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Bester, Francois

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A COMPARISON OF ASSESSMENT CENTRE AND CAREER PATH APPRECIATION PROCEDURES IN MANAGEMENT SELECTION

Francois Bester

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ABSTRACT

This research compares the Assessment Centres and the Career Path Appreciation procedure used in the assessment of managerial potential for selection purposes. The aims of the research are to conduct a concurrent validation of the Career Path Appreciation and to determine any redundancy of the two procedures and of the subprocedures of the Appreciation.

Assessment Centres are established and accepted as a valid procedures for management potential measurement. The Career Path Appreciation is a fairly new procedure with a small research base. The Appreciation uses the Stratified Systems Theory to construct its validity.

The Appreciation is more economical to apply than Assessment Centres. Claims are made that the Appreciation can replace Assessment Centres. The value of this research is in the investigation of this claim of redundancy.

The two procedures are administered to a sample of 319 senior management candidates. The Spearman rank correlation coefficient is applied to analyse the ordinal data.

Results of the analysis show that there are no grounds for the claims of redundancy. The concurrent validation of the Appreciation shows that it probably measures the same domain as Assessment Centres.

DECLARATION

I declare that this research report is my own, unaided work. It is being submitted in partial fulfilment of the requirements for the degree of Master of Management in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.



Francois Bester

31st day of January, 19 92

Thank you

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CHAPTER ONE

INTRODUCTION

1.1 *INTRODUCTION*

High level manpower is essential for economic and social development and therefore the quality of life of the population. It is generally recognised that there are inadequate numbers of high level manpower available in Southern Africa. It is also unknown to which extent high level positions are filled with unsuitably qualified people - whether in terms of education, temperament or cognitive abilities.

In a recent article in a daily newspaper, it is suggested that 500 000 managers are needed in South Africa by the year 2000 (Half a million, 1992, p. 5). The basis for the many projections such as these are seldom known and the validity of the calculations seldom proven. In view of the awareness of manpower quality shortages and of the importance of leadership of the work-force in South Africa, impressive statistics about the situation are not offered. Senior managers are needed to shape the futures of organisations, to create visions that will guide organisations and initiate strategic plans to direct growth and survival. Ever increasingly in the future, this will be the area where the real profits or losses will be created (Jaques, 1989, p. 28). The quest for organisational leadership enjoys world-wide attention (Zaleznik, 1989) and Southern Africa is not

an exception (Ball and Asbury, 1989).

1.2 MANAGEMENT SELECTION

1.2.1 Introduction

Assessment of management potential for selection purposes, especially senior management selection, is an expensive and often time-consuming activity. Not only is senior level manpower assessed, but highly qualified manpower is often used to conduct the assessment. Because senior managers play a decisive role in companies, the selection of this level is important and thorough assessment procedures are employed.

1.2.2 Assessment Centres

The use of Assessment Centres is a well established means of assessment, especially for senior manpower. Assessment Centres are often and widely used. Research about the procedure shows that the procedure have good predictive validity. Assessment Centres have high face-validity, enjoy wide publicity and provide an opportunity to test on a non-discriminatory basis (Baker and Stamp, 1990, p. 3 and Friedman, 1984, p. 13).

Twelve candidates participate in an Assessment Centre over a period of three days. Thirteen different dimensions of management behaviour are assessed.

Since some of the dimensions of managerial work includes interaction with people, it is essential in the observation of these dimensions to involve groups

of people in the assessment. The groups can be composed of trained role-players and, as in this case, the other centre participants. Together with the three administrators of the centre six experienced observers are involved in each centre. Participation in an Assessment Centre cost R2 700 per person.*

1.2.3 The Career Path Appreciation

The Career Path Appreciation procedure has been used world-wide for approximately twenty years and for eight years in Southern Africa. The results of longitudinal studies and other available research show high predictive validities (Stamp, 1988a & 1989b).

The Career Path Appreciation procedure is based on Jaques' work related to stratified systems in organisations and the cognitive complexity of work (Stamp, 1988a).

The Career Path Appreciation procedure involves an interview with a candidate by a qualified administrator. Administration takes approximately two hours and it is currently available from the Career Development Centre at R600.00 per Career Path Appreciation.* Resident psychologists or other human

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* This data is obtained from the Career Development Centre, the institution used in this research. Career Development Centre is a pseudonym for the institution. The real name of this institution is withheld to avoid any implication that may result from this report. Suffice it to mention that the Career Development Centre is a branch of one of the largest corporations in Southern Africa.

resources practitioners of many companies are trained to administer the technique in-house. Groups are not essential as the procedure is applied individually.

1.2.4 Comparing the two procedures

Baker and Stamp (1990) promote Career Path Appreciation as a cost-effective alternative to Assessment Centres. Their argument is based on the high predictive validity of the Career Path Appreciation found in Stamp's (1988a) longitudinal research. The comparison between the predictive validity of the two procedures is, however, where their reported base for the argument stops. The redundancy of the two procedures is not researched.

The status of the Career Path Appreciation in comparison with Assessment Centres can give an indication of its contribution to the assessment of managerial potential. Formal local research in the Career Path Appreciation procedure is currently largely limited to the participation in the world-wide longitudinal studies on the procedure by the Brunel Institute of Organisational and Social Studies at Brunel University. This study is therefore not only an attempt to identify the status of the Career Path Appreciation procedure, but also to contribute to the local research base of the procedure.

Both procedures attempt to predict managerial potential and development. The Assessment Centre measures managerial potential based on observations of agreed-upon dimensions of managerial behaviour. The Career Path Appreciation procedure bases its measurement of managerial potential on the candidate's reported and apparently displayed use of discretion in situations of relative uncertainty.

1.3 THE AIMS OF THIS RESEARCH

In this research a sample of 319 senior management candidates were exposed to both techniques. The research aims to:

conduct a concurrent validation of the Career Path Appreciation procedure;

determine the redundancy of the Career Path Appreciation and the Assessment Centre procedure;

establish the relationship of both procedures with candidates' present job grades (a factor clearly associated with senior management);

investigate the relationship between the different outcomes obtained within the Career Path Appreciation procedure.

1.4 THE VALUE OF THIS RESEARCH

The Career Path Appreciation is still a relatively new procedure in human resources potential assessment, but it is growing rapidly. Baker and Stamp's (1990) claims that the Career Path Appreciation makes Assessment Centres redundant.

This research aims to contribute in a responsible manner to the research base of the Career Path Appreciation. As far as could be established, the validity of Career Path Appreciation outcomes has never been tested in the manner that this research project aims to do, namely comparing the Career Path Appreciation results with the results of the

respected procedure for management potential assessment, the Assessment Centre. This research project is therefore breaking new ground by comparing the Career Path Appreciation with an established procedure and in doing so aims to establish the Career Path Appreciation's concurrent validity. At the same time this research investigates the possibility of the redundancy of the two procedures.

1.5 CHAPTER CONTENTS

To provide an orientation to this report, the main contents of the other chapters are introduced.

Chapter 2 contains a discussion of relevant prior research. The credibility of both procedures is established. Since no prior research compares the two procedures, the external validity of the procedures was established by referring to studies investigating similar factors.

The second chapter briefly introduces Jaques' Stratified Systems Theory and its link with Career Path Appreciation. Two factors necessary to obtain appropriate decision-making are discussed. These factors are the individual's range of capabilities and the work challenges offered by an organisation. The state of balance of the capabilities and the challenges is explained. Types of work capacity are introduced.

Chapter 3 deals with the research problems and hypotheses and explains the research methodology. A discussion of the sample and the reasons for and application of the statistical analysis techniques concludes the third chapter.

In Chapter 4 the results of the analysis are presented and interpreted.

Chapter 5 discusses the outcome of the study by comparing the research results with the previous studies and the underlying theoretical framework.

Chapter 6 concludes with a critical summary of the investigation and recommendations for further research.

CHAPTER TWO

SIGNIFICANT PRIOR RESEARCH

2.1 INTRODUCTION

In this chapter, the results of prior research with relevance to the field of study are presented. The background of the development of Assessment Centres is discussed. The theoretical base of the Career Path Appreciation is introduced to explain the meaning of the Appreciation's outcomes.

2.2 ASSESSMENT CENTRES

2.2.1 Introduction

Two references introduce the rationale of Assessment Centre technology. According to Williamson and Schaalman (1980, quoted by Britz, 1984a, p. 16) prediction of future behaviour relies on the "psychodynamic inference of unobservable constructs ... drawn from observable behaviour".

The observable behaviour is the "basic unit for consideration" in potential assessment rather than the creation of hypotheses about hidden constructs (such as motivation) of an individual (Godfried and Kent, 1972, quoted by Britz, 1984a, p. 16).

According to Asher and Sciarrino (1974, quoted by Britz, 1984a, p. 16), samples of behaviour correlate

better with work behaviour than do tests.

Samples of behaviour form the basis of the Assessment Centre procedure.

2.2.2 The procedure

Many of the facts about the background of the Assessment Centre procedure are obtained from Britz (1984b). He developed the Assessment Centre used in this research and his work is often quoted.

The history of Assessment Centres in South Africa goes back to the middle 1970s. By the beginning of the 1980s a body that promoted and monitored Assessment Centre technology in South Africa was formed. The procedure was by then well-developed overseas and perceived as credible.

World-wide, since the beginning of the seventies, more emphasis has been placed on a scientific (or at least a responsible technological) base for managerial activities. During the seventies, Assessment Centres, in use since the Second World War, already had a firm research-base and a high face-validity which appealed to users.

Assessment Centres call for the observation of candidates in different work-related simulations. Observation takes place by multiple assessors through multiple assessments.

Publicity about centres helped spread their popularity as did the perception of "culture-freedom" of the procedure (in comparison with selection by means of psychometric testing that was frequently contested in American courts).

Moses (1975, quoted by Britz, 1984a, p. 18) states that an Assessment Centre should

> consist of a standardised evaluation of behaviour based on multiple inputs. Multiple trained observers and techniques are used. Judgements about behaviours are made, in part, from specially developed assessment situations. Those judgements are pooled by the assessors at an evaluation meeting during which all relevant assessment data are reported and discussed, and the assessors agree on the evaluation and dimension of the candidate and any overall evaluation that is made.

The design requirements (summarised by Britz, 1984a, p. 19) are therefore:

1 multiple assessment techniques, including simulation,
2 specially trained observers,
3 the integration of observers' information,
4 the separating of final evaluation from observation,
5 tested and relevant exercises to elicit specific responses,
6 assessed dimensions which must be based on relevant work analysis,
7 techniques which must provide the information needed to assess.

According to Britz (1984a, p. 20), Assessment Centres use from three to 15 groupings of managerial behaviour, called dimensions.

Each dimension is observed in different exercises by

different observers. This increases the validity of the observations because it restricts the influence of possible personal bias by the individual observer. In general the ratio of observers to participants is one-to-two. A further restriction of individual bias is that decisions are made on the basis of observations by the whole group of observers.

Several studies (quoted by Britz, 1984a, p. 25-26) researched the ability of psychologists, line managers and non-professionals to act as observers. Virtually no differences in the ratings were found (correlations of 0.93). Other quoted studies show that observers observe better after training. It is therefore possible that the extensive training of observers is essential for the success of Assessment Centres. Observers are also not allowed to observe candidates who are their friends or who work in the same department.

Another possible source of error in Assessment Centres is that a participant's performance can be influenced, particularly in group exercises, because of the presence of another individual. To combat this, the centre used in this study includes more than one group exercise and the composition of groups for each exercise is different.

The Assessment Centre used in this research was originally developed at the South African Transport Services - probably the largest users of Assessment Centres in South Africa in the 1980s. The centre consists of a background interview, executive council, analytical problem, counselling interview, and an in-basket exercise. The focus of centres is behaviour. Non-ability aspects (such as motivation) are rated and based on behaviour. In this regard,

Bray (1991, p. 7) points out that the interview forms an important basis to which we can compare behaviour.

Through the five exercises, thirteen dimensions are evaluated, namely: self-development, initiative, tenacity, analytical ability, judgement, flexibility, utilisation and development of subordinates, empathy, decisiveness, task-structuring, reasoning power, oral presentation, and planning and organising.

Six observers, including three administrators, are used to observe and then evaluate the behaviour of twelve candidates.

2.2.3 The managerial dimensions

The thirteen dimensions of managerial behaviour observed at the Assessment Centre used in this study, can be grouped in five management areas. The areas were determined by factor analysis of the dimensions and are therefore summary labels for groups of observable behaviour.

The information sources pertaining to the dimensions are Britz (1984b) and the participant notes of the Assessment Centre at the Career Development Centre.

The combination of the first three dimensions form the management area of drive, i.e. self-motivation:

1 Self-development: The degree to which a person develops him/herself physically, mentally and psychologically (in the context of the centre) for a higher managerial position. Evidence of the person's effort to see him or herself as a manager and to develop as a manager will be participation in community activities,

management course attendance, and involvement in a comprehensive reading programme on management.

2 Initiative: The ability, ingenuity, alacrity to originate ideas, and initiate activities without being urged on. The two aspects are ability and willingness to initiate out of the person's own accord and secondly, the resourcefulness, originality and creativity of, for instance, problem-solving and decision-making activities. This calls for pro-active behaviour, not reactive behaviour. The underlying causes of problems must be addressed and not only the symptoms.

3 Tenacity: A person's ability to persevere in spite of opposition or obstacles. Qualitative time and energy spent to complete a task. The effectiveness and adaptability (not mere repetition) of a strategy in the context of a group may also call for a compromise of personal objectives in favour of group objectives.

The next combined set of three dimensions form the management area of decision-making skills. These skills are often used in problematic and doubtful situations, or conflict.

4 Analytical ability: To grasp a problem and to delve to its root causes and analyse them. The collecting and analysing of relevant information in all its breadth and depth is important. The asking of penetrating questions in group activities and the quick grasping of implications is evidence of analytical ability.

5 Judgement: A consideration of what the

consequences of a decision will be, gives proof of a good (positive consequences) or bad (negative consequences) decision. Evidence of judgement is in the consideration of consequences and the tactful reaction to the ideas of others.

6 Flexibility: This implies a readiness to consider new ideas, methods or circumstances versus dogmatic adherence to personal standpoints. Other credible ideas may lead to the adjustment of personal views.

The four dimensions that follow combine to form the area of leadership. This is the ability to influence the behaviour of others.

7 Utilisation and development: Delegating so that the subordinate is also responsible for the final decisions. This gives subordinates the opportunity to exercise their judgement and initiative. Training, job enrichment, and similar principles are applied. Evidence of this is seen in the manager's reaction of giving effect and credit to deserving suggestions.

8 Task structuring: Part of the process of influencing others is to structure tasks in such a way that the goals can be realised. It relates to measures ensuring group effectiveness and giving momentum to the modus operandi. This must enhance confidence as well as ensuring correct action.

9 Decisiveness: Firm and assertive decision-making without unnecessary hesitation, also the acceptance of the responsibility of the

consequences. The manner is assertive, not aggressive and not over-decisiveness that resembles autocratic or dogmatic stances.

10 Empathy: A genuine and active concern for others' needs and feelings. Personal encouragement, recognition and appropriate involvement can be used for motivation.

The next two dimensions are communication skills in a one-to-one situation or formally in a group. This area refers to qualitative and spontaneous communication.

11 Reasoning power: The ability to generate convincing arguments spontaneously and to achieve a purpose - in quantity and quality.

12 Oral presentation: A prepared presentation or fluent and logical speech which has impact on the audience.

The last dimension is the management area of administrative skills.

13 Planning and organising: This refers to longer and shorter term objective-setting, priority setting, development of alternatives, evaluation of alternatives and the choice of the best alternative. Organising the scheduling of the alternatives, co-ordination of activities, and control through feedback is often associated with the effective use of a diary.

2.2.4 The measurement scale of Assessment Centre data

Little is said about the status of the data of Assessment Centre measurement in prior research literature.

All available studies, treat Assessment Centre data as belonging to the interval scale. In the comprehensive meta-analysis of Assessment Centre validity by Gaugler, Rosenthal, Thornton and Bentson (1987), the issue of measurement scale is not mentioned. These authors state that some correction of the statistics is necessary, but this was to compensate for sample size and other differences between studies in the meta-analysis.

Britz (1984a and 1984b) provides a clue to the nature of Assessment Centre data when he states that the criteria scores are normally distributed in his study of 670 managers. This does not refer to the Assessment Centre scores on their own. .

All available studies about Assessment Centres use parametric statistics which belong to interval measurement scales. Based on the extent of the research, this is accepted as the norm. An assumption such as this is in line with behavioural science practice (Runyon and Haber, 1984, p. 32).

2.2.5 The reliability of Assessment Centres

Reliability and validity are the factors of objectivity (Anastasi, 1982, p. 26-27). Reliability refers to the consistency of scores of a test. A

test is valid if it tests what it is supposed to be testing.

Reliability is therefore an internal factor determining the credibility of the techniques used and the results of the application of the techniques.

Reliability is achieved if different assessors achieve the same assessment results. This is called inter-assessor reliability. Britz (1984a, p. 31) quotes studies that report correlations between different assessors findings of 0.69 to 0.97.

To reach the Assessment Centre total score one of two approaches applies. Assessors reach consensus about the Assessment Centre total score or a a numerical formula is used to calculate the total score from the subscores. Studies show that the numerical technique come to the same results as consensus 95% of the time (Sackett and Ryan, 1991, p. 18). The consensus method can therefore be replaced by the numerical technique. This reliability makes it possible to use videotaped behaviour in cases where all assessors are not available on the same site.

Moses (1973, quoted by Britz, 1984a, p. 50) attempted to determine the reliability of the Assessment Centre procedure. Two different Assessment Centres over a period of time are compared with each other. A correlation between overall performance on the two centres is 0,73 for the total group.

According to Sackett and Ryan (1991, p. 19) there is no valid evidence that coaching in Assessment Centre exercises, especially by ex-candidates, improves results. Mixed effects are recorded. The same authors state that reading ability seems to have an

influence on the candidates' performance.

Several factors were studied to determine the reliability of the Assessment Centre procedure. The studies quoted here indicate acceptable reliability.

2.2.6 Internal validity

An aspect that is closely associated with reliability is internal validity.

A test is valid when it tests what it is supposed to test (Anastasi, 1982, p. 27). For this purpose an external criterion is usually used.

Internal validity is therefore a measure of the validity of a subtest where the criterion used is an internal criterion, namely another subtest. Internal validity determines if coherence among the subscores of a test exists.

Significant correlations for the internal validity of Assessment Centres are found by Dulewicz, Fletcher and Wood (1983, p. 19). They correlate the exercise scores with the overall assessment rating. Their findings and that of Bray and Grant (1966, quoted by Dulewicz, et al., 1983) shows similar results.

Bray and Grant factor-analyse the inter-correlations for two groups of management trainees. One group is college graduates and the other group not. The average communality is 0.64 (graduates) and 0.57 (not graduated). This consistency indicates internal validity. The significance level used was 0.001.

2.2.7 External validity or criterion-referenced validity

2.2.7.1 Introduction

A test is always an indication of something else which is related to the test. Achieving high scores on an Assessment Centre is not of importance. It is only of importance if it indicates that you will be successful in the criterion, that is, be a successful manager. If the test does not indicate, or predict with a certain degree of accuracy, successful behaviour in the criterion, then it is a waste of time. For this very reason, controversy exists about the value of academic examinations.

Test items need not always resemble behaviour to be predicted. The empirical correspondence between the test and the predicted behaviour must only correspond empirically (Anastasi, 1982, p. 23). In the case of assessment centres, the test items resembles the work situation closely. The Career Path Appreciation is an interview and claims to make use of at least one work sampling technique. The test items do not resemble the work situation closely.

Criterion-related validation is an indication of the effectiveness of a test in predicting an individual's behaviour in a specific situation (Anastasi, 1982, p. 137). For example a test for managerial potential is measured against management job performance.

There are two types of criterion-related validation (also called external validity): Predictive validation and concurrent validation.

Ideally a predictive validation is needed to

establish the validity of any psychological procedure aimed at predicting behaviour. The test results must be validated against the criterion of actual behaviour. Anastasi (1982, p. 137) describes the time-interval between the prediction of the test and the criterion situation as being longer when the predictive validity is sought.

The criterion-referenced validity is thoroughly discussed in this report to establish the credibility of the Assessment Centre. This is necessary because the Assessment Centre results are used in this research as the criterion for a concurrent validation.

2.2.7.2 Important general validation studies about management potential

Many studies compare Assessment Centres' results with other procedures such as management appraisals and with factors such as subsequent management success.

One of the most important studies on predictive validity available was conducted at the American Telephone and Telegraph Company (AT&T). AT&T used the Assessment Centre procedure in 1956 to assess 422 employees. Two thirds were college graduates and one third was non-college employees who were considered for managerial positions. The importance of the study lies in Bryan and Grant's report (1966 quoted by Britz, 1984a, p. 46), that to minimise contamination, the results were not announced, but used for research purposes only.

The result of this AT&T project are available. The salary and job grading levels of those who were still employed in 1965, are reflected in a study by

Dunnette (1971, quoted by Britz, 1984a, p. 92). The possible shortcoming of Dunnette's study is that by 1965 only 130 employees remained at AT&T. However, of the remaining employees, 82% of the college graduates were identified correctly and 75% of the non-college employees advanced to appropriate management positions. Of those who did not advance, the global prediction was correct in 94% of the cases.

Out of a sample of 6 000 cases, further studies at the same company (Moses, 1972) reports correlations of 0.44 with job level changes (quoted by Gaugler, et al., 1987, p. 499).

Hinrichs (1978) conducted a follow-up of 46 candidates over a period of eight years in a different milieu. Only 30 candidates remained in the study after the eight years. While after one year the correlation between Assessment Centre results and job level was r = 0.26, the correlation was r = 0.46 after the eighth year.

In a meta-analysis of 50 Assessment Centre studies, a corrected mean for all validities of 0.37 is found (Gaugler, et al.,1987, p. 493). This is considered very low in comparison with the validities of the components of Assessment Centres (Jones, Herriot, Long and Drakeley, 1991, p. 1).

In the 30-year follow-up of 301 candidates from the British Civil Service, Anstey (1977, p. 152) reports that only 21 failed to reach or exceed the expected job grading based on the Civil Service Selection Board (an Assessment Centre) procedure. The original appointed sample was 421. 122 candidates were not considered for the follow-up study because they were

not in the employ of the Service anymore. The reasons stated for the drop-outs are mostly legitimate. Only three who left because of inefficiency in their positions. The original selection through this procedure allowed for prescreenings to eliminate large numbers of original applicants for positions.

In a summary study published by Cohen, Moses and Byham (1974, quoted by Britz, 1984a, p. 47), the results of nineteen centres are reported. This study finds a median of prediction validity "over all studies, median r = 0.33;in predicting job performance, median r =0.33; in predicting job potential, median r = 0.63; and in predicting job progress, median r = 0.40." Assessment Centres predict management potential better than job progress or performance.

All the results quoted so far compare well with validity coefficients for other Assessment Centres of between between 0.33 and 0.41 with job proficiency and 0.63 with promotion (Hunter and Hunter, 1984, quoted by Stamp, 1988a, p. 2).

Most studies quoted in this chapter consist of sample sizes of less than 100 cases. There are, however, a few studies with more than 1 000 cases.

All findings of available longer-term studies on Assessment Centres, necessarily show a decrease in sample sizes. The fact that these drop-outs are not included in further studies is a shortcoming. One is not able to establish their job levels to verify the quoted positive correlations. It is, however, widely accepted that the prediction of Assessment Centres, with regard to managerial potential, remains valid

over long periods.

2.2.7.3 Choosing the appropriate criteria

The importance of the selection of the appropriate criteria for predictive validation studies is accentuated by some authors. The following discussion of prior research relates to the selection of criteria. Sackett and Ryan (1991) conducted the study.

As mentioned, several studies attempt to evaluate the ability of Assessment Centres to predict promotion potential. Borman's research (1982, quoted by Sackett and Ryan, 1991, p. 11) shows that the results were significantly correlated with successful performance in training. This can be seen on the US Army recruiter training programme. This is valuable because Assessment Centres are often used to determine development areas.

Tziner and Dolan (1982, quoted by Sackett and Ryan, 1991, p. 11) found that while both Assessment Centre scores and intelligence test scores correlate significantly with training success, the combination of the two sets of scores increases the correlation from 0.40 to 0.50. It compares well with Stamp's reports that the correlation of cognitive ability with training success is 0.55 and with job proficiency 0.45 (Stamp, 1988a, p. 3).

Sackett and Ryan (1991, p. 12) go on to report that supervisor evaluation, interviews, and personality tests show poorer correlation with training success than Assessment Centres.

It is Bray (1991, p. 6) that points out that the

motivational aspects are important considerations when Assessment Centres are compared with training success. Not all people are motivated to advance, and personality characteristics may influence the achievement of training goals.

In this quest to prove that Assessment Centres predict promotion potential, it is therefore important to remember that training success does not guarantee job performance. While training success and Assessment Centre results are related, it is, to prove promotion potential, more relevant to compare Assessment Centre results with job performance - however, job performance data is more difficult to obtain than training results.

2.2.7.4 Manager ratings as criterion

In a study to determine the correlation of Assessment Centres scores and manager ratings as well as peer and subordinate ratings, Schmitt, Noe, Meritt and Fitzgerald (1984, quoted by Sackett and Ryan, 1991, p. 13) find that the Assessment Centre scores are positively related to the job performance ratings.

2.2.7.5 Assessment Centre results and age

In the meta-analysis of Gaugler, et al. (1987, p. 504) it is stated that in their investigation of the 50 Assessment Centres, no relation between the average age of assessees and the predictive validity is found. Britz (1984a and 1984b) makes no mention of investigations of age and Assessment Centre results.

Boroughs, Rollins and Hopkins (1973, quoted by Dulewicz, Fletcher and Wood, 1983, p. 16) as well as

Slivinski, Yan and Richter (1977, quoted by Dulewicz, et al., 1983) found negative correlations between Assessment Centre results and age. Mental ability and Assessment Centre performance correlations are also inconclusive.

2.2.7.6 Concluding remark

Although some doubts about the validity of longitudinal studies of Assessment Centre results may exist because drop-outs are not included in the follow-up, the many studies of validity are unanimous in their findings which show that Assessment Centres are valid in the prediction of several factors including potential and job progress. The support, continuous use, and acceptance of Assessment Centres by the business community can signify its face-validity.

2.2.8 Content validity

The purpose of content validity studies is to determine whether Assessment Centres representatively samples important job behaviours. Byham (1980, p. 27) noted that the following relationships are essential in Assessment Centres:

1 dimensions must be related to important job activities;
2 exercises must represent the most common and most significant job activities; and
3 the dimensions must be observable in exercises.

Sackett and Ryan (1991, p. 15) point out that content validity is usually high, that is, exercises represent the most common and significant job activities and that the dimensions are related to

important job activities.

As important as content validity is assessor skill, job analysis and exercise design.

To point out the importance of exercise design, Sackett and Ryan (1991, p. 17) report that they as well as Turnage and Muchinsky (1982, quoted by Sackett and Ryan, 1991, p. 17), found that ratings of different dimensions made in the same exercise were highly correlated while ratings of a dimension in different exercises showed lower intercorrelations. This is probably because behaviour is situation specific. It is therefore critical that exercises simulate situations that form part of the job.

2.2.9 The question of prescreening

Biased selection of candidates for an Assessment Centre will produce biased results (Thornton & Byham, quoted by Warmke, 1991, p. 23). Prescreening is a form of biased selection for good reasons.

There are many reasons why prescreening takes place. Warmke (1991, pp. 23-24) lists the reasons to conduct good prescreenings:

1. Savings - especially for selection.
2. Employee morale/job satisfaction in order to minimise "failures".
3. Legal concerns. (Although prescreening may disqualify certain candidates from a selection process. Care must be taken that the prescreening process is legally defendable.)
4. Assessment Centres are not infallible.

Prescreening is therefore important to minimise the risks that lead to employee morale problems. Apart from the aspects already covered, improper administration can also add to Assessment Centres which are invalid.

The purpose of the prescreening, in summary, is to increase the validity of the predictions.

One of the prescreening activities is recommendations by line managers. The exact validity of managerial recommendation is unknown, but since managerial nomination often concentrates on typical job performance, it can be useful as a prescreening technique.

It must be noted that prescreening per se may be sufficient to predict success of lower level jobs. Apparently because of the less tangible nature of more senior level managerial positions, prescreening does not seem to predict success as well as prescreening techniques predict success on the lower levels (Warmke, 1991, pp. 32-33). There is also evidence showing that more senior candidates see the developmental opportunities of Assessment Centres in a more serious light (Boehm, 1991, p. 35).

2.2.10 Concluding remarks about Assessment Centres

The research results presented here show that it can be accepted that Assessment Centres predict management potential.

The question now arises that if senior level management potential can be predicted by Assessment

Centres - and if Assessment Centres do not give conclusive evidence about mental ability - will a procedure which looks more exclusively at the cognitive area select the same candidates who display senior management potential or not?

2.3 CAREER PATH APPRECIATION

2.3.1 Secondary data about Career Path Appreciation

Little information about the Career Path Appreciation procedure is published. A possible reason for this is that Stamp's Institute of Organisational and Social Studies (BIOSS) at Brunel University is self-funding. The work of this institution all over the world may therefore depend on their competitive edge in the form of the Career Path Appreciation.

Two dissertations mention the Career Path Appreciation procedure. Bishop (1989) investigated the required and preferred approaches to work and the corresponding levels of capacity of nurses. She used Jaques' Stratified Systems Theory and the Career Path Appreciation procedure to survey work complexity, job satisfaction and fair pay. This study did not critically seek to validate the Career Path Appreciation procedure but to establish nurses' attitudes about their salaries in view of the complexity of their jobs. This concept of "fair" pay is discussed later on in this chapter.

Perlmutter (1990) investigated the phenomena of cognitive complexity and time perspective in an attempt to maximise scarce human resources decision-making. She found that the Stratified Systems Theory

provided a sound basis to analyse the way in which an organisation is structured and to identify pseudo-levels. In this way better productivity, recognition and better use of employees' capacities could be achieved.

All Stamp's own publications are identified (1980, 1981, 1986, 1988a, 1989a, 1989b, 1989c, 1989d, 1989e, 1990) and listed in the list of references. Documents belonging to BIOSS at Brunel University and used in the training of Career Path Appreciation administrators was studied. Permission to quote the papers has to be obtained. Only two of these documents (1988b and 1988c) are therefore referred to in this report.

2.3.2 Introduction

It is commonly accepted that adults develop. They also develop at different rates. This makes assessment difficult, but essential.

The Career Path Appreciation procedure of predicting potential in the cognitive domain is based on the Stratified Systems Theory of Elliot Jaques. The procedure was developed by professor Gillian Stamp of the Brunel Institute of Organisation and Social Studies (BIOSS) at the Brunel University, Uxbridge, where Jaques used to work. According to Stamp (1988a, p. 5), the Stratified Systems Theory forms a solid base for the construct validity of the Career Path Appreciation procedure.

That is, the theory:

1 enhances content validity, i.e. defining work so

that predictors can be designed or decided upon;

2 ensures that predictors and criteria are in a common domain;

3 provides explicit guidelines about development and individual differences (Stamp, 1988a, p. 4).

A brief introduction to Stratified Systems Theory highlights the essential elements applicable to this study.

2.3.3 Stratified Systems Theory

2.3.3.1 Introduction to the theory

Stratified Systems Theory is developed from the research work of Jaques from the 1950s to 1970s in various industries in various countries. Work is defined as "the exercise of discretion within prescribed limits in order to reach a goal within a stated completion time" (Jaques, 1975, quoted by Stamp, 1988a, p. 6).

Through the discussion of its important elements, it is clear that the definition provides a description which is precise enough to allow measurement under certain conditions.

Jaques (1985, p. 235) explains that the exercise of discretion is a function of the individual's psychological equipment, cognitive power and opportunity. The tools of the psychological equipment are knowledge and skills. Temperament, wisdom, interests and values determine the psychological equipment's orientation (Jaques, 1989, p. 15). Aspects of cognitive power are discussed later. The definition needs some explanation first.

The "exercise of discretion" takes place within boundaries, in the form of policies, norms, procedures and regulations set by the organisation. Discretion refers to the choices an individual must make in order to imagine, formulate and execute a course of action that is not prescribed (Stamp, 1989d, p. 5). At certain levels in the organisation the choices are often based more on imagination and less on concrete data. Discretion is therefore applied in different ways depending on the data available to guide the individual in making choices. Jaques identified the phenomenon that the complexity of the work increases if the exercise of discretion is based on less tangible variables.

Complexity also increases if the time-span of an activity increases. Time-span is the "by-when" part of completing a task - that is the longest maximum-target-completion-time set for the output (Jaques, 1989, p. 16). Jaques (1976) found that individuals perceive the "weight" of the exercise of discretion to be more if the time-span of an activity is longer. The reason for this may be found in the fact that the exercise of discretion is unassessed for as long as an activity takes to complete. In this way responsibility can be measured in terms of time-span in an objective and quantifiable way.

The weight of responsibility does not refer to the degree of difficulty of the task.

Time-span is an indication of the limits of a task (deemed completion time which is an external factor) as well as the (internal) perception of the weight of responsibility (Stamp, 1988a, p. 9).

Jaques's further research (1977, quoted by Stamp,

1988a, p 9), involving 250 000 people in 25 countries, showed remarkable correlation between the time-span of work and salary in organisations - 0.90 correlations are confirmed. Levels within organisations and the time-span of activities also correlate with each other.

The Stratified Systems Theory indicates these work levels of complexity as bounded work strata. There are currently seven such strata identified. The strata depict time-spans from three months through to time-spans ranging from between 20 to 50 years.

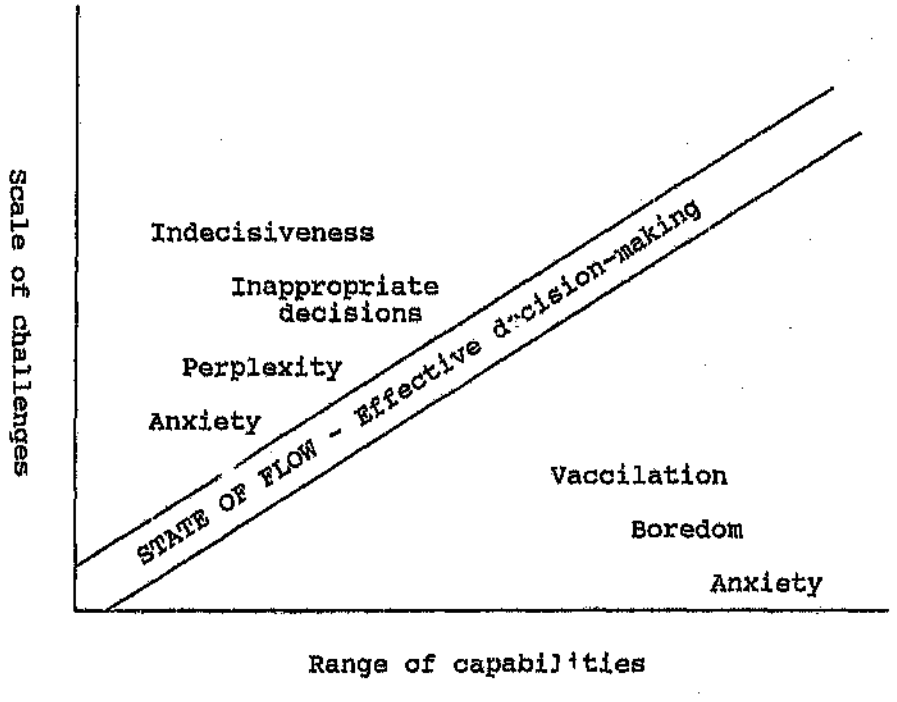
2.3.3.2 The "flow" concept

Jaques, already in 1956 (quoted by Stamp, 1988a, p. 11) related the patterns of mastery of different strata of work in a person's life as an increasing strive towards more use of personal discretion and demand for "fair" pay for this work. The amounts of discretion were however not the same in all individuals. There is a relationship between the pay that is demanded and the capacity for discretion that is perceived to be fair. When individuals use more discretion than what is perceived to be fairly paid for, they perceive an imbalance within themselves. This equilibrium principle works both ways - underutilised and overburdened.

The demand for one's salary or wages to match discretion indicates that a possible intuitive sense of one's comfort zone exists.

The "flow" concept of Csikszentmihalyi (1975, quoted by Stamp, 1988b) explains the environment of discretion (refer to Figure 2.1). The use of discretion to make sound judgements involves the

interplay of the scale of challenges of the task, and the range of capabilities of the individual. It is in this interplay that the importance of the additional supporting elements, that Jaques' added to the definition (knowledge, wisdom and so forth), is accentuated. This interplay determines the effectiveness of the individual's judgement or discretion.



Range of capabilities

Figure 2.1: The "flow" concept
(Adapted from Stamp, 1989a, p. 29 and Stamp, 1988c, p. 3)

Overutilisation (when the scale of challenges exceeds the range of capabilities) of a person or underutilisation (when the range of capabilities exceeds the scale of challenges) leads to ineffective decision-making based on either indecisiveness or vacillation.

According to Csikszentmihalyi (1975, quoted by Stamp, 1988b, pp. 24-29) being either overstretched (by challenges in view of one's capabilities) or underutilised, the occurrence of anxiety and stress is the outcome. A state of equilibrium is however not fixed, but changes as an individual and an organisation develops. Challenges offered by work must grow with individual capabilities and vice versa. This requires pacing of the growth of the organisation and its employees. This pacing aims to establish and maintain an inner coherence as well as to establish and maintain connections between the organisation and its environment.

The name Appreciation is apt because of the notion that, over time, a person's capabilities appreciate (Stamp, 1989b, p. 12). This appreciation of challenges may not be happening in the organisation. For this reason the flow concept is an important part of the understanding of the Career Path Appreciation procedure.

From the studies about "fair" pay it is clear that a person can apparently identify his or her present point of balance. Jaques's research (1967, and a later study by Evans, 1979, both quoted by Stamp, 1988a, p. 13) on equitable pay, identified a logarithmic and smooth curve of future development of the points of balance. This projection closely follows the "sigmoidal progression characteristic of

biological growth" (Stamp, 1988a, p. 14).

Capacity is thus seen as multi-modal. The boundaries between different levels of complexity are discontinuous, says Jaques (1985, p. 382) and he quotes the work of Harvey, Hunt and Schroder (1961) and Streuffert and Streuffert (1978) in support of the concept. Stamp (1988, pp. 22-23) quotes Wijnberg (1965) and Homa (1967) who confirm the existence of a modal development curve, and Richardson (1971) who supports the concepts of fair pay and time-span. He found a direct linear relationship between the two aspects. In a follow-up study, Kohler (1982, quoted by Stamp, 1988, p. 24) confirmed the development curves by a study of 52 employees over 40 years.

Studies involving large numbers of people in diverse situations seem to prove Jaques's theory. The validity and reliability of the concepts seem to be sufficiently tested to assume that the Stratified Systems Theory is currently an acceptable explanation of work in organisations.

This does not mean that all individuals' career paths function in the exact way as described by the Stratified Systems Theory. There may well be other theories about successful development curves or career paths. The work of Driver (1982) expose interesting phenomena in this regard. The Stratified Systems Theory is however a well-researched and very comprehensive explanation of organisational career paths. Furthermore, the aim here is to study the use of two procedures in organisations where senior managers can be found distinctly from middle and other levels of management.

While focusing on the larger organisation, this

study, on the other hand, does not negate that there are possible similarities of decision-making in smaller and "non-traditionally" functioning organisations. To generalise in this regard is not the aim of this research project.

2.3.3.3 The strata of work

A brief introduction to the different identified strata of work in organisations, based on complexity and time-span is necessary. The sources of this explanation are Stamp (1988, pp. 12-13), and Jaques (1989, pp. 20-30).

Stratum I: Direct work level
(Direct judgement over a time-span of one day to three months.)

Direct and concrete hands-on operator or clerical work. Decisions are made about the best way to manipulate physical materials, use tools or touch people so that an immediate and direct change will occur. The individual will continue along a prescribed linear route, use previously learned methods to overcome immediate obstacles, and get continuous feedback in order to proceed. Example: operators or clerks.

Stratum II: Operations domain
(Diagnostic accumulation over a time-span of three months to one year.)

A concrete level of abstraction is needed because one can observe what is happening by directly scanning the whole. Executive decisions are made about ways in which people or things are worked with or on. An

individual will reflect on the current activity to anticipate potential problems. This involves consciously accumulating and sorting out data to diagnose emerging problems. The individual initiates actions to prevent or overcome problems. Example: supervisors or first line managers/specialists.

Stratum III: Operations domain
(Alternative paths over a time-span of one to two years)

Decisions still involve a concrete level of abstraction but consider the various ways in which established means can best be realised. That is imagining and preplanning all possible ways, selecting the best ones, making the most of people and technologies to realise the chosen ways. This is the level of running an operating unity. Example: Unit managers/specialists or middle managers.

Stratum IV: General domain

(Parallel processing over a time-span of two to five years)

The level of abstraction increases sharply. This level is concerned with the relationship between the mission of the organisation and the means necessary to realise it. Developing new means, co-ordinating existing means and terminating ineffective means are this level's concerns. An individual will process several interacting projects, pacing them, resourcing them and make tradeoffs to maintain progress towards the goal. Example: production or sales general manager/specialist.

Stratum V: General domain

(Unify a whole system over a time-span of five to ten years)

The individual considers and judges changing situations and consequences with many variables. Executive decisions about the organisation itself are made to keep it in existence both now and in the future. Adjusting and integrating the internal environment and linking with the external environment while sensing the multiple effects of all the variables on the pursued plan, are the challenges. Example: business unit general manager or specialist.

Stratum VI: Strategic domain

(World-wide diagnostic accumulation over a time-span of 10 to 20 years.)

Work on this level concerns executive decisions about building and maintaining networks. These monitor and filter world-wide trends which provide a transnational context for the long-term success of strategic operating units. Example: strategic group executives.

Stratum VII: Strategic domain

(Put business in society over a time-span of 20 years or more.)

Executive decision about critical resource masses required for new strategic units. The individual pursues alternative world-wide strategic plans and produces stratum V units through development, acquisitions and/or mergers, drawing on international

financial resources. Example: corporation chief executives.

Each level supervises the activities of the level directly below it. Senior general management (the focus of this study) in most organisations, is stratum V. This includes the people who will be the general managers of substantially large organisations or business units. These units can be seen as unified whole independent systems.

2.3.3.4 The cognitive states

Stamp (1986, p. 387) explains each of the strata in terms of cognitive states. Jaques (1986, p. 382) explains cognitive power as

> the ability of individuals to form and pattern the world in which they live in a manner that allows them to construct goals and organise their approaches in achieving them.

Jaques (1985, p. 234) explains that the world of the individual has a certain "scale and complexity" that has to do with the "information being processed". This explanation makes it clear that the person has the ability to interact with his or her environment in a certain way. In so doing he or she may form or create something and realise it. The differences between these abilities (if not already clear) are finally presented in Table 2.2.

This study will not investigate the cognitive domain theories, but Stamp's explanation, duplicated in Table 2.2, may clarify the strata further.

Each stratum maintains some aspect of the previous

stratum's work while adding the new state.

TABLE 2.2: STRATA OF COGNITIVE STATES

Source: Stamp, 1986, p. 387

Time frame	Stratum	Cognitive state
20-50 years	VII	Extrapolating requirements for new complex work systems & creating such systems
10-20 years	VI	Defining work, objectives & relationships with the environment of complex work systems
5-10 years	V	Shaping a complex work system
2-5 years	IV	Transforming existing work systems by comparing them to existing alternatives
1-2 years	III	Extrapolating from current trends to fine-tune a work system to respond to changing requirements
3 months-1 year	II	Defining work at stratum I, planning & controlling aggregates of tasks
1day-3 months	I	Shaping concrete materials or individual behaviour

While the first stratum's shaping may be to know (or feel - in the intuitive sense) when the right amount of pressure is applied, the same shaping capability in stratum seven is to be sensitive to minor events that could trigger significant events. The extrapolating capabilities of stratum seven are not expected at any other level.

The explanation of strata of work shows that each stratum contributes a distinct competence to the organisation. The scale of challenges in an organisation will determine which strata of work must be present to make it viable.

There are two aspects with regard to Stratified Systems Theory which are often misconceived. It must be accentuated that the Stratified Systems Theory is not an attempt to grade positions. Stratified Systems Theory attempts to explain the strata of complexity of work in an organisation in terms of discretion and time-span. One should also not confuse difficulty with complexity. A very difficult or intricate task can be performed at stratum one, because it contains little discretion or complex judgement.

If the levels of work in an organisation are not present in their correct form, pseudo-levels are established (Stamp, 1988b, p. 22). These pseudo-levels are costly in terms of value addition, the loss of sense of shared purpose, techniques and purpose not matched, resistance to change, blocked communication and eventual disintegration of the organisation. For this reason it is essential that a state of flow or fit between the individual's capabilities and the organisational challenges is maintained.

2.3.4 Validation of the Career Path Appreciation procedure

One of the most important concerns about the validation of the Career Path Appreciation procedure (and for that matter any behavioural science-related technique) is the status of the data. In the case of the longitudinal studies quoted with respect to the Career Path Appreciation procedure, the product-moment coefficient r is mostly used to determine the relationships between the sets of data. Because the development curves represent discontinuous strata (described in the previous section), it is likely that the data is nonparametric and should therefore be treated as such. These are however the only studies available. On the other hand some authorities (Runyon and Haber, 1984, p.32) hold that it is acceptable common practice to treat data in the behaviour sciences as parametric, as most practitioners are willing to assume that their scales achieve interval measurement .

The purpose of quoting validity indications is not to compare the different companies' results - there are too many possible organisational differences - but to get an idea of the validity of the procedure in different settings. Where, in the case of longitudinal studies, the original author combined data from different samples (from different settings, such as Stamp, 1988a, p. 41) those studies were ignored.

Some research about the external or criterion-referenced validity of the procedure is available.

Longitudinal research (Stamp, 1988a, pp. 44-48) stretching over a period of four to thirteen years in

various companies in various parts of the world, show predictive validities of between 0.70 and 0.92.

In a career path study of non-dominant group employees in Namibia, a five year follow-up of 124 employees was conducted. This study does not mention the drop-out rate. The correlation between the actual level of work, after five years, versus predicted level of work is 0,918 (Stamp, 1989b, p. 17). An important contributing factor in this case was, without doubt, the reported careful career planning and career development approach in the company. In many companies career planning is probably more occasional. It is also possible that the results of the Appreciation procedure were known to the candidates' managers or others who decided on the promotion of the candidates in this study. This is not uncommon practice because Career Path Appreciations are conducted to assist in the "mapping" of employees' career paths. If so, this factor is an important confounding variable in this study.

Stamp makes the statement that an evaluation of intrinsic capability can be made regardless of sex, education or ethnic background. She bases the statement on a world-wide study and experiences in developing countries (1989b, p. 18).

Criterion-referenced validity studies investigating the congruence between informal managerial assessments and the Career Path Appreciation procedure are also available. Correlations, using the same samples as the longitudinal studies (Stamp, 1988a), are between 0.71 and 0.86. It is also a common phenomenon that candidates who are assessed through the Career Path Appreciation procedure agree

that the outcome and their own perception of their capabilities correlate with each other (De Kock, note 1, confirmed by Stamp, note 2).

The quoted longitudinal studies have some design characteristics which may question the scientific value thereof. Follow-up was not performed on candidates who left the organisations. (The same shortcoming is pointed out in the discussion of the longitudinal studies concerning Assessment Centres.)

No research concerning the internal validity of the procedure is available. The consistency of the different administrators' findings must be studied. There are discussions among users of the procedure and information sharing does take place. This may help to control the reliability of the results. The contribution of the phrase and symbol cards is also not empirically determined.

However pragmatic it may seem, the use of the Career Path Appreciation procedure is growing and managers are selected for senior positions based on the procedure's results.

2.4 CONCLUSION

Based on this brief review of prior research - regarding the two procedures - one can conclude that although dealing with predominantly different methodologies (work-sampling through symbol cards and structured and semi-structured interviews versus simulation and other exercises which includes an interview), the outcome is to predict the potential of a manager to function at the appropriate level of work. This is the case even though the focus of the

procedures is different (i.e. complexity capabilities versus managerial behaviour). Career Path Appreciation claims to evaluate the possible success of a manager's comfort in decision-making based on discretion. Assessment Centres see this decision-making as one of the success factors manifested in the behaviour of a manager.

The discussion in the first two chapters refers to the rapid growth in the use of Career Path Appreciations and the remarkable validity figures reported by Stamp and her associates. This evidence suggests that one cannot ignore the Appreciation procedure. There are however questions about the limitations of the small amount of research conducted on the Career Path Appreciation. So far the research cannot be accepted blindly.

It is beyond the scope of this study to validate the Career Path Appreciation longitudinally. It was decided to compare the Appreciation with a very well-established assessment procedure, the Assessment Centre.

Several questions about the two procedures can be asked:

1 To what extent are the two procedures measuring similar constructs?
2 Is it redundant to use both procedures? Specifically, could the Career Path Appreciation be considered as having the potential to replace the much costlier Assessment Centre as suggested by Stamp?
3 What is the relationship between the various results obtained from the Career Path Appreciation and those obtained from the

Assessment Centre?

4 Is it possible that the aspects assessed by the two procedures are factors of age?

5 How do the results of the two procedures relate to the current Paterson grade of the candidates?

The next chapter states the research problems and the hypotheses. The discussion in the next chapter clarifies the methodology employed to investigate the research problems. The use of the statistical analysis techniques and the assumptions underlying the techniques are explained.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

In this chapter the research methodology and the sample are described. The research problems and the hypotheses are stated, the assumptions discussed and the statistical technique introduced.

The purpose of the Career Path Appreciation is to predict managerial effectiveness in the longer term. The criterion for this procedure is the effective application of discretion at different levels of work as the individual moves along his or her career path. The predicted level of capability, where the individual will reach maturity and probably make the most significant contribution in his or her working life, is of particular interest. Depending on the current age of the candidate, this career path may stretch over many years.

The scope of this research allows no time for the longer term follow-up of candidates whose career path potential is measured. For this reason concurrent validation is sought.

3.2 THE RESEARCH METHODOLOGY

3.2.1 Introduction

Anastasi (1982, p. 137) describes concurrent validation as the test administration on a group for which the criterion data is already available.

This research follows the route of comparing the Career Path Appreciation results with the results of another validated test, the Assessment Centre procedure. A brief discussion of the two procedures follow to highlight their contributions to the assessment and the prediction of potential.

Assessment Centres diagnose the existing status of candidates. The prediction here is that if someone can display behaviour associated with senior management now, given the opportunity, he or she will be able to do so successfully in the future as well. The procedure makes some statements about possible development in as much as it gives the candidate an indication of managerial dimensions where he or she already displays appropriate behaviour, dimensions that can be seen as developmental areas, and dimensions where fine-tuning is appropriate. There are, however, different Assessment Centres for different levels of management. One application of the procedure may therefore not provide an indication of effectiveness on all levels of management. For this reason, junior, middle and senior management Assessment Centres are conducted. It is pointed out in the previous chapter that the reason why senior management Assessment Centres are more popular is because research showed that lower level potential can be validly assessed through more economical means such as manager and/or peer ratings.

Career Path Appreciation asks a concurrent question and then predicts that the person will progress along a specific path of increasing ability. In Figure 3.1 in Chapter 2, one can see that "progress" is not strictly true if the Appreciation takes place at a stage when the person has already achieved his or her maximum level of capability. The purpose of the procedure is to establish the likely career development path a person will follow in the future.

Both procedures focus on the future effectiveness of the individuals in the work situation.

The availability of the criterion data - in this instance, displaying behaviours associated with senior management - is helpful in a concurrent study because its availability makes the research simpler, quicker and less expensive.

3.2.2 The Assessment Centre used in this study

The information in this section is obtained from the work of the original designer of the Assessment Centre, Britz (1984a and 1984b) as well as the Assessment Centre administrator, Den Ouden (1985 and Note 3).

The dimensions in this study are similar to those used to describe managerial success by most organisations in the world.

A thorough mix of exercises and techniques is used. The exercises include a background interview, a counselling interview, an in-basket exercise, an analysis problem, and an executive council. The

exercises are constructed in such a way that assessors can observe the candidates in a variety of situations: prepared and unprepared, group and individual, competitive and group supportive, and with or without appointed roles.

The background interview collects facts about the dimensions, provides the observer with the candidate's background and clarifies questions about the centre. The interview is semiformal and structured, individual and conducted in private.

The background interview is accepted as an important and valuable part of an Assessment Centre.

Two leaderless group discussion are part of the Assessment Centre: an executive council and an analysis problem. The executive council makes use of a prepared discussion and the candidates represents the departments of an organisation in the form of role playing the positions. The content evokes conflict between departmental, organisational and group interests. The analysis problem is a case study. A written report of findings and recommendations, and an oral presentation is followed by a leaderless group discussion. This exercise resembles committee work.

The role play of the counselling interview provides the candidates with a prepared opportunity to play the role of a subordinate's manager in an individual situation. The subordinate's role is structured and played by an assessor. Because this is such a realistic simulation of the manager's job, the validity of the counselling interview is highly regarded.

The in-basket exercise consists of thirty items which have to be worked through in three hours. It involves the areas of obtaining and developing personnel, maintaining an effective relationship with the community as well as allowing the candidate to demonstrate his or her technical, human and conceptual skills. A questionnaire and an interview follows the in-basket exercise in order to establish the candidate's insight and decision-making.

Possibly the most extensive research is conducted about the in-basket exercise in the Assessment Centre. Studies show that this exercise has a high predictive validity, content validity and reliability (Brostoff and Meyer, 1984, p. 18). It can be seen as the most important exercise at the Assessment Centre.

Table 3.1 represents the spread of dimensions assessed through the various exercises.

Objective and normative observation is the key to an Assessment Centre. The selection, training and maintaining of the observers are systematically planned and conducted.

The following rating scale applies:

5 - Excellent
4 - More than adequate
3 - Adequate
2 - Inadequate
1 - Poor
0 - No opportunity to demonstrate.

The exponential character of this five point scale gives an indication that it is more difficult to achieve a two than a one, three than a two, and so

forth. This normal five-point scale is considered to be continuous (Britz, 1984b, p. 235). Discrete in-between scales are however added in.

TABLE 3.1:
COVERAGE OF DIMENSIONS IN DIFFERENT EXERCISES
Source: Britz, 1984a, p. 65

	EXERCISES				
DIMENSIONS	Back-ground inter-view	Execu-tive coun-cil	Coun-sel-ling inter-view	Analy-tical problem	In-bas-ket
Self-development	X				
Initiative	X	X		X	X
Tenacity		X		X	
Analytical ability		X		X	
Judgement		X	X	X	X
Flexibility		X	X	X	X
Utilisation & development	X	X	X		X
Empathy		X	X		X
Decisiveness		X		X	X
Task structuring		X		X	X
Reasoning power		X	X	X	
Oral present.		X		X	
Planning & organising	X			X	X

Several specific in-between scales are used to indicate conflicting evidence or the need for coaching or counselling. Candidates are compared against the norm and not with each other. Observation patterns and the discussion of candidates' performance take place in a sequence to ensure the uniform application of the norms.

Cross-checking of decisions takes place in the group discussions between observers and administrators.

Inter-correlations between the dimensions of the Assessment Centre used at the Career Development Centre and five specific criteria of managerial success is investigated by Britz (1984b and 1984b). Significant correlations between the criteria of management and the dimensions are found. It shows product-moment correlation coefficients between centre results and five specific criteria for management success to be between 0.55 and 0.62 for the overall assessment rating. For individual areas (where the thirteen dimensions are grouped into five areas) the rating is between 0.33 and 0.75 (Britz, 1984b, p. 83).

The five criteria for management success referred to in the previous paragraph, are:

1 the management and development of subordinates;
2 goal achievement;
3 the quality of action plans;
4 the quantity of action plans; and
5 implementation of action plans.

These results compares well with validity coefficients for other Assessment Centres discussed in the previous chapter.

A longitudinal study conducted of candidates who were assessed, also show positive results.

3.2.3 The Career Path Appreciation procedure

The discussion in Chapter 2 sets the scene for a procedure that identifies the current and past points of balance in coping with complexity. Stamp (1988a, p. 28) describes this current level of capability as:

> the person's capability at a particular age to generate and to respond to complexity within the world, within him/herself and in the constant work needed to keep both in equilibrium.

Stamp (1988b, p. 30) describes a Career Path Appreciation as:

> a guided interview with an individual about the present, past and future of their working life. The interview has a double purpose; it is concerned with the decision-maker and with decision-making. For the decision-maker it offers a review of working experience and a tool for development. From the point of view of decision-making, it offers a review of capabilities within the whole or a part of the organisation.

Seeing complexity as a generic work element at all levels of work, the Career Path Appreciation procedure sets out to observe judgement and discretion in action with minimal instructions and no rehearsal. The interview includes (in this order) phrase cards about approaches to work, a sorting exercise to discover a sorting rule and an interview

questioning past work experiences and future expectations.

The composition of the Career Path Appreciation procedure seems to encourage reliability. Both the interview about work experiences and the exercise with the phrase cards are unlikely to be coached by someone who previously completed a Career Path Appreciation because the subprocedures are highly individualised. The sorting exercise has no single correct answer and the sorting rule is therefore not revealed to candidates. Because of these factors, as well as the cross-checking between the subprocedures, candidates' performance in all three subprocedures is unlikely to be contaminated by previous candidates' coaching or advice. Formal studies in this regard have not been conducted.

Through the procedure, a person's present level of capability is determined and can be plotted against the growth curves to identify future potential. The Career Path Appreciation procedure can therefore be seen to:

1 assess the present relationship between a person's ability to use discretion and the work he/she performs,
2 consider the history of this relationship,
3 consider the likely future relationship, and
4 create awareness of internal resources which are available.

The Career Path Appreciation procedure attempts to use work sampling and work traits as predictors during the procedure. These characteristics are also found in the Assessment Centre procedure.

The Career Path Appreciation procedure identifies the individual's current point of balance between his or her capacity to master the cognitive complexities and the challenges of specific strata of work. This point is then matched with the development curves and extrapolated to determine the individual's likely career path.

Age plays an important role in the determination of the career path. If a young person show a current ability to master complexity that matches a high stratum of work he or she will be placed on a steep career path curve. If an older person show the same current ability his or her identified career path curve will be relatively flat. There is a diagram of the development curves in Figure 3.1. The effect of age on the determination of a career path curve can be demonstrated by comparing a 30 year old with a current capability of low level IV (place the candidate on the borderline between level III and level IV) with a 40 year old person with the same current capability. The 30 year old will be on the middle mode VI career path, while the 40 year old will be on the high mode IV career path.

In other words, the procedure firstly identifies the current level (stratum of work) of capability. Secondly, according to the development curves, likely future points of capability are plotted to determine the path of development. The likely boundary of a person's career path is referred to as a work mode (Stamp, 1986, p. 388). The level at which the individual's career path should reach maturity indicates the number of the work mode (refer to Figure 3.1).

The development curves show on which stratum an

individual can reach maturity in his or her career path. This does not mean that the person currently operates on that stratum. Their current capacity may, depending on factors such as age, be on a level or even levels below their development potential. Using Figure 3.1 one can determine that a mode VI manager will be capable to work on level III at age 25, on level IV at age 35, and on level V at age 45. This is why a Career Path Appreciation report will always indicate a person's current level of actual work, current level of capability, work mode (or career path) and age. The current level of actual work compared with the current level of capability will indicate current overstretching or underutilisation (refer to Figure 2.1 in Chapter 2).

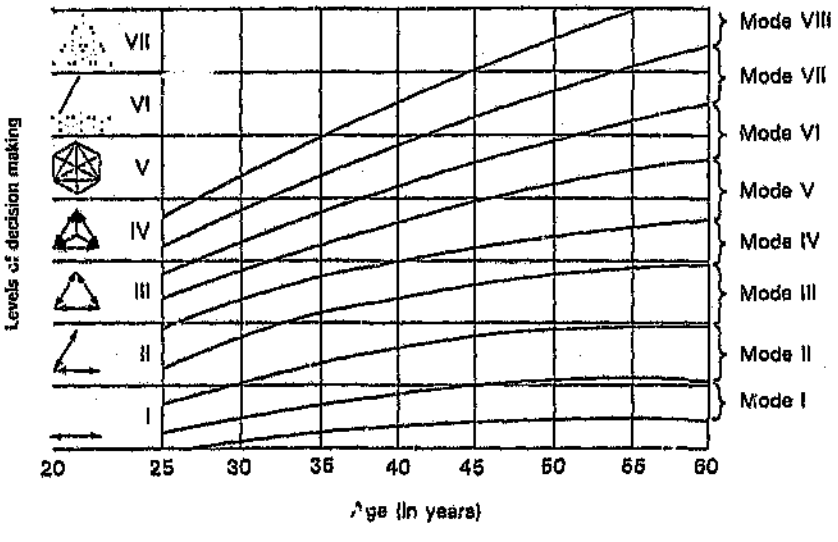


Figure 3.1: Array of time frame curves.
Source: Stamp, 1989b, p. 13.

Each work mode is divided into bands, namely low, medium, or high. A point of balance can also be identified as being on the border between two work modes (such as mode 4 high bordering mode 5 low [4H5L], or mode 5 low bordering 5 medium [5LM]).

3.2.4 Types of capability

The procedure also identifies the type of capability. The types of capability are indicated with A, B, C, D, or E. Someone can therefore be indicated as Mode IV High D, that is, on a career path reaching maturity in the upper fourth stratum of work and approaching the work according to type D of the capability typology.

Brief explanations of the capability types follow.

Type A: Knowledge-in-action

Constantly in touch with the work as it progresses while paying close attention to detail especially through observation. Often a specialist.

Type B: Trial and error

Prefers to learn by doing. Relies on current experience with occasional reflection. Often a generalist.

Type C: Operate and analyse

Alternate between knowledge-in-action and knowledge-in-reflection. Create the context, marshal the

strengths of others and get involved with the work to help only if really necessary.

Type D: Logical analysis

Filter immediate experience through ideas and concepts. Detached in the sense that thorough logical analysis requires.

Type E: Knowledge-in-reflection

Little knowledge-in-action. Prefer to look for the unusual and original idea. Detached from the actual.

Each level of work can be approached through any of these types of capability. In some cases an individual may display a combination of the types in his or her approach to work. The effectiveness of an individual in the capacity of a manager will be influenced by his or her capability type.

3.2.5 Concluding remarks

The standard senior management Assessment Centre at the Career Development Centre was employed to assess the sample. The standard Career Path Appreciation was employed to appreciate the sample. In both cases qualified staff conducted the assessments in their normal course of duty. Two separate groups of people administered the two procedures in order to minimise moderation of the results.

All data is used and presented in such a way as to not reveal the candidates' identity.

Through the Assessment Centre procedure the following data about each case in the sample is obtained:

1 displayed behaviour classified in 13 dimensions, rated in terms of adequacy;
2 dimension ratings combined in five managerial effectiveness areas;
3 overall Assessment Centre performance (cumulative score).

The Career Path Appreciation procedure makes the following information available:

1 Current capable level of work;
2 Mode of development (stratum of maturity);
3 Type of capability (approach to work).

Biographical data add:

1 Age;
2 Current position (and job grading);
3 Several other aspects which are worthwhile to use for further exploration if comparisons of the two procedures are inconclusive.

3.3 THE STATEMENT OF THE RESEARCH PROBLEMS

3.3.1 The first subproblem

The first subproblem is to conduct a concurrent validation of the Career Path Appreciation procedure as a senior management assessment procedure.

This refers to the criterion-related validity.

3.3.1.1 Comparisons with Assessment Centre scores

The concurrent validation will be conducted by comparing the Career Path Appreciation procedure with the recognised senior management assessment procedure of Assessment Centres.

In this regard the following Career Path Appreciation outcomes are used: work mode (level of capability where maturity will be reached), current level of capability, and type of capability. Each of these outcomes is compared with the following Assessment Centre scores: total assessment score, the five areas of management, and the 13 dimensions.

The concurrent validation will also establish if the procedures are redundant.

Because there are 31 categories of work mode indications in the Career Path Appreciation data, a cluster set of this data is compared separately with all the Assessment Centre scores.

The 31 work mode categories are made even more complex with the addition of the nine possible types of capability to form the "total score" or career path indication. A further cluster set, including both work modes and the capability types are also compared with all the Assessment Centre scores.

The use of the cluster sets will help to explain the relationships found in the comparisons of the individual scores.

3.3.1.2 Comparisons with current Paterson grade

Another factor the Career Path Appreciation can be compared to is the Paterson job gradings of the cases in the sample. The Paterson post gradings indicate on which level of management are the current positions of the sample. In this way the Paterson grading is a factor associated with senior management.

The association of both procedures with the current Paterson grading of the cases in the sample is investigated. This investigation aims to establish which of the procedures has the closer association with this factor.

The results of the comparisons will tell if the procedures indicate that those cases who display senior management potential are on senior Paterson grades.

The Paterson grading is an indicator of formal managerial assessment of a candidate's current ability. As discussed, comparisons of procedures with formal management evaluation is an accepted measure to determine external validity.

3.3.1.3 Comparisons with age

The results of both procedures are compared with age in order to determine whether the procedures determines unique factors of potential or only factors inevitable because of physiological development. It is important to note that age is already a factor in establishing the work mode of the career path (refer to section 3.2.3 for the explanation).

3.3.2 The second subproblem

The second subproblem is to investigate the relationship between the Career Path Appreciation work modes, current levels of capability and the types of capability. The purpose of this analysis is to produce the results of an exploratory investigation into the Career Path Appreciation procedure to further our understanding of the procedure and to provide further research questions.

3.3.3 The hypotheses

3.3.3.1 Comparisons with Assessment Centres

Based on the prior research referred to in Chapter 2, it is hypothesised that there will be a significant correlation between the results of the two procedures.

Both procedures focus on future management potential. These are compared to similar criteria in the prior research and both procedures are found to produce significant indicators of managerial potential.

3.3.3.2 Comparisons with Paterson grading

When comparing Paterson grading and Assessment Centre scores, the job grades are expected to correlate well with the scores. the reason for this being that the grading is an indication of managerial rating of present effectiveness as a manager. Prior research shows that Assessment Centre scores compare well with managers' ratings.

It is hypothesised that the current levels of capability measured by the Career Path Appreciation will significantly compare with Paterson job gradings. If candidates are in "flow" (scale of challenge and scale of capabilities are balanced [refer to Figure 2.1]) there will be a significant correlation between the current level of capability and the Paterson grading.

The finding of no significant correlation between current level and the Paterson grading, or the finding of a negative correlation, has one of two meanings. Either most cases in the sample are out of "flow" (current capabilities and challenges are not in balance) or the procedure is not measuring accurately and is therefore not valid.

Career Path Appreciation work modes and Paterson job grading levels are not expected to correlate, because different paths of development are identified.

It is hypothesised that types of capability and Paterson job gradings will not correlate significantly. The basis for this hypothesis is, as explained in section 3.2.4 that any level of work can be approached from any of the types of capability.

3.3.3.3 Comparisons with age

It is hypothesised that Career Path Appreciation outcomes will not correlate with age, because the theoretical basis of the procedure determines that different career paths are followed at different rates in peoples' development.

It is accepted that experience is gathered over time. Older employees may therefore have gathered more over

the years. The type of experience that constitute effective managerial behaviour is specific. Assessment Centres establish whether those behaviours are displayed by the candidates.

It is hypothesised that the Assessment Centre scores will not show significant positive correlations with age. In the discussion of prior research about Assessment Centres (in Chapter 2) results are quoted which state that several studies found no correlation between Assessment Centre results and age.

3.4 THE SAMPLE

The sample consists of 319 managers from large companies who attended the same senior management Assessment Centre and who completed a Career Path Appreciation. The positions occupied by these managers are mainly in the fields of engineering, accounting, information processing, mining, geology, personnel, administration, and general management. The companies are mainly in the Anglo American and Gencor groups. All the candidates are assessed to determine senior management potential.

The criteria for inclusion in the sample were: completion of both the Assessment Centre and Career Path Appreciation procedures, and an indication by the organisational system that the candidate is to be considered for assessment of senior management potential. This indication could be the opinion of the candidate's manager, the candidates' own request (after due consideration of his/her manager) or a formalised career development system. This system allows candidates (according to criteria such as a specific level of seniority, with specific

qualifications, after a certain period of time) to attend an Assessment Centre as part of the career development process. In all cases the candidates' own willingness is an important consideration for participation.

No other selection for inclusion in the sample took place.

In some cases some of the biographical data was not available. Where appropriate, those cases were not considered for analysis.

A form of preselection took place in this sample. It is therefore important to point out that neither the candidates for the Assessment Centres, nor the candidates for the Career Path Appreciation used in this study were selected at random. They were specifically chosen for the assessment because they were considered for possible senior managerial positions. This is standard procedure in the case of Assessment Centres and often the procedure in Career Path Appreciation because of time, manpower and financial constraints. This preselection represents standard procedures in the organisations.

The table in Annexure 1 shows the distribution of the sample in terms of age, job grading and the scores from the two procedures. As mentioned earlier, some data is missing and therefore the number of cases is indicated. For only 259 cases is Paterson job grading available. The type of capability for six cases is not noted. The clustering of the work mode and type of capability is influenced by this absence of the type indications and consists of only 312 cases.

Although from different companies, the cases in this sample are mainly from two large corporations in the mining industry. This factor may limit the generalisation of the results. Houston's research about the culture in the mining industry involved senior and middle managers from that industry (1990). He found that the culture is mainly bureaucratic in a utilitarian compliance structure.

In conclusion, while not a random sample of all employees, this sample does represent a good set of potential managers from companies in two large corporations.

3.5 STATISTICAL ANALYSES

3.5.1 Important assumptions

Parametric statistical techniques were frequently used in prior research of both of the procedures. The absence of verification (especially with Career Path Appreciation data) lead to the more conservative approach in this research project. All data is therefore treated as ordinal.

3.5.2 Comparing the two procedures

The concurrent validation is achieved through the comparison of the Career Path Appreciation procedure with an accepted indicator of senior management potential, namely the Assessment Centre procedure. This is achieved by comparing the Career Path Appreciation procedure's indication of work mode, current level of capability and type of capability with the Assessment Centre scores for each dimension, with the Assessment Centre areas of management

scores, and with the overall assessment rating. The technique employed is the Spearman rank correlation coefficient.

The correlation coefficient is a strength measurement of the linear relationship between two variables (Groebner and Shannon, 1989, p. 717).

3.5.3 Further explanation of the comparisons

To further explain the relationship between the two procedures cluster sets of work modes and cluster sets of work modes and types (the "total score" of the Career Path Appreciation procedure) are used.

A brief introduction to cluster analysis explains the contribution of cluster sets in the study.

Cluster analysis starts with undifferentiated items and group them in homogeneous groups (Emory and Cooper, 1991, p. 655). This study used the K-means algorithm technique to classify the items in clusters This results in a minimising of the within-cluster sum of squares (Hintze, 1987, p. 149). Because there are numerous arrangements, the algorithm finds an optimum in which no movement of an observation between clusters will reduce the within-cluster sum of squares.

The clusters are compared with the Assessment Centre scores in the same manner as the raw Career Path Appreciation data.

Career Path Appreciation results are categorised in 31 possible work mode categories and nine classifications of types of capabilities. Cluster analyses may identify the cluster sets associated

with the senior management groupings. The cluste , are valuable supporting data which can be compared with the Assessment Centre scores in or ler to help explain the relationship better.

3.5.4 Comparisons with Paterson grading

To expand the concurrent validation, the correlations between Paterson job gradings and the Assessment Centre totals are analysed.

Paterson gradings (as a known indication of managerial level) is furthermore compared with the Career Path Appreciation type of capability (approach to work) to compare the strength of the linear relationship between the two variables. The statistical technique used here is, like before, Spearman's rank correlation coefficient. Both sets of data are ordinal.

Spearman's rank correlation is also used to compare the Paterson grading with the current level of capability. Again, both sets of data are ordinal.

3.5.5 Scatter plots

Scatter plots are drawn to determine the relationship between the Career Path Appreciation data, the biographical data and the Assessment Centre data are drawn. These plots can be indications of whether any relationships between two variables exist (Groebner and Shannon, 1989, p. 49).

The scatter plots may also serve as a graphic orientation to the nature of the data in this study.

3.6 SIGNIFICANCE LEVEL

Since this research is mainly exploratory in nature, the significance level of 0.05 is chosen. This will allow an acceptable level of significance in the field of behavioural sciences when hypotheses are accepted.

A significance level lower than 0.05 may cause undue rejection of the hypotheses.

3.7 CONCLUSION

3.7.1 Introduction

To conclude this discussion about the research approach, the hypotheses are stated without discussion.

3.7.2 Career Path Appreciation and Assessment Centre results

The results of the two procedures will correlate significantly and positively.

3.7.3 Paterson grading

3.7.3.1 Assessment Centre results

The results of the Assessment Centre and Paterson gradings will correlate significantly and positively.

3.7.3.2 Career Path Appreciation current level of capability

The current level of capability will correlate significantly and positively with Paterson post gradings.

3.7.3.3 Career Path Appreciation work modes

The Career Path Appreciation work modes and Paterson post gradings will not correlate significantly.

3.7.3.4 The Appreciation types of capability

Types of capability and Paterson gradings will not correlate significantly.

3.7.4 Comparisons with age

3.7.4.1 Assessment Centre scores

Assessment Centre scores and age will not correlate significantly.

3.7.4.2 Career Path Appreciation results

Career Path Appreciation results (i.e. work modes, current level and type of capability) and age will not correlate significantly.

The comparison results between the different sets of data are presented in the next chapter. Hypotheses are accepted or rejected based on these results.

CHAPTER FOUR

RESEARCH RESULTS

4.1 INTRODUCTION

Spearman's rank correlation coefficient determined correlations between all the variables. These correlations are reported in this chapter.

The results are presented in the following order:

1 Acceptance and rejection of hypotheses;

2 Verification of reliability and internal coherence of the Assessment Centre results;

3 Relationships among the Career Path Appreciation results;

4 The usefulness of the scatter plots.

The decision rule for hypothesis rejection an all the analyses is that the correlation must be more significant than 0.05 in order to be accepted.

Annexure 2 contains the Spearman multiple correlation coefficient matrix with the results of the analysis. Tables and figures presents extracts of this matrix to explain specific aspects related to this study's aims.

4.2 CORRELATIONS BETWEEN THE CAREER PATH APPRECIATION RESULTS AND THE ASSESSMENT CENTRE SCORES

4.2.1 Introduction

The purpose of the comparison of Career Path Appreciation results and Assessment Centre scores has two aims. Firstly, it aims to conduct a concurrent validation of the Career Path Appreciation. Secondly, it investigates the redundancy of the two procedures.

The Career Path Appreciation procedure allows the user to obtain the work mode (likely path of career development), current level of capability and the type of capability (approach to work) of an individual. Annexure 3 contains an anonymous sample of a Career Path Appreciation report to illustrate the outcomes of the procedure.

Assessment Centre scores are presented in three different ways:

1 There are scores which reflect performance in each one of the 13 behaviour dimensions.
2 The dimensions are combined in five areas of management. Combination scores are calculated for each area of management.
3 The Assessment Centre total score is the sum of all the areas of management scores.

The hypothesis for this comparison is that the results of the two procedures will correlate significantly and positively. The hypothesis is accepted.

To verify the correlations between the sores, a cluster analysis of

4.2.2 The results

4.2.2.1 Work modes and Assessment Centre scores

The Career Path Appreciation work modes correlate positively and significantly with all the Assessment Centre scores excluding the dimensions of empathy, flexibility and judgement.

Table 4.1 lists the correlations. Although significant, the correlations explain only between 3% and 17% of the variance between variables.

The highest correlation is between work mode and the Assessment Centre total score (0.44).

Of the areas of management (grouped dimension scores), the communications area (0.42) shows the highest correlation with work mode. The area of administrative skills (0.21) shows the lowest correlation with work mode. This area consists of only one dimension: planning and organising.

Another area of management score which shows a low correlation with work mode is decision-making (0.27). It is this area that contains the scores of the dimensions of flexibility and judgement.

The highest correlation between work mode and the dimensions is with oral presentation (0.40).

The second highest correlation is with the dimension of tenacity (0.33). The area of drive (of which

tenacity is a dimension) also has the second highest correlation of the areas of management with work mode.

TABLE 4.1: CORRELATIONS BETWEEN MODES AND ASSESSMENT CENTRE SCORES

Assessment Centre variable	Correlation with CPA mode	% of variance explained
Total score	0.44*	19.36
Areas:		
Drive	0.38 *	14.44
Decision-making	0.27 *	7.29
Leadership	0.29 *	8.41
Communication	0.42 *	17.64
Administrative	0.21 *	4.41
Dimensions:		
Self-development	0.26 *	6.76
Initiative	0.23 *	5.29
Tenacity	0.33 *	10.89
Analytical	0.25 *	6.25
Judgement	0.08	
Flexibility	0.06	
Utilisation & D	0.19 *	3.61
Decisiveness	0.21 *	4.41
Task-structuring	0.24 *	5.76
Empathy	0.06	
Reasoning power	0.28 *	7.84
Oral presentation	0.40 *	16.00
Planning & org.	0.21 *	4.41

* Significant at the 95% level

4.2.2.2 Current levels of capability and Assessment Centre scores

Career Path Appreciation identifies the level of work where the candidate is currently most capable. It should be pointed out that the current level is not an indication of managerial potential, but that work mode is.

The correlations between the Career Path Appreciation current levels of capability and Assessment Centre scores are shown in Table 4.2.

Most of the correlations between current level and Assessment Centre scores are significant. Current level of capability does not correlate with the three dimensions of empathy, flexibility and judgement.

TABLE 4.2: CORRELATIONS BETWEEN CURRENT LEVEL AND ASSESSMENT CENTRE SCORES

Assessment Centre Variable	Correlation with CPA level	% of variance explained
Total score	0.32*	10.24
Areas:		
Drive	0.28*	7.84
Decision-making	0.15*	2.25
Leadership	0.28*	7.84
Communication	0.31*	9.61
Administrative	0.10	
Dimensions:		
Self-development	0.17*	2.89
Initiative	0.19*	3.61
Tenacity	0.31*	9.61
Analytical	0.17*	2.89
Judgement	0.04	
Flexibility	-0.02	
Utilisation & D	0.16*	2.56
Decisiveness	0.20*	4.00
Task-structuring	0.25*	6.25
Empathy	0.02	
Reasoning power	0.28*	7.84
Oral presentation	0.26*	5.88
Planning & org.	0.10	

* significant at the 95% level

There is one other dimension that current level does not correlate with: the dimension of planning and organising (and therefore also the management area of administrative skills).

There are no significant negative correlations in this section.

4.2.2.3 Types of capability and Assessment Centre scores

The Career Path Appreciation type of capability indicates the candidate's approach to work.

This variable does not predict management potential as all types can be associated with all work modes. In specific environments this may however be an important variable to give an indication of fit into the environment of the work.

Type of capability correlates significantly with many of the Assessment Centre scores as indicated in Table 4.3

4.2.2.4 Comparing work mode clusters with the Assessment Centre results

The Career Path Appreciation work mode clusters show the same pattern of correlations with the Assessment Centre scores as the work modes and the Assessment Centre scores. All the significant correlations between the work mode clusters and the Assessment Centre scores are however smaller. The three dimensions that show no correlation with work mode also shows no correlation with the work mode clusters.

The correlations are presented in Table 4.4.

TABLE 4.3: CORRELATIONS BETWEEN CPA TYPE OF CAPABILITY AND ASSESSMENT CENTRE SCORES

Assessment Centre Variable	Correlation with CPA type	% of variance explained
Total score	0.16*	2.72
Areas:		
Drive	0.13*	1.74
Decision-making	0.12	1.44
Leadership	0.12*	1.44
Communication	0.16*	2.56
Administrative	0.09	
Dimensions:		
Self-development	0.17*	2.89
Initiative	-0.02	
Tenacity	0.13*	1.69
Analytical	0.09	
Judgement	0.05	
Flexibility	0.10	
Utilisation & D	0.10	
Decisiveness	0.05	
Task-structuring	0.13*	1.69
Empathy	0.12*	1.44
Reasoning power	0.09	
Oral presentation	0.12*	1.44
Planning & org.	0.09	

* significant at the 95% level

4.2.2.5 Comparing Career Path Appreciation clusters with Assessment Centre results

While there was no correlation between any of the Career Path Appreciation results and the dimension judgement, there is a significantly positive relationship between judgement (0.12) and the Career Path Appreciation clusters. The Career Path Appreciation clusters are formed by combining the work mode and the type of capability of each case.

Other significant correlations between the Career Path Appreciation clusters and Assessment Centre scores are listed in Table 4.4.

TABLE 4.4: CORRELATIONS BETWEEN MODE CLUSTERS AND ASSESSMENT CENTRE SCORES, AND CPA CLUSTERS AND ASSESSMENT CENTRE SCORES

Assessment Centre variable	Correlation with CPA mode cluster	Correlation with CPA cluster
Total score	0.28*	0.13*
Areas:		
Drive	0.20*	0.09
Decision-making	0.20*	0.14*
Leadership	0.20*	0.08
Communication	0.25*	0.13*
Administrative	0.16*	0.09
Dimensions:		
Self-development	0.12*	0.08
Initiative	0.12*	-0.02
Tenacity	0.18*	0.09
Analytical	0.17*	0.13*
Judgement	0.11*	0.12*
Flexibility	0.07	0.04
Utilisation & D	0.16*	0.09
Decisiveness	0.13*	0.00
Task-structuring	0.17*	0.05
Empathy	0.04	0.00
Reasoning power	0.12*	0.05
Oral presentation	0.28*	0.14*
Planning & org.	0.16*	0.09

*significant at 95% level

4.2.2.6 Correlations between work mode and the Assessment Centre clusters

The Assessment Centre total scores are grouped in

clusters. The correlation score between work modes and the Assessment Centre total score clusters (0.45), supports the correlations found between work modes and individual Assessment Centre scores.

4.2.2.7 Conclusion

Although all Career Path Appreciation results do not correlate with all the Assessment Centre scores, the work modes show many significant and positive correlations with Assessment Centre scores. Mode is also the single Career Path Appreciation indication of potential. On this basis the hypothesis is accepted.

4.3 CORRELATIONS WITH PATERSON GRADING

4.3.1 Introduction

Paterson grading reflects the current post grading of the positions held by the cases in the sample. The Paterson grading is therefore an indication of current seniority of candidates. Post grading may also be an indication of managerial rating of the candidate's present capability.

The purpose of the inclusion of the comparisons between Career Path Appreciation results and Assessment Centre scores with the current Paterson post grading is to validate the procedures against the Paterson gradings. If the two procedures correlate positively with one another and with the Paterson grading, it indicates that they probably measure the same constructs.

4.3.2 Assessment Centre score correlations with Paterson grading

The hypothesis is that the Assessment Centre results and the Paterson grading will correlate significantly and positively. This hypothesis is accepted. The correlations between Assessment Centre scores and Paterson grading are significant but small. The results are listed in Table 4.5.

A number of the Assessment Centre scores correlate with current job grading. The highest correlation is with the dimension of task-structuring (0.23). The lowest significant correlation is decisiveness (0.13). The correlation between job grading and Assessment Centre total is 0.22.

Three of the areas of management correlate positively and significantly with job grade. The areas of decision-making and administrative skills do not correlate significantly with Paterson grade.
Not one of the dimensions in the decision-making area of management correlates significantly with grade.

Although several Assessment Centre scores do not correlate significantly with the Paterson gradings, there are important scores (the total score, three of the areas of management and five of the dimensions of managerial behaviour) that correlate with the gradings.

The clusters of Assessment Centre total scores show a significant correlation with the Paterson job grading (0.19). This finding supports the acceptance of the hypothesis.

TABLE 4.5: CORRELTAIONS BETWEEN PATERSON GRADE AND ASSESSMENT CENTRE SCORES, AND AGE AND ASSESSMENT CENTRE SCORES

Assessment Centre Variable	Correlation with Paterson grade	Correlation with age
Total score	0.22*	-0.18*
Areas:		
Drive	0.19*	-0.15*
Decision-making	0.07	-0.14*
Leadership	0.20*	-0.06
Communication	0.20*	-0.16*
Administrative	0.06	-0.16*
Dimensions:		
Self-development	0.16*	-0.14*
Initiative	0.07	-0.06
Tenacity	0.22*	-0.07
Analytical	0.10	-0.12*
Judgement	-0.04	-0.05
Flexibility	0.02	-0.06
Utilisation & D	0.10	-0.09
Decisiveness	0.13	-0.04
Task-structuring	0.23*	-0.03
Empathy	0.03	-0.01
Reasoning power	0.17*	-0.06
Oral presentation	0.20*	-0.18*
Planning & org.	.06	-0.16*

* significant at the 95% level

4.3.3 Career Path Appreciation results and Paterson grading

4.3.3.1 Current level of capability and Paterson grading

The correlations between the different Career Path Appreciation results and job grading are presented in Table 4.6.

The hypothesis states that the Career Path

Appreciation current level of capability and Paterson grading will correlate significantly and positively.

The statistical analysis show that this hypothesis is acceptable. The correlation of 0.50 between the Appreciation current level of capability and the Paterson grading explains 25% of the variance.

TABLE 4.6: CORRELATIONS BETWEEN CAREER PATH APPRECIATION RESULTS AND AGE AND JOB GRADING - ALL SIGNIFICANT AT THE 95% LEVEL

Variable	Mode	Level	Type	Mode C	CPA C
Age	-0.55	0.34	-0.22	-0.36	-0.19
Job grading	0.27	0.50	0.15	0.21	0.13

C = Cluster

4.3.3.2 Work mode and Paterson grading

The hypothesis states that work mode and Paterson grading will correlate significantly and positively.

This is accepted. The correlation between work mode and job grading (0.27) explains 7.29 of the variance between the two variables.

4.3.3.3 Type of capability and Paterson grading

The hypothesis is that the Career Path Appreciation type of capability and Paterson grading will correlate significantly and positively. This is accepted.

There is a significant and positive correlation between the two variables (0.15). This correlation

is however smaller than that of the other two Career Path Appreciation variables with Paterson grading.

4.3.3.4 Clusters of Career Path Appreciation results and the Paterson grading

The correlations between the work mode clusters Paterson gradings as well as the Career Path Appreciation clusters and the gradings are similar to the correlations between the Appreciation results and Paterson grading.

All the correlations in section 4.3.3 are presented in Table 4.6.

4.4 CORRELATIONS WITH AGE

4.4.1 Introduction

The Assessment Centre scores and the Career Path Appreciation results are compared with age as a precaution to ensure that neither of the procedures measure constructs that are merely inevitable factors physiological development.

4.4.2 The results

The hypothesis in both cases is that the results of the procedures will not correlate significantly with age. In both cases the hypotheses are rejected.

The correlations between the Career Path Appreciation work mode, current level, and type of capability with age are significant. Work mode and type of capability correlate negatively with age. Current

level of work achieved a positive correlation with age (0.34).

All the correlations are listed in Table 4.6.

Assessment Centre results correlate negatively with age. Table 4.5 shows these correlations.

4.5 CORRELATIONS AMONG THE ASSESSMENT CENTRE RESULTS

4.5.1 Introduction

The investigation of the correlations among Assessment Centre results aims to verify the procedure's reliability as discussed in Section 2.2.4.2 in Chapter 2.

4.5.2 The results

The reliability of the Assessment Centre is supported by the findings here.

The multiple correlations among the 19 variables are difficult to present in a single table. Annexure 2 contains all the correlations found in the statistical analysis of the data.

There are positive correlations between most of the dimension scores and the Assessment Centre total score. Two of the dimensions (judgement and flexibility) do not correlate significantly with the Assessment Centre total score.

The dimension of judgement correlates significantly with the dimension of utilisation and development

(0.17), and with the area of decision-making (0.31). The dimension of judgement is however one of the three dimensions constituting the decision-making area.

Flexibility is another of the three dimensions in the area of decision-making. This dimension correlates significantly with the management area of decision-making (0.32). Flexibility, like judgement, correlates with utilisation and development (0.16) and also with the dimension of empathy (0.12). This is one of the few dimensions correlating with empathy.

The empathy dimension correlates with the Assessment Centre total score, but there are only a few other significant correlations. Other than with flexibility, empathy significantly correlates with the dimensions utilisation and development (0.21), task-structuring (0.12), and oral presentation (0.16). Empathy is one of the dimensions in the management area of leadership. There is a significant correlation between the dimension empathy and this area (0.31). The correlations between empathy and the areas of communication (0.16) and decision-making (0.12) are also significant.

No significantly negative relationships exist among the Assessment Centre scores.

the internal relationships between Assessment Centre scores indicate reliability. In the next chapter the scores with the smallest number of correlations are discussed further.

4.6 CORRELATIONS AMONG THE CAREER PATH APPRECIATION RESULTS

4.6.1 Introduction

The purpose of the investigation of correlations among the Career Path Appreciation results is to explore the relationships between the three results and to establish whether an internal coherence among the scores exists.

4.6.2 The results

The results show definite internal correlations. All the three results correlate significantly and positively with each other.

The Career Path Appreciation clusters (clusters of the work mode and types of capability together) correlate significantly and positively with the individual Career Path Appreciation results.

The correlations of work mode clusters with all the Career Path Appreciation results are positive and significant. Table 4.7 shows the correlations among the Career Path Appreciation results.

TABLE 4.7:
CORRELATIONS AMONG CAREER PATH APPRECIATION SCORES - ALL SIGNIFICANT AT THE 95% LEVEL

	CPA Variable			
	Mode			
Level	0.53	Level		
Type	0.48	0.34	Type	
Mode C	0.71	0.36	0.32	Mode C
CPA C	0.42	0.24	0.32	0.53

C = Cluster

4.7 SCATTER PLOTS

Scatter plots indicate whether a relationship between two variables exist. In this study scatter plots show some interesting relationships between clusters of data and the raw data.

The data analysis uses three sets of clusters. Two of these sets are of Career Path Appreciation outcomes: the work mode clusters and the clusters of work mode and type of capability combined (referred to as Career Path Appreciation clusters). The third set of clusters is assessment centre total scores clusters.

The scatter plots helped to identify the cases contained in the clusters. There are specific clusters of the Career Path Appreciation work mode that clearly show relationships with higher work modes, while other clusters are closely grouped around lower work modes.

Some of the clusters of Career Path Appreciation work mode associate with higher Assessment Centre total scores and other clusters from the same set do not associate with the higher scores.

None of the clusters is however compared separately with the rest of the data in this study. The main purpose of the sets of clusters in this study is therefore to act as separate variables which are used to verify correlations where appropriate.

There are several scatter plots presented in Annexure 5. These may serve as an orientation to the data.

4.8 CONCLUSION

There are significant and positive correlations between Career Path Appreciation results and Assessment Centre scores. The correlations vary, and the Assessment Centre total score is always part of the picture.

The analysis of the relationship between both procedures and Paterson post grading show significant and positive correlations.

While the hypotheses with regard to the two sets of relationships mentioned above are accepted, the hypotheses with regard to the relationship between the procedures and age are rejected. The correlations between the Assessment Centre scores and age are negative. The Career Path Appreciation work mode and type of capability showed significant but negative correlations.

The presentation of the results and the acceptance or rejection of hypotheses allow the discussion of the research findings in more detail. In the next chapter the research findings presented here are integrated with prior research to reach conclusions.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 INTRODUCTION

The outcome of the analysis presented in the previous chapter, the theoretical framework and the prior research is discussed in this chapter.

5.2 THE ASSESSMENT CENTRE SCORES

The multiple correlations between the different Assessment Centre scores shows that each variable correlates with at least one other variable. Most of the Assessment Centre variables correlate significantly with several other Assessment Centre variables. There is therefore strong evidence that this Assessment Centre shows internal coherence (also called internal validity as mentioned in section 2.2.6 in Chapter 2).

The correlations of the Assessment Centre scores and the only external criterion available (managerial rating in the form of the current Paterson post grading) are significant and positive for most variables. Prior research quoted managerial ratings as a concurrent factor to indicate the validity of Assessment Centres. This study can present the the same correlations of its validity.

5.3 THE CONCURRENT VALIDATION OF THE CAREER PATH APPRECIATION PROCEDURE

5.3.1 Mode and Assessment Centre scores

5.3.1.1 Introduction

Only three of the 19 variables of the Assessment Centre do not show a significant positive correlation with the work mode (i.e. likely career path). All three of these variables are dimensions which also show the lowest correlations with other Assessment Centre scores.

It is therefore accepted that the Career Path Appreciation, measured against the Assessment Centre, is a valid procedure to measure managerial potential.

5.3.1.2 The question of redundancy

The question now arises: are the correlations positive enough to say that the Career Path Appreciation can replace Assessment Centre as a management potential measure (as recommended by Stamp [1990, p. 4])? The answer is no, it cannot.

Anastasi's (1982, p. 145) guidelines state that high correlations between two tests mean that the tests duplicate each other. To indicate redundancy, high correlations of the Career Path Appreciation results and Assessment Centre results are sought. Anastasi states further that moderate (not too high) correlations indicate that the two procedures are valid indicators of the same domain.

This research found many significant correlations between the Career Path Appreciation results and the

Assessment Centre scores. None are high enough as to indicate duplication.

To illustrate this evaluation it is pointed out that the correlations indicate the percentages of the variance between variables. In the comparison between the two procedures the highest correlation is between Career Path Appreciation work mode and Assessment Centre total score (0.44). The percentage of variance explained by this correlation is 19.36%.

The meaning of the moderate correlation of the two procedures is that most of what is measured by the Assessment Centre is not measured by the Career Path Appreciation. Furthermore, there are three dimensions in the Assessment Centre which do not correlate significantly (the 95 per cent level of significance is used) with the Career Path Appreciation. Assuming that these three dimensions validly represents aspects of management, they would be left out of any decision based entirely on the Career Path Appreciation.

The moderate correlation of the two procedures makes it possible to accept that the Career Path Appreciation is probably a valid indicator of the same domain as Assessment Centres, namely management potential. The two procedures are sufficiently correlated to see that they do measure something in common. We cannot assume from this that this something is management potential but he fact that both the procedures correlate with the Paterson grading does support that conclusion. To prove that both procedures measure management potential a longitudinal study has to be conducted with a more satisfactory criterion than current Paterson grade.

5.3.1.3 Judgement and flexibility

It is mentioned that there are three dimensions that do not show significant correlations with work mode. The dimensions are judgement, flexibility and empathy.

Interestingly enough, two of these variables, the dimensions judgement and flexibility, appears (based on the theoretical background) to be linked with the domain of the Career Path Appreciation. As pointed out, the dimensions of flexibility and judgement show the lowest correlation with other Assessment Centre variables.

Low internal correlations among Assessment Centre results is not problematic if these results correlate with the criterion. This is the case. Britz (1984b, p. 83) indicates that the dimensions of empathy and judgement correlate significantly and positively with all five criteria of management success (discussed in section 3.2.2 in Chapter 3). The dimension of flexibility correlate significantly with two of the criteria, namely management of subordinates and goal achievement.

The definitions of judgement and flexibility presented in section 2.2.2 of Chapter 2 are not incompatible with the explanations of discretion in section 2.3.2.

There are at least two possible explanations for the lack of correlation between the Career Path Appreciation work mode and the dimensions of judgement and flexibility. One explanation has to do with sample variety and another with the background of the cases.

The median score for judgement and flexibility on the Assessment Centre is 100 (refer to Annexure 1: Descriptive statistics). This score represents an adequate display of the two dimensions of behaviour. It may be that the sample is not varied enough to make the distinction between high work mode cases' performance on these two variables and lower work mode cases performance in the variables.

Anastasi (1984, p. 123) states clearly that relation coefficients are affected by the range of individual differences in a group. If all the cases in a sample score very high on one variable, it is unlikely that that variable will significantly correlate with another variable (for that group). The smaller the range of the sample the less significant the correlation between variables.

It may therefore be that this sample is too homogeneous to distinguish between the two tests at least on some of the variables. Scatter plots in Annexure 5 represent the relationship between a number of variables. Work mode and Assessment Centre total scores are two of the variables. The plots clearly show the spread of a variable, such as judgement, with a small range. Compare this to the spread of a variable with a wider range, such as oral presentation, and the reasoning becomes clear.

Another possible explanation of the shortfall on the correlations is the culture of the mining industry. The dimensions under scrutiny are judgement, flexibility and the third dimension showing no correlation with work mode, empathy. Houston (1990) explains that the mining industry (a large part of the sample is from this industry) suffers from

decision-making that is rated "not good" because problems are often inadequately defined. This results in quick fixes (p. 136). He explains further that the mining industry has a role culture that fosters rule-boundedness and discourages risk-taking and innovation (p. 191). It is possible that these phenomena in the sample's industry could discourage the use of judgement and flexibility by employees.

It may also be that the Career Path Appreciation procedure can make a special contribution as to the understanding and prediction of the management area of decision-making. This is the area where the dimensions of judgement and flexibility play the biggest role.

5.3.1.4 Communication and drive

The focus is on those variables showing the highest correlation with the Career Path Appreciation work mode after this attention that the variables with no correlation received.

It will be recalled that the Assessment Centre results consist of thirteen dimensions of managerial behaviour that combines to form five management areas. The summed scores of the five management areas form the Assessment Centre total score.

The Assessment Centre total score shows the highest correlation with Career Path Appreciation work mode. This is one of the main reasons why the concurrent validation of the appreciation is acceptable.

Among the other Assessment Centre results, work mode correlates the highest with the management area of communication skills. Of the dimensions, work mode

correlates the highest with oral presentation.

The fact that both work mode and communication skills, together with work mode and oral presentation have the highest correlation, is a point of interest.

The following question arises: can a person with better verbal ability obtain a higher Career Path Appreciation score than someone without good oral presentation skills? This may seriously affect the validity of the procedure. On the other hand, it is a commonly asked in management circles, what is an Einstein worth if he does not open his mouth? Communication is an important part of management.

It may be reasoned that the oral presentation score refers to a prepared presentation and this factor could misrepresent verbal ability. However, the management area of communication skills contains oral presentation (prepared) and reasoning power. The dimension of reasoning power refers to the generation of spontaneous convincing arguments.

The score in the management area of communication skills correlates highly with the Assessment Centre total score (0.80). This is second only to the managerial area of drive (0.81). The dimension correlating highest with Assessment Centre total score is reasoning power (0.70).

It is clear that communication-related variables play an important role in both the procedures.

The management area of drive also correlate well with work mode (0.38). This is the second highest in the areas of management. It is widely accepted that the area of drive contains the key to success for

managers (Den Ouden, Note 3). This may be true but the results of this research show that communication skills are probably just as important.

Effective communication skills place managers in "an enviable" position (Labich, 1992, p. 39).

Work modes and the Assessment Centre total score show "best" correlations with similar variables. While this may strengthen the relationship between the two procedures, it indicates that both procedures are focusing on the same domain.

5.3.1.5 Concluding remarks

On the basis of this research it must be concluded that the Career Path Appreciation is probably a procedure that, like Assessment Centres, predicts management potential. But the two procedures are not so similar that the one can replace the other.

Career Path Appreciation may be a good prescreening tool for Assessment Centres (or vice versa). The Appreciation can also be an additional procedure in the domain of managerial potential. The difference in theory bases, behavioural for Assessment Centres and cognitive for Career Path Appreciation, supports the finding that the procedures are complementary rather than substitutive.

5.3.2 Type of capability and Assessment Centre scores

The type of capability does not show positive correlations with most of the Assessment Centre variables.

Assessment Centre theory accepts that different behaviours reveal different types of approaches to work and people. The descriptions of the different dimensions in section 2.2.2 in Chapter 2 suggest that there are norms of acceptable display as for example, decisiveness. Behaviour can be too dogmatic or too indecisive. The norms describe what is expected of the type of approach appropriate for senior management. While acknowledgement of different types of approaches exists, the types are not explored in the Assessment Centre context.

The type of capability of the Career Path Appreciation may be a unique contribution when taken the framework of the two procedures discussed here. The theory behind types recognises that there are different types but any person can approach any level of work from any of the types. There is, therefore, a closeness to detail (type A as explained in section 2.3. in Chapter 2) that can be very successful as the type of capability from which to approach high work mode strategic activities. On the other hand there may be a detached way to approach operational activities that allow the operator to look for the unusual or original idea. The innovative antics of the barmen in the movie Cocktail may serve as an example here. The theoretical base of Career Path Appreciation makes no judgement about which type of approach is suited to which work mode.

There are some indications (refer to the scatter plots in Annexure 5) in the data analysis of the relationships between types of capability and the distribution of Assessment Centre and Career Path Appreciation results in this sample. The trend is that type A is more associated with cases that do not

display many appropriate senior management behaviours at the Assessment Centre. There are also indications that type C, D and E capabilities are more associated with work modes denoting senior management potential.

Type of capability makes a decisive contribution as seen with the dimension judgement. Neither type of capability, nor work mode correlate with the dimension judgement. The Career Path clusters, where work mode and type are clustered together, shows a significant positive correlation of 0.12 with judgement. The small range of scores in the dimension of judgement makes it however impossible to establish which judgement scores are associated with which types or with which work modes. This matter remains unresolved.

The type of capabilities assists in the concurrent validation in the sense that it correlates with the Assessment Centre total score, with the areas of management and with four of the dimensions. According to Career Path Appreciation theory, type of capability on its own is however not an indication of senior management potential. The type of capability status appears in this regard secondary to work mode.

5.3.3 Paterson job grading

Job grades are the only evidence of the managers' assessment of candidate ability which is also available for this research project. It is granted that the jobs are graded and not the person in the position. The people filling the positions are, however, deemed worthy of filling these graded positions.

It can also be said that the fact that each candidate attended the Assessment Centres, is a management assessment in itself. The results of both procedures indicate that there are several candidates who did not show senior management potential.
The candidates were not formally rated by their managers directly prior to the application of the procedures so as to establish who was considered to have the most or the least senior managerial potential. Job grades therefore remain the most tangible indication of management assessment.

The comparisons of procedures with Paterson job grade show similar significant positive correlations. Prior research about both procedures mentioned that significant correlations with managerial evaluation exist.

The importance in the research of the correlations in both cases, and the similarity in correlation, is that it confirms the concurrent validity of the Career Path Appreciation procedure. Independently the correlation between the Career Path Appreciation outcome and the job grade confirms the validity of the Appreciation with a separate criterion, that is management evaluation.

The correlation between Assessment Centre scores and the job grade as management evaluation shows further the Assessment Centre used here lives up to the validity of other mentioned centres. This fact helps to justify the use of the specific Assessment Centre in this study and it supports the positive results achieved.

5.3.4 Age

Prior research shows that there is no relation between age and the the predictive validity of Assessment Centres (Gaugler, et al., 1987, p. 504). There is also no correlation between Assessment Centre results and age (Slivinsky, et al., quoted by Dulewicz, et al., 1983) as pointed out in section 2.2.2.3 in Chapter 2.

It must again be pointed out that age is already considered in establishing a person's work mode or career path. The reason for the negative correlation with work mode may be found here. However, type of capability also shows a negative correlation with age and age is not considered when that the type is established.

There can be three possible explanations for the negative correlations. Firstly the procedures could be inadequate. Secondly, the culture of the mining industry (referred to earlier) can be blamed again in the sense that older employees had more time to be influenced or even punished by their work environment.

The third explanation has the most merit. Prescreening identifies candidates for assessment of management potential. Someone earmarked at 25 for senior management stands out more than someone who is identified at the age of 45.

5.4 CAREER PATH APPRECIATION OUTCOMES

There is no reason to doubt the internal coherence of the Career Path Appreciation outcomes of work mode,

current level and type of capability. The cluster variables support this finding. On the other hand none of the correlations is so high that it signals duplication.

Since no irregularities are found in the procedure variables, it can be said that the internal variables of the Career Path Appreciation focus on the same domain.

5.5 CONCLUSION

In Chapter 1 the objectives of this research are stated. Those questions can now be answered.

Is it redundant to use both procedures?

This concurrent validation shows that Career Path Appreciation does not explain the Assessment Centre results adequately enough to conclude that there is redundancy.

Does the Career Path Appreciation measure management potential?

This research found that the Career Path Appreciation and Assessment Centres measure common constructs. The fact that both procedures correlate with the Paterson post grading (an aspect associated with senior management) can be an indication that this construct is management potential.

Does the Career Path Appreciation show internal validity?

The three parts of the Career Path Appreciation

namely the work mode, the current level of capability and the type of capability, are cohesive in the way they measure aspects in the same domain. There is no redundancy among the three parts.

The next chapter will critically review the research and suggest further study.

CHAPTER SIX

RECOMMENDATIONS

6.1 INTRODUCTION

In this chapter a brief summary of the research will lead to recommendations for further research.

6.2 THE REVIEW OF APPLICABLE LITERATURE AND PRIOR RESEARCH

The prior research and literature related to assessment centres is well established and accessible. Even so, some difficulty to establish the scientific nature of prior research is apparent.

Prior research establishes that the assessment centre procedure is valid, accepted, and widely used. The choice of assessment centres as a criterion in a concurrent validation is therefore probably fairly safe. Fairly safe is an objective in responsible research. It is felt that in this project, where concurrent validation is only second choice in establishing the validity of a procedure, a fairly safe criterion is necessary.

Literature about the Career Path Appreciation is, for understandable reasons, difficult to obtain. The research base of this procedure is still fairly small. The theoretical base (the Stratified Systems Theory) is controversial. Circumspection is therefore important in approaching the subject.

Furthermore, the aim of the research is not to validate the Stratified Systems Theory, but to establish the status of the Career Path Appreciation as a procedure in senior management selection.

Owing to the fact that little research has been published, and given the controversy, the decision to treat all data as ordinal and not interval, is dictated by the conservative nature of scientific research. This is done in spite of the tendency to use parametric procedures on data in the behavioural sciences.

The prior research available on both procedures shows that the the Assessment Centre procedure is accepted as a valid measure of management potential. Claims are made that the same substance applies to the Career Path Appreciation. Although there are several common criteria used in the prior research about the two procedures it fails to validate the Career Path Appreciation beyond any doubt. The Career Path Appreciation does not enjoy the same respect in the academic literature as the Assessment Centre procedure.

The published literature provides enough facts to formulate testable hypotheses and arguments in the discussion of the results of the tests.

6.3 THE DATA ANALYSIS AND RESEARCH RESULTS

The Spearman rank correlation coefficient provides an opportunity to conduct multiple correlations between non-parametric variables.

A few helpful explanations are added through the use

of scatter plots.

With few surprises the hypotheses can be accepted. The instances where the hypotheses are not accepted, are discussed and comment about further research follows.

The research results provide outcomes that support the concurrent validation of the Career Path Appreciation procedure. This is further supported by the positive relationships between both Assessment Centre scores and the Career Path Appreciation outcomes with current job grade.

The Career Path Appreciation is not however found to duplicate the Assessment Centre.

High, but not too high correlations between the three elements of the Career Path Appreciation are found to establish internal coherence without duplication in the procedure.

6.4 SHORTCOMINGS OF THIS STUDY

While the sample size is large enough to establish significant and valid relationships, the range of the sample is limited. The sample consists mainly of candidates from two large mining corporations. The characteristics of the sample are therefore not similar to managerial candidates from all organisations.

Concurrent validation is not the best way to establish validity of a procedure such as the Appreciation.

The fact that prior research about both procedures excludes some candidates from the follow-up studies in longitudinal research is a shortcoming in the review of prior research.

6.5 RECOMMENDATIONS FOR FURTHER RESEARCH

6.5.1 Longitudinal study

A longitudinal study where all the initial participants are followed up and drop-outs are not ignored, is essential to establish the predictive validity of the Career Path Appreciation procedure. The sample for this study must be selected with care to avoid the pitfalls of limited range and industry-specific phenomena.

A longitudinal study with a reliable criterion of managerial success is also required to confirm with greater confidence that the Assessment Centre and the Career Path Appreciation measure sufficiently different aspects of managerial potential to warrant their both being included in the assessment battery.

6.5.2 The theory base

It is regularly emphasised in this study that the theory base of the Career Path Appreciation procedure is the Stratified Systems Theory. It may therefore only be valid in larger organisations. Research about career path patterns in varied types and size organisations is needed to provide substantiation for the career paths used in the Appreciation.

6.5.3 Decision-making

The major discrepancies in the correlations of the work mode of Career Path Appreciation and Assessment Centre scores are the dimensions of judgement and flexibility. As mentioned, this could be as a result of the limited range of the sample's scores in the two dimensions. The place of the Career Path Appreciation procedure in the domain of cognition and decision-making is not clear. Even concurrent validations in this field may further understanding of the status of the Career Path Appreciation procedure.

Questions such as the following need answers.

Which one of the explanations for the lack of correlation between Career Path Appreciation work mode, as well as the Assessment Centre scores, and the dimensions judgement and flexibility is correct?

Are there differences in the cognitive approaches to decision-making as practised in major industries and also what is the nature of such differences?

6.5.4 Reliability

Several factors regarding the Career Path Appreciation itself need clarification. These factors are: the consistency of different administrators' assessments (i.e. inter-rater reliability); the contribution of the phrase and symbol cards; the influence of the verbal presentation ability of the candidates on the outcomes of the Appreciation; the effect of coaching by previous candidates on performance on the

Appreciation; the effect of candidate's managers' knowledge of the Career Path Appreciation results on the progress of the candidate.

6.6 CONCLUSION

The ease of application of the Career Path Appreciation and the wealth of information implied by its results, signify that this procedure can revolutionize (sic) the assessment of management potential. The reasons that make this procedure attractive, expose it to abuse (probably unintentionally). Thorough scientific enquiry will pinpoint the value and the loopholes in the Career Path Appreciation.

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2 Stamp, G. 1991. Personal communication, 15 May.

3 Den Ouden, J. 1991. Personal communication, 10 June. (Den Ouden is a veteran assessment centre administrator and the chief administrator of the assessment centre used in this study.)

ANNEXURE 1
Descriptive statistics

CORRELATION ANALYSIS

28 'VAR' VARIABLES: VAR1 VAR2 VAR3 VAR4 VAR5 VAR6 VAR7 VAR8 VAR9 VAR10 VAR11 VAR12
VAR13 VAR14 VAR15 VAR16 VAR17 VAR18 VAR19 VAR20 VAR21 VAR22 VAR23 VAR24
VAR25 VAR26 VAR27 VAR28

SIMPLE STATISTICS

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
VAR1	312	36.371065	6.932349	37.500000	24.000000	57.000000
VAR2	312	3.579151	1.767272	4.000000	0	5.000000
VAR3	312	13.924528	4.498226	14.000000	3.000000	25.000000
VAR4	312	6.650943	2.467617	7.000000	1.000000	16.000000
VAR5	312	4.437107	1.759259	4.000000	1.000000	7.000000
VAR6	312	6.254872	4.481274	6.000000	1.000000	66.000000
VAR7	312	43.025157	17.073862	40.000000	20.000000	100.000000
VAR8	312	45.144654	19.696702	40.000000	20.000000	100.000000
VAR9	312	88.660377	21.632529	98.000000	20.000000	140.000000
VAR10	312	47.660377	20.463657	40.000000	20.000000	100.000000
VAR11	312	99.119497	3.393006	100.000000	84.000000	100.000000
VAR12	312	98.157233	7.133725	100.000000	40.000000	100.000000
VAR13	312	53.524529	18.145242	40.000000	20.000000	100.000000
VAR14	312	99.635220	16.817327	100.000000	40.000000	150.000000
VAR15	312	43.679245	19.383176	40.000000	20.000000	100.000000
VAR16	312	41.805363	8.617241	40.000000	40.000000	86.000000
VAR17	312	99.122257	18.782622	98.000000	20.000000	140.000000
VAR18	312	58.157477	25.778494	40.000000	20.000000	140.000000
VAR19	312	61.128527	24.977295	40.000000	20.000000	100.000000
VAR20	312	659.388715	123.221126	658.000000	540.000000	1236.000000
VAR21	312	176.840125	42.029471	178.000000	80.000000	326.000000
VAR22	312	244.871473	21.253319	240.000000	180.000000	300.000000
VAR23	312	239.065831	37.855552	224.000000	140.000000	372.000000
VAR24	312	147.922571	37.315552	140.000000	40.000000	240.000000
VAR25	312	61.128527	24.977295	40.000000	20.000000	100.000000
VAR26	312	2.573668	1.141028	2.000000	1.000000	5.000000
VAR27	312	2.445141	1.133800	2.000000	1.000000	5.000000
VAR28	312	2.798077	1.208596	3.000000	1.000000	5.000000

ANNEXURE 2
Multiple Correlation matrix

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR1	VAR2	VAR3	VAR4	VAR5	VAR6	VAR7	VAR8	VAR9	VAR10
VAR1	1.00000 0.0 318	0.19288 0.0018 259	-0.54506 0.0001 318	0.33451 0.0001 318	-0.48296 0.0001 318	-0.21833 0.0001 312	-0.14021 0.0123 318	-0.05833 0.2997 318	-0.07450 0.1828 318	-0.12082 0.0312 318
VAR2	0.19288 0.0018 259	1.00000 0.0 259	0.27236 0.0001 259	0.50543 0.0001 259	0.26298 0.0001 259	0.14925 0.0171 255	0.15707 0.0114 259	0.06769 0.2820 259	0.21567 0.0005 259	0.10442 0.0936 259
VAR3	-0.54506 0.0001 318	0.27236 0.0001 259	1.00000 0.0 318	0.52822 0.0001 318	0.91988 0.0001 318	0.47462 0.0001 312	0.26301 0.0001 318	0.23952 0.0001 318	0.33158 0.0001 318	0.25424 0.0001 318
VAR4	0.33451 0.0001 318	0.50543 0.0001 259	0.52822 0.0001 318	1.00000 0.0 318	0.51009 0.0001 318	0.33578 0.0001 312	0.17027 0.0023 318	0.15150 0.0006 318	0.30794 0.0001 318	0.16703 0.0028 318
VAR5	-0.48256 0.0001 318	0.26258 0.0001 259	0.91988 0.0001 318	0.51009 0.0001 318	1.00000 0.0 318	0.42885 0.0001 312	0.25412 0.0001 318	0.20949 0.0002 318	0.31716 0.0001 318	0.27105 0.0001 318
VAR6	-0.21833 0.0001 312	0.14925 0.0171 255	0.47462 0.0001 312	0.33578 0.0001 312	0.42885 0.0001 312	1.00000 0.0 312	0.17288 0.0022 312	-0.02202 0.6984 312	0.12677 0.0251 312	0.09909 0.0805 312
VAR7	-0.14021 0.0123 318	0.15707 0.0114 259	0.26301 0.0001 318	0.17027 0.0023 318	0.25412 0.0001 318	0.17288 0.0022 312	1.00000 0.0 318	0.24565 0.0001 318	0.31588 0.0001 318	0.25475 0.0001 318
VAR8	-0.05833 0.2997 318	0.06769 0.2820 259	0.23952 0.0001 318	0.15150 0.0006 318	0.20949 0.0002 318	-0.02202 0.6984 312	0.24565 0.0001 318	1.00000 0.0 318	0.35258 0.0001 318	0.45665 0.0001 318
VAR9	-0.07450 0.1828 318	0.21567 0.0005 259	0.33158 0.0001 318	0.30794 0.0001 318	0.31716 0.0001 318	0.12677 0.0251 312	0.31588 0.0001 318	0.35258 0.0001 318	1.00000 0.0 318	0.35285 0.0001 318
VAR10	-0.12082 0.0312 318	0.10442 0.0936 259	0.25424 0.0001 318	0.16703 0.0028 318	0.27105 0.0001 318	0.09909 0.0805 312	0.25475 0.0001 318	0.45665 0.0001 318	0.35285 0.0001 318	1.00000 0.0 318
VAR11	-0.04907 0.3929 318	-0.04420 0.4788 259	0.08745 0.1196 318	0.03730 0.5075 318	0.10686 0.0570 318	0.08984 0.1132 312	-0.01335 0.8125 318	0.05363 0.3556 318	0.00162 0.8923 318	0.03986 0.4788 318
VAR12	-0.05846 0.2987 318	0.02494 0.6895 259	0.06259 0.2582 318	-0.01723 0.7596 318	0.08373 0.1363 318	0.05066 0.3725 312	-0.00876 0.8764 318	-0.04632 0.4737 318	-0.06852 0.1135 318	-0.04015 0.4756 318
VAR13	-0.08635 0.1242 318	0.09996 0.1087 259	0.18544 0.0007 318	0.15855 0.0046 318	0.21043 0.0002 318	0.10065 0.0759 312	0.14338 0.0105 318	0.35114 0.0001 318	0.33885 0.0001 318	0.29730 0.0001 318

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR1	VAR2	VAR3	VAR4	VAR5	VAR6	VAR7	VAR8	VAR9	VAR10
VAR14	-0.04692 0.4044 318	0.13162 0.0349 259	0.21411 0.0001 319	0.20430 0.0002 318	0.17799 0.0014 318	0.09659 0.0885 312	0.11733 0.0365 318	0.28561 0.0001 318	0.35704 0.0001 318	0.17381 0.0019 318
VAR15	-0.02782 0.6211 318	0.22503 0.0002 259	0.24279 0.0001 319	0.25022 0.0001 318	0.22866 0.0001 318	0.09701 0.0871 312	0.20960 0.0002 318	0.45178 0.0001 318	0.46456 0.0001 318	0.41757 0.0001 318
VAR16	-0.01072 0.8493 317	0.03441 0.5822 258	0.05454 0.3331 317	0.02285 0.6853 317	0.05335 0.3437 317	0.04927 0.3865 311	0.01283 0.8200 317	0.08745 0.1202 317	0.10353 0.0646 317	0.06665 0.2367 317
VAR17	-0.05662 0.3142 318	0.16614 0.0074 259	0.28031 0.0001 318	0.27969 0.0001 318	0.24045 0.0001 318	0.13252 0.0192 312	0.24171 0.0001 318	0.42702 0.0001 318	0.48523 0.0001 318	0.39859 0.0001 318
VAR19	-0.18425 0.0010 318	0.20855 0.0007 259	0.40069 0.0001 318	0.26179 0.0001 319	0.36905 0.0001 318	0.12175 0.0316 312	0.24584 0.0001 318	0.29067 0.0001 318	0.44993 0.0001 318	0.27717 0.0001 318
VAR19	-0.15627 0.0052 318	0.05775 0.3546 259	0.21385 0.0001 318	0.10392 0.0642 318	0.19148 0.0006 318	0.09141 0.1071 312	0.12223 0.0293 318	0.46196 0.0001 318	0.22824 0.0001 318	0.44196 0.0001 318
VAR20	-0.18363 0.0010 318	0.21647 0.0005 259	0.43528 0.0001 318	0.31934 0.0001 318	0.41270 0.0001 318	0.16540 0.0034 312	0.41968 0.0001 318	0.65460 0.0001 318	0.66492 0.0001 318	0.62956 0.0001 318
VAR21	-0.14744 0.0085 318	0.19398 0.0017 259	0.37788 0.0001 318	0.28875 0.0001 319	0.37011 0.0001 318	0.13169 0.0200 312	0.41470 0.0001 318	0.7 245 0.0001 318	0.74354 0.0001 318	0.45764 0.0001 318
VAR22	-0.13600 0.0152 318	0.07258 0.2445 259	0.26854 0.0001 319	0.14553 0.0094 319	0.28970 0.0001 318	0.11985 0.0343 312	0.22206 0.0001 318	0.4 [illegible] 0.0001 318	0.27571 0.0001 318	0.85718 0.0001 318
VAR23	-0.06304 0.2624 318	0.15542 0.0013 259	0.28677 0.0001 318	0.27519 0.0001 318	0.28152 0.0001 318	0.11850 0.0364 312	0.22459 0.0001 318	0.45656 0.0001 318	0.51002 0.0001 318	0.40445 0.0001 318
VAR24	-0.16056 0.0041 318	0.20237 0.0011 259	0.41785 0.0001 318	0.31341 0.0001 318	0.37656 0.0001 318	0.15893 0.0049 312	0.28266 0.0001 318	0.46764 0.0001 318	0.64123 0.0001 318	0.38914 0.0001 318
VAR25	-0.15627 0.0052 318	0.05775 0.3546 259	0.21385 0.0001 318	0.10392 0.0642 318	0.19148 0.0006 318	0.09141 0.1071 312	0.12223 0.0293 318	0.46196 0.0001 318	0.22824 0.0001 318	0.44196 0.0001 318
VAR26	-0.17757 0.0014 318	0.18668 0.0026 259	0.41494 0.0001 319	0.29436 0.0001 318	0.38810 0.0001 318	0.15553 0.0059 312	0.40710 0.0001 318	0.63467 0.0001 318	0.64048 0.0001 318	0.61615 0.0001 318

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR1	VAR2	VAR3	VAR4	VAR5	VAR6	VAR7	VAR8	VAR9	VAR10
VAR27	-0.35856 0.0001 318	0.20941 0.0007 259	0.71525 0.0001 318	0.35572 0.0001 318	0.77083 0.0001 318	0.31917 0.0001 312	0.12225 0.0293 318	0.11675 0.0374 318	0.17475 0.0018 318	0.17342 0.0019 318
VAR28	-0.19256 0.0006 311	0.13783 0.0281 254	0.41938 0.0001 311	0.24037 0.0001 311	0.45102 0.0001 311	0.32278 0.0001 311	0.08441 0.1375 311	-0.01640 0.7732 311	0.09086 0.1098 311	0.13212 0.0198 311

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR11	VAR12	VAR13	VAR14	VAR15	VAR16	VAR17	VAR18	VAR19	VAR20
VAR1	-0.04897 0.3929 318	-0.05846 0.2987 318	-0.06639 0.1242 318	-0.04692 0.4044 318	-0.02782 0.6211 318	-0.01072 0.8493 317	-0.05662 0.3142 318	-0.18425 0.0010 318	-0.15627 0.0052 318	-0.18303 0.0010 318
VAR2	-0.04420 0.4788 259	-0.02454 0.6895 259	0.09996 0.1087 259	0.13162 0.0342 259	0.22903 0.0002 259	0.03441 0.5822 258	0.16614 0.0074 259	0.20855 0.0007 259	0.05775 0.3546 259	0.21647 0.0005 259
VAR3	0.08745 0.1196 318	0.06355 0.2582 318	0.19944 0.0007 318	0.21411 0.0001 318	0.24279 0.0001 318	0.05454 0.3331 317	0.28031 0.0001 318	0.40069 0.0001 318	0.21385 0.0001 318	0.43538 0.0001 318
VAR4	0.03730 0.5075 318	-0.01722 0.7596 318	0.15855 0.0046 318	0.20430 0.0002 318	0.25022 0.0001 318	0.02285 0.6853 317	0.27965 0.0001 318	0.26170 0.0001 318	0.13952 0.0042 318	0.31534 0.0001 318
VAR5	0.10686 0.0570 318	0.08373 0.1362 318	0.21043 0.0002 318	0.17799 0.0014 318	0.22866 0.0001 318	0.05335 0.3457 317	0.24045 0.0001 318	0.36905 0.0001 318	0.19148 0.0006 318	0.41270 0.0001 318
VAR6	0.08587 0.1132 312	0.05066 0.3725 312	0.10066 0.0759 312	0.09655 0.0885 312	0.09701 0.0871 312	0.04927 0.3865 311	0.13252 0.0192 312	0.12175 0.0316 312	0.05141 0.1071 312	0.16540 0.0034 312
VAR7	-0.01335 0.8125 318	-0.00876 0.8764 318	0.14338 0.0105 318	0.11733 0.0365 318	0.20980 0.0002 318	0.01283 0.8200 317	0.24171 0.0001 318	0.24584 0.0001 318	0.12225 0.0293 318	0.41988 0.0001 318
VAR8	0.09363 0.0956 318	-0.04032 0.4737 318	0.35114 0.0001 318	0.28561 0.0001 318	0.45178 0.0001 318	0.08745 0.1202 317	0.42702 0.0001 318	0.25867 0.0001 318	0.48156 0.0001 318	0.65860 0.0001 318
VAR9	0.09762 0.8325 318	-0.08852 0.1135 318	0.33885 0.0001 318	0.35704 0.0001 318	0.46456 0.0001 318	0.10393 0.0646 317	0.68323 0.0001 318	0.44595 0.0001 318	0.22824 0.0001 318	0.68452 0.0001 318
VAR10	0.03986 0.4788 318	-0.04015 0.4756 318	0.25730 0.0001 318	0.17381 0.0019 318	0.41757 0.0001 318	0.06665 0.2367 317	0.35855 0.0001 318	0.27717 0.0001 318	0.44156 0.0001 318	0.62956 0.0001 318
VAR11	1.00000 0.0 318	0.02237 0.6911 318	0.16587 0.0024 318	-0.00617 0.9127 318	0.00074 0.9895 318	0.08971 0.1109 317	0.05365 0.0955 318	-0.01218 0.8287 318	0.11601 0.0590 318	0.09743 0.0828 318
VAR12	0.02237 0.6911 318	1.00000 0.0 318	0.15736 0.0049 318	-0.05257 0.3501 318	0.02556 0.6498 318	0.11638 0.0384 317	-0.03019 0.5917 318	0.04771 0.3964 318	0.01413 0.8013 318	0.03975 0.4800 318
VAR13	0.16587 0.0024 318	0.15736 0.0049 318	1.00000 0.0 318	0.17995 0.0013 318	0.38611 0.0001 318	0.20653 0.0002 317	0.40107 0.0001 318	0.35495 0.0001 318	0.31578 0.0001 318	0.60641 0.0001 318

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR11	VAR12	VAR13	VAR14	VAR15	VAR16	VAR17	VAR18	VAR19	VAR20
VAR14	-0.00617 0.9127 318	-0.05257 0.3501 318	0.17955 0.0013 318	1.00000 0.0 318	0.41795 0.0001 318	0.10820 0.0543 317	0.28794 0.0001 318	0.27854 0.0001 318	0.24335 0.0001 318	0.46539 0.0001 318
VAR15	0.00074 0.9895 318	0.02556 0.6498 318	0.38611 0.0001 318	0.41795 0.0001 318	1.00000 0.0 318	0.11615 0.0387 317	0.44487 0.0001 318	0.37832 0.0001 318	0.34743 0.0001 318	0.67949 0.0001 318
VAR16	0.08571 0.1109 317	0.11038 0.0384 317	0.20653 0.0002 317	0.10820 0.0543 317	0.11615 0.0387 317	1.00000 0.0 317	0.09670 0.0856 317	0.16477 0.0033 317	0.05379 0.3398 317	0.20992 0.0002 317
VAR17	0.05365 0.0955 318	-0.03019 0.5917 318	0.40107 0.0001 318	0.38794 0.0001 318	0.44487 0.0001 318	0.09670 0.0856 317	1.00000 0.0 319	0.44801 0.0001 319	0.27931 0.0001 319	0.70416 0.0001 319
VAR18	-0.01218 0.8287 318	0.04771 0.3964 318	0.32495 0.0001 318	0.27854 0.0001 318	0.37832 0.0001 318	0.16477 0.0033 317	0.44801 0.0001 319	1.00000 0.0 319	0.24335 0.0001 319	0.65369 0.0001 319
VAR19	0.10601 0.0590 318	0.01412 0.8018 318	0.31978 0.0001 318	0.24339 0.0001 318	0.34743 0.0001 318	0.05379 0.3398 317	0.27931 0.0001 319	0.24335 0.0001 319	1.00000 0.0 319	0.62151 0.0001 319
VAR20	0.09743 0.0828 318	0.03975 0.4800 318	0.60641 0.0001 318	0.46539 0.0001 318	0.67949 0.0001 318	0.20992 0.0002 317	0.70416 0.0001 319	0.65369 0.0001 319	0.62151 0.0001 319	1.00000 0.0 319
VAR21	0.04589 0.4148 318	-0.04834 0.3903 318	0.35618 0.0001 318	0.34161 0.0001 318	0.48761 0.0001 318	0.09080 0.1066 317	0.55472 0.0001 319	0.45683 0.0001 319	0.36438 0.0001 319	0.80564 0.0001 319
VAR22	0.30771 0.0001 318	0.31236 0.0001 318	0.35469 0.0001 318	0.14984 0.0078 318	0.38532 0.0001 318	0.12276 0.0289 317	0.57537 0.0001 319	0.28852 0.0001 319	0.41153 0.0001 319	0.59545 0.0001 319
VAR23	0.09549 0.0891 318	0.08846 0.1154 318	0.78423 0.0001 318	0.53573 0.0001 318	0.78850 0.0001 318	0.30584 0.0001 317	0.53681 0.0001 319	0.43518 0.0001 319	0.41265 0.0001 319	0.80207 0.0001 319
VAR24	0.04838 0.3899 318	0.01665 0.7669 318	0.42545 0.0001 318	0.37841 0.0001 318	0.46731 0.0001 318	0.15860 0.0046 317	0.80536 0.0001 319	0.86252 0.0001 319	0.36583 0.0001 319	0.79697 0.0001 319
VAR25	0.10601 0.0590 318	0.01412 0.8018 318	0.31978 0.0001 318	0.24339 0.0001 318	0.34743 0.0001 318	0.05379 0.3398 317	0.27931 0.0001 319	0.24335 0.0001 319	1.00000 0.0001 319	0.62151 0.0001 319
VAR26	0.09507 0.0906 318	0.05080 0.2797 318	0.55541 0.0001 318	0.44538 0.0001 318	0.66748 0.0001 318	0.20773 0.0002 317	0.69836 0.0001 319	0.63619 0.0001 319	0.61511 0.0001 319	0.96400 0.0001 319

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR11	VAR12	VAR13	VAR14	VAR15	VAR16	VAR17	VAR18	VAR19	VAR20
VAR27	0.10582 0.0595 318	0.06750 0.2306 318	0.15544 0.0044 318	0.13230 0.0183 318	0.16610 0.0030 318	0.04126 0.4642 317	0.12149 0.0301 319	0.27493 0.0001 319	0.15702 0.0049 319	0.27613 0.0001 319
VAR28	0.12154 0.0321 311	0.04012 0.4858 311	0.09133 0.1075 311	0.00060 0.9916 311	0.04638 0.4158 311	0.00155 0.9727 311	0.04735 0.4046 312	0.13846 0.0144 312	0.08523 0.1157 312	0.13133 0.0203 312

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR21	VAR22	VAR23	VAR24	VAR25	VAR26	VAR27	VAR28
VAR1	-0.14744 0.0085 318	-0.13600 0.0152 318	-0.06304 0.2624 318	-0.16056 0.0041 318	-0.15627 0.0052 318	-0.17797 0.0014 318	-0.35859 0.0001 318	-0.19256 0.0006 311
VAR2	0.19398 0.0017 259	0.07256 0.2445 259	0.15942 0.0013 259	0.20237 0.0011 259	0.05775 0.3546 259	0.18668 0.0026 259	0.26941 0.0007 259	0.13763 0.0281 254
VAR3	0.37768 0.0001 318	0.26854 0.0001 318	0.26577 0.0001 318	0.41785 0.0001 318	0.21385 0.0001 318	0.41494 0.0001 318	0.71525 0.0001 318	0.41936 0.0001 311
VAR4	0.28875 0.0001 318	0.14553 0.0094 318	0.27519 0.0001 318	0.31341 0.0001 318	0.10392 0.0642 318	0.29436 0.0001 318	0.35572 0.0001 318	0.24137 0.0001 311
VAR5	0.37011 0.0001 318	0.28970 0.0001 318	0.28152 0.0001 318	0.37656 0.0001 318	0.19148 0.0006 318	0.38810 0.0001 318	0.77083 0.0001 318	0.45103 0.0001 311
VAR6	0.13169 0.0200 312	0.11585 0.0343 312	0.11850 0.0364 312	0.15893 0.0049 312	0.09141 0.1071 312	0.15553 0.0059 312	0.31917 0.0001 312	0.32276 0.0001 311
VAR7	0.61470 0.0001 318	0.22206 0.0001 318	0.22459 0.0001 318	0.28206 0.0001 318	0.12223 0.0293 318	0.40710 0.0001 318	0.12225 0.0293 318	0.06441 0.1375 311
VAR8	0.71249 0.0001 318	0.40123 0.0001 318	0.49056 0.0001 318	0.40704 0.0001 318	0.46196 0.0001 318	0.62467 0.0001 318	0.11675 0.0374 318	-0.01640 0.7732 311
VAR9	0.74794 0.0001 318	0.27571 0.0001 318	0.51002 0.0001 318	0.64123 0.0001 318	0.22824 0.0001 318	0.64048 0.0001 318	0.17475 0.0018 318	0.09066 0.1098 311
VAR10	0.45704 0.0001 318	0.25718 0.0001 318	0.40445 0.0001 318	0.38914 0.0001 318	0.44196 0.0001 318	0.61519 0.0001 318	0.17342 0.0019 318	0.13212 0.0198 311
VAR11	0.04585 0.4148 318	0.30771 0.0001 318	0.09549 0.0891 318	0.04838 0.3899 318	0.10601 0.0590 318	0.09507 0.0906 318	0.10582 0.0595 318	0.12154 0.0321 311
VAR12	-0.04834 0.3903 318	0.31238 0.0001 318	0.08846 0.1154 318	0.01665 0.7669 318	0.01413 0.8018 318	0.06080 0.2797 318	0.06750 0.2306 318	0.04012 0.4806 311
VAR13	0.39618 0.0001 318	0.35469 0.0001 318	0.78423 0.0001 318	0.42945 0.0001 318	0.31978 0.0001 318	0.55541 0.0001 318	0.15944 0.0044 318	0.09133 0.1079 311

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR21	VAR22	VAR23	VAR24	VAR25	VAR26	VAR27	VAR28
VAR14	0.24161 0.0001 318	0.14884 0.0078 318	0.53573 0.0001 318	0.37841 0.0001 318	0.24329 0.0001 318	0.44538 0.0001 318	0.13230 0.0183 318	0.00060 0.9916 311
VAR15	0.48761 0.0001 318	0.36532 0.0001 318	0.78850 0.0001 318	0.46731 0.0001 318	0.34743 0.0001 318	0.66748 0.0001 318	0.16610 0.0030 318	0.04038 0.4150 311
VAR16	0.09080 0.1066 317	0.12276 0.0289 317	0.30584 0.0001 317	0.15860 0.0046 317	0.05379 0.3398 317	0.20773 0.0002 317	0.04126 0.4642 317	0.00155 0.9727 311
VAR17	0.89472 0.0001 319	0.37537 0.0001 319	0.53681 0.0001 319	0.80536 0.0001 319	0.27931 0.0001 319	0.68836 0.0001 319	0.12145 0.0301 319	0.04735 0.4046 312
VAR18	0.43683 0.0001 319	0.28952 0.0001 319	0.43918 0.0001 319	0.86292 0.0001 319	0.24335 0.0001 319	0.63919 0.0001 319	0.27493 0.0001 319	0.13846 0.0144 312
VAR19	0.36438 0.0001 319	0.41153 0.0001 319	0.41269 0.0001 319	0.30983 0.0001 319	1.00000 0.0001 319	0.61511 0.0001 319	0.15702 0.0049 319	0.08923 0.1157 312
VAR20	0.80564 0.0001 319	0.59545 0.0001 319	0.80207 0.0001 319	0.79697 0.0001 319	0.62151 0.0001 319	0.96400 0.0001 319	0.27613 0.0001 319	0.13133 0.0203 312
VAR21	1.00000 0.0 319	0.37540 0.0001 319	0.54545 0.0001 319	0.59250 0.0001 319	0.36438 0.0001 319	0.76316 0.0001 319	0.20482 0.0002 319	0.09026 0.1118 312
VAR22	0.37540 0.0001 319	1.00000 0.0 319	0.42072 0.0001 319	0.38293 0.0001 319	0.41153 0.0001 319	0.59528 0.0001 319	0.15985 0.0003 319	0.14129 0.0125 312
VAR23	0.54545 0.0001 319	0.42072 0.0001 319	1.00000 0.0 319	0.56369 0.0001 319	0.41269 0.0001 319	0.76254 0.0001 319	0.15835 0.0004 319	0.08425 0.1376 312
VAR24	0.59250 0.0001 319	0.38293 0.0001 319	0.56369 0.0001 319	1.00000 0.0 319	0.30983 0.0001 319	0.77618 0.0001 319	0.25254 0.0001 319	0.13159 0.0197 312
VAR25	0.36438 0.0001 319	0.41153 0.0001 319	0.41269 0.0001 319	0.30983 0.0001 319	1.00000 0.0 319	0.61511 0.0001 319	0.15702 0.0049 319	0.08923 0.1157 312
VAR26	0.76316 0.0001 319	0.59528 0.0001 319	0.76254 0.0001 319	0.77618 0.0001 319	0.61511 0.0001 319	1.00000 0.0 319	0.26511 0.0001 319	0.13278 0.0190 312

CORRELATION ANALYSIS

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / NUMBER OF OBSERVATIONS

	VAR21	VAR22	VAR23	VAR24	VAR25	VAR26	VAR27	VAR28
VAR27	0.20482 0.0002 319	0.19589 0.0003 319	0.19825 0.0004 319	0.25294 0.0001 319	0.15702 0.0049 319	0.26511 0.0001 319	1.00000 0.0 319	0.53018 0.0001 312
VAR28	0.09020 0.1118 312	0.14129 0.0125 312	0.08425 0.1376 312	0.13195 0.0197 312	0.08923 0.1157 312	0.13278 0.0190 312	0.53018 0.0001 312	1.00000 0.0 312

ANNEXURE 3
Anonymous Career Path Appreciation report

CPA REPORT

NAME:

DATE: 22/05/91 SEX: Male

AGE: 31

POSITION: Asst Concentrator Manager

GRADE: D3

QUALIFICATIONS: BSc Hons (Birmingham University)

CPA RESULTS:

CURRENT LEVEL: High III

WORKING MODE: High V

TYPE: E

Dave is currently appointed in a D3 role which is the equivalent of a mid to high level III position in Stratified Systems Theory terms. The nature of work at this level focusses on improvement. The individual is aware of a broad picture with many possible inputs and outputs. He works within a very broad framework of rules and procedures and chooses the most efficient way of doing things from a number of alternative options.

During his CPA interview Dave demonstrated an ability to generate the cognitive complexity that would be expected at high level III. He should, therefore, be coping with his current level of work and may even already be ready for a D4 role in cognitive terms.

In the symbol card task Dave's approach was to create knowledge by reflecting on the task - weighing up alternatives quickly and accurately.

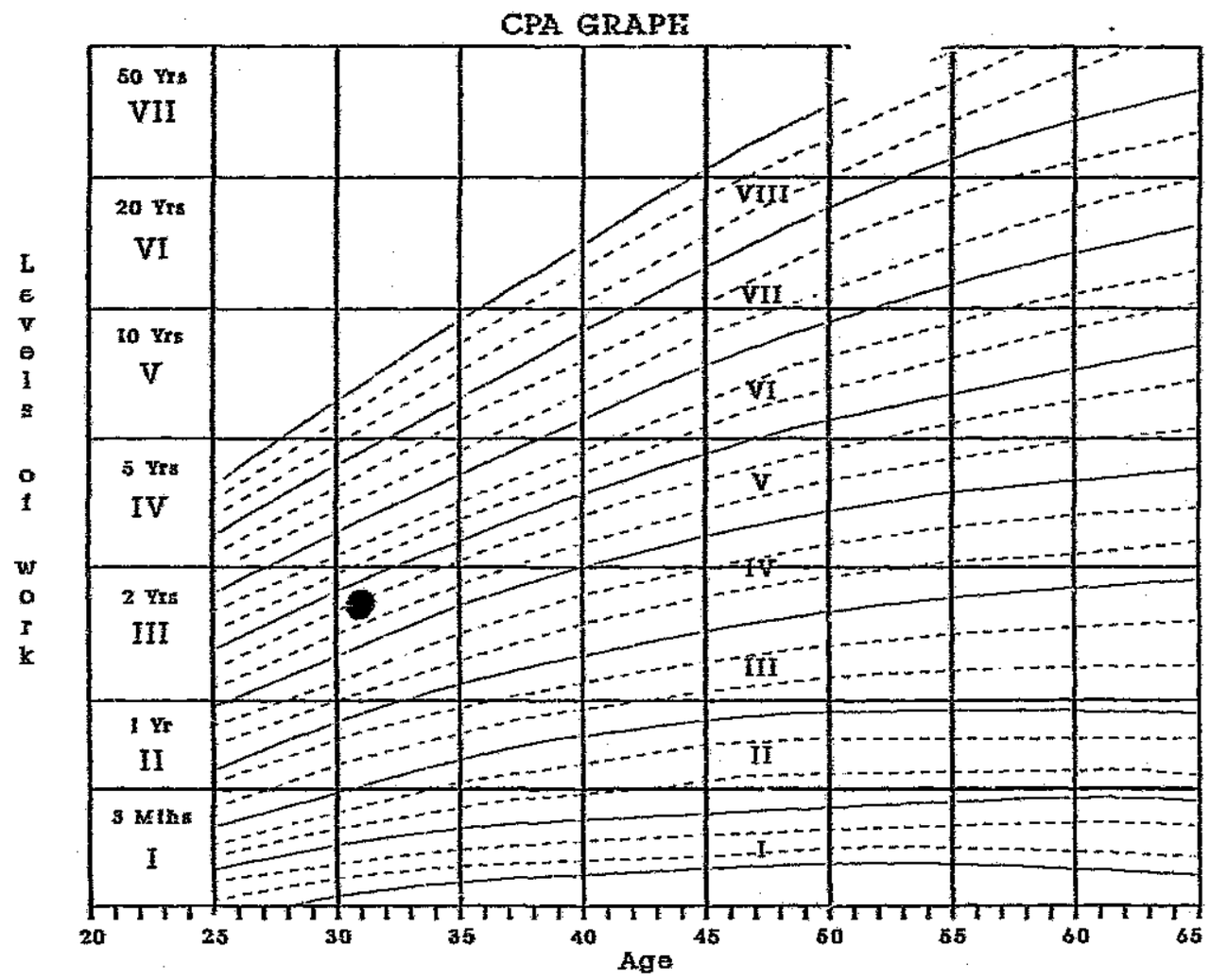
Dave's mode of functioning (high V) gives an indication of his growth potential. He should be comfortable with the cognitive complexity required of a low level IV within 5 years and should contribute over the full range of level IV and beyond before retirement.

Dave shows extremely good potential in cognitive terms and should be carefully developed to ensure that he maximises this inherent potential. The Career Development Centre results may help to determine areas where he may need some further development.

Personality, work performance, circumstances, etc, have however not been measured and may influence the realisation of his potential to some degree.

YT030601/dh

ANNEXURE 4
Career Path map

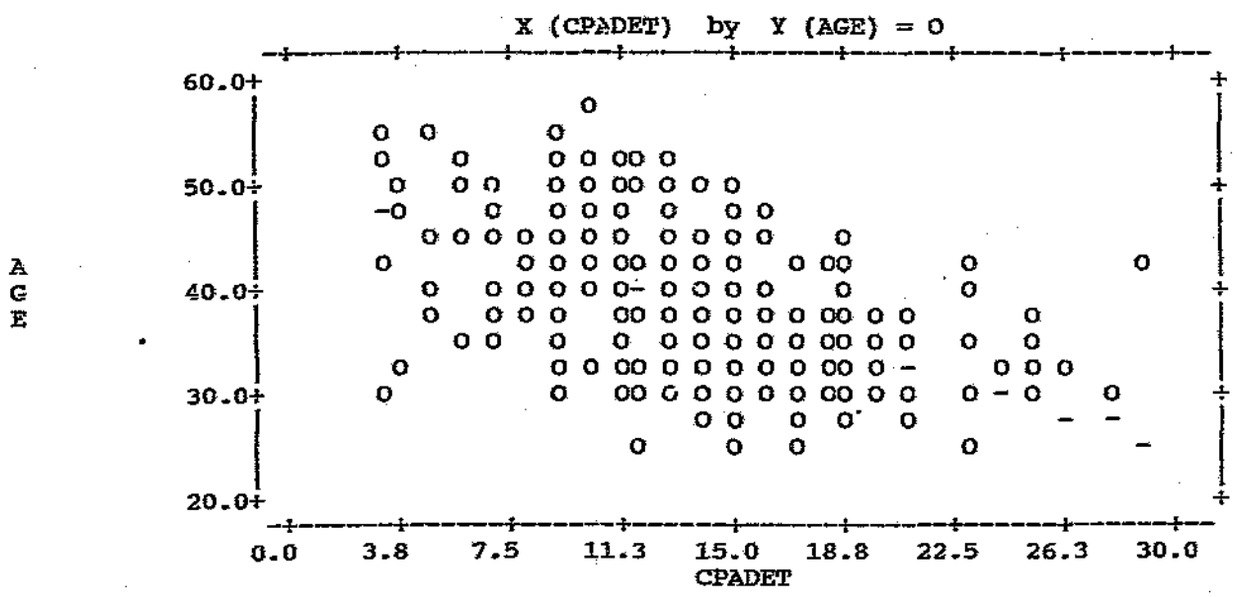

CPA GRAPH
50 Yrs
VII
20 Yrs
VI
10 Yrs
V
5 Yrs
IV
2 Yrs
III
1 Yr
II
3 Mths
I
VIII
VII
VI
V
IV
III
II
I
Levels of work
20
25
30
35
40
45
50
55
60
65
Age

ANNEXURE 5
Scatter plots

Scatter Plots

Date/Time 01-29-1992 03:13:05
Data Base Name D:data\WBSDATA
Description

Scatter Plots

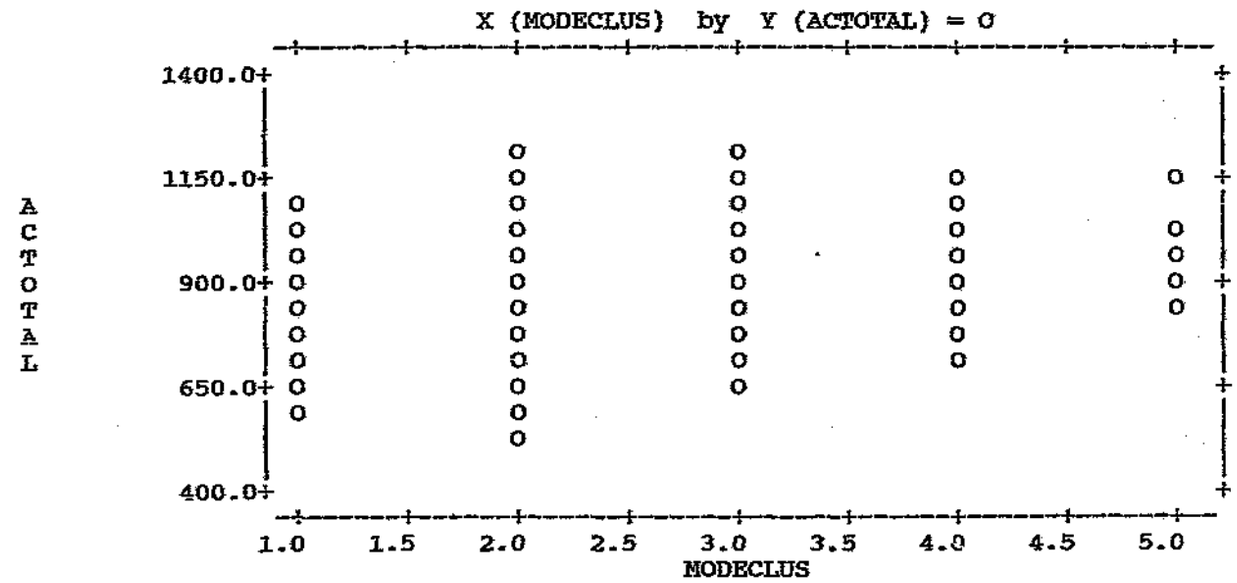


Scatter plot: Vertical: Age
Horizontal: Work modes

----------Scatter Plots----------

Date/Time 01-29-1992 03:12:05
Data Base Name D:data\WBSDATA
Description

Scatter Plots

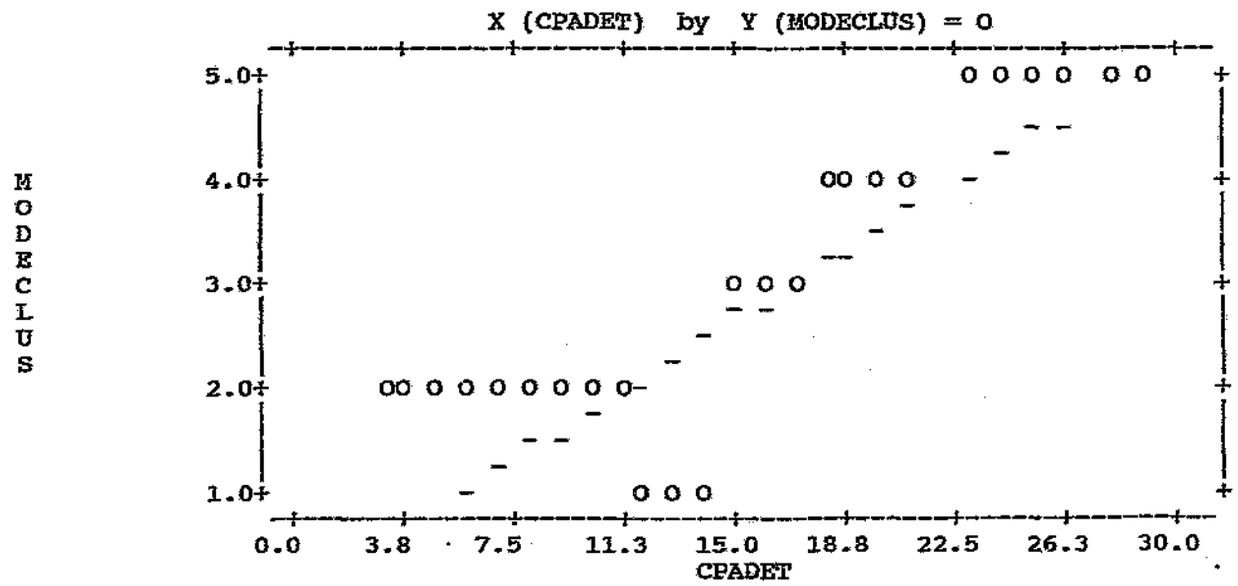


Scatter plot: Vertical: AC total score
Horizontal: Work mode clusters

----------Scatter Plots----------

Date/Time 01-29-1992 02:59:56
Data Base Name D:data\WBSDATA
Description

Scatter Plots

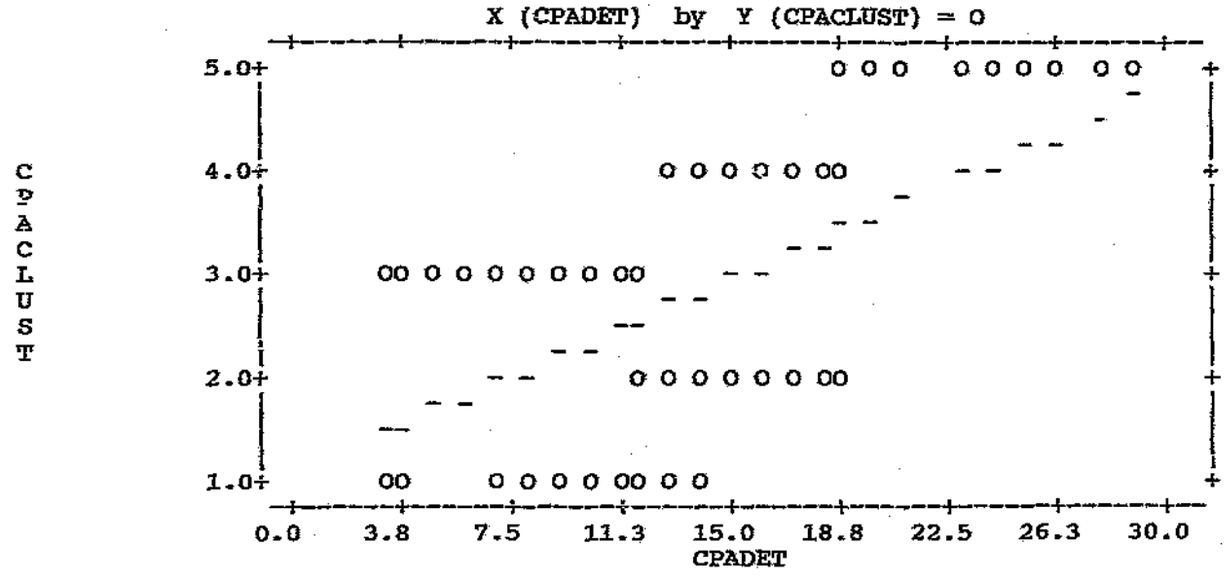


Scatter plot: Vertical: Work mode clusters
Horizontal: Work modes

----------Scatter Plots----------

Date/Time 01-29-1992 03:01:37
Data Base Name D:data\WBSDATA
Description

Scatter Plots

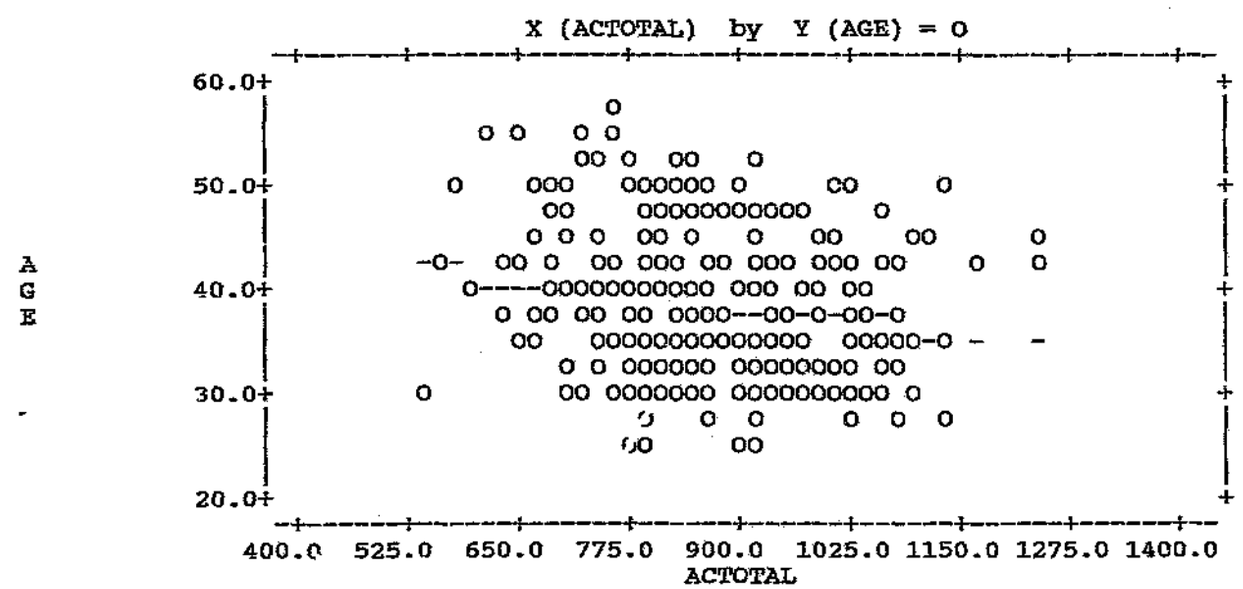


Scatter plot: Vertical: Career Path clusters
Horizontal: Work modes

---------- ---------Scatter Plots--------- ----------

Date/Time 01-29-1992 03:13:34
Data Base Name D:data\WBSDATA
Description

Scatter Plots

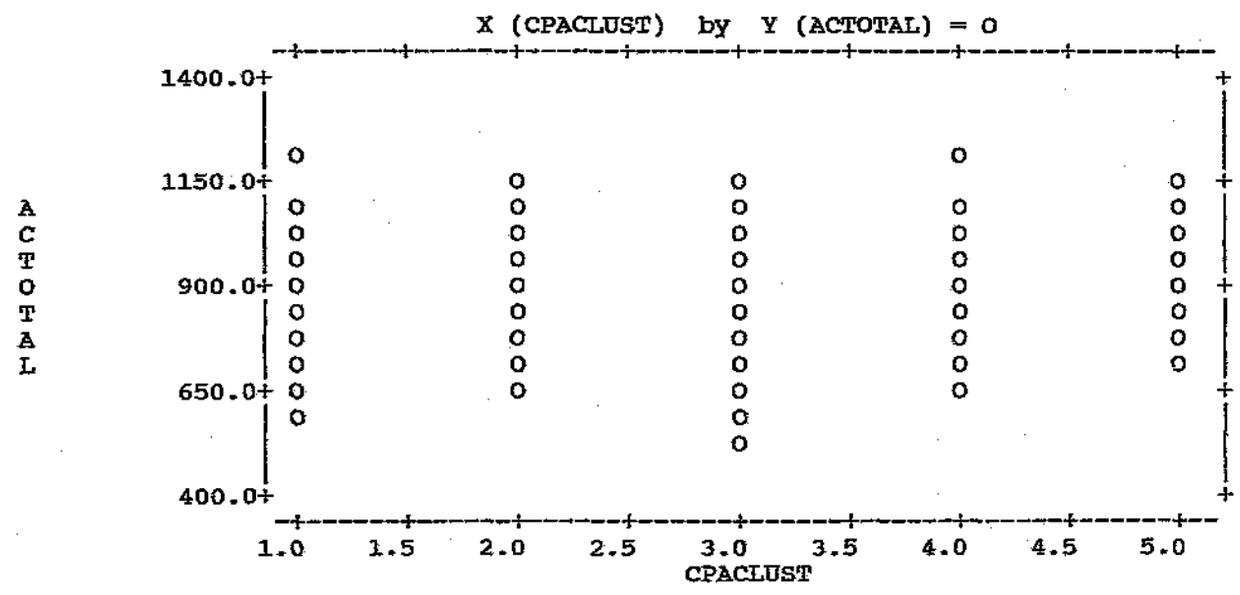


Scatter plot: Vertical: Age
Horizontal: AC total score

----------Scatter Plots----------

Date/Time 01-29-1992 03:12:29
Data Base Name D:data\WBSDATA
Description

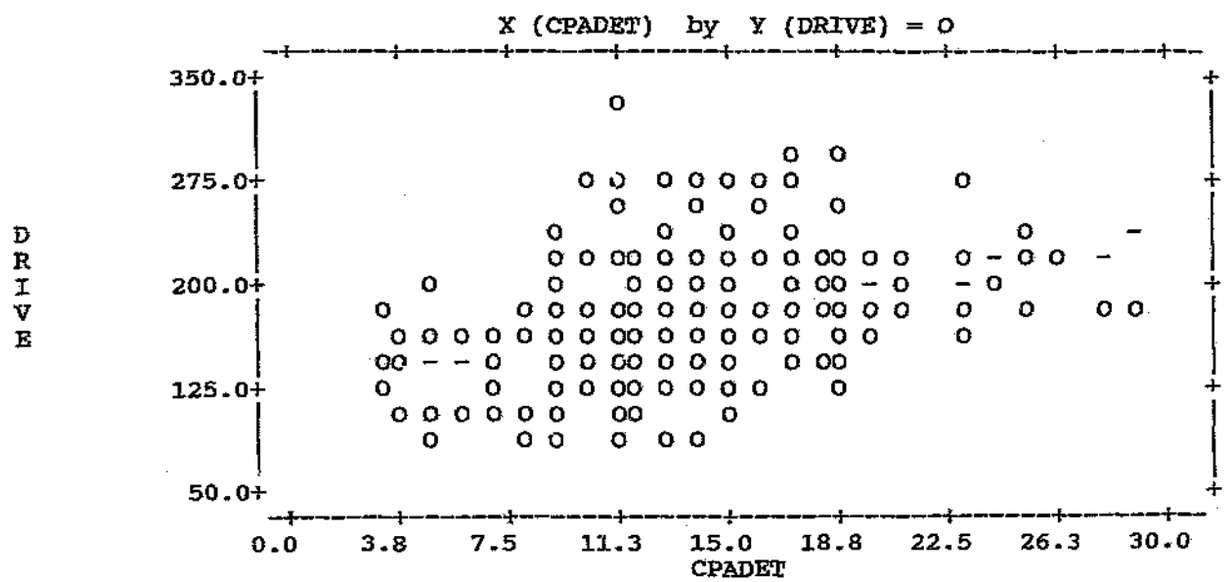
Scatter Plots



Scatter plot: Vertical: AC total score
Horizontal: CPA clusters (modes and type)

---------- Scatter Plots----------
Date/Time 01-29-1992 03:10:33
Data Base Name D:data\WBSDATA
Description

Scatter Plots

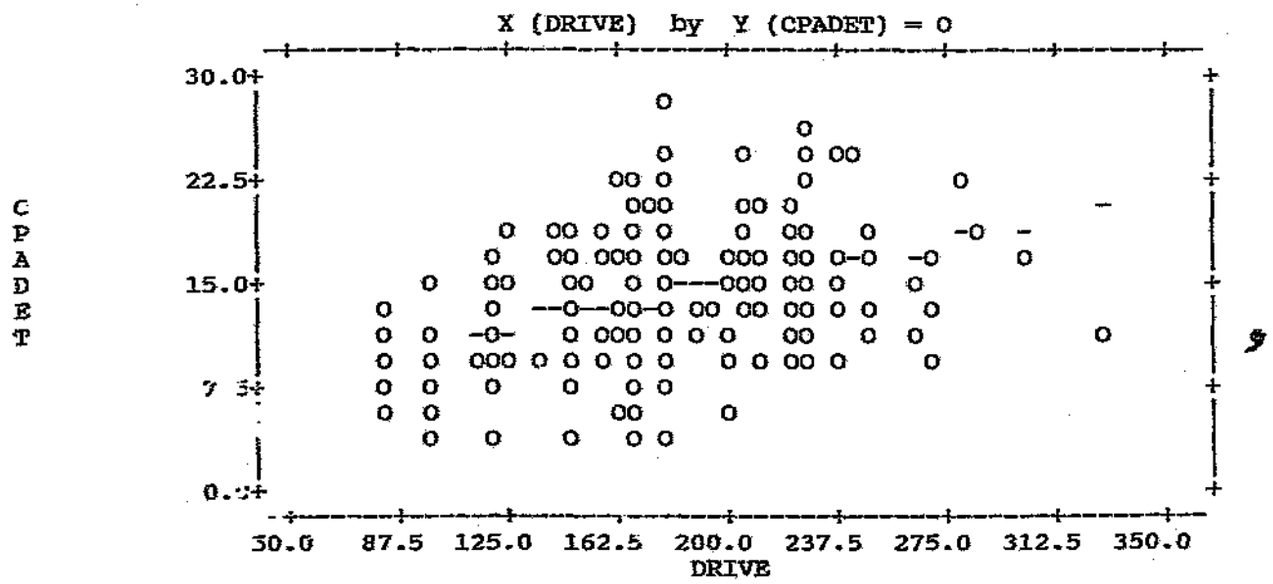


Scatter plot: Vertical: AC area of drive
Horizontal: Work modes

Scatter Plots

Date/Time 01-29-1992 03:14:11
Data Base Name D:data\WBSDATA
Description

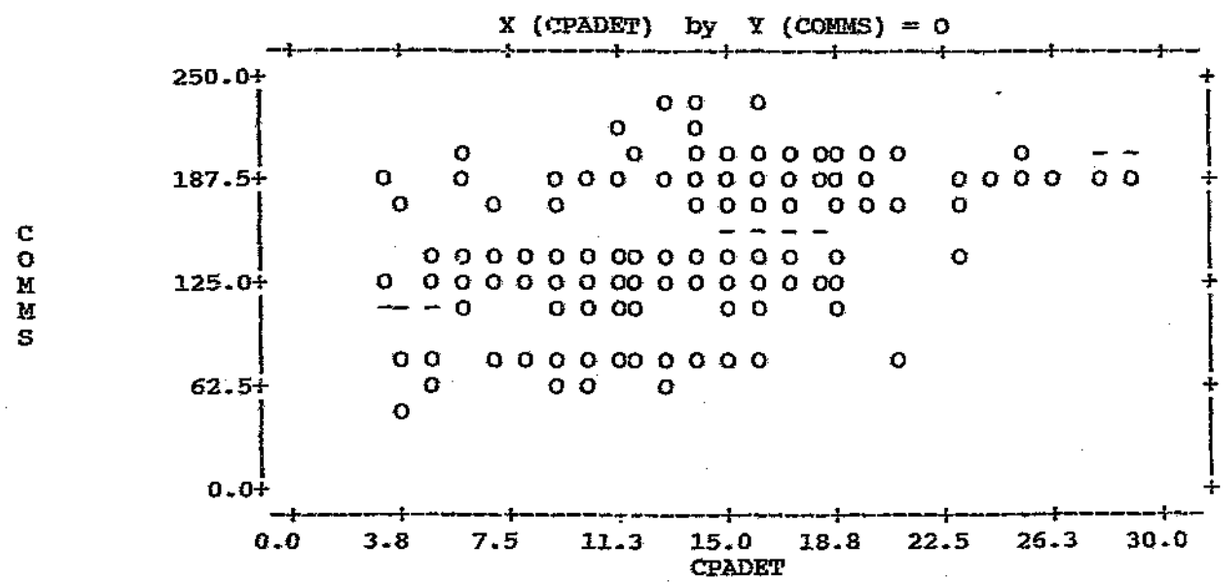
Scatter Plots



Scatter plot: Vertical: Work modes
Horizontal: AC area of management of drive

Date/Time 01-29-1992 03:11:05
Data Base Name D:data\WBSDATA
Description

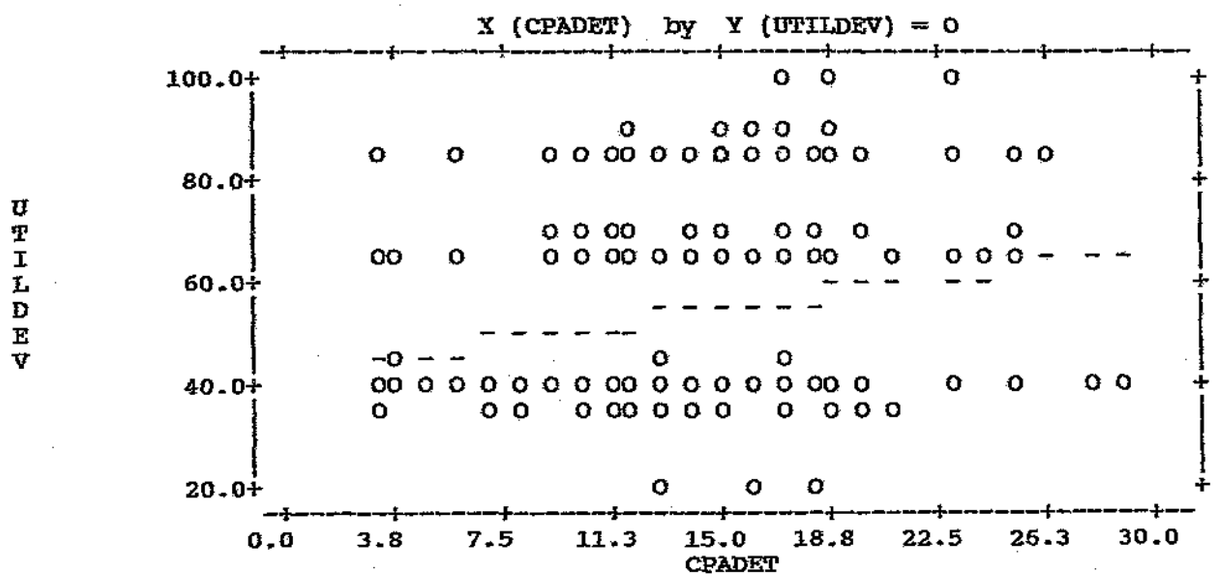
Scatter Plots



Scatter plot: Vertical: AC area of management of communication skills
Horizontal: Work modes

Date/Time 01-29-1992 03:10:01
Data Base Name D:data\WBSDATA
Description

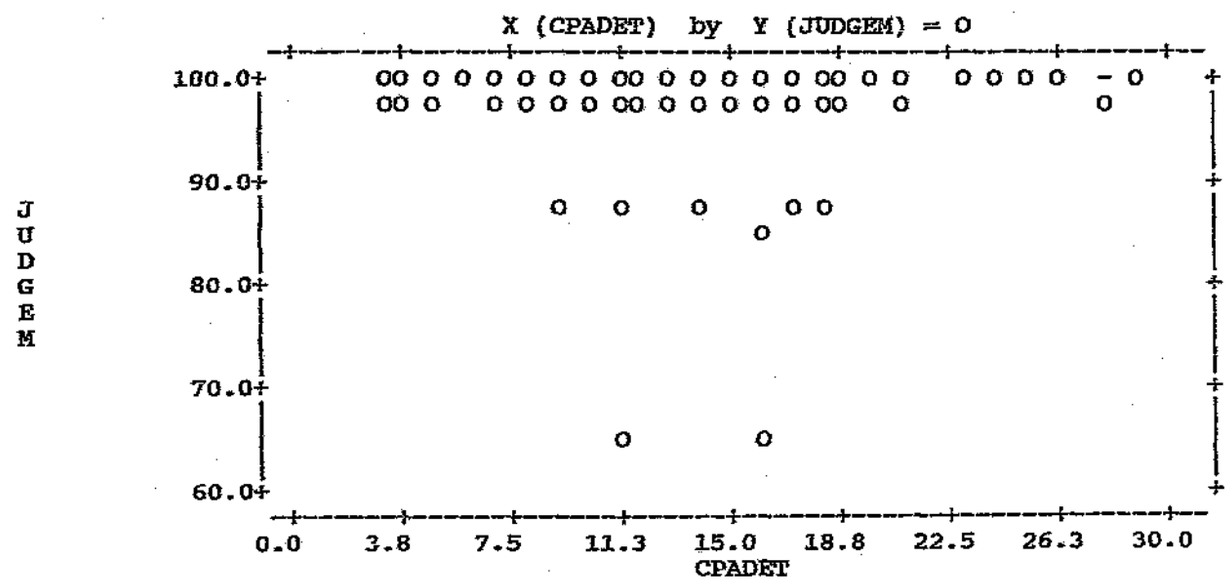
Scatter Plots



Scatter plot: Vertical: AC dimension of utilisation and development
Horizontal: Work modes

---------------------------------Scatter Plots---------------------------------
Date/Time 01-29-1992 03:07:48
Data Base Name D:data\WBSDATA
Description

Scatter Plots



Scatter plot: Vertical: AC dimension of judgement
Horizontal: Work modes

:

Author: Bester F
Name of thesis: A comparison of assesment centre and career path appreciation procedures in management selection

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