FACTORS PREDICTING SUCCESS IN THE FINAL QUALIFYING EXAMINATION FOR CHARTERED ACCOUNTANTS

by

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SUPERVISOR: MARIÉ DE BEER

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SUMMARY

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SUBJECT : INDUSTRIAL PSYCHOLOGY

Anyone desiring to qualify as an accountant or auditor is required to pass an examination as approved by the Public Accountants' and Auditors' Board to establish whether candidates have attained the required standard of academic knowledge in terms of the syllabi laid down by the Board, as well as whether they are able to apply that knowledge in practice (PAAB, 1995). However each year many students fail this very important examination. The reasons for this are not clear and the purpose of this research is to determine whether: personality; vocational interests; intelligence; matriculation Mathematics and home language (English/Afrikaans) results, predict success in the QE, by comparing a group of successful and unsuccessful QE candidates.

The logistic regression, discriminant analysis and t-test statistical procedures, indicated that: warmth (A), liveliness (F), rule-consciousness (G), social boldness (H), apprehension (O), self-reliance (Q2), perfectionism (Q3), tension (Q4), computational interest, social services interest, mechanical interest, Mental Alertness and matriculation home language, are significant factors to consider when identifying candidates likely to be successful in the QE.
KEY TERMS

Chartered accountants; Trainee accountants; Qualifying examination; Personality; High Level Test Battery; Mental Alertness; Intelligence; Academic history; Vocational interests; Sixteen Personality Factor questionnaire; Rothwell-Miller Interest Blank; Selection testing; Psychological assessment.
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ABBREVIATIONS EXPLAINED

ABASA: Association of Black Accountants in South Africa

ACT: American College Testing Program

CA: Chartered Accountant

CPI: California Personality Inventory

CPA: Chartered Practising Accountant

CTA: Certificate in the Theory of Accounting

GPA: Grade Point Average

PAAB: Public Accountants' and Auditors' Board

QE: Qualifying Examination

RIB: Rothwell-Miller Interest Blank

SA: South Africa

SAICA: South African Institute of Chartered Accountants

SAS: Statistical Analysis System
SPSS: Statistical Packages for Social Sciences

UFE: Uniform Final Examination

UCCA: University Council for Central Admissions

USA: United States of America

16PF: Sixteen Personality Factor questionnaire
CHAPTER 1

SCIENTIFIC ORIENTATION TO THE RESEARCH

As the title suggests this research considers factors predicting success in the final Qualifying Examination for Chartered Accountants. As a starting point this chapter provides a comprehensive outline of the research project, including background to the chartered accounting profession in general and the motivation or need for the research. The chapter includes the problem statement, aims and research design which together provide insight into what the study involves and how the research was conducted. The chapter concludes with a summary of the structure of the remainder of this dissertation.

1.1. BACKGROUND FOR AND MOTIVATION OF THE RESEARCH

Psychology is the field of study that scientists and philosophers of various persuasions have created to try to fulfil the need to understand the minds and behaviours of various organisms (Reber, 1985). According to Reber (1985) it is an attempt to understand what in the past escaped understanding, and any effort to circumscribe it would imply that something is known about the edges of our knowledge and that would be wrong.

This research falls within the field of Industrial Psychology which includes areas such as tests and measurement, the study of organisations and organisational behaviour, personnel practices, human engineering, human factors, the effects of work, etcetera (Reber, 1985). Wise and Campbell (1990, p. 355) point out that "Industrial psychology has long been concerned with the problem of matching people to jobs. Historically, the implicit assumptions seemed to be that virtually all jobs have a unique profile of ability, skill, and knowledge requirements and for each person there is one best match, if we can only find it." Although the research would be of use to various functions within Industrial Psychology, it is most relevant to Career Psychology and in particular the area of recruitment and selection. Most people are involved in a career development process just as they are involved in physical growth,
personality development, and some educational process, and because the individual and work are so closely interrelated, it is rarely possible to separate one from the other (Isaacson, 1985).

For an Industrial Psychologist concerned with helping individuals in the working environment, a thorough knowledge of both theory and practice is essential. A theoretical framework provides the basis for understanding the client, the client's problem and possible courses of action (Isaacson, 1985). Several factors contribute to the lack of a solid theoretical base in career psychology, including the brief period that career development has been studied, the impact of vast social change on career patterns, and the lack of sophistication in basic disciplines such as psychology and sociology of career counsellors (Isaacson, 1985). A theoretical framework is needed to assist individuals in making appropriate career choices and decisions. Industrial Psychologists need this base to make appropriate recruitment and selection decisions. In order to expand this theoretical framework scientific research is required.

By way of introduction to the profession of Chartered Accounting here follows an outline of the qualifications required to become a Chartered Accountant.

1.1.1 Academic qualifications

The Chartered Accountancy profession was established in South Africa during the early years of this century, and in 1921 the General Examining Board was set up by the provincial societies to conduct a uniform Qualifying Examination (Mockler, 1994). Following the formation of the Public Accountants' and Auditors' Board (PAAB) in 1951, the Chartered Accounting bodies agreed that the Qualifying Examination (QE) should be accepted as the educational entry requirement for Chartered Accountants (CAs) (Mockler, 1994). The QE is administered to candidates who meet the board requirements and is designed to measure technical competence, which includes not only technical knowledge and its application but also exercise of good judgement and understanding of professional responsibility (Sadler, 1988).

In order to qualify as a CA in South Africa students are expected to pass a three year Bachelor of Commerce (or equivalent) degree majoring in accounting, followed by a one year
Certificate in the Theory of Accountancy (CTA) (or equivalent). Students are required to sign a training contract with a registered public accountants' and auditors' firm. The student can enter into a training contract at any stage from the commencement of studying until after writing and passing the final CTA examination. Having completed the CTA, students have an annual opportunity to write the QE. The QE may be attempted a maximum of five times before students have to rewrite their CTA if they wish to make further attempts. Students who pass the QE and have completed their training are entitled to join the South African Institute of Chartered Accountants (SAICA) and to call themselves a Chartered Accountant of South Africa (SA) or CA(SA).

The QE has been structured to reflect the multi-disciplinary nature of the practical experience that is gained in a practice office and to give effect to the PAAB’s examining policy (Public Accountants' and Auditors' Board [PAAB], 1995). The purpose is therefore to determine a candidate's competence in the skills expected of the practising accountant (PAAB, 1995). The examination process is embodied in two parts as outlined by the PAAB (1995, p. 4):

(1) Part I tests the integrated application of the cognitive knowledge, preferably as soon as possible after the prescribed academic requirements have been met.

(2) Part II is skills oriented to test the integrated practical knowledge gained in professional practice. It should ideally be attempted after a reasonable amount of the prescribed practical training is completed.

The objective of Part I of the examination is to establish whether candidates are able to apply the concepts and principles underpinning the defined field of study to the problems arising within the relevant practical domain (PAAB, 1995). The objective of Part II is to establish whether candidates have an adequate knowledge of the material incorporated in the defined field of study and whether or not they have the ability to apply their knowledge in a professional manner to the types of situations they are likely to encounter in public practice (PAAB, 1995).
Credits are awarded separately for a pass in Part I and Part II and candidates only receive recognition for having passed the QE once they have obtained credits for both (PAAB, 1995). Candidates may pass the two parts in different attempts, therefore any research analysis would need to consider the two parts separately.

Each year approximately 2000 potential CAs register for the final QE. Anyone desiring to qualify as an accountant or auditor is required to pass this examination as approved by the PAAB. The purpose of the QE is to establish whether candidates have attained the required standard of academic knowledge in terms of the syllabi laid down by the Board, as well as whether they are able to apply that knowledge in practice (PAAB, 1995). However each year many students fail this very important examination. The reasons for this are not clear and only an investigation into the potential factors which may have an impact on a candidate's chances of success in the QE would result in further clarity regarding this issue.

The Education Committee of the Board, concerned about the unsatisfactory results which candidates are achieving in particular in Part II of the examination, has launched an in-depth investigation into factors such as the in-service training, the instructional design, the training provided by the academic institutions, the timing of the examination, etcetera. Therefore research on the technical aspects of the QE would not be relevant.

The present format of the QE as outlined above was set in 1993 and will change again in future. However it is unlikely that the standards and the requirements with regard to personality, cognitive ability, etcetera will change significantly.

Having provided some background to the accounting profession in general, the following section will consider the increased need for CAs, as much of the motivation for this research is based on this issue.

1.1.2 Increased need for chartered accountants

Managing money becomes more complicated every year. Firstly, for the government which has to find a balance between taxation and public expenditure and ways to curb inflation;
secondly for businesses, either trying to maintain their existence, or to become more profitable, and thirdly for the increasing number of families buying homes and therefore needing bonds and insurance (Segal, 1981). The enormous growth in the financial sector of the economy has resulted in an equally large increase in the demand for financial expertise (Segal, 1981).

Internationally studies such as that of Katchadourian and Boli (1985) have found that the last few decades have seen tremendous shifts in the distribution of students across major fields of study. For example, at Stanford by 1979-80, business degrees had increased by 64 percent over 1970-71, with declines of 44 percent in English, 42 percent in foreign languages, and 33 percent in the social sciences over the same period (Katchadourian & Boli, 1985). In South Africa registrations at universities show increasing numbers of students entering the accounting stream. In 1997, 760 and 1459 students registered for first year accounting at the University of the Witwatersrand and Rand Afrikaans University respectively compared with 565 and 224 in 1990. At the University of South Africa 10 916 students registered for the subject of first year accounting in 1997 compared to 6536 in 1990.

However the need is not only for general commerce or finance students but more specifically for CAs. In 1991 South Africa had approximately 10 000 CAs active in public practice and in commerce and industry and it is predicted that another 10 000 may be needed by the turn of the century (Cilliers & Roodt, 1992; Holmes, 1991). It is therefore necessary to give serious attention to the training and education of CAs to meet the numbers and the quality demanded by public practitioners and commerce and industry (Cilliers & Roodt, 1992).

Furthermore anyone hoping to follow a career in the financial sector, wishing to assure themselves of a job in the future, wanting to keep their options open and not to restrict themselves to one branch of finance for life should aim for the highest qualification, that is, for the professional CA(SA) qualification. Professional qualifications in accountancy have the widest currency outside the main financial institutions (Segal, 1981) and the CA(SA) is presently well recognised internationally.
The number of students writing the QE reflects a more or less constant increase over the last five years (see table 1.1). However failure in the QE prevents many potential CAs from qualifying. Factors impeding the progress of students, such as failure in the QE need to be investigated.

Table 1.1: Pass rates for the QE over the past five years.

<table>
<thead>
<tr>
<th>Year</th>
<th>% Pass</th>
<th>Passed</th>
<th>Failed</th>
<th>Total</th>
<th>% Pass</th>
<th>Passed</th>
<th>Failed</th>
<th>Total</th>
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<tr>
<td>1993</td>
<td>79.7</td>
<td>1379</td>
<td>351</td>
<td>1730</td>
<td>53.5</td>
<td>926</td>
<td>806</td>
<td>1912</td>
</tr>
<tr>
<td>1994</td>
<td>74.5</td>
<td>1081</td>
<td>370</td>
<td>1451</td>
<td>47.7</td>
<td>910</td>
<td>997</td>
<td>1349</td>
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<tr>
<td>1995</td>
<td>69.9</td>
<td>1087</td>
<td>468</td>
<td>1555</td>
<td>50.1</td>
<td>1079</td>
<td>1075</td>
<td>2295</td>
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<td>1996</td>
<td>65.6</td>
<td>1100</td>
<td>577</td>
<td>1677</td>
<td>53.7</td>
<td>1207</td>
<td>1039</td>
<td>2246</td>
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<tr>
<td>1997</td>
<td>64.8</td>
<td>1114</td>
<td>606</td>
<td>1720</td>
<td>51.0</td>
<td>1085</td>
<td>1043</td>
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In order to alleviate the potential skills shortage SAICA is currently repositioning itself in order to be in line with similar trends in other leading accountancy countries, and to further contribute to the Employment Equity Programme by actively promoting, training and educating accountants from the broad spectrum of the South African population (Mockler, 1995). These changes include changes in the structure to include multiple entry points for aspirant accountants allowing for 4 levels of membership namely: Chartered Accountant, General Accountant, Accounting Technician, and Student Accountant (Mockler, 1995). This research is concerned only with the Chartered Accountant for which SAICA states that "there would be no lowering of standards" (Mockler, 1995, p. 2).

Davidson, Gelardi and Hart (1995) suggest that entry into professions such as accounting almost universally require applicants to pass a set of examinations designed to ensure that applicants have the minimum level of technical knowledge deemed necessary for all members of the profession. There appears to be a general assumption that performance in these examinations is a reliable measure of a candidate's level of technical knowledge that is not significantly affected by other factors (Davidson, 1995). However Davidson et al (1995) also point out that there may be other factors that affect candidate responses, namely: innate intellectual abilities such as level of reasoning ability; skills such as knowledge of English; and psychological factors such as personality. At this stage it is unclear what factors impact on a
person's ability to pass the QE. In fact there is very little clarity or agreement on the qualities one needs to identify when recruiting potential CAs.

The above outline has shown that there is an increased need for CAs in South Africa. There is also an annual increase in the number of students studying the relevant subjects and registering to write the QE. However failure of the QE prevents many potential CAs from entering the profession. There is very little clarity on the reasons why certain individuals pass the QE and others do not. If industrial psychology was more successfully fulfilling one of its functions, of matching the person to the job, this problem would be partly alleviated. This emphasises the need for research to facilitate the identification of those students most likely to pass the QE.

The present procedures used in the recruitment and selection of CAs also provide motivation for research to improve the present knowledge base regarding factors to consider when identifying candidates most likely to be successful in the QE.

1.1.3 Recruitment and selection procedures

Criteria for selection are difficult to isolate, generalisation is limited and predictive value seems to be low. Regardless of these problems, selection is an acceptable way of coping with too many applicants for a limited number of posts. It is very difficult to define the job of a CA because there are so many options open to anyone entering the field: either in private practice, in commerce and industry, in the academic field, or in the public sector. Very briefly, the accountant will report on what has happened to a company financially, measure its profitability regularly, find the reasons for good and poor performance and use techniques of analysis and forecasting to decide on present and future company policy (Segal, 1981).

According to SAICA (1995) the following qualities are important for CAs:

(1) Communication skills and the ability to get on with people.

(2) Numeracy, that is, to be comfortable with figures and able to work with them quickly and accurately.
(3) Analytical ability and the ability to think in a systematic and logical way and to distinguish the unimportant from the significant.

(4) A flexible mind.

(5) Integrity.

The investigation of the general and specific characteristics of those who are involved with accounting has interested researchers for decades (Amernic, Aranya & Pollack, 1979). In 1965 Maslow stated that accountants show a low level of verbal competency, prefer working with numbers, are precise and exact when it comes to details, are not creative and do not like to encounter anything new without being thoroughly prepared for it (Amernic et al, 1979). De Coster on the other hand found in the early 70's that accountants scored higher on friendliness, personal acceptance and psychological sensitivity than other professional groups such as dentists, architects, scientists, and bank managers (Amernic et al, 1979). These studies and other research conducted on this topic will be outlined in chapter 3. However further research would be necessary to more accurately clarify the qualities required to successfully pass the QE in order to ensure the effectiveness of recruitment and selection procedures.

When dealing with any aspect of an individual's career it is necessary to deal with the whole person (Isaacson, 1985). Furthermore vocational assessors collect and interpret information in three separable domains: abilities, interests, and personality characteristics (Lowman, 1991). Competent career assessment rests on a careful examination of variables in each of these domains and should take into account group differences in ability, interest, and personality (Lowman, 1991). For example, the typical accountant presents a different profile in many important ways from a psychologist or an engineer.

In an attempt to recruit those applicants who are seen to be suitable for the profession of chartered accountancy a combination of some or all of the following recruitment techniques is traditionally used:

(1) Campus interview by a member of the firm for a limited period (about 20 minutes per candidate).
(2) Office visit by the student for about one hour, including an interview of at least 30 minutes.

(3) Vacation work for an average period of two weeks.

(4) Review of the application form to consider factors such as academic achievement, leadership positions, extra mural activities, and work experience.

(5) Psychometric tests, currently administered by only one of the six large international accounting firms in South Africa.

The failure rate on the QE makes it evident that these procedures have their shortcomings. Much of the interview time is spent telling the student about the firm because average-to-good students may receive three or four offers and their decisions are often based on information obtained during interviews.

Research to identify and determine factors predicting success in the QE should assist in increasing the number of candidates passing the QE, and would hopefully improve the present recruitment and selection procedures, but would also have several other benefits. The author takes the liberty of expanding on these benefits under the next heading, in order to emphasise the need for this type of research.

1.1.4 Benefits of the research

The results of the research could be used by industrial psychologists to more accurately identify students suited to the career of a CA, to improve the predictive validity of tests such as the 16 Personality Factor (16PF) questionnaire and High Level Test Battery, for more accurate manpower planning, recruitment and selection, and to generally provide a better service to clients, on an organisational as well as an individual level.

Proposed changes to the structure of SAICA will allow students to complete their traineeship in commerce and industry and the public sector, rather than only in the professional firms. This will result in increased competition for top graduates. Organisations will benefit from the research by being able to more accurately identify those students likely to pass the QE. Pass rates can be calculated for each accounting firm or University. Although these are not
published, they do become known by word of mouth and the firm or University with the best statistics is likely to attract the most and the best of the student pool.

Interviewing techniques can be improved by providing interviewers with more information, allowing them to compare their impressions of the candidate with the test results and perhaps prompting them to ask more relevant questions. The reliability and validity of interview information is highly questionable (Cherrington, 1983), and using valid and reliable testing data in addition to interviews will improve selection procedures. More accurate selection techniques may limit turnover to a certain extent and ensure the provision of top level staff and ultimately partners in the future and result in savings in the costs of training and replacement.

Inadequate selection causes discouragement amongst staff who are performing well and often have to work under pressure, because they are forced to work with colleagues who do not have the abilities required to perform effectively. Similarly the high rate of attrition due to the inappropriate course selection by students is inefficient for academic institutions and the presence of inadequately prepared students inhibits the learning of the competent student. Furthermore by knowing students' individual strengths and weaknesses an organisation can determine where best to place them and how best to handle them in order to ensure they reach their maximum potential. Training and career paths can be developed to suit each individual.

The Labour Relations Act requires that organisations provide empirical evidence to validate selection instruments used. This research will provide relevant validation data for the use of certain instruments for the selection of CAs.

If work is as important to most people as the evidence overwhelmingly indicates, then helping individuals to make better choices will enhance their lives and those of their families (Isaacson, 1985). Research on the factors predicting success in the QE for CAs will also be of particular benefit to students. Although success in the QE does not necessarily guarantee that the person will be a successful practising CA, it is the last hurdle in the career objective of obtaining a professional qualification. Career changes can be made afterwards but the person will at least have achieved the professional status on which so much time, money and effort has been spent. Students at school or university can be more accurately advised as to whether
Chartered Accountancy is an appropriate career for them or not. Counselling at universities is limited and students who spend years studying an inappropriate course are likely to be disappointed later. The increasing number of school leavers and the ever increasing costs of higher education make these early career decisions even more critical. Through the assessment students become more aware of themselves and their strengths as well as areas needing development. This allows them an opportunity to address any shortcomings as early as possible to improve their chances of success.

Results of the research may encourage the public to hold a more realistic view of accountants and help eliminate the stereotype held by the layman. This will also increase the likelihood that students entering university will make more suitable choices when selecting accountancy as they will have more realistic expectations.

Having outlined the motivation for the research, the specific problem under investigation needs to be defined and formulated.

1.2. PROBLEM STATEMENT

Research is required to investigate the impact of factors such as personality, interests, cognitive ability, and academic history of accountants, for the purpose of identifying those factors most likely to predict success in the QE. Although the factors that could be considered to adequately cover this research topic are infinite it is necessary to limit the number of factors in order to suitably fulfil the requirements for a dissertation of limited scope, such as this one.

Therefore although there are numerous potential predictors, it has been decided that the purpose of this research will be limited to answering the following questions:

(1) Is there a significant difference between the groups of successful and unsuccessful candidates in the QE, with regard to personality, vocational interests, intelligence, and academic history?

(2) Is there a combination of variables that can be used to predict success in the QE?
The problem statement is therefore: Do personality, vocational interests, intelligence, or academic history predict success in the final Qualifying Examination for trainee accountants?

Although this research is limited to certain factors it will still be of benefit to Industrial Psychologists, to students either presently studying accounting or considering a career in accounting and their guidance and career counsellors, organisations employing accounting graduates, Universities educating students in accounting, and other relevant institutions such as the PAAB, SAICA, and the Association of Black Accountants in South Africa (ABASA). Because the QE limits the number of accountants entering the profession, the passing of this examination is also of relevance to businesses that require CAs, the Receiver of Revenue and other government organisations that require the ongoing services of CAs directly or indirectly.

The research project should logically attempt to solve the problem outlined above. The research therefore has both general and specific aims arising from the problem.

1.3. AIMS

As mentioned previously there is an increased need for CAs in South Africa. However failure of the QE prevents many potential CAs from entering the profession and it is unclear what the factors are that impact on a person's ability to pass the QE. Research is required to investigate the impact of factors such as personality, vocational interests, intelligence and academic history of accountants, for the purpose of identifying those factors most likely to predict success in the QE.

Having limited the research to answering the questions referred to under the previous heading the general and specific aims of the research are outlined in the following paragraphs.

1.3.1 General aim

With reference to the above formulation of the problem, the general aim of this research is to evaluate by means of research whether personality, vocational interests, intelligence, or
academic history, predict success in the final Qualifying Examination for Chartered Accountants.

1.3.2 Specific aims

The specific aims are:

Theoretical: (1) To identify and summarise the theory and most recent research on personality, vocational interests, intelligence and academic history, in relation to accountants.

Empirical: (1) To determine whether there is a significant difference between the groups of successful and unsuccessful candidates in the QE, with regard to personality, vocational interests, Mental Alertness score, and matriculation Mathematics and matriculation home language results.

(2) To select a combination of variables that can be used to predict success in the QE.

1.4. RESEARCH MODEL

For the purposes of this research the model of Mouton and Marais (1990) was used as it adequately and simply outlines the plan of how this research was executed. In terms of this model, research in the social sciences is defined by Mouton and Marais (1990, p. 7) as: "a collaborative human activity in which social reality is studied objectively with the aim of gaining a valid understanding of it."

This definition of research emphasises five dimensions: sociological; ontological; teleological; epistemological; methodological, and these five dimensions are systematised within the research model (Mouton & Marais, 1990).
(1) The sociological dimension: research is a joint or collaborative activity and in this instance the industrial psychology research community contributed, although the accounting fraternity also generated certain relevant studies. Consequently the mechanisms of social control, the research ethics and the influencing ideologies and interests of industrial psychology were adhered to during the research process. More specifically this research is for the purpose of part fulfilment of an academic qualification and is thus an individual project, self-initiated, under the supervision of the faculty department, where the researcher controls all resources within the time deadlines set by the university.

(2) The ontological dimension: research is always directed at an aspect of social reality and in this instance different paradigms were used for different dimensions covered in the study. This dimension is referred to in detail in point 1.5. More specifically at the project level this research studies groups rather than individuals, interactions or objects.

(3) The teleological dimension: as a human activity, research is goal-directed, with the aim being the understanding of phenomena. These theoretical and practical goals were outlined in point 1.3. At the project level this research can be regarded as practical to the extent that it attempts to provide information, diagnose and solve a problem.

(4) The epistemological dimension: the aim of research is to provide a valid and reliable understanding of reality. The validity, demonstrability, reliability or replicability of the research will be referred to in greater detail later in this chapter.

(5) The methodological dimension: research is objective by virtue of its being critical, balanced, unbiased, systematic and controllable. This research was conducted under the high-level methodological paradigm of the positivistic approach, which suggests that science is rational to the extent that it complies with the rules of logic. More specifically at the project level, the research is descriptive, with the emphasis on the frequency and extent to which a specific characteristic or variable occurs in a sample. The research is non-experimental.

The model is a systems theoretical model consisting of three subsystems interacting with each other and with the research domain: intellectual climate; market of intellectual resources; research process (Mouton & Marais, 1990).
Before considering the specific research it is necessary to indicate the paradigm perspective used in the research.
1.5. THE PARADIGM PERSPECTIVE

In defining the area of research it is important to identify the paradigm in which the problem will be addressed. By doing this one ascertains boundaries and points of departure for the research. An eclectic approach has been chosen for this research. This means that in accordance with the definition of eclectic used in the Dictionary of Psychology, no one system is followed, but whatever is considered best in all systems is selected and used (Reber, 1985). No one theoretical position is regarded as universally applicable (Reber, 1985). According to Reber (1985) eclecticism is regarded as healthy in fields like psychology which are still too immature to expect that any one of its theories or procedures could be universally applicable. Similarly Carson, Butcher and Coleman (1988), refer to psychologists who have responded to the plethora of perspectives by adopting an eclectic stance by accepting working ideas from several viewpoints and using them all as practicable.

The term "intellectual climate" is used to refer to the variety of meta-theoretical assumptions held by those practising within a discipline at any given stage (Mouton & Marais, 1990). The focus in this research is mainly on Industrial Psychology. Some of the subdisciplines are: biological, psychodynamic, behaviourist, humanistic, interpersonal, sociocultural. As mentioned above this research follows an eclectic approach. There are four dimensions addressed in the research, namely: personality, vocational interest, intelligence and academic history. The basic assumptions of the approach used for each dimension will be addressed in the following sections.

1.5.1. Personality presented from the dimensional framework

A summary list of the theoretical approaches to personality would be: trait, psychoanalytic, phenomenological, and learning, but it is the trait approach to personality that is most frequently referred to in the context of recruitment and selection (Lewis, 1992). Personality, as measured by the 16PF, will be addressed from the dimensional paradigm where the focus is on traits or aspects making up or determining human behaviour. This approach embraces the idea of the personality type, or an all-embracing unique dimensional difference, and the idea is
that personality does not refer to an all-embracing difference, but to a whole range of
classifications, thus offering a multi-dimensional model (Lewis, 1992).

McCrae and Costa (1990, p. 23) define traits as "dimensions of individual differences in
tendencies to show consistent patterns of thoughts, feelings, and actions", and they refer to the
following characteristics of the trait theory:

(1) The psychology of traits, or individual differences, has always played a major role in
common sense and academic psychology and it can be seen as a philosophy of human
nature well suited to pluralist society.
(2) Trait models of personality are compatible with a wide variety of theoretical
approaches, and they have formed the basis for most research on personality.
(3) Traits are only dispositions, not absolute determinants, and people can be ranked by
the degree to which they show these traits.
(4) Whatever their origin, by adulthood individuals can be characterised in terms of a
variety of traits and personality research proceeds from that point.
(5) Trait names do not refer to the underlying physiology, but to the abstract consistencies
in the way people act and experience and whatever complex underlying causes they
may have.

Each individual has a unique set of characteristics or traits that can be identified and measured
by tests or other means, and each occupation requires certain factors for successful
performance (Isaacson, 1985). Individuals can be placed on a quantitative scale according to
the occurrence of a certain characteristic (Plug, Meyer, Louw & Gouws, 1986). Different
dimensions explaining the same case are independent of one another, that is, orthogonal (Plug
et al, 1986).

1.5.2. Vocational interests presented from the behaviourist framework

Vocational interests, as measured by the Rothwell-Miller Interest Battery (RIB), will be
addressed by the behaviourist paradigm. According to Carson et al (1988) the behaviourist
perspective is organised around the central theme of the role of learning in human behaviour, and they outline the following as the basics of the behaviourist perspective:

(1) Prior to learning a specific stimulus will elicit a specific response and through classical conditioning the same response may be elicited by a wide range of other stimuli. In operant conditioning the response typically precedes the desired stimulus and through conditioning the response rate increases as the individual learns to associate it with achieving a desired goal.

(2) Reinforcement or the strengthening of a new response by its repeated association with some unconditioned stimulus.

(3) When a response is conditioned to one stimulus or a set of stimulus conditions, it tends to become associated with other stimuli in proportion to the degree of similarity between the original and the new stimuli. This process is called generalisation. Similarly discrimination occurs when the individual learns to distinguish between similar stimuli and to respond differently to them.

Vocational interests are defined by the RIB manual as stereotypical conceptions that people hold about the activities, responsibilities and the roles of occupations (Hall, Halstead & Taylor, 1986). In other words the individual responds in a particular way to certain activities, and even to associated activities. For example, an individual may find pleasure in solving a mathematical problem. The person's goal then becomes solving the problems. Related activities, such as balancing a balance sheet, may result in similar rewarding feelings of satisfaction. Ultimately the vocational interest battery is based on the assumption that the individual has learnt that certain activities are enjoyable or result in pleasure and others not.

1.5.3. Intelligence presented from the cognitive framework

Intelligence is addressed from the cognitive paradigm. Cognitive psychologists emphasise cognitions and intervening mental processes (Lundin, 1985). Hayes (1978, p. 1) defines cognitive psychology as: "the study of processes by which people come to understand the world - such processes as memory, learning, comprehending language, problem solving, and
creativity." Implied in this definition is the notion that cognitive psychology emphasises the study of higher mental processes (Lundin, 1985).

Lundin (1985) refers to the cognitive behaviourists, who stress the importance of behaviour but do not object to using intervening cognitive principles as part of their explanations. Leahey (1980) defines three additional paradigms for cognitive psychology, the first of which would be relevant to this study and the use of the Mental Alertness test:

1. The new structuralism - stresses a structural approach to cognition, that is, what its structures are and how they work. The relationship of language to cognition is also considered to be important.
2. Man and machine - the study of information processing and the computer and consequent analogies between man's cognitions and the functions of the computer.
3. The new mentalism - an eclectic group of psychologists that do not fit into the first two groups. They do not stress principles of association considered important by some other cognitive psychologists.

In line with the new structuralism approach the Mental Alertness test is part of the High Level Battery, which consists of a number of sub-tests each measuring an area of intelligence, and provides an overall measure of general intelligence (Lombard, 1975). As mentioned above the relationship of language to cognition is important to this group of psychologists and Owen and Taljaard (1989) mention that the Mental Alertness primarily measures verbal aspects of intelligence.

1.5.4. Academic history presented from the functionalist framework

Academic history is addressed from the functionalist paradigm. The common threads that characterise functionalism are outlined by Lundin (1985) as follows:

1. Psychology deals with mental functions rather than contents.
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(2) Psychological functions are adjustments or adaptations to the environment. The organism's ability to make changes according to its changing relationship to its environment is of the utmost importance.

(3) Psychology has utilitarian aspects and allows for practical applications to children, animals, education, and other fields.

(4) There is no break between the stimulus and the response. Mental activity is part of the whole world of activity that includes both mental and physical aspects.

(5) Psychology is closely related to, and evolves out of biology. An understanding of the anatomical and physiological functions is helpful in understanding the mental.

With regard to academic history this paradigm suggests that previous academic history will predict future academic performance, as the individual is prone to reacting to certain aspects of the environment in a similar way. Furthermore the individual's academic results will be a direct result of the examination situation, which is dependent on a variety of aspects, that is, the psychology, biology, physiology, etcetera, of the individual.

Having considered the paradigm perspectives, the research design will be considered in more detail. With reference to the research project it will be endeavoured to make use of an optimal research design and fitting methods, to test theoretical hypotheses.

1.6. RESEARCH DESIGN

Selltiz, Jahoda, Deutsch and Cook (1965, p. 50), describe a research design as "the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure." According to Mouton and Marais (1990, p. 33) "the aim of a research design is to plan and structure a given research project in such a manner that the eventual validity of the research findings is maximised."

The aim of this design is to ascertain if the specifically chosen, independent variables of personality, vocational interests, Mental Alertness score, and matriculation Mathematics and matriculation home language results, influence another dependent variable; QE result.
The unit of analysis in this case is groups, or more specifically a group of individuals who passed the QE, and a group of individuals who failed the QE.

The research is descriptive, with the emphasis on the frequency and extent to which a specific characteristic or variable occurs in a sample (Mouton & Marais, 1990). The research is based on a structured statistical analysis characterised by the use of a systematic classification of variables by means of arithmetic means, medians, and so on, and is thus quantitative. The research is non-experimental. It is not possible to control the independent variables as their manifestations have already occurred, and they are non-manipulable (Kerlinger, 1986).

It is important to give consideration to the internal and external validity of the research. According to Kerlinger (1986, p. 417) "the commonest definition of validity is epitomised by the question: Are we measuring what we think we are measuring?" In other words it should be ensured that it is really the personality, vocational interests, intelligence, and academic history, of the QE candidates that is being measured. Error variance was minimised by using as much objective data as possible, that is, by using valid and reliable measuring instruments such as the 16PF and the Mental Alertness test, and by making the conditions under which the psychological assessments were conducted as uniform as possible. The validity of this research is therefore dependent on the validity of these specific instruments. Their validity will be referred to in more detail in chapter 4. At this stage, because the instruments are all widely accepted and used, it can be assumed that the research data obtained is valid. With regard to construct validity, it can be assumed that any differences in scores on the various tests used are indeed due to a difference in performance, as all other factors concerning the testing conditions were controlled, for example, the venue used for testing, the order of the test administration, etcetera.

Although the trainees were assessed over a number of years, all were assessed under exactly the same conditions and following exactly the same procedures. That is, they were assessed before their entry into the firm and in all cases for purposes of selection. To assess trainees after they had been employed would have decreased the validity of the data as the circumstances of their assessment would then have been different. Data could not be collected from more than one source as none of the other major firms in South Africa uses
psychological assessment for the selection of trainee accountants. Only successfully employed applicants, that is, employees of the firm, were included in the sample. To include unsuccessful applicants would also have decreased the validity of the data, because other factors which may have predicted success would not have been controlled, such as access to a QE course, induction training or relevant work experience.

Concerning external validity or generalisability, results should be relevant to all candidates attempting the QE. However the sample used for this research was not random, and only included students who successfully applied to one particular organisation for traineeship, and the group was therefore pre-selected to a certain extent. Extraneous variables were controlled as far as possible by selecting all candidates within a particular organisation, who wrote the QE and who had been assessed prior to joining the organisation. Although not all QE candidates employed by the organisation had been psychologically assessed, there was no particular preselection of those assessed and those not assessed. The sample was a preselected group to the extent that the candidates all chose to attempt the QE, and they were all selected for traineeship at a particular organisation. Therefore a part of the universe of candidates writing the QE was excluded. Therefore generalising results to all QE candidates should be undertaken with caution.

The sample excluded the lower end of the assessed applicant pool or QE candidates as these candidates would already have been declined for employment in the organisation, perhaps partly as a result of their psychological assessment results. Therefore the sample was also preselected to the extent that there was a greater chance that the candidates would pass. Schneider (1987) also points out that particular kinds of people are attracted to different kinds of settings, combined with the finding that those who do not fit in leave, this produces restriction in range. Consequently the range of variance in individual differences in a setting is much less than would be expected by chance (Schneider, 1987). This does not mean that the results of the study are not meaningful as the results are primarily for improving the selection procedures within one particular firm and not for predicting success within the entire pool of QE candidates.
Experimental variance was maximised by considering as many independent variables as possible within the limitations of the research requirements. Race, sex, age, language and years of experience could be independent variables for future research but would have added too many variables to the study if included in this research.

Ultimately the research design should facilitate the process of testing the research hypotheses.

1.7. RESEARCH HYPOTHESES

The study will confirm or reject the following hypotheses:

H1: There is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to personality factors as measured by the 16PF.

H2: There is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to vocational interests as measured by the RIB.

H3: There is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to the Mental Alertness score of the High Level Test Battery.

H4: There is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to matriculation Mathematics and matriculation home language results.

The following section will address the specific method used to conduct the research in order to adequately meet the research aims.

1.8. RESEARCH METHODOLOGY

The research was conducted in two phases:

The first phase involved the literature review in the form of descriptive research. This entails the most relevant models and theories presented in an integrated way to serve as background to the variables being investigated in the research (personality, vocational interests, intelligence
and academic history), and the instruments used to measure these factors (16 Personality Factor questionnaire, Rothwell-Miller Interest Blank, the Mental Alertness test and matriculation results). Some of the most important and relevant research undertaken on each of these factors, over the last five years is described. In this regard reference was limited to those studies involving similar measuring instruments or studies involving chartered accountants specifically.

The literature review emphasised the following:

Step 1: procedure.
Step 2: data analysis and description.
Step 3: population and sample.
Step 4: validity and reliability.

The second phase entailing the empirical study consisted of four steps:

Step 1: obtaining the data of a group of trainee accountants within a specific organisation attempting the QE over a period of five years (n = 113).
Step 2: identification of the measuring battery based on the identification of the standard dimensions that need to be considered in order to comprehensively assess an individual, that is: personality; vocational interests; intelligence; and observed performance or in this case, academic history, which was more relevant to the study.
Step 3: selection of instruments for measuring each of these variables. Details regarding the scales, administration, interpretation, validity and reliability of the various instruments are provided in chapter 4.
Step 4: analysis of data and the procedures for doing this. Logistic regression analysis, a t-test and discriminant analysis are the chosen statistical procedures. These procedures were chosen on the advice of statistical experts in order to best identify the factors predicting success in the QE. The chosen packages were also best suited to the type of data used in the study. Detail on the statistical processing as well as the computer packages used is provided in chapter 4.
Step 5: testing the hypotheses.
Step 6: reporting the results of the research. This step is covered in chapter 5.
Step 7: interpretation and generalisability of the results, addressed in chapter 6.
Step 8: conclusions, covered in chapter 7.
Step 9: limitations of the research, addressed in chapter 7.
Step 10: recommendations, also discussed in chapter 7.

This chapter is concluded with an outline of the structure for reporting the remainder of the research study.

1.9. CHAPTER DIVISION

The chapters of this research will be presented as follows:

Chapter 2: Theoretical background
Chapter 3: Review of empirical studies
Chapter 4: Empirical study
Chapter 5: Results
Chapter 6: Interpretation and discussion of results
Chapter 7: Conclusions, limitations and recommendations
CHAPTER 2

THEORETICAL BACKGROUND

The theoretical aim of the research is to identify and summarise the theory and most recent research on personality, vocational interests, intelligence and academic history in relation to accountants. This chapter will address the first part of this theoretical aim, that is, to identify and summarise the theory regarding the variables. The next chapter will identify and summarise the most recent research on the variables. This specific study is most relevant to Career Psychology, and more specifically the function of selection by means of psychological assessment, within Career Psychology. After an initial discussion on the theory of psychological assessment, the relevant theory for each of the variables of the research is documented.

2.1. PSYCHOLOGICAL ASSESSMENT

This research involves an investigation of various variables and the psychometric instruments used to measure them, and their ability to predict success in the QE. Therefore some discussion on psychological assessment in general is warranted. Although the origins of assessment can be traced to antiquity, modern psychological assessment dates back to the beginning of this century (Graham & Lilly, 1984). The function of psychological tests is to measure differences between individuals or between reactions of the same individual on different occasions (Anastasi, 1990). Psychological assessment is a valuable way to measure individual characteristics and hundreds of tests have been developed to measure numerous dimensions of human behaviour, for instance mental abilities, physical abilities, knowledge, skills, personality, interests, temperament, and other attitudes and behaviours (Cherrington, 1983). The classification of children with reference to their ability to profit from various types of school instruction, the identification of intellectual retardation or giftedness, the diagnosis of academic failure, the educational and vocational counselling of high school and university students, the selection of applicants for professional and other special courses, and the
selection and classification of industrial personnel are among the many educational uses of tests (Anastasi, 1990). Psychological assessment provides recruitment and selection with an overlay of scientific respectability by isolating the psychological dimensions of a candidate and attempting to accurately measure them (Lewis, 1992).

### 2.1.1 Psychological assessment and recruitment and selection

One of the most critical stages in a person's career, both for the individual and for national economic and manpower planning, is the transition from school to work, and counselling and placement activities in the school, and recruiting operations in organisations play a crucial role in this transition (Super & Hall, 1978). Despite this, psychological assessment does not appear to have played an important role in career counselling and guidance. Similarly it is inevitable that in an exercise which is aiming to predict human behaviour, there will be concern with psychological attributes, therefore the success or failure of recruitment and selection procedures can rest heavily on those operating them to deal with such intangible notions as personality, or intelligence, as used to classify desirable attributes for job performance (Lewis, 1992), yet psychological assessment appears to be infrequently used in recruitment or selection. Super and Hall (1978) refer to various early studies in this regard:

1. A study conducted by Graff, Raque and Danish in 1974 assessing counselling activities at 52 university counselling centres found that masters level staff and practicum students did most of the counselling, innovative practices were few, and research and evaluation were limited. It is likely that research at South African institutions will yield similar, if not poorer results.

2. A study by Drake, Kaplan and Stone conducted in 1973 amongst 258 organisations recruiting graduating students at universities, found that few companies provided training programs for interviewers and selection criteria tended to be very subjective and nebulous.

3. A study by Bray, Cambell and Grant in 1974 concluded that career success is most likely to be enhanced through a combination of careful selection through assessment of individual potential and stimulating and challenging jobs early in a person's career.
A more recent investigation by Ryan and Sackett (1992) in America found that 78.8 percent of organisations surveyed used personality tests to make recruitment decisions. Similar results have been found in the United Kingdom where successive surveys using the same survey instrument and sampling frame of the usage of personality measures for management selection showed 12 percent usage in a 1984 sample (Robertson & Makin, 1986) and 37 percent usage in a 1989 sample (Shackleton & Newell, 1991). Lotz (1990) points out that with regard to career selection candidates' personalities are just as important as their ability to ensure career satisfaction and it is therefore necessary to test personality for selection into specific careers. An alternative model in which personality measures have interactive effects with ability tests in predicting performance provides a strong theoretical rationale to support a relationship between personality variables and performance (Hollenbeck & Whitener, 1988).

Internationally there has been a resurgence in the use of preemployment screening devices as an aid to recruitment over the last ten years (Cherrington, 1983; Evans & Brown, 1988; Lee, 1988). According to these authors this comeback can be attributed to: the possibility of lawsuits around selection procedures and the consequent need for objective standards; methodological improvements in the field of industrial psychology that make it easier to demonstrate the validity of tests; focus on increasing productivity and competitiveness and productivity; and the high cost of poor hiring decisions. Similar pressures such as the new Labour Relations Act are likely to lead to a similar phenomenon in South Africa.

Only one of the six large accounting firms in South Africa presently utilises psychological testing as part of the recruitment procedure. Employers generally tend to rely on intuition rather than proven objective procedures to select job applicants and generally rely on a variety of subjective selection procedures, such as personal interviews, reference checks and resumé evaluations. Employment interviews are used by virtually every organisation to hire employees at every job level although research evidence does not support the value of employment interviews as they are conducted by individuals who have different orientations, different levels of competence, and different perceptual biases (Cherrington, 1983). In other words the interview process in general is inconsistent, and the evaluations of the interviewer are essentially random observations (Cherrington, 1983). The evaluation is therefore usually not standardised for all applicants and therefore places the organisation in a vulnerable legal
position. Research has shown that these subjective procedures are relatively ineffective in predicting how applicants will perform on the job. Selection decisions can therefore be improved by the use of testing.

It is important to note that using test results alone for prediction is a discouraging and unsatisfying process because a limited sample of the behaviour (the test results) is used to predict a complex global result (Isaacson, 1985), such as success on the QE. Even if it were possible to control completely the variability on the criterion side, it would still be difficult because tests do not yet allow for perfect prediction and such predictions are based on a regression equation that assumes a perfect relationship between the predictor and the criterion (Isaacson, 1985). Psychological assessment is essentially an attempt to achieve objectivity, or rather to reduce subjectivity in selection decision-making and if undertaken correctly it can narrowly measure aspects of a candidate relatively accurately (Lewis, 1992). When the correlation is less than perfect as it inevitably is with tests, predictive accuracy declines and the standard error of estimate that provides a range in which a given forecast is likely to occur must be considered (Isaacson, 1985). Reliability and validity are two of the major concerns that must be addressed in the selection and use of tests. All of the tests and questionnaires used in this research have adequately proven reliability and validity as indicated in the relevant testing manuals (Cattell, Eber & Tatsuoka, 1970; Hall et al., 1986; Lombard, 1975).

Lewis (1992) suggests that the advantages of psychological assessment are: the validity can be predicted in statistical terms for certain candidate attributes; candidates can be tested in groups, and; it is inexpensive because most of the tests are re-usable. He considers the disadvantages of psychological assessment to be the following: the candidate cannot be comprehensively assessed, which causes gaps in the information for decision-making; a knowledge of psychology is necessary to interpret the results; the initial purchase of the tests can be costly. Evidence suggests that in spite of the limitations, any predictions based on actuarial data seem to be stronger and more reliable than those based on clinical assessment alone (Isaacson, 1985). Predictive accuracy is increased by using multiple predictors and for this reason a variety of measures is investigated with regard to their ability to predict success in the QE. Before considering these measures, it is necessary to clarify the issue of psychological assessment bias, as well as other ethical issues relevant to the topic.
2.1.2 Psychological assessment bias

Psychological assessment or testing has been subjected to much criticism especially recently with regard to cultural fairness and cultural bias. Tests have been scientifically developed, and most are very reliable, that is, they provide consistent measures of individual characteristics, however, they may or may not be related to job performance, or any other outcome, and therefore they may or may not be valid (Cherrington, 1983). Tests have been found to eliminate a large proportion of certain groups of "minority employees" from jobs for which the tests are not valid (Cherrington, 1983).

The question of whether traditional employment tests are appropriate for Blacks or certain minorities is an important one in the present South African climate. A statistic is biased if, on the average, it does not equal the parameter it is supposed to estimate (Graham & Lilly, 1984). In testing, bias is mainly claimed to exist in intelligence and aptitude tests, less often in achievement tests and rarely in personality tests (Graham & Lilly, 1984). Test bias exists if one group receives consistently lower scores on a test than do members of another group of the same ability level. This has various consequences, for example, if the test is used for selection, fewer of the group with the lower score will be selected.

A study by Hunter, Schmidt and Hunter (1979) examined 866 Black-White employment test validity pairs from 39 studies for evidence of differential validity beyond what could be expected on the basis of chance, and found that apparent differential validity in samples is produced by chance and a number of statistical artefacts. This indicates that true differential validity probably does not exist. Although their findings do not assure test fairness they do constitute strong evidence against substantive hypotheses of test bias based on the assumption that the meaning of test content differs by race (Hunter et al, 1979). Research in South Africa and in the United States of America (USA) has shown that Blacks do not perform as well as Whites on the formal Western-type tests (Hall, 1980).

Test bias is also related to validating the test against the wrong criterion, or bias may be identified in the situation in which the assessment occurs (Graham & Lilly, 1984). From the brief outline above it is clear that test bias should be kept in mind when implementing any
psychological assessment as part of selection procedures. Apart from the above there are also other contentious issues requiring clarification when considering psychological assessment.

2.1.3. Other ethical issues in psychological assessment

Cherrington (1983) points out that testing has been criticised as a process which creates conformity or as an invasion of an individual's private thoughts. With regard to psychological assessment as cited in the ethical code for psychologists and monitored by the South African Medical and Dental Council certain procedures and requirements should also be adhered to, such as the confidentiality of information obtained during testing and the client's right to receive information about tests they have taken. Legal issues with regard to employment testing especially with regard to the Labour Relations Act and the Bill of Rights will need to be considered very carefully before conducting any of the testing referred to in this research.

Graham and Lilly (1984) suggest that two principles should be constantly kept in mind when considering both the criticism and use of tests. Firstly, a test score represents current performance on a standardised task and as such is a function of both environmental and genetic influences. Secondly, test scores should not be the only data used in making decisions about people and should not be the most important factor in such decisions. The real danger of psychological assessment is that the confidence inspired by its apparent objectivity can be seriously abused (Lewis, 1992).

Although further discussion on these issues is beyond the scope of this research, it is relevant to mention that an understanding of the strengths and weaknesses of testing is assumed and perhaps this research will further contribute to an understanding of the limitations and uses of psychological assessment.

2.2. FACTORS PREDICTING SUCCESS

As mentioned earlier part of the specific theoretical aim of this study is to identify and summarise the theory on personality, vocational interests, intelligence and academic history, in
relation to accountants. More specifically, each variable is defined before specifically investigating the theoretical relationship between each dimension and Career Psychology.

2.2.1 Personality

The concept of personality is widely recognised as being central in psychology, yet its nature and the ways in which it can be defined and measured are questions about which psychologists are in considerable disagreement. Here follows a brief reference to the definition of personality, and some background to the way personality has been considered in recruitment and selection.

2.2.1.1 Definition

Psychologists, especially those who are interested in why individuals differ from one another, pay particular attention to personality, but the common usage of the word is too broad, and there are many different definitions as to the nature of personality (Lewis, 1992). Personality is not a thing or tangible object to be defined and identified, but rather an inference or abstraction that calls to mind the individuality, adaptability, and characteristic disposition of the human organism (Gough, 1976). Personality is a differentiating concept and there are dimensions and facets that are present in varying degrees in everyone, that can be identified and measured, and personality assessment is that branch of study concerned with the specification of these dimensions of variation and the construction of tests and measuring devices for their calibration (Gough, 1976). Although theorists tend to disagree over definitions of personality, there seems to be agreement that in order to perform a systematic exploration of personality's relationship to other variables, a definite set of personality factors needs to be specified (Eaves, 1989).

Gough (1976) refers to Hall and Lindzey (1957) who stated that no substantive definition of personality can be used in any very general way, and add that personality in any specific inquiry is defined by the empirical methods of inquiry of the investigator. Gough (1976) also refers to Wiggins, Renner, Clore and Rose (1971) who stress the incompleteness of any single
perspective, and suggest that biological, experimental, social, and psychometric perspectives are all required if the diversity of personality is to be adequately comprehended.

Lewis (1992, p. 53) suggests that most of the theoretical approaches to personality would accept the definition of personality as being "characteristic patterns of behaviour and modes of thinking that determine a person's adjustment to the environment." That is, personality can be seen as those enduring aspects of individuals which cause them to be different from other individuals (Lewis, 1992).

2.2.1.2 Personality and recruitment and selection

Given a choice, people tend toward occupations that allow the expression of their personality (McCrae & Costa, 1990). Personality is relevant to this study because of its influence on career selection and consequently also the decision to become a CA.

To advise a person about fit to an occupation (Holland's congruence principle), the personality profiles that characterise various occupations must be known (Schuerger, 1992). The assumption in profile-matching is that the mean profile of a criterion group is in some sense an "ideal" pattern for selecting new members of that group, even though it may not be known exactly how the individual factors composing the profile work together to make the individuals' behaviour resemble that of the criterion group (Cattell et al, 1970). If a personality profile has been developed for the occupation as well as for more and less successful members of the occupation, the counsellor should be able to determine if the candidate's personality is likely to make the person more or less successful (Davidson & Dalby, 1993a).

There has been substantive and widespread research on the criterion predictions, numerical forecasts, and interpretative decisions of the 16PF in the personnel and guidance field (Cattell et al, 1970). Conn and Rieke (1994) state that the link between personality traits and vocational interest, as measured by the 16PF appears to be strong. However, to establish a connection between personality traits and actual occupational membership, research studies need to assess the personality characteristics of successful job incumbents (Conn & Rieke,
Personality tests are concerned with the affective or non-intellectual aspects of behaviour (Anastasi, 1990). According to Anastasi (1990) the term personality test most often refers to measures of characteristics such as emotional adjustment, interpersonal relations, motivation, interests and attitudes. There are numerous personality tests available and most fall into two broad categories: self-report inventories and projective tests (Moursund, 1990). Self report is the most widely used method (McCrae & Costa, 1990). Individuals have spent a lifetime getting to know themselves, and they can draw on the subjective experience that tells them whether they enjoy an activity or have vague desires or anxieties (McCrae & Costa, 1990). The 16PF, used in this research is the most widely used self-report inventory (Lewis, 1992), where the candidate answers questions about his ideas, feelings and past experiences. Having discussed the variable of personality in detail, vocational interests will be discussed along similar lines.

2.2.2 Vocational interests

The vocational interest variable is considered in terms of defining the concept and referring to how this variable is used in recruitment and selection.

2.2.2.1 Definition

Vocational interests give insight into the types of occupations likely to arouse motivation and to create feelings of satisfaction, and group people into a small number of career relevant groups (Lowman, 1991). Vocational interests, vocational choices, and characteristics of people in related occupations are manifestations of a common personal disposition or construct (Holland, 1976). In this research the Rothwell-Miller Interest Blank (RIB), is the instrument used to measure this factor, and therefore the appropriate definition of vocational interests for this research would be the one used in the manual of the RIB where vocational interests are defined as the stereotypical conceptions that people hold about the activities,
responsibilities and the roles of occupations, and on which they base their choice of occupation (Hall et al, 1986).

2.2.2.2 Vocational interests and recruitment and selection

A factor that commands much attention during a selection procedure is that of interests (Lewis, 1992). According to Lowman (1991) many aspects of ability and personality are embedded within interest profiles and interests are complex and clinically rich sources of information. The assessment of vocational interests provided one of psychology's early success stories (Lowman, 1991).

The basic assumption of interest inventories is that people perceive occupations and their associated activities accurately and that these perceptions remain the same for long periods (Holland, 1976). Studies suggest that stereotypes or generalisations about occupations are stable over time, have validity, and are selectively perceived according to social status, intelligence, and degree of involvement in the occupation (Holland, 1976). Someone with an accounting interest will seek accounting training and engage in an accounting career because they have a relatively stable disposition which expresses itself in similar behaviour at different ages. People are supposed to be interested in their jobs.

Vocational profile data involves the comparison of individual profiles with those obtained by people in defined occupational groups (Lowman, 1991). As for personality profiling, mentioned earlier, the premise is that the closer the match between the individual and the occupational group, the more likely it is that the person will be well suited to that occupational group (Lowman, 1991). Interest profile analysis can only offer useful pointers to the consequences of an interest in a particular area being related to the possibility of doing well in it (Mikellides, 1989). People well matched with their occupations are more likely to be satisfied, to remain in their jobs, and to be productive employees (Lowman, 1991). In a similar way it is hypothesised that interest in accounting related careers is likely to influence success in the QE.
A person's vocational interests, preferences, choices, or occupational membership can be assessed by: administering an interest inventory; administering a standard questionnaire; or by classifying interest inventory scores, questionnaire responses, or current job into an occupational classification (Holland, 1976). These procedures yield similar but not identical results and for the purposes of this research an interest questionnaire was used. Many sophisticated interest measuring instruments exist, although most need refinement and there is no single best instrument (Lowman, 1991). Interest inventories present large numbers of items asking whether or not various activities, occupations, or types of people are liked or disliked, with the aim of identifying the kinds of activities and occupations in which people are interested (Graham & Lilly, 1984).

Self-report interest inventories have many of the characteristics associated with personality inventories, such as the possibility of faking, change over short periods of time, and a variety of construction techniques, however, unlike personality and aptitude tests, interest inventories are relatively easy to understand (Graham & Lilly, 1984). The scores should help a candidate identify possible educational or vocational careers (Graham & Lilly, 1984). Specialisation and division of work within organisations and higher heterogeneity in organisational environments, have resulted in more narrowly defined occupational categories which are valuable in career development and human resource planning (Mossholder, Bedeian, Touliatos, & Barkman, 1985). As mentioned previously the psychological instrument used to assess vocational interest in this research is the RIB. The measuring instruments will be covered in more detail in chapter 4. The next variable to be discussed is that of intelligence.

2.2.3 Intelligence

The complex issue of defining intelligence is addressed under this heading as well as the use of the concept of intelligence or cognitive ability for recruitment and selection.

2.2.3.1 Definition

Intelligence is a very complex psychological concept and psychologists doing research in the field cannot even agree on a definition - some see it as an ability to reason in the abstract,
others as the ability to make optimum decisions in given situations, and others simply as the ability to take intelligence tests (Lewis, 1992). Intelligence as learning ability or the ability to learn is commonly referred to in definitions of intelligence (Guilford, 1967). Sternberg and Wagner (1993) make a distinction between academic and practical intelligence, firstly because academic and practical problems have different characteristics, and secondly because academic and practical intelligence have different characteristics. For example, in academic intelligence the relevant knowledge is of content and rules, and is formal and out in the open (Sternberg & Wagner, 1993). While in practical intelligence, the relevant knowledge is of norms, and is often informal and often tacit (Sternberg & Wagner, 1993).

Guilford (1967) suggests that both learning ability and intelligence involve many different component abilities and they share the same components, depending on the nature of the learning task and intelligence test. The QE is mainly an academic exercise and for this reason academic intelligence rather than practical intelligence is probably relevant, although the opposite is likely to be relevant for the CA to be successful in the work environment.

Guilford (1967) refers to Boring (1923) who stated that "...intelligence as a measurable capacity must at the start be defined as the capacity to do well in an intelligence test." In other words, Boring was saying that intelligence is whatever intelligence tests measure (Guilford, 1967). It is therefore necessary to identify what each intelligence test is measuring. This information is generally referred to as construct validity.

In this research the test used claims to measure an area of intelligence, that is, Mental Alertness. It is important to determine whether whatever is being measured by the test should be used as a criterion for the selection of trainee accountants. Therefore rather than debate the issue further, the term intelligence will merely be referred to, and should be considered with the necessary reservation.

2.2.3.2 Intelligence and recruitment and selection

The practice of predicting performance by means of psychological tests began in the modern age with World War I, when pen-and-paper versions of the Binet intelligence test were used to
qualify and classify conscripts (Ree & Earles, 1992). In the next two decades psychologists worked on improving personnel selection by testing other human abilities, either in addition to or instead of intelligence (Ree & Earles, 1992).

Guilford (1967) stated at that time that the development of tests had generally far outrun the development of the understanding of that which the tests have measured. Not much has changed since then and Hilliard (1994) suggests that psychologists have not yet measured intelligence, and whatever the results of intelligence tests are, they should not be treated as if they validate a scientific description of intelligence.

A debate which has continued throughout the twentieth century is whether intellectual activity is an all embracing affair, that is, whether there is such a thing as general intelligence (Lewis, 1992). Certain authors refer to the *g*-ocentric view of intelligence which holds that a *general ability* is at the centre of the person, in much the same way as the geocentric view of the universe holds that the earth is at the centre of the universe (Ree & Earles, 1992; Sternberg & Wagner, 1993). In seeking to explain why individuals perform tasks differently, the most powerful influence is a factor that embraces all activities, which is something approaching general intelligence (Lewis, 1992). According to *g*-ocentric theorists, if an employer were to use only intelligence tests to select the highest scoring applicant for each job, training results would be predicted, regardless of the job, and overall performance of the employees selected would be maximised (Hunter, 1986). The alternative view is that there is a set of discrete independent ability categories labelled *primary mental abilities* such as spacial ability, numerical ability, inductive reasoning, perceptual speed, etcetera (Lewis, 1992). For the purposes of this research the latter view appears to be more appropriate as aptitude testing then involves identifying which of the primary mental abilities is necessary for the performance of the task, that is, in this case the research is attempting to determine whether Mental Alertness specifically predicts success in the QE. (The Mental Alertness sub-test of the High Level Battery is used to assess intelligence in this research).

Having discussed personality, vocational interests and intelligence, academic history is the remaining factor involved in the research and will be addressed in the following paragraphs.
2.2.4 Academic history

The final variable to be investigated regarding determining success in the QE will be considered under the same headings as those above, that is, the definition, and the use of the variable in recruitment and selection.

2.2.4.1 Definition

For the purposes of this research academic history is defined as and limited to the matriculation Mathematics result and the matriculation home language result. For the purposes of this research only English and Afrikaans languages were considered, as it is only possible to write the QE in one of these two languages at this stage.

Matriculation accountancy results are not included in this definition because although a review of studies reflects mixed results, the most recent studies have found that university students who had studied accountancy at school initially exhibited superior performance in university accountancy courses, but this early superiority diminished over time and had been completely eroded by the end of the first year (Bartlett, Peel & Pendlebury, 1993; Cilliers & Roodt, 1992; Doran, Bouillan & Smith, 1991). A study by Cilliers and Roodt (1992) found that symbols obtained in matriculation subjects other than Mathematics and English, as well as the number of distinctions obtained in matriculation did not have any significant influence on success in the CTA examination.

2.2.4.2 Academic history and recruitment and selection

The academic record is a rich source of insight into candidates who are still at school or who have only recently completed their educational activities (Isaacson, 1985). Apart from the student input of effort, ability, and motivation, there are many other uncontrollable factors such as school attended, exams written, or competition in the group, that play a role. Prediction for an individual is difficult because data is based on group results. Therefore it can be predicted fairly accurately that a high proportion of students with matriculation marks
above a certain point will succeed in passing the QE, but not that all students with such scores will succeed.

The crux of this research is recruitment and selection and the role of psychological assessment. It is therefore necessary to provide some theoretical background regarding psychological assessment in general. All of the dimensions measured in this research are well known and the theory of each has been comprehensively documented. The assessment instruments used to measure each of the dimensions are also well known and frequently used. These instruments will be covered in more detail in chapter 4. The purpose of this chapter was merely to give a short summary of the most relevant theory regarding each dimension. The empirical research conducted on each of these dimensions and instruments, specifically with regard to CAs is of particular interest and is the topic of the next chapter.
CHAPTER 3

REVIEW OF EMPIRICAL STUDIES

The specific theoretical aim of the research is to identify and summarise the theory and most recent research on personality, vocational interests, intelligence and academic history in relation to accountants. The previous chapter covered the theory, and the aim of this chapter is therefore to describe the most recent empirical research conducted with regard to the factors to be considered for this research, that is, personality, vocational interests, intelligence, and academic history. The general direction of early research with regard to each dimension is briefly considered. In the research a differentiation is made between the measured and perceived attributes of each dimension in relation to accountants. The QE can be considered to be a reflection of academic performance and therefore research with regard to academic performance and the various dimensions is also recounted.

3.1. PERSONALITY

As an introduction to the empirical research conducted with regard to personality, early research on the topic will first be considered. This will be followed by research conducted on the measured and perceived personality traits of accountants. In addition, because the research considers CAs in terms of their success in an examination situation, in other words where academic performance is required, empirical research on personality characteristics which are likely to contribute to academic success will also be considered.

3.1.1 Early research

Personality is one of the most neglected areas of study in career assessment (Schneider, 1987). Early studies in the field showed that personality was not very predictive of job performance and this had a discouraging impact on selection research dealing with such variables (Hollenbeck & Whitener, 1988). The lack of findings is explained as follows:
(1) Researchers considered elements of psychopathology in personality rather than normal personality traits (Lowman, 1991).

(2) The emphasis was on situational determinants of behaviour rather than acknowledgement of the consistency of specific behaviours of individuals (Lowman, 1991).

(3) The misspecification of the model in anticipating direct effects (Lowman, 1991).

(4) The inadequate statistical power and the use of very small sample sizes (Lowman, 1991).

(5) Contamination of measures by reliance on self-report or observational methods (Hollenbeck & Whitener, 1988).

(6) Lack of an acceptable taxonomy for classifying personality traits made it difficult to determine whether consistent, meaningful relationships between particular personality constructs and performance criteria in different occupations existed (Barrick & Mount, 1991).

More recently the views of personality psychologists have converged regarding the structure and concepts of personality, and researchers agree that there are five robust factors of personality which can be used as a meaningful taxonomy for classifying personality attributes (Barrick & Mount, 1991). These are: extroversion, emotional stability or neuroticism, agreeableness, conscientiousness and openness to experience (Barrick & Mount, 1991; Cattell, 1994; Digman, 1990; McCrae & Costa, 1990; Schuerger, 1992; Terpylak & Schuerger, 1994).

Contrary to earlier reviews a study by Paunonen, Jackson and Oberman (1987) found that applicants with personality characteristics congruent with the target job were judged as being more suitable for that position, and that personnel hiring decisions for a variety of jobs can be reliably predicted using information about applicant personality characteristics.

A more recent review by Tett, Jackson and Rothstein (1991) concerning the use of personality measures in selection concluded that there were some grounds for optimism, derived from the overall positive findings obtained in their study as well as from the perceived correctable weaknesses in validation practices. Robertson and Kinder (1993) found that particularly for
criteria such as creativity, analysis and judgement, personality scales produce practically useful
criterion-related validity and compare reasonably well with coefficients obtained from
meta-analysis of highly regarded predictors such as assessment centres, cognitive ability tests
and work samples.

Having briefly outlined some of the earlier research undertaken with regard to personality, the
next section summarises research conducted on the measured personality traits of accountants.

3.1.2 Measured personality traits of accountants

Maslow (1965, p. 214-215) who may have been one of the first to puzzle over the
accountant's personality, wrote:

Observe that much of the difficulty in the concepts of profit, taxes, costs, and so on,
can be seen to come from the professionalisation of the accountants as a group. They
are the ones who force upon the industrial situation the concern with numbers, with
exchangeable money, with tangibles rather than intangibles, with exactness, with
predictability, with control, with law and order generally, etcetera. Andy Kay pointed
out that accountants have the lowest vocabulary scores of any of the professional
groups. I added that the psychiatrists think of them as being the most obsessional of
any group. From what I know of them, they also attract to the schools of accounting
those who are number bound, those who are interested in small details, those who are
tradition bound and the like....

So much of the accountant's philosophy of life ultimately boils down to a mistrust of
self... This is all the opposite of the creative personality. The creative person trusts
himself sufficiently to face a new problem or situation without any preparation, to
improvise a solution in the new situation. The more obsessional person tends to
classify the whole of the future, to prepare for every contingency, to have schedules
and plans which he will not break.
Many other researchers have included the accountant among those on whom data was gathered because of the preconception that the accountant would fit the mould or stereotype of the impersonal, quantitative, inflexible, orderly, introvert (De Coster, 1971). Cattell et al (1970) presents profiles of means and standard deviations for as many adequate occupational samples as possible, including that of the accountant. Accountants in the three samples referred to are all male, and tend to be socially outgoing, intelligent, serious, staid, self-reliant, and practical. It is likely that the attributes required of an accountant have changed substantially since the research referred to was conducted; with the advent of computers, for example. There were also differences across the samples which may reflect the differences in requirements of accountants across countries. In the 16PF Handbook, profiles are provided for accountants in America, and the United Kingdom, and for accounting clerks in Australia. It is possible that South African CAs will also have certain unique characteristics (see table 6.1).

Researchers have ascribed various personality characteristics to accountants. Although the 16PF was not the favoured instrument in all cases the findings are still relevant. Some of the personality characteristics ascribed to accountants are as follows:

1. Amernic et al (1979) described accountants in terms of the following characteristics: conforming; low social interests; a poorly developed aesthetic sensitivity; passive; constructive and stable; well-balanced with a preference to work in a well-defined environment.

2. De Coster (1971) described accountants as higher on friendliness, personal acceptance and psychological sensitivity than other professional groups.

3. There is much debate over whether certain personality types choose accountancy as a career or whether different personality types are moulded into conforming to a particular personality type the longer they stay in the profession. The computer has relieved the accountant of the tasks of processing routine data, opening up the way for a new breed of people with analytical and scientific minds, with more emphasis on the quantification of variables and a multidisciplinary approach (McKenna, 1978). However it is possible that partners and relevant others are still consciously or unconsciously advocating characteristics that made them successful.
De Coster and Rhode (1971) using the California Personality Inventory (CPI) revealed that on five scales: sociability, social presence, self-acceptance, tolerance and achievement via conformance, a progressive and seemingly evolutionary pattern of higher scale mean scores emerged through the sub-samples of juniors, seniors, and managers terminating in depressed scores for the partners. This may be due to partners having entered the accounting profession years ago when the profession was composed of more conservative and introverted individuals or, perhaps members of the profession undergo a maturation process, leading from idealistic, independent behaviour to a more inflexible orientation (De Coster & Rhode, 1971). Davidson and Dalby (1993a) had similar findings and concluded that personality seems to be a significant factor in promotion as partners have personality profiles that differ significantly from those of accountants at other levels. They found that partners are more conscientious, trusting, serious, conforming, introverted, and more strongly influenced by emotional information than staff at other levels.

(4) Dinius and McIntyre (1979) using the *Einstellung* Water Jug performance test to measure the personality variable of rigidity often associated with accountants, found that both accounting majors and subjects successful in accounting courses were better able to solve the test question which indicates that these groups do have the ability to throw off the old conditions if circumstances require it.

(5) Amernic et al (1979) found that 61 percent of a study of audit seniors had a personality characterised as competitive, intense and aggressive.

(6) Studies of the Myers-Briggs Personality Type Indicator indicate that the personality type of practising Chartered Practising Accountants (CPAs) in the USA tends to be the "Introversion, Sensing, Thinking, Judging" (ISTJ) combination, followed by the "Extroversion, Sensing, Thinking, Judging" (ESTJ) combination (Kreiser & McKeon, 1990; Shackleton, 1980). Other professional business persons also view the Chartered Practising Accountant (CPA) personality type as being the ISTJ type (Kreiser & McKeon, 1990). Senior accounting students were found to be almost identical to professional accountants with their STJ profiles (Larabee, 1994).
Rule-consciousness of the 16PF was identified as one of the most effective variables for identifying first year Bachelor of Commerce (Accounting) students' suitability for their chosen field (Vander Walt & Esterhuyse, 1987).

Davidson and Dalby (1993a) using the 16PF on a sample of Canadian public accountants from large firms found them to be intelligent, competitive, experimenting and self-sufficient.

Female public accountants in Canada were identified as a distinct group when compared to the general population, and Davidson and Dalby (1993b) found them to be intelligent, dominant, enthusiastic, tough-minded, self-sufficient, and hard driving.

A two year study of accountants in Canada by Schell and DeLuca (1991) found that the profession attracts and conditions personalities with task-oriented, order-driven, Type A characteristics. However they also found that most of the accountants were only moderately job satisfied and were not committed to staying in their present positions. These personality types can therefore not be presumed to be necessary in order to be a successful CA.

Granleese and Barrett (1990) tested 100 members of the Institute of Chartered Accountants in Ireland on the Eysenck Personality Questionnaire and found that the professionally qualified male accountant is a socially conforming, stable introvert, compared to the norms of the Eysenck Personality Questionnaire Manual. As such he is typically calm, even-tempered, controlled and unworried, quiet, introspective, reserved, fond of books rather than people, tends to plan ahead, distrusts the impulse of the moment, he does not like excitement, takes matters of everyday life with proper seriousness and likes order in his life, he is reliable, somewhat pessimistic and places great value on ethical standards (Granleese & Barrett, 1990).

An interesting dimension of personal characteristics that affects task performance is thinking style. Precise, reliable individuals with strongly focused thinking styles are called *adapters* because they adapt well to existing systems, while individuals who are less focused but more imaginative are called *innovators* because their thinking style often produces novel ideas (King & Masters, 1991). A study by King and Masters (1991) supported previous research which found that accountants as a group have a thinking style characterised by preciseness and conformity, but the most successful accountants are those that are more prone to challenging rules and questioning
assumptions. In addition CPAs at the supervisory level are more innovative than those at the working level and the change from favouring adapters in the career preparation phase to favouring individuals with a mix of adapter and innovator traits in supervisory positions suggests that academic performance or performance on the CPA examination may not be a good indicator of managerial potential (King & Masters, 1991).

Day and Silverman (1989) investigated the relationship between particular personality dimensions, cognitive ability, and ratings of job performance in a sample of accountants, and significant linear relations were found between the personality scales and job performance ratings held even after the effects of cognitive ability were partialled.

The above mentioned characteristics have all been measured as characteristics of accountants, however there have also been studies on assumptions made regarding the personality characteristics of accountants. These studies are also relevant to this research. These will be addressed in the next section on the perceived personality traits of accountants.

3.1.3 Perceived personality traits of accountants

Occupational stereotyping is both common and unavoidable because individuals either find or construct a classification system to help reduce the identity variables they must manipulate (De Coster & Rhode, 1971). There is considerable evidence that the accounting profession is negatively stereotyped by the layman as cold, aloof, passive, and devoid of sensitivities (De Coster, 1971). The stereotyping of accountants has resulted in assigning negative attributes to the profession by many observers. More recent research indicates that this stereotype is largely inappropriate. The danger of this is not only that it is inaccurate but that the right type of people are unlikely to be recruited or attracted to the profession. The research on the assumed rather than measured personality characteristics of CAs can be summarised as follows:

A study by Hakel, Hollman and Dunnette (1970) found that one group of CAs perceived accountants as adventurous and socially inclined, while a second group of employment interviewers, students and older CAs viewed accountants as primarily
interested in business, detail work and activities requiring low levels of physical exertion.

(2) Studies by Jackson, Peacock and Holden (1982) asked interviewers to imagine an accountant and to rate whether ten personality traits were relevant for them. Accountants were described as: strong tendency to be meek, seek definitiveness, orderly; somewhat dominant, ambitious, aggressive; somewhat persistent; slightly nonsupporting, unsociable; slightly intellectually curious; approval seeking; very strongly defensive; very slightly ambitious and independent. Although they did not investigate the degree to which these personality characteristics were actually found in accountants, or shown to be related to success in the profession, they do state that data suggests that interview judges are accurate with respect to knowledge of the personality patterns of individuals in occupations.

(3) People who show an interest in accounting tend to be high in order and cognitive structuring and low in autonomy, change and impulsivity (Paunonen et al, 1987).

(4) Leaders in the accounting profession have stated that accountants need to be able to function in a complex and changing environment (Amernic & Beechy, 1984).

This particular study is considering CAs in terms of their success in an examination situation, in other words where academic performance is required. It is therefore relevant to also consider personality characteristics likely to contribute to academic success.

3.1.4 Personality and academic performance

For some time accounting educators have been trying to identify what predicts relative performance in accounting undergraduates (Granleese, Green & Moore, 1996), and presumably in other courses as well. Here follows a summary of some of the research conducted:

(1) Personality is known to be related to academic achievement in higher education and early studies showed that an optimum level of neuroticism and introversion were important determinants of successful academic performance (Entwistle & Entwistle, 1970; Furnham & Mitchell, 1991; McKenzie, 1989; Savage, 1962). McKenzie
(1989) examined the relationship between neuroticism and academic achievement and confirmed the hypothesis advanced by Furneaux that neuroticism correlates positively with degree results for students with a high superego strength as measured by the 16PF. The Furneaux Factor is also more apparent in students following more academically demanding courses (McKenzie, 1989).

(2) Dinius and McIntyre (1979) developed an Accountant Personality Battery consisting of three personality performance tests and an Accountant Personality Inventory. Administering the battery to 250 university students indicated that use of the battery in conjunction with traditional predictors of grade point average and academic achievement tests, may increase the predictability of an individual's performance in accounting courses. Successful accounting students showed high motivation, a strong desire to succeed, superior examination ability, conscientiousness, and persistence, they remained cool in stressful situations, were uninterested in abstract creativity, and searched for new methods of problem solving (Dinius & McIntyre, 1979).

(3) Granleese et al (1996) examined personality and specific ability in accountancy (as measured by coursework marks) for their impact on students across three cohorts at two universities. Using the Eysenck Personality Questionnaire, Granleese et al (1996) found that in the one female sample introversion was associated with higher examination marks in accountancy, while in another female sample the tender-minded students obtained higher examination marks.

Due to the academic nature of the QE it is likely that characteristics similar to those outlined in the above mentioned studies will have an influence on an individual's success in the QE.

The second dimension to be considered is that of vocational interest.

3.2. VOCATIONAL INTEREST

Once again, as for personality, early research with regard to vocational interest is initially referred to, followed by empirical research conducted on only the measured vocational interests of accountants. Research on the perceived vocational interests of accountants, as well as on vocational interest and academic performance, was not available.
3.2.1 Early research

Interest studies in the 1970's were criticised for failing to recognise that interests are an expression of personality and Holland responded to this with a theory of personality and vocational interests which became the most prominent attempt to relate these two domains (Costa, Fozard & McCrae, 1977). Holland's theoretically based groupings of occupations found empirical support in a cluster analysis of occupations and his psychological interpretation of the groups was confirmed in various studies (Costa et al, 1977).

A Review by Holland, Magoon & Spokane (1981) found that interest inventories remain perhaps the most useful form of vocational assistance. Garbin and Stover (1980) refer to research findings by Reeves and Booth (1979), that interest measures are useful predictors of occupational success. Their review also concluded that cultural prescriptions of job appropriateness for both males and females are still heavily entrenched in society and act as major constraints in vocational decision-making, and a student's ideal self has a much greater similarity to the preferred occupation than the present self, for male and female subjects. If occupational materials show the status quo via sex ratios and illustrations, they probably have to maintain the status quo with all of its inequities: and if the same materials report and depict a future ideal status, they probably mislead some indeterminate proportion of aspirants (Holland et al, 1981). The dilemma of how occupational information should be presented to people who differ in terms of race, sex and age, remains (Holland et al, 1981). These factors should be kept in mind when reviewing the literature as well as the results of this study.

Having briefly outlined the early research undertaken with regard to vocational interest, empirical research conducted on the measured vocational interests of accountants is reviewed.

3.2.2 Measured vocational interests of accountants

Some of the research conducted on the vocational interests of accountants is outlined here, however none could be found that used the RIB as the research instrument.
(1) Holland states that individuals will flourish in an environment that matches their personality (Holland, 1985) and research has confirmed his theory that the accountant stereotype fits the conventional type (Amernic et al, 1979; Aranya, Meir & Bar-Ilan, 1978; Aranya & Wheeler, 1986). According to Holland (1985) the conventional type: accepts the aims, obligations and values of society; is restrained, wholesome and attracted to occupations dealing with computations in the business and organisational fields; is considered to be conservative, conscientious, sober, stable and amenable; is a practical thinker, persevering and stubborn, and; prefers to work with clear and well-defined instructions. Accordingly accountants have a higher level of interest in business and organisation, and they show a lower level of interest in service, general cultural interests, and arts and entertainment (Aranya et al, 1978).

(2) Clear and thorough conclusions regarding the interest profile of the CA can only be reached by comparison with other professional groups or, at least, with a mixed group of people from all vocational fields (Aranya et al, 1978). Mikellides (1989) found that Engineering students showed stronger preferences in mechanical and scientific interest, while Commerce students show stronger preference in persuasive and scientific interests.

(3) A study carried out by Visser (1978) on Black South African first year university students found that Commerce students are more inclined towards computational and clerical occupations than either the Arts or Science groups, and at least a third of the group rated the persuasive category highly.

As can be seen from the studies referred to above, in practice the standardised measures of occupational interest are found more in the field of vocational guidance than in selection. According to Lewis (1992) there is a general acceptance that interest measurement is a cruder device than the measurement of intelligence, for example, and it is very difficult to unearth evidence of the predictive ability of interest blanks when used in selection. This may be one of the reasons for the fairly scant empirical data available regarding the variable of vocational interests.
3.2.3 Perceived vocational interests of accountants

Recent studies on the perceived vocational interests of accountants could not be found.

3.2.4 Vocational interests and academic performance

In the absence of empirical research information on vocational interests and academic performance, the next dimension, intelligence, will be addressed in the following sections.

3.3. INTELLIGENCE

By way of introduction there is a brief reference to the early research conducted on intelligence. This is followed by empirical research conducted on the measured and perceived intellectual attributes of accountants. Once again, research on intelligence and academic performance with regard to accountants was not available.

3.3.1 Early research

Day and Silverman (1989) state that the numerous validity generalisation studies that have appeared in the literature have demonstrated that cognitive ability measures, in general, predict job performance better than any other types of measures. This debate is extended to include the predictive value of intelligence scores on job performance.

In a classic study by Ghiselli (1973) it was found that measures of mental abilities and of spacial and mechanical abilities were significant predictors of aptitude for training and future work performance. This research was confirmed in more recent studies. After examining three large data bases for evidence Hunter (1986), concluded that general cognitive ability predicts performance ratings in all lines of work, although the validity is much higher for complex jobs than for simple jobs. Schmidt, Hunter and Pearlman (1981) maintain that there is no other predictor as reliable as general cognitive ability testing for selection in all jobs where training follows hiring. Ree and Earles (1992) suggest that if an employer were to use
only intelligence tests and select the highest scoring applicant for each job, over-all performance from the employees selected could be maximised.

However it is noted that there is also criticism from those who feel test batteries are too dependent on academically learned content, the knowledge of which can be affected by the extent of the examinee's experience as well as ability (Ree & Earles, 1992). Keeping this in mind the next section will refer to studies that have been conducted to identify the intellectual attributes of accountants.

3.3.2 Measured intellectual attributes of accountants

Research on the intelligence variable and accountants appears to be rather limited and those studies that were found did not relate to the Mental Alertness test specifically.

(1) A Canadian study by Davidson (1995) found that marks received on unstructured questions in the Canadian equivalent of the QE, the Uniform Final Examination (UFE), are related to candidates' level of cognitive complexity as measured by the Accounting Cognitive Complexity Test (an instrument measuring cognitive ability, especially designed for accountants), but marks received on structured questions are not significantly related to candidates' cognitive complexity. Although cognitive ability is related to general intelligence, the correlation is weak (Davidson, 1995). According to cognitive theory people with relatively high levels of cognitive complexity are significantly better at solving problems in unstructured situations than people with low levels of cognitive complexity, but are not significantly better in structured situations (Davidson, 1995).

(2) Jones and Davidson (1995) found that on accounting examination questions that involved only straightforward types of problems, students performed equally well regardless of their formal reasoning level, but students with higher levels of reasoning ability performed significantly better on questions that involved more difficult types of problems.
In the absence of further research evidence on this topic, the next section refers to recent research regarding the perceived intellectual attributes of accountants.

3.3.3 Perceived intellectual attributes of accountants

Once again the research regarding the perceived intellectual attributes of accountants is limited, and the studies do not relate specifically to the Mental Alertness test.

(1) Leaders in the accounting profession believe that accountants need to be able to function in a complex and changing environment (Amernic & Beechy, 1984). Literature on cognitive development suggests that such individuals must possess a high level of cognitive complexity, and therefore courses should be designed so as to attract those individuals capable of more complex cognitive functioning, as is required by the profession (Amernic & Beechy, 1984).

(2) The mechanisms for refining existing rules, generating new rules, and making inferences within the mental model, form the basic skills used in professional audit judgement (Anderson, Koonce & Marchant, 1991). These skills are measured by the Mental Alertness test and therefore the person with a higher Mental Alertness test score should perform better as an auditor.

It is often assumed that intelligence is linked to academic performance. The QE can be regarded as an academic exercise, therefore the next section addresses the empirical research available on intelligence and academic performance.

3.3.4 Intelligence and academic performance

There has been much debate and discussion on the predictive value of intelligence scores on university students' later academic achievements.

(1) An early study by Pilkington and Harrison (1967) found that two high level intelligence tests predicted degree classification no better than the conventionally used A level marks, and even combining the two test scores with the mean A level mark resulted in
only a slight improvement on the correlation coefficient found for the later measure alone.

(2) Bloomberg (1983) found that cognitive tests do not appear to be as significant predictors of success in Physiology as are matriculation results.

(3) In contrast to this view Visser (1978) found that there was some correlation between half-yearly examination results of students at the University of Fort Hare with subtests of both the High Level Battery and the Intermediate Battery.

Having provided the review of recent research on intelligence and accountants, the variable of academic history will be considered in the following paragraphs.

3.4. ACADEMIC HISTORY

After considering early research conducted in the area of academic history the measured academic history or performance of accountants will be referred to, for Mathematics and English separately. The chapter ends with a reference to the empirical research on the perceived academic history of accountants.

3.4.1 Early research

There has been no specific transformation in the research relating to academic history. It is well known that past academic performance is significantly related to future performance, that grades predict other grades, and that standard measures of academic aptitude such as university entrance examination results explain large amounts of the variance in overall academic performance (Eskew & Faley, 1988).

The literature is replete with articles that investigate various aspects of student performance within the accounting curriculum but not many that investigate performance on the QE or other similar examinations. There is also not specifically any early research on academic history and the work performance of accountants. Therefore the following research review refers mainly to studies undertaken amongst graduate and post-graduate accounting students.
3.4.2 Measured academic history of accountants

Research indicates that measures of past academic performance and aptitude are significant determinants of future academic performance in accounting courses and these studies are referred to in point 3.4.4. Therefore academic history should be an indicator of success in the QE. However this does not necessarily mean that academic history will indicate successful job performance as a CA. A study by Ferris (1982) found that there was little relationship between educational background and subsequent on-the-job performance. There do not appear to be any documented studies on this topic in the accounting field, and the findings of Ferris would have to be investigated further to be regarded as conclusive. However it does provide interesting food for thought.

Documented research on the next topic, that of the perceived academic history of accountants, appears to be just as scant as that of the measured academic history of accountants.

3.4.3 Perceived academic history of accountants

Because of the lack of research on the perceived academic history of accountants the research review for this variable will continue with research relating to academic history and academic performance.

3.4.4 Academic history and academic performance

The results of most of the studies suggest that grade-point average (GPA), or performance in prior examinations is the best predictor of future student performance in accounting (Eckel & Johnson, 1983; Eskew & Faley, 1988; Hicks & Richardson, 1984; Ibrahim, 1989; Ingram & Petersen, 1987).

According to Cilliers and Roodt (1992) the profile of a successful CTA candidate is one who:

(1) Obtained a high average in the matriculation examination and an A or a B symbol for Accounting and/or Mathematics.
(2) Took Mathematics for matriculation.

(3) Has the ability to master at least four subjects in matriculation at the higher grade.

(4) Is proficient in English and is able to communicate.

In an investigation of the Canadian UFE, Davidson et al (1995) found that the level of technical accounting, auditing, and tax knowledge, as reflected in past performance in other courses, is the best predictor of performance in the UFE.

Unpublished research on the final accounting examinations in the United Kingdom conducted by one of the Big 6 accounting firms found that the pass rate for students with a first class degree was 79 percent in December 1994 and 94 percent in July 1995, compared with pass rates of 57 percent and 76 percent for those with a second class pass for their degree (Thomas, 1995a, 1995b). The pass rate for students with 15 University Council for Central Admissions (UCCA) points was 74 percent in December 1994 and 77 percent in July 1995, compared with 52 percent and 68 percent for those with 14 UCCA points (Thomas, 1995a, 1995b).

In terms of academic history this study refers to the variables of matriculation Mathematics and matriculation English results specifically. There is significant research on both of these subjects and the research review will continue with separate reviews on the research findings relating to each of these variables.

3.4.2.1 History of performance in Mathematics

Here follows a summary of the most recent research investigating the influence that historical Mathematics results may have on performance in accounting:

(1) Research conducted at the University of Fort Hare with regard to the development of a testing program for Black university students for the purposes of selection and career counselling, illustrated the advantage of good matriculation Mathematics symbols when it came to achieving well in subjects with a mathematical basis at university (Visser, 1978).
Dinius and McIntyre (1979) found that accounting majors showed greater aptitude for Mathematics ACT (American College Testing Program) tests than non-accounting majors, and successful students were also more successful on the Mathematics ACT test.

Eckel and Johnson (1983) found that the lower-level accounting average of the two principle courses was the most important variable followed by the ACT Mathematics score when developing an explicit methodology for screening admission into an accounting programme.

In a study to investigate a programme for the evaluation of students' suitability for the accounting field of study by Van der Walt and Esterhuyse (1987), school Mathematics was identified as one of the most significant variables.

Extensive research by Cilliers and Roodt (1992) relating matriculation results to achievement in the CTA or equivalent examination found that 46,2 percent of successful respondents achieved an A or B symbol in Mathematics while only 28,3 percent of the unsuccessful respondents fell into this category. They also found that of those who obtained an A symbol for Mathematics, 86 percent passed the CTA examination while a smaller percentage of those who had obtained lower percentages passed and they concluded that the best predictor of success in the CTA examination was the matriculation Mathematics symbol.

In contrast Bartlett et al (1993) found that overall distinctions and the study of Mathematics did not have a significant impact on student performance in undergraduate accounting degree examinations in the United Kingdom. However they suggest that this could be explained by the very low variation in the scores of the sample group, or it may reflect the differences in the quality of the final level of school examinations of different examination boards.

Unpublished research on the final accounting examinations for students in the United Kingdom found that students with a higher A level Mathematics grade have a higher percentage pass rate (Thomas, 1995a, 1995b).

In their interviews with university lecturers, Cilliers and Roodt (1992) found that of the 47 lecturers interviewed, 44 (93,6 percent) of them believed Mathematics as a matriculation subject was essential for success in the CTA, while 20 (42,6 percent)
believed matriculation Accountancy was essential, and 16 (34 percent) regarded matriculation English as necessary. All other subjects were regarded as less important.

Although this research considers academic history in terms of matriculation Mathematics and home language results, where home language of the sample group is either English or Afrikaans, the empirical research available refers to English results, therefore the next section considers academic performance in terms of English results only.

3.4.2.2 History of performance in English

Here follows a summary of the most recent research investigating the influence that historical English results have on performance in accounting:

(1) Dinius and McIntyre (1979) found that verbal ACT scores had no significant discriminatory power between accountants and non-accountants, however, scores of successful above average and below average students were logically ordered from high to low.

(2) In the study by Van der Walt and Esterhuysse (1987) they found that matriculation first language was one of the most significant variables in evaluating students' suitability for the accounting field of study.

(3) In the research by Cilliers and Roodt (1992) a higher percentage of the unsuccessful CTA respondents (43.8 percent) than of the successful CTA respondents (35.1 percent) achieved a C symbol in English, while only 13.3 percent of the unsuccessful respondents achieved an A or a B symbol as opposed to 25.9 percent of the successful respondents.

(4) As mentioned above, in their interviews with university lecturers, Cilliers and Roodt (1992) found that of the 47 lecturers interviewed, 16 (34 percent) regarded matriculation English as necessary for success in the CTA.

This chapter has outlined the most recent empirical research on the personality, vocational interest, intelligence and academic history of accountants. Wherever possible early history of the variable was referred to as well as how the variable related to academic performance. A
differentiation was made between those studies that actually measured the various attributes and those that measured perceived attributes. Therefore at the conclusion of this chapter the specific theoretical aim of the study has been achieved, that is, to identify and summarise the theory and most recent research on personality, vocational interests, intelligence and academic history, in relation to accountants.

The following chapters will deal specifically with the research method and results of this research, and it will be interesting to compare these new research results with those of previous studies. The next chapter deals more specifically with the research design.
CHAPTER 4

EMPIRICAL STUDY

The specific empirical aims of the research are, firstly to determine whether there is a significant difference between the groups of successful and unsuccessful candidates in the QE, with regard to personality, vocational interests, Mental Alertness and matriculation Mathematics and matriculation home language result. The second is to select a combination of variables that can be used to predict success in the QE. This chapter provides an outline of how the empirical study was conducted, including a discussion of the elements of the research such as the sample, the instruments and the statistical procedures, and a brief outline of the method of data collection.

4.1. SAMPLE

The sample consists of a group of 113 trainee accountants who wrote the QE over a period of five years.

Table 4.1: Breakdown of the sample per year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Cases</th>
<th>Percentage of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>20</td>
<td>18%</td>
</tr>
<tr>
<td>1994</td>
<td>14</td>
<td>12%</td>
</tr>
<tr>
<td>1995</td>
<td>16</td>
<td>14%</td>
</tr>
<tr>
<td>1996</td>
<td>32</td>
<td>28%</td>
</tr>
<tr>
<td>1997</td>
<td>31</td>
<td>28%</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
<td>100%</td>
</tr>
</tbody>
</table>

Most of the participants in the sample are White males. Only 3.5 percent (n=4) of the sample is Asian and the rest is White. Only 29.2 percent (n=33) of the sample is female. The age at
which candidates wrote the QE ranges between 21 and 28 and most (73 percent) were in their first year of traineeship.

Data was collected from the sample group using various instruments.

4.2 INSTRUMENTS

Here follows a list indicating the independent variables in the study and the instrument used to collect data for each:

(1) Personality - the measuring tool used was the 16PF questionnaire (Form A).
(2) Interests - measured by the RIB, a simple forced choice ranking scale.
(3) Intelligence - measured by the Mental Alertness subtest of the High Level Test Battery.
(4) Academic history - measured by the matriculation Mathematics and matriculation home language results.

These instruments are discussed under the following headings, in each case referring to the rationale for choosing the specific instrument, as well as the aim, scale, administration, interpretation, validity and reliability and the motivation for selection.

4.2.1 16 Personality Factor questionnaire

The 16PF was published in 1949 by Dr. Raymond B. Cattell, and is well known as one of the most objective measures of normal personality (Cattell et al, 1970). Here follows a more detailed explanation of this instrument as the chosen means for assessing personality in the research.

4.2.1.1 Rationale

According to Cattell et al (1970) the 16PF developed as follows: Cattell began with a list of 171 personality variables, drawn from previous rosters of trait names and descriptors, and
used this list to represent the *personality sphere*; surface traits were then defined by examining the intercorrelations of these 171 variables and by noting the clusters formed by variables correlating positively with each other; Cattell developed a self-descriptive personality inventory to measure 16 of these source traits. These source traits are believed to be inherent traits, underlying the more manifest behavioural traits (Spangenberg, 1990).

4.2.1.2 Aim

Spangenberg (1990) suggests that the aim of the 16PF is to make available, in practical testing time, information about an individual's standing on the majority of primary personality factors. Since its original publication, the 16PF has matured through four revisions into the most recent Fifth Edition which was created with a combination of traditional factor-analytic and contemporary item-analysis methods, but it is still in line with the original purpose, that is, to measure comprehensively the basic factors underlying normal personality (Conn & Rieke, 1994). Form A was used in this particular research. The 16PF scales measure temperament - a person's characteristic style of thinking, perceiving and acting over a relatively long period of time and in a variety of situations, and these personality traits are manifested in a set of attitudes, preferences, social and emotional reactions, and habits (Cattell, 1989).

4.2.1.3 Scales

The 16PF is comprised of 16 primary factor scales and five global factor scales developed via factor analysis of the primary scales (Conn & Rieke, 1994). Only the 16 primary factor scales are referred to in this study. The names and descriptors of the primary factor scales across several editions are presented in table 4.2 (Conn & Rieke, 1994, p. 17,18).
Table 4.2: Names and descriptions of the primary factor scales across several editions of the 16PF (Conn & Rieke, 1994, p. 17,18).

<table>
<thead>
<tr>
<th>Descriptors of Low Range</th>
<th>Primary Factors</th>
<th>Descriptors of High Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved, Impersonal, Distant Cool, reserved, impersonal, detached, formal, aloof.</td>
<td>Warmth (A)</td>
<td>Warm, Outgoing, Attentive to Others Warm, outgoing, kindly, easygoing, participating, likes people.</td>
</tr>
<tr>
<td>Sizothymia</td>
<td></td>
<td>Affectothymia</td>
</tr>
<tr>
<td>Concrete Concrete-thinking, lower general mental capacity, less intelligent, unable to handle abstract problems. Lower Scholastic Mental Capacity</td>
<td>Reasoning (B)</td>
<td>Abstract Abstract-thinking, more intelligent, bright, higher general mental capacity, fast-learner. Higher Scholastic Mental Capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher Ego Strength</td>
</tr>
<tr>
<td>Deferential, Co-operative, Avoids Conflict Submissive, humble, obedient, easily led, docile, accommodating. Submissiveness</td>
<td>Dominance (E)</td>
<td>Dominant, Forceful, Assertive Dominant, assertive, aggressive, competitive, stubborn, bossy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dominance</td>
</tr>
<tr>
<td>Serious, Restrained, Careful Sober, serious, restrained, prudent, taciturn, introspective, silent. Desurgency</td>
<td>Liveliness (F)</td>
<td>Lively, Animated, Spontaneous Enthusiastic, spontaneous, happy-go-lucky, cheerful, expressive, impulsive, talkative.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surgency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Superego Strength</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parmia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prembia</td>
</tr>
<tr>
<td>Trusting, Unsuspecting, Accepting Trusting, accepting conditions, easy to get on with. Alaxia</td>
<td>Vigilance (L)</td>
<td>Vigilant, Suspicious, Sceptical, Wary Suspicious, hard-to-fool, sceptical, distrustful, oppositional.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Protension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Autia</td>
</tr>
<tr>
<td>Descriptors of Low Range</td>
<td>Primary Factors</td>
<td>Descriptors of High Range</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Forthright, Genuine, Artless</td>
<td>Privateness (N)</td>
<td>Private, Discreet, Non-Disclosing</td>
</tr>
<tr>
<td>Forthright, genuine, artless, open, unpretentious, naive, warmly emotionally involved.</td>
<td></td>
<td>Shrewd, polished, socially aware, worldly, astute, diplomatic, calculating, emotionally detached, wears a social mask.</td>
</tr>
<tr>
<td>Artlessness</td>
<td></td>
<td>Shrewdness</td>
</tr>
<tr>
<td>Self-assured, Unworried, Complacent</td>
<td>Apprehension (O)</td>
<td>Apprehensive, Self-Doubting, Worried</td>
</tr>
<tr>
<td>Untroubled</td>
<td></td>
<td>Guilt Proneness</td>
</tr>
<tr>
<td>Traditional, Attached To Familiar</td>
<td>Openness to Change (Q1)</td>
<td>Open To Change, Experimenting</td>
</tr>
<tr>
<td>Conservative, respecting traditional ideas.</td>
<td></td>
<td>Experimenting, liberal, analytical, critical, free-thinking, open-to-change.</td>
</tr>
<tr>
<td>Conservatism</td>
<td></td>
<td>Radicalism</td>
</tr>
<tr>
<td>Group-Oriented, Affiliative</td>
<td>Self-reliance (Q2)</td>
<td>Self-reliant, Solitary, Individualistic</td>
</tr>
<tr>
<td>Group-oriented, a joiner &amp; sound follower, group dependent.</td>
<td></td>
<td>Self-sufficient, resourceful, prefers own decisions.</td>
</tr>
<tr>
<td>Group Adherence</td>
<td></td>
<td>Self-sufficiency</td>
</tr>
<tr>
<td>Tolerates Disorder, Unexacting, Flexible</td>
<td>Perfectionism (Q3)</td>
<td>Perfectionistic, Organised, Self-Disciplined</td>
</tr>
<tr>
<td>Undisciplined, self-conflict, lax, follows own urges, uncontrolled, careless of social rules, low self sentiment integration.</td>
<td></td>
<td>Following self-image, socially precise, self-disciplined, compulsive, exacting will power, control, high strength of self sentiment.</td>
</tr>
<tr>
<td>Low Integration</td>
<td></td>
<td>High Self-concept Control</td>
</tr>
<tr>
<td>Relaxed, Placid, Patient</td>
<td>Tension (Q4)</td>
<td>Tense, High Energy, Impatient, Driven</td>
</tr>
<tr>
<td>Relaxed, tranquil, composed, has low drive, unfrustrated, torpid.</td>
<td></td>
<td>Tense, driven, frustrated, over-wrought, has high drive.</td>
</tr>
<tr>
<td>Low Ergic Tension</td>
<td></td>
<td>High Ergic Tension</td>
</tr>
</tbody>
</table>

4.2.1.4 Administration

The 16PF is a C-level test and can be completed within 50-60 minutes. Instructions for completion of the 16PF appear in the re-usable test booklet and the test is marked with the aid of four stencils enabling raw scores for the 16 "primary" scales to be obtained (Bergh, Flowers, van N.Cilliers, Kriek, & Viviers, 1980). In addition the analysis of specific items leads to the calculation of honesty, validity or distortion scores (Bergh et al, 1980).

4.2.1.5 Interpretation

According to Bergh et al (1980), interpretation of the 16PF requires sophisticated psychological knowledge and scale scores cannot be interpreted simplistically, in isolation and out of context. Each of the primary factors is assessed in terms with high and low scores
indicating specific personality characteristics of the individual. Certain combinations of scores are also considered and may indicate certain behavioural traits such as leadership, success potential, interpersonal skills, etcetera. Distortion scores should also be considered in the interpretation of the factors. Second order factors would also be interpreted under normal circumstances, however these factors were not considered for the purposes of this research.

Norms for the Form A are available in the form of stens for first year university students (men and women separately) and for young White adult males from the general population (average age 20 years) and White females (average age 35 years).

Interpretation may also involve the consideration of occupational profiles. Specific profiles can also be linked to specific careers for the purposes of career counselling and are referred to in various 16PF manuals, such as that of Cattell et al, (1970).

For this specific research interpretation involved identifying those factors that were consistently prevalent in those candidates who were successful in the QE. The characteristics described by this factor would then be requirements for future candidates selected as trainee accountants.

4.2.1.6 Validity

The 16PF is founded on factor analytical experiments with the simple structure criterion involving technically accurate and widely repeated experiments to demonstrate that the separate traits or dimensions of personality which test scales measure, correspond to uniquely definable, functionally unitary, and psychologically significant source traits (Cattell, 1994). Therefore the 16PF consists of scales carefully oriented and groomed to basic concepts in human personality structure research (Cattell, 1994). The 16PF construction and validation have developed from a carefully planned converging series of factor analyses which demonstrate that the validities for most items are as high as are typically reached for scales of their lengths (Cattell et al, 1970). The evidence at a pragmatic level also indicates a consistency in what the scales are measuring with different populations (Cattell et al, 1970). Comprehensive validity data regarding the 16PF are reported by Cattell et al (1970) and they
state that the generally satisfactory coefficients reported with respect to the 16 scales of the various forms are indicative of the validity of the test. According to Cattell et al (1970, p. 13) the following attributes enhance the validity of the 16PF:

(1) Suppressor action among items to reduce the effect of contaminating factors.
(2) Known correlations of every item with the pure factors.
(3) Relations established between the questionnaire factors and corresponding factors in the behaviour rating, "criterion" realm.
(4) Relations examined to personality factors in the objective test realm.
(5) Clear relations calculable between primary scales and derivable second order-factor scales.
(6) Computer synthesis tables whereby higher validities can be obtained than for simple unweighted scales.
(7) A structure which can be related to the same factors measured, with continuous development.
(8) Concrete validities established in relation to numerous clinical, educational, industrial, and social real-life criteria.
(9) A set of factors demonstrated to retain their conceptual validities as unitary source traits in other cultures.

According to Van Zyl (1995) the construct validity as well as its suitability for different cultures has been established over many years. A study by De Ray (1986) to investigate the personality structure, derived from 16PF scores of a group of South African Black males found a similar personality structure as found with South African Whites and other population groups at both the primary and the secondary order levels. Furthermore, ethnicity significantly influenced 16PF scores in 10 out of 16 factors (De Ray, 1986).

Eaves (1989) claims that although the 16PF purports to measure 16 distinct personality traits there is no evidence of the convergent validity of the 16 scales apart from the factor loadings and what evidence there is of discriminant validity suggests the primary traits are not clearly differentiated. He suggests that when coupled with the relatively low internal consistency of the scales and their modest test-retest reliabilities, the psychometric adequacy of the test must
be questioned (Eaves, 1989). According to Graham and Lilly (1984) systematic research to
determine empirical characteristics associated with high or low 16PF scores has not been
undertaken. Although data suggest that the personality factors identified by Cattell are found
in many different groups of people, data concerning whether the 16PF actually measures the
underlying major dimensions of human personality are unclear and not compelling (Graham &
Lilly, 1984). For this reason psychologists must use caution when interpreting 16PF profiles.

Validity in this instance is not critical as the test will be used to determine how candidates who
pass the QE answer the questionnaire compared with how candidates who fail the QE answer
it. Therefore how the applicant answers the 16PF is the criterion for passing the QE. It is
therefore not essential to know how accurately the factors present actual behaviour, where
validity refers to the degree to which a test measures what it is supposed to measure.

Further detailed results of the different forms of validity are available in the 16PF Handbook
(Cattell et al, 1970) and do not warrant further discussion here.

4.2.1.7 Reliability

Reliability refers to the stability of the scores (how they hold up over time), the internal
consistency of the scales (how highly the items on a scale correlate with one another), and test
taking attitude (indications of distortion in self-presentation). The degree of reliability of a test
hinges partly on the construction of the test, partly on its mode of administration, and partly
on its manner of scoring (Cattell et al, 1970).

The concept reliability coefficient, which in this case is potentially perfect (equal + 1.0),
evaluates the last mentioned and Cattell et al (1970) report that dependability differences are
slight over a short period where the lapse of time is insufficient for people themselves to
change. Other research has shown that certain traits are more liable to fluctuate with
psychological state (Cattell et al, 1970). Scale reliabilities for Form A seem acceptable, with
dependability coefficients varied between 0.72 for Tension and 0.92 for Boldness, with a
median of 0.82, and stability coefficients varied from 0.63 for Intelligence to 0.88 for
Boldness, with a median of 0.78 (Spangenberg, 1990). According to Owen and Taljaard
(1989) reliability coefficients between 0.45 and 0.92 were reported for the different scales using the test-retest method. In this research, participants were all tested under similar administrative conditions and reliability should therefore not have been negatively influenced in any way.

The temporal stability of the 16PF scales is comparable to those of other instruments (Schuerger, 1992). With regard to internal consistency reliability the 16PF has item correlations slightly above average for personality questionnaires, but because of the few number of items per scale the internal consistency for the 16PF is lower than is common among personality questionnaires, except for the second-order values, which compare favourably with those for other instruments (Schuerger, 1992).

Test taking attitude refers to the reliability or accuracy of measurement in the sense that the person is describing self accurately (Schuerger, 1992). It is well established that many persons' self presentations on personality questionnaires change with the circumstances (Schuerger, 1992). These problems are partially addressed by the motivational distortion detection score and consequent adjustment of ratings. This device is used to decide when to reject a candidates answer sheet altogether, or to apply corrections (Cattell et al, 1970). Elliot (1981) refers to Cronbach (1970) who summarised the opposition to these procedures: "if the subject tells lies to the tester there is no way to convert the lies to truth. These suggested changes to certain items form a cumulative scale of the extent to which the testee wishes to present favourably, and may deny common faults or claim uncommon virtues, or both". However in selection the person may not be as concerned with presenting a favourable picture of his total personality as with demonstrating the personality characteristics required for the particular job.

It is well established that people can fake personality inventories in laboratory conditions, but is unclear whether they actually do so in real-life conditions where they know they will be subject to checks from other assessment procedures (Bartram, 1992). Tett et al (1991) found that faking failed to have a significant depressing effect on validation studies using job applicants. Bartram (1992) points out that the profile of the average management applicant, as an independent, stable extrovert who is neither particularly tough-minded nor
tender-minded but who is somewhat more conventional and controlled than the average for the general population, may reflect a degree of "faking" because these are by and large the qualities one would expect to see in managers (Bartram, 1992). However he suggests that this does not necessarily reduce the utility of the 16PF as a source of information for selection purposes, because these new norms can still be used in place of the population norms to profile individual variations around the management average (Bartram, 1992). This will provide better discrimination between candidates than stens based on the general population. This logic can also be used for the research described in this thesis.

4.2.1.8 Motivation for inclusion in this research

The 16PF was chosen as the instrument for measurement of personality mainly because of its widespread use and applicability to a large variety of situations. The 16PF has been rated among the most frequently administered, researched and recommended questionnaires in a wide variety of settings, by various authors and has been translated into over 40 languages (Conn & Rieke, 1994; Lewis, 1992; Piotrowski & Keller, 1989; Ryan & Sackett, 1992; Schuerger, 1992). It is also one of the most important personality measures commonly used in South Africa and there are few tests that have such a large and growing information database as the 16PF (Van Zyl, 1995). The 16PF can be used in industry for the selection, placement and promotion of personnel and for the prediction of important criteria such as work performance (Owen & Taljaard, 1989). Spangenberg (1990) points out that although the 16PF was initially developed as a research instrument for measuring source traits, it has been used increasingly over a wide range of normal assessment situations such as personnel selection, guidance, counselling, or personality research.

The instrument used to measure vocational interests will be discussed next.

4.2.2. The Rothwell-Miller Interest Blank

The above mentioned interest blank was specifically chosen to assess the trainee accountants in the sample and the relevant background information regarding the instrument is provided in the following paragraphs.
4.2.2.1 Rationale

The RIB was developed in Australia by J Rothwell and KM Miller in 1958 as an aid in career guidance, and modified for use in the United Kingdom by KM Miller in 1968 (Miller & Tyler, 1993). In 1976 it was modified for use in South Africa by B Shannon of the National Institute of Personnel Research (Hall et al, 1986). There are twelve categories, and the assumption is that all occupations can be classified under one or a combination of two or more of these categories.

The rationale of the RIB is that people hold stereotyped conceptions about the activities, responsibilities and the roles of occupations, and base their choice of occupation on these stereotypes, regardless of whether or not they are accurate. The RIB makes use of the individual's knowledge of these stereotypes and according to Hall et al (1986) there are three underlying assumptions:

(1) Occupations can be grouped according to activities, demands and roles.
(2) These groups are synonymous with fields of occupational interest.
(3) Information about an individual's field of interest or preference for an occupational stereotype can be obtained by determining reaction to occupational stereotypes.

4.2.2.2 Aim

The purpose of the RIB is to assess an individual's measured interests for use in vocational counselling, selection, placement, or career development (Hall et al, 1986). In the context of this research the RIB is used to identify those fields of interest that are indicative of success in the QE.

4.2.2.3 Scales

The RIB consists of nine blocks, each containing twelve occupations. To complete it students rank the occupations in each block from one to twelve in order of preference. These rankings
are then totalled to give a score in each of the twelve interest fields - outdoor, mechanical, computational, scientific, persuasive, aesthetic, literary, musical, social service, clerical, practical and medical (Hall, 1980). As a result an individual interest profile is obtained which can be compared to norms representing different occupational groups. The lowest score indicates the preferred field, and the highest the least preferred (Hall, 1980). Table 4.3 refers to the names and descriptions of the twelve categories as listed by Hall (1980).

**Table 4.3:** Names and descriptions of the RIB categories (Hall, 1980).

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor</td>
<td>An interest in outdoor activities with a dislike of being tied down to routine work or regularity.</td>
</tr>
<tr>
<td>Mechanical</td>
<td>An interest in working with machines, tools and mechanical contrivances.</td>
</tr>
<tr>
<td>Computational</td>
<td>An interest in working with figures.</td>
</tr>
<tr>
<td>Scientific</td>
<td>An interest in analytical and investigatory activities, in experimentation and in science generally.</td>
</tr>
<tr>
<td>Persuasive</td>
<td>An interest in talking to people, in persuading and discussing, arguing, mixing with others. Confidence in making personal contacts of all kinds.</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>An interest in artistic activities, in colour, design and beauty, with a desire to create things containing these qualities.</td>
</tr>
<tr>
<td>Literary</td>
<td>An interest in books, in reading or writing imaginative and original verbal material.</td>
</tr>
<tr>
<td>Musical</td>
<td>An interest in playing musical instruments, or hearing others play, in singing, or in reading about music and musicians. Music appreciation.</td>
</tr>
<tr>
<td>Social Service</td>
<td>An interest in people's welfare, with a desire to help and guide people with their problems and worries. Desire to understand others and be of service.</td>
</tr>
<tr>
<td>Clerical</td>
<td>An interest in routine office work that requires precision and accuracy.</td>
</tr>
<tr>
<td>Practical</td>
<td>An interest in working with one's hands, constructing, making or mending things, practical work of all kinds as compared with occupations where work is more mental than manual.</td>
</tr>
<tr>
<td>Medical</td>
<td>An interest in curing people, relieving the effects of disease or illness, in healing and in medical and biological matters generally.</td>
</tr>
</tbody>
</table>

4.2.2.4 Administration

The RIB can be administered to individuals and groups (Hall et al, 1986), and should be completed within 10-30 minutes. Instructions for completion of the RIB appear on the single answer sheet. The test is also marked on the same sheet.
4.2.2.5 Interpretation

The RIB is interpreted in terms of category totals, category patterns, first and last choices in each block and free choice responses. The lowest category total shows the preferred field and the highest category total indicates the least preferred field. Each category should be examined for consistency as both inconsistent or sequential ranking may be an indication of an inappropriate approach to the RIB completion (Hall et al, 1986). An examination of the candidates first choices in each block provides insight into occupational needs and degree of maturity. By comparing the three free choice responses with the first three occupational categories an indication of the consistency of responses can also be determined (Hall et al, 1986).

Scores on the RIB indicate the relative importance of the interests for the individual but not the strength of those interests, therefore although norms can be used to compare the category scores of a particular individual with those of a similar group of people, the interests do not indicate the chances of success, but it is recognised that a person puts more effort into an activity which interests him (Hall et al, 1986). Hall et al, (1986) point out that the stronger a person's interest the more likely he or she is to persevere under difficulties or setbacks and therefore a comparison of the strength of a respondent's interest with those of a group of individuals in a given field gives an indication of the respondent's likelihood of success in the field.

More detail on the interpretation of the RIB is available in the manual, but is not relevant to this research. For this research the interpretation involved identifying those fields of interest that were consistently prevalent in those candidates who were successful in the QE. Interests in these fields would then be considered important for future candidates selected as trainee accountants.
4.2.2.6 Validity

The content validity was checked by correlating the interest categories and the highest positive correlations were: Medical with Scientific and Social Service; Practical with Mechanical and Outdoor; Aesthetic with Literary and Musical (Hall et al, 1986).

Several studies on the criterion validity of the earlier versions of the RIB, found that groups of similar students with similar professional aims score differently in certain interest categories from a general student group (Hall et al, 1986). Hall et al (1986) also refer to construct validity that was investigated by comparing the RIB to the Kuder Preference Record which has similar categories to the RIB - all the corresponding categories correlated significantly at the 0.05 level.

Shannon (1975) suggests that there are limitations to the RIB: variations between occupations in the degree to which they represent a given interest stereotype; variations in individual interpretations of stereotypes; incomplete matching of jobs according to status, income, educational level required; status and specific nature of occupations varies between cultures; the ipsative rank ordering of interests on the RIB restricts comparison of individuals. Breger (1976) found that although occupations, as they are presented in the RIB, are perceived by Black school-leavers according to the Western stereotypes, the interest patterns of Whites and Blacks were found to differ. The middle to lower class Whites showed high computational interests, while only the relatively privileged Whites showed interest in accountancy, and Blacks showed high interests in the clerical and computational categories (Breger, 1976).

However there has also been research indicating that the RIB can be administered successfully to all race groups in South Africa where the respondents have an educational level of at least standard ten (Shannon, 1975; Breger, 1976; Visser, 1978; Hall, 1980; Hall et al, 1986). The RIB involves less reading than the Kuder for example, which is an advantage with people whose home language is not English or Afrikaans and who are therefore likely to read more slowly (Hall, 1980).
4.2.2.7 Reliability

Research has indicated that interests do not crystallise or become stable until 18 - 21 years of age (Lowman, 1991). There is evidence that the test-retest reliability tends to be quite high once interests have stabilised (Lowman, 1991). In England the RIB was tested for reliability and the coefficients of stability were calculated for each interest category of the RIB for two groups of third form school pupils, and again approximately three months later (Hall et al, 1986). The coefficients of stability ranged from 0.33 to 0.84, with a mean of 0.61, and the means and standard deviations changed very little from the first test to the retest (Hall et al, 1986). A statistical analysis of reliability by Miller and Tyler (1993) yielded a test-retest median coefficient of 0.85 for both a school sample and a group of bank employees, after a three week interval. While for a university sample a median coefficient of 0.78 was obtained after an interval of eight months.

By examining the spread in the highest and lowest summed category scores Shannon (1975) found that very few pupils responded randomly.

4.2.2.8 Motivation for inclusion in this research

This specific instrument was chosen because it is quick and easy to administer. It has also been used in South Africa extensively and as mentioned above it has been administered successfully to all race groups in South Africa. The RIB manual specifically refers to the use of the battery in the selection of candidates for a particular occupation, where a respondent's profile on the RIB is compared to the profile characteristics of people in that occupation to ascertain whether their interests are similar to those of people in that occupation. It also gives an indication of fields of interest rather than specific careers. This is more appropriate for recruitment and selection, as there is flexibility in the fields of interest an individual who is suited to the CA profession may have. For example, a person with interests in the persuasive field may be just as suitable as a person with interests in the computational field.

The RIB has been used effectively by psychologists making selection and placement decisions and a number of Australian consultants use it extensively across the full range of assessment
work, from career counselling to senior company appointments, and one of the largest groups of consultants in Australia has included the RIB in their test battery ever since it first became available and were using it with about 4 000 clients at one stage (Miller & Tyler, 1993).

The Mental Alertness will be discussed under the same headings as those used to investigate the 16PF and RIB.

4.2.3. The Mental Alertness Sub-Test of the High Level Battery

As the chosen instrument for measuring intelligence, the Mental Alertness sub-test is described in more detail in the following paragraphs.

4.2.3.1 Rationale

The High Level Battery is based on the assumption that the test items which represent intellectual problems in symbol form and which are presented to groups of testees through the medium of test booklets, measure Spearman's *g* factor of intelligence (Owen & Taljaard, 1989). The Battery was designed as a group test for academic intelligence or scholastic ability (Owen & Taljaard, 1989). Knowledge acquired through the traditional Western educational system is a prerequisite for the solution of problems (Latti & Verster, 1975).

The 42 items of the Mental Alertness subtest include: numerical and letter series, verbal analogies, common elements, and other problems verbally stated requiring reasoning ability (Lombard, 1975).

4.2.3.2 Aim

The High Level Battery provides measures of general intelligence, arithmetic ability and certain language abilities and is used for vocational guidance and the selection and classification of high level personnel, that is, matriculants and higher (Lombard, 1975). The Battery can be used as an objective aid to determine level of reasoning ability or
problem-solving ability, and to indicate what the individual is capable of (Owen & Taljaard, 1989).

The Mental Alertness provides a measure of general intelligence. Owen and Taljaard (1989) suggest that the Mental Alertness primarily measures verbal aspects of intelligence. The purpose of the test is to discriminate within a group with a given high level of schooling, on intellectual ability, especially of the reasoning kind required in a wide range of problems (Latti & Verster, 1975).

4.2.3.3 Scales

There are no scales for this test.

4.2.3.4 Administration

The Mental Alertness is one of six sub-tests of the High Level Battery bound in a single reusable test booklet, and can be administered separately (Spangenberg, 1990). The 42 items of the Mental Alertness should be completed in 45 minutes. The test is marked by means of a stencil key.

4.2.3.5 Interpretation

There are norm tables available based on the performance of White matriculants, first year university students, college students, Black bursary applicants, Asian first year university students and White university graduates (Latti & Verster, 1975).

Interpretation for the purposes of this research merely involved recording the raw scores of all those tested to determine whether candidates obtaining higher raw scores are more likely to pass the QE. If this was the case a cut-off score could be determined for use in the selection of trainee accountants.
4.2.3.6 Validity

According to Spangenberg (1990) several studies have been done in which the validity of the battery, or tests within the battery, have been evaluated and the Mental Alertness has been particularly successful with regard to predicting relevant criteria because it is a broad ranging measure of intellectual ability.

4.2.3.7 Reliability

The relative heterogeneity of the items improves the possibility of adequate prediction of success in a variety of situations where a premium is placed on independent thinking and general problem solving (Latti & Verster, 1975), such as accounting. For a group of Black university applicants, reliability coefficients of the internal consistency type, which depend on the intercorrelations or homogeneity of items, were on five different norm groups found to range from 0.74 to 0.86 (Latti & Verster, 1975). Spangenberg (1990) refers to reliabilities of 0.73 to 0.87 for the Mental Alertness. Hunter and Hunter (1984) state rather emphatically that the difference in ability test scores is mirrored by a corresponding difference in academic achievement and in performance on the job.

In contrast with this, Visser (1978) found that the tests of the Intermediate Battery were more reliable than those of the High Level Battery for a group of Black university students. The Mental Alertness has a high verbal component that is borne out by the significant intercorrelations of Mental Alertness with Reading Comprehension and Vocabulary (Erwee, 1981). Therefore lower scores may not be due to deficiencies in cognitive functioning but to differences in verbal ability or to a lower level of proficiency in English.

4.2.3.8 Motivation for inclusion in this research

The Mental Alertness is a relatively quick means of obtaining a score for general intelligence. All candidates in the sample group have at least a matriculation qualification and the Mental Alertness is suitable for matriculants and higher and is also suitable for the selection and
classification of high level personnel, such as those in the sample group (Owen & Taljaard, 1989; Spangenberg, 1990).

With regard to the instruments used in the research the final topic is that of matriculation Mathematics and matriculation home language results.

4.2.4. Matriculation Mathematics and matriculation home language results

The instrument used to measure academic history is the matriculation Mathematics result as well as the matriculation home language result. For purposes of consistency this instrument will be discussed under the same headings as above, although the information is rather scant or non existent in certain instances, due to the fact that it is not a measuring instrument as such.

4.2.4.1 Rationale

Educational measurement involves the allocation of scores to the results of instruction and/or learning at school which is inferred from the pupils' understanding of some or other measure of knowledge or from their proficiency in certain skills (Owen & Taljaard, 1989).

Aptitude has often been demonstrated clearly in various experiences to an extent that objective evidence is available and obviously high results in Mathematics demonstrates ability in these areas (Isaacson, 1985). Entrance to certain universities and certain university courses is often limited by minimum results in matriculation Mathematics or matriculation home language results. This indicates a general assumption amongst educators and others that these results indicate the chances of future academic success.

Lewis (1992) suggests that ability is the nearest to an all-embracing factor which suggests whether an individual will be able to perform the job. The two components of ability are: attainment and aptitude or potential, and judgement as to whether the required attainment exists rests on the detail of educational achievement (Lewis, 1992).
4.2.4.2 Aim

The aim is to evaluate the matriculation Mathematics and matriculation home language results for all candidates in the sample. It provides a dependable measure of a candidate's minimal level of skill (Lewis, 1992).

4.2.4.3 Scales

There are no scales for matriculation Mathematics and matriculation home language results.

4.2.4.4 Administration

In order to determine the matriculation Mathematics and matriculation home language results the matriculation certificates of the candidates are considered. These certificates are a requirement for registration as a trainee accountant and are therefore readily available on all employee files in the organisation where this particular research was conducted.

4.2.4.5 Interpretation

The only interpretation necessary is to identify the symbol obtained for both Mathematics and home language from the matriculation certificate.

4.2.4.6 Validity

Matriculation results should measure differences in performance. However, there may be different standards in matriculation results arising from the different matriculation examining bodies. Furthermore factors other than an individual's subject knowledge may have influenced their matriculation results. For example, some students may have been writing in an examination hall that was not ideally situated or designed.
In terms of content validity the requirements of Guion (1977) referred to by Owen and Taljaard (1989) are met, that is:

(1) The content domain of the test is based on behaviour with a generally accepted meaning.
(2) The definition of the content domain of the test is clear.
(3) The content domain is relevant to the purpose of measurement.
(4) It is generally accepted that the test satisfactorily samples the content domain.
(5) Reliable observations and evaluations of the candidates' responses are possible.

4.2.4.7 Reliability

In considering the issue of reliability it is necessary for there to be a high degree of stability in the information that candidates offer as matriculation certificates, and the data considered would also have to be reliably assessed by the person gathering the information (Lewis, 1992). Apart from the slight chance of a fraudulent certificate one can assume that the information provided will indeed be reliable. In this instance no interpretation is necessary as the relevant matriculation symbol is simply used, therefore the information should be reliable.

4.2.4.8 Motivation for inclusion in this research

Although there are various measures that could have been used as an indication of academic history, such as previous accounting results at either school or university, matriculation Mathematics and home language results were chosen firstly because they were available for all candidates in the sample. Secondly they are probably more comparable across academic institutions than other indicators may have been, for example, university results. Thirdly there is much debate at this fundamental level regarding the role matriculation results should play in selection for university as well as various occupations or jobs.

Having comprehensively discussed the instruments used to collect data on each variable, the method of data collection is considered in the next section.
4.3. DATA COLLECTION

One of the most important considerations in descriptive studies is to collect accurate information or data on the domain phenomena under investigation (Mouton & Marais, 1990). Research was limited to students applying for traineeship or a bursary at only one of the large international accounting and auditing firms represented in South Africa (commonly referred to as the "Big 6" accounting firms). Students were tested before entry into the firm, but only those entering the firm and subsequently writing their QE were included in the research. This sample may have certain unique characteristics because candidates were successful in their selection into a firm with a particular culture.

Prior to being selected as trainee accountants and prior to writing the QE, trainee accountants applying for traineeship or bursaries at a particular auditing and accounting firm were assessed. Students in various years of study, that is, matriculation up until fourth year university were assessed in groups of about 50. They would have already completed an application form and some may have had an interview. Those who had not yet attended an interview would have been called in for an interview at some stage after the assessment.

The assessment began with the Mental Alertness test, followed by a 15 minute break. The 16PF and RIB were then administered in turn. Information on matriculation results was obtained from application forms, Curricula Vitae and personnel files, or where this information could not be found the individuals were contacted directly. Results were then kept on record and reviewed once applicants had written the QE.

For the purposes of this research, data on the QE pass rates and previous assessment results of a sample of trainee accountants in the previously referred to auditing and accounting firm was collected over a period of five years.

Although the trainees were assessed over a number of years, all were assessed under exactly the same conditions and following exactly the same procedures. That is, they were assessed before their entry into the firm and in all cases for purposes of selection. Once the data had been collated it was analysed statistically.
4.4 DATA ANALYSIS

For the purposes of this research the stepwise logistic regression procedure was employed as a fast and effective means of screening a large number of variables, and simultaneously fitting a number of logistic regression equations (Hosmer & Lemeshow, 1989).

Two additional methods of statistical analysis were also used for the purposes of confirming that the results found in the logistic regression analysis were correct. Firstly a statistical analysis of the two independent successful and unsuccessful groups was conducted using a simple t-test. Secondly a discriminant analysis was conducted.

4.4.1 Logistic Regression

Logistic regression is considered in terms of the objective and assumptions of the technique, as well as the procedure for implementing this statistical technique.

4.4.1.1 Objective of Logistic Regression

According to Hosmer and Lemeshow (1989) the goal of logistic regression analysis is the same as that of any model-building technique used in statistics: To find the best fitting and most parsimonious, yet biologically reasonable model to describe the relationship between an outcome (dependent or response variable) and a set of independent (predictor or explanatory) variables. The logistic regression procedure will identify those variables that have a marked effect on the odds of a candidate's success or failure in the QE. The model is therefore fitted with all the variables to see whether the estimated coefficients for the exposure variables change when each potential confounder is omitted (Hosmer & Lemeshow, 1989). The parameters of the model are estimated using the maximum likelihood method, where the coefficients that make the observed results most likely are selected, and since the model is non-linear, an iterative algorithm is necessary for parameter estimation (Norusis, 1994).

Regression methods have become an integral part of any data analysis concerned with describing the relationship between a response variable and one or more explanatory variables,
and the logistic regression model has become the standard method of analysis in situations where the outcome variable is discrete, taking on two or more possible values (Hosmer & Lemeshow, 1989). In this case whether a candidate will either be successful or unsuccessful in the QE. Logistic analysis or logit analysis is a combination of multiple regression, where one or more independent variables are used to predict a single dependent variable, and discriminant analysis (Hair, Anderson, Tatham & Black, 1995).

4.4.1.2 Assumptions of the Logistic Regression procedure

According to Norusis (1994) the minimum specifications for logistic regression are, a dichotomous dependent variable and one or more predictor variables or covariates. What distinguishes a logistic regression model from the linear regression model is that the outcome variable in logistic regression is binary or dichotomous (Hosmer & Lemeshow, 1989). In other words there are just two possible outcomes in the research - success or failure.

The results could not be studied using normal regression because several of the assumptions would have been violated (Hair et al, 1995). For example, the error term of a discrete variable follows the binomial distribution instead of the normal distribution, thus invalidating all statistical testing performed in regression (Hair et al, 1995). Logistic regression is a particular type of generalised linear model and the class of general linear models involves a different type of extension to the usual linear regression and ANOVA models, by relaxing the assumptions about independence among the observations (McCullagh & Nelder, 1989). These types of linear probability models accommodate all types of independent variables (metric and non metric) and do not require the assumption of multivariate normality (Hair et al, 1995). This difference between logistic and linear regression is reflected in the choice of a parametric model and in the assumptions, but once this difference is accounted for, the methods follow the same general principles (Hosmer & Lemeshow, 1989).

Logistic regression also differs from discriminant analysis, referred to later, in that discriminant analysis requires the independent variables to be normally distributed, which implies that they must be continuous variables. Logistic regression does not require normality and is still valid when some or all of the covariates are discrete (Norusis, 1994).
Hosmer and Lemeshow (1989) refer to the following requirements in a regression analysis when a variable is dichotomous:

1. The conditional mean of the regression equation must be formulated to be bounded between zero and one.
2. The binomial, not the normal, distribution describes the distribution of the errors and will be the statistical distribution upon which the analysis is based.

In logistic regression the contribution of each variable depends on the other variables in the model, and this is a problem particularly when independent variables are highly correlated (Norusis, 1994). A test for correlation conducted for this research found that the hypothesis that they were not correlated was rejected, indicating that certain of the variables may well be correlated. This should be considered when reviewing the results of the study.

4.4.1.3 The Logistic Regression procedure

According to Hosmer and Lemeshow (1989) any stepwise procedure for selection or deletion of variables from a model is based on a statistical algorithm which checks for the importance of variables, and either includes or excludes them on the basis of a fixed decision rule. The importance of a variable is defined in terms of a measure of the statistical significance of the coefficient of the variable, and in logistic regression the errors are assumed to follow a binomial distribution, and significance is assessed via the likelihood ratio chi-squared test (Hosmer & Lemeshow, 1989).

Nominal and categorical data can be included in a logistic analysis through some form of dummy-variable coding (Hair et al, 1995). This was done for the matriculation Mathematics, and matriculation home language variables.

For the purposes of this research the logistic regression procedure of the Statistical Packages for Social Sciences (SPSS) program was used for analysing the data. The outcome, or dependent variable can take on one of two possible values, denoted for convenience by 0 and 1. For example, in this study 0 = fail, and 1 = pass. Here follows an outline of the statistical
computations that the computer must perform at each step of the procedure to illustrate the algorithm for forward selection followed by backward elimination in stepwise logistic regression, as outlined by Hosmer and Lemeshow (1989):

STEP (0): This step involves a fit of the intercept only model and an evaluation of its log-likelihood. This is followed by fitting each of the independent variables possible univariate logistic regression models and comparing their respective log-likelihoods. The most important variable is the one with the smallest p value. Hosmer and Lemeshow (1989) refer to studies by Bendel and Afifi (1977) with regard to stepwise linear regression, and Costanza and Afifi (1979) with regard to stepwise discriminant analysis which concluded that an entry level cut-off of 0.05 is too stringent, often excluding important variables from the model. According to Hosmer and Lemeshow (1989) choosing a cut-off of 0.15 to 0.20 is more highly recommended. In this case a cut-off of 0.15 was chosen.

STEP (1): This step commences with a fit of the logistic regression model containing the first variable. The variable with the smallest p value is once again chosen and if this value is less than the cut-off value, the process will continue. The likelihood ratio chi-squared of this model versus the model containing only the first variable are compared.

STEP (2): It is possible that once the second variable has been included in the model the first variable is no longer important. Therefore this step includes a check for backward elimination. To ascertain whether a variable should be deleted from the model the program selects that variable which, when removed, yields the maximum p value. To decide whether a variable should be removed or not a second cut-off is specified which should be greater than the initial cut-off to prevent the same variables from being entered and removed in successive steps. For the purposes of this research a cut-off of 0.20 was chosen because a continued significant contribution is required. The program then evaluates the log-likelihood for each model, computes the likelihood ratio test versus the model containing only the first two selected variables and determines the corresponding p value. Once again if this variable is smaller than the cut-off (in this case 0.15) then the program continues to step (3), otherwise it stops.
STEP (3): The procedure for this step is identical to that of the previous step and the program performs a check for backward elimination followed by forward selection. This process continues until the last step, step (S).

STEP (S): This step occurs either when all \( p \) variables have entered the model, or when all variables in the model have \( p \) values to remove which are less than the second cut-off (in this case 0.20), and the variables not included in the model have \( p \) values to enter which exceed the initial cut-off (in this case 0.15).

For the purposes of confirming that the results found in the logistic regression analysis were correct a statistical analysis of the two independent successful and unsuccessful groups was conducted using a simple \( t \)-test.

4.4.2. The \( t \)-test

The objective, assumptions and procedures involved in \( t \)-testing are covered in the next few paragraphs.

4.4.2.1 Objective of the \( t \)-test

The \( t \)-test procedure computes a \( t \) statistic for testing that the hypothesis that the means of two groups of observations in a data set are equal (Statistical Analysis System [SAS] Institute, 1985). The \( t \)-test computes the \( t \) statistic based on the assumption that the variances of the two groups are equal and also computes an approximate \( t \) based on the assumption that the variances are unequal (SAS Institute, 1985). To determine whether the score on each variable is different for the successful group and the unsuccessful group of QE candidates, that is, that the variable is significant in identifying those candidates that will pass, a \( t \) statistic is calculated. The \( t \) statistic is the ratio of the difference between the sample means to its standard error (Hair et al, 1995). According to Hair et al (1995) the standard error is an estimate of the difference between the means to be expected because of sampling error, rather than the real differences between means.
4.4.2.2 Assumptions of the t-test procedure

The underlying assumption is that the variables are normally distributed within each group (SAS Institute, 1985). However, $t$ is not markedly affected by violations unless the sample size is particularly small (Guilford & Fruchter, 1981). The samples should not have markedly differing variances, or the $t$-test is questionable and finally, the independent variables should be mutually exclusive (Guilford & Fruchter, 1981).

4.4.2.3 The t-test procedure

The first step in computing a $t$-test value is to compute the means of the dependent-variable scores and the sum of squares of the two groups concerned (McGuigan, 1990). For each $t$, the degrees of freedom and probability level are given, and as outlined by the SAS Institute (1985), the SAS program uses Satterthwaite's (1946) approximation to compute the degrees of freedom associated with the approximate $t$, and Steel and Torrie's (1980), $F'$ (folded) statistic is computed to test for equality of the two variances.

Further confirmation of the results found in the logistic regression analysis was sought by means of the discriminant analysis procedure.

4.4.3. Discriminant Analysis

Discriminant analysis is discussed under the same headings as the other two statistical procedures outlined above.

4.4.3.1 Objective of Discriminant Analysis

Discriminant analysis is suitable for research involving a categorical dependent variable and several metric independent variables. This is not the metric type measure required by multivariate regression analysis, and therefore discriminant analysis is a more appropriate method of identifying those variables that discriminate between the successful and the unsuccessful QE candidates.
Discriminant analysis allows for a study of the differences between two or more groups of objects with respect to several variables simultaneously (Klecka, 1980). This technique is appropriate when the dependent variable is categorical, that is, nonmetric and the independent variables are metric, and it has widespread application in situations where the primary objective is identifying the group to which a person belongs (Hair et al, 1995).

According to SAS Institute (1985) the purpose of discriminant analysis is to find:

1. A mathematical rule, or discriminant function, for guessing which class an observation belongs to based on the knowledge of the quantitative variables only.
2. A set of linear combinations of the quantitative variables that best reveals the differences among the classes.
3. A subset of the quantitative variables that best reveals the differences among the classes.

4.4.3.2 Assumptions of Discriminant Analysis

Certain conditions must be met for the proper application of discriminant analysis:

1. The data cases should be members of two mutually exclusive groups (Klecka, 1980), such as is the case in this research, where a person will either be in the group of successful candidates or in the group of unsuccessful candidates.

2. According to Hair et al (1995) several studies suggest a ratio of 20 observations for each predictor variable. They go on to suggest that although this ratio may be difficult to maintain in practice the results may become unstable as the sample size decreases relative to the number of independent variables. In this research there are 32 variables and a sample of 113, which exceeds the guideline above. Klecka (1980, p. 9) in contrast to this states that "there is no limit to the number of discriminating variables as long as the total number of cases exceeds the number of variables by more than two." Hair et al (1995, p. 200) also state during a discussion on "specifying probabilities of classification" that "if the analyst is unsure if the observed proportions of the sample
are representative of the population proportions, then equal probabilities should be employed". However in this case the sample group sizes do reflect the population, as can be seen by comparing the percentage failures on each paper in the sample to those of the overall QE statistics mentioned in chapter 1.

(3) Hair et al (1995) also suggest that at a minimum, the smallest group size must exceed the number of independent variables and as a guideline each group should have at least 20 observations. The sample sizes for the auditing paper meet this requirement with a group of 74 successful candidates, and a group of 39 unsuccessful candidates. Unfortunately for the accounting paper the sample sizes are 97 successful candidates and 16 unsuccessful candidates. The auditing paper can be viewed as more important to the study as it is this paper that most QE candidates fail (see chapter 1), however the negative influence of this requirement was considered when reviewing the results of the statistical analysis for the accounting paper.

(4) The discriminating variables must be measured at the interval or ratio level of measurement, so that means and variances can be calculated and so that they can be legitimately employed in mathematical calculations (Klecka, 1980). The data used in this research complies with this requirement.

(5) An implicit assumption is that all relationships are linear (Hair et al, 1995). Once again the data used in this research complies with this requirement.

(6) No variable may be a linear combination of other discriminating variables and, two variables which are perfectly correlated cannot be used at the same time (Klecka, 1980). The SPSS program for collinearity diagnostics was also conducted in order to investigate whether any of the variables were dependent on one another. Results showed that some of the variables may be correlated.

(7) Hair et al (1995) suggest that outliers should be identified and eliminated. The SAS program identified outliers on each variable, however to be classified as an outlier, a survey participant would have had to be classified as an outlier on several variables. This exercise was not deemed to be necessary for the purposes of this research, as the discriminant analysis is merely a secondary means of statistical analysis.

The assumption of multivariate normality of the independent variables, as well as equal variance-covariance matrices in the two groups, is required for the prediction rule to be
optimal (Norusis, 1994). These requirements were not met for all variables used in this research, and therefore discriminant analysis was only used to compare the results with those of the logistic regression, as the primary method of statistical analysis.

4.4.3.3 The Discriminant Analysis procedure

Describing the statistical procedure used in detail is beyond the ambit of this research, however here follows a brief explanation of the basic procedure as outlined by Hair et al (1995):

1. Discriminant analysis involves deriving a variate, the linear combination of all the independent variables that will discriminate best between the groups of successful and unsuccessful candidates in the QE.

2. Each independent variable is multiplied by its corresponding weight and the products are then added together.

3. The result is a single composite score for each individual in the analysis, and by averaging the discriminant scores for all the individuals within a particular group a group mean (or centroid) is derived.

4. The centroids indicate the most typical location of any individual from a particular group, and a comparison of the group centroids shows how far apart the groups are along the dimension being tested.

5. The test for the statistical significance of the discriminant function is a generalised measure of the distance between the group centroids and it is computed by comparing the distribution of the discriminant scores for the two groups. If the overlap is small, the discriminant function separates the groups well.

6. Where there is a relatively large number of independent variables, stepwise procedures should be used. Variables that are not useful in discriminating between the groups are eliminated and a reduced set of variables is identified. This involves entering the independent variables into the discriminant function one at a time on the basis of their discriminating power.

In this research a forward stepwise procedure was used. The stepwise approach begins by choosing the single best discriminating variable, which is then paired with each of the other
independent variables one at a time, and the variable that is best able to improve the discriminating power of the function in combination with the first variable is chosen (SAS Institute, 1985). Any subsequent variables are selected in a similar manner.

The elements used to conduct the empirical study such as the instruments and techniques used to collect and analyse data have been dealt with in this chapter, as well as the method of data collection. The following chapter therefore involves an analysis of the information yielded through the use of these instruments and techniques.
CHAPTER 5

RESULTS

In this chapter the results of the research are reported. The findings will be presented according to the various statistical procedures used, that is: applied logistic regression analysis, a t-test, and discriminant analysis, and will deal with the accounting and auditing papers separately. The descriptive statistics for each independent variable are also provided at the end of the chapter to indicate that there is sufficient breadth in the scores of the sample group.

5.1. RESULTS OF THE LOGISTIC REGRESSION

For the accounting paper the logistic regression procedure included three variables in the equation for classifying candidates as successful or unsuccessful. For the accounting paper matriculation home language, perfectionism (Q3), and computational interest were added to the model in this order. For the auditing paper matriculation home language, liveliness (F), self-reliance (Q2), rule-consciousness (G), Mental Alertness, warmth (A), social boldness (H), apprehension (O), and tension (Q4) were added to the model in this order. Mental Alertness was excluded at a later step and does not appear in the final model.

The results of the logistic regression procedure will be summarised by following the same steps outlined in the previous chapter point 4.4.1.3, describing the logistic regression procedure.

STEP (0): The most important variable, that is the one with the smallest $p$ value, is the matriculation home language result, for both the auditing and the accounting papers. This variable is statistically significant in both cases with a $p$ value of 0.0136 for the accounting paper and 0.0183 for the auditing paper. The model chi-squared value of 0.0117 for the accounting paper, and 0.0172 for the auditing paper show that the
model including this first variable is more predictive than the model without any variables. A classification table predicting the number of successful and unsuccessful candidates in each paper shows no change for the accounting paper once the first variable is included in the model, but for the auditing paper the percentage correctly predicted increases from 65.49 percent to 69.91 percent. (See table 5.1).

STEP (1): Once matriculation home language has been excluded the variable with the next smallest $p$ value in the accounting paper is perfectionism (Q3), with a $p$ value of 0.0479, and for the auditing paper it is liveliness (F) with a $p$ value of 0.0893.

STEP (2): The check for backward elimination did not drop any of the variables and at the forward selection phase the next variable chosen for the accounting paper was computational interest with a $p$ value of 0.0128, and for the auditing paper self-reliance (Q2) with a $p$ value of 0.0265. The classification table showed only a very slight increase in those candidates correctly classified for the accounting paper, 85.84 percent to 86.73 percent. The auditing paper decreased from 68.14 percent to 67.26 percent. (See table 5.1).

STEP (3): The process ended with step (2) for the accounting paper but continued adding variables for the auditing paper as can be seen in table 5.1. After apprehension (O) was added to the model, the Mental Alertness variable was removed as its significance level was 0.1934 and the Log Likelihood decreased by less than 0.01 percent after adding this variable.

In table 5.1 the percentages under the column heading percent correct assess how well the model fits (including all variables at each step), by comparing the predictions to the observed outcomes. Although the percentage correctly predicted by the model may seem high, this percentage should be seen in context. For example, for the accounting paper there were 97 successful candidates and 16 unsuccessful candidates. Based on this data the model made the reasonable prediction that all of the candidates would pass and therefore 85.84 (or 97 of the 113 candidates) were correctly predicted by the model initially, before any variables had been added.

*Chi-squared improvement* in table 5.1 refers to the change in log likelihood between successive steps of building the model (Norusis, 1994). Therefore where the values
have increased with each step the adding on of each variable to the model has been worthwhile. For example, the small observed significance level of 0,0151 when adding the variable of apprehension (O) to the model for the auditing paper indicates that the coefficient for apprehension (O) is not zero.

*Model chi-squared* referred to in table 5.1 is used to test the null hypothesis that the coefficients for all of the terms in the current model, except the constant, are zero (Norusis, 1994). If the value is small the null hypothesis is rejected. In other words *model chi-squared* tests whether the model including, for example, the matriculation home language variable is different to the model excluding the matriculation home language variable, and in the first step the value of 0,0117 indicates that the model for the accounting paper is improved (or more predictive) when matriculation home language is included.

**Table 5.1: Results of the Logistic Regression**

<table>
<thead>
<tr>
<th>Paper</th>
<th>Variable</th>
<th>p value</th>
<th>Percent Correct</th>
<th>Chi-squared Improvement</th>
<th>Model Chi-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>Matriculation home language</td>
<td>0,0136</td>
<td>85,84</td>
<td>0,0117</td>
<td>0,0117</td>
</tr>
<tr>
<td></td>
<td>Perfectionism (Q3)*</td>
<td>0,0479</td>
<td>85,84</td>
<td>0,0433</td>
<td>0,0054</td>
</tr>
<tr>
<td></td>
<td>Computational interest</td>
<td>0,0128</td>
<td>86,73</td>
<td>0,0185</td>
<td>0,0011</td>
</tr>
<tr>
<td>Auditing</td>
<td>Matriculation home language</td>
<td>0,0183</td>
<td>69,91</td>
<td>0,0172</td>
<td>0,0172</td>
</tr>
<tr>
<td></td>
<td>Liveliness (F)</td>
<td>0,0893</td>
<td>68,14</td>
<td>0,0893</td>
<td>0,0138</td>
</tr>
<tr>
<td></td>
<td>Self-reliance (Q2)</td>
<td>0,0265</td>
<td>67,26</td>
<td>0,0256</td>
<td>0,0036</td>
</tr>
<tr>
<td></td>
<td>Rule-consciousness (G)</td>
<td>0,0307</td>
<td>71,68</td>
<td>0,0289</td>
<td>0,0011</td>
</tr>
<tr>
<td></td>
<td>Mental Alertness</td>
<td>0,0720</td>
<td>71,68</td>
<td>0,0708</td>
<td>0,0006</td>
</tr>
<tr>
<td></td>
<td>Warmth (A)</td>
<td>0,1182</td>
<td>69,91</td>
<td>0,1178</td>
<td>0,0005</td>
</tr>
<tr>
<td></td>
<td>Social Boldness (H)*</td>
<td>0,0301</td>
<td>73,45</td>
<td>0,0284</td>
<td>0,0002</td>
</tr>
<tr>
<td></td>
<td>Apprehension (O)*</td>
<td>0,0151</td>
<td>74,34</td>
<td>0,0151</td>
<td>0,0000</td>
</tr>
<tr>
<td></td>
<td>Mental Alertness</td>
<td>0,1934</td>
<td>73,45</td>
<td>0,1943</td>
<td>0,0000</td>
</tr>
<tr>
<td></td>
<td>Tension (Q4)</td>
<td>0,1041</td>
<td>76,11</td>
<td>0,1046</td>
<td>0,0000</td>
</tr>
</tbody>
</table>

* Variables that are negatively related to the outcome. In other words candidates that have a higher than average score on these variables have less chance of success in the QE. (A variable's positive or negative relation to the outcome was indicated in the SPSS printout).
STEP (S): After adding computational interest for the accounting paper and tension (Q4) for the auditing paper, all variables in the model have $p$ values which are less than the second cut-off (in this case 0.20), and the variables not included in the model have $p$ values to enter which exceed the initial cut-off (in this case 0.15).

All of the assumptions for logistic regression outlined in chapter 4 were complied with except with regard to correlation. In logistic regression the contribution of each variable depends on the other variables in the model, and this is a problem particularly when independent variables are highly correlated (Norusis, 1994). A test for correlation conducted for this research found that the hypothesis that they were not correlated was rejected, indicating that certain of the variables may well be correlated. This should be kept in mind when reviewing the results of the study.

Furthermore Norusis (1994) points out that none of the algorithms result in a best model in any statistical sense and different algorithms for variable selection may result in different models. The model is selected to fit a particular sample well, so there is no assurance that the same model will be selected if another sample from the same population is taken (Norusis, 1994).

The next section will consider whether the results of the $t$-test support those of the Logistic Regression procedure.

5.2. RESULTS OF THE $t$-TEST

The $t$-test procedure has only been referred to as a means of comparing the results with those of the logistic regression. A summary of the $t$-test results for the auditing and accounting papers is shown below in table 5.2. A probability $F$ value and a probability $t$ value are shown for each variable. The $t$ value indicates which of the variables have means which differ significantly between the successful and unsuccessful groups. For the purposes of these statistics the matriculation Mathematics and matriculation home language results were excluded because they did not comply with the normality requirements of $t$-tests.
Table 5.2: Results of the t-test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Accounting Prob&gt;F</th>
<th>Accounting t-value</th>
<th>Auditing Prob&gt;F</th>
<th>Auditing t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Alertness</td>
<td>0,8949</td>
<td>0,4837</td>
<td>0,1407</td>
<td>0,0517*</td>
</tr>
<tr>
<td>Outdoor</td>
<td>0,4933</td>
<td>0,6042</td>
<td>0,8762</td>
<td>0,4248</td>
</tr>
<tr>
<td>Mechanical</td>
<td>0,1353</td>
<td>0,0599*</td>
<td>0,0209</td>
<td>0,8753</td>
</tr>
<tr>
<td>Computational</td>
<td>0,0160</td>
<td>0,1175</td>
<td>0,9543</td>
<td>0,6151</td>
</tr>
<tr>
<td>Scientific</td>
<td>1,0000</td>
<td>0,7871</td>
<td>0,7468</td>
<td>0,1589</td>
</tr>
<tr>
<td>Persuasive</td>
<td>0,0349</td>
<td>0,7188</td>
<td>0,4234</td>
<td>0,1673</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>0,5831</td>
<td>0,1797</td>
<td>0,8661</td>
<td>0,5560</td>
</tr>
<tr>
<td>Literary</td>
<td>0,0042</td>
<td>0,2664</td>
<td>0,2970</td>
<td>0,6717</td>
</tr>
<tr>
<td>Musical</td>
<td>0,4031</td>
<td>0,9843</td>
<td>0,2334</td>
<td>0,5074</td>
</tr>
<tr>
<td>Social Service</td>
<td>0,1432</td>
<td>0,0818*</td>
<td>0,8487</td>
<td>0,8130</td>
</tr>
<tr>
<td>Clerical</td>
<td>0,7220</td>
<td>0,6069</td>
<td>0,7299</td>
<td>0,2979</td>
</tr>
<tr>
<td>Practical</td>
<td>0,5039</td>
<td>0,9767</td>
<td>0,6027</td>
<td>0,7961</td>
</tr>
<tr>
<td>Medical</td>
<td>0,8699</td>
<td>0,6571</td>
<td>0,6141</td>
<td>0,2501</td>
</tr>
<tr>
<td>A</td>
<td>0,7243</td>
<td>0,9918</td>
<td>0,9261</td>
<td>0,0496*</td>
</tr>
<tr>
<td>C</td>
<td>0,4845</td>
<td>0,1575</td>
<td>0,6357</td>
<td>0,6371</td>
</tr>
<tr>
<td>E</td>
<td>0,7163</td>
<td>0,5594</td>
<td>0,4252</td>
<td>0,3519</td>
</tr>
<tr>
<td>F</td>
<td>0,2024</td>
<td>0,1825</td>
<td>1,0000</td>
<td>0,1670</td>
</tr>
<tr>
<td>G</td>
<td>0,7957</td>
<td>0,2507</td>
<td>0,5033</td>
<td>0,2236</td>
</tr>
<tr>
<td>H</td>
<td>0,2426</td>
<td>0,8799</td>
<td>0,6356</td>
<td>0,5141</td>
</tr>
<tr>
<td>I</td>
<td>0,7025</td>
<td>0,9812</td>
<td>0,4806</td>
<td>0,5056</td>
</tr>
<tr>
<td>L</td>
<td>0,7977</td>
<td>0,2275</td>
<td>0,1617</td>
<td>0,5374</td>
</tr>
<tr>
<td>M</td>
<td>0,1364</td>
<td>0,3913</td>
<td>0,6874</td>
<td>0,3930</td>
</tr>
<tr>
<td>N</td>
<td>0,0001</td>
<td>0,4859</td>
<td>0,5304</td>
<td>0,4591</td>
</tr>
<tr>
<td>O</td>
<td>0,3747</td>
<td>0,7999</td>
<td>0,3612</td>
<td>0,2154</td>
</tr>
<tr>
<td>Q1</td>
<td>0,7884</td>
<td>0,3569</td>
<td>0,4211</td>
<td>0,8413</td>
</tr>
<tr>
<td>Q2</td>
<td>0,2635</td>
<td>0,2556</td>
<td>0,1556</td>
<td>0,1326</td>
</tr>
<tr>
<td>Q3</td>
<td>0,7998</td>
<td>0,0955*</td>
<td>0,6038</td>
<td>0,8731</td>
</tr>
<tr>
<td>Q4</td>
<td>0,8387</td>
<td>0,5481</td>
<td>0,9421</td>
<td>0,3298</td>
</tr>
</tbody>
</table>

* Variables significant at the 0,10 level.

For the accounting paper, mechanical and social services interests and perfectionism (Q3) are significant at the ten percent level. For the auditing paper, the Mental Alertness and warmth
(A) variables are significant at the 0.10 level. There is more than a random chance that the means of the successful and unsuccessful groups for these variables differ, that is, the difference between the means for these variables is significant. Therefore these are the variables that can be used to appropriately identify candidates that are likely to be successful or unsuccessful in the QE.

As mentioned in the previous chapter the underlying assumptions of a t-test are:

(1) The variables are normally and independently distributed within each group (SAS Institute, 1985). The SAS univariate procedure program indicates that some of the independent variables are not normally distributed. However because of the relatively large sample size of 113, the requirement of normality is not that critical.

(2) The samples should not have markedly differing variances (Guilford & Fruchter, 1981). This requirement was taken into account, as the report gave an indication of equal or unequal variance and a corresponding value for each.

(3) The dependent variables should be mutually exclusive (Guilford & Fruchter, 1981). This requirement was adhered to as the candidates would either pass or fail.

More specifically with regard to normality the SAS program was run to consider the normality of the variables of the successful and unsuccessful candidates as one group. The SAS printout gives a normality score. If this value is less than 0.05 the variable is not normally distributed. The significant accounting variables of mechanical interest, social services interest and perfectionism (Q3) had normality scores of 0.0058; 0.2767; and 0.2069 respectively, indicating that the two latter variables are indeed normally distributed. The significant auditing variables of Mental Alertness with a normality score of 0.1278, and warmth (A) with a normality score of 0.1800 are both normally distributed.

The last statistical procedure conducted was that of discriminant analysis, and the following section will consider whether the results of this procedure support the results of the other statistical methods used.
5.3. RESULTS OF THE DISCRIMINANT ANALYSIS

It is important to mention at the outset that the research has not complied with all of the assumptions required for discriminant analysis as outlined in the previous chapter. Only the first of these principles was adhered to with regard to the data used for this research. The results are merely to be used as a comparison with the results of the other two procedures and should be interpreted with the necessary amount of caution.

Certain conditions must be met for the proper application of discriminant analysis:

(1) The data cases should be members of two mutually exclusive groups (Klecka, 1980). This is true for the data used in this research as a candidate is either successful or unsuccessful.

(2) Hair et al. (1995) suggest a ratio of 20 observations for each predictor variable as results may become unstable as the sample size decreases relative to the number of independent variables. There are 30 independent variables and the sample size is 113, therefore this requirement is clearly not met.

(3) The smallest group size must exceed the number of independent variables and as a guideline each group should have at least 20 observations (Hair et al, 1995). The fail group for the accounting paper consists of 16 observations, this is less than the number of independent variables and less than the guideline of 20.

(4) The discriminating variables must be measured at the interval or ratio level of measurement (Klecka, 1980). This requirement is met.

(5) No variable may be a linear combination of other discriminating variables and two variables which are perfectly correlated cannot be used at the same time (Klecka, 1980). Although none of the variables is perfectly correlated, the SPSS correlation coefficients program did indicate that some of the variables may well be correlated.

(6) Outliers should be identified and eliminated (Hair et al, 1995). The SAS univariate procedure program identified outliers on each variable, however to be classified as an outlier, a survey participant would have had to be classified as an outlier on several variables. This exercise was not deemed to be necessary for the purposes of this
research, as the discriminant analysis is merely a secondary means of statistical analysis.

Having considered the assumptions of discriminant analysis the various statistics provided by the SAS computer printout regarding the analysis are reported in the following paragraphs.

5.3.1 Stepwise inclusion of variables

A stepwise procedure was used because the objective of the analysis was to identify the variables that efficiently discriminate between candidates that are successful and those that are unsuccessful in the QE. The stepwise procedure begins with all of the variables excluded and selects the variables that maximise the Mahalanobis distance between the groups (Hair et al, 1995). This limitation eliminated all but two variables in the study of the accounting paper and all but seven in the auditing paper. For the purposes of these statistics the matriculation Mathematics and matriculation home language results were excluded because they did not comply with the normality requirements of discriminant analysis.

The overall stepwise discriminant analysis results after all the significant discriminators have been included in the estimation of the discriminant function reveals that two variables in the accounting paper: computational interest and perfectionism (Q3), and seven variables in the auditing paper: Mental Alertness, warmth (A), liveliness (F), rule-consciousness (G), social boldness (H), apprehension (O) and self-reliance (Q2), were included in the model.

The report on the discriminant analysis results continues with an analysis of the statistical data provided by the SAS program.

5.3.2 Wilks' Lambda

Wilks' lambda statistic takes into consideration both the differences between groups and the cohesiveness or homogeneity within groups (Klecka, 1980). Values of lambda which are near zero denote high discrimination, that is, the group centroids are greatly separated and very distinct relative to the amount of dispersion within the groups (Klecka, 1980). As lambda
increases towards its maximum value of 1,0, it is reporting progressively less discrimination (Klecka, 1980).

The values for Wilks' lambda varied from 0.76 to 0.96 and are therefore all fairly high. It can therefore be concluded that these discriminant variables are fairly unimportant and statistically spurious.

The discriminant analysis procedure is also able to predict group membership.

5.3.3 Prediction of group membership

The discriminant function gives the best prediction in the least-squares sense, of the correct group membership of each member of the sample (Kerlinger, 1986). From the scores on the two or more measures, the least-squares best composite score is calculated (Kerlinger, 1986). The higher the \( R^2 \) the better the prediction of group membership (Kerlinger, 1986). For the accounting paper computational interest is the best predictor with an \( R^2 \) value of 0.04, and for the auditing paper apprehension (O) is the best predictor with an \( R^2 \) value of 0.06.

In the auditing paper 26.14 percent of the variance is explained by the identified discriminating variables, while 8.37 percent of the variance in the accounting paper can be explained by the discriminating variables identified by the stepwise discriminant analysis. Therefore it would be worthwhile to use the identified discriminating variables to identify candidates that are likely to pass the auditing paper. However the contribution of the variables identified for the accounting paper is questionable.

The discriminant analysis computer printout also refers to the Canonical Correlation Squared which is discussed in the following paragraphs.
5.3.4 Canonical Correlation Squared

Another way to judge the substantive utility of a discriminant function is by examining the canonical correlation coefficient and according to Klecka (1980) this coefficient is a measure of association which summarises the degree of relatedness between the groups and the discriminant function. A value of zero denotes no relationship at all, while large numbers represent increasing degrees of association, with one being the maximum. The canonical correlation squared is the proportion of variation in the discriminant function explained by the groups (Klecka, 1980).

The canonical correlation ranges from 0.03 to 0.23 indicating that there is not much of a relationship between the groups and the various discriminating variables.

The canonical correlation is also useful because it reports on how well the discriminant function is doing (Klecka, 1980). The groups are not very different on the variables being analysed, therefore all of the correlation's are low. In the accounting paper perfectionism (Q3) with a value of 0.08 best discriminates, and in the auditing paper rule-consciousness (G) with a value of 0.23 has the most utility in explaining the group differences.

Statistical significance has been referred to several times in this report, it is therefore relevant to consider this issue in more detail.

5.3.5 Statistical significance

As mentioned previously under the discussion of logistical regression there is much debate over appropriate significance levels. Many researchers prefer the one percent level of significance, but this is quite a high level of certainty, and some researchers say that the ten percent level may sometimes be used (Kerlinger, 1986).

In the accounting paper both computational interest and perfectionism (Q3), have a \( \text{prob} > F \) score less than 0.05 indicating significance at the five percent level. For the auditing paper apprehension (O) is most significant with a score of 0.0097 significance at the one percent
level. Warmth (A) is significant at the five percent level. Liveliness (F), Mental Alertness, self-reliance (Q2) and social boldness (H) are significant at the ten percent level. Rule-consciousness (G) with a score of 0.1140 is less significant. These probabilities indicate that the above mentioned variables chosen by the stepwise discriminant analysis process have more than a random chance of discriminating between a successful and an unsuccessful candidate in the QE.

The results of the discriminant analysis were perhaps not as significant as one might have hoped and for this reason experiments were performed using different combinations of the variables.

5.3.6 Independent variable experiment

Klecka (1980) points out that although stepwise procedures produce an optimal set of discriminating variables, this set may not be the best (maximal) combination, and to secure a maximal solution all possible combinations would have to be tested, and this would be costly and time consuming. Although the stepwise procedure is a logical and efficient way to seek the best combination it cannot guarantee that the end product is indeed superior to all others (Klecka, 1980). Furthermore the sequence in which variables are selected does not necessarily coincide with their relative importance, and because of intercorrelations, an important discriminator may be selected late because its unique contributions are not as great as those of other variables (Klecka, 1980).

In order to consider the influence of the above mentioned factors as well as the number of independent variables chosen for the discriminant analysis the stepwise discriminant analysis procedure, for the accounting paper only, was repeated a few times using different combinations of variables. The accounting paper results are more likely to be questioned because of the relatively small sample size of the group of unsuccessful candidates. Results were not very different to those of the initial statistics and it can therefore be safely assumed that the discriminating variables identified in the initial statistics will be very close to an optimum combination of the variables under consideration.
The means, standard deviations, and maximum and minimum scores for each variable will be referred to in the next section.

5.4. DESCRIPTIVE STATISTICS

As mentioned previously, particular kinds of people are attracted to different kinds of settings, and it has also been found that those who do not fit in leave. This produces restriction in range, and consequently the range of variance in individual differences in a setting is much less than would be expected by chance (Schneider, 1987). The descriptive statistics for each independent variable were considered in order to determine whether this was perhaps the reason for the relative lack of discrimination between the successful group and those that were not successful. Table 5.3 is a summary of the means, standard deviations, maximum and minimum scores for each variable. These figures indicate that in most instances there is a fairly wide spread of scores.

Matriculation Mathematics and matriculation home language are not relevant as symbols were used rather than numbers out of 100. For Mental Alertness the maximum possible score is 42 (Lombard, 1975). The mean of 29.64 indicates that scores are more towards the top end of the range, which is likely because of the relatively high level of education of most of the candidates.

The maximum possible score for the interest variable is 110, with a higher score indicating a greater interest in a specific field. The mechanical, musical and practical fields of interests had relatively low means as candidates with interests in these areas are unlikely to show an interest in chartered accountancy, whereas the computational field of interest predictably had a relatively high mean of 84.68.

The maximum possible score for the 16PF variables is 20 for the items marked with an asterix (*) and 26 for the others (Prinsloo, 1996). The means for emotional stability (C), liveliness (F) and rule-consciousness (G) were relatively high. The means for sensitivity (I) and apprehension (O) were relatively low.
Table 5.3: Descriptive statistics for independent variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum Score</th>
<th>Maximum Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matriculation Mathematics</td>
<td>65.84</td>
<td>13.21</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>Matriculation home language</td>
<td>62.74</td>
<td>11.20</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Mental Alertness</td>
<td>29.64</td>
<td>4.67</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>Outdoor</td>
<td>46.81</td>
<td>14.94</td>
<td>17</td>
<td>77</td>
</tr>
<tr>
<td>Mechanical</td>
<td>35.50</td>
<td>16.67</td>
<td>7</td>
<td>89</td>
</tr>
<tr>
<td>Computational</td>
<td>84.68</td>
<td>12.29</td>
<td>43</td>
<td>99</td>
</tr>
<tr>
<td>Scientific</td>
<td>59.26</td>
<td>14.99</td>
<td>20</td>
<td>86</td>
</tr>
<tr>
<td>Persuasive</td>
<td>68.43</td>
<td>14.71</td>
<td>16</td>
<td>93</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>50.54</td>
<td>14.72</td>
<td>11</td>
<td>83</td>
</tr>
<tr>
<td>Literary</td>
<td>49.11</td>
<td>16.77</td>
<td>15</td>
<td>92</td>
</tr>
<tr>
<td>Musical</td>
<td>34.19</td>
<td>14.02</td>
<td>6</td>
<td>72</td>
</tr>
<tr>
<td>Social Services</td>
<td>48.79</td>
<td>13.89</td>
<td>12</td>
<td>83</td>
</tr>
<tr>
<td>Clerical</td>
<td>56.27</td>
<td>15.84</td>
<td>20</td>
<td>91</td>
</tr>
<tr>
<td>Practical</td>
<td>29.10</td>
<td>14.30</td>
<td>5</td>
<td>77</td>
</tr>
<tr>
<td>Medical</td>
<td>56.92</td>
<td>16.47</td>
<td>9</td>
<td>92</td>
</tr>
<tr>
<td>A*</td>
<td>12.01</td>
<td>3.67</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>C</td>
<td>18.10</td>
<td>4.08</td>
<td>9</td>
<td>32</td>
</tr>
<tr>
<td>E</td>
<td>15.77</td>
<td>4.45</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>F</td>
<td>17.92</td>
<td>4.70</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>G*</td>
<td>15.34</td>
<td>3.42</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>H</td>
<td>16.24</td>
<td>5.63</td>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>I*</td>
<td>6.29</td>
<td>3.73</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>L*</td>
<td>9.04</td>
<td>3.28</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>M</td>
<td>11.51</td>
<td>3.69</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>N*</td>
<td>11.88</td>
<td>2.70</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>O</td>
<td>8.58</td>
<td>3.54</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Q1*</td>
<td>11.24</td>
<td>3.26</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>Q2*</td>
<td>9.24</td>
<td>3.59</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Q3*</td>
<td>12.37</td>
<td>3.08</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Q4</td>
<td>9.27</td>
<td>4.58</td>
<td>0</td>
<td>23</td>
</tr>
</tbody>
</table>

This chapter is concluded after having reported on the results of the logistic regression, *t*-test and discriminant analysis. The descriptive statistics were also presented to ensure that the
distribution or range of scores of the sample group were not inhibiting the results of the statistical procedures in any way. The next chapter will interpret and discuss the results while considering whether they confirm or reject the hypotheses referred to in chapter 1. In this way the major findings of the study are presented.
CHAPTER 6

INTERPRETATION AND DISCUSSION OF RESULTS

Having described the results it is now necessary to interpret them in terms of the overall purpose of the research, which is to identify factors predicting success in the QE for chartered accountants. This interpretation and discussion is conducted by reviewing the results separately for each hypothesis. Once again results are also presented separately for the accounting and auditing papers. Apart from the summary of the major findings of the study, this chapter also considers the generalisability and utility of the results and how these results compare with previous research findings. At the conclusion of the chapter the specific empirical aims of the research should have been met.

6.1. MAJOR FINDINGS OF THE RESEARCH

The major findings of the study which are derived from the results presented in the previous chapter, are outlined according to each hypothesis. Before confirming or rejecting each hypothesis the findings relating to each of the QE papers are presented.

6.1.1 Hypothesis 1

H1: There is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to personality factors as measured by the 16PF.

6.1.1.1 Accounting paper

Logistic regression identified perfectionism (Q3) as a variable that differentiated between the successful and unsuccessful candidates on the accounting paper. Perfectionism (Q3) is negatively related to the outcome as indicated in the logistic regression computer generated
report. In other words candidates with a higher than average score in perfectionism (Q3) have less chance of success in the accounting paper of the QE.

The t-test found that for the accounting paper perfectionism (Q3) is significant at the ten percent level. That is, the means for the successful and unsuccessful groups differ significantly.

Perfectionism (Q3) was identified by the discriminant analysis as a discriminating variable in the accounting paper. The score also indicates that this factor is significant at the five percent level. In the accounting paper perfectionism (Q3) with the higher canonical correlation squared value of 0.08 best discriminates between successful and unsuccessful candidates.

6.1.1.2 Auditing paper

For the logistic regression exercise, liveliness (F), self-reliance (Q2), rule-consciousness (G), warmth (A), social boldness (H), apprehension (O) and tension (Q4), were added to the model in this order, as variables that differentiated between the successful and unsuccessful candidates. Social boldness (H), apprehension (O), and tension (Q4) are negatively related to the outcome. In other words candidates that have higher scores on these variables have less chance of success in the auditing paper of the QE.

For the auditing paper the t-test indicated that the warmth (A) variable is significant at five percent. There is more than a random chance that the means of the successful and unsuccessful groups for this variable differ, that is, the difference between the means of the two groups for this variable is significant.

The overall stepwise discriminant analysis results after all the significant discriminators have been included in the estimation of the discriminant function reveals that in the auditing paper warmth (A), liveliness (F), rule-consciousness (G), social boldness (H), apprehension (O) and self-reliance (Q2) were all included in the model. Therefore these variables should be used to identify those candidates most likely to be successful in the auditing paper.
The canonical correlation squared score of 0.23 for rule-consciousness (G) indicates that this variable has the most utility in explaining the group differences. Apprehension (O) is the best predictor of all the discriminating variables with an $R^2$ value of 0.06. Apprehension (O) is also the most significant with a score of 0.0097 indicating its significance at the one percent level. Warmth (A) is significant at the five percent level. Liveliness (F), self-reliance (Q2) and social boldness (H) are significant at the ten percent level. Rule-consciousness (G) with a score of 0.1140 has a lower significance level.

6.1.1.3 Confirmation or rejection of the hypothesis

The first hypothesis is confirmed, that is, there is a significant difference between groups of successful and unsuccessful candidates in the QE with regard to personality factors as measured by the 16PF.

For the accounting paper there are differences between the two groups with regard to:

1. Perfectionism (Q3) identified by logistic regression, the $t$-test and discriminant analysis.

For the auditing paper there are significant differences between the two groups with regard to the following personality factors:

1. Warmth (A) identified by the logistic regression, the $t$-test and the discriminant analysis.
2. Liveliness (F) identified by the logistic regression and the discriminant analysis.
3. Rule-consciousness (G) identified by the logistic regression and the discriminant analysis.
4. Social Boldness (H) identified by the logistic regression and the discriminant analysis.
5. Apprehension (O) identified by the logistic regression and the discriminant analysis.
6. Self-reliance (Q2) identified by the logistic regression and the discriminant analysis.
7. Tension (Q4) identified by the logistic regression.

The second hypothesis will be discussed along similar lines to the above discussion.
6.1.2 Hypothesis 2

H2: There is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to vocational interests as measured by the RIB.

6.1.2.1 Accounting paper

Computational interest was the only interest variable to be included in the logistic regression models, however the statistical data does not indicate that it has a very strong impact on the differentiation between successful and unsuccessful candidates. The results indicate that candidates with a higher than average interest in the computational field will have a greater chance of success in the accounting paper of the QE.

The t-test indicated that for the accounting paper mechanical and social services interests were significant at the ten percent level.

The second and last variable to be included in the stepwise discriminant analysis for the accounting paper, was computational interest. This variable therefore discriminates between those candidates more or less likely to pass the accounting paper. Computational interest is also the best predictor of group membership in the accounting paper as indicated by the $R^2$ score of 0.0421. It also has a $\text{prob}>F$ score less than 0.05 indicating significance at the five percent level. This indicates that candidates with a higher computational interest are more likely to be successful in the accounting paper.

6.1.2.2 Auditing paper

For the auditing paper there were no interests, as measured by the RIB, identified as significant by the statistical procedures used.
6.1.2.3 Confirmation or rejection of hypothesis

The second hypothesis states that there is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to vocational interest as measured by the RIB. This hypothesis is confirmed for the accounting paper but rejected for the auditing paper.

For the accounting paper there are significant differences between the two groups with regard to the following fields of interests:

(1) Computational interest identified by the logistic regression and the discriminant analysis.

(2) Mechanical interest identified by the t-test.

(3) Social services interest identified by the t-test.

Having completed the discussion of the second hypothesis, the third hypothesis will now be discussed.

6.1.3 Hypothesis 3

H3: There is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to the Mental Alertness score of the High Level Test Battery.

6.1.3.1 Accounting paper

The statistical procedures used did not identify Mental Alertness as a significant variable for the accounting paper.
6.1.3.1 Auditing paper

Logistic regression initially identified Mental Alertness as a factor differentiating between successful and unsuccessful candidates in the auditing paper. That is, the candidates that obtained a higher Mental Alertness score are more likely to be successful in the auditing paper of the QE. However after other variables had been included in the logistic regression model, Mental Alertness was removed from the model.

The t-test identified the Mental Alertness variable as significant at ten percent. There is more than a random chance that the means of the successful and unsuccessful groups differ, that is, the difference between the means of the two groups for this variable is significant. Therefore this variable can be used to appropriately identify candidates that are likely to be successful or unsuccessful in the auditing paper.

Mental Alertness was also identified by the stepwise discriminant analysis as a discriminating variable in the auditing paper. The statistical data also indicates that this variable is significant at the ten percent level. This data therefore confirms the findings of the other two statistical procedures that the Mental Alertness score can be used to appropriately identify those candidates that are more likely to pass the auditing paper.

6.1.3.2 Confirmation or rejection of hypothesis

The third hypothesis states that there is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to the Mental Alertness score of the High Level Test Battery. This hypothesis is confirmed for the auditing paper and rejected for the accounting paper.

For the auditing paper there is a difference between the two groups with regard to the Mental Alertness identified by the logistic regression (although it was left out of the final model), the t-test and the discriminant analysis.

Finally hypothesis 4 will be discussed.
6.1.4 Hypothesis 4

H4: There is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to matriculation Mathematics and matriculation home language results.

6.1.4.1 Accounting paper

For the accounting paper matriculation home language was also the first variable included in the logistic regression model, with a statistical significance of 0.0136. Therefore those candidates with a higher matriculation home language result are also more likely to be successful in the accounting paper.

6.1.4.2 Auditing paper

For the auditing paper matriculation home language was the first variable to be included in the logistic regression model, with a statistical significance of 0.0183. In other words those candidates with a higher matriculation home language result are more likely to be successful in the auditing paper of the QE.

6.1.4.3 Confirmation or rejection of hypothesis

The last hypothesis states that there is a significant difference between the groups of successful and unsuccessful candidates in the QE with regard to matriculation Mathematics and matriculation home language results. This hypothesis is confirmed for matriculation home language, but rejected for matriculation Mathematics.

For both the auditing and accounting papers there are differences between the two groups with regard to matriculation home language as identified by the logistic regression. It is interesting to note however that this variable's relevance is not confirmed by the t-test or discriminant analysis as were many of the other variables.
The discussion of the confirmation or rejection of the hypotheses complete, it is relevant to consider how generalisable these results are to the rest of the sample population.

6.2. GENERALISABILITY OF RESULTS

Generalisability refers to the extent to which scores on a sample of observations can generalise to the class or population of observations to which they belong, and to determine generalisability the researcher must first define the universe (Campbell, 1976). In this case the universe refers to all candidates writing the South African QE. The candidates in the sample are not fully representative of the universe because the group were preselected to the extent that the candidates were all successful in their application to join a particular firm. Therefore the lower end of the universe may be excluded from the study.

Campbell (1976) also points out that sampling from one particular time is not random sampling from the population to which the research is generalised - it is sampling from one cohort of the population. Samples of candidates for the QE are cohorts and the candidates for future QEs are most likely not random samples from the same population. A cohort of students in one year may differ markedly from the previous year's cohort of students taking the same course in the same institution (Granleese et al, 1996). Therefore the amount of sampling error in estimates will increase. Campbell (1976) suggests that the solution to this problem is to use Monte Carlo techniques to describe the variance of the sampling distribution over a number of years.

In conclusion then although it would seem that from a scientific point of view results are not generalisable to the total population of QE candidates, the results would apply in most instances to anyone writing the QE, bearing in mind the limitations already mentioned. In spite of these limitations, the research still has widespread utility, and this utility will be discussed in the following section.
6.3. UTILITY OF RESULTS

Perhaps the lack of highly significant results is appropriate, because by limiting an organisation's intake to one particular type of employee, the organisation would be inadvertently assisted into decline by implementing selection systems that further restrict the range of their adaptive capability by employing clones of people with the same characteristics. It is therefore more appropriate to use the identified criteria as a guideline in selecting people with a variety of characteristics.

This research will hopefully encourage the public to question or at least to hold a more realistic view of accountants and help eliminate the negative stereotype held by the layman of the accountant as cold, aloof, passive and devoid of sensitivities.

These results could be utilised by Industrial Psychologists, students either presently studying accounting or considering a career in accounting and their guidance and career counsellors, organisations employing accounting graduates, Universities educating students in accounting, and other relevant institutions such as the PAAB, SAICA, and the Association of Black Accountants in South Africa (ABASA), as well as by businesses that require CAs, the Receiver of Revenue and other government organisations that require the ongoing services of CAs directly or indirectly.

By considering the results of this research some or many of the benefits outlined in chapter 1 could be realised. By way of example some of the most important benefits and how they are addressed by the results of the study are referred to.

Those variables that have been identified as significant can be used to guide candidates into the field of chartered accountancy. For example, those students who have achieved adequate home language results and mental alertness scores, have a better chance of being successful in the QE. The results also suggest that the Industrial Psychologist should not place too much emphasis on the vocational interest questionnaire or the matriculation Mathematics result.
Organisations now have confirmation that by using the psychometric assessment procedures they may be slightly increasing their chances of selecting candidates that are more likely to be successful in the QE. Thus increasing their chances of improving the organisations' pass rates and ensuring that they are making a worthwhile investment in the candidate in terms of recruitment, training and career planning costs.

Lowman (1991) suggests that the most appropriate career path for bringing lasting growth and satisfaction to an individual is the one most congruent with intelligence, vocational interests and personality. This research provides information on those individuals best suited to the accounting field, in terms of the likelihood of success in the QE. This information can provide the individual or significant others with more certainty when making a decision to enter this field of study.

Students comparing themselves to the results of the research can make an effort to address any potential areas of development. For example, those who do not have an above average matriculation home language result could make an effort to improve their skills in this area. Those who do not have personality factors similar to those identified as significant in the results of this research will be aware that they may need to put in an additional effort to be successful. At the extreme, students may even use the information to choose an alternative, perhaps more suitable career. Other students already considering alternative career options may be encouraged to pursue a career in accounting because their psychometric assessment results match those of the significant variables in the study.

Chapter 3 investigated the most recent empirical research conducted with regard to the factors considered in this research, that is, personality, vocational interests, intelligence and academic history. The next section will reconsider these studies in the light of these research findings.

6.4. RESULTS OF THIS RESEARCH COMPARED TO PREVIOUS RESEARCH

Having interpreted and discussed the results of this research it is interesting to compare these findings with those of previous studies conducted on similar topics. This comparison is
presented in terms of the different variables in the research, and in most instances relates back to the review of empirical studies in chapter 3.

6.4.1 Personality

Half, that is, eight of the 16 personality factors as measured by the 16PF appear to have some sort of significance in predicting success in the QE. These results confirm previous studies which have also shown a significant relationship between personality and work performance for accountants (Day & Silverman, 1989).

The means of the sample correspond with the means of many of the accountants profile points identified in the 16PF Handbook (Cattell et al., 1970), and referred to in table 6.1.

**Table 6.1: 16PF occupational profiles: Means and standard deviations in sten units (Cattell et al., 1970, p. 124).** (The information regarding, accounting clerks SA, comes from this research and not from the source quoted).

| Occupation                  | A  | B  | C  | D  | E  | F  | G  | H  | I  | J  | L  | M  | N  | O  | Q1 | Q2 | Q3 | Q4 |
|-----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Accountants, USA (n=94)    | x  | 7.1| 7.9| 5  | 6  | 5  | 6  | 6  | 5  | 6  | 6  | 7  | 5.7| 6.3| 6.2| 5.8| 5.1|
|                             | s  | 2.3| 2.2| 2  | 3  | 2  | 2  | 2  | 1  | 2  | 2  | 2  | 2.3| 2.3| 2.1| 1.8| 2.4|
| Account, England & Scotland| x  | 7.1| 6.3| 5  | 5  | 6  | 5  | 5  | 5  | 6  | 5  | 6  | 6  | 7.1| 6.2| 5.3| 5.6|
| (n=90)                      | s  | 1.8| 1.9| 2  | 2  | 1  | 2  | 2  | 2  | 2  | 2  | 2  | 1.8| 1.8| 1.6| 1.8|
| Account Clerks Australia    | x  | 5.4| 6.9| 6  | 5  | 6  | 5  | 5  | 4  | 5  | 6  | 5  | 5.8| 5.5| 5.7| 4.9|
| (n=44)                      | s  | 2.2| 1.8| 2  | 2  | 2  | 2  | 3  | 3  | 3  | 3  | 3  | 2.1| 2.3| 2.3| 2.4| 1.7|
| Account Clerks SA (n=113)   | x  | 6  | *  | 7  | 7  | 8  | 6  | 3  | 5  | 4  | 6  | 3.3| 5.6| 4.6| 6.2| 3.6|
|                             | s  | 1.8| 2  | 2  | 2  | 2  | 2  | 2  | 1  | 1  | 1  | 1.4| 1.6| 1.8| 1.5| 1.8|

* Information on this factor is not available, as the Mental Alertness score was used rather than the Intelligence (B) factor score.

If the means for the South African group of trainees used in this research are compared to all three sample groups (American, England and Scotland and Australian clerks), they seem to be similar with regard to: warmth (A), dominance (E), social boldness (H), vigilance (L), and privateness (N). The South African group obtained higher mean scores than the other groups
for: emotional stability (C), liveliness (F), perfectionism (Q3), and particularly for rule-consciousness (G). The South African group have lower mean scores than the other groups for: sensitivity (I), abstractedness (M), openness to change (Q1), self-reliance (Q2), tension (Q4), and particularly for apprehension (O).

Here follows a summary of how the results of this research compare to those of the previous studies referred to in chapter 3 regarding each of the significant personality characteristics.

6.4.1.1 Warmth (A)

Warmth (A) is identified as a variable predicting success in the QE. The mean for the group as a whole is 12.01, and for the auditing paper the pass group mean is 12.5 and the fail group mean is 11.08. The maximum possible score is 20. Therefore it would seem that in all instances the accountants can be described as being slightly inclined towards the upper end of the scale. The upper end of the scale is described by Conn and Rieke (1994) as warm, outgoing, attentive to others, and participating (see table 4.1).

Previous studies have described accountants as higher on friendliness (De Coster, 1971), and sociability (De Coster & Rhode, 1971), and socially inclined (Hakel et al, 1970). In contrast, other studies described accountants as being low on social interests (Amernic et al, 1979), high on introversion as measured by the Myers-Briggs Personality Type Indicator (Kreiser & McKeon, 1990; Laribee, 1994; Shackleton, 1980), and stable introverts (Granleese & Barrett, 1990). This finding is contrary to the preconception that the accountant fits the mould or stereotype of the impersonal, quantitative, inflexible, orderly, introvert (De Coster, 1971), and opposes the common stereotype describing the accountant as cold, aloof, passive, and devoid of sensitivities (De Coster, 1971).

As mentioned previously the QE can also be regarded as an academic exercise and previous research on academic performance has found that introversion is an important determinant of successful academic performance (Entwistle & Entwistle, 1970; Furnham & Mitchell, 1991; Granleese et al, 1996; McKenzie, 1989; Savage, 1962).
6.4.1.2 Liveliness (F)

Liveliness (F) predicts success in the QE. The mean for the sample group was 17.92, and for the auditing paper the pass and fail samples had means of 18.36 and 17.08 respectively. The maximum possible score is 26. According to Conn and Rieke (1994) the descriptors of high range on this factor are: enthusiastic, spontaneous, cheerful, expressive, impulsive and talkative.

Davidson and Dalby (1993b) found accountants to be enthusiastic, and leaders in the accounting profession have stated that accountants need to be able to function in a complex and changing environment (Amernic & Beechy, 1984). But Granleese and Barrett (1990) describe accountants as: reserved, fond of books rather than people, tending to plan ahead, distrusting the impulse of the moment, disliking excitement, and considering matters of everyday life with proper seriousness and liking order in life. Interviewers see accountants as approval seeking and very strongly defensive (Jackson et al, 1982).

6.4.1.3 Rule-consciousness (G)

Candidates with a higher score for rule-consciousness (G), or those who are conscientious, conforming, moralistic, staid, and rule-bound (Conn & Rieke, 1994) are more likely to be successful in the QE. The mean for the sample was 15.34 and for the auditing paper the sample groups of successful and unsuccessful candidates had means of 15.62 and 14.79 respectively. The maximum possible score is 20.

Research ascribed the characteristics of conformity (Amernic et al, 1979; Davidson & Dalby, 1993a; Granleese & Barrett, 1990; King & Masters, 1991) and order-driven (Paunonen et al, 1987; Schell & DeLuca, 1991) to the accountant. Conscientiousness has also been connected to studies of successful accounting students (Dinius & McIntyre, 1979; Van der Walt & Esterhuysse, 1987).
However Dinius and McIntyre (1979) found that both accounting majors and subjects successful in accounting courses have the ability to throw off the old conditions if circumstances require it.

6.4.1.4 Social boldness (H)

Social boldness (H) was identified as being negatively related to performance on the QE, that is, candidates who are bold, venturesome, uninhibited, can take stress, and are thick-skinned (Conn & Rieke, 1994) are less likely to be successful. The mean for the sample group was 16.24 and for the successful and unsuccessful groups on the auditing 15.99 and 16.72 respectively. That is, all of the means were just above the midpoint of the scale, where the maximum score is 26.

"So much of the accountant's philosophy of life ultimately boils down to a mistrust of self...." (Maslow, 1965, p. 214), indicating that the accountant is unlikely to be bold. Granleese and Barrett (1990) found that accountants take matters of everyday life with the proper seriousness, and interviewers described them as approval seeking and very strongly defensive with a strong tendency to be meek (Jackson et al, 1982). Previous studies have also shown that an optimum level of neuroticism is an important determinant of successful academic performance (Entwistle & Entwistle, 1970; Furnham & Mitchell, 1991; McKenzie, 1989; Savage, 1962).

In contrast, other studies have found that accountants are perceived as adventurous (Hakel et al, 1970), slightly intellectually curious (Jackson et al, 1982), and experimenting (Davidson & Dalby, 1993a).

6.4.1.5 Apprehension (O)

Apprehension (O) is negatively related to performance on the QE. The mean for the sample group is 8.58 and the mean for the auditing paper's successful sample is 8.25 and for the unsuccessful sample 9.15. The maximum possible score is 26, and therefore the scores are towards the lower end of the scale. The lower end of the scale for this factor is described as
self-assured, untroubled, secure, feels free of guilt, self-satisfied and confident (Conn & Rieke, 1994). As a group they tend to score lower and among them, those candidates that are more towards this end of the scale are less likely to be successful in the QE.

In contrast to this De Coster (1971) found that accountants were higher on personal acceptance than other professional groups. Accountants have also been described as self-accepting (De Coster & Rhode, 1971). Leaders in the accounting profession stated that accountants need to be able to function in a complex and changing environment (Amernic & Beechy, 1984), therefore characteristics such as those just described would be essential.

6.4.1.6 Self-reliance (Q2)

Self-reliance (Q2) is identified as a factor predicting success in the QE. The sample mean is 9.24 and the auditing paper mean for the successful group is 9.61 and for the unsuccessful group is 8.54. The maximum possible score is 20, therefore most of the sample is around the midpoint or slightly below the midpoint of the 16PF scale. The lower end of the scale is described as: group-oriented, affiliative and group dependent (Conn & Rieke, 1994). The upper end of the scale is described as: self-reliant, solitary, individualistic and resourceful (Conn & Rieke, 1994).

Previous research has described accountants as self-sufficient (Davidson & Dalby, 1993a; Davidson & Dalby, 1993b) and independent (Jackson et al, 1982). King and Masters (1991) found that the most successful accountants are those that are more prone to challenging rules and questioning assumptions, and that those at the supervisory level are more innovative than those at the working level. One study found those interested in accounting were low in autonomy (Paunonen et al, 1987). These contradictory results therefore seem to confirm the results of this research, indicating that the accountants would be somewhere in-between the two extremes.
6.4.1.7 Perfectionism (Q3)

Perfectionism (Q3) is a factor often associated with accountants that in this case is identified as being negatively related to success in the QE. The total sample mean for this variable is 12.37. In this case the variable was significant in the accounting paper where the mean for the successful group is 12.18 and for the unsuccessful group is 13.56. The maximum possible score is 20. Therefore these means are more towards the upper end of the 16PF scale for this factor, described by Conn and Rieke (1994) as: perfectionistic, organised, self-disciplined, socially precise, compulsive, etcetera. In other words those candidates that exhibit these types of characteristics are less likely to be successful in the QE.

This is contrary to popular belief as well as to much of the research undertaken in the past. Many studies have found accountants to be conforming (Amernic et al, 1979; Davidson & Dalby, 1993a; De Coster & Rhode, 1971; Granleese & Barrett, 1990; Jackson et al, 1982; Paunonen et al, 1987). Successful accounting students have also been described as conscientious (Dinius & McIntyre, 1979).

The description of the accountant in terms of these characteristics also contradicts the descriptions given for the other significant 16PF factors identified, such as rule-consciousness (G) and apprehension (O). On the other hand the description of the accountant in terms of this factor would go hand-in-hand with the descriptions referred to for some of the other significant 16PF factors identified such as, warmth (A), liveliness (F) and tension (Q4).

6.4.1.8 Tension (Q4)

Finally tension (Q4) is also a factor predicting success in the QE. The mean for the sample is 9.27 and for the candidates successful in the auditing paper, 8.96, and for those candidates who were unsuccessful 9.85. The maximum score is 26, therefore the means are all on the lower end of the 16PF scale for this variable. In other words those candidates who are successful in the QE are more likely to be relaxed, placid and patient rather than tense, impatient, driven, and frustrated (Conn & Rieke, 1994).
Similar personality characteristics such as stable, well-balanced (Amernic et al, 1979), calm, even-tempered, and unworried (Granleese & Barrett, 1990) have previously been ascribed to accountants. Dinius and McIntyre (1979) also found that successful accounting students remained cool in stressful situations.

6.4.1.9 Other

Certain factors which were frequently related to accountants in previous research such as competitiveness (Amernic et al, 1979; Davidson & Dalby, 1993a; Schell & DeLuca, 1991), tough-mindedness (Davidson & Dalby, 1993b) and aggression (Amernic et al, 1979; Jackson et al, 1982) were not identified as significant factors in this research.

The next variable to be discussed is that of vocational interests.

6.4.2 Vocational interests

The computational field of interest is positively related to success in the accounting paper of the QE. Mechanical and social services fields of interest were also identified as being significant for the accounting paper only. A rough comparison of the means for the successful group and the means for the unsuccessful group on the two latter dimensions indicates that those with less mechanical interest and those with more social services interest are more likely to be successful in the accounting paper.

Interest in the computational field confirms the research results of Visser (1978) who found that Black South African first year commerce students are more inclined towards computational occupations. But this research did not confirm previous research results which found that commerce students have an interest in the persuasive and scientific fields (Mikellides, 1989), as well as the clerical and persuasive fields (Visser, 1978). It should be pointed out that only a limited number of studies considering accountants and their vocational interests were found.

The variable of intelligence will be considered next.
6.4.3 Intelligence

There has been much debate as to whether intelligence tests predict later academic success and there are studies to support both viewpoints. In this research the Mental Alertness test of the High Level Battery appears to predict success for the auditing paper, but not for the accounting paper. There is generally a perception that accountants need a high level of cognitive ability or intelligence (Amernic & Beechy, 1984; Anderson et al., 1991; Davidson & Dalby, 1993a; Davidson & Dalby, 1993b).

However this research indicates confirmation of previous studies which have shown that this is only true for certain types of situations, for example, when solving problems in unstructured situations (Davidson, 1995), or in more complex questions (Jones & Davidson, 1995). Further research would be needed in order to identify the possible reasons for Mental Alertness being a determining factor for success in the one paper but not in the other.

The last variable to be compared to previous research findings is that of academic history.

6.4.4 Academic history

Although both matriculation Mathematics and matriculation home language results were considered in this research, only the matriculation home language result appears to have any significance as a factor predicting success in the QE. It was identified as a discriminating variable in the logistic regression for both papers.

With regard to the matriculation home language result, this research confirms previous research conducted where language was found to have an influence on performance in accounting (Cilliers & Roodt, 1992; Dinius & McIntyre, 1979; Van der Walt & Esterhuysen, 1987).

Most of the research referred to in chapter 3 found that performance in prior examinations was the best predictor of future performance in accounting. Previous studies have also found a link between Mathematics and performance in accounting (Cilliers & Roodt, 1992; Dinius &
However these studies were all conducted at the under-graduate level, in contrast with this research which is conducted at a higher level where the effects of matriculation results may have already been worked out by people failing their under-graduate courses.

Bartlett et al (1993) found that overall number of distinctions and the study of Mathematics did not have a significant impact on undergraduate accounting examinations in the United Kingdom. The explanation they use to justify their result is also relevant to this research, that is, that there was a low variation in the scores of the sample group. The use of matriculation symbol rather than actual result may also have had an impact on the results.

These results contradict perceptions of academics in the accounting field who perceive matriculation Mathematics results to be critical and first language results to be less important for performance in accounting (Cilliers & Roodt, 1992). However the study referred to once again considers performance at the under graduate level where the perception may well be accurate.

Having comprehensively evaluated the results, their generalisability and their utility, and considered how these results differ from those of previous studies, numerous ideas or opportunities for future research have been identified. The next chapter will therefore discuss these future research opportunities. The final conclusions regarding the research as well as limitations of the research and final recommendations will also be covered in the final chapter.
CHAPTER 7

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

In this final chapter recommendations are formulated from the results to indicate if and how the problem investigated in this research was solved. The chapter also covers the limitations of the literature review, the empirical study and the execution thereof. Recommendations for practice and further research are presented.

7.1 CONCLUSION

This research set out to solve the following problem: Do personality, vocational interests, intelligence, or academic history predict success in the final Qualifying Examination for Chartered Accountants?

The problem has been solved or at least answered to the extent that it has been determined that there is a significant difference between the two groups with regard to personality, vocational interests and matriculation home language result for the accounting paper, and personality, Mental Alertness and matriculation home language result for the auditing paper. The named variables do therefore have a role to play in predicting success in the final Qualifying Examination for chartered accountants.

Similarly the general aim of the research specified in chapter 1 was to evaluate by means of research whether personality, vocational interests, intelligence, and academic history, predict success in the final Qualifying Examination for Chartered Accountants. The same answer as above applies, and therefore the general aim of the research was met.

The specific theoretical aim of the study was met in chapters 2 and 3 by identifying and summarising the theory and most recent research on personality, vocational interests, intelligence and academic history, in relation to accountants.
The first specific empirical aim of the research was to determine whether there is a significant difference between the groups of successful and unsuccessful candidates in the QE, with regard to personality, vocational interests, Mental Alertness score, and matriculation Mathematics and home language result. From the summary of the findings outlined in the previous chapter it is clear that this aim has been met, that is, it has been determined that there is a significant difference between the two groups with regard to personality, vocational interests and matriculation home language result for the accounting paper, and personality, Mental Alertness and matriculation home language result for the auditing paper.

The second specific empirical aim of the research was to select a combination of variables that could be used to predict success in the QE. The achievement of this aim is not as straightforward as the first and requires further explanation before drawing a conclusion.

The variables identified as significant in the logistic regression for the accounting paper increase the percentage of correctly predicted candidates from 85.84 percent to 86.73 percent. This difference is minimal and therefore the use of the test data can hardly be justified. For the auditing paper the percentage of candidates correctly predicted increases from 69.91 percent to 76.11 percent, when using the model identified by logistic regression. Although this is also not a particularly large increase (it means an additional 7 candidates were correctly predicted), the use of the test results could be justified especially if one refers to arguments such as that of Campbell (1976).

Campbell (1976, p. 209) considers the utility of research results and poses the question: "given a specific base rate, is the value of a 15 percent increase in predictive accuracy always the same?" He points out that the value of an increase in predictive accuracy is dependent upon the costs associated with obtaining it versus the payoffs to the organisation from each additional correct prediction (Campbell, 1976). He specifically mentions the example that in most situations the cost of increasing predictive accuracy for managerial positions may be considerable but they pale beside the payoff from making even one more correct selection decision, and the concern should therefore be with predictive usefulness rather than with predictive validity and predictive accuracy (Campbell, 1976).
Any measure can be deemed to have validity if it is possible to demonstrate, in objective terms, that it improves a selector's level of understanding, which in turn allows proper discrimination between candidates to take place (Lewis, 1992).

In the auditing paper 26, 14 percent of the variance is explained by the discriminating variables identified in the stepwise discriminant analysis, while 8.37 percent of the variance in the accounting paper can be explained in the same way. Therefore once again, it would be worthwhile to use the identified discriminating variables to identify candidates that are likely to pass the auditing paper. However the contribution of the variables identified for the accounting paper is questionable.

It can be concluded that it will be useful to consider the matriculation home language result, Mental Alertness score, and the warmth (A), liveliness (F), rule-consciousness (G), social boldness (H), apprehension (O), self-reliance (Q2), and tension (Q4) variables from the 16PF, when selecting trainee accountants. Therefore the second specific empirical aim has been achieved by selecting the above mentioned combination of variables to predict success in the QE.

Having tested the various hypotheses and confirmed or rejected them, there is that much more clarity on the criteria that should be used for the future selection of trainee CAs.

It is therefore concluded that the following variables should be considered when identifying candidates more likely to be successful in the auditing paper of the QE:

(1) Warmth (A)
(2) Liveliness (F)
(3) Rule-consciousness (G)
(4) Social Boldness (H)
(5) Apprehension (O)
(6) Self-reliance (Q2)
(7) Tension (Q4)
(8) Mental Alertness
(9) Matriculation home language score

The following variables could be considered when identifying candidates more likely to be successful in the accounting paper of the QE:

(1) Perfectionism (Q3)
(2) Computational interest
(3) Social services interest
(4) Mechanical interest
(5) Matriculation home language score

In spite of the fairly positive results of the study, there were certain limitations to the research regarding the research variables as well as the method used to conduct the research. These limitations will be referred to in the following sections.

7.2. LIMITATIONS REGARDING THE RESEARCH VARIABLES

The limitations of the literature review, the empirical study and the execution thereof are presented in terms of each of the variables of the study, and then the limitations regarding the methodology of the research are more specifically considered.

7.2.1 Personality

Although the research has produced interesting findings, there were certain limitations to the study which could have affected the results, or which needed to be considered when evaluating the results.

Firstly, with regard to the various personality factors, the specific point, or range of scores on the 16PF scale most likely to indicate a candidate's chances of success in the QE was not identified. It would also be necessary to identify the optimum amount of the factor needed, for example, it would most likely not be true that the lower a candidate scored on tension (Q4), the better the chances of success in the QE. All that can be assumed at this stage is that
there is a difference between the successful and the unsuccessful candidates with regard to the factors identified. According to Lowman (1991) a career-relevant variable will be one where those people scoring in a desired direction will be more likely to succeed in a given career and those scoring in an opposite direction will be shown to perform poorly in the same occupation. Having considered the means of the various 16PF Factors for the successful and unsuccessful candidates separately there do not appear to be any factors that comply with this requirement. Ideally, further research is required to determine adequate norms, as well as to determine whether those people without the identified variables are more likely to fail the QE.

Lowman (1991) points out that the personality scores of various occupational groups may be similar to one another, for example, a group of physicians and a group of accountants may both score high on a measure of assertiveness, but a person who individually scores high on assertiveness will not necessarily make a good physician or a good accountant. However scoring low on assertiveness may constitute grounds for exclusion from certain occupations, provided that the variable is associated with failure in that occupation, or in this case failure in the QE. Therefore personality variables may constitute exclusionary rather than inclusionary criteria.

Lowman (1991) proposes that data be reduced to a relatively small set of promising occupationally relevant personality measures, and that only those results that have demonstrated occupational relevance be interpreted. A career relevant personality variable will ideally demonstrate theoretical and empirical relevance, have norms for various occupational groups of sufficient size and diversity, and demonstrate a pattern of differential performance (Lowman, 1991). Use of general population norms tends to carry with it an implicit referencing of applicants against those norms (Bartram, 1992). If the firm believes a trainee accountant should for example, be more of an extrovert, they will tend to perceive norms that are in the region of seven and above as indicating an extroverted person. However it may be that most or even all trainee accountants tend to score in that region. In other words a limitation of the study is that the potential candidates were not compared to norms of the population of trainee accountants.
Some of the identified significant factors in the study have descriptions which seem to be in conflict with one another and therefore it is unlikely that both factors would be found in the same individual. For example, two of the factors identified as predicting success in the QE are: rule-consciousness (G), described by Conn and Rieke (1994) as: conscientious, conforming, moralistic, staid and rule-bound; and liveliness (F), described by Conn and Rieke (1994) as: enthusiastic, spontaneous, happy-go-lucky, cheerful, expressive, impulsive and talkative. These two factors appear to describe opposing characteristics. Further research would be needed to investigate the implications or reasons for results such as these.

It is important to remember the wide variability of personality scores even when the modal or mean profile is consistent with expected characteristics (Lowman, 1991). Using personality and interest tests to make fine distinctions among candidates is like employing a yardstick when a micrometer is required and Schneider (1987) suggests that psychologists inappropriately use personality and interest measures to predict which of a number of persons being considered for a specific job in a company is more likely to succeed, as these kinds of measures were not designed to make fine distinctions among people who are to begin with relatively similar. This may be one of the reasons for the relatively low predictability of the identified variables in this study. It is impractical to uncompromisingly insist on the identified career profile for a CA during selection, because there will not be sufficient candidates that fit the profile exactly.

A further limitation is that both the personality questionnaire and the interest questionnaire used, are self inventory measures and one of their major drawbacks is that they tend to be dominated by a general factor of social desirability (Hollenbeck & Whitener, 1988). If these inventories are indeed susceptible to conscious faking, where an individual tries to present a desirable rather than an accurate self-portrayal, it is hard to imagine a context where an individual would be more motivated to present a desirable picture than when applying for a job (Hollenbeck & Whitener, 1988).

Future selection research that avoids the problems of this and other studies may provide a more positive picture regarding the utility of personality traits as screening devices. It would be unfortunate if the study of personality, so long a focus of attention for psychologists, was
prematurely and permanently abandoned by personnel psychologists (Hollenbeck & Whitener, 1988).

Many of the limitations referred to regarding personality also apply to vocational interests.

7.2.2 Vocational interests

Unfortunately, very little empirical research is available on the RIB. Although research on vocational interests in general is plentiful there is also very little research relating vocational interests to recruitment and selection rather than career counselling specifically. As the instrument originated in Australia it could be that there is more empirical research information there. This would be an avenue requiring further investigation.

Although certain interest variables seem to be significant in predicting success in the QE, as mentioned above the RIB at face value would appear to be easily manipulated. For example, the careers relating to accounting such as accountant are easy to identify and because the candidates were doing the assessment for selection purposes they were most likely to select careers in the accounting field. One would expect to see the computational field of interest identified as significant for trainee accountants, therefore this profile may reflect a degree of "impression management" on the part of the candidates.

Lowman (1991) points out that, as for personality, averages in interest profiles can be problematic and he refers to a research example displaying the average vocational preference (using Holland's (1985) theory) scores for a group of successful managers. Of the managers assessed only one actually had the identified ideal profile, the remainder had profiles that were not exact matches and, in some cases were highly discrepant, although all of the participants were functioning effectively (Lowman, 1991). He concludes that a misfit on vocational preferences does not mean that a given occupational preference is necessarily inappropriate (Lowman, 1991). Therefore the results of the RIB should probably not be used to turn away potential candidates, as many of those without interests in the fields identified as relevant in the research may well be successful in the QE.
Lowman (1991) points out that there has been surprisingly little research on the relation between vocational interest and abilities. At least this research has contributed in some way to this deficiency by identifying that the interest variables are significant when comparing candidates to an examination measuring ability in a defined field. Schneider (1987) concurs with the comment of Hollenbeck and Whitener (1988) referred to above, that it would be a grave mistake to accept the idea that personality and interest measures are not useful, as at least in leadership research there is good evidence to suggest that different kinds of people are likely to be effective leaders in different kinds of settings.

The limitations regarding the intelligence variable will be considered in the following section.

7.2.3 Intelligence

With regard to the theoretical review of intelligence this expansive and complex dimension was barely mentioned. It was considered too broad and complex to consider further for the purposes of this research, however the relatively scant information provided on this variable may be considered to be a limitation of the research.

Lowman (1991) points out that any investigation into intellectual attributes is limited to current commercially published measures and although some very good tests exist, norms are often outdated and occupationally relevant validity coefficients are often in short supply. These problems certainly apply to the Mental Alertness test of the High Level Test Battery used in this research.

Once again a limitation of the study is that there is not a specific point, or range of scores on the Mental Alertness test that is most likely to indicate a candidate's likelihood of success in the QE.

The results of the study could also have been affected by the fact that most of the candidates would have at least achieved matriculation results with university entrance and may even have completed a degree or part thereof. The candidates therefore already represent the upper end
of the population in terms of intelligence and in this way a difference in Mental Alertness for the successful and unsuccessful candidates was less likely.

The fact that the Mental Alertness is significant for the auditing paper and not for the accounting paper also emphasises the need for caution when considering this dimension.

The last variable to be considered in terms of the limitations of the research is academic history.

7.2.4 Academic history

Previous research on this dimension has also produced contradictory results. The academic history results in this study may have been limited by a low variation in the scores of the sample group. A further problem could have been the use of matriculation symbol rather than actual result.

A further limitation of the study is the many variables that have a potential impact on a candidate's matriculation results. Furthermore, because the QE is written after passing four years of increasingly difficult examinations, the impact of matriculation results may well have been eroded by the time the candidate attempts the QE.

There is no ground-breaking evidence in this regard resulting from this research although it is interesting to note that language appears to be a better predictor than Mathematics. Therefore the results should merely be considered in conjunction with other results and remain an area of consideration for all involved in the selection of future trainee accountants.

Apart from the above there were also certain methodological limitations that may have impacted on the results of the study.
7.3 METHODOLOGICAL LIMITATIONS

The study could be criticised on methodological grounds relating to the relatively small sample size (especially for the group of unsuccessful candidates in the accounting paper), failure to denote the sex or race of the respondents and to control for Type I error, thereby calling into question the generalisability of the findings. Schmidt, Hunter and Urry (1976) argue that large numbers of validation studies have been performed without adequate power. According to Cohen and Cohen (1982) sample size needs to be at least 84 in order to have a power of 0.80 to detect a medium effect size with an alpha of 0.05. They further suggest that sample sizes need to be at least 130 in order to detect interactions, such as those considered in the discriminant analysis, with power of 0.80, alpha of 0.05 (Cohen & Cohen, 1982). Considering the accounting and auditing papers separately this study did not comply with this guideline.

The organisational setting is a potential limitation of the study and should also be taken into account as sub-occupational differences may exist. Schneider (1987) points out that particular kinds of people are attracted to different kinds of settings, combined with the finding that those who do not fit in leave, produces restriction in range. Consequently the range of variance in individual differences in a setting is much less than would be expected by chance (Schneider, 1987).

Referring to logistic regression, Norusis (1994) points out that none of the algorithms result in a "best" model in any statistical sense and different algorithms for variable selection may result in different models. The model is selected to fit a particular sample well, so there is no assurance that the same model would be selected if another sample from the same population was taken (Norusis, 1994).

Similarly, with regard to discriminant analysis, Klecka (1980) states that although stepwise procedures produce an optimal set of discriminating variables, this set may not be the best (maximal) combination, and to secure a maximal solution all possible combinations would have to be tested, which would be costly and time-consuming. Although the stepwise procedure is a logical and efficient way to seek the best combination it cannot guarantee that the end product is indeed superior to all others (Klecka, 1980). Furthermore the sequence in
which variables are selected does not necessarily coincide with their relative importance, and because of intercorrelations, an important discriminator may be selected late because its unique contributions are not as great as those of other variables (Klecka, 1980).

Even if a candidate possesses all the significant variables identified in the study, there is no guarantee that the individual will be successful in the QE because there are so many other variables that could influence the QE results. The profile is rather used to select the most appropriate candidate, taking into account other selection criteria such as academic performance and the interview (Lotz, 1990).

The limitations outlined above have identified many opportunities for future research. These and others are covered in the following section before defining the overall recommendation flowing out of the research.

7.4. RECOMMENDATIONS FOR FUTURE RESEARCH

This report will first consider recommendations for future research of a general nature and then more specifically for each of the variables investigated in this research.

7.4.1 General

There are many variables other than those referred to in this study that may influence a candidate's success in the QE and these would be relevant areas for future research. The study of values has been used for years in research, career guidance, counselling and personnel selection and placement (Spangenberg, 1990). Instruments designed to measure values have much in common with measures of interests and attitudes and some overlap test of personality variables, but since the 1960's there has been a resurgence of interest in the assessment of values (Anastasi, 1990). It would seem that values would be an important area to consider when choosing accounting as a career, or when selecting candidates as trainee accountants.

There are also many aspects relating to the area of academic study and learning that may impact on a candidate's chances of success in the QE, such as: study time prior to QE; the
amount of time the student has for study; financial concerns; personal problems. All of these factors may impact on a student's academic performance (Granleese et al, 1996). Learning style is another variable generating much discussion in the field of academic performance.

Success expectation (Granleese et al, 1996), motivation, attitudes, and other questions of affect that have a clearly recognisable impact on learning (Burris, 1976) and consequently on success in the QE would be possible areas for further research. Achievement orientation which refers to a persistent striving to get ahead and a preference for activities in which one's abilities are goal directed (Lowman, 1991) would most likely impact on a candidate's ability to pass the QE, and is therefore also recommended as an area for future research.

It is also recommended that future research considers aspects relating more directly to the QE examination situation. For example, the QE examination situation and the multiple interaction among the attributes of the examinee, the examination problem and the examiner who grades the answer. A structural analysis of the attributes of the professional examination situation based on empirical data would help in the identification of factors which operate in the gatekeeping function and reveal the interrelationships among them (Shye & Aranya, 1975). An investigation into the type and period of QE course attended prior to writing the QE, would also provide useful information.

There has been much debate over the QE and whether work experience should be a requirement for even attempting to write the auditing paper of the QE in particular. By all accounts, 18 months of work experience will more than likely be a requirement to write the auditing paper in the future. It would therefore be necessary to consider the impact of years of, and type of work experience prior to writing the QE, in future research. This would also mean that job satisfaction criterion, and overall life satisfaction considerations may be related to the success of candidates in the QE.

There is also a host of opportunities for future research to consider the unique environmental forces such as demographic traits, family and religious upbringing, education and other experiences as well as the unique perceptions of the individual's inner dynamics (May, 1985). A profession may serve as a force in how an individual behaves but a host of forces provide
the material for a single personality's development along the evolutionary experience of daily life (May, 1985).

It would also be interesting to investigate the variables of this study as well as those outlined above with regard to various demographic groups, such as age, race, sex, etcetera.

It would be relevant to compare the findings of this study to a study using the same independent variables to identify those that predict on the job performance rather than success in the QE. It could be that those candidates successful in the QE are not necessarily the best performing accountants.

These same independent variables could also be investigated for various intraoccupational groups, such as the accountant in commerce compared to the accountant in public practice. Given current tendencies for greater specialisation and division of work within organisations and higher heterogeneity in organisational environments, more narrowly defined occupational categories are likely to become valuable in career planning and human resource planning (Mossholder et al, 1985).

Useful results would be obtained if the optimum scores or cut-offs below which a candidate is unlikely to succeed, were determined for each of the variables considered in this research.

Having considered the general research opportunities, the more specific opportunities identified for each variable in the study will be discussed.

7.4.2 Personality

According to Lowman (1991) the measurement of personality is still at the incipient stage, and missing from the literature is an examination of how scores in a particular direction on a personality scale longitudinally predict job behaviour, and the relations among personality variables. Further research considering these aspects with regard to CAs would help to fill this gap in the literature.
An interesting area of study in the future would be the relationship between ability and personality that is likely to increase an individual's chances for success in the QE, or alternatively, that is required to perform effectively as an accountant or auditor. For example, Lowman (1991) mentions that intelligence seems to predispose individuals toward certain personality characteristics such as conscientiousness, superego strength, persistence, and certain aspects of assertiveness. Similarly the interest-personality interactions could be investigated, for example, to identify the 16PF Factors that are prevalent in the individuals with a high interest in the computational field.

No large scale South African study has been reported which examines the performance of South African accountants on the 16PF in a selection situation. The majority of users rely on the general norms of very specific groups of the South African population found in the handbook by Prinsloo (1996). While this may pose no practical problem when the 16PF is being used for individual interpretative development purposes, it does raise problems in selection. Use of general population norms tends to carry with it an implicit referencing of applicants against those norms (Bartram, 1992). Comparing applicants to norms established for other trainee accountants under the same conditions will provide a better picture of their relative personalities. Comprehensive norms developed from people undergoing selection should enable effects of self-selection and possible impression management to be taken into account when interpreting applicant profiles (Bartram, 1992).

Women have not been very successful in reaching the highest levels of the major accounting firms, and since there is no obvious reason why, one possible explanation could be that female CAs are different from their male colleagues for example, in their personality profiles (Davidson & Dalby, 1993b). Granleese et al (1996) maintain that gender is an important variable and that the appropriate way to examine gender issues is to look at males and females, separately, particularly when looking at intervening variables such as personality. Personality is biologically based and socially constructed, and because men are biologically different to women and experience the world in a socially constructed manner that differs from that of women, there are likely to be significant differences in many cases (Granleese et al, 1996). Further research investigating the personality profiles of successful female CAs would provide
useful information on the personality profile of females who are suitable for the profession. Similar studies with other groups, such as Black candidates would also be useful.

There are also several opportunities for further research in the vocational interests arena.

7.4.3 Vocational interests

Further investigation and research could be conducted to investigate the use of the RIB in Australia for example. Further research considering the value of vocational interests in the recruitment and selection process would also be valuable.

There is a need for considerably more research on ability-interest relationships (Lowman, 1991), such as the relationship between a candidate's Mental Alertness score and an interest in the computational field or the musical field, or a candidate's career progress within an organisation and an interest in the computational or persuasive fields.

According to Lowman (1991), for the purposes of career counselling, where there is a conflict between degree of fit and the three domains of personality, abilities and vocational interests, abilities and interests should take precedence over personality characteristics. Further investigation to determine which of these variables carries the most weight, when considering success in the QE, is warranted.

The topic of intelligence also offers the opportunity for further research.

7.4.4 Intelligence

Further research would be needed in order to identify the possible reasons for Mental Alertness being a determining factor for success in the one paper but not in the other.

Information processing is a major area of research attention for accounting educators, but the research appears to fall short of relating the accounting students' different information processing strategies to their academic performance (Tan & Choo, 1990). Knowledge of
students' information processing strategies and their academic performance may help academics further understand the learning difficulties some students may have in specific aspects of a course, and to select appropriate teaching strategies and instructional designs (Tan & Choo, 1990). Although this research suggestion is listed under the heading of intelligence, Tan and Choo (1990) point out that there is evidence that the relationships between learning styles and performance are not attributable to simple differences in intelligence.

It was mentioned in chapter 2 that the term intelligence is defined by whatever is being measured by the specific intelligence test. It was also pointed out that the theoretical review regarding intelligence was fairly limited. It would therefore be interesting to consider the relationship between success in the QE and other intelligence tests, or success in the QE and the whole concept of intelligence in depth.

Finally, there may also be certain research opportunities in the area of academic history.

7.4.5 Academic history

There is a wide range of research opportunities under the area of academic history. The following variables could be investigated in terms of their ability to predict success in the QE:

1. The average obtained in matriculation examinations.
2. The number of distinctions obtained in matriculation examinations.
3. Academic institution and type of study, that is, part-time or full-time.
4. University accounting marks for course work or examinations.
5. Other variables of the matriculation examinations, that is, other matriculation subjects, such as accounting.

Finally, having made recommendations regarding the literature, practice and further research, recommendations are formulated from the results to indicate the solution to the problem investigated in this research, that is, to indicate how the results of this research can be used.
7.5 FINAL RECOMMENDATION REGARDING THIS RESEARCH PROJECT

A few years ago Lowman (1991) pointed out that no recent studies were found in the literature addressing the intelligence-vocational, interest-personality interactions simultaneously, and not much seems to have changed since then. In spite of the limitations of this research outlined above, at least this research begins to consider these relationships. This study begins to compare the predictive power of each of the domains in an attempt to integrate cross-domain data, although it would have been more useful if relative weights for the various variables had been determined.

As mentioned previously the impact of the significant factors identified for the accounting paper is minimal and therefore the variables identified under point 7.1. should not be used as a definitive means for selecting candidates likely to be successful in the QE. Although the results therefore only appear to be warranted for identifying candidates likely to be successful in the auditing paper and not in the accounting paper, all candidates are required to pass both papers, it is therefore recommended that all candidates be assessed in terms of their matriculation home language results, personality and Mental Alertness test score. The variables identified as significant in the auditing paper should be utilised in future when selecting candidates for traineeship, when guiding students into the accounting field, etcetera.

It is important to note that the degree of fit is not just a quantitative issue but a matter of careful and often tedious comparison of relative fits and misfits, likes and dislikes (Lowman, 1991). Furthermore there may also be other factors, not measured in this study, that carry more weight in the identification of candidates likely to be successful in the QE. Therefore the process of selecting potential CAs is still not a simple one, and all the information one has access to needs to be considered in order to make an informed decision that will be in the best interests of all parties.

As a matter of urgency a more significant means of identifying successful QE candidates needs to be developed or identified, by investigating some of the other variables which potentially influence success in the QE or by investigating more progressive methods such as competency based assessment in order to update recruitment techniques.
REFERENCES


