be taught?

- 49 17. Would you be prepared, in principle, to pass on your knowledge and experience to consultants outside your firm (e.g. through Institute courses)?

Yes ()

No ()

Maybe ()

Comments:

18. What personal traits do you consider important for an individual to be a good consultant?

19 What attracted you to consulting in the first place? Rank top three reasons ("1" for most important, etc.)

- 50-1st a. The opportunity to learn ()
51-2nd b. Variety of assignments ()
52-3rd c. The income ()
d. The exposure to potential employers ()
e. The excitement and challenge ()
f. The travel ()
g. The status ()
h. Other (describe) _____ ()

Comments:

20. When I joined consulting, I really knew little about the life of a consultant.

- 53 1. True ()
2. Not true ()
3. Partly true ()

21 How did the following sources of information rate in usefulness and accuracy about the nature of a consultant's job? Rate each source according to the following code:

- 1= extremely useful and accurate 4= slightly useful and accurate
2= very useful and accurate 5= minimally useful and accurate
3= moderately useful and accurate 6= not applicable

- 54 a. Friends in the firm ()
55 b. Friends outside the firm ()
56 c. Recruiters from the firm ()
57 d. Consultants visited at the firm during recruitment ()
58 e. Partners visited at the firm during recruitment ()
59 f. Firm literature ()
60 g. University faculty ()
61 h. Outside articles or books about consulting ()
62 i. Other (please specify) _____ ()

22. After having been a consultant, I find the life:

1. better than I expected ()
2. what I expected ()
- 63 3. somewhat worse than I expected ()
4. significantly worse than I expected ()

Comments:

23. Which aspects of consulting do you consider:

- a. Most interesting and challenging?
- b. Most stressful and/or uninteresting?

64
65
66
67
68
69
70
4. Most of my work now is: (Check one.)

1. supervisory or project management ()
2. diagnosis, conceptual design, market research, feasibility studies or corporate planning ()
3. vendor selection, detailed design, project planning or implementation of systems ()
4. other (describe) _____ ()

B. General views on consulting

Please indicate your reaction to the following statements by circling the appropriate number.

		<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
71	1. There are some situations where the operating consultant's value to a client continues to increase with his experience (i.e. a consultant with 10 years' relevant experience is worth more than a consultant with only 5 years).	1	2	3	4	5
	If you agree, can you give an example:					
72	2. In general, it is unrealistic to expect much innovation from a management consultant because:					
	a) there is no time for research	1	2	3	4	5
73	b) clients should not be treated as guinea pigs	1	2	3	4	5
	Comments:					
74	3. Most consultants tend to rely on their own resources rather than seek the advice of other consultants in the firm.	1	2	3	4	5
	This is due to:					
75	a) time and budget pressures	1	2	3	4	5
76	b) a consultant's strong feeling of self-confidence	1	2	3	4	5
77	c) a feeling that it will be interpreted as a sign of weakness	1	2	3	4	5
	Comments:					

Agree No Disagree
Strongly Agree Opinion Disagree Strongly

- 78 4. Most management consulting work is not technical in nature but requires a basic knowledge of people and how organizations function.

1 2 3 4 5

Comments:

- 79 5. An intelligent, capable, MBA with 5 years of good business experience can handle most management consulting assignments.

1 2 3 4 5

Comments:

- 80 6. If two consultants (of equal competence) are asked for their opinion about a problem, it is quite possible that their recommendations will differ significantly (in terms of the client action required).

1 2 3 4 5

Comments:

- 81 7. Given that two recommendations both pass the "test of reasonableness", there is no objective way in most situations to decide which one is better.

1 2 3 4 5

If you disagree, please explain your answer:

- 82 8. In most cases, a client, on his own, is not in a position to decide what is the best remedial action to adopt.

1 2 3 4 5

Comments:

Agree Strongly Agree No Opinion Disagree Disagree Strongly

- 83 9. The true test of the quality of a consultant's work is that the client is satisfied at the conclusion of the engagement.

1 2 3 4 5

- 84 10. If you do not agree, which criteria would you offer?

- 85 11. It is not feasible for any regulatory body to set down quality standards, which can be monitored, for consulting work.

1 2 3 4 5

If you disagree, please give some indication of how you feel this would be achieved.

- 86 12. I would expect women to make just as successful management consultants as men.

1 2 3 4 5

Comments:

- 87 13. It is wrong for a consultant to let his personal values (e.g. a strong sense of social responsibility) influence his recommendations to the client.

1 2 3 4 5

Comments:

- 88 14. Consultants in the quantitative or systems areas are under more pressure because their performance criteria are more explicit.

1 2 3 4 5

Comments:

Agree No Disagree
Strongly Agree Opinion Disagree Strongly

- 89 15. There is no place in a management consulting firm for the technical specialist (e.g. psychologist, economist, management scientist, software expert, etc.)

1 2 3 4 5

If you agree, is it because:

- 90 a) management consulting assignments generally do not need such specialists

1 2 3 4 5

- 91 b) consulting firms are not organized to accommodate the needs of specialists (e.g. career paths, technical updating, reward systems)

1 2 3 4 5

Comments:

- 92 16. Management consultants should be able to advertise their services as they wish.

1 2 3 4 5

Comments:

- 93 17. There seems to be a trend for the experienced client to hire the individual rather than the firm when he engages a consultant.

1 2 3 4 5

Comments:

- 94 18. Most clients attach some significance to the credentials CMC (Certified Management Consultant).

1 2 3 4 5

Comments:

19. On a project, the consultant with more experience in the particular area is likely to: (Check one.)

- 95
1. devote less than the budgeted number of hours to the project ()
 2. devote the budgeted number of hours but do a "better" job ()
 3. Other (specify) _____ ()

Comments:

C. Role of consultant

Every consultant behaves differently in the face of different client situations. We are interested, however, in your behaviour on your more typical engagements. Please circle the number which is most characteristic of your present behaviour.

1. I find myself in situations where:

a. I use my specialized knowledge in the solution of problems.

96 Often 1 2 3 4 5 Seldom

b. I use my skills at diagnosing and solving broad problems.

97 Often 1 2 3 4 5 Seldom

c. I use my skills at persuading the client to adopt some specific point of view or course of action.

98 Often 1 2 3 4 5 Seldom

d. My presence gives the client the confidence to carry on programs which he would not otherwise do.

99 Often 1 2 3 4 5 Seldom

e. I show the client how to go about solving problems of the type encountered should they occur again.

100 Often 1 2 3 4 5 Seldom

f. I introduce new ideas, novel ways of doing things.

101 Often 1 2 3 4 5 Seldom

g. I exchange ideas with the client and we work on the problem together.

102 Often 1 2 3 4 5 Seldom

h. I use my skills at interpreting the meaning of unfamiliar concepts.

103 Often 1 2 3 4 5 Seldom

i. I act as an objective source of information because I am familiar with a greater variety of problems and because I have no axe to grind.

104 Often 1 2 3 4 5 Seldom

- j. I help the client decide on a course of action if several alternatives look equally attractive.

105 Often 1 2 3 4 5 Seldom

- k. I take part in making decisions for the client when he wants me to do so.

106 Often 1 2 3 4 5 Seldom

- l. I motivate people to change their style of behaviour on a sustained basis.

107 Often 1 2 3 4 5 Seldom

- m. I am given a general mandate by the client to look around for everything which might be wrong.

108 Often 1 2 3 4 5 Seldom

- n. I use client personnel as much as possible to gather data and seek their participation in the development of solutions to problems.

109 Often 1 2 3 4 5 Seldom

- o. I am asked to act as a referee to help a client resolve conflicting opinions.

110 Often 1 2 3 4 5 Seldom

- p. I am engaged to manage important projects.

111 Often 1 2 3 4 5 Seldom

- q. I act as an extra resource to aid a client when his own personnel are fully utilized.

112 Often 1 2 3 4 5 Seldom

2. Please go back and circle on the foregoing list the four dimensions which you feel are most central to the consultant's job.

e.g. (m)

113

114

115

116

D. Desirable personal characteristics

1. Indicate the extent to which the following characteristics are important in consulting work.

		<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
117	1. Cooperativeness	()	()	()
118	2. Orderliness	()	()	()
119	3. Openness, spontaneity	()	()	()
120	4. Independence	()	()	()
121	5. Loyalty to my firm	()	()	()
122	6. Loyalty to clients	()	()	()
123	7. Loyalty to fellow consultants	()	()	()
124	8. Loyalty to partners	()	()	()
125	9. Drive to be the best	()	()	()
126	10. Drive for power over others	()	()	()
127	11. Satisfaction in creating something new	()	()	()
128	12. Pleasure in learning something new	()	()	()
129	13. Critical and questioning attitude toward authority	()	()	()
130	14. Sense of humor	()	()	()
131	15. Toughness, lack of sentimentality	()	()	()
132	16. Modesty	()	()	()
133	17. Personal charm	()	()	()
134	18. Idealism	()	()	()
135	19. Ability to take orders	()	()	()
136	20. Satisfaction in helping others	()	()	()
137	21. Ability to take the initiative	()	()	()

	<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
--	---------------------------	-------------------------------	--------------------------

138	22.	Self-confidence	()	()	()
139	23.	Patience	()	()	()
140	24.	Tenacity	()	()	()
141	25.	Coolness under stress	()	()	()
142	26.	Stubbornness	()	()	()
143	27.	Fairness	()	()	()
144	28.	Generosity	()	()	()
145	29.	Flexibility	()	()	()
146	30.	Open-mindedness	()	()	()
147	31.	Compassion	()	()	()
148	32.	Need for achievement	()	()	()
149	33.	Need to win	()	()	()
150	34.	Detachment	()	()	()
151	35.	Aggressiveness	()	()	()
152	36.	Pride in performance	()	()	()
153	37.	Need for recognition	()	()	()
154	38.	Efficiency	()	()	()
155	39.	Honesty	()	()	()
156	40.	Self-control	()	()	()
157	41.	Decisiveness	()	()	()
158	42.	Friendliness	()	()	()
159	43.	Energy	()	()	()
160	44.	Credibility	()	()	()

2. What is the most productive age range for consultants as "operators"? ()
 Comments:

3. Indicate the extent to which the following kinds of intellectual capacities are important in consulting work.

		<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
161	1. Concern for practical detail	()	()	()
162	2. Integrating or synthesizing ideas into an overall plan	()	()	()
163	3. Inventing new ideas	()	()	()
164	4. Awareness of others feelings	()	()	()
165	5. Attention to small details	()	()	()
166	6. Working facts into a logical order	()	()	()
167	7. Good memory for facts	()	()	()
168	8. Speed	()	()	()
169	9. Ability to dramatize (and sell) one's ideas	()	()	()
170	10. Ability to create an environment in which others work better	()	()	()
171	11. Ability to listen carefully to others	()	()	()
172	12. Mathematical ability	()	()	()
173	13. Ability to stimulate or activate others	()	()	()
174	14. Ability to sell oneself	()	()	()
175	15. Extensive vocabulary	()	()	()
176	16. Extensive technical vocabulary	()	()	()
177	17. Ability to communicate orally	()	()	()
178	18. Ability to communicate in writing	()	()	()

		<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
179	19. Ability to reach conclusions, with a minimum of information	()	()	()
180	20. Critical thinking (questioning methods and techniques that others take for granted)	()	()	()
181	21. Ability to put one's self in another's position	()	()	()
182	22. Ability to size up another's character	()	()	()
183	23. Ability to concentrate by oneself	()	()	()
184	24. Systems thinking	()	()	()
185	25. Ability to recognize good ideas	()	()	()
186	26. Ability to be critical of bad ideas	()	()	()
187	27. Imagination	()	()	()
188	28. Ability to see the whole, not merely the parts	()	()	()
189	29. Perspective or vision	()	()	()

SECTION II

CHARACTERISTICS OF YOUR PERSONAL STYLE

A. Problem solving type

The Myers-Briggs Type Indicator

The material for this instrument has been removed because of
copyright restrictions.

Information may be obtained from:

Consulting Psychologists Press

Palo Alto, California

B. Value preferencesPART IDirections

A number of statements or questions with two alternative answers are given below. Indicate your personal preferences by writing the appropriate figures in the right-hand columns, as indicated:

If you agree with alternative (a) and disagree with (b), write 3 in the first column and 0 in the second column, thus [3] [0]

If you agree with (b); disagree with (a), write [0] [3]

If you have a slight preference for (a) over (b), write [2] [1]

If you have a slight preference for (b) over (a), write [1] [2]

Do not write any other combination of figures after any questions except one of these four.

There is no time limit, but do not linger long over any one question or statement, and do not leave out any of the questions, unless you find it really impossible to make a decision.

- | | (a) | (b) |
|---|---------|---------|
| 1. The main object of scientific research should be the discovery of pure truth rather than its practical applications. (a) Yes; (b) No | 326 [] | [] 327 |
| 2. If you were a university professor and had the necessary ability, would you prefer to teach: (a) poetry; (b) chemistry and physics? | 328 [] | [] 329 |
| 3. Under circumstances similar to those of Qu. 2, would you prefer (a) economics; (b) law? | 330 [] | [] 331 |
| 4. Is a person who analyzes his emotions likely to be less sincere in his feeling than one who is not so reflective? (a) Yes; (b) No | 332 [] | [] 333 |
| 5. Do you believe that contemporary charitable policies should be curtailed because they tend to undermine individual initiative? (a) Yes; (b) No | 334 [] | [] 335 |

(a) (b)

6. In your opinion, has general progress been advanced more by: (a) the freeing of slaves, with the enhancement of the value placed on individual life; (b) the discovery of the steam engine, with the consequent industrialization and economic rivalry of European and American Countries? 336 [] [] 337
7. If you had the opportunity, and if nothing of the kind existed in the community or college where you lived, would you prefer to found: (a) a debating society; (b) a classical orchestra? 338 [] [] 339
8. At an exposition, do you chiefly like to go to the buildings where you can see: (a) automobiles; (b) scientific apparatus or chemical products? 340 [] [] 341
9. If you had some time to spend in a waiting room, and there were only these two magazines to choose from, would you prefer: (a) The Scientific American; (b) Arts and Decorations? 342 [] [] 343
10. Would you encourage your children, while at school, to: (a) try to make several teams; (b) have vocational training (supposing that they interfered with one another)? 344 [] [] 345
11. You are asked to wait for a few minutes in a strange living-room; are you more likely to judge: (a) the owner's knowledge and intellectuality as shown by the books in his book-cases; (b) his friendliness and hospitality as shown by the photographs on the walls, and the general comforts of the room? 346 [] [] 347
12. Since the class or social status to which a man belongs depends mainly upon his push and ability, it is just that a small proportion of the population should be very rich. (a) Yes; (b) No. 348 [] [] 349
13. If you were given certain topics on which to write an essay, would you choose to write about: (a) the best way to distribute one's income between, say, the necessities of life, luxuries, and savings, or (b) the personality of some close friend of yours. 350 [] [] 351

B. Value preferences continuedPART IIDirections

Each of the following situations or questions is followed by four possible attitudes or answers. Arrange these answers in the order of your personal preference from first to fourth by writing, in the left hand margin,

- [1] beside the answer that appeals to you most,
- [2] beside the answer which is next most important to you,
- [3] beside the next, and
- [4] beside the answer that least represents your interest or preference

You may think of answers which would be preferable from your point of view to any of those listed. It is necessary, however, that you make your selection from the alternatives presented, and arrange all four in order of their desirability, guessing when your preferences are not distinct. If you find it really impossible to guess your preference, omit the question.

1. Do you think that a good government should aim chiefly at -

- 352 [] a. more aid for the poor, sick, and old
- 353 [] b. the development of manufacturing and trade
- 354 [] c. introducing more ethical principles into its policies and diplomacy
- 355 [] d. establishing a position of prestige and respect among nations

2. Do you prefer a friend (of your own sex) who -

- 356 [] a. is efficient, industrious, and of a practical turn of mind
- 357 [] b. is seriously interested in thinking out his attitude toward life as a whole
- 358 [] c. possesses qualities of leadership and organizing ability
- 359 [] d. shows refinement and emotional sensitivity

3. If you lived in a small town and had more than enough income for your needs, would you prefer to -

- 360 [] a. apply it productively to industrial development
- 361 [] b. help to endow the church to which you belong
- 362 [] c. give it to a university for the development of scientific research
- 363 [] d. devote it to hospitals

4. When you go to the theatre do you, as a rule, enjoy most -

- 364 [] a. plays that treat the lives of great men
 365 [] b. ballet or similar imaginative performances
 366 [] c. plays with a theme of human suffering and love
 367 [] d. problem plays that argue consistently for some point of view

5. Assuming that you are a man with the necessary ability and that the salary for each of the following occupations is the same, would you prefer to be a -

- 368 [] a. mathematician
 369 [] b. sales manager
 370 [] c. clergyman
 371 [] d. politician

6. If you had unlimited leisure and money would you prefer to -

- 372 [] a. make a collection of fine sculptures or paintings
 373 [] b. establish a mental hygiene clinic for taking care of the maladjusted and mentally deficient
 374 [] c. aim at a senatorship, or a seat in the Cabinet
 375 [] d. enter into banking and high finance

7. Which of the following would you prefer to do during part of your next summer vacation (if your ability and other conditions would permit)

- 376 [] a. write and publish an original biological essay or article
 377 [] b. stay in some secluded part of the country where you can appreciate fine scenery
 378 [] c. go in for a local tennis or other athletic tournament
 379 [] d. get experience in some new line of business

380

385

Score

C. Personal characteristics

Please rate yourself on each of the adjective dimensions below. Circle the number in each row which is closest to the one which best describes you.

386	1.	Active	1	2	3	4	5	6	7	Reflecting
387	2.	Confident	1	2	3	4	5	6	7	Hesitant
388	3.	Logical	1	2	3	4	5	6	7	Intuitive
389	4.	Detached	1	2	3	4	5	6	7	Involved
390	5.	Academic	1	2	3	4	5	6	7	Pragmatic
391	6.	Outspoken	1	2	3	4	5	6	7	Reserved
392	7.	People oriented	1	2	3	4	5	6	7	Concept oriented
393	8.	Global	1	2	3	4	5	6	7	Detailed
394	9.	Persuasive	1	2	3	4	5	6	7	Unconvincing
395	10.	Opinionated	1	2	3	4	5	6	7	Open minded
396	11.	Disorganized	1	2	3	4	5	6	7	Methodical
397	12.	Innovative	1	2	3	4	5	6	7	Conventional
398	13.	Vague	1	2	3	4	5	6	7	Precise
399	14.	Theoretical	1	2	3	4	5	6	7	Practical
400	15.	Generalist	1	2	3	4	5	6	7	Specialist
401	16.	Expedient	1	2	3	4	5	6	7	Painstaking
402	17.	Assertive	1	2	3	4	5	6	7	Retiring
403	18.	Realistic	1	2	3	4	5	6	7	Idealistic
404	19.	Patient	1	2	3	4	5	6	7	Impatient
405	20.	Perfectionist	1	2	3	4	5	6	7	Pragmatic
406	21.	Dominating	1	2	3	4	5	6	7	Reactive
407	22.	Satisfied	1	2	3	4	5	6	7	Ambitious
408	23.	Decisive	1	2	3	4	5	6	7	Cautious
409	24.	Line	1	2	3	4	5	6	7	Staff

410	25.	Autocratic	1	2	3	4	5	6	7	Participative
411	26.	Cautious	1	2	3	4	5	6	7	Impulsive
412	27.	Demanding	1	2	3	4	5	6	7	Undemanding
413	28.	Flexible	1	2	3	4	5	6	7	Single-minded
414	29.	Independent	1	2	3	4	5	6	7	Team member
415	30.	Procrastinating	1	2	3	4	5	6	7	Active
416	31.	Persistent	1	2	3	4	5	6	7	Yielding
417	32.	Do-it-yourself	1	2	3	4	5	6	7	Delegating
418	33.	Insensitive	1	2	3	4	5	6	7	Considerate
419	34.	Tense	1	2	3	4	5	6	7	Relaxed
420	35.	Talker	1	2	3	4	5	6	7	Listener
421	36.	Disciplined	1	2	3	4	5	6	7	Undisciplined
422	37.	Anti-social	1	2	3	4	5	6	7	Social
423	38.	Uncomplicated	1	2	3	4	5	6	7	Complex
424	39.	Clear	1	2	3	4	5	6	7	Unclear
425	40.	Hard data (numbers)	1	2	3	4	5	6	7	Soft data (opinions)
426	41.	Private	1	2	3	4	5	6	7	Public
427	42.	Take charge	1	2	3	4	5	6	7	Follow
428	43.	Trusting	1	2	3	4	5	6	7	Distrusting
429	44.	Non-conformist	1	2	3	4	5	6	7	Conformist
430	45.	Sympathetic	1	2	3	4	5	6	7	Unsympathetic
431	46.	Inhibited	1	2	3	4	5	6	7	Uninhibited

Go to III.C pg. III.5

432 - 448

D. Attitudes

Please indicate your reaction to the following statements by circling the appropriate number.

	<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
449 1. It bothers me when I am unable to follow another person's train of thought.	1	2	3	4	5
450 2. People lose some measure of control when they rely on computers.	1	2	3	4	5
451 3. I really resent it when people try to tell me what to do.	1	2	3	4	5
452 4. I sometimes get a kick out of breaking the rules and doing things I'm not supposed to do.	1	2	3	4	5
453 5. I can more easily cope with set routine than constant change in my work.	1	2	3	4	5
454 6. I don't mind going "out on a limb" if I strongly believe in a principle.	1	2	3	4	5
455 7. In a stock purchase decision, I would give more weight to a careful analysis of the financial statements of the company than in my feeling about the management of the firm after interviews with them.	1	2	3	4	5
456 8. I find that I can frequently recall my dreams.	1	2	3	4	5
457 9. If computers are used properly, they will make a significant contribution to the planning and control of organizations.	1	2	3	4	5
458 10. I can get along more easily with people if they belong to about the same social and business class as myself.	1	2	3	4	5

		<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
11.	There are one or two very experienced consultants in my field that I take every opportunity to listen to.	1	2	3	4	5
459						
12.	I work under a great deal of tension.	1	2	3	4	5
460						
13.	I am often the last one to give up trying to do a thing.	1	2	3	4	5
461						
14.	I am uncomfortable in a situation where I do not know the rules of the game.	1	2	3	4	5
462						
15.	I often become so wrapped up in something I am doing that I find it difficult to turn my attention to other matters.	1	2	3	4	5
463						
16.	I usually arrange the bills in my wallet in denomination order.	1	2	3	4	5
464						
17.	Vague and impressionistic pictures really have little appeal for me.	1	2	3	4	5
465						
18.	Nothing important gets accomplished in this world unless someone sticks his neck out.	1	2	3	4	5
466						
19.	Inspiration has nothing to do with the successful solution of problems.	1	2	3	4	5
467						
20.	It is important for me to have a place for everything and everything in its place.	1	2	3	4	5
468						
21.	The most interesting life is subject to rapidly changing conditions.	1	2	3	4	5
469						
22.	I have always felt that there is a clear difference between right and wrong.	1	2	3	4	5
470						

		<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
23.	I prefer to stop and think before I act on even trifling matters.	1	2	3	4	5
471						
24.	I would rather bet 1 to 6 on a long shot than 3 to 1 on a probable winner.	1	2	3	4	5
472						
25.	It usually takes me a long time to choose a new car. I look at a variety of makes and models before coming to a decision.	1	2	3	4	5
473						
26.	I'm more interested in what could be than what is.	1	2	3	4	5
474						
27.	I sometimes feel that ideas come to me as if from some external source and that I am not directly responsible for them.	1	2	3	4	5
475						
28.	It is wise not to expect too much of others.	1	2	3	4	5
476						
29.	I have never done anything dangerous just for the thrill of it.	1	2	3	4	5
477						
30.	I believe that punctuality is a very important personal characteristic.	1	2	3	4	5
478						
31.	A question is best decided by experience not by statistics.	1	2	3	4	5
479						
32.	I definitely prefer to work under conditions where I am my own boss.	1	2	3	4	5
480						
33.	I usually check more than once to be sure that I have locked a door, put out the light or something of the sort.	1	2	3	4	5
481						
34.	I use a fixed rule for tipping.	1	2	3	4	5
482						

		<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
483	35. By digging and digging the truth is discovered.	1	2	3	4	5
484	36. I seem to be always learning new things and changing the beliefs that I once held.	1	2	3	4	5
485	37. When I am proof-reading, a lot of errors can slip by me.	1		3	4	5
486	38. I always finish tasks I start even if they are not very important.	1	2	3	4	5
487	39. People who seem unsure and uncertain about things lose my respect.	1	2	3	4	5
488	40. Organizations never seem to learn. It only takes a few years after an assignment for them to revert to their former ways of doing things.	1	2	3	4	5
489	41. If the president of an organization tells me something, I assume it to be factual.	1	2	3	4	5
490	42. Some bureaucracy is to be expected no matter what one's occupation.	1	2	3	4	5
491	43. Obedience and respect for authority are the most important virtues children should learn.	1	2	3	4	5
492	44. Science has its place but there are many important things that can never be understood by the human mind.	1	2	3	4	5
493	45. Nowadays, more and more people are prying into matters that should remain personal and private.	1	2	3	4	5
494	46. I concentrate harder on whatever interests me than do most people.	1	2	3	4	5

		<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
47.	I occasionally voice opinions in groups that seem to turn some people off.	1	2	3	4	5
495						
48.	I tend to rely more on my first impressions and feelings when making judgments than on a detailed analysis of the situation.	1	2	3	4	5
496						
49.	When someone tries to get ahead of me in a line of people, I usually point it out to him.	1	2	3	4	5
497						
50.	I usually work things out for myself rather than get someone to show me.	1	2	3	4	5
498						
51.	During my youth, I frequently had a desire to be alone and to pursue my own interests and thoughts.	1	2	3	4	5
499						
52.	Things that are obvious to me are not so obvious to others.	1	2	3	4	5
500						
53.	If I have to give the same presentation several times, it rarely comes out the same.	1	2	3	4	5
501						
54.	I make most of my repetitive decisions on an "ad hoc" basis rather than by following rules.	1	2	3	4	5
502						
55.	I am distinctly a "morning" (rather than an "evening") person.	1	2	3	4	5
503						
56.	I dislike going grocery shopping without a list.	1	2	3	4	5
504						

57. In communicating with others, I may: (Rank from "1" to "4", using "1" for the ending which best fits you.)

505 a. express unintended boredom with talk that is too detailed ()

506 b. convey impatience with those who express ideas that they have obviously not thought through carefully ()

507 c. show little interest in thoughts and ideas that exhibit little or no originality ()

508 d. tend to ignore those who talk about long-range implications and direct my attention to what needs to be done right now. ()

E. Learning style (KOLB'S Learning Style Inventory)

This inventory is designed to assess your method of learning. As you take the inventory, give a high rank to those words which best characterize the way you learn and a low rank to the words which are least characteristic of your learning style.

You may find it hard to choose the words that best describe your learning style, because there are no right or wrong answers. Different characteristics described in the inventory are equally good. The aim of the inventory is to describe how you learn, not to evaluate your learning ability.

Directions

There are nine rows of four words listed below. Rank order the set in each row, assigning a "1" to the word which best characterizes your learning style, a "2" to the next most characteristic word, a "3" to the next most characteristic, and a "4" to the word which is least characteristic of you as a learner. Be sure to assign a different rank number to each of the four words in each set. Do not make ties.

Remember: Rank order across the rows, not down the columns.

- | | | | | | | | | |
|-----|----|----------------------|-----|-----------------|-----|-----------------------|-----|---------------------|
| 516 | 1. | ___ discriminating | 517 | ___ tentative | 518 | ___ involved | 519 | ___ practical |
| 520 | 2. | ___ receptive | 521 | ___ relevant | 522 | ___ analytical | 523 | ___ impartial |
| 524 | 3. | ___ feeling | 525 | ___ watching | 526 | ___ thinking | 527 | ___ doing |
| 528 | 4. | ___ accepting | 529 | ___ risk-taker | 530 | ___ evaluative | 531 | ___ aware |
| 532 | 5. | ___ intuitive | 533 | ___ productive | 534 | ___ logical | 535 | ___ questioning |
| 536 | 6. | ___ abstract | 537 | ___ observing | 538 | ___ concrete | 539 | ___ active |
| 540 | 7. | ___ present-oriented | 541 | ___ reflecting | 542 | ___ future-oriented | 543 | ___ pragmatic |
| 544 | 8. | ___ experience | 545 | ___ observation | 546 | ___ conceptualization | 547 | ___ experimentation |
| 548 | 9. | ___ intense | 549 | ___ reserved | 550 | ___ rational | 551 | ___ responsible |

552

↓

557

} SCORE

SECTION III

CONSULTING TASKS

A. Range of tasks encountered

1. During the past 12 months, to what extent did you devote time to the following tasks? Try to estimate as a %.

<u>Task description</u>	<u>%</u>
558 a. Developing new business.	()
559 b. Gathering data from clients (e.g. interviews, attending client meetings, etc.).	()
560 c. Researching records or articles (e.g. client, industry, consulting firm records).	()
561 d. Analysing data.	()
562 e. Planning consulting strategy with your supervisor.	()
563 f. Writing reports and preparing presentations.	()
564 g. Helping the client with the implementation of recommendations.	()
565 h. Internal administration (e.g. filling out time sheets and other internal paperwork, staff meetings, etc.)	()
566 i. Practice development (preparing articles or making presentations to associations, etc.).	()
567 j. Professional development (attendance at seminars or courses).	()
568 k. Other (please specify). _____	()
Total: 100%	
569 2. What is the average number of assignments (client firms) you work with in a year? (Do not count proposals)	()
570 3. How many assignments do you generally work on at the same time?	()
4. Most of your clients are: (check one)	
571 1. Government agencies or groups	()
2. Non-profit institutions (e.g. hospitals or schools)	()
3. Profit-oriented businesses	()
4. A fairly balanced mix of (1) and (3) or (2) and (3)	()

5. What kind of variety do you encounter in your assignments? (In terms of the nature of the problem). (Check one).

- 572
1. Very little variety ()
 2. Little ()
 3. Moderate ()
 4. Great variety ()
 5. Very great variety ()

6. Which functional areas are you most frequently associated with in your assignments? (Check one).

- 573
- | | |
|---------------------------|---------------------------------|
| 1. Marketing () | 5. Corp. or policy planning () |
| 2. Production () | 6. General management () |
| 3. Finance/Control () | 7. Data processing () |
| 4. Personnel/Training () | 8. A general mix () |
| | 9. Other (specify) _____ () |

7. In evaluating the attractiveness of a project, which of the following aspects are important to you? (Assign a "1" to each of your three top concerns, and a "3" to your three least concerns).

- 574
575
576
577
578
579
1. The contribution which experience with the proposed project will make to your firm's range of services. ()
 2. The potentialities for publication which might arise with the new project. ()
 3. The risks which could be incurred as a result of your lack of experience with a project of this nature. ()
 4. The possibility of a conflict of interest because of other work your firm is currently engaged in. ()
 5. The possibility that a number of employees may have to be let go as a result of your recommendations. ()
 6. The chance to work in an important/interesting area to which you have never been exposed. ()
 7. The risks which you and your firm are incurring because of the difficult (e.g. political) nature of the assignment. ()
 8. The contribution of the project to your firm's over-all image for quality and innovation. ()
 9. The development of a model or package which will be applicable to a number of other clients. ()
 10. The location of the client and the distance from your home office. ()

B. Ambiguity rating

Indicate the degree of uncertainty which you feel is generally inherent in each of the activities listed below. (Think of a typical case and use this as your frame of reference.)

1. Developing new business - The initial work concerned with obtaining an extension with same client or obtaining new engagement

580 Demands of the task are very clear in most instances. 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances.

2. Carrying out the preliminary survey - Determining the real problem

581 Demands of the task are very clear in most instances. 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances.

3. Writing the proposal - Estimating consulting resource requirements

582 Demands of the task are very clear in most instances. 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances.

4. Writing the proposal - Estimating potential client benefits

583 Demands of the task are very clear in most instances. 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances.

5. Operating on the assignment - Formulating a diagnosis
(Putting together the facts which seem relevant to the case.)

584 Demands of the task are very clear in most instances. 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances.

6. Operating on the assignment - Finding a solution

585 Demands of the task are very clear in most instances. 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances.

7. Operating on the assignment - Judging whether the benefits are worth the costs from the client's viewpoint

586 Demands of the task are very clear in most instances 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances

8. Supervising the assignment

587 Demands of the task are very clear in most instances 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances

9. Helping client with implementation of recommendations

588 Demands of the task are very clear in most instances 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances

10. Internal administration (obtaining staff, billing client, etc.)

589 Demands of the task are very clear in most instances 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances

For Data Processing Consultants, only

11. Carrying out a feasibility study

590 Demands of the task are very clear in most instances 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances

12. Selecting a vendor (software or hardware)

591 Demands of the task are very clear in most instances 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances

13. Developing a conceptual design for a system

592 Demands of the task are very clear in most instances 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances

14. Developing the detailed design, programming etc.

593 Demands of the task are very clear in most instances 1 2 3 4 5 6 7 Demands of the task are not at all clear in most instances

C. Task preferences

Please indicate your reaction to the following statements by circling the appropriate number.

	<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
432 1. I mainly prefer problems which will help <u>increase my technical experience and reputation.</u>	1	2	3	4	5
433 2. I prefer assignments where I can be fairly sure of <u>some acceptable results</u> even if they are not spectacular.	1	2	3	4	5
434 3. I prefer assignments which permit me to concentrate in a <u>few selected areas.</u>	1	2	3	4	5
435 4. I have trouble applying myself to problems which I find repetitive or uninteresting.	1	2	3	4	5
436 5. I get more pleasure working in <u>unfamiliar situations</u> than I do from working in situations I am used to.	1	2	3	4	5
437 6. I mainly prefer problems with <u>large tangible benefits</u> for the client.	1	2	3	4	5
438 7. If given the choice, I would prefer to give a technical talk to a group of colleagues rather than a more general address to a group of business managers.	1	2	3	4	5
439 8. A problem has little attraction for me if I don't think I can do something about it.	1	2	3	4	5
440 9. If I were in business I would prefer a <u>staff</u> to a <u>line</u> position.	1	2	3	4	5

	<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
441 10. I enjoy working on complex and ill-defined problems.	1	2	3	4	5
442 11. I seem to be less interested in problems which are decided mainly on people's opinions rather than on facts and analysis.	1	2	3	4	5
443 12. I dislike writing reports.	1	2	3	4	5
444 13. I enjoy trying to convince a client that my course of action is better than the one he favours.	1	2	3	4	5
445 14. For most projects, I would prefer to supervise other consultants rather than do the work myself.	1	2	3	4	5
446 15. For me, the business development side of consulting is one of its more interesting aspects.	1	2	3	4	5
447 16. I like to work on more than one problem at a time.	1	2	3	4	5
448 17. If you agreed, up to how many concurrent assignments are you comfortable with?				()	

D. Task effectiveness

Please indicate your reaction to the following statements by circling the appropriate number.

		<u>Exceptional</u>	<u>Above Average</u>	<u>Average</u>	<u>Below Average</u>	<u>Weak</u>	<u>Don't Know</u>
1.	A. How would you assess your general performance for the following stages of an assignment:						
594	a) in identifying problems that were not specified in Terms of Reference	5	4	3	2	1	0
	b) in diagnosing complex problems:						
595	i) technical	5	4	3	2	1	0
596	ii) organizational	5	4	3	2	1	0
	c) in prescribing (developing workable solutions)						
597	i) technical aspects	5	4	3	2	1	0
598	ii) organizational	5	4	3	2	1	0
599	d) in obtaining acceptance for your recommendations	5	4	3	2	1	0

Comments:

B. Please circle the three stages that you would most enjoy from question 1. e.g. ①

600

601

602

		<u>Exceptional</u>	<u>Above Average</u>	<u>Average</u>	<u>Below Average</u>	<u>Weak</u>	<u>Don't Know</u>
2.	What is your assessment of your effectiveness in the following capacities:						
	a) communicator						
	i) oral						
603	- person to person	5	4	3	2	1	0
604	- group presentations	5	4	3	2	1	0
605	- interact with groups	5	4	3	2	1	0
606	ii) written	5	4	3	2	1	0
	b) tactician (able to anticipate and overcome potential client objections)	5	4	3	2	1	0
607							
	c) developer of new business	5	4	3	2	1	0
608							
	d) contributor to the consulting firm's reputation	5	4	3	2	1	0
609							
	e) supervisor or project leader	5	4	3	2	1	0
610							
	f) specialist consultant to other consultants	5	4	3	2	1	0
611							
	g) developer of consulting staff	5	4	3	2	1	0
612							
	h) contributor to team effort on an assignment	5	4	3	2	1	0
613							
	i) ability to get client acceptance and co-operation	5	4	3	2	1	0
614							
	j) developer of new packages or new areas of the practice	5	4	3	2	1	0
615							
	k) ability to apply strong conceptual skills to resolve complex problems	5	4	3	2	1	0
616							

		<u>Exceptional</u>	<u>Above Average</u>	<u>Average</u>	<u>Below Average</u>	<u>Weak</u>	<u>Don't Know</u>
617	l) ability to meet deadlines, stay within budgets, etc.	5	4	3	2	1	0
618	m) ability to work to a detailed work plan	5	4	3	2	1	0
619	n) ability to operate with little supervision	5	4	3	2	1	0
620	o) ability to identify clients needs	5	4	3	2	1	0
621	p) ability to come up with a different (practical) approach to a problem	5	4	3	2	1	0

Comments:

		<u>Agree Strongly</u>	<u>Agree</u>	<u>No Opinion</u>	<u>Disagree</u>	<u>Disagree Strongly</u>
3.	How do you view yourself on the <u>technical</u> level:					
622	a) clients see you as an expert in your field	1	2	3	4	5
623	b) colleagues view you as being up-to-date in your field	1	2	3	4	5
624	c) you are respected by fellow professionals in your specialty (outside the firm)	1	2	3	4	5
625	d) you have contributed to advancements in your field	1	2	3	4	5

Comments:

4. A variety of assignments are given below. Try to assess your suitability for each.

	<u>Very Suitable</u>	<u>Suitable</u>	<u>Not very Suitable</u>	<u>Probably Unsuitable</u>	<u>Don't Know</u>
626 a) implement a well tested and documented package in your area	4	3	2	1	0
627 b) manage a large project team comprising client and consultant staff	4	3	2	1	0
628 c) handle an assignment which has sensitive, political, aspects - such as getting members of a family business to agree to hire an outside general manager	4	3	2	1	0
629 d) evaluate candidates for a senior executive position	4	3	2	1	0
630 e) collect information through structured interviews	4	3	2	1	0
631 f) act in a line capacity for a period, to help a client over a staffing problem	4	3	2	1	0
632 g) act as an expert witness in a court case	4	3	2	1	0
633 h) help to resolve a problem where there are several different opinions among the senior executives and there is no time to gather relevant facts	4	3	2	1	0
634 i) work with large corporations with sophisticated staff on a complex problem in your field	4	3	2	1	0

4. Continued

Very <u>Suitable</u>	<u>Suitable</u>	Not very <u>Suitable</u>	Probably <u>Unsuitable</u>	Don't <u>Know</u>
-------------------------	-----------------	-----------------------------	-------------------------------	----------------------

- 635 j) carry out a diagnostic survey in a difficult (non technical) area where you have had no direct experience

4	3	2	1	0
---	---	---	---	---

Comments:

- 636 5. Circle the three assignments which you would most enjoy from question
637 4. e.g. (e)
638

6. Compared to colleagues with the same title, how do you rank yourself in terms of:

- a) effectiveness as a consultant. (Consider only the aspects related to problem solving and achieving change.)

far above <u>average</u>	{ somewhat above <u>average</u>	slightly above <u>average</u>	slightly below <u>average</u>	slightly below <u>average</u>	slightly below <u>average</u>	far below <u>average</u>
--------------------------------	---------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	--------------------------------

7	6	5	4	3	2	1
---	---	---	---	---	---	---

- b) degree of adaptation to the job (i.e. the extent to which you feel comfortable with the match between your expectations and those of the consulting firm.)

far above <u>average</u>	slightly above <u>average</u>	slightly above <u>average</u>	slightly below <u>average</u>	slightly below <u>average</u>	slightly below <u>average</u>	far below <u>average</u>
--------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	--------------------------------

7	6	5	4	3	2	1
---	---	---	---	---	---	---

7. List the three most important criteria used in making your above judgments.

- a) Effectiveness

641 1. _____
642 2. _____
643 3. _____

- b) Adaptation

644 1. _____
645 2. _____
646 3. _____

8. Regarding the future, I have often thought about: (Rank up to three using "1" for most important).

1. Going into the academic or research world. ()
2. Starting up my own business (non-consulting). ()
3. Becoming a senior executive in a large corporation. ()
4. Finding a senior position in government. ()
5. Moving into the political world. ()
6. Progressing up the consulting ladder with a large firm. ()
7. Continuing as an operating management consultant with, perhaps, more autonomy. ()
8. Getting into a more technical area (e.g. computer hardware or software, psychological testing, economic forecasting, etc.). ()
9. Moving to industry in a staff role. ()
10. Other (specify) _____ ()

647 - 1st

648 - 2nd

649 - 3rd

SECTION IVAPPROACH TO PROBLEMSA. Personal problem solving style - part 1

Please indicate your reaction to the following statements by circling the appropriate number.

- | | <u>Agree</u>
<u>Strongly</u> | <u>Agree</u> | <u>No</u>
<u>Opinion</u> | <u>Disagree</u> | <u>Disagree</u>
<u>Strongly</u> |
|---|---------------------------------|--------------|-----------------------------|-----------------|------------------------------------|
| 1. I typically strive for the most practical solution rather than an ingenious one. | 1 | 2 | 3 | 4 | 5 |

650 Comments:

- | | | | | | |
|--|---|---|---|---|---|
| 2. The way to understand complex problems is to be concerned with their larger aspects instead of breaking them into pieces. | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

651 Comments:

- | | | | | | |
|---|---|---|---|---|---|
| 3. Many problems are first solved intuitively and then data are gathered to support the solution. | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

652 Comments:

- | | | | | | |
|---|---|---|---|---|---|
| 4. I feel much more comfortable discussing a human relations problem if I can picture the individuals involved. | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

653 Comments:

Agree	No	Disagree
<u>Strongly</u>	<u>Opinion</u>	<u>Strongly</u>
	<u>Agree</u>	<u>Disagree</u>

5. Before learning how others have resolved a problem, I like to think it through myself.

1 2 3 4 5

654 Comments:

6. Most business problems ought to be solved more scientifically than they are now.

1 2 3 4 5

655 Comments:

7. I find that I am able to develop a good appreciation of most problems very early in the assignment.

1 2 3 4 5

656 Comments:

8. When I get involved in technical detail I do not understand, I usually try to assess the credibility of the informant.

1 2 3 4 5

657 Comments:

9. On each assignment, I try to find general principles that I can apply elsewhere.

1 2 3 4 5

658 Comments:

10. The initial Terms of Reference rarely seem to describe the assignment which follows.

1 2 3 4 5

659 Comments:

- | | <u>Agree</u>
<u>Strongly</u> | <u>Agree</u> | <u>No</u>
<u>Opinion</u> | <u>Disagree</u> | <u>Disagree</u>
<u>Strongly</u> |
|---|---------------------------------|--------------|-----------------------------|-----------------|------------------------------------|
| 11. In fact-finding it is very dangerous to accept routine client reports at their <u>face value</u> . | 1 | 2 | 3 | 4 | 5 |
| 660 Comments: | | | | | |
| 12. In general, it is easier to discover what is wrong in a particular situation than to identify the remedial action best suited to the particular client. | 1 | 2 | 3 | 4 | 5 |
| 661 Comments: | | | | | |
| 13. Most clients are in a position to define their needs when they engage a consultant: | | | | | |
| 662 a) large companies (over 500 employees) | 1 | 2 | 3 | 4 | 5 |
| 663 b) medium companies (50-500 employees) | 1 | 2 | 3 | 4 | 5 |
| 664 c) small companies (under 50 employees) | 1 | 2 | 3 | 4 | 5 |
| Comments: | | | | | |
| 14. Most superior consulting work results from a <u>team</u> rather than an <u>individual</u> approach. | 1 | 2 | 3 | 4 | 5 |
| 665 Comments: | | | | | |
| 15. I find that I frequently end up a survey (diagnostic phase) with an assessment of the problem quite different from the one I started with. | 1 | 2 | 3 | 4 | 5 |
| 666 Comments: | | | | | |

	<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
--	---------------------------------	--------------	-----------------------------	-----------------	------------------------------------

16. During an assignment, I tend to collect more data than other consultants.

1	2	3	4	5
---	---	---	---	---

667. Comments:

17. In a particular functional area, I find one client problem is much like another.

1	2	3	4	5
---	---	---	---	---

668. Comments:

18. For most complex problems there is insufficient time on a project to give adequate attention to all the factors that should be evaluated.

1	2	3	4	5
---	---	---	---	---

669. Comments:

19. I tend to work in "fits and starts" (rather than steadily) even when I am under pressure.

1	2	3	4	5
---	---	---	---	---

670. Comments:

20. I like to have some accepted theory or framework to refer to when I am developing my recommendations.

1	2	3	4	5
---	---	---	---	---

671. Comments:

21. I have relatively little difficulty putting myself in the client's place when deciding if an action is worth taking.

1	2	3	4	5
---	---	---	---	---

672. Comments:

	Agree <u>Strongly</u>	Agree	No <u>Opinion</u>	Disagree	Disagree <u>Strongly</u>
--	--------------------------	-------	----------------------	----------	-----------------------------

22. When making changes I believe in evolution rather than revolution.

1	2	3	4	5
---	---	---	---	---

673

Comments:

23. In selecting a course of action I consciously try to assess the client's attitude to risk.

1	2	3	4	5
---	---	---	---	---

674

Comments:

24. There is little place in management consulting for theory. Experience will tell us what will work and what will not.

1	2	3	4	5
---	---	---	---	---

675

Comments:

25. It is the consultant's responsibility to present the client with at least two alternative courses of action in any assignment.

1	2	3	4	5
---	---	---	---	---

676

Comments:

26. In essence, dollar return is the criterion for motivating any client change in the private sector.

1	2	3	4	5
---	---	---	---	---

677

Comments:

27. I enjoy finding loopholes and contradictions in previous efforts to solve a problem.

1	2	3	4	5
---	---	---	---	---

678

Comments:

Agree No Disagree
Strongly Agree Opinion Disagree Strongly

28. Where possible I try to apply solutions which have proven successful elsewhere.

1 2 3 4 5

679 Comments:

29. I usually wait until the last minute before trying to meet a deadline.

1 2 3 4 5

680 Comments:

30. In every problem there is a right way and a wrong way to go about resolving it.

1 2 3 4 5

681 Comments:

31. I rely on intuitive hunches and the feeling of "rightness" or "wrongness" when moving toward the solution of a problem.

1 2 3 4 5

682 Comments:

32. Problems should be solved without any emotional involvement.

1 2 3 4 5

683 Comments:

33. When I draw up a work program, I usually leave lots of room for flexibility in approach.

1 2 3 4 5

684 Comments:

Agree No Disagree
Strongly Agree Opinion Disagree Strongly

34. Most of my reports include extensive use of numbers either in the form of graphs or tables.

1 2 3 4 5

685

Comments:

35. I find that I tend to put more weight on the need for experience in a problem area than do others in the firm.

1 2 3 4 5

686

Comments:

36. In making recommendations, I often have no evidence, other than "gut" feel, that my project will work.

1 2 3 4 5

687

Comments:

37. I like to bring about order and simplicity in chaotic and complex situations.

1 2 3 4 5

688

Comments:

38. If mathematical techniques were better understood by managers, higher quality solutions could be developed.

1 2 3 4 5

689

Comments:

- | | <u>Agree</u>
<u>Strongly</u> | <u>Agree</u> | <u>No</u>
<u>Opinion</u> | <u>Disagree</u> | <u>Disagree</u>
<u>Strongly</u> |
|---|---------------------------------|--------------|-----------------------------|-----------------|------------------------------------|
| 690 39. I prefer to map out the broad features of a complex assignment leaving the detail and implementation to others. | 1 | 2 | 3 | 4 | 5 |
| Comments: | | | | | |
| 691 40. I believe that the primary role of the consultant is to help the client find his own answers rather than act as the expert. | 1 | 2 | 3 | 4 | 5 |
| Comments: | | | | | |
| 692 41. I usually have a pretty good idea of what the problem is well before I complete the diagnostic survey. | 1 | 2 | 3 | 4 | 5 |
| Comments: | | | | | |
| 693 42. For most interviews, I find it helpful to prepare a list of questions beforehand which I tend to follow closely. | 1 | 2 | 3 | 4 | 5 |
| Comments: | | | | | |
| 694 43. I prefer to spend my time building on my more successful assignments rather than finding the reasons for my less successful projects. | 1 | 2 | 3 | 4 | 5 |
| Comments: | | | | | |

- | | <u>Agree</u>
<u>Strongly</u> | <u>Agree</u> | <u>No</u>
<u>Opinion</u> | <u>Disagree</u> | <u>Disagree</u>
<u>Strongly</u> |
|---|---------------------------------|--------------|-----------------------------|-----------------|------------------------------------|
| <p>44. The client is interested mostly in the consultant's recommendations and not in the reasoning process which led up to them.</p> <p>695</p> <p>Comments:</p> | 1 | 2 | 3 | 4 | 5 |
| <p>45. I find a bar chart more useful than a network diagram (CPM) in planning most complex assignments.</p> <p>696</p> <p>Comments:</p> | 1 | 2 | 3 | 4 | 5 |
| <p>46. I usually wait until I have all of the facts before I start trying to draw conclusions.</p> <p>697</p> <p>Comments:</p> | 1 | 2 | 3 | 4 | 5 |
| <p>47. A consultant can effectively manage a complex, technical project in which he is not familiar with the technical concepts involved.</p> <p>698</p> <p>Comments:</p> | 1 | 2 | 3 | 4 | 5 |
| <p>48. Getting the client to adopt the consultant's recommendations is the consultant's most important task.</p> <p>699</p> <p>Comments:</p> | 1 | 2 | 3 | 4 | 5 |
| <p>49. I usually dictate my reports.</p> <p>700</p> <p>Comments:</p> | 1 | 2 | 3 | 4 | 5 |
| <p>50. I find checklists very helpful.</p> <p>701</p> | 1 | 2 | 3 | 4 | 5 |

Agree		No		Disagree
<u>Strongly</u>	<u>Agree</u>	<u>Opinion</u>	<u>Disagree</u>	<u>Strongly</u>

51. I believe that there are certain principles of good management which are applicable in almost all situations.

1 2 3 4 5

If you agree, give 2 or 3 examples.

702

52. When faced with a problem in a technical area I am not familiar with, I will tend to: (check one)

1. rely on my own experience and approach to resolve the problem ()
2. seek the judgment of technical experts within my firm. ()
- 703 3. turn over the assignment responsibility to another consultant ()
4. other (please specify) _____ ()

Comments:

53. When selecting an alternative solution to recommend to a client, I usually: (check one)

1. try to put myself in the client's shoes ()
2. do what I think is best ()
- 704 3. find there is usually only one alternative by the time I have completed my analysis ()
4. other (please specify) _____ ()

Comments:

B. Personal problem solving style - part 2

1. Suppose you discovered that the time for a project was insufficient to carry it out as you originally planned, and the client will not authorize an extension. Which of the following steps would you be most likely to take? Least likely? (Check up to three in each column.)

		<u>Most Likely</u>	<u>Least Likely</u>
<u><u>MOST LIKELY</u></u>	1) Cut back on your aspirations regarding the scope of the assignment or the range of the recommendations, while adhering to the terms of reference.	()	()
705			
706			
707			
<u><u>LEAST LIKELY</u></u>	2) Try to work faster.	()	()
708	3) Stick to the original objectives, but do not charge the overrun to the client (work at nights, weekends, etc.)	()	()
709			
710	4) Reduce the time devoted to fact finding.	()	()
	5) Reduce the time devoted to analysis.	()	()
	6) Instead of tailoring a solution specific to the client, recommend one which worked in a similar situation.	()	()
	7) Spend less time on communications with the client, pre-testing the recommendations.	()	()
	8) Spend less time on the report.	()	()
	9) Other (describe) _____	()	()

Comments:

2. In your consulting assignments, what are the most frequent sources of your proposed solutions? (Rank top three, "1" being most important.)

		<u>Rank</u>
711	1) Text books and articles describing how others have approached such problems.	()
712	2) Advice from colleagues and outside contacts.	()
713	3) Reports in your firm library describing similar engagements.	()
	4) Professors of your acquaintance.	()

(Continued on next page.)

2. Continued

- 5) Mostly your own experience. ()
- 6) Your supervisor. ()
- 7) Other (please describe) _____ ()

3. In what circumstances do you get your best ideas? (Check top four and underline choice in parentheses as appropriate).

- 714 1) While working alone in your office (writing, calculating, designing, relaxing). ()
- 715 2) In conversation with one other person (client, fellow consultant); (formal conversation, informal conversation). ()
- 716 3) In meetings with a number of people (problem-solving sessions, presentations). ()
- 717 4) While working with equipment. ()
- 5) While working with sales people. ()
- 6) While reading (technical journals, operating manuals, about competitors). ()
- 7) While driving. ()
- 8) During sports events (spectator, participant). ()
- 9) While eating. ()
- 10) While walking. ()
- 11) In bed (during the night, napping, dreaming). ()
- 12) While watching TV. ()
- 13) While listening to music. ()
- 14) Other (describe) _____ ()

Frequently Sometimes Rarely Not at All —

- 718 4. To what extent do you find you can apply packaged techniques or solutions already developed by you or your firm?

4 3 2 1

		<u>Frequently</u>	<u>Sometimes</u>	<u>Rarely</u>	<u>Not at All</u>
5.	To what extent do you use quantitative methods in your work?				
719	- regression analysis	4	3	2	1
720	- linear programming	4	3	2	1
721	- statistical forecasting	4	3	2	1
722	- other statistical packages	4	3	2	1
723	- simulation	4	3	2	1
724	- financial modelling	4	3	2	1

C. Personal problem solving style - part 3

1. Fact-finding styles

Two approaches to a diagnostic survey are given below. You are asked to decide if either (or both) in some way describe(s) the approach you use.

Approach A

The individual with approach A is able to prepare and follow a detailed work plan which defines the nature of the information sought, the source of the information, and the order in which it will be gathered.

Such an individual has often made an initial classification of the problem (and the likely range of solutions) which he will retain unless subsequent information causes him to discard it. In the latter case, he will select a new model, revise the work plan and continue in an iterative fashion. In the process he gives early attention not only to the formulation of the problem but to the criteria (implicit or explicit) which will determine a "satisfactory" outcome.

He frequently uses checklists and carries out structured, rather than unstructured, interviews. One of the features of this approach is a fairly clear appreciation, at any time of:

- the information remaining to be gathered, and
- the conclusions which the individual feels are warranted at that stage,

These are usually advanced with relative confidence.

The process of fact-finding (and analysis) is terminated when a conclusion has been formulated satisfying the initial criteria or time runs out. There are rarely any major surprises in the final conclusions and any overruns of time are foreseen relatively early in the process.

Approach B

The individual with approach B resists a detailed work plan. He may prepare one if asked to but afterwards he pays little attention to it. He is usually unable to articulate the schema or model he is following when fact gathering. To an outside observer, he appears to operate by evaluating the information as it comes in before deciding what to do next. His mode is acquisitive, as he seeks to collect a wide range of data, from seemingly meaningless detail to important facts.

He does not often use checklists and his interviews are generally unstructured. During the survey, if questioned on his work plan, he will describe the need to get a "feel" for various aspects of the problem (which he may be unable to define very clearly). While a variety of conclusions may be beginning to emerge, he does not

appear to have a strong commitment to most of them.

Finally, when the deadline approaches, he stops collecting information and switches to data sifting and analysis. Not all of the data will be used. Conclusions and confidence are built up rapidly. Unforeseen conclusions or solutions may surface and fairly significant overruns may develop, on occasion, which were not anticipated.

Check only one

- 725
1. I frequently adopt an approach similar to A above. ()
 2. I frequently adopt an approach similar to B above. ()
 3. I believe that I can use either approach (A or B) depending on the circumstances. ()
 4. I don't recognize my approach as being either A or B. ()

Comments:

2. Does the amount of time that has been budgeted for the survey in any way affect which approach you might use?

1. Yes ()

2. No ()

If so, how?

- 726
3. Two approaches to a complex diagnostic survey are described below. You are again asked to decide if either (or both) in some way describe(s) the approach you might use.

Approach C

This individual carries out his fact-finding in "passes" of progressively greater detail.

- Pass #1 gives him an idea of the various components of the problem, or process, and how they generally fit together.
- Pass #2 adds more details about each:

- Fact-finding continues in this fashion until the individual feels that he understands the operation and is in a position to assemble and test his conclusions.

Approach D

The individual with approach D divides the problem (or process) into components (e.g. functional areas). He then proceeds to assess each component thoroughly and independently, one after the other, conclusions being developed regarding each separately. His findings are then assembled into a coherent whole.

The difference between the two approaches described above is perhaps best demonstrated by an example.

Suppose you have been asked to study a finished goods inventory management problem in a manufacturing firm. The four functional areas concerned are: production planning, sales forecasting, order processing, and warehouse replenishment.

The work plan for approach C might consist of three separate levels of fact-finding:

- The first, allocating 1-2 days to each of the four areas to gain an appreciation of the scope of the activities, the practices employed and the inter-relationships between the areas.
- The second, allocating perhaps 2-3 days to each, to obtain more details.
- The third, of up to a week in each for a complex situation, going into the level of detail required to understand the operation to the extent necessary to locate problems and anomalies.

The work plan for approach D might consist of four separate two-week segments. In each, the component, such as production planning, would be explored in detail. After the eight weeks, the findings would be tied together into a coherent whole.

In a complex diagnostic survey: (Check only one.)

1. I frequently adopt an approach similar to C. ()
- 727 2. I frequently adopt an approach similar to D. ()
3. I believe that I can use either approach (C or D). ()
4. I don't recognize my approach as being either C or D. ()

D. Factors detracting from project success

1 When you look back there must have been assignments you worked on which were less successful than you would have wished. Please check the four reasons which in your experience were most responsible. (Select the four least successful assignments in your memory and give the reasons for these.)

1. From the start the client had no intention of taking any action (i.e. he was initiating the assignment for political reasons). ()
2. The magnitude and complexity of the assignment were underestimated by the consultant during the initial survey. ()
3. The roles of the consultant and client were not clearly defined at the outset. ()
4. The consultant did not address the real problem bothering the client. ()
5. The consultant recognized the real problem but was unable to obtain the sponsor's acceptance. ()
6. The client's expectations regarding the assignment were different from those of the consultant. ()
7. The consultant was pressured by the client to make recommendations he did not believe in. ()
8. The solution was inappropriate for the client (e.g. "too much too soon") or infeasible. ()
9. The project was dropped because the benefits did not justify the costs of implementation. ()
10. The client was not sold on the recommendations and/or the expected benefits. ()
11. Conditions changed which were outside of the consultant's control (e.g. the sponsor changed jobs). ()
12. Client personnel did not support the project. ()
13. Serious difficulties arose during the assignment (e.g. client sabotage) which should have been resolved at the time but which were not. ()
14. There were difficulties with a subcontractor. ()
15. The operating consultant had to work within terms of reference with which he did not agree. ()

(Continued on next page.)

1. Continued

16. The supervisor and the consultant disagreed on the nature of the problem, the approach and/or the solution which would be appropriate. ()
17. We were reporting to the wrong sponsor. ()
18. The solution was too technical for the client's understanding. ()
19. The solution was technically invalid. ()
20. Other (describe) _____ ()

728

729

730

731

SECTION VTHE WORK ENVIRONMENTA. Workload and home life

- 732 1. How many hours a week do you usually work on "office" work? ()
2. Does your work ever require an environment for thought where you will not be interrupted?
1. a great deal ()
- 733 2. some ()
3. hardly any ()
- 734 3. About how much time (in hours) do you need each day for uninterrupted analytical work (design, thinking, planning, etc.)? ()
4. Do you have any problem in finding this time at work?
1. yes ()
- 735 2. no ()
3. sometimes ()
5. Do you find at least part of this time at home (or in a hotel)?
- 736 1. yes ()
2. no ()
- 737 6. How many week nights, on average, are you out of town because of your work? (Use the past 12 months as a frame of reference). ()
7. How much do the following upset homelife? Indicate the degree of interference of each item using the following scale:
1. a very great deal of interference
2. a great deal of interference
3. a moderate amount of interference
4. some interference
5. little or no interference
- 738 a. Uncertainty of trips, dates, duration. ()
- 739 b. Uncertainty of time of return home from the office. ()
- 740 c. Home office location (i.e. radius within which must live). ()
- 741 d. Length of time away from home. ()
- 742 e. Thinking about work while at home. ()

(Continued on next page.)

7. Continued

743 f. Bringing work home. ()

744 g. Other (please specify) ()

8. Do you have any ideas how engagements might be managed to reduce the amount of stress and personal hardship experienced by the consultant and his family?

745

746

747

748

B. Working with others

1. Each person comes to a firm with his own previous experiences and background (the kinds of groups he has worked with, the specialist skills he has developed, the kinds of problems he has dealt with, etc.). How similar or different do you feel your current work colleagues and you are along these lines of previous experience and background? (Check one)

1. Extremely different ()
 2. Quite a bit more different than similar ()
 3. Slightly more different than similar ()
 4. Slightly more similar than different ()
 5. Quite a bit more similar than different ()
 6. Extremely similar ()

749
 Comments:

2. Many consulting firms have a number of hierarchical levels (e.g. partner, principal, manager, etc.)

- a. Does your firm have more than three levels for professional staff?

- 750
 1. yes ()
 2. no ()

- b. In your view, what is the role of such levels in a consulting practice? (Rank, "1" being most important to "4" for least important.)

- 751 i) To determine fee rate ()
 752 ii) To match the levels of client organizations ()
 753 iii) To indicate role differences within the firm ()
 754 iv) To indicate seniority within the firm ()
 755 v) Other (describe) _____ ()

Comments:

3. In general, how much choice are you able to exercise in determining the task or project you will be involved in? (Check one)

756

- 1. almost no choice ()
- 2. very little choice ()
- 3. some choice ()
- 4. a moderate amount of choice ()
- 5. quite a bit of choice ()
- 6. a great deal of choice ()

Comments:

4. Once you have a task or project to work on, the freedom or authority that you have to run the job on your own can also vary. We know that this will differ with the supervisor, but in general how autonomous are you? (Check one.)

757

- 1. almost no freedom ()
- 2. very little freedom ()
- 3. some freedom ()
- 4. a moderate amount of freedom ()
- 5. quite a bit of freedom ()
- 6. a great deal of freedom ()

Comments:

5. In general, which of the following statements most nearly represents the type of work relationship that exists between you and your superiors? (Check one)

758

- 1. We don't discuss things very much and I make most of the decisions. ()
- 2. We discuss things a great deal and my decision is usually adopted. ()
- 3. We discuss things a great deal and come to a mutual decision regarding the task at hand. ()

(Continued on next page.)

5. Continued

4. We discuss things a great deal and his decision is usually ()
adopted.

5. We don't discuss things very much and his decision is ()
usually adopted.

Comments: //

759 6. During the period that you have been with your present firm, how ()
many different supervisors have you worked with?

7. Many consulting firms have made it a policy that no consultant ever works alone on an assignment. The role of this second individual, who is generally a more senior member of the firm, may vary from supervisor to back-up specialist. Indicate from your experience which roles are most common. Then (in the second column) indicate the role which you would prefer for him. (Check as many as appropriate).

	Most Common	Preferred
a. Carry out the preliminary survey.	760 ()	772 ()
b. Develop the detailed work plan.	761 ()	773 ()
c. Get into detail and direct the day-to-day activities.	762 ()	774 ()
d. Provide technical guidance.	763 ()	775 ()
e. Run "interference" with the client.	764 ()	776 ()
f. Act as a sounding board for your ideas.	765 ()	777 ()
g. Participate in developing the recommendations.	766 ()	778 ()
h. Help to evaluate the alternatives from the client's point of view.	767 ()	779 ()
i. Act as a surrogate client to identify where the presentation is unclear or the argument unconvincing.	768 ()	780 ()
j. Play a major role in writing the report.	769 ()	781 ()

(Continued on next page.)

7. Continued

	Most Common	Preferred
k. Other (describe) _____	770 ()	782 ()

l. Don't have this arrangement in our firm.	771 ()	783 ()
---	---------	---------

Comments:

8. The approach or "strategy" in tackling an assignment can vary (e.g. where you start, what concepts or methods you use, what sequence of steps you follow, etc.). When you are talking over a client problem with a) your supervisor b) your colleagues c) your clients, to what extent do you find yourself adopting similar or different approaches? (Check one space under each column.)

	With Supervisors	With Colleagues	With Clients
1. Almost always different.	784 ()	785 ()	786 ()
2. Often more different than similar.	()	()	()
3. More different than similar.	()	()	()
4. More similar than different.	()	()	()
5. Often more similar than different.	()	()	()
6. Almost always similar.	()	()	()
7. Not applicable.	()	()	()

Comments:

9. As an operating consultant, your experience in working on a team with other consultants has been the following: (Do not consider a partner or supervisor "on the team" unless he was "operating".)

	% of the time
787 As a team of 1	()
788 With 1 other	()
789 With 2 others	()
790 With more than 2 others	()

Total:	<u>100%</u>
--------	-------------

10. Do you prefer to work by yourself or with other consultants? (Check one.)

1. alone ()
 2. with others ()
 3. a mixture ()

791

Comments:

11. In your experience, how many consultants are usually assigned to a project (including the supervisor)? ()

792

12. Three different kinds of collaboration among team members have been identified. Each is described below. In the first column indicate the kind of collaboration that you usually experience with other consultants on the team (giving a % breakdown). In the second column give your ranked preference.

My experience %	My preference Rank ("1" most preferred etc.)
--------------------	---

a. Cold-war collaboration:

Members of the team are of equal status but very competitive, each trying to outdo the other. Collaboration is minimal. Each appears to be trying to minimize his own risk and workload while maximizing his recognition.

793
()

796
()

b. Collaboration by specialist division of labour:

There is a mutually agreed on, equitable, division of the work based on the established specialties of the members. This gives each member maximum autonomy within his boundaries.

794
()

797
()

c. Creative collaboration

There is initial ambiguity regarding the task roles. Each member feels free to "invade" the specialist domain of the other. Eventually the roles are clarified but they need not follow specialist boundaries.

795
()

798
()

8-8
C. Performance feedback

1. On the basis of which criteria is your work judged by your superiors?

Comments:

2. Which of these criteria are the most meaningful to you?

Comments:

3. What is the frequency of formal performance feedback?

a After each assignment

1. yes ()

799 2. no ()

3 supposed to ()

b General feedback:

1 weekly ()

2. monthly ()

800 3 quarterly ()

4. semi annually ()

5 annually ()

4. How standardized are formal criteria?

1 extremely standardized (virtually the same across all assignments) ()

2. moderately standardized ()

801 3. somewhat standardized ()

4 somewhat unstandardized ()

5 moderately unstandardized ()

6 extremely unstandardized ()

Comments:

5. How important are formal criteria in practice?

1. informal seem far more important ()
2. informal seem slightly more important ()
3. informal and formal equally rated ()
- 802 4. formal slightly more important ()
5. formal far more important ()
6. criteria so unclear, impossible to estimate ()

Comments:

6. For you, what would be the highest honour you could achieve in your work?

Comments:

7. What percentage of your consulting talent do you feel has been utilized in your years with your present consulting firm? (Check one).

1. 20% or less ()
- 803 2. between 20% and 40% ()
3. between 40% and 60% ()
4. between 60% and 80% ()
5. 80% or more ()

Comments:

8. When you want to talk over personal problems relating to your career development, or when you want advice concerning how to deal with a particular (non-technical) problem, to whom do you usually turn?

1. A supervisor or partner to whom you relate ()
- 804 2. Someone assigned within the firm to counsel you ()
- 805 3. Another consultant within the firm ()
4. Someone outside the firm ()
5. Such problems don't usually arise ()

(Continued on next page.)

8. Continued

6. I really don't have anyone to talk to ()

7. Other (please specify) _____ ()

Comments:

9. In deciding whether or not you would remain with a consulting firm, how do you rank the following considerations? (Assign a rank of "1" for the most important to "9" for least important).

806 1. The extent to which you can control your own time. ()

807 2. The degree to which you feel your values must be compromised in order to advance (e.g. partner or director), or remain in the firm. ()

808 3. The extent to which you are assigned to those projects you prefer. ()

809 4. The degree to which you are satisfied with the amount of money you earn. ()

810 5. The extent to which you work with people you enjoy. ()

811 6. The degree to which you feel able to influence consulting firm policy. ()

812 7. The extent to which you feel you are being challenged or to which your talent is being utilized. ()

813 8. The extent to which you have supervisory authority and responsibility. ()

814 9. The degree to which you feel confident of promotion. ()

815 10. The dislocation of your home life created by the pressures and travel of consulting work. ()

816 11. The degree of autonomy you are given on your assignments in deciding how to approach the problem, the work timetable, etc. ()

Comments:

SECTION VIPERSONAL BACKGROUND

1. Participant code: _____

830 2. Age 20-25 _____ 31-35 _____ 41-45 _____
 26-30 _____ 36-40 _____ 46-50 _____ over 50 _____

3. BUSINESS EXPERIENCE

a. Line vs Staff

		<u>No. of years</u>	<u>Amplifying Comments</u>
831	As external consultant	_____	_____
832	In a line position	_____	_____
833	In a staff* position	_____	_____
834	Other (specify) _____	_____	_____
	Total	_____	_____

b. Functional Area

Give approximate % breakdown of your experience by functional area. (If you have worked in Systems, use area for which systems were developed.)

		%
835	General Management	_____
836	Finance	_____
837	Accounting, budgeting & control	_____
838	Marketing & distribution	_____
839	Production or operations	_____
840	Personnel	_____
841	Corporate planning	_____
842	Engineering	_____
843	Data processing operations	_____
844	Research and development	_____
	<u>Government</u>	
845	Program management	_____
	Economic analysis	_____
	Program evaluation	_____
846	Other _____	_____
	Total	100

*Staff in this context is taken to mean working in a function with a research, planning, design, or advisory responsibility.

c. Type of Business

Give approximate % of breakdown of your experience by type of business. (Include your consulting assignments.)

		%
847	Government (fed., prov. or municipal)	_____
848	Manufacturing (incl. refining and food proc.)	_____
849	Agriculture (incl. meat, poultry, dairy)	_____
850	Mining & Forest Products	_____
851	Financial Institution (incl. insurance)	_____
852	Utilities (electric, telephone, gas)	_____
853	Transportation (incl. trucking)	_____
854	Para-public institutions (hospitals, education etc.)	_____
855	Other _____	_____
	Total	100

d. Size of business

Give approximate % breakdown of your experience by size of business. (For consulting - use the size of the client organization not the consulting firm. For government departments - use size of department.)

	<u>No of employees</u>	%
856	1 - 20	_____
857	20 - 100	_____
858	100 - 1,000	_____
859	1,000 - 10,000	_____
860	10,000 - 100,000	_____
861	over 100,000	_____
	Total	100

4. TECHNICAL PROFICIENCY

Check the one which applies in each row.

		<u>None</u>	<u>Low</u> (Familiar with some of the concepts)	<u>Medium</u> (Familiar with most of the concepts)	<u>High</u> (Accepted as an expert)
	<u>Specialty</u>				
862	Finance & investment	_____	_____	_____	_____
863	Cost accounting & control	_____	_____	_____	_____
864	Data processing systems	_____	_____	_____	_____
865	Organization design	_____	_____	_____	_____
866	Quantitative methods	_____	_____	_____	_____
867	Industrial engineering	_____	_____	_____	_____
868	Psychology & org. behaviour	_____	_____	_____	_____
869	Computer programming	_____	_____	_____	_____
870	Computer hardware	_____	_____	_____	_____
871	Telecommunications	_____	_____	_____	_____
872	Other	_____	_____	_____	_____

5. SUPERVISORY EXPERIENCE (Include your consulting experience)

	<u>Size of staff</u>	<u>No. of years</u>
873 {	1 - 5	_____
	6 - 25	_____
	26 - 100	_____
	over 100	_____

6. EDUCATION

Give details on university education.

	<u>Country</u>	<u>No. of years</u>	<u>Degree</u>	<u>Subject Specialties</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____

Add information on any other specialty training you have received:

874 -> Highest Degree

875 -> HAVE MBA - NO MBA

876 -> MAJOR #1

877 -> MAJOR #2

7. BUSINESS OR PROFESSIONAL EXPERIENCE OUTSIDE CANADA

	<u>Country</u>	<u>No. of years</u>		
		<u>Government</u>	<u>Private Sector</u>	<u>Other (spec.)</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____

878 8. UPBRINGING OR EARLY SCHOOLING OUTSIDE CANADA

	<u>Country</u>	<u>No. of years</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____

9. MILITARY EXPERIENCE

	<u>No. of years</u>	
	<u>Full-time</u>	<u>Part-time</u>
	_____	_____

879 10. Which sports did you play while at school?

880 11. Language - Mother tongue

1. English ()
- 881 2. French ()
3. Other ()

882 12. If you specialize in a particular area, please indicate which:
(functional, industry or technical specialty)

13. Sex

- 883 1. Male ()
2. Female ()

14. Do you have children under 17 years of age living at home?

- 884 1. Yes ()
2. No ()

15. Do you make extensive use of clubs? (Golf clubs, business clubs, etc.)

- 885
1. Extensive ()
 2. Moderate ()
 3. Hardly any ()
 4. None ()
- 5

APPENDIX O

Questionnaire No. 2: Consultant Effectiveness Assessment

COLOURED PAPER
PAPIER DE COULEUR

896 - Firm Code
 897 - Supervisor Code
 898 - Specialty

898
 1 DP.
 2 Gen Mgmt
 3 Fin. Services
 4 Exec. Search
 5 Personnel
 6 Op Mgmt
 7 Ec. Studies
 8 Marketing

III.1.

SECTION III

OBSERVATIONS RE CONSULTANT EFFECTIVENESS

(Note: The questions in the main refer to the individual's effectiveness as a problem solver/change agent not his strengths regarding business development.)

Re: Consultant

- What do you consider to be his (her) field of specialization? (functional, industrial or technical)
- How well do you know him:

		Very Well	Well	Fairly Well	Remotely
899	- socially	1	2	3	4
900	- professionally	1	2	3	4

- In what capacity do you know him professionally? (Complete more than one, if appropriate.)

		Approx. No. of Contact Weeks
901	- I was his supervisor	()
902	- We worked together	()
903	- other (describe) _____	()

- How would you assess his general performance for the following stages of an assignment:

904 a) in identifying problems that were not specified in Terms of Reference.

Exceptional	Above Average	Average	Below Average	Weak	Don't Know
5	4	3	2	1	0

		<u>Exceptional</u>	<u>Above Average</u>	<u>Average</u>	<u>Below Average</u>	<u>Weak</u>	<u>Don't Know</u>
	b) in diagnosing complex problems:						
905	- technical	5	4	3	2	1	0
906	- organizational	5	4	3	2	1	0
	c) in prescribing (developing workable solutions):						
907	- technical aspects	5	4	3	2	1	0
908	- organizational	5	4	3	2	1	0
	d) in obtaining acceptance for his recommendations						
909		5	4	3	2	1	0

Comments:

5. What is your assessment of his effectiveness in the following capacities:

	a) communicator						
	i) oral						
910	- person to person	5	4	3	2	1	0
911	- group presentations	5	4	3	2	1	0
912	- interact with groups	5	4	3	2	1	0
913	ii) written	5	4	3	2	1	0
	b) tactician (able to anticipate and overcome potential client objections)						
914		5	4	3	2	1	0
	c) developer of new business						
915		5	4	3	2	1	0
	d) contributor to the consulting firm's reputation						
916		5	4	3	2	1	0
	e) supervisor or project leader						
917		5	4	3	2	1	0

		<u>Exceptional</u>	<u>Above Average</u>	<u>Average</u>	<u>Below Average</u>	<u>Weak</u>	<u>Don't Know</u>
918	f) specialist consultant to other consultants	5	4	3	2	1	0
919	g) developer of consult- ing staff	5	4	3	2	1	0
920	h) contributor to team effort on an assign- ment	5	4	3	2	1	0
921	i) ability to get client acceptance and co- operation	5	4	3	2	1	0
922	j) developer of new packages or new areas of the practice	5	4	3	2	1	0
923	k) ability to apply strong conceptual skills to resolve complex problems	5	4	3	2	1	0
924	l) ability to meet deadlines, stay within budgets, etc.	5	4	3	2	1	0
925	m) ability to work to a detailed work plan	5	4	3	2	1	0
926	n) ability to operate with little supervision	5	4	3	2	1	0
927	o) ability to identify clients needs	5	4	3	2	1	0
928	p) ability to come up with a different (practical) approach to a problem	5	4	3	2	1	0

Comments:

	<u>Exceptional</u>	<u>Above Average</u>	<u>Average</u>	<u>Below Average</u>	<u>Weak</u>	<u>Don't Know</u>
--	--------------------	----------------------	----------------	----------------------	-------------	-------------------

6. How do you think he is viewed on the technical level:

1929	a) clients see him as an expert in his field	5	4	3	2	1	0
930	b) colleagues view him as being up-to-date in his field	5	4	3	2	1	0
931	c) he is respected by fellow professionals in his specialty (outside the firm)	5	4	3	2	1	0
932	d) he has contributed to advancements in his field	5	4	3	2	1	0

Comments:

7. How would you assess his over-all effectiveness as a management consultant (problem solver/change agent)?

933		5	4	3	2	1	0
-----	--	---	---	---	---	---	---

Comments:

934 - # of assessments

8.a. In what kind of situations does he perform most effectively?

b. Do you believe that he is a potential partner?

1. Definitely	()
2. Possibly	()
3. Unlikely	()
4. Definitely not	()
5. Don't know	()

935

	<u>Very</u> <u>Suitable</u>	<u>Suitable</u>	<u>Not very</u> <u>Suitable</u>	<u>Probably</u> <u>Unsuitable</u>	<u>Don't</u> <u>Know</u>
9. A variety of assignments are given below. Give your assessment of his likely suitability for these tasks.					
936 a) implement a well tested and documented package in his area	4	3	2	1	0
937 b) manage a large project team comprising client and consultant staff	4	3	2	1	0
938 c) handle an assignment which has sensitive, political aspects - such as getting members of a family business to agree to hire an outside general manager	4	3	2	1	0
939 d) evaluate candidates for a senior executive position	4	3	2	1	0
940 e) collect information through structured interviews	4	3	2	1	0
941 f) act in a line capacity for a period, to help a client over a staffing problem	4	3	2	1	0
942 g) act as an expert witness in a court case	4	3	2	1	0
943 h) help to resolve a problem where there are several different opinions among the senior executives and there is no time to gather relevant facts	4	3	2	1	0

	Very Suitable	Suitable	Not very Suitable	Probably Unsuitable	Don't Know
--	------------------	----------	----------------------	------------------------	---------------

- 944 i) work with large corporations with sophisticated staff on a complex assignment within his specialty 4 3 2 1 0
- 945 j) carry out a diagnostic survey in a difficult (non technical) area where he has had no direct experience 4 3 2 1 0

Comments:

10. Personal characteristics

Please rate the consultant on each of the adjective dimensions below. Circle the number in each row which is closest to the one which best describes him.

- | | | | | | | | | | |
|-----|-----------------|---|---|---|---|---|---|---|---------------|
| 946 | 1. Active | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Reflecting |
| 947 | 2. Confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Hesitant |
| 948 | 3. Logical | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Intuitive |
| 949 | 4. Detached | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Involved |
| 950 | 5. Innovative | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Conventional |
| 951 | 6. Generalist | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Specialist |
| 952 | 7. Flexible | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Single-minded |
| 953 | 8. Team member | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Independent |
| 954 | 9. Academic | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Pragmatic |
| 955 | 10. Persuasive | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Unconvincing |
| 956 | 11. Cautious | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Impulsive |
| 957 | 12. Talker | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Listener |
| 958 | 13. Unambitious | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Ambitious |

959	14. Open	1	2	3	4	5	6	7	Political
960	15. Precise	1	2	3	4	5	6	7	Vague
961	16. Unplanned	1	2	3	4	5	6	7	Scheduled
962	17. Facts	1	2	3	4	5	6	7	Ideas
963	18. Critical	1	2	3	4	5	6	7	Uncritical
964	19. Undisciplined	1	2	3	4	5	6	7	Disciplined
965	20. Global	1	2	3	4	5	6	7	Detailed
966	21. Complex	1	2	3	4	5	6	7	Uncomplicated
967	22. Last minute	1	2	3	4	5	6	7	On time
968	23. Line	1	2	3	4	5	6	7	Staff

11. Personal problem solving style

a) Fact-finding styles

Two approaches to a diagnostic survey are given below. You are asked to decide if either (or both) in some way describe(s) the approach he uses.

Approach A

The individual with approach A is able to prepare and follow a detailed work plan which defines the nature of the information sought, the source of the information, and the order in which it will be gathered.

Such an individual has often made an initial classification of the problem (and the likely range of solutions) which he will retain unless subsequent information causes him to discard it. In the latter case, he will select a new model, revise the work plan and continue in an iterative fashion. In the process he gives early attention not only to the formulation of the problem but to the criteria (implicit or explicit) which will determine a "satisfactory" outcome.

He frequently uses checklists and carries out structured, rather than unstructured, interviews. One of the features of this approach is a fairly clear appreciation, at any time of:

- the information remaining to be gathered, and
- the conclusions which the individual feels are warranted at that stage.

These are usually advanced with relative confidence.

- The process of fact-finding (and analysis) is terminated when a conclusion has been formulated satisfying the initial criteria or time runs out. There are rarely any major surprises in the final conclusions and any overruns of time are foreseen relatively early in the process.

Approach B

The individual with approach B resists a detailed work plan. He may prepare one if asked to but afterwards he pays little attention to it. He is usually unable to articulate the schema or model he is following when fact gathering. To an outside observer, he appears to operate by evaluating the information as it comes in before deciding what to do next. His mode is acquisitive, as he seeks to collect a wide range of data, from seemingly meaningless detail to important facts.

He does not often use checklists and his interviews are generally unstructured. During the survey, if questioned on his work plan, he will describe the need to get a "feel" for various aspects of the problem (which he may be unable to define very clearly). While a variety of conclusions may be beginning to emerge, he does not appear to have a strong commitment to most of them.

Finally, when the deadline approaches, he stops collecting information and switches to data sifting and analysis. Not all of the data will be used. Conclusions and confidence are built up rapidly. Unforeseen conclusions or solutions may surface and fairly significant overruns may develop, on occasion, which were not anticipated.

Check only one.

- 969
1. He frequently adopts an approach similar to A above. ()
 2. He frequently adopts an approach similar to B above. ()
 3. I believe that he can use either approach (A or B) depending on the circumstances. ()
 4. I don't recognize his approach as being either A or B. ()

Comments:

- b) Does the amount of time that has been budgeted for the survey in any way affect which approach he might use?

- 970
1. Yes ()
 2. No ()

If so, how?

- c) Two approaches to a complex diagnostic survey are described below. You are again asked to decide if either (or both) in some way describe(s) the approach he might use.

Approach C

This individual carries out his fact-finding in "passes" of progressively greater detail.

- Pass#1 gives him an idea of the various components of the problem, or process, and how they generally fit together.
- Pass#2 adds more details about each:
 - .
 - .
 - .
- Fact-finding continues in this fashion until the individual feels that he understands the operation and is in a position to assemble and test his conclusions.

Approach D

The individual with approach D divides the problem (or process) into components (e.g. functional areas). He then proceeds to assess each component thoroughly and independently, one after the other, conclusions being developed regarding each separately. His findings are then assembled into a coherent whole.

The difference between the two approaches described above is perhaps best demonstrated by an example.

Suppose you have been asked to study a finished goods inventory management problem in a manufacturing firm. The four functional areas concerned are: production planning, sales forecasting, order processing, and warehouse replenishment.

- The work plan for approach C might consist of three separate levels of fact-finding:
 - The first, allocating 1-2 days to each of the four areas to gain an appreciation of the scope of the activities, the practices employed and the inter-relationships between the areas.
 - The second, allocating perhaps 2-3 days to each, to obtain more details.
 - The third, of up to a week in each for a complex situation, going into the level of detail required to understand the operation to the extent necessary to locate problems and anomalies.

The work plan for approach D might consist of four separate two-week segments. In each, the component, such as production planning, would be explored in detail. After the eight weeks, the findings would be tied together into a coherent whole.

In a complex diagnostic survey: (Check only one.)

- 971
1. He frequently adopts an approach similar to C. ()
 2. He frequently adopts an approach similar to D. ()
 3. I believe that he can use either approach (C or D). (/)
 4. I don't recognize his approach as being either C or D. ()

12. The approach or "strategy" in tackling an assignment can vary (e.g. where you start, what concepts or methods you use, what sequence of steps you follow, etc.). When you are discussing a client problem with him, to what extent do you find him advocating approaches which are similar to, or different from, your own?

- 972
1. Almost always different ()
 2. Often more different than similar ()
 3. More different than similar ()
 4. More similar than different ()
 5. Often more similar than different ()
 6. Almost always similar ()
 7. Don't know how to answer this ()

Comments:

APPENDIX P

Questionnaire No. 3: The Supervisor's Views and Background

SECTION I

MANAGEMENT CONSULTING AS A PROFESSION

To reduce the demands on your time, pages 1-5 have been eliminated.

B. General views on consulting

Please indicate your reaction to the following statements by circling the appropriate number.

- | | <u>Agree</u>
<u>Strongly</u> | <u>Agree</u> | <u>No</u>
<u>Opinion</u> | <u>Disagree</u> | <u>Disagree</u>
<u>Strongly</u> |
|--|---------------------------------|--------------|-----------------------------|-----------------|------------------------------------|
| 1. There are some situations where the operating consultant's value to a client continues to increase with his experience (i.e. a consultant with 10 years's relevant experience is worth more than a consultant with only 5 years): | 1 | 2 | 3 | 4 | 5 |

If you agree, can you give an example:

2. In general, it is unrealistic to expect much innovation from a management consultant because:

- | | | | | | |
|---|---|---|---|---|---|
| a) there is no time for research | 1 | 2 | 3 | 4 | 5 |
| b) clients should not be treated as guinea pigs | 1 | 2 | 3 | 4 | 5 |

Comments:

3. Most consultants tend to rely on their own resources rather than seek the advice of other consultants in the firm.

1	2	3	4	5
---	---	---	---	---

This is due to:

- | | | | | | |
|--|---|---|---|---|---|
| a) time and budget pressures | 1 | 2 | 3 | 4 | 5 |
| b) a consultant's strong feeling of self-confidence | 1 | 2 | 3 | 4 | 5 |
| c) a feeling that it will be interpreted as a sign of weakness | 1 | 2 | 3 | 4 | 5 |

Comments:

Agree No Disagree
Strongly Agree Opinion Disagree Strongly

4. Most management consulting work is not technical in nature but requires a basic knowledge of people and how organizations function.

1 2 3 4 5

Comments:

5. An intelligent, capable, MBA with 5 years of good business experience can handle most management consulting assignments.

1 2 3 4 5

Comments:

6. If two consultants (of equal competence) are asked for their opinion about a problem, it is quite possible that their recommendations will differ significantly (in terms of the client action required).

1 2 3 4 5

Comments:

7. Given that two recommendations both pass the "test of reasonableness", there is no objective way in most situations to decide which one is better.

1 2 3 4 5

If you disagree, please explain your answer:

8. In most cases, a client, on his own, is not in a position to decide what is the best remedial action to adopt.

1 2 3 4 5

Comments:

	<u>Agree</u> <u>Strongly</u>	<u>Agree</u>	<u>No</u> <u>Opinion</u>	<u>Disagree</u>	<u>Disagree</u> <u>Strongly</u>
9. The true test of the quality of a consultant's work is that the client is satisfied at the conclusion of the engagement.	1	2	3	4	5

10. If you do not agree, which criteria would you offer?

11. It is not feasible for any regulatory body to set down quality standards, which can be monitored, for consulting work.

1 2 3 4 5

If you disagree, please give some indication of how you feel this would be achieved.

12. I would expect women to make just as successful management consultants as men.

1 2 3 4 5

Comments:

13. It is wrong for a consultant to let his personal values (e.g. a strong sense of social responsibility) influence his recommendations to the client.

1 2 3 4 5

Comments:

14. Consultants in the quantitative or systems areas are under more pressure because their performance criteria are more explicit.

1 2 3 4 5

Comments:

Agree No Disagree
Strongly Agree Opinion Disagree Strongly

15. There is no place in a management consulting firm for the technical specialist (e.g. psychologist, economist, management scientist, software expert, etc.)

1 2 3 4 5

If you agree, is it because:

- a) management consulting assignments generally do not need such specialists

1 2 3 4 5

- b) consulting firms are not organized to accomodate the needs of specialists (e.g. career paths, technical updating, reward systems)

1 2 3 4 5

Comments:

16. Management consultants should be able to advertise their services as they wish.

1 2 3 4 5

Comments:

17. There seems to be a trend for the experienced client to hire the individual rather than the firm when he engages a consultant.

1 2 3 4 5

Comments:

18. Most clients attach some significance to the credentials CMC (Certified Management Consultant).

1 2 3 4 5

Comments:

19. On a project, the consultant with more experience in the particular area is likely to: (Check one.)

1. devote less than the budgeted number of hours to the project ()
2. devote the budgeted number of hours but do a "better" job ()
3. Other (specify) _____ ()

Comments:

C. Role of consultant

Every consultant behaves differently in the face of different client situations. We are interested, however, in your behaviour on your more typical engagements. Please circle the number which is most characteristic of your present behaviour.

1. I find myself in situations where:

a. I use my specialized knowledge in the solution of problems.

Often 1 2 3 4 5 Seldom

b. I use my skills at diagnosing and solving broad problems.

Often 1 2 3 4 5 Seldom

c. I use my skills at persuading the client to adopt some specific point of view or course of action.

Often 1 2 3 4 5 Seldom

d. My presence gives the client the confidence to carry on programs which he would not otherwise do.

Often 1 2 3 4 5 Seldom

e. I show the client how to go about solving problems of the type encountered should they occur again.

Often 1 2 3 4 5 Seldom

f. I introduce new ideas, novel ways of doing things.

Often 1 2 3 4 5 Seldom

g. I exchange ideas with the client and we work on the problem together.

Often 1 2 3 4 5 Seldom

h. I use my skills at interpreting the meaning of unfamiliar concepts.

Often 1 2 3 4 5 Seldom

i. I act as an objective source of information because I am familiar with a greater variety of problems and because I have no axe to grind.

Often 1 2 3 4 5 Seldom

- j. I help the client decide on a course of action if several alternatives look equally attractive.

Often 1 2 3 4 5 Seldom

- k. I take part in making decisions for the client when he wants me to do so.

Often 1 2 3 4 5 Seldom

- l. I motivate people to change their style of behaviour on a sustained basis.

Often 1 2 3 4 5 Seldom

- m. I am given a general mandate by the client to look around for everything which might be wrong.

Often 1 2 3 4 5 Seldom

- n. I use client personnel as much as possible to gather data and seek their participation in the development of solutions to problems.

Often 1 2 3 4 5 Seldom

- o. I am asked to act as a referee to help a client resolve conflicting opinions.

Often 1 2 3 4 5 Seldom

- p. I am engaged to manage important projects.

Often 1 2 3 4 5 Seldom

- q. I act as an extra resource to aid a client when his own personnel are fully utilized.

Often 1 2 3 4 5 Seldom

2. Please go back and circle on the foregoing list the four dimensions which you feel are most central to the consultant's job..

e.g. (m)...

D. Desirable personal characteristics

1. Indicate the extent to which the following characteristics are important in consulting work.

	<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
1. Cooperativeness	()	()	()
2. Orderliness	()	()	()
3. Openness, spontaneity	()	()	()
4. Independence	()	()	()
5. Loyalty to my firm	()	()	()
6. Loyalty to clients	()	()	()
7. Loyalty to fellow consultants	()	()	()
8. Loyalty to partners	()	()	()
9. Drive to be the best	()	()	()
10. Drive for power over others	()	()	()
11. Satisfaction in creating something new	()	()	()
12. Pleasure in learning something new	()	()	()
13. Critical and questioning attitude toward authority	()	()	()
14. Sense of humor	()	()	()
15. Toughness, lack of sentimentality	()	()	()
16. Modesty	()	()	()
17. Personal charm	()	()	()
18. Idealism	()	()	()
19. Ability to take orders	()	()	()
20. Satisfaction in helping others	()	()	()
21. Ability to take the initiative	()	()	()

	<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
22. Self-confidence	()	()	()
23. Patience	()	()	()
24. Tenacity	()	()	()
25. Coolness under stress	()	()	()
26. Stubbornness	()	()	()
27. Fairness	()	()	()
28. Generosity	()	()	()
29. Flexibility	()	()	()
30. Open-mindedness	()	()	()
31. Compassion	()	()	()
32. Need for achievement	()	()	()
33. Need to win	()	()	()
34. Detachment	()	()	()
35. Aggressiveness	()	()	()
36. Pride in performance	()	()	()
37. Need for recognition	()	()	()
38. Efficiency	()	()	()
39. Honesty	()	()	()
40. Self-control	()	()	()
41. Decisiveness	()	()	()
42. Friendliness	()	()	()
43. Energy	()	()	()
44. Credibility	()	()	()

2. What is the most productive age range for consultants as "operators"? ()
 Comments:

3. Indicate the extent to which the following kinds of intellectual capacities are important in consulting work.

	<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
1. Concern for practical detail	()	()	()
2. Integrating or synthesizing ideas into an overall plan	()	()	()
3. Inventing new ideas	()	()	()
4. Awareness of others feelings	()	()	()
5. Attention to small details	()	()	()
6. Working facts into a logical order	()	()	()
7. Good memory for facts	()	()	()
8. Speed	()	()	()
9. Ability to dramatize (and sell) one's ideas	()	()	()
10. Ability to create an environment in which others work better	()	()	()
11. Ability to listen carefully to others	()	()	()
12. Mathematical ability	()	()	()
13. Ability to stimulate or activate others	()	()	()
14. Ability to sell oneself	()	()	()
15. Extensive vocabulary	()	()	()
16. Extensive technical vocabulary	()	()	()
17. Ability to communicate orally	()	()	()
18. Ability to communicate in writing	()	()	()

	<u>Very Important</u>	<u>Somewhat Important</u>	<u>Not Important</u>
19. Ability to reach conclusions with a minimum of information	()	()	()
20. Critical thinking (questioning methods and techniques that others take for granted)	()	()	()
21. Ability to put one's self in another's position	()	()	()
22. Ability to size up another's character	()	()	()
23. Ability to concentrate by oneself	()	()	()
24. Systems thinking	()	()	()
25. Ability to recognize good ideas	()	()	()
26. Ability to be critical of bad ideas	()	()	()
27. Imagination	()	()	()
28. Ability to see the whole, not merely the parts	()	()	()
29. Perspective or vision	()	()	()

4. In evaluating the attractiveness of a project, which of the following aspects are important to you? (Assign a "1" to each of your three top concerns, and a "3" to your three least concerns).

1. The contribution which experience with the proposed project will make to your firm's range of services. ()
2. The potentialities for publication which might arise with the new project. ()
3. The risks which could be incurred as a result of your lack of experience with a project of this nature. ()
4. The possibility of a conflict of interest because of other work your firm is currently engaged in. ()
5. The possibility that a number of employees may have to be let go as a result of your recommendations. ()
6. The chance to work in an important/interesting area to which you have never been exposed. ()
7. The risks which you and your firm are incurring because of the difficult (e.g. political) nature of the assignment. ()
8. The contribution of the project to your firm's over-all image for quality and innovation. ()
9. The development of a model or package which will be applicable to a number of other clients. ()
10. The location of the client and the distance from your home office. ()

E. Factors detracting from project success

1. When you look back there must have been assignments you worked on which were less successful than you would have wished. Please check the four reasons which in your experience were most responsible. (Select the four least successful assignments in your memory and give the reasons for these.)

- a. From the start the client had no intention of taking any action (i.e. he was initiating the assignment for political reasons). ()
- b. The magnitude and complexity of the assignment were underestimated by the consultant during the initial survey. ()
- c. The roles of the consultant and client were not clearly defined at the outset. ()
- d. The consultant did not address the real problem bothering the client. ()
- e. The consultant recognized the real problem but was unable to obtain the sponsor's acceptance. ()
- f. The client's expectations regarding the assignment were different from those of the consultant. ()
- g. The consultant was pressured by the client to make recommendations he did not believe in. ()
- h. The solution was inappropriate for the client (e.g. "too much too soon") or infeasible. ()
- i. The project was dropped because the benefits did not justify the costs of implementation. ()
- j. The client was not sold on the recommendations and/or the expected benefits. ()
- k. Conditions changed which were outside of the consultant's control (e.g. the sponsor changed jobs). ()
- l. Client personnel did not support the project. ()
- m. Serious difficulties arose during the assignment (e.g. client sabotage) which should have been resolved at the time but which were not. ()
- n. There were difficulties with a subcontractor. ()
- o. The operating consultant had to work within terms of reference with which he did not agree. ()

1. Continued

- p. The supervisor and the consultant disagreed on the nature of the problem, the approach and/or the solution which would be appropriate. ()
- q. We were reporting to the wrong sponsor. ()
- r. The solution was too technical for the client's understanding. ()
- s. The solution was technically invalid. ()
- t. Other (describe) _____ ()

SECTION IIPERSONAL BACKGROUND

1. Age 20-25 _____ 31-35 _____ 41-45 _____
 26-30 _____ 36-40 _____ 46-50 _____ over 50 _____

2. BUSINESS EXPERIENCEa. Line vs Staff

	<u>No. of Years</u>	<u>Amplifying Comments</u>
As external consultant	_____	_____
In a line position	_____	_____
In a staff* position	_____	_____
Other (specify) _____	_____	_____
Total	_____	

b. Functional Area

Check main areas of experience by function. (If you have worked in Systems, use area for which systems were developed).

General Management _____
 Finance _____
 Accounting, budgeting & control _____
 Marketing & distribution _____
 Production or operations _____
 Personnel _____
 Corporate planning _____
 Engineering _____
 Data processing operations _____
 Research and development _____
Government _____
 Program management _____
 Economic analysis _____
 Program evaluation _____
 Other _____

* Staff in this context is taken to mean working in a function with research, planning, design, or advisory responsibility.

3. EDUCATION

Give details on university education.

	<u>Country</u>	<u>No. of years</u>	<u>Degree</u>	<u>Subject specialities</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____

Add information on any other specialty training you have received:

4. No of years with your present firm ()

5. Most of your work now is: (check one)

1. supervisory or project management ()

2. diagnosis, conceptual design, market research,
feasibility studies or corporate planning ()3. vendor selection, detailed design, project planning
or implementation of systems ()

4. other (describe) _____ ()

6. Sex Male ()

Female ()

7. What is your present area of specialization?

These pages have been eliminated

15. Personal problem solving style

a. Fact-finding styles

Two approaches to a diagnostic survey are given below. You are asked to decide if either (or both) in some way describe(s) the approach you use.

Approach A

The individual with approach A is able to prepare and follow a detailed work plan which defines the nature of the information sought, the source of the information, and the order in which it will be gathered.

Such an individual has often made an initial classification of the problem (and the likely range of solutions) which he will retain unless subsequent information causes him to discard it. In the latter case, he will select a new model, revise the work plan and continue in an iterative fashion. In the process he gives early attention not only to the formulation of the problem but to the criteria (implicit or explicit) which will determine a "satisfactory" outcome.

He frequently uses checklists and carries out structured, rather than unstructured, interviews. One of the features of this approach is a fairly clear appreciation, at any time of:

- the information remaining to be gathered, and
- the conclusions which the individual feels are warranted at that stage.

These are usually advanced with relative confidence.

The process of fact-finding (and analysis) is terminated when a conclusion has been formulated satisfying the initial criteria or time runs out. There are rarely any major surprises in the final conclusions and any overruns of time are foreseen relatively early in the process.

Approach B

The individual with approach B resists a detailed work plan. He may prepare one if asked to but afterwards he pays little attention to it. He is usually unable to articulate the schema or model he is following when fact gathering. To an outside observer, he appears to operate by evaluating the information as it comes in before deciding what to do next. His mode is acquisitive, as he seeks to collect a wide range of data, from seemingly meaningless detail to important facts.

He does not often use checklists and his interviews are generally unstructured. During the survey, if questioned on his work plan, he will describe the need to get a "feel" for various aspects of the problem (which he may be unable to define very clearly). While a variety of conclusions may be beginning to emerge, he does not

appear to have a strong commitment to most of them.

Finally, when the deadline approaches, he stops collecting information and switches to data sifting and analysis. Not all of the data will be used. Conclusions and confidence are built up rapidly. Unforeseen conclusions or solutions may surface and fairly significant overruns may develop, on occasion, which were not anticipated.

Check only one

1. I frequently adopt an approach similar to A above. (☒)
2. I frequently adopt an approach similar to B above. (☐)
3. I believe that I can use either approach (A or B) depending on the circumstances. (☐)
4. I don't recognize my approach as being either A or B. (☐)

Comments:

- b. Does the amount of time that has been budgeted for the survey in any way affect which approach you might use?

1. Yes (☐)

2. No (☐)

If so, how?

- c. Two approaches to a complex diagnostic survey are described below. You are again asked to decide if either (or both) in some way describe(s) the approach you might use.

Approach C

This individual carries out his fact-finding in "passes" of progressively greater detail.

- Pass #1 gives him an idea of the various components of the problem, or process, and how they generally fit together.
- Pass #2 adds more details about each:
 -
 -
 -
 -
- Fact-finding continues in this fashion until the individual feels that he understands the operation and is in a position to assemble and test his conclusions.

Approach D

The individual with approach D divides the problem (or process) into components (e.g. functional areas). He then proceeds to assess each component thoroughly and independently, one after the other, conclusions being developed regarding each separately. His findings are then assembled into a coherent whole.

The difference between the two approaches described above is perhaps best demonstrated by an example.

Suppose you have been asked to study a finished goods inventory management problem in a manufacturing firm. The four functional areas concerned are: production planning, sales forecasting, order processing, and warehouse replenishment.

The work plan for approach C might consist of three separate levels of fact-finding:

- The first, allocating 1-2 days to each of the four areas to gain an appreciation of the scope of the activities, the practices employed and the inter-relationships between the areas.
- The second, allocating perhaps 2-3 days to each, to obtain more details.
- The third, of up to a week in each for a complex situation, going into the level of detail required to understand the operation to the extent necessary to locate problems and anomalies.

The work plan for approach D might consist of four separate two-week segments. In each, the component, such as production planning, would be explored in detail. After the eight weeks, the findings would be tied together into a coherent whole.

In a complex diagnostic survey: (Check only one.)

1. I frequently adopt an approach similar to C. ()
2. I frequently adopt an approach similar to D. ()
3. I believe that I can use either approach (C or D). ()
4. I don't recognize my approach as being either C or D. ()

16. Suppose you discovered that the time for a project was insufficient to carry it out as you originally planned, and the client will not authorize an extension. Which of the following steps would you be most likely to take? Least likely? (Check up to three in each column.)

	<u>Most Likely</u>	<u>Least Likely</u>
1) Cut back on your aspirations regarding the scope of the assignment or the range of the recommendations, while adhering to the terms of reference.	()	()
2) Try to work faster.	()	()
3) Stick to the original objectives but do not charge the overrun to the client (work at nights, weekends, etc.)	()	()
4) Reduce the time devoted to fact finding.	()	()
5) Reduce the time devoted to analysis.	()	()
6) Instead of tailoring a solution specific to the client, recommend one which worked in a similar situation.	()	()
7) Spend less time on communications with the client, pre-testing the recommendations.	()	()
8) Spend less time on the report.	()	()
9) Other (describe) _____	()	()

Comments:

	<u>Agree Strongly</u>	<u>Agree</u>	<u>No Opinion</u>	<u>Disagree</u>	<u>Disagree Strongly</u>
17. I believe that there are certain principles of good management which are applicable in almost all situations.	1	2	3	4	5

If you agree, give 2 or 3 examples.

18. When faced with a problem in a technical area I am not familiar with, I will tend to: (Check one.)

1. rely on my own experience and approach to resolve the problem. ()
2. seek the judgment of technical experts within my firm ()
3. turn over the assignment responsibility to another consultant ()
4. other (please specify) _____ ()

Comments:

19. When selecting an alternative solution to recommend to a client, I usually: (check one)

1. try to put myself in the client's shoes ()
2. do what I think is best ()
3. find there is usually only one alternative by the time I have completed my analysis ()
4. other (please specify) _____ ()

Comments: