

**ACADEMIC ACHIEVEMENT ON THE NATIONAL
HIGHER DIPLOMA IN EMERGENCY MEDICAL CARE:
THE ROLE OF PERSONALITY AND STUDY ATTITUDES**

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CONTENTS

LIST OF TABLES	iv
ABSTRACT	v
CHAPTER ONE	1
INTRODUCTION	1
1.1. INTRODUCTION	1
1.2. EMS IN THE SOUTH AFRICAN CONTEXT AND THE RELEVANCE OF PROPER TRAINING	2
1.2.1. EMS in the South African context	2
1.2.2. The relevance of proper training	8
1.3. ATTRITION OF EMC STUDENTS AT THE WITWATERSRAND TECHNIKON	10
1.4. AIM OF THE STUDY	12
1.5. BRIEF PREVIEW OF THE STUDY	14
1.6. CONCLUSION	16
CHAPTER TWO	17
THE ACADEMIC STRUCTURE AND SELECTION PROCESS OF THE NATIONAL HIGHER DIPLOMA IN EMC AT THE WITWATERSRAND TECHNIKON	17
2.1. INTRODUCTION	17
2.2. COURSE OUTLINE: AIMS AND DESCRIPTION	18
2.3. SELECTION PROCESS FOR EMC	20
2.3.1. Selection Criteria for first year	20
2.3.1.1. Academic Achievement	20
2.3.1.2. Written English Language Proficiency Essays	23
2.3.1.3. Panel Interview	23
2.3.1.4. Physical endurance exercises	24
2.3.1.5. Phobias and fears	25
2.4. OBSERVATIONS AND COMMENTS ON SELECTION PROCEDURE	26
CHAPTER THREE	29

LITERATURE REVIEW	29
3.1. INTRODUCTION	29
3.2. FACTORS ASSOCIATED WITH ACADEMIC PERFORMANCE	29
3.2.1. Personality factors	30
3.2.2. Personality, study habits and attitudes	32
3.3. FACTORS RELEVANT TO SELECTION AND TRAINING WITHIN A MEDICAL ENVIRONMENT	37
3.4. CONCLUSION	40
CHAPTER FOUR	42
METHODOLOGY	42
4.1. INTRODUCTION	42
4.2. INSTRUMENTATION: THE 16 PF AND SSHA	42
4.2.1. The 16 PF	42
4.2.1.2. Factors of the 16 PF	44
4.2.1.3. Reliability and validity	50
4.2.2. The SSHA	51
4.2.2.1. Factors on the SSHA	52
4.2.2.2. Reliability and validity	53
4.3. RESPONDENTS	54
4.4. PROCEDURE	55
4.5. STATISTICAL METHODS	56
4.6. CONCLUSION	59
CHAPTER FIVE	60
RESULTS	60
5.1. INTRODUCTION	60
5.2 RESULTS	60
5.2.1. Descriptive statistics for all three year groups	60
5.2.1.1. Average academic percentage	60
5.2.1.2. 16 PF and SSHA: selected psychological variables	61
5.2.2. Stepwise Multiple Regression Analyses	63

5.2.3. Multiple Regression Analysis	66
5.2.4. Pearson Product-Moment Correlation Coefficient	69
5.3 CONCLUSION	70
CHAPTER SIX	71
INTERPRETATION AND DISCUSSION OF RESULTS	71
6.1. INTRODUCTION	71
6.2. INTERPRETATION	71
6.3. LIMITATIONS AND CRITIQUE OF THE STUDY	76
CHAPTER SEVEN	80
CONCLUSION	80
7.1 SUMMARY OF FINDINGS	80
7.2 RECOMMENDATIONS FOR WITWATERSRAND TECHNIKON	81
7.3 RECOMMENDATIONS FOR FUTURE STUDY	82
REFERENCES	83
APPENDICES	93
Appendix A	93
SELECTION ESSAYS-2003	93
Appendix B	94
SELECTION 2003: PERFORMANCE EVALUATION FOR INTERVIEW	94
Appendix C	95
LETTER OF INTRODUCTION AND CONSENT	95
Appendix D	98
BIOGRAPHICAL QUESTIONNAIRE	98
Appendix E	101
DESCRIPTIVE STATISTICS (STENS AND PERCENTILES) FOR ALL VARIABLES ON THE 16 PF AND SSHA	101

LIST OF TABLES

TABLE 1: EMC COURSE OUTLINE	19
TABLE 2: EMC: POINTS ALLOCATION FOR SELECTION	22
TABLE 3: DESCRIPTIVE STATISTICS: AVERAGE ACADEMIC PERCENTAGE	61
TABLE 4: DESCRIPTIVE STATISTICS FOR SELECTED PSYCHOLOGICAL VARIABLES	63
TABLE 5: SUMMARY OF STEPWISE MULTIPLE REGRESSION ANALYSIS WITH AVERAGE ACADEMIC PERCENTAGE AS DEPENDENT VARIABLE AND 2 ND ORDER FACTORS AND YEAR LEVEL AS INDEPENDENT VARIABLES	64
TABLE 6: SUMMARY OF STEPWISE MULTIPLE REGRESSION ANALYSIS WITH AVERAGE ACADEMIC PERCENTAGE AS DEPENDENT VARIABLE AND 1ST ORDER FACTORS AND YEAR LEVEL AS INDEPENDENT VARIABLES	65
TABLE 7: SUMMARY OF STEPWISE MULTIPLE REGRESSION ANALYSIS WITH AVERAGE ACADEMIC PERCENTAGE AS DEPENDENT VARIABLE AND SSHA FACTORS AND YEAR LEVEL AS INDEPENDENT VARIABLES	65
TABLE 8: MULTIPLE REGRESSION ANALYSIS: 2 ND ORDER FACTORS AND YEAR LEVEL	67
TABLE 9: MULTIPLE REGRESSION ANALYSIS: 16 PF AND YEAR LEVEL	68
TABLE 10: MULTIPLE REGRESSION ANALYSIS: SSHA AND YEAR LEVEL	69
TABLE 11: PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENT: TOTAL GROUP	70

ABSTRACT

This study undertook to examine factors potentially contributing to a high rate of attrition experienced on the National Higher Diploma in Emergency Medical Care (EMC) at the Witwatersrand Technikon. The sample group consisted of students currently registered for the EMC course who wished to participate. The total group consisted of 53 students (n=53), 30 of which were first year students, eight were second year students and 15 were third year students. Using the 16 PF and SSHA as assessment tools, this study assessed the role of personality and study habits and attitudes on academic achievement on this course. Initial Kruskal-Wallis analyses of the scores for the three-year groups on a selected number of factors from these instruments showed no significant statistical difference between the groups. Subsequent analyses were consequently performed on the whole group. Five factors were found to be significant in relation to academic achievement on this course. These included abstract, verbal reasoning, levels of anxiety, levels of extraversion, work methods and year level of study. Of the personality factors, two are in accordance with findings of previous research. The findings of this study included comments and recommendations for amendments to the current National Higher Diploma EMC selection procedure.

CHAPTER ONE

INTRODUCTION

1.1. INTRODUCTION

Emergency Medical Services (EMS) provide expert and highly specialised medical care to people in a number of critical and often life threatening situations. EMS personnel are thus highly trained and skilled professionals whose job it is to provide the first form of treatment to patients, stabilising them until they can be transferred to a hospital or other medical centre. It is thus imperative that the training provided for EMS personnel is sufficient.

In Johannesburg, South Africa, EMS personnel may choose to study the National Higher Diploma in Emergency Medical Care (EMC) at the Witwatersrand Technikon. A high dropout and /or failure rate has been observed on this course, resulting in the present research being commissioned. The question arose as to what factors may be paramount in contributing to this high rate of attrition. Having some insight into this would be in the interests of not only the Technikon, in terms of selection procedures, course structure and requirements and teaching methodologies, but also of students undertaking the course. It would be beneficial for all to be able to predict with some certainty the academic performance of EMC students.

This study investigates various personality factors and study habits and attitudes of students currently undertaking the National Higher Diploma in EMC in order to ascertain their role in academic achievement. Some of the information that follows is based upon the researcher's personal experience with EMS, and discussions with friends and acquaintances.

1.2. EMS IN THE SOUTH AFRICAN CONTEXT AND THE RELEVANCE OF PROPER TRAINING

1.2.1. EMS in the South African context

EMS are vital to any society, especially one as fraught with violence and crime as South Africa. Recent statistics show that most trauma casualties in downtown Johannesburg occur due to domestic violence that is exacerbated by the use of alcohol and firearms. It is reported that 76% of all deaths after interpersonal violence are alcohol related and that there has been a 13-fold rise in the number of gunshot patients arriving at the Johannesburg General Hospital in need of resuscitation in the past 17 years (McClelland, 2002). A study conducted by the University of the Witwatersrand and the Johannesburg General Hospital, reported that the number of patients in 2001 who required resuscitation as a result of gunshot wounds numbered 664 more than in 1985 (McClelland, 2002). As can also be gleaned from any South African newspaper reporting on car hijackings, robberies, rapes and murders, the services provided by EMS personnel are essential in the face of frequent and

repeated violence and trauma. Hence the effective training of such service providers is crucial.

Briefly, the structure of EMS in South Africa is such that personnel are employed either by private companies (for example, Netcare 911, E.R 24) or governmental or provincial structures (for example, the Greater Johannesburg Metropolitan Council). They work in shifts and are dispatched from fixed physical locations (for example, at fire stations) around the city. EMS personnel work in mutable teams who constantly move around in vehicles responding to wherever they are needed. They thus form a physically separate and interchangeable group who are forced to work together and who have to depend on one another, often in highly critical and dangerous situations. At the scene of an accident, responsibility for the management and co-ordination of a scene is automatically delegated to the most medically qualified individual present. This may place increased pressure on EMS workers by causing them to feel ousted from a position of control and by having to work under the supervision of a more qualified colleague. The converse is also true, in that if no more qualified personnel are available to assist, then responsibility falls wholly onto the first EMS personnel on the scene. The job of EMS is thus one of being constantly in motion and under pressure.

On a daily basis, EMS personnel are likely to encounter several incidents of severe injuries, serious, life-threatening illnesses, contagious diseases and sometimes multiple patient scenarios. These circumstances can occur almost

anywhere, and EMS personnel may find themselves having to work in potentially hazardous or awkward environments where they are physically and/or emotionally at risk themselves. They also need to perform their duties within a multicultural society, where racial tensions and language barriers may hamper effective medical care. An example of the danger to which EMS personnel are exposed was reported in *The Citizen* on May 4, 2000. The article reported on the deaths of two paramedics who were shot execution style on the night of April 25, 2000, while transferring a patient from one ambulance to another in Soshanguve, north of Pretoria (cited in Cosser, Jansen van Rensburg, Niewoudt, Ratlhagane, van Staden & Wade, 2000). An article by Hazard (2002) alludes to some of the dangers experienced by all rescue workers (including fire fighters, police and EMS personnel) attending the scenes of traumatic events, such as automobile accidents. He highlights the point that motorists are unaccustomed to encountering rescue vehicles on a road, and that this has resulted in a number of incidents in which rescue personnel have been injured or killed while providing roadside assistance.

On an emotional level, EMS work is stressful. EMS personnel work long hours and are responsible for the lives and well being of their patients. They often perform their tasks under the scrutiny of the patient's family or bystanders, rendering it necessary for them also to contend with the distress experienced by those around them (Carrington, Stark, Bluechardt & MacLennan, 1999). For some EMS personnel, a special area of emotional difficulty arises when working with children (Cosser *et al.*, 2000). The helplessness and vulnerability

of children seem to make treating them especially difficult and heart-wrenching.

Given that EMS personnel face daily forms of occupationally related hazards, much research has been aimed at stress levels and coping styles adopted within this field. It is well documented that repeated and continual exposure to violence and trauma may have secondary-traumatic effects for those exposed to them (Carrington *et al.*, 1999; Johnsen, Eid, Laberg & Thayer, 2002; Regehr, Goldberg, Glancy & Knott, 2002). Rescue workers never become fully desensitised to trauma and may eventually suffer from “burnout” and/or post-traumatic stress disorder (PTSD), amongst others. The term *burnout* refers collectively to occupationally related symptoms resulting in physical or emotional exhaustion (Carrington *et al.*, 1999). Burnout pertains to feelings of depersonalisation and a reduced sense of personal accomplishment, resulting in a deterioration in job performance and job satisfaction. PTSD on the other hand, suggests a severe anxiety disorder, which according to the *Diagnostic and Statistical Manual Of Mental Disorders* (DSM IV) involves persistent re-experiencing of the trauma, avoidance and hyper-arousal (Kaplan & Sadock, 1998). Repeated exposure to traumatic events is believed to result in the development of PTSD. Other stress reactions common to rescue workers include psychic numbing, short-term memory impairment, decreased problem-solving abilities and diminished communication (Young, Ford, Ruzek, Friedman & Gusman, 1998). Over a sustained period, depression and/or anxiety may manifest, that in turn may aggravate or create marital, vocational, or substance abuse problems (Young *et al.*, 1998).

Besides intense clinical conditions, administrative issues have been identified as critical stressors in EMS in a number of studies. These include long work hours, poor administrative support, negative attitudes of hospital personnel, low pay, paperwork issues, inadequate equipment and limited career options (Cosser *et al.*, 2000; Young *et al.*, 1998;). The literature has also focused on interpersonal issues as a source of stress, i.e. relationships with spouse, family, friends and colleagues (Young *et al.*, 1998). Organisational and administrative issues, however, have repeatedly been identified as having more significance than clinical or interpersonal factors as sources of stress in EMS. A study by Grigsby and McKnew (1988) applied the “Staff Burnout Scale for Health Professionals” to EMS personnel. The conclusion reached was that burnout amongst EMS workers was most strongly associated with organisational and job characteristics, rather than individual attributes.

In the face of so many stress-inducing elements, EMS personnel tend to employ a number of coping mechanisms. These include both positive and negative factors, although as Lazarus and Folkman, and Thoits (cited in Young *et al.*, 1998) point out, adaptive coping is situation-specific and depends on the appraisal of a situation by an individual. Palmer (1983) identified six main coping methods used in EMS, namely talking with family, chatting to friends, using humour, taking time-out, socialising and recreation or hobbies.

As a coping technique, humour has probably been focused on most frequently. A study by Rosenberg (cited in Cosser *et al.*, 2000) found that EMS workers used humour to relieve the seriousness and stress of a call and to help them prepare for the next one. By using humour as a means to create emotional distance from a situation, it functions as a defence mechanism, assisting in gaining objectivity and mastery over circumstances.

Humour is used extensively in the EMS subculture as a means of informal debriefing amongst co-workers. Although the introduction of formal debriefing strategies are coming more into use by organisations, the EMS subculture seems to place a stronger emphasis on debriefing within the group. Personnel tend to use black, cynical humour, their anecdotes often having morbid overtones. Tangherlini (2000) conducted a study on this method of debriefing amongst EMS personnel. He comments on the sardonic and self-deprecatory tone employed which serves to set up the storyteller as an anti-hero. His interpretation of this tactic is that it serves as resistance to other groups with whom they are forced to interact on a daily basis. These include managers, supervisors, police officers, hospital staff, fire fighters and bystanders. For Tangherlini (2000) the act of storytelling serves the dual purpose of recreating and mastering events in the telling, while also serving to delineate power relationships within the EMS group and beyond. For example, power is represented by the ability to ‘ “see it all” without recoiling in disgust or terror ’ (Tangherlini, 2000, p.7). It seems to the researcher that this method of satirical storytelling also serves to define EMS personnel as a self-contained

sub-group. It thus speaks to the culture of this subgroup, and its need to segregate.

While humour and storytelling seem to be effective in their use in the EMS culture, some behaviours may be considered maladaptive. These include the acceptance of too much responsibility, confrontational coping and escape/avoidance, in the form of substance abuse for example (Cosser *et al.*, 2000). Maladaptive coping styles impact negatively on overall job performance and motivation (Koesake, 1993), as well as on the immune system and general well-being (Olf, 2001; Regehr *et al.*, 2002). The ability to work and cope effectively within the current EMS environment in South Africa is thus a challenging task.

1.2.2. The relevance of proper training

Students undertaking to study on the National Higher Diploma in Emergency Medical Care (EMC) need to become properly equipped for EMS work in South Africa. Given the conditions surrounding EMS work in this country as described above, students need to be properly trained and supervised. It seems they may also require a certain amount of personal resilience, good stress management skills, adaptability and flexibility, leadership skills and intellect. The three-year National Higher Diploma in EMC offered at the Witwatersrand Technikon attempts to cater for all these requirements.

Within the structure of EMS qualifications, the National Higher Diploma is considered on par with a CCA (Critical Care Assistant) qualification. The National three-year degree includes phases which can roughly be organised alongside the intermediate qualification of AEA (Advanced Emergency Assistant) and the introductory qualification of BAA (Basic Ambulance Assistant). During the first year of training on the National Higher Diploma, students gain basic clinical and rudimentary drug administration skills (Castle, 2003a). These skills are honed during the compulsory practical component of the course, which requires that a certain number of hours be worked on the road with an ambulance crew, at emergency service control centres, and emergency and labour wards (Castle, 2003b). Once students have successfully completed the first year of study, they qualify as intermediate life support (ILS) providers, registered with the South African Health Professions Council. With this registration, they can undertake a level of independent practice.

During the second and third years of training, students work towards advanced life support (ALS) qualifications. They continue with their practical exposure, being required to fulfil 200 hours on a response vehicle during the second year, and 400 hours in the third year (Castle, 2003b). Students are also taught rescue training during the course. This provides them with the technical skills of a rescue operation, as well as patient management, and incident and command and control competencies (Castle, 2003a). In order to cope with the demands of the three-year course, students need to be physically fit and have little fear of heights and enclosed spaces. The National

Higher Diploma attempts to provide as comprehensive training as possible for EMS personnel, in order to equip them for work in South Africa.

1.3. ATTRITION OF EMC STUDENTS AT THE WITWATERSRAND TECHNIKON

In discussion with various EMC lecturers at the Witwatersrand Technikon, the researcher was made aware of an increasing and alarmingly high rate of attrition over the past few years amongst students on the EMC Diploma course. Preliminary investigations undertaken by the EMC department indicate that students tend not to complete the course due to academic failure or a tendency to terminate their studies prematurely, for any number of reasons. The highest rate of incomplete study occurs within the first year of study, and then at second year level. Although the exact reasons for such a high rate of attrition can at this stage only be speculated on, the impact on the individual student is detrimental in terms of numerous aspects, such as finances, academic performance record, and personal sense of achievement and/or identity. Students who do not complete a course for whatever reason, may well be discouraged or incapable of undertaking any further academic courses.

From the Technikon's perspective, a high rate of attrition amongst students reflects negatively on both the course itself and the academic institution as a whole. When many students perform poorly over time, questions must be raised as to whether a specific problem(s) can be identified and whether such

a problem(s) lies with the individual student or whether the course as a whole needs to be re-evaluated. Another problem area may be the selection criteria and selection process utilised by the Technikon to select first year students.

The Technikon has therefore requested that a scientific study be undertaken in order to try to ascertain or identify possible factors contributing to the high rate of student attrition on this particular course. As the study will only explore individual factors, the Witwatersrand Technikon's School of Public Health department has undertaken to explore and modify the current National Higher Diploma curriculum in order to assist students, wherever possible with their studies. By also exploring the option of introducing various courses to help facilitate students to adjust from school to the level of Technikon academics, it is hoped that the high rates of attrition can be counteracted. However, the results from the present study may help to highlight individual factors. This, together with the Witwatersrand Technikon's adaptations, may serve to reduce the poor performance rate on the National Higher Diploma course.

At a societal level, the information gleaned from this study may be used to improve teaching of EMC practitioners by aligning individual information with selection criteria and teacher-student fit. In so doing, and hopefully by thus reducing the rate of attrition on the EMC National Higher Diploma course, it stands to reason that more qualified EMS providers will graduate and be able to fulfil a vital function within any community, and especially within South Africa.

1.4. AIM OF THE STUDY

The aim of this study is to explore the role of personality characteristics and study habits and attitudes as correlates to students' academic achievement on the EMC National Higher Diploma at the Witwatersrand Technikon in Johannesburg. The research will constitute only an initial exploration of possible factors related to the academic performance of these students and will thus assess broadly. By exploring individual attributes amongst students it is hoped that insight may be gained into factors influencing the attainment of successful academic achievement.

In this study, personality will be defined according to Raymond Cattell, who, by means of factor analysis, identified certain *traits* that are thought to constitute personality (Phares, 1991). From this perspective, traits are described as the elements that form the structure of personality. More specifically, traits are mental constructs inferred from behaviour, which predispose a person to behave consistently from one situation to another over time. Briefly, according to Cattell's theory, a set of 16 source traits exist in relative amounts in each individual which underlie personality and which distinguish one person from another (Phares, 1991; Reber, 1985;). By empirically measuring or assessing these source traits, an individual's personality profile can be mapped onto a trait matrix in order to predict behaviour. This mapping of traits also permits individuals to be compared to one another with regards to their individual differences in the clustering of

traits. (Cattell's personality theory is presented in more detail in paragraph 4.2.1).

Personality needs to be distinguished as separate from what is known as *temperament*, which the literature describes as having a "narrower meaning than 'personality' in that [it focuses] on the more emotional aspects of a person's biological and psychological dimensions" (Meyer, Moore & Viljoen, 1997, p 13). In other words, temperament refers to particular patterns of emotional reactions to stimuli that have a genetic basis. Fromm (cited in Meyer *et al.*, 1997) further differentiates between *character* and *temperament* by suggesting that temperament includes those responses determined by an individual's constitution which cannot be modified; while character on the other hand refers to those components of personality that are shaped by personal experience and socialisation, and are subject to change as the individual acquires new experiences. Thus according to Fromm, character is the social component of personality, and his theory implies a process of self-consciousness whereby individuals are able to reason and regulate their behaviour.

Linked to this concept is the concept of attitude. Briefly, attitudes are a combination of cognitive, emotional and behavioural components (Weiten, 1989) by which an individual evaluates situations and forms judgements. The cognitive aspect of an attitude refers to the *beliefs* centred around a specific object or situation, while the emotional aspect is determined by the *affect* the

object or situation stimulates. The behavioural component consists of *predispositions* to act in certain ways toward an object or situation.

This complex, tripartite structure of attitudes may explain why attitudes and behaviours are not always consistent with one another. For example, although the cognitive components of an attitude may suggest a certain behavioural response, the affective aspect may differ quite substantially, thus affecting behaviour. The behavioural component, as Weiten (1989) points out, is thus predispositional only, and depends on interaction with social norms and values. This links to the idea of habitual behavioural responses, which are thought to be learned reactions in response to certain stimuli. According to Reber (1985), a *habit* is a pattern of activity that has, through repetition, become automated and durable. It is closely linked therefore with the concept of *traits*.

By researching personality traits and study habits and attitudes, it is hoped that this study will highlight those aspects inherent to an individual as well as those modified by experience, all of which may contribute to academic success on the EMC diploma course.

1.5. BRIEF PREVIEW OF THE STUDY

This study is of a quantitative design and makes use of two standardised assessment instruments, namely the *16 Personality Factor Questionnaire* (16

PF) and the *Survey of Study Habits and Attitudes* (SSHA). The 16 PF is based on Raymond Cattell's theory of personality. It is a self-rated questionnaire that measures 16 factors thought to reflect individual personality profiles. The 16 PF measures 10 primary and 6 secondary source traits that, according to the various loadings scored by an individual, serve to delineate stronger and weaker personality characteristics. By plotting these stronger and weaker loadings, an individual personality profile can be concluded (Cattell, Eber & Tatsuoka, 1970).

The SSHA considers the notion that some students with high academic abilities often perform poorly at their studies, while others of mediocre aptitude may be academically successful (Du Toit, 1981). The SSHA sets out to evaluate study methods, motivation for studying and certain attitudes towards academic activities. By identifying the effectiveness of students' study habits and attitudes, the SSHA serves to predict academic performance and may be useful in detecting areas contributing to academic underachievement.

The research was undertaken in the middle of the academic year with a sample of current full-time EMC students, i.e. first, second and third year students at the Witwatersrand Technikon. The total number of candidates was fifty-three. Due to course constraints, students were tested in three sequential groups. The first group constituted first year students, while the subsequent groups consisted of second and third year students. The results were then analysed by means of correlation and regression analyses.

By assuming that third and second year students have already been academically successful on the National Higher Diploma in EMC, it was expected that there would be differences in personality traits and study habits and attitudes as compared to first year students. Academic achievement was determined by calculating the average for each year group using each student's available academic results. Students were then compared with regards to average academic achievement and various personality and study habits and attitudes.

The researcher was also invited by the Technikon to attend and observe the first year selection procedure that took place at the end of 2003. She has been asked to include her observations and comments or recommendations on this procedure.

1.6. CONCLUSION

The above outlines the role of EMS in South Africa and relevance of proper training of EMS personnel to cope with situations that are often stressful, life threatening and dangerous. In order to ensure a higher rate of academic success on the EMC course, the role of various personality traits and study behaviours are investigated in conjunction with academic performance.

CHAPTER TWO

THE ACADEMIC STRUCTURE AND SELECTION PROCESS OF THE NATIONAL HIGHER DIPLOMA IN EMC AT THE WITWATERSRAND TECHNIKON

2.1. INTRODUCTION

Every year, many students from around the country apply to undertake the Witwatersrand Technikon's EMC course. As is always the case, many more students apply than there are places available on the course. Owing to the limitations of funding and facilities, only about 30-40 students can be accommodated at first year level. A rigorous selection procedure is thus implemented. Students are carefully chosen on a number of criteria, including academic achievement, English language proficiency, performance on a panel interview, and on physical endurance and phobias or aversions exercises. Appropriate selection of students who will cope with and succeed on this course is vital, as not only is the course academically challenging and of a high standard, but students will need to function effectively within the EMS structure in South Africa. The EMC course aims to instil a working knowledge of emergency medical procedures, physical rescue procedures, and practical encounters. This is achieved by exposing students to various academic courses, as well as practical, hands-on experience on the road with qualified EMS personnel.

The following section will explore in more detail the current academic structure of the National Higher Diploma in EMC at the Witwatersrand Technikon, as well the selection procedure undertaken by the Technikon at the end of 2003.

2.2. COURSE OUTLINE: AIMS AND DESCRIPTION

The EMC course at the Witwatersrand Technikon is offered both at a full-time and part-time level. The full-time course runs over three years, while the part-time course may be completed over a period of six years.

The following subjects are taken at the various year-levels of study:

Table 1: EMC Course Outline

First Year	Emergency Medical Care I
	Rescue I
	Anatomy and Physiology
	Basic Sciences: Chemistry and Physics
	Ambulance Technology: Mechanic and Dispatch
Second Year	Emergency Medical Care II
	Rescue II
	Physiology II
	Primary Health Care I
	Psychology
	Computers
	Dispatch II
Third Year	Emergency Medical Care III
	Rescue III
	Pathology
	Pharmacology
	Law
	Administration
	Primary Health Care II

2.3. SELECTION PROCESS FOR EMC

The following is a description of the criteria and methodology used to select first year students for the EMC course in 2004.

2.3.1. Selection Criteria for first year

First year students for the 2004 National Higher Diploma in EMC were selected in November of 2003, based on the following criteria:

- (i) Current academic achievements, including Grade 12 or equivalent, and /or any EMS training,
- (ii) Short written essays used to assess written English language proficiency,
- (iii) An interview before a panel,
- (iv) Various physical endurance exercises, and
- (v) Various activities aimed at exploring any phobias or aversions an individual may have, (for example, a fear of heights).

2.3.1.1. Academic Achievement

Students were selected for the first year of study of the National Higher Diploma in EMC for 2004 from 268 initial applications received from students throughout South Africa. Of these, 115 were invited to attend a panel interview based on their academic record. (This refers to Grade 12 results. If these were not available, then the candidate's most recent academic results were

reviewed, for example, results obtained for a degree in another field, etc). An error made by the Technikon's Student Services department, however, meant that invitations to attend a panel interview were sent out to a further 6 applicants who did not actually qualify for an interview. The total number of applicants interviewed was thus 121.

Applicants were selected to attend an interview based on their most recent or most applicable academic results. A scoring system devised by the School of Public Sciences at the Technikon allocates points to various levels of academic achievement or symbols. This points system is set out below; in Table 2.

Table 2: EMC: Points Allocation for Selection

Grade 12 Results:			Higher Grade Points	Standard Grade Points
	75 +	A	6	4
	74-70	B	5	3
	69-65	C	4	2
	64-60	D	3	1
	59-55	E	2	
	54-50	F	1	
Tertiary Degree/ Diploma			6	
EMS Qualification	BAA		1	
	AEA		2	
	CCA		3	

Applicants were only considered for selection if their average score was above 4 points and if they had a minimum of two Higher Grade Ds and /or two Standard Grade Cs in their final results. Students also had to have taken at least two of the following three subjects, Mathematics, Science and/or Biology, at a Grade 12 level. Any Tertiary or EMS qualification (for example, BAA, AEA or CCA) was awarded additional points (Table 2). Applicants were then ranked according to the number of points scored.

2.3.1.2. Written English Language Proficiency Essays

Applicants who were successful in terms of academic criteria were asked to write short individual essays on four topics in order to assess their ability to converse and write proficiently in English. (Appendix A gives the topics on which students were asked to comment). Because the EMC course is currently offered in English only, students need to be able to communicate competently in that language. The prescribed textbooks are also mostly from the USA, and are therefore written in English. It is thus necessary to ensure that students whose first or home language is not English, will manage receiving their lectures and learning in English.

Of the students asked to write essays, only those who were granted an interview and then did not perform satisfactorily (due to nervousness, hearing disorder etc.) were then read. This served to provide the selectors with an indication of the student's written performance and mastery of English. The essays thus serve as a backup and method of validation for students and selectors.

2.3.1.3. Panel Interview

Applicants were interviewed before a panel which was composed of the Head of Department, the first year course co-ordinator, a third year student, a second year student and a first year student. The researcher was present during the interviews and was included as the final member of the panel. On the whole, the interviews were very unstructured and each panel member was permitted to ask any or no questions of an interviewee. General themes were

explored, including academic achievement, relevant EMS training (if any), attitude to authority, motivation and reason for career choice, knowledge of the course, financial means, transport and overall impression. An overall score of between 1 to 5 was given to each applicant on each of these themes (Appendix B).

The overall aim of the interview was to ascertain the applicant's expectations and perceptions of the course, what he/she hoped to gain from the experience, and why he/she had elected to want to complete the National Higher Diploma in EMC.

After each interview, the panel members would briefly discuss the applicant and an overall score and decision was made regarding the acceptability of the candidate. Successful candidates were then invited to attend one of two days during which they would be exposed to certain situations in order to challenge any fears or phobias they may have that may hinder their EMC training process. Candidates were warned that knowing how to swim/ learning how to swim is a pre-requisite for EMC training and that this would be challenged during the phobias and fears program.

2.3.1.4. Physical endurance exercises

This aspect of the selection procedure serves to eliminate those candidates for whom physical exertion, teamwork and responding to authority are difficult. Candidates were randomly divided into teams and then given instructions to complete a number of physically demanding tasks. For example, each team of

about 8 people had to carry a rescue stretcher laden with full water bottles, backpacks and a rescue-dummy on a run around the campus training area. Teams were also ordered to run up and down a steep incline, and were made to repeat the exercise until all candidates reached the top at roughly the same time. All candidates then participated in a run of about 15 km. The aim of these activities was to encourage group participation and cohesion, to explore the assumption of leadership roles as well the attitude to authority and commands. Candidates were then taken to a swimming pool and asked to tread water for about 20 minutes to explore their ability and stamina in water.

Those candidates who showed good physical fitness, strong leadership, good co-operation, and a positive and respectful attitude towards figures of authority and power, were considered for selection.

2.3.1.5. Phobias and fears

In EMS, especially during rescue operations, individuals are often exposed to fear-inducing circumstances. For example, a rescue may take place in a small, confined space, like a drain culvert. In some instances the EMS worker may have to assist someone injured and trapped in a lift shaft. EMS personnel can thus not afford to be afraid of heights or small, tight areas.

The phobias and fears aspect of the selection procedure involved ordering candidates onto a high diving board and making them jump into water. Those candidates who could not overcome their fear of heights were no longer seriously considered for placement. Candidates were also made to crawl into

a culvert or sewer beneath the Technikon. Once inside this confined area, candidates' tolerance of small spaces was noted, as well their ability to feel safe in the dark. To test candidates' ability to contain their panic, a teargas canister was then exploded in or near the mouth of the tunnel, sufficiently close to scare them.

Once again, those candidates who coped well under these circumstances were considered more favourably for selection.

Of the 121 candidates, 43 applicants were selected to attend for the first year of the course.

2.4. OBSERVATIONS AND COMMENTS ON SELECTION PROCEDURE

The selection procedure aims at identifying individuals with the specific attributes described in paragraphs 2.3.1.1 to 2.3.1.5. Although the process is rigorous and time-consuming, it aims at filtering out those candidates who seem unlikely to be successful on the EMC course as they do not fit the prescribed idea of what an EMC candidate should be like. The criteria for selection however, although relevant to the EMC training and profession, are perceived by the researcher to be somewhat arbitrary and subjective in nature. Academic criteria are assessed in an objective and repeatable manner. However, the remainder of the process seems to the researcher to be too subjectively biased.

The researcher would like to suggest that the panel interview be conducted in a more structured and systematic manner, ensuring that each candidate is afforded the same amount of time and asked similar types of questions. A systematic scoring method may be implemented whereby certain types of response are given a fixed numerical value. This may also be applied to the written English proficiency essays. In this way, some of the subjectivity of the selection procedure may be circumvented.

The phobias and physical endurance exercises are also regarded as important contributors for a successful candidate. This phase of the selection procedure is demanding but also fun, in that it aims to foster competitiveness, team building, leadership skills and respect for authority figures. Once again, however, the researcher felt that the selection of candidates at this level was very subjective and not based on any criteria other than the candidate being able to comply with physical demands. If a candidate could run a certain distance or crawl through a small space, then he/she was considered successful. Even though this aspect of the selection process was not attributed as much significance as the academic criteria, panel interview and written English proficiency essays, it nevertheless determined a candidate's being selected or not. The researcher thus suggests that the phobias and physical endurance exercises are conducted in a more structured manner, and that the psychological aspect of physical activities (e.g. running or climbing) and phobia exercises be explored in more depth.

Finally, the researcher feels that not enough focus is placed on assessing candidates in terms of personality traits and their behavioural study strengths and weaknesses. This research is thus aimed at exploring the value of the contribution such factors may make to the EMC selection process.

CHAPTER THREE

LITERATURE REVIEW

3.1. INTRODUCTION

To be able to predict and understand with some confidence a student's academic performance is of concern to educational institutions everywhere. In order for places of education to maximise their rate of academic success, it becomes important that they not only select appropriate students but also have some insight into what factors are influential on student performance. Such knowledge may then be used to tailor selection procedures, course construction and methods of teaching in such a manner as to maximise the rate of accomplishment amongst students. The following is a review of some of the relevant literature associated with factors related to academic achievement, specifically those of personality and study habits and attitudes.

3.2. FACTORS ASSOCIATED WITH ACADEMIC PERFORMANCE

The literature refers to many factors that may impact on students' academic performance. Amongst these are included the dimensions of student satisfaction, teacher-student relationships, teacher and student attitudes, students' feelings of powerlessness and/or lack of support within the academic environment, methods of study, selection procedure, and individual

personality and cognitive factors. According to Townsend, McNerny and Arnold (1993) there are three categories of factors which pertain to degree completion. These include (i) student centred explanations (including academic and personal characteristics), (ii) institutional centred explanations (including educational cultural practices and co-operation), and (iii) societal explanations (including economic and political factors). Similarly, Gerdes and Mallinckrodt (1994) identified the following three areas as influential on rates of college attrition: (i) academic adjustment, (ii) social adjustment, and (iii) personal or emotional adjustment. A substantial portion of the literature is focused on the personal aspect of students' ability to succeed at their studies. Amongst others, research attention has focused on personality and cognitive factors as related to academic success.

3.2.1. Personality factors

A number of studies have explored the relationship of personality variables and academic performance. Sánchez, Rejano and Rodriguez (2001) conducted a study describing personality characteristics found to be common in the failing university student at the University of Seville, Spain. Based on Eysenck's theory (cited in Sánchez *et al.*, 2001) which affirms the greater predictive value of personality traits over intelligence with regards to academic performance, their results are in line with other findings that indicate that defaulting students tend to score higher on traits of neurosis and extraversion than the population group. Their study further indicates the role of traits such

as psychoticism, poor leadership skills, high levels of nonconformity and low generosity in academic failure.

Other studies have explored the converse of this by examining the relationship of personality variables to success and persistence in academics. For example, Blickle (1996) obtained results whereby 17% of scholastic scores were explained by five basic personality concepts. These comprise extroversion, friendliness, neurosis, meticulousness, and openness to experience. These five factors are known as the Big-Five. Lathey (1991) confirmed these findings in a study with adolescents, as did Weiss, Lotan, Kedar & Ben-Shakhar (1988) with university students.

In 1995 Wolfe and Johnson undertook a study exploring personality as a predictor of college performance. They argue that current methods of prediction (for example, using Scholastic Aptitude Test (SAT) scores and high school results) are redundant in anticipating future college achievement. Their findings indicate certain personality constructs as being influential predictors. According to Wolfe and Johnson, the construct of *self-control* emerges as the most robust predictor. This holds true no matter how self-control is defined or measured, as the characteristics of organisation, conscientiousness, and self-efficacy (which are factors of self-control) all emerge as more effective than SAT results in anticipating positive academic achievement. They thus recommend that the global trait of self-control or conscientiousness be recognised when anticipating academic achievement and be considered during college selection processes.

Although a relationship has been found to exist between personality factors and academic success, the trend in the research suggests that personality itself may not solely be able to account for this. Much of the literature has thus focused on the interrelation or interaction of personality with other variables in predicting academic success. A review of some of the literature by Mouw and Khanna (1993) suggests that factors like personality are all but irrelevant in predicting academic performance. Rather, they propose that certain personal traits and skills, such as ability and willingness to study, be considered.

3.2.2. Personality, study habits and attitudes

Scepansky and Bjornsen (2003) have elaborated on these ideas by comparing 166 students who wished to study after completing school with 161 students who did not, on academically related behaviours, attitudes and personality traits. Their results indicated that students who showed an interest in graduate school differed from those who did not in terms of class participation and several personality traits. Students hoping to attend graduate school were shown to be more engaged in classroom discussions and independent, self-directed study, than were non-hopeful graduate school attendees. Students were further distinguished by the characteristics of conscientiousness and openness. On the whole, students who scored high on conscientiousness are purposeful, strong-willed and determined; while those who have high openness scores are curious and receptive to experience.

These students also showed an adaptable approach to learning and were found to be more motivated by learning itself than by grades.

In line with this, the literature reviewed by Wigen, Holen and Ellingsen (2003) cites an earlier study by Busato *et al.* who explored how personality may relate to learning styles and learning outcomes. This study corroborates the notion that the factor of conscientiousness shows the strongest correlation with learning results.

Other studies have found a relationship between locus of control and academic performance. Wigen *et al.* (2003) obtained results supporting those of Webb *et al.* (cited in Wigen *et al.*, 2003), who found that the personality trait of internal locus of control had a positive correlation with test-performance. This seems to signify that such students attribute reinforcement with personal application, rather than to luck or powerful others as do students with an external locus of control. Wigen *et al.*'s study found that external locus of control is negatively associated with constructive learning styles and positively with dysfunctional ones. Hence, the personality factor of locus of control seems to be related to attitudes and personal study-styles. These studies provide a strong argument for the idea that attitude and study habits go hand-in-hand with personality traits in determining academic achievement.

Orbell (2003) focuses on the effects of self-regulatory and volitional components on studying behaviour as specified by personality systems interactions theory and theory of planned behaviour. Her results show that

participants reporting self-determination, conscious attention control and implicit attention control were more likely to enact their intentions, while volitional components were associated with increased studying and were useful predictors of studying behaviours. This research highlights individual disposition or attitude towards study-goals as a determinant worth considering in terms of academic success.

A longitudinal study undertaken by Lufi, Parish-Plass and Cohen in 2003 with Israeli college students, explored the role of personality and other variables in relation to academic perseverance. Students were administered two questionnaires, namely the Persistence Scale in School (PSS) and the 16 PF. After four years, the students were divided into two groups, defined as those who had completed their degree (PG-Persisting Group) and those who had not completed their studies (NGP-Non-Persisting Group). Although the results did not confirm any significant personality differences between the PG and NGP groups on the 16 PF, Lufi *et al.* did establish a link between the PG and a high grade point average (GPA). They took this to suggest that success in college contributes to the ability to persevere with studies. However, Lufi *et al.* point out that the converse to this may also be true and that other significant variables may play an important role in predicting academic persistence. Lufi *et al.* suggest that further research may be needed to explore pre-existing factors such as success in school, social supports in school, adjustment to school environment, ability to pay for tuition etc. By recommending that one considers a student's overall academic performance record and his/her trait of persistence, it is reasoned that those students who score highly on both these

variables are more likely to persevere with university studies despite non-academic variables or other difficulties, than are those who score low on one or both variables. Their results are thus in line with those of Orbell (2003).

A study along the lines recommended by Lufi *et al.* (2003) provides additional evidence that personality characteristics can predict academic performance in high school. Hair and Graziano (2003) undertook a longitudinal study measuring early-appearing personality characteristics of children in middle school, in order to predict high school GPA. Their investigation revealed that the trait of openness to experience largely contributed to high school performance. The authors suggest that aspects of the self in children are related to their development and later adaptation to school and its academic environment. However, as Hair and Graziano point out, openness to experience is the most “cognitive” aspect of the Big-Five dimensions, thus underscoring the contribution of both cognitive and personality aspects to academic performance.

Messick (1996) however, points out that it is important to distinguish what constitutes cognition as opposed to personality, and how these two aspects of the self may be interrelated. He goes on to distinguish cognitive style from ability, and cautions against failing to identify cognitive styles as both competence and performance variables, as each may bear on the problem of fit between student characteristics and educational experiences. An article by Sadler-Smith and Badger (1998) highlights the crucial role that cognitive style plays in determining both individual and organisational behaviour. They argue

that in order to optimise individual performance, individual versatility and differences in style should be encouraged.

This notion is expanded upon in the research of Wehmeyer, Baker, Blumberg and Harrison (2004). Their work stresses the importance of self-determination and student empowerment and involvement in reducing problem behaviours. By providing opportunities for students with problematic behaviour to make decisions, a feeling of empowerment is created, thus reducing the undesirable behaviour. This can be addressed by amending deficient contexts in order to provide greater choice and more outcome opportunities for students. This is in line with other studies cited in Karatzias, Power, Flemming, Lennan and Swanson (2002), which suggest overall that increased levels of school satisfaction are positively associated with acceptance of educational values, commitment to the institution, high levels of learning motivation and lowered drop-out rates.

Bloomfield, Harris and Hughes (2003) argue that the goals of learning and assessment activities need to be sufficiently aligned with academic aims in order to maintain student focus and attain a positive outcome. Hassan (2002) comments on the notion that student attitudes to their studies and their learning approaches are related to academic satisfaction. He refers specifically to academic satisfaction being linked to ability, effort and goals, as well as to students' perception of the quality of their educational programs, teacher's attitude and relevance of study matter. An article by Yoon (2002) comments on the effects of teacher disposition and characteristics on teacher-

student relationships, with negative relationships being associated with teacher stress and pessimistic affect. Further studies have referred to other variables that impact on educational satisfaction and performance. For example Karatzias *et al.* (2002), highlight the significance of demographic, personality variables and school stress on the overall indication of school attendees' welfare. Collectively, these factors are known as *Quality of School Life* (QSL). The significance of the context of the academic institution on educational achievement is thus evident.

3.3. FACTORS RELEVANT TO SELECTION AND TRAINING WITHIN A MEDICAL ENVIRONMENT

There can also be found in the literature, explorations of and comments on selection methods and criteria within a medical environment, and how these relate to personality and study habits and attitudes. Although little research appears to focus specifically on selection criteria and procedures within an EMS environment, there is ample literature referring to selection for medical school. The researcher feels that similarities may be drawn between the findings of these two fields by virtue of the nature of the work involved. An examination of some of the material pertaining to academic performance, personality and study habits and attitudes in the area of medical school training thus follows.

The above idea is advocated by Ferguson, Sanders, O’Heir & James (2000), who suggest that their findings may be generalised to other professions sharing similar characteristics with medicine. Although Ferguson *et al.* (2000) do recommend that similar research is undertaken in other fields in order to verify their results, their research strongly indicated that previous academic experience and one personality factor are the only useful predictors of success in medical training. Their analysis indicated large associations between training performance and conscientiousness from the Five-Factor model. They argue therefore that current selection procedures, that utilise personal statements as a selection criterion, need to be revisited.

It is the opinion of Gordon (2003) that students need to be continuously assessed throughout their medical training. She suggests that this be done by means of sustained personal and professional development, whereby interaction of students with faculty and one another may promote continuous commitment, co-operation, responsibility to the self and others, and organisational and management skills. This may also help to promote a sense of empowerment and individual satisfaction for the student.

To some extent Ferguson *et al.* ‘s (2000) results are supported by Marley and Carman (1999) and Hughes (2003), who found that matriculation scores, or A-levels alone, are poor predictors of academic success at medical school. When correlated with high conscientiousness scores, however, the results are consistently related to better pre-clinical training assessments (Hughes, 2003). Such individuals show themselves to be hardworking, organised and

methodical. Contrary to this, however, in the same study conscientiousness was also related to worse performance in clinical assessments. Hughes explains this as possibly relating to the nature of clinical performance which requires strategic problem solving abilities, rather than factual, methodological skills.

Articles by Kay-Lambkin, Pearson and Rolfe (2002) and Searle and McHarg (2003) have argued convincingly for a revision and remodelling of current medical school selection procedures used in Australia and the UK respectively. Both studies acknowledge differences in personal variables, social characteristics and academic and non-academic attributes as being important factors to consider when selecting candidates for medical training, and are in favour of discarding academic achievement as the sole criterion for selection. Although Searle and McHarg have not included a personality assessment aspect to their new selection strategy, they do recognise the potential value of such instruments and are currently awaiting results of trials with a new instrument in a number of different countries.

The collaborative works of Hojat and various authors strongly support the inclusion of measures of personality to the prediction model of performance in medical school (cited in Hojat, Glaser, Xu, Veloski & Christian, 1999). In a study that explored differences in personality between male and female medical students that may be influential on academic attainment and personal success, Hojat *et al.* (1999) found that males scored significantly higher on the intensity of loneliness, while female students obtained higher scores on

general anxiety, test anxiety and neuroticism. Interestingly, no significant gender differences were observed on measures of chronicity of loneliness, depression, extraversion, self-esteem, external locus of control, perception of general health and perceptions of the mother and the father. Based on results such as these, Hojat *et al.* (1999) argue that in addition to cognitive abilities and the acquisition of empirical knowledge, personality and personal attributes contribute to academic success and professional performance.

3.4. CONCLUSION

It is evident from this review of the relevant literature that academic performance hinges upon multiple factors, and that any assessment or attempt at predicting academic achievement needs to involve more than merely measurements of intelligence and past academic performance. Many studies highlight the interrelation of individual characteristics, societal and institutional factors with academic achievement. At an individual level, the literature focuses on variables associated with personality traits, study habits and attitudes. Personality traits such as conscientiousness, extroversion, openness to experience, self-control or self-regulation, internal locus of control and determination have been shown to play an important role in predicting academic success, while behaviours and attitudes pertaining to active class participation, independent study and the capacity to persevere have been positively associated with academic success.

It is also clear from the literature that social and educational values, as well as acceptance of institutional norms are significant to academic performance. Students who value education, who are comfortable in their relationships with lectures and staff, and who feel empowered within their academic environment, tend towards better academic performance. It is thus with these ideas in mind, that selection criteria and/or prediction of academic achievement should be viewed.

CHAPTER FOUR

METHODOLOGY

4.1. INTRODUCTION

The research design for this study is quantitative and makes use of two standardised assessment instruments, namely the *16 Personality Factor Questionnaire (16 PF)* and the *Survey of Study Habits and Attitudes (SSHA)*. By comparing personality factors, study habits and attitudes with academic performance, this research will serve as an initial exploration of the relationship between possible factors related to academic performance of students undertaking the National Higher Diploma in Emergency Medical Care.

4.2. INSTRUMENTATION: THE 16 PF AND SSHA

4.2.1. The 16 PF

The 16 PF, designed by Raymond Cattell, is one of the most widely used and recommended personality questionnaires. Briefly, according to Cattell's theory of personality, behaviour is attributed to elemental structures, known as *traits*. These traits allow an individual to respond consistently to various sets of circumstances, permitting personality to be mapped and predicted. This

mapping of traits also permits individuals to be compared to one another with regards to their individual differences in the clustering of specific traits (Phares, 1991).

Cattell's theory differentiates between *surface* and *source* traits, as well as *hereditary* and *environmental* traits. Surface traits refer to those behaviours that tend to be correlated with one another. For example, smiling, greeting and shaking hands with people may be behaviours associated with the trait of friendliness. They seem to belong together. Source traits on the other hand, are the underlying structures that constitute the core of personality for Cattell in that they cause behaviour and determine behavioural consistencies (Phares, 1991). Surface traits are seen as being the product of both genetic and environmental factors. Source traits, however, are regarded by Cattell as developing either from experience, hence the term environmental traits, or having a constitutional origin, as in hereditary traits. For Cattell, source traits are few or finite in number, and although everyone belonging to a specific culture possesses the same source traits, they differ in the degree to which their behaviour, thoughts and feelings are influenced by them. Cattell further distinguished between *ability* traits, which determine how effective one is in pursuit of goals, *temperament* traits, which determine an individual's level of emotionality, and *dynamic* traits, which motivate behavioural responses (Phares, 1991).

In designing the 16 PF, Cattell and his collaborators set out to sample broadly the realm of personality traits. By utilising personal descriptors, rating scales

and various factor analyses, Cattell developed 16 primary traits of personality. These form the basis of the 16 PF Questionnaire.

The 16 PF is a self-rated questionnaire that measures 16 first-order factors thought to reflect individual personality profiles. According to the various loadings scored by an individual on these factors, stronger and weaker personality characteristics can be delineated. By plotting these stronger and weaker loadings, an individual personality profile can be concluded. The 16 PF also provides for the calculation of five second-order factors as described below. These provide further measurements of personality characteristics.

4.2.1.2. Factors of the 16 PF

The following first order factors are measured by the 16 PF:

- *Factor A: Reserved (Sizothymia) vs. Outgoing (Affectothymia)*: A high score, for example, on Factor A suggests traits of sociability and a tendency towards unreserved behaviour, whereas a lowered score on this factor implies a tendency to be more withdrawn, critical and less gregarious (Meyer, 1983).
- *Factor B: Less Intelligent (Low g) vs. More Intelligent (High g)*: Factor B, although termed a measure of intelligence, is really more of an indication of general ability factors and general mental capacity. Being tested without speed, it is essentially a measure of *mental power*. In a clinical situation therefore, this scale cannot replace the measures provided by other, speeded intelligence assessment tools. However it is sufficient for

such things as vocational guidance, where the relevance of intelligence is sought in relation to several other abilities (Meyer, 1983).

- *Factor C: Emotional (Low ego strength) vs. Stable (High ego strength):* Factor C provides an indication of emotionality, i.e. the lower the score on this scale, the more volatile and unstable the individual's emotions are assumed to be. A person scoring high on Factor C is presumed to show more emotional maturity and is more likely to cope well within stressful and demanding or unpredictable situations. In general, they are presumed to show higher ego strength than individuals scoring lower on this trait (Meyer, 1983).
- *Factor E: Humble (Submissiveness) vs. Assertive (Dominance):* Factor E measures character traits of submissiveness and dominance. A high score on Factor E suggests characteristics of assertiveness and dominance, as well as the ability to command and take control. A lowered E score is indicative of tendencies towards docility, tolerance of the wishes of others and dependency etc. This factor is appreciably influenced by hereditary characteristics and is one of the personality factors distinguishing the sexes (Meyer, 1983).
- *Factor F: Sober (Desurgency) vs. Happy-Go-Lucky (Surgency):* Factor F is a component of extraversion, with high scores on surgency indicating adaptable, impulsive and communicative individuals, while low scores suggest more responsible, concerned, sober and serious individual tendencies (Meyer, 1983). It is important to note that although persons high on desurgency may appear silent, cautious and introspective, their

profile should not be confused with one indicating depression. Rather it serves to describe 'soberness' and practicality.

- *Factor G: Expedient (Low super-ego) vs. Conscientiousness (High super-ego)*: Factor G resembles Factor C in terms of ego strength, although its focus is aimed at the desire and persistence to perform optimally. This factor thus incorporates moral standards in terms of effort and performance. High scores on Factor G indicate perseverance, determination and consistency, while lower scores tend to indicate disorderliness and inattention to work (Meyer, 1983).
- *Factor H: Shy (Threctia) vs. Venturesome (Parmia)*: Factor H is a strongly defined factor which has been shown to have constitutional and autonomic associations, with high-shyness scores correlating with a proneness to schizoid disorders, ulcers, etc, and low shyness results suggesting an association with heart attacks (Ostfeld *et al.*, cited in Meyer, 1983). Low Factor H individuals are thus represented by shyness, timidity, feelings of inferiority and responsibility, while high scores on Factor H suggest uninhibited, adventurous, and socially bold behaviour.
- *Factor I: Tough-minded (Harrja) vs. Tender-minded (Premsia)*: High scores on Factor I indicate empathy and an imaginative appreciation of aesthetics and dramatics. Women tend to score decidedly higher than men on this factor, with low Factor I scores representing tough, masculine, practical, unsentimental and realistic traits (Meyer, 1983).
- *Factor L: Trusting (Alaxia) vs. Suspicious (Protension)*. Individuals measuring low on Factor L are trusting, accepting of the self and others, easygoing and perhaps lacking in drive and ambition. High Factor L

scores suggest tension and suspicion, with a tendency to be dogmatic, irritable and superior towards others. Such individuals are believed to be characterised by projection and inner tension (Meyer, 1983) thought to be associated with the adoption of projection as a defence mechanism.

- *Factor M: Practical (Praxemia) vs. Imaginative (Autia):* Factor M distinguishes between practical concerns versus imaginative tendencies. High scores on Factor M indicate temperamental tendencies, accompanied by imagination and some impracticality. Low scores on Factor M indicate a more systematic approach to tasks, attention to detail, objective assessment of situations (Meyer, 1983).
- *Factor N: Forthright (Artlessness) vs. Shrewd (Shrewdness):* Factor N seems to represent a socially acquired pattern of skills that may become impaired in pathology. Initial evidence shows that it is negatively associated with pathologies like schizophrenia and neurosis (Meyer, 1983). Thus individuals scoring high on Factor N are likely to be polished and socially aware. They show exact, calculating minds and tend to be emotionally detached and disciplined. High N scores also indicate insight regarding the self and others. Low Factor N scores however, indicate a lack of self-insight, an unquestioning trust in human motives, spontaneity and social clumsiness.
- *Factor O: Placid (Assurance) vs. Apprehensive (Guilt-proneness):* Factor O distinguishes between individuals who act out their maladjustment from those who suffer their maladjustment as internal conflict (Meyer, 1983). A person scoring highly on Factor O has a rigidly introjected superego. Such individuals tend to blame the self if things go wrong and they may become

disheartened and discouraged. Anxiety levels are high and they are sensitive to the approval or disapproval of others. A low Factor O score suggests self-assurance and self-confidence, along with weak superego introjection.

- *Factor Q1: Conservative (Conservatism) vs. Experimenting (Radicalism):* Factor Q1 is indicative of conservatism versus radicalism and persons scoring low on this factor show a respect for tradition while tending to be more conservative in their actions and deeds. High scores on Factor Q1 tend to indicate individuals more inclined to experiment in terms of problem-solving. They are critical, rebellious and may experience difficulties with authority figures (Meyer, 1983).
- *Factor Q2: Group-tied (Group adherence) vs. Self-sufficient (Self-sufficiency):* Factor Q2 differentiates between group dependency and self-sufficiency. In other words, it is indicative of introversion. Low scores of this factor delineate a person who is more group dependent in that they require social approval and group support (Meyer, 1983). Such individuals tend to be conventional and fashionable, while higher scores suggest a resolute and independent person who is not swayed by group opinion.
- *Factor Q3: Casual (Low integration) vs. Controlled (High self-concept):* A higher score on Factor Q3 is indicative of a high sense of self-esteem. Such individuals are controlled, precise, and exacting of their will power. A high score on this factor is often found in leaders. A lowered score on Factor Q3 suggests low integration, a tendency to follow own urges and an underdeveloped sense of consistent adherence to socially approved behaviour (Meyer, 1983).

- *Factor Q4: Relaxed (Low ergic tension) vs. Tense (Ergic tension):* Factor Q4 measures ergic tension, or the levels of tension experienced by the individual. A high score on this factor indicates a person who often feels tense, frustrated, fretful and overwrought. A person scoring low on Factor Q4 appears more relaxed, tranquil and composed.

By combining the scaled scores of various first order factors according to specific formulae, the 16 PF allows for the measurement of further (so-called) second-order factors. These include:

- *Invia vs. Exia (QI)*, popularly known as *Introversion vs. Extraversion*. This factor is calculated using the primary traits of A, E, F, H and Q2. It is a broad trait, referring to social inhibition. In other words, it refers to traits which render an individual either more or less socially outgoing.
- *Adjustment vs. Anxiety (QII)* refers to a combination of low ego strength (C-), high guilt proneness (O+), high ergic tension (Q4+), high protension (L+), low temperamental thrextia (H-) and poor self-sentiment development (Q3-). Although associated in psychoanalytic theory with pathology, certain levels of anxiety are considered normal and functional, and it is important to therefore distinguish between the *state* (which is situational) and the *trait* (which is a consistent pattern of behaviour) of anxiety. The 16 PF aims to measure the trait of anxiety.
- *Pathemia vs. Cortertia (Emotional Sensitivity / Tough Poise) (QIII)* refers to levels of arousal, with high scores indicating cheerfulness, alertness and readiness to handle problems in a cognitive and objective manner. The opposite pole indicates frustrated and depressed mood, with individuals

tending to *feel* rather than to *think*. This second order factor is calculated using Factors A, I, M, E, and L.

- *Subduedness vs. Independence (QIV)* refers to a general temperamental independence, describing an individual who is independent, radical, autistic, projective and a law unto him/herself. This factor is calculated using factors E, L, M, Q1 and Q2.
- *Compulsivity or Low Superego vs. High Superego Strength (QVIII)* is calculated using Factors G, N and Q3. In general, it refers to superego strength from Factor G. It also includes aspects of Factors N and Q3, such as shrewdness and self-discipline (Cattell *et al.*, 1970).

4.2.1.3. Reliability and validity

Although the use and application of the 16 PF (SA 92) in a multi-cultural South African context has been challenged in a number of studies (for example, Abrahams, 2002; Abrahams & Mauer, 1999a; Abrahams & Mauer, 1999b and Tack, 1998), some studies (for example, Wallis & Birt, 2003) attest to its applicability if used sensitively. Further, the HSRC Test Catalogue (1997/8) reports the construct validity of the 16 PF as being well established, along with its suitability for use in different cultures. Two forms (A and B) have already been adapted and standardised for South African use (HSRC Test Catalogue, 1997/8). On the whole, the 16 PF shows intercorrelations slightly above average for internal consistency reliability. Because it has a small number of items only, the internal consistency values for the 16 PF are lower than is common amongst personality questionnaires. However, its second-order

values compare well with those used by other instruments. The inter-form and inter-instrument correlations for Forms A and B are the highest when compared to similarly named scales. The 16 PF also has two scales FG (fake good) and FB (fake bad) which address the issue of self-presentation. The scores of these two scales may be calculated and used to correct or modify scores obtained that suggest tendencies to present the self as either psychologically healthy or with psychological difficulties. Such scores are possible because it is known that when a person “fakes good” for example, the direction of bias is towards stereotypical and socially accepted constructs. The opposite is true for “faking bad”, where introversion, anxiety and pathology variables may go up (Schuerger, 1992). According to Schuerger (1992), the 16 PF is useful for proficiency predictions in the areas of leadership, productivity and achievement. This renders the 16 PF a useful instrument for this type of study design.

4.2.2. The SSHA

The SSHA aims to assess students' study habits and attitudes with regards to their academic performance. In other words, the test evaluates the impact of study behaviours and approach to studies on academic achievement. The SSHA therefore sets out to evaluate study methods, motivation for studying and certain attitudes towards academic activities (Du Toit, 1981). By identifying students with ineffective study habits and attitudes, the SSHA can be used to try to prevent poor academic performance.

The test is available in two forms: Form H for High school pupils and Form C for students. The Form H Questionnaire was translated, adapted and standardised for high school pupils in South Africa by the Institute for Psychometric Research of the Human Sciences Research Council, while Form C has stanines and percentile ranks for university and teachers' training college students for the various years of study for men and women in South Africa (HSRC Test Catalogue, 1997/8). It is noted in the HSRC Test Catalogue (1997/8) that the SSHA can be administered at the beginning of the academic year, either on its own or as part of a test battery. However, its use need not be limited to the beginning of the year as the questionnaire can be administered at any given time during an academic career.

4.2.2.1. Factors on the SSHA

The SSHA measures the following scales:

- *Delay avoidance (VU/DA)*: This measures the extent to which students complete assignments promptly, avoid delays and engage in unnecessary wasting of time.
- *Work Methods (WM/WM)*: Provides an indication of the student's effective use of study methods, together with his/her efficiency in completing assignments and the manner in which he/she sets about undertaking tasks realistically.
- *Study habits (SG/SH)*: This factor combines the score on VU/DA and WM/WM scales in order to measure academic behaviour on the whole.

- *Teacher Approval (OG/TA)*: This factor provides a scale to determine the student's attitude towards the teacher/lecturer's behaviour and teaching style.
- *Education acceptance (AO/EA)*: This factor measures a student's acceptance of educational ideals, objectives, practices and requirements.
- *Study Attitudes (SH/SA)*: This scale is a combination of OG/TA and AO/EA, providing a measure of the pupil's confidence in academic aims.
- *Study Orientation (SO)*: This factor is a combination of all the above-mentioned aspects, providing an overall measure of a student's study habits and attitudes.

4.2.2.2. Reliability and validity

The SSHA has been shown to have high predictive validity with regard to academic achievement (Du Toit, 1981). Although the test depends on the honesty of the student, its predictive validity is still useful, as it shows a low correlation with other academic tests, suggesting that the predictive value of the test be based on factors other than those assessed by such instruments. The test may also be used diagnostically by using the specifically designed counselling key to identify problematic areas of study practice and attitudes. These may then be addressed and academic performance enhanced.

4.3. RESPONDENTS

The study made use of a closed sample of participants, as only students currently registered in 2004 for the National Higher Diploma in EMC at the Witwatersrand Technikon were included. Of the total number of students registered for the course in 2004 (n=70), 53 agreed to participate in the study. Of these, 34 respondents were male and 19 were female. All of the respondents were between the ages of 18 and 33. As only 51 of the 53 respondents denoted their age, the average age across 51 participants was 23.3 years. Two of the respondents were married and two reported being divorced or separated. The remainder of the respondents were single or had never been married.

The sample of respondents comprised a multilingual, multiracial and multicultural group from various ethnic and educational backgrounds. Some of the respondents had begun attending the course immediately after leaving school (and thus had no previous work experience or qualifications), while others had pursued various careers before studying EMS. A number of the participants were military enlists who had had some previous exposure to EMS services within the army.

The respondents also differed in their EMS exposure and/or qualification at the time of assessment. Of the participants, 12 had no previous EMS experience or qualifications, 21 of the participants held the qualification of

BAC and 20 were registered as AEAAs. None of the participants held a CCA registration.

4.4. PROCEDURE

All students currently enrolled in the EMC course were asked by lecturers to participate in the study. This included both part-time and full-time students across all three years of the course. It was made clear to the students by the lecturers that participation was voluntary, and that non-participation would in no way impact upon their performance on the course. Students who participated in the study were asked to sign a letter that introduced the aims and procedures of the study, as well as the voluntary basis of participation (Appendix C). The letter also stated that all participants' details would remain confidential.

Students were asked to attend a once-off assessment session, of approximately 90 minutes, at a time and venue arranged with the researcher. Due to logistical constraints, each year of study was assessed separately. All students were asked to complete the 16PF (SA 92, Form A) and SSHA (Form C), as well as a short biographical questionnaire (Appendix D). These results were analysed in order to determine any correlation between high and low personality and study habits and attitudes scores at each year level with reference to academic performance.

Academic performance was based on available students' test and exam results. However, due to the fact that this study was conducted during the academic year, results do not represent a student's final mark. An average was thus calculated for first year students across the 3 test results available at that time. For second years, academic performance was assessed as their final year mark for first year. Similarly, third year student's academic performance was taken as being represented by their final second year mark. The final sample size was reduced (n=44) due to the lack of availability of all students' academic results.

4.5. STATISTICAL METHODS

Based on the literature reviewed in Chapter Three, and the researcher's understanding of requirements for EMC students, 14 psychological factors were selected for statistical analysis. From the 16 PF, Factors B, G, M, Q1 and Q3 were selected as first order factors; while second order factors included QI, QII, QIII and QIV, The final five factors were selected from the SSHA and included DA, WM, SH, EA and SO. This selection of certain factors was done to ensure that the statistical analyses were theory driven and not statistically driven. Using an analogy by way of explanation, it is more relevant to bait a hook and cast for specific types of fish than to cast a net into the sea and catch whatever happens to swim into it. By selecting certain factors the likelihood of a Type I Error occurring was decreased. In other words, the

possibility of finding something that is statistically significant purely by chance was reduced (Aron & Aron, 1994).

Due to the small sample size ($n=53$), a number of non-parametric and parametric statistical procedures were applied. This was done using SAS ® (V8.2). Initially, all students were compared with regards to 16 PF and SSHA factors. No significant differences were found between the three year-groups and thus all subsequent analyses involving the 16 PF and SSHA were done on the entire group.

Means and standard deviation scores were calculated for all students on all the psychological variables and average academic percentage (Appendix E). A Kruskal-Wallis test was then used to ascertain whether there were significant differences between the rank scores in average academic percentage for the three-year groups. This test is based on the idea that once ranked, scores should be randomly distributed and the sum of the ranks (or their means) should be approximately equal (Kerlinger, 1986; McCall, 1990). If this assumption can be rejected, then the rank scores of the group(s) are said to be different in some way.

The scores on the 16 PF and the SSHA were on an interval level of measurement whilst the year level of the students was on a nominal level of measurement. In order to relate year level and the psychological variables in a multiple regression analysis, dummy variables were created for the year of study.

Stepwise Multiple Regression Analysis was performed, with the 14 selected psychological factors as independent variables and average academic percentage as dependent variable. Stepwise Multiple Regression Analysis serves to pick out which variable(s) make the most useful contribution to overall prediction. The SAS ® program systemically determines which variable(s) have the highest correlation with the dependent variable. At the point where no further correlations are significant, no further analysis is done. Significant correlations are explored in combination in order to determine which combination produces the highest multiple correlation. If such a combination is significant, over the single variable alone, this combination of variables is then explored with each of the remaining predictors, one at a time, to find the best multiple combination. This process continues until all variables have been included or excluded due to statistical non-significance (Aron & Aron, 1994). In this study, the 14 factors were tested with Stepwise Multiple Regression Analyses in groups according to their origin on the psychological tests, i.e. second-order factors, first-order factors and factors from the SSHA were tested separately with average academic percentage as dependent variable. The reasons for conducting separate analyses were firstly that the sample size was small, and secondly because the 16 PF second-order factors are calculated by combining first-order factor scores. This overlap of scores would have distorted the results.

Factors found to be significant by the Stepwise Multiple Regression Analysis were then explored by means of *Multiple Regression Analyses*. Briefly, this

procedure allows for the prediction of scores of the dependent variable based on the scores of two or more other variables (independent variables) (Aron & Aron, 1994). This test was performed to establish which of the significant factors best predicted average academic percentage on the EMC course.

Pearson Product-Moment Correlation Coefficients (r) were then calculated to describe the overall correlation between the independent variables and the dependent variable. The *r* is a measure of the degree and direction of linear correlation which ranges from -1 (a perfect negative linear correlation) through 0 (no correlation) to $+1$ (a perfect positive correlation) (Aron & Aron, 1994).

4.6. CONCLUSION

Various statistical procedures were performed in order to compare the scores obtained by EMC students on the 16 PF and SSHA with their academic performance. A relationship between variables whereby success on the EMC course could be predicted was thus investigated.

CHAPTER FIVE

RESULTS

5.1. INTRODUCTION

This chapter sets out the results obtained by this study. The descriptive statistics for all three-year groups, including average academic percentage and selected psychological variables are provided first. This is followed by the results of Stepwise Multiple Regression Analyses, Multiple Regression Analyses and the Pearson Product-Moment Correlation Coefficient.

5.2 RESULTS

5.2.1. Descriptive statistics for all three year groups

5.2.1.1. Average academic percentage

As can be seen in Table 3, the average academic percentage across all three-year groups was 54.1%, suggesting an overall pass rate of students on the EMC course but not with a very comfortable margin. When the average academic percentage of 49.5% for first year students is compared with that of second and third year students, at 61.7% and 58.4% respectively, the idea that second and third year students are academically more successful on the EMC course is underscored. Results of the Kruskal-Wallis test indicate that

there is a significant difference in terms of average academic percentage between first year and second year students, as well between first year and third year students ($df = 2, p < 0.02$). The difference between second and third year students is not significant. There is only a 3.29% difference between second and third year students' average academic percentage, while the average academic percentage for first year students differs from second and third year students by about 10%. The standard deviation for first year students indicates a much wider spread of scores than is evident for second and third year students, suggesting a wider range of academic performance at this level.

Table 3: Descriptive Statistics: Average Academic Percentage

Year Level	Mean	SD
First Year	49.46	15.50
Second Year	61.69	5.64
Third Year	58.40	5.70
Total Group	54.10	12.97

5.2.1.2. 16 PF and SSHA: selected psychological variables

Table 4 shows the means and standard deviations (SD) for the psychological variables selected from the 16 PF and SSHA. The mean scores on the first order factors Q1 and Q3 were slightly elevated (i.e. above a sten of 5), while the mean of Factor B was marginally lowered (i.e. below a sten of 5). EMC students thus show slightly elevated traits of experimentation, self-sufficiency

and control, with a lower overall score on abstract verbal reasoning. The SDs of factors Q1 and Q3 suggest slightly more variability of scores than for factors B, G and M.

The mean scores for the second order factors QII and QIII were slightly lowered, indicating a reduced average of traits of anxiety and emotional sensitivity for EMC students. However, the SDs are relatively uniform for these factors, except for factor QII, indicating a relatively even spread of scores for Extraversion, Emotional Sensitivity, Independence and Compulsivity.

The mean scores of factors on the SSHA were all measured as being well above 50% (i.e. the 50th percentile), except for Factor DA at 52.77% indicating an overall tendency of students to delay occasionally in completing study tasks. The high mean score for Factor WM however, shows that although students may put off doing academic assignments, they do tend to work effectively and realistically. The SDs here are also fairly uniform, suggesting an even spread of scores across all study habits and attitude factors.

Table 4: Descriptive Statistics for Selected Psychological Variables

		Mean	SD
16 PF: 1st order Factors	<i>Factor B</i>	4.92	1.74
	<i>Factor G</i>	5.49	1.94
	<i>Factor M</i>	5.55	1.59
	<i>Factor Q1</i>	6.11	2.29
	<i>Factor Q3</i>	6.51	2.14
16 PF: 2nd order Factors	<i>Factor QI</i>	5.59	1.58
	<i>Factor QII</i>	4.89	1.81
	<i>Factor QIII</i>	4.77	1.56
	<i>Factor QIV</i>	5.94	1.10
SSHA	<i>DA</i>	52.77	30.09
	<i>WM</i>	68.88	29.14
	<i>SH</i>	61.52	30.25
	<i>EA</i>	62.41	31.04
	<i>SO</i>	63.83	31.12

5.2.2. Stepwise Multiple Regression Analyses

Stepwise Multiple Regression Analyses were conducted in order to identify which variables predict average academic percentage at a significant level. Stepwise regression analysis revealed Factors QI, QII and Year Level to be significant predictors of average academic percentage. As seen in Table 5, Factor QII accounts for 23% of the variance in average academic percentage,

while Year Level and factor QI account for 13% and 7% respectively. Together, these second order factors and Year Level explain 43% of the variance in average academic percentage.

Table 5: Summary of Stepwise Multiple Regression Analysis with Average Academic Percentage as Dependent Variable and 2nd Order Factors and Year Level as Independent Variables

Step	Variable	Parameter Estimate	Partial R²	Cumulative R²	F Value	p
	Intercept	79.71				
1	Factor QII	-4.65	0.23	0.23	12.65	0.0009
2	Year Level	-6.25	0.13	0.36	8.27	0.0064
3	Factor QI	-2.48	0.07	0.43	4.94	0.0319

Factor B was shown to explain only 5% of the variance of average academic percentage, while Year Level accounted for 9% (Table 6).

Table 6: Summary of Stepwise Multiple Regression Analysis with Average Academic Percentage as Dependent Variable and 1st order factors and Year Level as Independent Variables

Step	Variable	Parameter Estimate	Partial R²	Cumulative R²	F Value	p
	Intercept	38.30				
1	Year level	4.40	0.09	0.09	4.28	0.0447
2	Factor B	1.64	0.05	0.14	2.30	0.1368

Of the SSHA factors, WM accounts for 20% of the variance in average academic percentage, and Year level explains 33%. This may be seen in Table 7.

Table 7: Summary of Stepwise Multiple Regression Analysis with Average Academic Percentage as Dependent Variable and SSHA factors and Year Level as Independent Variables

Step	Variable	Parameter Estimate	Partial R²	Cumulative R²	F Value	p
	Intercept	29.15				
1	Factor WM	0.22	0.20	0.20	10.52	0.0023
2	Year Level	5.59	0.13	0.33	7.57	0.0088

5.2.3. Multiple Regression Analysis

Once the variables playing a significant role in predicting average academic percentage were identified, they were entered into a Multiple Regression Analysis with average academic percentage as dependent variable. Table 8 shows the results of Multiple Regression Analysis of second order factors and year level as independent variables with average academic percentage as dependent variable. $R^2 = 0.46$, which was significant at the 0.0001 level. This means that the model accounts for 46% of the variance in average academic percentage. Factor QI shows a negative relationship with average academic percentage, suggesting that the higher a student's level of extraversion, the lower his/her average academic percentage tends to be.

Factor QII also shows a negative relationship with average academic percentage, implying that students with higher levels of anxiety tend to perform more poorly at their studies. Year Level also showed a significant relationship with average academic percentage, in that the higher the year of study, the better the students' academic performance. This applies specifically to progress from the first year of study to the second, as the p value for Year Level 2 indicates a non-significant change from Year Level 2 to Year Level 3.

Table 8: Multiple regression Analysis: 2nd Order Factors and Year Level

Source	DF	R ²	F	p
Model	4	0.46	8.25	0.0001
Error	39			
Corrected Total	43			
Factor	DF	Parameter Estimate	t	p
Intercept	1	94.64	9.14	0.0001
Factor QI	1	-2.27	-2.03	0.05
Factor QII	1	-4.48	-4.72	0.0001
Year Level 1	1	-11.28	-2.92	0.00
Year Level 2	1	0.25	0.10	0.92

From Table 9 it can be seen that Factor B together with Year Level, was significant in relationship to average academic percentage, with $R^2 = 0.20$. Factor B showed a positive relationship with average academic percentage, emphasising the idea that an increased ability in abstract, verbal reasoning coincides with increased academic performance. The model also shows that the higher the year of study, the better the academic achievement. Again, this application is restricted to progress from the first year of study to the second, as the p value for Year Level 2 is 0.40.

Table 9: Multiple Regression Analysis: 16 PF and Year Level

Source	DF	R ²	F	p
Model	3	0.20	3.31	0.0295
Error	40			
Corrected Total	43			
Factor	DF	Parameter Estimate	t	p
Intercept	1	48.82	7.27	0.0001
Factor B	1	1.67	1.58	0.12
Year Level 1	1	-7.21	-1.57	0.12
Year Level 2	1	2.61	0.86	0.40

In Table 10 Factor WM and Year level of study were found to be significant in relation to average academic percentage, with $R^2 = 0.39$. Factor WM showed a significant and positive relationship with average academic percentage, suggesting that more effective methods of study are related to higher academic performance. Once again, year of study from first year to second year was significant in relation to average academic percentage, but not so from second to third year level of study.

Table 10: Multiple Regression Analysis: SSHA and Year Level

Source	DF	R ²	F	p
Model	3	0.39	8.42	0.0002
Error	40			
Corrected Total	43			
Factor	DF	Parameter Estimate	t	p
Intercept	1	43.16	8.67	0.0001
Factor WM	1	0.22	3.94	0.00030.
Year Level 1	1	-9.58	-2.40	0.0214
Year Level 2	1	2.16	0.82	0.4188

5.2.4. Pearson Product-Moment Correlation Coefficient

Table 11 shows the Pearson Product-Moment Correlation Coefficient (r) for factors identified via the Stepwise Multiple Regression Analysis for the total group of students in relation to average academic percentage. From this it can be seen that Factors QI and QII, Extraversion and Anxiety, have negative relationships with average academic percentage. Factor B and WM both indicate a positive correlation with average academic percentage. This confirms findings done with the other statistical tests above.

Table 11: Pearson Product-Moment Correlation Coefficient: Total Group

		r	p
16 PF: 1st Order Factors	<i>Factor B</i>	0.25	0.10
16 PF: 2nd Order Factors	<i>Factor QI</i>	-0.01	0.96
	<i>Factor QII</i>	-0.48	0.00
SSHA	<i>WM</i>	0.45	0.00

5.3 CONCLUSION

The results obtained show there to be a relationship between various personality factors, study habits and attitudes and academic performance. Specifically, the results indicate that levels of anxiety and extraversion are negatively related to average academic percentage. The ability to reason abstractly and to study effectively impact on average academic percentage, indicating that those students with flexible reasoning abilities and efficient study methods are likely to perform more successfully on the EMC course. As progress from the first year of study to the second showed a positive correlation with average academic percentage, there seems to be some evidence that experience and perseverance on the course may assist in producing successful academic results. This is confirmed by the non-significant difference existing between second and third year students who have had academic success on the course in the past

CHAPTER SIX

INTERPRETATION AND DISCUSSION OF RESULTS

6.1. INTRODUCTION

The results of this study are in accordance with results obtained by various researchers regarding the existence of a relationship between personality and study attitudes with academic achievement. Levels of anxiety, extraversion, intelligence or verbal abstract thinking ability and work or study methods were found to impact upon overall academic performance. To some degree, year or level of study was also shown as impacting on academic performance.

6.2. INTERPRETATION

The descriptive statistics of this study (Table 4) suggest that on the whole, current EMC students may be described as experimenting, self-sufficient and controlled. In other words, students can be expected to be explorative and independent in terms of their thinking. They also tend to be self-confident and critical.

Students show lower abstract, verbal reasoning abilities than may be expected. As the various regression results show, abstract, verbal reasoning is correlated with better average academic percentage on the EMC, and a low

overall percentage is thus noteworthy in terms of expected academic performance. However, this characteristic may be in line with the requirements of studying EMS in terms of needing to follow very specific, practical medical procedures in particular circumstances.

From the descriptive statistics it is also clear that EMC students have slightly lowered levels of anxiety and emotional sensitivity. This seems to suggest a generalised tendency to remain calm, collected and emotionally in control. Slightly reduced levels of emotional sensitivity may, however, suggest a tendency for students to become easily frustrated, depressed and moody. Although this may seem contradictory, the researcher's experience of EMS suggests that within a crisis situation, EMC students and /or practitioners need to remain calm, clear headed and functional. However, they generally present as the kind of people who prefer high activity and stimulation, and may thus become bored and dejected when these needs are not sufficiently met.

In terms of study habits and attitudes, EMC students were shown to delay in the completion of academic tasks. They tend to procrastinate with regards to deadlines and may waste time rather than planning sufficiently. The results indicate, however, that once students do settle down to studying, they are effective and realistic in their study methods. This may not necessarily be problematic, however, given that the EMS environment is one that demands performing competently under pressure rather than engaging in long-term, strategic planning.

From the results, it is evident that the overall pass rate of students on the EMC course is not a confident one with, on average, little over half of students passing each year. Although this tends to improve slightly once second and third year of study are attained, there is still reason for concern. It may be, given the wide spread of average academic percentage obtained by students in the first year of study, that this year serves to filter out those students who are not likely to cope with the course requirements. In theory, this should leave only successful students on the EMC course, but the results indicate that average academic performance does not exceed the average range by more than approximately 10% for the following years of study as well. In light of this and the findings of Lufi *et al* (2003) (discussed in Chapter 3), it is clear that other variables may play important roles on academic performance.

The results suggest that students who are more likely to be academically successful tend to score lower on the trait of Extraversion. This is in line with the findings of Sánchez *et al.* (2001) as discussed in Chapter 3. Students who tend to show lower levels of Anxiety are also more likely to be academically successful on the course. Such students are generally less inclined towards social interaction, being more reserved and quiet. They are also relaxed, composed and controlled with good ego strength. As Extraversion and Anxiety, together with Year Level, explained 43% of the variance of average academic percentage (see Table 5) it seems that these factors are important contributors to academic success.

Although the average mean score on Factor B is low, successful students were characterised by a slightly heightened abstract, verbal reasoning ability. Because the percentage of contribution to average academic percentage is small (5%), it suggests that although not essential to success on the EMC course, it may be beneficial to have some ability to think “outside of the box”. In other words, it is advantageous to have some measure of the ability to think and reason abstractly. For example, it may be valuable, and sometimes necessary, for EMS personnel to be able to apply medical procedures according to varying situational demands. In a situation where correct medical equipment is not available, alternatives may have to be found. When medical splints, used to stabilise a broken arm or leg, are not available for example, the researcher has heard how EMS personnel may be forced to use their ingenuity and brace the broken limb with sticks of wood, splinters from furniture or any readily available material that will meet the need.

The Stepwise Multiple Regression Analyses showed that of the SSHA factors, Work Methods explained 20% of the variance of average academic percentage. The work methodology employed by EMC students, together with year of study and experience on the course, thus affects average academic percentage. As noted above, students who work and study effectively and pragmatically are more likely to be academically successful on the course. Although study methods presumably evolve from one year of study to the next, it seems that successful students may have a study routine and methodology that is flexible and dependable and which may be amended if necessary. This can be linked to the findings of Orbell (2003) (see Chapter 3)

with regards to planned behaviour and individual disposition to studying being influential determinants of academic success.

Of the 14 factors selected by the researcher to play a significant role in academic success on the EMC course, it is interesting to note that only four showed statistical significance in this study, and that this was in conjunction with year level of study. This is not to say however, that the remaining 10 factors do not have any relationship with average academic percentage on the course, but rather that their singular or combined contribution within this group of EMC students is unknown. It may be that as single factors, their respective contribution to average academic percentage is negligible. As part of a combination of factors however, as in the second-order factors, many of the first-order factors do play a role. This is evidenced by the significant roles Factors QI and QII play in predicting academic performance (see Table 5).

Given the prominence of Factor G in the literature (see Ferguson *et al.*, 2000; Hughes, 2003; Marley & Carman, 1999; Scepansky & Bjornsen, 2003; Wigen *et al.*, 2003; Wolfe & Johnson, 1995 in Chapter 3), its lack of singular significance in this study is noteworthy. This is true more specifically as this factor refers to the desire to persevere and to perform optimally. The non-significance of this result for EMC students requires further investigation as it suggests a reduction in determination and commitment from students to the course. As discussed in Chapter 3, it may be that lowered levels of commitment and determination are influenced by various contextual factors (for example, student's feelings of support and satisfaction with the academic

institution, teacher-student relationships, selection procedures and individual factors) shown to impact on academic performance.

As to why only one of the selected factors from the SSHA showed significance is not clear and may also require further future investigation.

6.3. LIMITATIONS AND CRITIQUE OF THE STUDY

Results of this study may have been affected by various limitations inherent in the study design.

Firstly, the study was undertaken with a homogeneous group in terms of all participants being current EMC students at the Witwatersrand Technikon. Although this limited the scope and variability of results within the group, it is inevitable when making use of a “ready-made” group in a study. The homogeneity of the group and associated low variability in the scores contributed to a restriction of the range of scores. The latter has the effect of lowering correlations (Howell, 1989), and this may be one of the reasons why so few of the variables entered the regression models. Although this perhaps limits the applicability of the results generated by this research, they remain relevant and useful to the Technikon in terms of gaining some understanding of the high attrition rates on the EMC course and may inform future research in this specific area.

Secondly, although the group of participants was comprised of only EMC students, it included students from different racial, cultural, ethnic, religious and linguistic backgrounds. Students also differed in terms of age, marital status and previous work and/or study experience. Although both the 16 PF and SSHA are deemed applicable for multicultural users, the differences in students' respective backgrounds may play a role in average academic percentage that is not evident in this study. This may be true especially for more mature students, with previous EMC exposure and /or training who may cope more effectively with the course requirements. Alternatively, previous social and educational factors experienced during the Apartheid regime, may also have affected the results in ways that are not immediately evident. With the development of more culturally sensitive test materials however, the researcher hopes that such potential bias may be avoided or better accounted for in the future. However, although issues of heterogeneity may have influenced the results of this study, this need not be seen as a limitation, as the group can be regarded as representative of the diversification found in other groups in South Africa.

Thirdly, the size of the group was quite small to begin with, and results were further limited to including only those students who consented to participate. Excluding students for whom academic results were not available then further reduced this number. However, Christensen (1997) cites a comment by Cowles that suggests that approximately 35 participants can be used in a preliminary study, or in the case of an analysis of variance design with several

independent variables, then at least 15 participants per cell is recommended. This study analysed the results of 44 students.

A fourth limitation of this study is in regards to the academic data used to obtain average academic percentage. The academic data that was used was gathered during the academic year and was therefore not a student's final result for that year of study. This was further complicated by the fact that students in second and third year had final examination results for the previous year of study, but this was not so for first year students. The results available for students were thus not the same. For the first-year students averages of available results had to be calculated and used to ascertain a student's level of academic performance.

Finally, this study was not able to include or account for factors possibly affecting rates of attrition other than personality and study attitudes. For example, practical considerations, such as life styles changes (e.g. marriage), bereavement (e.g. death of a loved one) and /or financial difficulties, etc., may impact on a student's academic performance. Such extraneous variables were beyond the scope of this study, but remain powerful influences within a student's life. Future research may therefore try to accommodate for them in some manner. For example, the inclusion into similar studies of a scale like the Holmes-Rahe Social Readjustment Rating Scale (Holmes & Rahe, 1967) may be advantageous

In summary then, the results found in this study are applicable and useful to EMC students doing the course at the Witwatersrand Technikon, but in order to be applicable to a wider sample of students, further research is recommended.

CHAPTER SEVEN

CONCLUSION

7.1 SUMMARY OF FINDINGS

In summary, this study revealed the following findings. Firstly, in accordance with the literature, the findings suggest a relationship between certain personality factors, study habits and attitudes, and academic achievement. The personality factors shown to be significant in relation to academic success on the National Higher Diploma in EMC include abstract, verbal reasoning, levels of anxiety and extraversion, which together with year of study, contributed to average academic percentage. Work methods in conjunction with year of study were also identified as playing a significant role in academic performance on the course.

The results indicate that students who showed lower levels of anxiety and extraversion demonstrated better academic performance on the course, while a greater capacity for abstract, verbal reasoning and efficient study methodologies also contributed to academic success. As acknowledged above, the fact that this study did not produce significant findings for any of the remaining 10 selected personality and study orientation factors does not necessarily preclude these from having an influence on academic performance. Although academic percentage was explained by variations in levels of anxiety, extraversion, abstract, verbal reasoning and work methods,

57% of the variance remains unaccounted for within this study. As the current average pass rate for students undertaking the EMC course is a little over 50%, it may be necessary to conduct further research to investigate additional factors that may be significant in contributing to academic achievement.

7.2 RECOMMENDATIONS FOR WITWATERSRAND TECHNIKON

Given that current EMC students are generally high-energy, self-confident, explorative and independent, critical thinkers who are capable of meticulous work, as well as autonomous, controlled decision-making, the selection criteria used by the Technikon may need to be revised as they do not seem to explore any of these attributes. It may therefore be beneficial for the Technikon to introduce a type of personality questionnaire into the selection procedure. Exploration of student's study methods is also recommended as these too were highlighted as significant in relation to academic performance on the course.

On the whole, the researcher recommends that the Technikon modify both its selection criteria and current selection process. The former should include measurements of the factors shown in this study to have an impact on academic performance, while the latter process may need to be rendered less subjective and more structured.

7.3 RECOMMENDATIONS FOR FUTURE STUDY

Benefits may well be gained by conducting future research into factors playing a role on academic performance, specifically with regards to the EMC course at the Witwatersrand Technikon. The use of alternative test instruments may be useful in checking whether or not the same or similar personality traits and study habits are identified as significant in interaction with academic achievement.

Ideally, a longitudinal study of students' academic progress over all three years on the course should be undertaken. In this way the effects of factors identified in this study can be examined over time, as well as possibly bringing to light other factors influential on academic achievement. The use of a control group may be advantageous in controlling for the influences of practical, everyday factors as mentioned above.

The researcher wishes also to comment here on the potential value of conducting a qualitative study with EMC students. By ascertaining which factors EMC students themselves identify as important in being successful on the course may lead to further understanding of the relationship between academic achievement and personality and study attitudes. This may also assist the Technikon in selecting suitable students in the future. Qualitative information may also elicit constructive comments and suggests from students on course modification and /or teaching methods.

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APPENDICES

Appendix A

SELECTION ESSAYS-2003

1. What is the role of the Paramedic in the 21st century?

(60 min)

2. National Higher Diploma Emergency Medical Care. What do you expect to do and learn should you be selected for the course?

(60 min)

3. If 600 applications were received for this course and only 40 will be accepted, why should you be chosen?

(15 min)

4. In today's times South Africa is full of violent crimes. As a Paramedic you will have to deal with the victims and the criminals involved in these violent crimes. Discuss how you would manage a murderer or a rapist should they require medical intervention

(60 min)

Appendix B

NATIONAL HIGHER DIPLOMA EMERGENCY MEDICAL CARE

SELECTION 2003: PERFORMANCE EVALUATION FOR INTERVIEW

NAME..... SELECTION NUMBER.....

DATE.....

1.	ACADEMIC SCORE	MATHS	_____	HG	_____	SG
		BIOLOGY	_____	HG	_____	SG
		SCIENCE	_____	HG	_____	SG

2.	RELEVANT SHORT COURSES	5	4	3	2	1
3.	EXPERIENCE	5	4	3	2	1
4.	ATTITUDE TO AUTHORITY	5	4	3	2	1
5.	WHY THIS PROFESSION	5	4	3	2	1
6.	INSIGHT INTO PROGRAMME	5	4	3	2	1
7.	IF NOT ACCEPTED/DEDICATION	5	4	3	2	1
8.	FINANCIAL STABILITY	5	4	3	2	1
9.	TRANSPORT/ DRIVERS LICENCE	5	4	3	2	1
10.	POST GRADUATE QUALIFICATIONS	5	4	3	2	1
11.	GENERAL PRESENTATION	5	4	3	2	1

12 . OVERALL IMPRESSION SUITABLE/UNSUITABLE

KEY:

(5) excellent (4) Above Average (3) Average (2) Below average (1) Poor

TOTAL POINTS:

NAME:..... .CONTACT NUMBER:.....

ACCEPTED

SHORT LISTED

NOT ACCEPTED

Appendix C

LETTER OF INTRODUCTION AND CONSENT

UNIVERSITY OF PRETORIA

RESEARCHER: SHARON LOURIA

FACULTY OF HUMANITIES

TEL NO: 082-950-6929

DEPARTMENT OF PSYCHOLOGY

PRETORIA

0002

MASTERS DISSERTATION

COUNSELLING PSYCHOLOGY

To All Participants

TITLE OF STUDY

*Academic achievement on the National Higher Diploma in Emergency Medical Care:
the role of personality and study habits and attitudes.*

PURPOSE OF STUDY

This investigation aims at exploring individual factors amongst students which may play an influential role in determining academic success on the National Higher Diploma in Emergency Medical Care at the Witwatersrand Technikon in Johannesburg.

PROCEDURES OF STUDY

The study will be of a quantitative nature and will be conducted with first, second and third year students of the EMC National Higher Diploma students of 2004. Students

will each be asked to attend a once-off assessment session of about 2 hours, during which time they will be administered a personality questionnaire (16 PF) and a study habits and attitudes questionnaire (SSHA). The time and venue for this assessment will be facilitated by the Technikon and will be conducted on campus and during lecture times.

The results of this study will be used in conjunction with observations made by the researcher during the first year selection procedure, in order to provide the Technikon with information and recommendations that may serve to enhance their selection procedure and course construction.

The results of this study will also be made available to the scientific community in the form of a masters dissertation and an article in a scientific journal.

GAINS

The participants will not be remunerated in way for their participation in the study.

CONFIDENTIALITY

Participant's participation in the study is voluntary and they may withdraw from participation in the study at any time without negative consequences. The study does not affect participant's academic record of performance in any manner.

All information gathered during this study will be treated as confidential and the anonymity of all participants is assured. Any data will be destroyed should a participant decide to withdraw from the study at any given time. Only the researcher and her supervisor (Prof J.B. Schoeman) will have access to the research data.

CONSENT

Participants (or in the case of the participant being a minor, the parent/legal guardian of the participant) is asked to sign below to indicate their consent to participate in this study and their understanding of the aims and objectives of the study.

The researcher may be contacted if clarification on any of the above points is required.

Signed _____ at this
place _____ on _____ 2004.

Researcher's signature _____

Appendix D

BIOGRAPHICAL QUESTIONNAIRE

Respondent number

V1 1

Please indicate your answers to the following questions by drawing a cross (X) over an appropriate number in a shaded box or by writing your answer in the shaded space provided

1. Please write your **name** in the shaded space below.

--

2. Please write your **student number** in the shaded boxes below.

--	--	--	--	--	--	--	--	--	--

V2

3. Please state your **age** in completed years

--

V3 13

4. Please state your **gender** (mark the appropriate number in a shaded box below)

Male	1
Female	2

V4 15

5. What is your **marital** status?

Single / never married	1
Divorced / separated	2
Widow / widower	3

V5 16

6. What is your **ethnicity**?

White	1
Black	2

V6 17

Asian	3
Coloured	4

7. What is your **home language**

English	1
Afrikaans	2
Zulu	3
Sotho	4
Other (specify):	

V7 18

8. What is your **highest level** of education attained?

Grade 12	1
Diploma	2
University degree	3
Other (specify):	

V8 19

9. What **EMS Qualifications** (if any) do you currently hold?

None	1
BAC	2
AEA	3
CCA	4

V9 20

10. For how many years have you **worked** in EMS with your **current** qualification?

--

V10 21

11. If you have had **other/previous occupation(s)** please describe these

--

V11 23

--

V12 25

--

V13 27

--

V14 29

12. What **year** of EMC are you **currently completing**?

First year	1
Second year	2
Third year	3

V15 31

13. If you have had to **repeat any** course(s) during your EMC training, please **specify** which course(s).

--

V16 32

--

V17 34

--

V18 36

--

V19 38

14. To what **extent** has the EMC course **met with your expectations**?

Not at all	1
Somewhat	2
Completely	3

V20 40

Appendix E

**DESCRIPTIVE STATISTICS (STENS AND PERCENTILES) FOR ALL
VARIABLES ON THE 16 PF AND SSHA**

VARIABLE	N	MEAN	STD DEV	MINIMUM	MAXIMUM
Average academic percentage	44	53.31	13.24	8.33	77.33
Sten of Factor A	53	5.21	1.71	1.00	9.00
Sten of Factor B	53	4.93	1.74	1.00	10.00
Sten of Factor C	53	6.55	2.45	1.00	10.00
Sten of Factor E	53	6.17	2.02	1.00	10.00
Sten of Factor F	53	6.26	2.53	1.00	10.00
Sten of Factor G	53	5.49	1.94	1.00	9.00
Sten of Factor H	53	5.68	2.29	1.00	10.00
Sten of Factor I	53	4.64	2.00	1.00	10.00
Sten of Factor MD	53	6.75	1.99	1.00	9.00
Sten of Factor L	53	6.00	2.56	1.00	10.00
Sten of Factor M	53	5.55	1.59	1.00	10.00
Sten of Factor N	53	6.25	1.97	2.00	10.00
Sten of Factor O	53	4.77	2.24	1.00	10.00
Sten of Factor Q1	53	6.11	2.29	1.00	10.00
Sten of Factor Q2	53	6.38	2.77	1.00	10.00
Sten of Factor Q3	53	6.51	2.15	3.00	10.00
Sten of Factor Q4	53	4.74	2.45	1.00	10.00
Extraversion	53	5.59	1.58	1.60	8.40
Anxiety	53	4.89	1.81	1.80	9.60
Emotional Sensitivity	53	4.77	1.56	2.50	9.50
QII	53	5.87	1.06	3.33	8.33
Independence	53	5.94	1.10	3.00	8.40
Compulsivity	53	6.08	1.63	2.67	8.87
Percentile of Factor DA	53	52.77	30.09	1.00	99.00
Percentile of Factor WM	53	68.88	29.14	12.50	99.00
Percentile of Factor TA	53	64.33	28.49	1.00	99.00
Percentile of Factor EA	53	62.41	31.04	5.00	99.00
Percentile of Factor SH	53	61.52	30.25	7.50	99.00
Percentile of Factor SA	53	64.13	30.69	4.00	99.00
Percentile of Factor SO	53	63.83	31.12	4.00	99.00