

# **Students' readiness for university education**

**by**

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“WE ARE OF DIFFERENT RACES  
NOT FOR STRIVE BUT TO WORK  
TOGETHER FOR THE COMMON WELFARE”

Cartier, 1865

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## SUMMARY

The aim of the thesis is to investigate the readiness characteristics that determine risk for either failure or withdrawal before students enter university. These relationships are investigated and explained with a literature discussion that includes readiness for university education, student transition, retention and withdrawal theory. The motivation for this research emanates against the challenges that the South African Higher Education in general faces as well as the demands placed on the Faculty of Economic and Management Sciences to supply for the high demand for well equipped financial service professionals.

The research project was completed in three phases. In the first phase a structured questionnaire was developed to measure the non-cognitive factors relating to readiness for university education. The purpose of the 'Academic Readiness Questionnaire' is to function as a screening test for first-year students that enter university. The Academic Readiness Questionnaire went through a scientific process of test development and standardisation. The overall Cronbach's alpha for the questionnaire is 0.87, which indicates good internal consistency reliability for the scale with this sample. In the second phase the Academic Readiness Questionnaire was administered to the 2008 cohort of first-time entering students from the faculty of Economic and Management Sciences during the first-year orientation week. The total number of students in the sample is 829 students. In the third phase the students who withdrew from their studies were interviewed telephonically. A total of 42 students were interviewed to determine the salient reasons for withdrawal. Quantitative data were analysed using various descriptive and inferential statistical methods. These include factor analysis, regression analysis and multiway frequency analysis. The telephonic interviews were analysed with content analysis.

The main findings reveal that the readiness characteristics show a direct relationship with academic success and intention to withdraw. The number of variables able to predict risk for either failure or withdrawal differ. More variables show a significant relationship with risk for failure than for withdrawal. Furthermore, the research results show that African students have higher academic achievement and are less likely to



withdraw, when compared to white students. African students also tend to have higher academic success, compared to white students. The differences in academic success and withdrawal rates among African and white students are due to high school achievement and the number of credits the students register for. White students are also more likely to withdraw voluntarily, mostly within the first couple of weeks or months mainly due to choosing an incorrect study choice.

## **KEYWORDS**

Achievement motivation

Academic success

First-year student

Goal orientation

Non-cognitive

Readiness for university

Retention

Learning-efficacy

Transition

Withdrawal



## CHAPTER 1

### INTRODUCTION

This study will investigate the non-cognitive, cognitive and demographic factors that determine risk for either failure or withdrawal before students enter university. Stated differently, the risk factor as determined by entry characteristics is seen as indicative of a student's readiness for university education. The theoretical framework of readiness for university education is based on various theories and models as well as psychological perspectives related to academic success, namely:

- Readiness theory (Conley, 2007)
- Transition theory (Schlossberg, Waters & Goodman, 1995; Tinto, 1993)
- Longitudinal model of student departure (Tinto, 1993)
- Psychological model of college student retention (Bean & Eaton, 2000)
- Psychological perspectives: constructs that have been related to student success include attribution theory, expectancy theory, self-efficacy theory and motivational theory.

The theoretical framework of this study is based on international research, specifically in the United States of America. One cannot from the outset reason that the context of higher education of all countries is the same or that one is unique from all other countries. There are, however, some differences between the North American (developed countries) and South African (developing countries) contexts. It is therefore important to consider the current educational context of the South African higher education system as background to the research. The motivation, scope, aim and research design will guide the reader as to the specific frame of reference of the research.

## 1.1. BACKGROUND

Higher education in South Africa has been subjected to rapid changes since the conception of a new democratic dispensation in 1994 (CHE, 2004). To enable such change, a national committee, The National Commission on Higher Education (NCHE), was established in 1995 (Cloete, 2006, p. 58). In 1997 the NCHE published a position paper entitled *Education White Paper 3: A Programme for the Transformation of the Higher Education to provide guidelines and principles on how the higher education system should change* (Bunting, 2006b, p. 96; DoE White Paper, 1997; Hay & Monnapula-Mapesela, 2009). Among others, some of the significant changes proposed to the higher education system were a change from a 'closed' system to an 'open' and equitable system with access to all the racial groups in South Africa (Cloete, 2006; Scott, Yeld & Hendry, 2007). This was necessary because the student profile of the higher education system before 1994 was characterised predominantly by white, male students (Bunting, 2006b, p. 95).

Another significant change proposed was the decision to increase and broaden participation (Cloete, 2006). The overall participation levels were estimated at 17% in 1993 and were also characterised by small graduate outputs. A third significant factor that was not added to the paper but became a concern for economic development in sub-Saharan Africa (Scott et al., 2007) was the low number of students enrolled in science, technology and commerce compared to the social sciences (Bunting, 2006b). Transformation of the higher education 'landscape' was eminent in the years to follow.

The transformation of higher education, according to Joubert (2002) and Scott et al. (2007) led to an increase in the number of prospective students wishing to enter tertiary education. Ten years after democracy a document was published by the CHE (2004) that points out that the enrolment of students has almost doubled since 1993 to 2002. African students' enrolment numbers in public higher education for instance grew from 40% of the student body in 1999 to 60% in 2002 (CHE, 2004) and 63% in 2007 (CHE, 2009).

The enrolment numbers in isolation seem to be very impressive, but at a closer glance the shortcomings in the South African higher education system become obvious. The racial distribution of student enrolment as set out in the guidelines of the *National Plan of Higher Education* (NPHE) in 1997 still does not represent the composition of the population in 2007 (DoE White Paper, 1997). Bunting (2006b, p. 100) indicates that by 1998 it was clear that the higher education system would not be able to reach the target of increasing student participation to 20%, as set out in the NPHE (DoE White Paper, 1997). Student enrolments are frequently transformed to participation rates in order to compare countries with one another and are often used to inform educational policy. Participation rates are calculated based on the total number of students enrolled in higher education (of all age's groups) in a given year, expressed as a percentage of the 20 to 24 year-old age group of the population (Scott, 2009, p. 20; Scott et al., 2007, p.10). Table 1.1. compares the racial distribution of participation rates at four definite points in South African higher educational history (Bunting, 2006b, p. 106; CHE, 2009, p. 18; Scott et al., 2007, p. 10).

**Table 1.1. Gross participation rates (1993, 2000, 2005 and 2007 cohorts)**

Year	African	Coloured	Indian	White	Overall
1993	9%	13%	40%	70%	17%
2000	13%	9%	39%	47%	16%
2005	12%	12%	51%	60%	16%
2007	12%	12%	43%	54%	16%

According to Table 1.1. the overall participation rates dropped to 16% by 2000 and continued to be approximately 16% through to 2007. There however seem to be minor fluctuations in overall participation rates when one takes into account that the rate was estimated at 15% in 2001 (Scott et al., 2007) and 18% in 2002 (CHE, 2004). Interpreting the results along racial distribution, a steady increase in African student participation

(1993-2000) is observed, as reflected by increased enrolment numbers as stated in the CHE document (2004) and in Bunting (2006b). During the same period (1993-2000) a drop is noted in participation rates in the coloured, Indian and white student groups, the largest drop being among white students. This, according to Bunting, was due to 41 000 fewer white student enrolling during this period and this largely influenced the drop in overall participation rates. The growth in African student enrolment, however, countered a drop in the overall participation rates (Bunting, 2006b) as would be expected.

During the period 2000 to 2005, African students' participation rate decreased by 1%, while all the other student groups had increases in participation rates. The white student group had the highest percentage increase of all the racial groups. Regardless of the increases in participation rates of white, Indian and coloured student groups, the overall participation rate stayed constant at 16%. The reason for this is that the participation rates are estimated on the proportionate size of the racial group. White, Indian and coloured racial groups are minority groups in South Africa and therefore have minimal impact on overall participation rates.

During the period 2005 to 2007, the overall participation rates remained constant at 16%. African and coloured students' participation rates remained constant at 12%, while there was a drop in the participation rates of white and Indian students. Participation rates for the white and Indian students are however still over-represented in the system with participation rates of 54% and 43% respectively (CHE, 2009). Accordingly there is not a drive to limit the number of white and Indian students but to increase the participation of African and coloured students. The drop in participation rates of white and Indian students is actually regarded as a cause of concern for the Ministry of Education (CHE, 2009).

Compared to other developing countries in 2001, South Africa's participation rates are low. The overall participation rate for South Africa was estimated at 15% compared to developing countries like Egypt with the same economic development at 22% (CHE, 2009, p. 4; Elmahdy, as cited in Teffera & Altbach, 2004, p. 25). A report by the Task

Force on Higher Education and Society (Teffera & Altbach, 2004, p. 25) indicates that South Africa has the third highest number of students enrolled in higher education following Nigeria and Egypt, but South Africa's participation rates compare favourably with only 5% for sub-Saharan Africa (CHE, 2009). Developed countries like the United States of America (USA), Finland and South Korea have participation rates of 60% and more (Maassen & Cloete, 2006, p. 13). These figures imply that South Africa is not making meaningful advances with their participation rates when compared to international participation rates.

Further concerns are the high attrition and low graduation rates of students who are in the system (CHE, 2009; Scott, 2009; Scott et al., 2007). Scott et al. (2007) report on the graduation rates of all 'first-time-entering' students who enrolled in the higher education system in 2000 (based on data from the Higher Education Management Information System of the DoE). This cohort study monitors student throughput over a five-year period and provides information on those students who have graduated, those that are still registered, and those who left without graduating. See Table 1.2. for the throughput rates of the first time entering student cohort at residential universities in 2000 (Scott et al., 2007, p. 12).

**Table 1.2. Throughput rates of the 2000 intake cohort across SA contact universities**

	<b>Graduate within 5 years</b>	<b>Still registered after 5 years</b>	<b>Left without graduating</b>
<b>Universities</b>	50%	12%	38%

Source: Scott et al. (2007, p. 12)

The results in Table 1.2. demonstrate that only half of all first-year students who registered in 2000 have graduated in a five-year period and 38% of students left without

graduating. The category 'left without graduating' refers to students who left their original institution without completing a qualification as a result of voluntary withdrawal or academic exclusion (Scott et al., 2007, p.12). The rates provided in Table 1.2. represent averages for all contact universities and according to Scott et al. (2007) the attrition rate for individual universities ranges from 25% to 64%. Universities' output of graduates in relation to the headcount enrolments for 2000 comprises only 16% of students graduated in that year (Bunting, 2006b, p. 109; CHE, 2009, p. 34). The graduate outputs of South African universities are 4% below the projected rate set out by the NPHE (DoE White Paper, 1997).

Scott et al. (2007, p.13) further differentiate between the graduation rates of different general Bachelor degrees (Table 1.3. below). Only half of the entering cohort of students graduated within five years and 43% of students leave the university without completing a general Bachelor's degree in Business and Management. Only 7% of students in these degrees are still registered after five years of study. The outcomes from the other programmes are similar to that of the Commerce programmes.

**Table 1.3. Graduation rates for general academic Bachelor degrees**

<b>Programme</b>	<b>Graduate within 5 years</b>	<b>Still registered after 5 years</b>
<b>Business/Management</b>	50%	7%
<b>Life and Physical Sciences</b>	47%	13%
<b>Mathematical Sciences</b>	51%	9%
<b>Languages</b>	47%	7%
<b>Social Sciences</b>	53%	6%

Source: Scott et al. (2007) based on the 2000 cohort of contact Universities

Scott et al. (2007, p.16) further show the graduation rates after five years in general Bachelor degrees according to race or equity of outcomes (Table 1.4. below). Graduation in general academic Bachelor degrees indicates that 33% of African versus 72% of white students graduated within five years. The difference between the two racial groups is a factor of 2.2 for a general academic Bachelor degree, implying that more than twice the number of white students graduate within five years, compared to African students.

**Table 1.4. Graduation after five years in general academic Bachelor degrees**

<b>Programme</b>	<b>African</b>	<b>White</b>
<b>Business/Management</b>	33%	72%
<b>Life and Physical Sciences</b>	31%	63%
<b>Mathematical Sciences</b>	35%	63%
<b>Languages</b>	32%	68%
<b>Social Sciences</b>	34%	68%

Source: Scott et al. (2007) based on the 2000 cohort of contact Universities

According to Scott et al. (2007) and Scott (2009) the growth in equity of access is disappointing when one views equity of outcomes along racial lines. Only one third of all African students who enrol for a general academic Bachelor degree in Business and Management complete within five years. The rest of the students are either still busy or have left without graduating. Roughly about 20% of first-year students registered at contact universities nationally withdraw from their studies (Scott, 2009).

The main reasons cited for low participation rates, poor graduation rates and high attrition rates are mainly ascribed to the many students who are under-prepared for higher education, even though they enjoy endorsement (Scott et al., 2007; Strydom as

cited in Joubert, 2002). Under-preparedness refers to students who are in general academically under-prepared and more specifically under-prepared in reading, writing and mathematics skills (Van Dyk & Weideman, 2004). This also explains the difficulty of conversing in the language of tuition in the case of English second language speakers. According to Van Dyk and Weideman (2004), under-prepared students find the transition to university even more challenging in programmes where advanced literacy skills are required.

Scott et al. (2007) indicate the reason for low participation levels of African students specifically is because of the shortage of candidates with endorsement for higher education (only 5% of 1995 grade 12 cohort) and the low number of African students passing physical and mathematical sciences on higher grade (26.8% of students in 2003). The result is that some schools are not preparing learners adequately to be successful at higher education.

Jones, Coetzee, Baily, and Wickham (2008) indicate that the low performing schools are predominantly in rural areas and from former Department of Education and Training schools (predominantly African schools). There is some evidence that the school system has lowered its standards for Senior Certificate Papers. The evidence can be seen in the elevated Senior Certificate pass rates since 2000 to 2003 (Scott et al., 2007, p. 35). According to the Council for Quality Assurance in General and Further Education and Training (Umalusi) there was a decline in the number of questions designed to assess student performance on more challenging cognitive levels during the period 2001 to 2003 (Umalusi, 2007). The Council's report on the quality of the Senior Certificate examination indicates that the question papers in 2007 in general were of a fair quality, but that some of the tasks set during assessment was not of an appropriate standard (Umalusi, 2007).

According to both Nunns and Ortlepp (1994) and Scott et al. (2007), universities admit students who comply with the minimum entry requirements, regardless of the standard of the Senior Certificate. The argument that only students who have the ability and who

are adequately prepared for higher education should be allowed to study further is highly contested by Scott et al. (2007). The reason is that the results of the NSC in many respects do not indicate the true ability or potential of a student to be ready for university education.

Scott et al. (2007) continue to say that despite the large number of under-prepared students that the secondary school sector is providing, the higher institutions also have a responsibility to accommodate more under-prepared students with the potential to succeed at higher education institutions. Scott et al. (2007) base their argument on the NPHE (DoE White Paper, 1997) to increase access to higher education and the responsibility of higher education institutions in developing the country by helping more students to graduate. The contribution of higher education according to the NPHE (DoE White Paper, 1997) towards this country's development and global competitiveness makes it imperative to nurture all students who have exemption to participate in higher education in order to achieve national goals (Scott et al., 2007).

Universities, however, have structural, financial and resource limitations and can only admit a limited number of students. The demand for higher education far exceeds the capacity. These limited resources should therefore be allocated to students who have the true possibility of achieving academic success (Nunns & Ortlepp, 1994). It should also be noted that the psychological impact and financial losses associated with failing a course outweigh the disappointment of being refused access to a preferred course (Nunns & Ortlepp, 1994). From an economic and financial point of view the Government, universities and industry can ill afford to lose human capital if the country is to achieve national developmental goals. Higher education institutions only receive funds based on a Subsidy Framework for students who complete their studies. If students do not complete their degrees, the institutions lose the initial financial investment in the student (consisting of marketing and recruitment expenses), as well as the state subsidy (Gouws & Wolmarans, 2002). Losing an estimated 35% to 40% of students before completing a degree, nationwide, could add up to an astronomical loss of income.

The motivation for the research against the backdrop of the national education system will be discussed in the next section.

## **1.2. MOTIVATION FOR THE RESEARCH**

The motivation for this study emanates against the backdrop of the national educational circumstances; these include the limited 'pool' of students with endorsement, the readiness of the students who have endorsement, the need for social transformation in terms of equity of access, the low graduation rates and the high attrition rates of students who are in the system, and the high demand for financial service professionals in the market place (CHE, 2009).

The demands placed on the Faculty of Economic and Management Sciences at the University of Pretoria are similar to South African contact universities with the same drivers taking precedence; namely to improve the graduation rate and decrease the attrition rate of first-time entering first-year students, the need to address equity of access and to supply the high demand for well equipped financial service professionals.

The Faculty of Economic and Management Sciences at the University of Pretoria is the largest faculty amongst eight other faculties and contributes 24.6% of all undergraduate enrolments for the 2008 cohort (BIRAP, 2008). The University of Pretoria is a large, research intensive 'contact' institution that provides tuition to both under- and postgraduate students. The majority of programmes are full-time and contact-based, where students have to attend classes and practical and tutorial sessions. In 2008, student numbers totalled 57 409 (38 934 contact and 18 475 distance) (University of Pretoria webpage). Pre-1994 the university was characterised as a 'Historically White (Afrikaans) University' (Bunting, 2006a, p. 50), but is currently a dual medium university that provides tuition in both English and Afrikaans (University of Pretoria webpage). Compared to four-year universities in the United States of America (Braxton & Hirschy,

2005), the University of Pretoria will be recognised as both a residential institution and a commuter institution.

The historical character of the University of Pretoria and the language of instruction influenced the equity of access of racial groups in the past, which influenced the number of African, coloured and Indian students gaining access to the university. From Table 1.5. below it is evident that in 2000 the enrolment rate of African students was only 20% and after eight years the rate almost doubled to 37%. The enrolment rate of African students registered at the faculty in 2007 was lower than the enrolment rate of the national cohort of contact universities during the same period. African students make up 50% of all enrolments in the national cohort of contact universities, thus the enrolment rate at the faculty under study is 13% lower than the average national enrolment rate (BIRAP, 2008; CHE, 2009). The proportion of white students enrolled in the faculty between 2000 and 2008 declined by a rate of over 20% in eight years. The decline experienced in the enrolment rate of white students corresponds to the trend in national enrolment rates for white students.

**Table 1.5. Enrolment by race of the 2000 and 2008 intake cohort at the Faculty of Economic and Management Sciences**

Year	African	Coloured	Indian	White
2000	20.1%	1.1%	4.0%	74.8%
2008	37.4%	2.2%	5.7%	54.7%

Source: BIRAP (2008)

Institutional information from the Bureau for Institutional Research and Planning (BIRAP) at the University of Pretoria will be used as the source of information for students' throughput rates. Throughput is monitored and analysed in cohort fashion over a five-year period and provides information on those students who have graduated, those who

are still registered, and those who left without graduating. From Table 1.6. below the graduation rates over five years of students registered within each of the Faculty Schools are 10% to 16% higher than the graduation rate of the national cohort of contact universities over the same period (2000 cohort). The number of students leaving the faculty after five years is also lower than the average rate of the national cohort of contact universities.

**Table 1.6. Throughput rates for general academic Bachelor degrees at the Faculty of Economic and Management Sciences Schools**

<b>Faculty School</b>	<b>Graduate within 5 years</b>	<b>Still registered after 5 years</b>	<b>Left without graduating</b>
<b>Financial Sciences</b>	66.1%	8.7%	25.2%
<b>Economic Sciences</b>	60.9%	15%	24.15%
<b>Management Sciences</b>	64.0%	17.6%	18.4%

Source: BIRAP (2008) for 2000 cohort

The rate that students leave the faculty without graduating is close to a quarter of the students. Research indicates that the majority of the students who leave the university do so in their first year (BIRAP, 2008; Scott, 2009; Scott et al., 2007, p. 29). In 2000 the percentage of the first-year attrition rate in relation to the total attrition rate over five years was estimated at 29%. National attrition rates for contact universities are estimated at 20% (Scott, 2009). These findings indicate that the first-year student is most at risk for withdrawal and that the reasons for doing so range from financial to emotional as well as academic reasons.

Given the realities faced by the Faculty of Economic and Management Sciences and the limited number of students allowed entry to the university and each faculty, the Faculty of Economic and Management Sciences use selection criteria. At present the only admission criteria for the Faculty of Economic and Management Sciences are cognitive variables, for example the Matriculation scores (M-score) and the Alternative Admissions Research Project (AARP) for those students who performed below a set standard in grade 11 or 12. Faculties use the subtests (Placement Test in English for Educational Purposes [PTEEP], Mathematics Achievement, and Mathematics Comprehension and Scientific Reasoning tests) of the AARP according to their own regulations and might differ from year to year (Murphy, 2002). The Faculty also makes use of a compulsory language test for all their first-year students (Van Dyk & Weideman, 2004).

Students who comply with the required M-score and register early are allowed to continue with their studies. Two factors inhibit registration: the first is students who have provisional permission to register but have to write the AARP test. The students who pass the test are allowed to register unconditionally. The second, related to the first, is that at a given point in time the dean of faculty decides that no more students are allowed to enrol at the faculty due to structural and resource limitations and students who apply late (even students who comply with the required M-score) are not allowed to register at the faculty.

The M-score and other ability tests measure cognitive skills and strategies as well as content knowledge (Conley, 2007). According to Conley (2007), these elements are very important indicators of students' readiness for university education. A number of factors, however, influence the motivation to include psycho-social factors as indicators of readiness. The first is that conventional ability tests do not measure the full range of abilities and characteristics necessary for university success (Sternberg, 2007). Closely aligned with the first factors are the questionable Senior Certificate results due to reviewed assessment standards (Umalusi, 2007). A third factor is the diverse student population registering at Historically White Universities since 1997 (Bunting, 2006b).

The fourth factor is that the M-score as predictor will no longer be used for the 2009 student intake. The Admissions Point Score (APS) based on the National Senior Certificate (NSC) will be used in its place, but it is still unclear how the APS will predict academic success. Calibration between the two measures is being done by Umalusi (2009) but due to various shortcomings in the assessment, data it is not yet finalised. It therefore makes sense to include non-cognitive factors when students are admitted to university, even if only as a transitional measure. As performance at university level serves as a constant, associations between student performance and their non-cognitive characteristics could serve as a means to calibrate the cognitive APS and M-Score measures and contribute to the calibration between the two measures. Having accomplished this, the outcome will impact on the entry requirements for students.

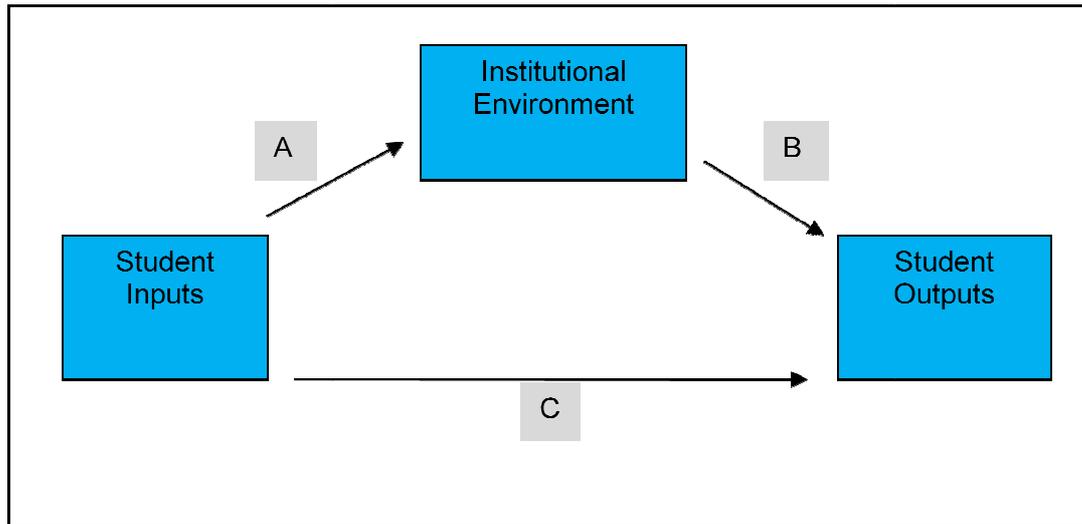
According to Kuh, Kinzie, Buckley, Bridges and Hayek (2007) an institution must understand and know its students when they arrive at the university (see Braxton & Hirschy, 2005, p. 82). Determining students' readiness for university education is seen as the first step in understanding the students that enrol at an institution and measuring the factors associated with risk for academic achievement and withdrawal. When students actually enrol, they bring with them, among others, personal attributes, academic ability and other socio-cultural characteristics (Tinto, 1993). The entry characteristics are hardly ever measured quantitatively and it is therefore difficult to know where and when in the life cycle students are most in need of academic, emotional or personal support. There seems to be a lack of measurement at strategic stages in the student life cycle and first-year students are particularly at risk for failure and voluntary withdrawal (BIRAP, 2008; Hawkins & Larabee, 2009; Du Plessis, Lemmens & Boardman, 2006; Jones, Coetzee, Baily & Wickham, 2008; Scott et al., 2007). The reasons for withdrawal vary and numerous authors (Braxton, 2000; Seidman, 2005; Tinto, 1993) mention family responsibilities, work responsibilities, social support, integration versus isolation and motivation as reasons for withdrawal.

### 1.3. SCOPE OF THE STUDY

Readiness for university education fits within the broad and encompassing field of student retention and success. The most basic model to explain this framework is from Astin's (1970) model of student development which indicates three distinct components of a higher education institution, namely Input – Environment – Output. The inputs refer to the abilities, skills and expectations that students bring with them to the university. The inputs that Astin refers to are associated with the elements of readiness for university education as explained by Conley (2007).

The environment refers to all the elements of the institution that influences the learning experiences of students. According to Wend (2006), the student learning experience can be defined as the variety of experiences within the sphere of the University's responsibility that students come in contact with and which influences learning. The student learning experience is therefore all-embracing and includes matters such as curricula, methods of teaching, learning and assessment, learning environment and resources, student progress and achievement, and academic and pastoral support.

Student outputs refer to the outcomes that institutions wish to influence, such as academic achievement, skills and attributes (Astin, 1970; Camara, 2005a). Academic success consists of many facets, such as knowledge and skills, motivation, leadership, communication and team work (Camara, 2005a).



**Figure 1.1. Astin's model of student development** (1970, p. 225)

Based on Astin's model of student development, the institutional environment is affected by student inputs (relationship A). Secondly, the institutional environment has an impact on the outputs of students (relationship B) and lastly the student inputs can affect outputs directly in relationship C (Astin, 1970).

The empirical part of the research of this study leans heavily on relationship C of Astin's model. Student inputs are measured with a questionnaire and available student information (demographic data). The outputs have been demarcated to include only academic achievement and withdrawal behaviour of first-year students. Relationships A and B are investigated and explained with a literature discussion that includes readiness for university education, student transition, retention and withdrawal models. Relationships A and B are regarded as important to student output but are regarded as a controlled variable here. This can be regarded as a shortcoming of the investigation, but does not influence the research negatively (Astin, 1970). Not measuring the scope of elements that incorporate academic success (output) is also regarded as a shortcoming of the research, but the output is clearly demarcated here.

Retention and withdrawal models have to be investigated to determine the range of factors that could influence student persistence. Based on the investigation, inferences can be made about the factors that need to be included in an academic readiness questionnaire. These factors could inform an early warning and referral model as part of a tracking system of first-year students. The models do not make provision for teaching and learning *per se*, but how entry characteristics eventually relate and interact with the students' learning experience and student outputs.

#### **1.4. AIM OF THE STUDY**

The aim of the study is to determine the relationship between a student's entry characteristics and (1) withdrawal and (2) academic failure respectively. This aim is based on proposition number 3 of Tinto's longitudinal model of student persistence (Tinto, 1993). According to this proposition, student entry characteristics directly affect the student's likelihood of persistence or withdrawal (Braxton, Hirschy & McClendon, 2004). An assumption from Tinto's proposition is that a profile of students at risk, based on entry characteristics, can be used to predict withdrawal or failure behaviour. Braxton et al. (2004) tested the internal consistency of Tinto's 13 propositions using meta-analysis of empirical studies from a number of researchers. From this analysis the only direct empirical affirmation for proposition 3 came from a study in two-year colleges.

The Braxton et al. (2004) study indicates that none of the other 12 propositions received strong support as they did in four-year universities. There is therefore the possibility that this proposition tested in isolation could yield statistically significant results in a South African contact university. Furthermore, none of the propositions have been tested empirically using different racial or ethnic groups within single institutions (Braxton et al., 2004). Studies to conclude statistically significant results for whites on proposition 3 have been found (Braxton et al., 2004). Providing empirical evidence on proposition 3 for different racial groups would be invaluable in the South African higher education system

taking account of the large discrepancies that exist between the various racial groups regarding enrolment and throughput.

This study would benefit academia on both a theoretical and practical level. On a theoretical level the study will contribute to the current readiness and retention models by focussing on the cognitive and non-cognitive readiness characteristics of first-year students at a South African tertiary institution. Various theories and models will be investigated as a guide for the theoretical model on readiness for university education.

The practical benefit would be the development of a concise measurement instrument from the theoretical model that can be used by faculty as a screening tool and as part of an early warning system to determine 'risk'. The entry characteristics can thus be used to profile students in need of academic or personal support (Seidman, 2005, p. 302). According to Seidman (2005) new students who enter the university can be compared with the risk profile and their chances at success can be estimated based on the comparison group. According to Seidman (2005, p. 307), the purpose of collecting data and determining risk profiles is to support students at an early stage in the first academic year to overcome challenges and to persist with their academic goals. Seidman (2005) indicates that the data should be from various sources.

The proposed hypotheses for this study are:

- Students who score high on the 'Academic Readiness Questionnaire' factors will have higher academic performance than students who perform lower on the questionnaire factors.
- Students who score low on the 'Academic Readiness Questionnaire' factors are more likely to withdraw from their studies than students who score higher on the questionnaire factors.
- Student readiness characteristics directly affect the likelihood of withdrawal.
- Student readiness characteristics directly affect academic performance at first year.

- Academic performance is an intervening variable for withdrawal.
- The predictors of risk for failure will differ between the racial groups.
- The predictors of risk for withdrawal will differ between the racial groups.

## 1.5. RESEARCH DESIGN

A quantitative and qualitative approach for the research design were taken. The research project were completed in three phases. In the first phase (2007) a literature study were done to determine the entry characteristics and demographic variables that correlate with withdrawal and academic performance. A model were developed to show the relationship between these variables. Current questionnaires on non-cognitive factors were used in conjunction with a literature study to develop a contextually relevant questionnaire. A sample were selected to administer a pilot study to test the questionnaire's item constructs and scales before it were administered to the final sample. The data of the pilot study were analysed using various descriptive and inferential statistical methods.

In the second phase the 'Academic Readiness Questionnaire' were administered to first-year students from the Faculty of Economic and Management Sciences in the beginning of February 2008 during the orientation week. The data were analysed using various descriptive and inferential statistical methods to report on the research problem. These include factor analyses, regression analyses and multiway frequency analyses. Student throughput statistics were also monitored at the end of the academic year to determine those students who have withdrawn from their studies.

Student marks at the end of the academic year were used as an indicator of academic achievement. Students were also monitored at the end of the academic year to determine those students who have withdrawn from their studies. Collectively the information from the academic readiness questionnaire and demographic information from the student database (BIRAP) will be known as readiness characteristics. These

readiness characteristics are synonymous with the elements of readiness for university education.

In the third phase the students who withdrew from their studies were interviewed in an attempt to triangulate the research result and to infer the 'causal' model of risk of first-year students in the faculty under study. The motivation for this approach is that '...theory on departure should develop from the direct experiences of college students' (Braxton et al., 2004, p. 19). The best way to understand student withdrawal behaviour is to ask students about their experiences and why they withdrew from university.

#### **1.6. LEVEL OF ANALYSIS**

The research on retention from the literature has various points of departures. The literature is dominated by contributions from the USA-model, in other words it distinguishes between two and four-year institutions. Some studies have been done with more than one institution and other studies within one institution. Braxton and Lee (2005) distinguished between commuter and residential colleges and universities because of the differences between the social communities in the two types of institutions. Residential institutions have well defined social communities, while commuter institutions lack structure and clarity in their social communities. The distinctions might indicate that student departure processes might differ between residential and commuter universities. Understanding the levels of analysis helps to interpret and compare the literature. The level of analysis of this study is focussed on individual withdrawal within a single institution, namely the University of Pretoria.

## **1.7. STUDENT LIFE CYCLE**

The student life cycle is seen as taking a holistic view of a student's academic career, in other words from pre-application to postgraduate learning experience. It is important to identify the different stages of the life cycle. The Centre for Teaching and Learning (CTL) at the University of Stellenbosch proposes an inclusive student life cycle model (Van der Merwe & Pina, 2008). The student life cycle addresses the potential prospective student, prospective student, first-year student, senior student, postgraduate student and the alumnus. Through each of these stages the students are tracked electronically using student information systems; the results are made accessible on student and staff portals. In each stage the CTL identified different administrative processes that need to be supported (Van der Merwe & Van Dyk, 2008). According to Van der Merwe and Van Dyk, the data sources could include surveys, and data from student information systems or a learning management system. Multiple sources of data should be sourced to profile, track and support students.

## **1.8. LAYOUT OF THE STUDY**

In Chapter 1 the background, motivation and aim of the study were discussed. A number of hypotheses are proposed and will be tested empirically. In Chapter 2, various retention and withdrawal models will be investigated to aid in the identification of the entry characteristics associated in the mentioned models. A seminal model will be used as the platform of departure and newer models will be used to evaluate the seminal model. A context specific model of risk will be proposed and evaluated. Chapter 3 will focus on the development of the questionnaire. The constructs and items of non-cognitive questionnaires will be evaluated based on the models discussed in Chapter 2. The process for the development of the 'Academic Readiness Questionnaire' will be discussed and the constructs and items of the questionnaire will be highlighted.

In Chapter 4 the research methodology and research design will be discussed. In Chapter 5 the results of the questionnaire will be presented. In this Chapter the reader can expect the psychometric properties of the questionnaire and view the relationships that exist between the entry characteristics with withdrawal behaviour and academic performance of first-year students. In Chapter 6 the research results will be discussed and interpreted based on the literature review in Chapter 2. In Chapter 7 the researcher will conclude with additional comments and recommendations and give a critical evaluation of his own research.

The models and perspectives are used firstly to identify the entry characteristics of students as they relate to readiness for university, secondly to determine how students' entry characteristics relate with institutional characteristics and thirdly how this interaction between students and institution leads to failure or withdrawal. This research project will make use of a structured questionnaire, biographical information from students, theoretical underpinnings and exit interviews to determine readiness for university education.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1. INTRODUCTION

The point of departure for this study is the development of a theoretical framework to explain students' perception of readiness for university education. To conceptualise students' readiness for university education, the theoretical framework consists of:

- Readiness theory (Conley, 2007)
- Transition theory (Schlossberg et al., 1995; Tinto, 1993)
- Longitudinal model of student departure (Tinto, 1993)
- Psychological model of college student retention (Bean & Eaton, 2000)
- Psychological perspectives: constructs that have been related to student success include attribution theory, expectancy theory, achievement goal theory and self-efficacy theory.

The readiness model of Conley (2007) is explained firstly to indicate that readiness for university education is not only associated with academic performance in school or with measures of ability on psychometric tests, but also with socio-cultural and motivational factors. Researchers like Sedlacek (2004, 2005) and Camara (2005a, 2005b) identified the non-cognitive and/or demographic characteristics of students to be used as an admission tool to determine risk and to determine developmental needs. Entry characteristics in the form of demographic variables have shown to predict accomplishment later in one's academic career, for example from school to university (Sedlacek, 2005). Authors like Tinto (1993) and Braxton et al. (2004) have identified a direct relationship between the elements associated with readiness and withdrawal behaviour, including high school academic achievement. The assumption is that students

demonstrate a consistency in their behaviours, attitudes, and values (in other words research in this area will generate the potential to predict future behaviour based on past behaviours).

Secondly, transition theory is briefly discussed to indicate the nexus between readiness theory and the experience of students within the institutional environment. Thirdly, three retention models from various perspectives are discussed to explain the interaction and elements associated with student retention and success. The three models are regarded as reputable by scholars and have been cited or have been empirically researched on many occasions (Braxton et al., 2004). The principal model seems to be Tinto's longitudinal theory of student departure (1993). The majority of researchers use this model as a platform for their own theories or models, such as Braxton et al. (2004, p. 29) and Bean and Eaton (2000). Following in these footsteps, the researcher will use Tinto's theory as a point of entry before moving on to other models.

The entry characteristics identified in the models are summarised and discussed separately in an attempt to determine their relationship with academic achievement or withdrawal behaviour. The readiness characteristics are discussed individually because the withdrawal and retention models do not show the true complexity associated with each element. The theories used are for instance, achievement goal theory, expectancy theory and attribution theory. The expectancy-value model has shown importance in explaining readiness for university education and the choices that students make. The expectancy-value model will therefore be used as the main psychological theory. The remainder of the theories will be discussed to indicate the intricacies and associations of the discussed theory and how it relates to readiness for university education.

In conclusion, a context specific readiness model is proposed that will include the readiness characteristic of first-year students and how these characteristics relate to withdrawal behaviour and academic achievement.

## **2.2. KEY CONCEPTS CLARIFIED**

### **2.2.1. Retention**

Retention refers to the ability of an institution to retain a student from admission to the university through to graduation (Berger & Lyon, 2005).

### **2.2.2. Withdrawal**

Withdrawal refers to the departure of a student from a university campus (Berger & Lyon, 2005).

### **2.2.3. Non-cognitive Variables**

Non-cognitive refers to variables relating to adjustment, motivation and self-concept (Sedlacek, 2005).

### **2.2.4. Persistence**

According to Tinto (1993), persistence refers to the students' decision to continue with their studies. Retention is measured from the institutions' side, while persistence is the measure from the students' side.

## **2.3. LITERATURE DISCUSSION**

Conley's theory on readiness for university education will be discussed in the section below, followed by Tinto's theory on student transition from high school to higher education. This will be followed by a discussion of three retention models.

### 2.3.1. Readiness Theory

Readiness for university education can be defined as the level of preparation a student needs in order to enrol and succeed, without remediation in a credit-bearing programme at a higher education institution (Conley, 2007, p. 1). Readiness for university education is predominantly associated with high school academic achievement and frequently with the results of admission tests (Byrd & MacDonald, 2005; Conley, 2007). In addition to academic achievement, the participants of Byrd and MacDonald's study pointed to additional factors associated with readiness, namely (a) skills in time-management, (b) motivational factors, (c) background factors and (d) student self-concept (Byrd & MacDonald, 2005). The readiness skills and abilities that are important for readiness for university education are further listed below (Byrd & MacDonald, 2005):

The first category identifies participant ideas about skills and abilities:

- Academic skills: the essential academic skills that are included are (a) reading, (b) writing, (c) math, (d) technology, (e) communication and (f) study skills.
- Time management: managing the responsibilities that are associated with the course requirements and 'balancing' personal or family responsibilities.
- Goal focus: the ability to apply oneself and focus on a goal.
- Self-advocacy: being able to speak up for one's needs and to seek help when necessary.

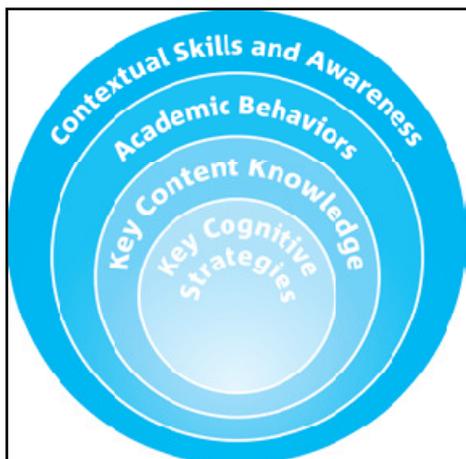
The second category, background, identifies factors discussed by participants as influential to a decision to enrol or prepare for higher education:

- Family factors: family experiences or expectations about higher education that influence decision or readiness.
- Career influences: work experience related to college readiness or career motivations that influenced the decision to go to college.
- Financial concerns: experiences and issues about finances and attending higher education.
- High school preparation: high school and community college educational experiences that contribute to readiness for university.

The third category, student self-concept, relates to a sense of identity as a student and ideas related to navigating the institutional culture.

- Self-concept: identity as a student and/or changes to self-concept as a result of educational experiences.
- Institutional system: understanding the system, standards and culture of the institution.
- Irrelevant information: information that is irrelevant to understanding college readiness.

The three categories of readiness that were identified by Byrd and MacDonald's (2005) qualitative study are confirmed by the research of Conley (2007) on readiness for university over a number of years. Conley (2007) suggests a broad definition of readiness that includes cognitive strategies, acquiring content knowledge, academic behaviours, and contextual knowledge and skills (refer to Figure 2.1.). Conley explains that the various elements of readiness are neither mutually exclusive nor perfectly nested as they appear to be in the model, because they interact with and affect one another extensively.



**Figure 2.1. Elements of college readiness** (Conley, 2007, p. 8)

The most central of the elements according to Conley (2007) is key cognitive strategies and is defined as the development of cognitive abilities through planned and practiced behaviours. The key cognitive strategies that are referred to in the model are amongst other conceptual and evaluative thinking, synthesising and problem solving (see Conley, Lombardi, Seburn & McGaughy, 2009, p. 4). These tasks are usually part of a high school curriculum and are demonstrated primarily through learning activities and tasks. These strategies should be expected to develop over time and have to be honed at high school because they are necessary to attain academic success at university.

Many of the cognitive strategies important for university are assessed by ability tests. Ability tests are frequently used to select high school students for university education (Conley, 2007). A number of researchers however contest the use of ability tests alone as a selection tool, because it does not allow for the influence of psycho-social factors that also contribute in explaining the variance of academic success (Conley, 2007; Sedlacek, 2005; Sternberg, 2007). Conley stresses that the development of cognitive strategies cannot be measured adequately by ability tests, as these are 'static' by nature and therefore imply the need for a 'continuous measurement system that is sensitive to increasing sophistication and elaboration of capabilities and not just counting the presence or absence of particular elements' (2007, p. 16). Conley suggests the collection of evidence that a skill or strategy has been developed and that the student is proficient at performing it.

The second element of readiness is on acquiring key content knowledge. Content knowledge is dependent on developing and using cognitive strategies because it is through the use of key cognitive strategies that content knowledge is achieved (Conley, 2005, 2007). Thus in order to be ready for university, a student has to have knowledge of the skills that are inherently part of specific school subjects, such as maths, languages and the sciences. It is not about the subject *per se* but the type of skills that are nurtured when one is engaged with the subject. English studies, for instance, teaches students to 'engage texts critically and create well written, organized, and supported work products in both oral and written formats' (Conley, 2007, p. 10). It is therefore not only about learning a language but about the skills that are acquired when being involved with the

subject and the ability to transfer the skills to the context of the university. It is therefore important that content knowledge is formally measured by end-of-course exams at high schools and that these tests comply with the standards and expectations of higher education.

The third element of readiness is academic behaviours, consisting of meta-cognitive skills and study skills (Conley, 2007). The meta-cognitive skills compose of self-awareness, self-monitoring and self-control. The study-skill behaviours compose of time management, which according to Conley (2007) refers to planning a task, setting up the study environment, breaking up the tasks into manageable chunks and balancing competing tasks. Academic behaviours also allude to engaging with peers and lecturers on academic matters, using literature resources effectively and being engaged in class (Conley, 2007, p. 13). Academic behaviours can be measured with surveys and questionnaires where students list their methods, tools and strategies in areas such as study skills, time management and self management (Conley, 2007, p. 17).

Lastly, contextual knowledge and skills refers to the ability to adapt and understand the context or climate of the institution. 'Examples of key context skills and awareness include a systemic understanding of the postsecondary educational system combined with specific knowledge of the norms, values, and conventions of interactions in the college context, and the human relations skills necessary to cope with and adapt to this system, even if it is radically different from the community in which a particular student was raised' (Conley, 2007, p. 13). Accordingly, students who do not understand or who are unable to adapt to the norms, values and expectations of the institution are more likely to feel alienated and have intentions to withdraw voluntarily (Conley, 2007). The concept of 'biculturalism' as explained by Rodgers and Summers (2008) and the concept of understanding racism by Sedlacek (2005) are evident here.

The contextual skills and awareness element of Conley also consists of social and interpersonal skills that allow students to work in groups, converse with students from different cultural backgrounds and indicate leadership skills too. Another important area of contextual awareness is known as 'college knowledge' (Conley, 2007, p. 13). College

knowledge refers to an understanding of the bureaucratic processes that are associated with applying, enrolling and studying at a university (Bean & Eaton, 2000; Conley 2007).

‘Student contextual knowledge about, and understanding of, the entire process of college admissions, financial aid, and successful functioning in college can be determined relatively readily through questionnaires’ (Conley, 2007, p. 17). Conley alludes that the most important use for the information is as a general indicator of the quality of the induction programme of an institution. Individual students’ information on the other hand provides a diagnostic perspective on areas where additional information is needed, the overall profile of a student’s values, norms and inter-personal skills.

Student contextual knowledge and skills refers to an understanding of the context or climate of the institution and can only be fully understood through transition theory.

### **2.3.2. Transition Theory**

Schlossberg, Waters and Goodman define transition as ‘...any event, or non-event, that results in changed relationships, routines, assumptions and roles’ (1995, p. 27). Schlossberg et al. (1995) differentiate between three types of transitions, namely anticipated transitions, unanticipated transitions and non-event transitions. An anticipated event could simply refer to a graduating high school student deciding to enrol at a university for a specific degree. The loss of a financial support source and not being able to study your first choice are examples of an unanticipated or a non-event transition relating to the loss of anticipated aspirations due to financial pressures or changes in career aspirations. In the event of any of the types of personal transitions, the evaluation of the transition is vital to how one thinks, feels and copes with the transition or non-event. The extent of the impact on for instance relationships, routines, motivation and expectations are most important in the evaluations of the transition (Schlossberg et al., 1995, p. 31; Beyers & Goossens, 2003, p. 377).

Van Gennep's 'Rites of Passage' (as cited in Tinto, 1993, p. 92) studies the process of establishing membership in traditional societies from a socio-anthropological perspective. Tinto's research on the movement of individuals from membership in one group to another is based on Van Gennep's work. Van Gennep identified three stages of passage (towards becoming a full member of the 'new' group), namely separation, transition and incorporation. Tinto used these three stages of passage as a basis for his reasoning on how a student becomes integrated within the institutional system over time.

According to Tinto (1993), first-year students are in a separation phase where they have to distance themselves as members of their past communities, for example; home and school. Schlossberg et al. states that one has to 'disidentify with one's previous roles' in the first phase of transition and take up the role of being a student (1995, p. 39). It does not mean that a student has to give up their norms, values and beliefs in order to take on the role of being a student (Bean & Eaton, 2000; Kuh & Love, 2000, p. 199; Tinto, 1993). Kuh and Love (2000, p. 201) reason that it is a student's 'meaning-making system' (values, beliefs and perspectives on what a higher education degree entails and what it means to be a student) that determines institutional fit and commitment.

Likewise, the academic and social communities of universities have their own characteristics. According to Kuh and Love (2000, p. 198) higher education institutions develop cultures and traditions over time, each '...expressed through daily interactions and routines, common symbols, and special ceremonies and traditions'. This implies a multitude of relationships between students and lecturers from the institutions, which indirectly and directly influence the values, norms and beliefs that constitute the culture of the institution (Kuh & Love, 2000). Consequently, these interactions have certain effects on students and the institution in the way involvement is nurtured, effort is encouraged and persistence is reached (see Hawkins & Larabee, 2009).

The transition phase refers to the shift from the old to the new by conforming to the norms, values and behaviour of the new community. Large discrepancies between the values, norms and behaviour of the old and the new complicate the transition to the new

community (Kuh & Love, 2000). The transition phase, according to Tinto (1993), is not always identical for each student because individual experiences vary considerably and the shift is not necessarily clearly sequenced. Individual goals and intentions play a role in making a successful transition and differ between students.

Bean and Eaton (2000, p. 51) indicate that the first semester is generally regarded as a period of transition where students have to adjust to the new institutional environment as well as manage increased levels of stress (see Hawkins & Larabee, 2009, p. 180; Tinto, 1993, p. 58; Upcraft, Gardner & Barefoot, 2005). Students who are able to adjust to the new environment experience a sense of belonging to the environment and those who do not experience feelings of isolation. Bean and Eaton (2000) argue that an individual not only has to adjust to the new environment, but has to adapt too. Bean and Eaton define adaptation as a decision to cope with an environment and compares adaptation to Tinto's idea of integration. Within Tinto's frame of reference, adaptation could refer to the process of incorporation of a student into the institutional environment (Bean & Eaton, 2000, p. 51). According to Bean and Eaton's definition of adaptation, students use coping mechanism to deal with the stressors of the environment. According to Lazarus and Folkman (as cited in Brown, Howcroft, & Jacobs, 2009, p. 450) coping refers to the behavioural and cognitive changes that a person has to make to be able to deal with various demands inter-personally or from the environment that are perceived to be intimidating in some way.

During the incorporation phase students are required to become involved in the academic and social communities of the institution (Tinto, 1993, p. 59). They become involved by establishing meaningful relationships with existing sub-cultures on campus. According to Kuh and Love (2000) a student does not necessarily have to conform to the dominant culture of the institution to become integrated or experience cultural connections (sense of belonging). According to Kuh and Love (2000, p. 205) a student can join a 'cultural enclave'. Cultural enclaves are subgroups within the institution that share similar norms, values and beliefs to that of a 'minority' student's culture (see Tinto, 1993, p. 60). Cultural enclaves help students to adapt and have a sense of belonging to the institution (Kuh & Love, 2000).

The extent of conformity is thus not as complete as is expected for transition from one group to another, as is the case in general settings described by Van Gennep (as cited in Tinto, 1993). The effect of university communities are less extensive and weaker than those found in broader society. The process of integration in college is an interactive one in which individuals also act to shape the environment. The term 'membership' would be more appropriate because it allows for more diversity of participation. Membership at an institution is also by definition always temporary (Tinto, 1993). Kuh and Love (2000, p. 206) defines Tinto's perspectives of membership differently by stating that students have to make a 'cultural connection', which is as a subjective sense of belonging with others from the institution.

According to Tinto, lack of incorporation is caused by two sources, namely 'incongruence' and 'isolation' (1993, p. 50). Incongruence refers in general to a mismatch between the entry characteristics of the student and the characteristics of the institution. This sense of mismatch develops from the perception of the student that he does not fit or belong to any of the systems of the university, academically or socially. These systems can range from formal to informal, individual or institutional characteristics, or in the rules and regulations of the institution. Tinto unpacks each of these systems as sources of incongruence. Tinto states that 'incongruence' manifests in students' evaluations of the 'intellectual' and 'social' values of the university compared to their own values and preferences.

The lecturers represent the academic community of the institution. It is then logical to infer that students' interactions with academic staff can affect a sense of incongruence in the student. 'Issues of quality of intellectual work, commitment to student intellectual growth, and opportunities for student involvement in learning, especially in the classroom, are all deeply affected by the way the faculty interacts with students over matters of intellectual substance' (Tinto, 1993, p. 53).

Incongruence in the social community manifests as a perceived mismatch between the 'social values, preferences, and/or behavioural styles' of the student and those of his peers, academic or support staff (Tinto, 1993, p. 53). The social community involves informal interactions and is usually more recreational in nature, although it also refers to the formal social events that are organized by university student bodies or residences. According to Tinto, social incongruence could lead to withdrawal. Most notably, students withdraw from the university where incongruence is experienced and move to another institution where there is a perceived match.

Incongruence due to a mismatch between the entry characteristics of the student and the demands of the academic system could ultimately result in withdrawal behaviour (Tinto, 1993, p. 51). Too high demands usually lead to timely voluntary withdrawal before actual institutional discontinuation due to poor academic achievement. Where the demands of the academic programme are too low, high achieving students tend to change their programmes, or withdraw (programme is not challenging enough). Tinto states that in some cases these students are unwilling to search for academic challenges on their own and are in some cases uncommitted to their own intentions or goals.

'Isolation' (Tinto, 1993, p. 55-56) refers to a student who is unable to establish a meaningful relationship with someone on campus, either with academic staff or peers. A feeling of isolation is regarded '...as the single most important predictor of eventual departure even after taking account of the independent effects of background, personality, and academic performance' (Pascarella & Terenzini, 1980). The work of Pascarella and Terenzini (as cited in Tinto, 1993) forms the backbone of Tinto's work on academic integration and social integration and its relationship with withdrawal. Of the two types of integration that is necessary on campus, contact, both meaningful and frequent, is important for student persistence (Tinto, 1993, p. 57).

Contact between students and academic staff should go beyond structured academic interactions to include interactions on 'intellectual' and 'social' issues that are perceived to be supportive. The extensions of interactions, above those that happen in class or in

lecturer offices, contribute to students' perceived integration and assist in students' decisions to persist. Students have to feel welcome at the university, that they are valued and that their needs are important (Hawkins & Larabee, 2009). The lecturers' behaviour in class 'not only influences academic performance and perceptions of academic quality, it also sets the tone for further interactions outside classroom' (Tinto, 1993, p. 57). For students of commuter institutions, as is the University of Pretoria, the experiences and interactions that happen in class are the main and in some instances the only way of interacting with the academic staff and peers. When this interaction fails, a student experiences a feeling of isolation and as Tinto stresses, can lead to voluntary withdrawal.

According to Tinto, students enrolled in very large institutions are at greater risk for isolation because of the large physical space, the complex administrative system and possible diverse student body. Tinto mentions that students who are able to make friendships easily could help a student to be integrated into the social system much quicker. Tinto also recognises 'social experiences' that could hinder or facilitate interaction, because in some instances the social environment is totally different to that which is experienced in their own communities (Tinto, 1993, p. 58). This could be true for students of colour in Historically White Institutions. Coming from a rural environment could also facilitate feelings of isolation (Jones et al., 2008) because these students are first of all not accustomed to the university culture and secondly the sheer number of students of large universities could be a challenge to overcome.

### **2.3.3. Tinto's Longitudinal Model of Institutional Departure**

Tinto's longitudinal model of institutional departure (Tinto, 1993, p. 114) broadly states that individual withdrawal occurs over a period of interactions between individual members of the academic staff and the social community of the institution. Tinto summarises individual student withdrawal in three broad 'themes' namely the entry characteristics of first-time entering students at university, the quality of their involvement within the university after entering the university, and the external drivers that influence

the students' behaviour. Tinto's longitudinal model of institutional departure is of great importance due to its paradigmatic stature. 'Paradigmatic status connotes the considerable consensus among scholars of college student departure concerning the potential validity of Tinto's theory' (Braxton et al., 2004, p. 7).

Tinto's longitudinal model of institutional departure describes that students enter the institution with differing (refer to Figure 2.2.):

- family backgrounds, including social status, parental education and size of the home community;
- personal attributes, namely gender, race and physical handicaps;
- skills, namely intellectual and social skills;
- financial resources;
- dispositions (intentions and commitments); and
- various pre-college educational experiences (such as high school marks).

According to Tinto, each attribute at entry is posited as having a direct impact upon withdrawal, as it influences individual intentions and commitments regarding future educational activities (also refer to Baird, 2000; Pascarella & Terenzini, 1980; Seidman, 2005, p. 67).

According to Tinto (1993), the abovementioned dispositions fall in two categories, namely intentions and commitments:

- Intentions specify the valued goals of the student, educational and occupational, toward which activities are directed. Intentions or goals reflect both aspiration and expectations. The intentions are stated in goals that mirror both the student's hopes for the future and his assessment, based on past experiences, of the likely attainment of the goals (Tinto, 1993).
- The commitments refer to the willingness of students to work toward the attainment of those goals. Students who are highly committed are willing to commit themselves fully to the attainment of valued goals and expend the

energies and resources to do so. Persons lacking the motivation, regardless of set goals, will be unable to commit themselves to the attainment of such goals.

Strong goals and/or commitments (motivations) may lead students to persist until degree completion. This may be particularly true when educational goals are closely linked to occupational goals. The logical deduction would be to reason that students who study professional degrees, compared to non-professional degrees, are more likely to persist. Tinto (1993) cautions the reader that some students place more emphasis on the intrinsic value of pursuing a degree and are not motivated by short-term occupational goals. These students are therefore still likely to persist even though educational goals are not closely linked to occupational goals.

Tinto states that strong goals and firm commitments are the drivers of persistence during the transition phase and adjusting to the culture of the university (Tinto, 1993, p. 36). This, however, does not guarantee that these students will persist. According to Tinto, some students are unable to cope with the demands of the university environment, both social and intellectual (Tinto, 1993, p. 47). These students are usually unable to make the necessary adjustments and eventually withdraw.

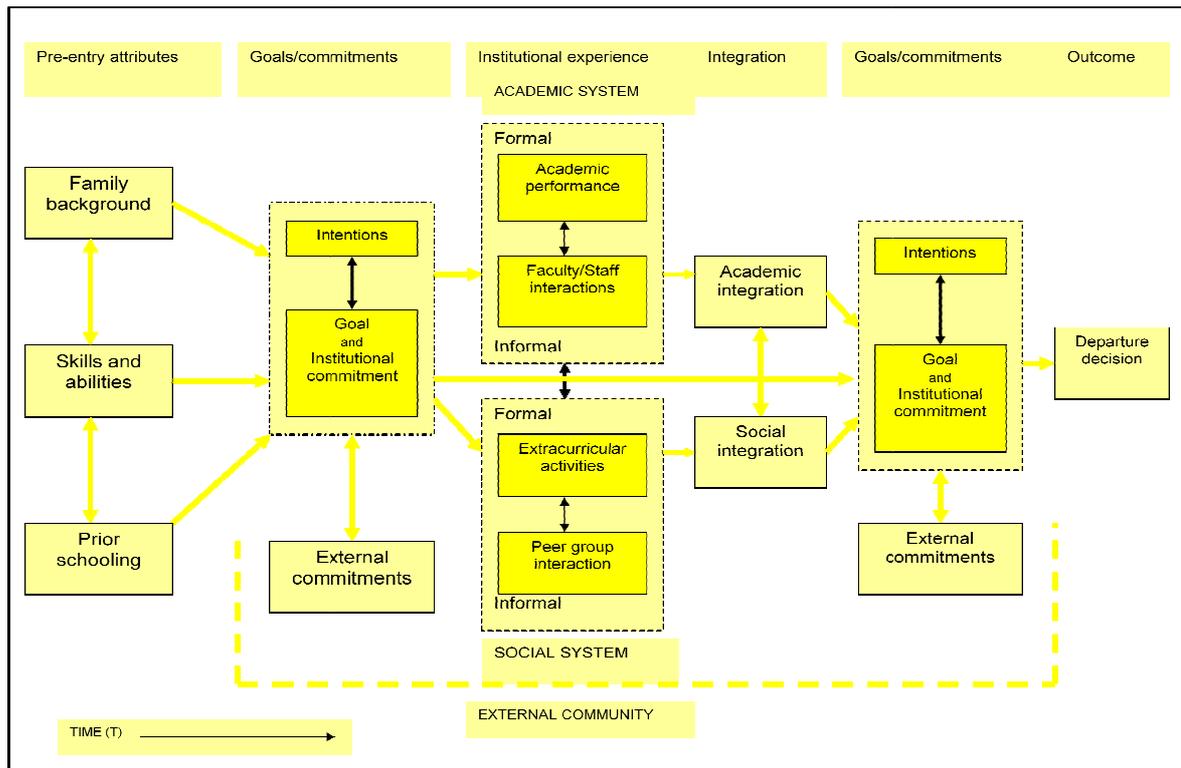
Intentions specify both the level and type of education and occupational goals desired by the individual. Commitments indicate the degree to which individuals are committed to both the attainment of those goals (goal commitment) and to the institution where they are registered (institutional commitment). The less a student is integrated into the academic and social communities of the institution, the more likely students will withdraw (Tinto, 1993).

According to Tinto, 'prior dispositions and attributes' may lead directly to withdrawal behaviour, but more weight and importance are placed on the quality of a student's interaction with lecturers and peers on campus and the perception that these interactions satisfy the needs of the students (Tinto, 1993, p. 45). The entry

characteristics together with the intentions, commitments and the external environment establish the conditions for subsequent interactions between peers and the lecturers of the institution (Tinto, 1993).

The individual's experiences of the academic and social systems, indicated by academic and social integration, continually modify intentions or commitments. Integration reinforces persistence through their impact upon heightened intentions and commitments both to the goal of completion and to the institution. The extent to which students are integrated in the academic system can be determined by the academic achievement of students, the value students place on their education and the level of satisfaction students have with their academic programme (Kuh & Love, 2000, p. 196). Social integration on the other hand can be determined by investigating the feelings of belonging students have with a group or groups of people within the institution (Kuh & Love, 2000).

The model (Figure 2.2.) regards the institution, with the academic and social systems that comprise it, as being nested in an external environment comprised of external communities with their own set of values and behavioural requirements. External commitments are able to alter the person's intentions (goals) and commitments at entry and throughout the learning experience. For example, the external communities can have a strong supportive influence on the student that may have a counter effect on withdrawal behaviour when a student is unable to adjust to the campus environment (Tinto, 1993). The actions of one's family, members of community, economic instability, as well as government decisions can play an important part in the decisions of students to withdraw from university. External demands placed on students, like family support, and work obligations can also influence students' decisions to withdraw. When the academic and social systems of the institution provide inadequate support to students, the additional external demands placed on the student can lead to increased intentions to withdraw.



**Figure 2.2. A longitudinal model of institutional departure** (Tinto, 1993, p. 114).

### **2.3.3.1. Evaluation of Tinto's model**

Braxton and Lee (2005, p. 110) conducted a meta-analysis of empirical research on the 13 propositions of Tinto's model to determine the reliability each. The 13 propositions as referenced in Braxton and Lee are:

1. Student entry characteristics affect the level of initial commitment to the institution.
2. Student entry characteristics affect the level of initial commitment to the goal of graduation.
3. Student entry characteristics directly affect the student's likelihood of persistence.

4. Initial commitment to the goal of graduation affects the level of academic integration.
5. Initial commitment to the goal of graduation affects the level of social integration.
6. Initial commitment to the institution affects the level of social integration.
7. Initial commitment to the institution affects the level of academic integration.
8. The greater the degree of academic integration, the greater the level of subsequent commitment to the goal of graduation.
9. The greater the degree of social integration, the greater the level of subsequent commitment to the institution.
10. The initial level of institutional commitment affects the subsequent level of institutional commitment.
11. The initial level of commitment to the goal of graduation affects the subsequent level of commitment to the goal of graduation.
12. The greater the level of subsequent commitment to the goal of graduation, the greater the likelihood of student persistence.
13. The greater the level of subsequent commitment to the institution, the greater the likelihood of student persistence.

Braxton and Lee (2005) empirically assessed one or more of the 13 propositions. The first criterion for assessments to be included in their analyses was that multivariate statistical procedures be used for all analyses, like path analysis with linear multiple regression, structural equation modelling, multiple discriminate analysis, or logistic regression. This was used to determine the individual effects of each of the 13 propositions. The second criterion was that the measures used, should have face validity. The third criterion of their investigation is that the propositions are restricted to peer-reviewed journal articles. The last criterion was a restriction to single-institutional samples for testing the propositions. The focus is also on four-year commuter and

residential institutions and a minimum of 10 report findings should empirically support the proposition.

According to the findings only three propositions showed reliable results in both residential and commuter colleges. These are:

Proposition 9: The greater the degree of social integration, the greater the level of subsequent commitment to the institution.

Proposition 10: The initial level of institutional commitment affects the subsequent level of institutional commitment.

Proposition 13: The greater the level of subsequent commitment to the institution, the greater the likelihood of student persistence.

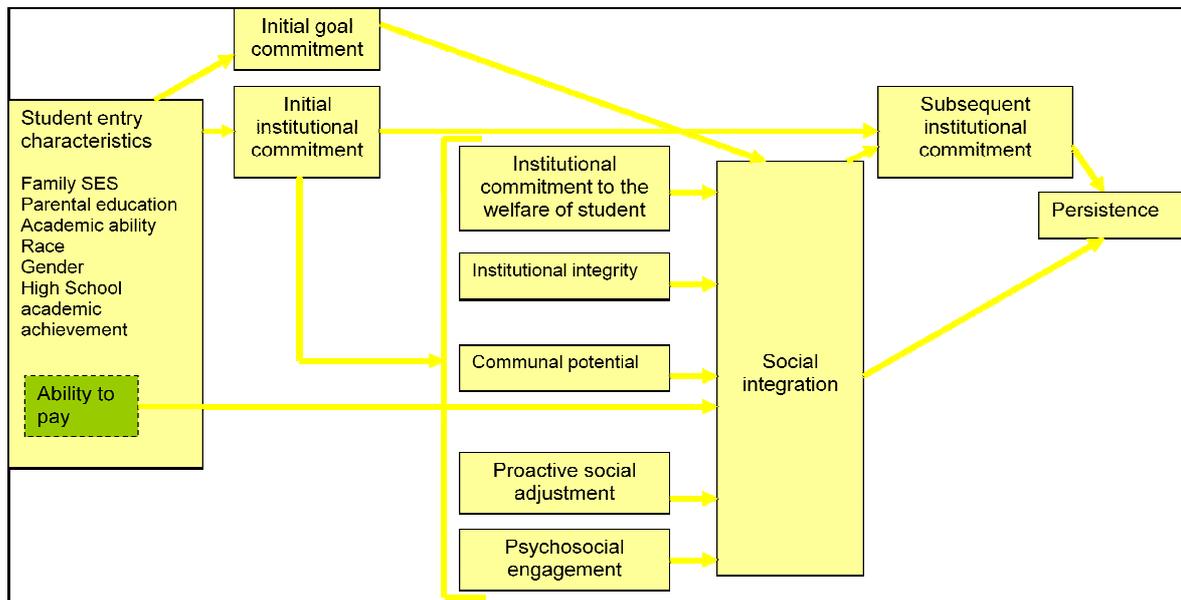
Based on the results of their meta-analyses, Braxton et al. (2004) developed revised models of student withdrawal for residential and commuter institutions. In both instances, Tinto's model was revised in such a way that it resembles the characteristics of the type of institution. Accordingly the entry characteristics for the two models differ moderately. There was also a change in the allocation of 'academic integration' and 'social integration'.

#### **2.3.4. Theory of Student Departure for Residential and Commuter Colleges**

The limitation of Tinto's theory of student departure is revealed when tested empirically because only five of the 13 propositions can be supported empirically (Braxton & Hirschy, 2005). Braxton et al. (2004) proposed a revision of Tinto's model to account for residential and commuter universities (and colleges). This revised model incorporates empirical findings from Tinto's model and other researchers' models. The contribution of this model involves identifying the background to social integration. Accordingly, students' entry characteristics influence the students' initial commitment to the institution, because it has an influence on a student's commitment to the goal of graduation and the institution. 'Entry characteristics include the student's gender, racial or ethnic

background, socio-economic status, academic ability, high school academic preparation, parental education, and ability to pay for college’ (Braxton & Hirschy, 2005, p 70).

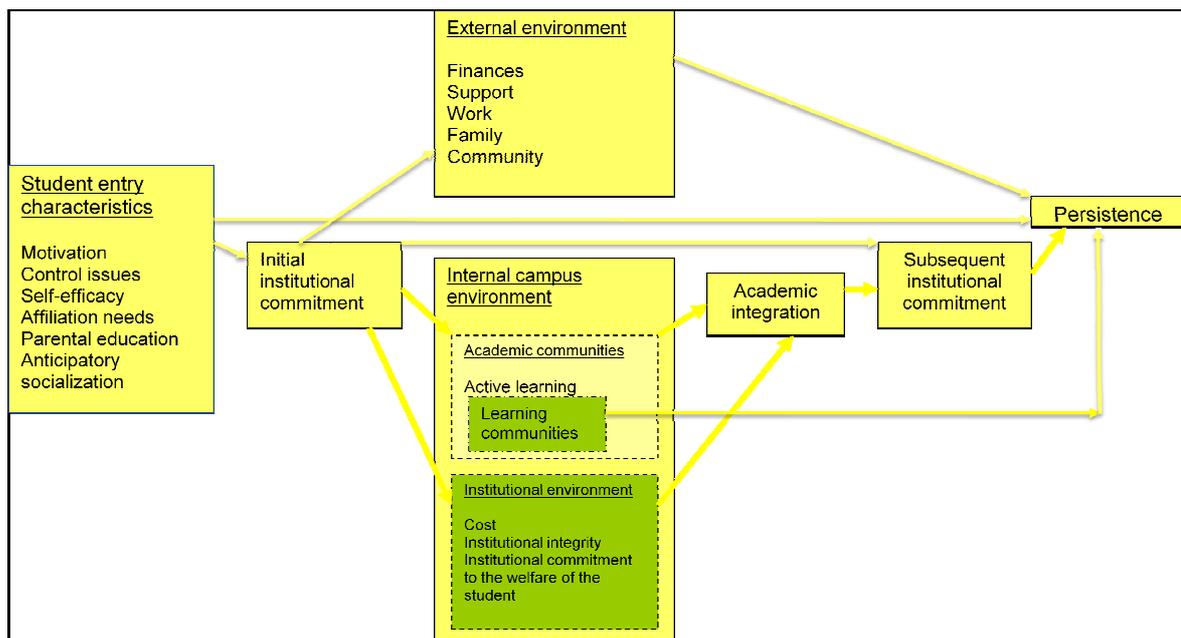
Students’ entry characteristics influence student commitment to the goal of graduation and the institution. The institutional commitments are represented in the values and beliefs of the institution. ‘When there is congruency between the values and beliefs of the students and the institution, students are more inclined to participate in proactive social behaviours (the tendency to approach the demands and pressures of social integration in a positive manner) and psycho-social engagement (the level of psychological energy a student devotes to his or her interactions with peers and to involvement in activities at the chosen college or university)’ (Braxton & Hirschy, 2005, p. 72). The greater a students’ initial institutional commitment, the greater a students’ social integration and subsequent institutional commitment and persistence.



**Figure 2.3. Tinto’s theory revised for student departure in residential colleges and universities** (Braxton et al., 2004, p. 71)

Family SES: Socio-economic status

The factors that influence withdrawal for residential institutions differ slightly from commuter institutions. In commuter institutions an additional contributor to withdrawal or persistence becomes relevant, especially in the South African higher education context, namely the external environment. Elements included in this category are finances, support, work, family and the community. The entry characteristics in the commuter institution model include motivation, self-efficacy, empathy, affiliation needs, and socialisation (also see Braxton & Lien, 2000). South African universities and specifically the University of Pretoria as a contact university have the characteristics of both a residential and commuter institution. The University of Pretoria's students are regarded as full-time students (they are required to be registered on a full-time basis in order to fulfil the requirements of a degree), but not all students reside at campus residences. The majority of students commute to university on a daily basis while a third of undergraduate students live in campus residences.



**Figure 2.4. Theory of student departure in commuter colleges and universities**  
(Braxton et al. 2004, p. 71).

Braxton and Hirschy (2005) provide an explanation of the relationship between the factors in the model and how they contribute to students' decisions to persistence or withdraw:

#### **2.3.4.1. Student entry characteristics**

According to Braxton et al. (2004, p. 71), students' entry characteristics have a direct impact on a student's decision to withdraw and indirectly influence persistence through students' initial commitments to the institution and the extent to which students make the transition from the external environment and adjust to the campus environment.

#### **2.3.4.2. External environment**

The external environment can have a positive or negative influence on students' decisions to withdraw. Most notably, the external environment plays an important supportive or demotivating role in decisions to enrol at a higher education institution in the first place. Students who for instance do not have the financial support to study a degree will decide not to study at all, or enrol but only later withdraw if financial support is still not available (Tinto, 1993). Students at commuter institutions typically have off-campus commitments in addition to their academic responsibilities on campus. These responsibilities influence the time students have to engage with their academic work.

#### **2.3.4.3. Sociological influences**

The social communities of commuter institutions do not have such a strong influence on the students as in residential institutions (Braxton et al., 2004). Students whose parents attended college are more likely to expect social engagement with peers, based on their college experience from their parents. Contrary to expectations, the higher the parental education, the less likely a student feels subsequent commitment to the institution and the more likely a student will withdraw from the institution. It is the anticipatory socialisation and the reality of less socialisation in social activities at commuter institutions that lead to withdrawal. Johnston (2000) adds that first-generation students

are more likely to succeed academically than those students whose parent/s has/have a degree qualification. A possible reason, according to Johnston, is that these students have higher underlying motivational levels because of possible challenges they have faced during their life as well as overcoming many obstacles just to enrol at the university.

#### **2.3.4.4. Internal campus environment**

The internal campus environment is constituted by two components, namely the institutional environment and the academic communities that students are associated with. The two components together lead to students' perceptions of being academically integrated, which lead to subsequent institutional commitment and persistence.

##### *2.3.4.4.1. Institutional environment*

The institutional environment consists of three factors that influence a student's subsequent commitment to the institution, namely institutional integrity, institutional commitment to student welfare and the cost of the education. Over time students perceive institutional integrity, a sense of congruence between the day-to-day actions of faculty, administrators and staff compared to the mission and values of the institution. The greater the perceived institutional integrity, the more students are committed to the institution. The greater the perceptions of institutional commitment to students' welfare, the more students are committed to the institution. Commitment to student welfare is displayed by showing respect toward students, treating students fairly and having concern for the growth and development of students. Students weigh the cost and benefits of investing their time and economic resources on higher education. Institutions that minimise the costs associated with enrolment and maximise the perceived value of the students' investment can influence persistence (Braxton et al., 2004).

##### *2.3.4.4.2. Academic communities*

Academic communities facilitate meaningful connections between students, lecturers and among peers according to Braxton and Lien (2000). The greater the degree of a student's

academic integration, the more subsequent commitment to the institution, eventually adding to their probability of persisting. Tinto (2000) hypothesises that academic communities influences goal commitment, but Braxton and Hirschy (2005) claim that it leads to institutional commitment.

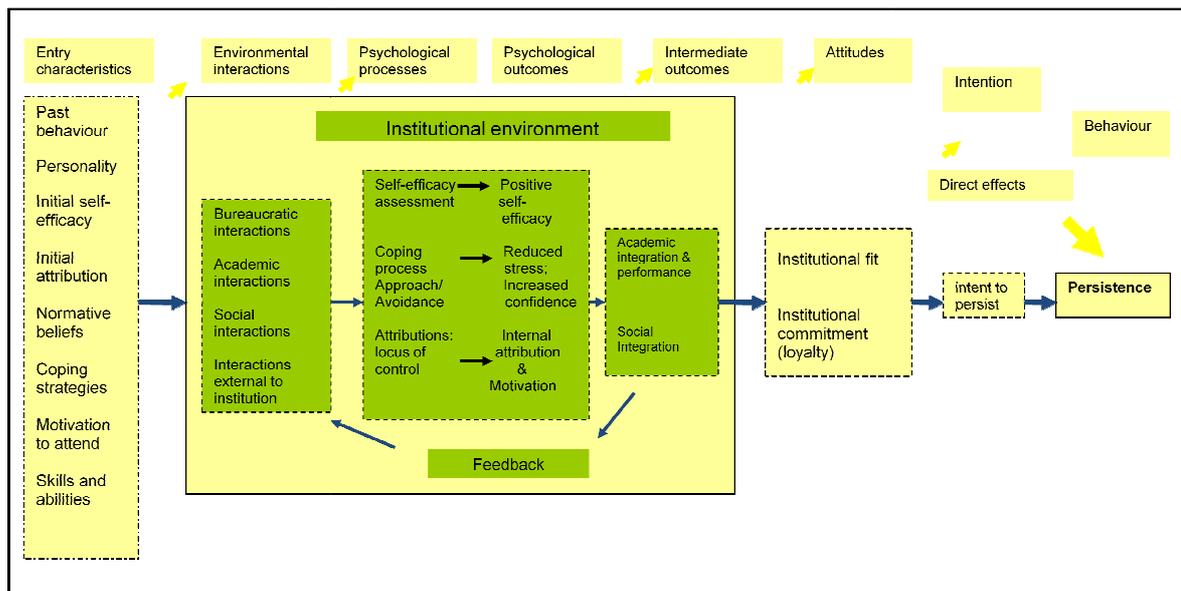
### **2.3.5. Psychological Model of Student Retention**

Bean and Eaton (2000, p. 48) developed a model of student retention, based on Tinto's longitudinal model of student departure and added four psychological theories to explain student retention from a psychological orientation. Individual student retention refers to '...studies [that] are conducted to identify how background characteristics, institutional experiences, students' behaviour, and attitudes interact to affect retention decisions' (Bean, 2005, p. 215). According to Bean and Eaton (2000) all behaviour is psychologically motivated. Withdrawing from higher education is therefore also seen as behaviour (p. 49) and therefore withdrawal behaviour is psychologically motivated. The authors focus their attention on the relationship between the independent variables in the model and persistence, both theoretically and statistically. The predictive ability of the variables on persistence is determined empirically and compared with what was expected from a theoretical point of view.

Bean (2005, p. 216) stated that retention models are calculated and developed with statistical procedures, as mentioned above. When there is a significant relationship between two variables it does not guarantee that by improving the independent variable (increasing social integration) it will necessarily increase retention. A significant relationship alludes to the potential of an intervention in that area on increased retention, rather than indicating precisely what the intervention should be. Students who are for instance not oriented socially might not persist because of increased social interaction.

The model attempts to explain withdrawal or persistence behaviour and Bean and Eaton states that behaviour is based on choices that people make. Present behaviour is based on past behaviour, personal beliefs, and the perceptions of others (normative beliefs),

and affect the way a student will interact with the institutional environment (Bean & Eaton, 2000). Accordingly, personal beliefs are determined by initial perceptions of the individual's psychological processes (Bean & Eaton, 2000). 'For example, the individual's efficacy for various tasks within the institutional environment will be based on an assessment of skills and abilities from the past' (Bean & Eaton, 2000, p. 56).



**Figure 2.5. A psychological model of college student retention** (Bean & Eaton, 2000, p. 57)

Bean explains his model with reference to nine themes that affect student retention (Bean, 2005). These themes are in order of importance of their effect on individual student retention. A short overview of the themes follows:

### 2.3.5.1. Intentions

Student intentions refer to the mere contemplation of behaviour (Bean, 2005). According to Bean (2005), the intention to leave is one of the best predictors of student withdrawal

for residential institutions. This predictor does however not predict withdrawal that accurate for commuter institutions. Intentions to withdraw are also dependent on the institutional and external environment. From Tinto (1993) and Braxton, Hirschy and McClendon's (2004) model it is evident too that the external environment can have both a positive or negative influence on students to persist at their studies. The institution (both the academic and social systems) also influences decisions to withdraw or persist. A shortcoming of this theme is that it does not explain why students withdraw, but only predicts who will leave (Bean, 2005, p. 218).

### ***2.3.5.2. Institutional fit and institutional commitment***

Institutional fit is a sense of fitting in with others at the institution. It is a sense of being similar to other members of a group and feelings of belonging (Bean, 2005, p. 219). This notion links to Tinto's longitudinal model of student departure (1993), who borrowed the concept from Durkheim and Spady (as cited in Tinto, 1993). According to Bean (2005), the concept of 'fitting in' implies a social dynamic which most often has a value component. 'A student is likely to fit in if that student shares values with other students' (Bean, 2005, p. 219). These values could, according to Bean (2005), be social or academic in nature, or based on an interest or an activity. The author also states the importance of cultural or ethnic background, religious beliefs and other forms of biases that could be stumbling blocks for students from these groups and their ability to fit into the institutional environment.

Institutional commitment is the commitment to a specific institution above another institution and it gives an indication of the extent to which a student is attached to an institution. It is also the most important variable influencing withdrawal (Bean, 1980). Both institutional fit and commitment represent an attitude toward an institution and can only be determined by asking students about their attitudes. A second set of attitudes that is important for retention but does not seem to be directly related to commitment and fit is attitudes about being a student.

Bean (2005, p. 219) refers to four attitudes about being a student that can influence intent to leave directly or indirectly by affecting institutional fit, loyalty and intent to persist (Bean, 2005, p. 222). These attitudes function interactively, recursively and are related to one another. The four attitudes are:

- positive attitudes relating to satisfaction with being a student;
- feeling a sense of self-efficacy as a student;
- understanding the value of education towards attaining a job; and
- experiencing stress as a student.

### **2.3.5.3. Psychological processes**

Bean refers to three psychological processes that affect social and academic factors and consequently influence retention decisions (2005, p. 220). The psychological processes are explained by three related theories, namely:

- *The theory of self-efficacy*: This refers to a belief in one's ability to perform academically (specific context) and to achieve set goals (specific context). Levels of self-efficacy are however dependent on positive feedback from behaviour in the specific context. According to Bean, there is an interactive influence between self-efficacy, educational goals and persistence;
- *Approach/avoidance behavioural theory*: This is seen as ways of coping with the institutional environment to reduce the stress that the environment creates (Bean, 2005, p. 221). Bean argues that in order to be academically successful, a student has to 'approach' certain behaviour that is associated with academic success (for example using the library and using effective study skills) and 'avoiding' behaviour that is detrimental to academic success (for example antisocial behaviour). These behaviours provide feedback to students and have the potential to increase or decrease a person's feeling of self-efficacy and could lead to various attitudes toward persistence;
- *Locus of control as part of attribution theory*: This means the perception of the source of influence on the person. Students with an internal locus of control believe they are personally responsible for their academic achievements, in contrast to students with an external locus of control who believe the environment or other people have an influence on their academic achievements

(Bean, 2005, p. 221). Bean is of the opinion that the institutional environment has an influence on students' locus of control. The way an institution acts toward its students could alter a student's locus of control. When students perceive lecturers to discriminate toward certain students, it might lead these students, who had an internal locus of control, to change to an external locus of control. This might also affect the students' attitude toward the institution negatively and lead to withdrawal behaviour (Bean, 2005, p. 220).

Bean (2005, p. 223) indicates three spheres wherein students interact with the institution. The spheres are academic, social and bureaucratic in nature.

#### **2.3.5.4. Academic sphere**

Interaction in the academic sphere refers to the interaction between lecturer and students through the course (Bean, 2005, p. 226). According to Bean, lecturers play a vital role in supporting educational development. The interaction with lecturers shapes the psychological processes and attitudes which have an effect on retention (Bean, 2005, p. 223). When there is substantial interaction that contributes to students' interest and when students feel that lecturers are supportive, students are more likely to have positive attitudes towards the institution (Bean, 2005, p. 225).

Another form of interaction in the academic sphere is through advising. The advising should be in such a way that it gives information on students' abilities and how their abilities relate to the subjects they propose to take so that students can make informed academic decisions (Bean, 2005). It is therefore important to indicate the relationship of course decisions with possible job opportunities. 'The combination of students' background, interaction with the institution related to academic matters, and a belief in one's ability to perform academic work have a cumulative mutual influence resulting in academic integration' (Bean, 2005, p. 226). Bean (2005) tends to agree with Tinto (1993) on the importance of academic integration in order to have a positive effect on academic performance and the persistence of students.

#### **2.3.5.5. Social sphere**

The social sphere refers to friendships and social support. Bean (2005) has broad perspective in mind when referring to the social sphere. According to Bean, the social sphere includes the friendships one has on campus with peers, lecturers and staff as well as the support a student receives from family members, siblings and friends. The social sphere, especially referring to the support from family members, siblings and friends is very closely related to the external environment theme discussed by Tinto (1993). Accordingly, the role players from the social sphere shape the way in which the student will interact with the institution (Bean, 2005, p. 228). According to Bean, the social interaction between students and lecturers should be focused on the positive aspects of learning and development as they contribute to the academic success of students. Consequently, this leads to institutional fit. Students who have a sense of belonging are believed to be more satisfied, loyal to the institution and will be more inclined to persist at their studies (Bean, 2005, p. 229).

#### **2.3.5.6. Bureaucratic sphere**

The bureaucratic sphere in the institution typically represents the client service centre, student administration and other offices that support students on non-academic issues. 'Bureaucratic factors are defined as the ways in which formal exchanges of resources (time, money, effort and information) between a student and the institution take place' (Bean, 2005, p. 229). These offices in many respects represent students' first contact with the institution and this is where first impressions are formed and positive attitude for integration starts. The operations of bureaucratic services have a direct influence on students' attitudes toward the institution and indirectly to the intent to withdraw (Bean, 2005, p. 230).

In the bureaucratic sphere decisions are made that influence various aspect of the students' learning experience. Some of the decisions that are made relate to financial support, residence and course decisions. According to Bean (2005, p. 230), the way the bureaucratic sphere carries out its services can leave students satisfied and loyal to the institution or disgruntled which influences students' decisions to withdraw or persist.

Students from lower socio-economic status (SES) experience the bureaucratic sphere of the institution more acutely because these students quite often have less knowledge of what to expect and how things are done at university (Kuh & Love, 2000, p. 203). Jones et al. (2008) confirm with recent research of South African students from low SES that it is difficult for these students to manage the administrative load of registering, finding accommodation and financial aid. The bureaucratic sphere that is supposed to provide support is in actual fact thwarting access to important programmes that are there to facilitate integration.

The orientation programme, for instance, is there to facilitate integration and is also used to give valuable information about support services on campus, how to navigate the learning management system and make friends (Mullendore & Banahan, 2005, p. 393; Strydom & Mentz, 2009, p. 62). Many students of disadvantaged backgrounds however miss the orientation week due to late registration or the inability to secure the funds to register (Jones et al., 2008). These students are therefore unable to benefit from these programmes that are there to help students adapt to the institutional environment.

#### **2.3.5.7. External environment**

The external environment is an umbrella term that includes friendships, opportunities to transfer, opportunities to work, and family responsibilities (Bean, 2005, p. 232). The external environment directs students' behaviour and attitudes and has an influence on the interaction between the student and the institutional environment. The factors of the external environment as mentioned in Bean (2005) are similar to the environmental variables that are mentioned in Tinto (1993), except for finances, which are discussed separately by Bean. The external environmental factors are proposed to have a direct affect on students' decisions to withdraw, but in many cases they indirectly contribute to students' decisions to withdraw. These forces are usually out of the direct control of the institution, but institutions can choose to support students within boundaries. Supporting students show that the institution is committed to the welfare of the student that could influence students to return to the institution when they are ready to do so (Braxton et al., 2004).

#### **2.3.5.8. Student background characteristics**

Student background characteristics are, for instance, educational goals, high school achievement, ability, motivation, and parents' education level and income. The student background characteristics as referred to here have been explained in the section on Bean's psychological processes.

#### **2.3.5.9. Financial factor**

In Tinto's (1993) model there is a direct link between a student's ability to pay for studies and retention. Bean (2005, p. 234) however states that understanding the influence of financial factors on retention is not always that clear. The reason for this is because of confounding factors associated with the financial status of families. Higher financial status is usually associated with better education, higher educated parents that are able to support their children financially and educationally, and who are able to pay for the cost of a higher education (Bean, 2005). What makes the influence of financial factors unclear is that even affluent students withdraw from their studies, indicating financial reasons for their withdrawal. Parents of these students might not be willing to pay for a child who is not performing adequately in their studies.

According to Bean (2005, p. 235), the following aspects of financial factors are clear in their influence on retention. Institutions with reduced tuition will likely increase retention. Grants are better than loans because they increase persistence rates. Students who have fewer resources are in some instances excluded from social and academic integration which influences these students to fit in, which consequently might result in intentions to withdraw.

#### **2.3.6. Evaluation of Bean and Eaton's Model**

Rodgers and Summers (2008, p. 182) argue that Bean and Eaton's psychological model does not include a thorough discussion on the effects of African students attending Historically White Institutions. The revised model is based on what Rodgers and

Summers (2008) call the effect of race or culture on the interaction between African students and Historically White Institutions. The first two major areas of Bean and Eaton's model are not changed, although Rodgers and Summers (2008) indicate that the levels of self-efficacy and the initial attributions of African-American students are more sensitive to negative academic experiences early in the academic year than it is for white students. Failure early in the academic year will result in lower levels of self-efficacy and lower expectations of academic success.

According to Tinto (1993), a match between the values, beliefs and norms of the student and that of the institution will promote integration. Bean and Eaton (2000) suggest that these interactions affect the institutional fit of students. Rodgers and Summers highlight what Tinto proposed in 1993, that minority students could belong to sub-cultures with similar values and beliefs in order to experience integration into the social and academic systems of the institution. Rodgers and Summers explain that the interactions of sub-cultures or 'enclaves' lead to certain attitudes, which are almost similar to the attitudes in the Bean and Eaton model, but moved earlier in the process of the model and includes 'belongingness and integration' (2008, p. 176). According to Rodgers and Summers (2008), the attitude of belongingness is defined as a feeling of membership to the institution which is dependent on a caring institutional environment.

The psychological processes and outcomes are similar in the revised model. An addition was made to the intermediate outcomes of Bean and Eaton's model to include the development of 'biculturalism' in African-American and minority students. Biculturalism, according to Rodgers and Summers refers to '...students [that] are able to successfully navigate membership in the larger predominantly white campus community, and also maintain cultural ties to the African American campus culture' (2008, p. 182). The changes made to 'attitudes' and 'intermediate outcomes' are regarded as the major revisions to the Bean and Eaton model to accommodate an explanation into African student retention in Historically White Institutions.

## 2.4. ENTRY CHARACTERISTICS, WITHDRAWAL AND ACADEMIC ACHIEVEMENT

Tinto's propositions, as stated in Braxton and Lee (2005, p. 113) set the scope and design of the empirical part of the study to investigate proposition 3. 'Student entry characteristics directly affect the student's likelihood of persistence'. The characteristics students present with when entering the institution influence the way students are able to engage with their programme, determine the possibility of becoming integrated and have positive learning experience (Jones et al., 2008). According to these results there is an indication that readiness characteristics directly affect the likelihood of persistence in some students and in some of the cases.

Astin (1975, p. 25) identified 53 variables that significantly predict first-year withdrawal. Stepwise regression analyses indicated that 37 of the 53 predictor variables carried statistical significant weight. The significant predictor variables were then categorised in six themes, namely academic background and ability, family background, educational aspirations, study habits, expectations about the institution, and student characteristics (Astin, 1975, p. 25). The six themes identified by Astin broadly correspond with the entry characteristics that are sourced from the three retention models and are listed in Table 2.1.

Camara (2005b) references 140 predictors and 27 criterion measures of academic success from the Personal Qualities Project conducted between 1978 and 1984. According to Camara (2005a), the three broad categories of entry characteristics that related to academic success are: 1. Temperament, Personality and Self-Appraisal; 2. Personal Qualities, Experiences and Biographical Data; and 3. Interviews, Personal Statements and Recommendations.

Table 2.1 provides a summary of the student entry characteristics related to persistence and academic achievement that have been sourced from the retention models

highlighted in the theoretical discussion. The student readiness characteristics will be discussed directly thereafter by way of a number of psychological theories.

**Table 2.1. Summary of the student readiness characteristics**

AUTHOR	PERSONAL & DEMOGRAPHIC	NON-COGNITIVE	COGNITIVE	OTHER
Tinto (1993)	<b>Family background</b> <ul style="list-style-type: none"> <li>Social status</li> <li>Parental education</li> </ul>	<b>Dispositions</b> <ul style="list-style-type: none"> <li>Intentions (goals)</li> <li>Commitments (motivations)</li> </ul>	<b>Skills and abilities</b> <ul style="list-style-type: none"> <li>Intellectual and social</li> </ul>	<b>External community</b> <ul style="list-style-type: none"> <li>Size of the home community</li> </ul>
	<b>Personal attributes</b> <ul style="list-style-type: none"> <li>Gender</li> <li>Race</li> <li>Physical handicaps</li> </ul>		<b>Prior schooling</b> <ul style="list-style-type: none"> <li>High school marks</li> </ul>	<b>External commitments</b> <ul style="list-style-type: none"> <li>Financial resources</li> </ul>
Braxton & Hirschy (2005) (Residential)	<b>Personal attributes</b> <ul style="list-style-type: none"> <li>Gender</li> <li>Racial or ethnic background</li> </ul>	<b>Dispositions</b> <ul style="list-style-type: none"> <li>Goals</li> <li>Values and beliefs</li> </ul>	<b>Prior schooling</b> <ul style="list-style-type: none"> <li>Academic ability</li> <li>High school academic preparation</li> </ul>	<b>Financial</b> <ul style="list-style-type: none"> <li>Ability to pay</li> </ul>
	<b>Family background</b> <ul style="list-style-type: none"> <li>Socio-economic status</li> <li>Parental education</li> </ul>			
Braxton & Hirschy (2005) (Commuter)	<b>Family background</b> <ul style="list-style-type: none"> <li>Parental education</li> </ul>	<b>Dispositions</b> <ul style="list-style-type: none"> <li>Motivation</li> <li>Self-efficacy</li> <li>Affiliation needs</li> <li>Anticipated socialisation</li> </ul>		<b>External environment</b> <ul style="list-style-type: none"> <li>Finances (cost of education)</li> <li>Support or discouragement</li> <li>Work</li> <li>Family support</li> <li>Community</li> </ul>
Bean and Eaton (2000)	<b>Family background</b> <ul style="list-style-type: none"> <li>Parental education and income</li> </ul>	<b>Dispositions</b> <ul style="list-style-type: none"> <li>Personality traits</li> <li>Initial self-efficacy</li> <li>Initial attribution</li> </ul>	<b>Skills and abilities</b> <ul style="list-style-type: none"> <li>High school grades</li> <li>Past behaviour</li> </ul>	<b>Financial</b> <ul style="list-style-type: none"> <li>Ability to pay</li> </ul>



		<ul style="list-style-type: none"> <li>• Normative beliefs</li> <li>• Coping strategies</li> <li>• Motivation</li> <li>• Educational goals</li> </ul>		<p><b>Bureaucratic factors</b></p> <ul style="list-style-type: none"> <li>• Administration process</li> </ul>
	<p><b>Personal attributes</b></p> <ul style="list-style-type: none"> <li>• Cultural backgrounds</li> <li>• Religions</li> <li>• Languages</li> <li>• Experiences</li> </ul>			<p><b>External environment</b></p> <ul style="list-style-type: none"> <li>• Work opportunities</li> <li>• Family responsibilities</li> </ul>

## 2.4.1. Non-Cognitive Predictors

### 2.4.1.1. Expectancy-value theory

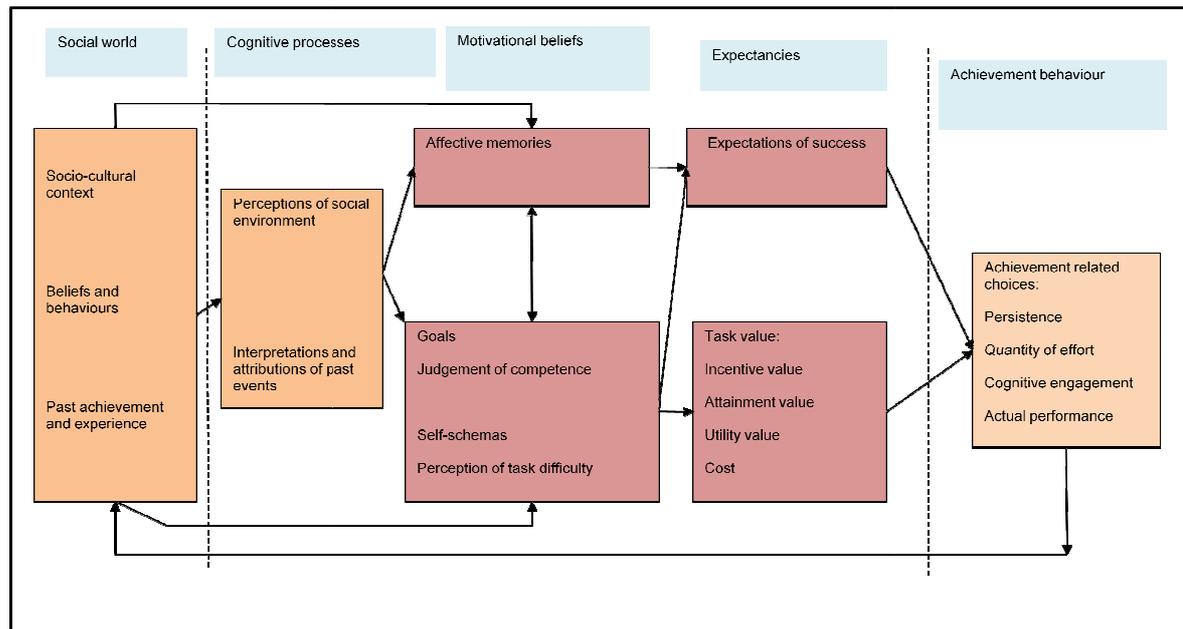
Expectancy-value theory is a school of thought to explain how motivation influences task initiation, persistence and performance (Wingfield & Eccles, 2000, p. 68). Accordingly the theory states that motivation is dependent on outcome expectations, thus what would be the likelihood of achieving an outcome and what is the perceived value of achieving the outcome (see Figure 2.6 below). A positive deduction from the expectation and value of the outcome will lead to a change in behaviour that would increase the probability of achieving the outcome. The outcome in an educational context is indirectly influenced by one or more forms of choices, like persistence, increasing effort, being more engaged or choosing different strategies for success (Geiger & Cooper, 1995, p. 251).

The type of subjective task value determines the behaviour. The types of value are attainment value, utility value, intrinsic value and the cost (Wingfield, Tonks & Eccles, 2004, p. 171). Attainment value refers to the importance of doing well on a task and the person usually identifies with the task. The utility value of a task refers to the usefulness of the task

to acquire something else. The cost of pursuing the outcome refers to choices one has to make as well as the expected effort one has to expend in order to complete the task (Wingfield et al., 2004).

The self-assessment of expectations and values are subsequently influenced by perceptions of motivational beliefs, personal past experiences and socio-cultural influences. The motivational beliefs incorporated into the theory are goals, concepts of ability, difficulty of the task and the way a student thinks about himself (self-schemata). The motivational beliefs directly influence the expectations for success as well as the subjective task value. The motivational beliefs are subsequently influenced by personal past experiences and socio-cultural influences and the attributions and interpretations of these past experiences and socio-cultural influences.

In an educational context students will be more motivated to expend effort at their work when their expectations for success are perceived to be achievable based on current evaluations of ability, task difficulty, goals and when a higher education degree is valued as important for career success (Wingfield & Eccles, 2000, p. 69). Vroom's 'Expectancy-valence theory of motivation' adds instrumentality to the equation and refers to the perceived expectancy that a reward (outcome) will actually be received based on performance levels (as cited in Geiger & Cooper, 1995, p. 251).



**Figure 2.6. Expectancy-value theory of motivation (Wingfield & Eccles, 2000)**

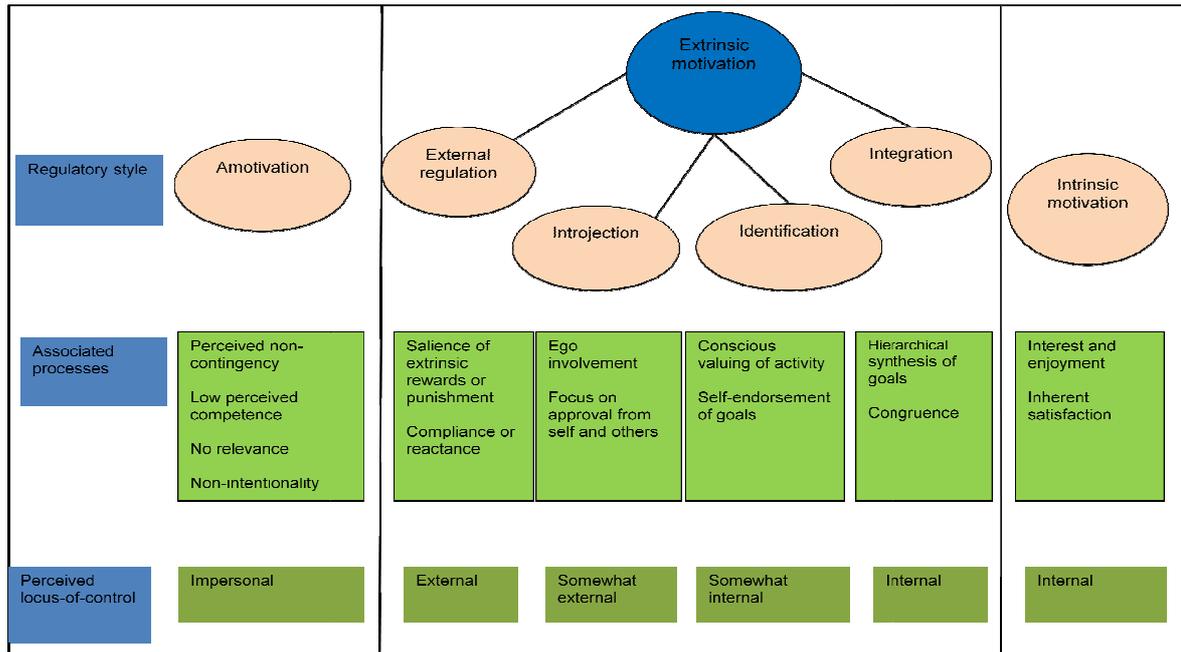
According to Wingfield (1994, p. 94), the expectancy-value theory is used to explain motivation for achievement tasks and provides insight into the concept of achievement motivation. Achievement motivation as referred to here by Wingfield (1994) is based on ‘needs theory’ which states that ‘individual motivated behaviour is substantially driven by the strength of various intrinsic needs (in other words, achievement, affiliation, autonomy, and dominance)’ (Geiger & Cooper, 1995, p. 251). Our focus is on achievement motivation which is the drive to excel academically (Busato, Prins, Elshout, & Hamaker, 2000). Achievement motivated students are driven by success (the pull action) and the avoidance of failure (the push action) (Haugen, Ommundsen & Lund, 2004; Haugen, Lund, & Ommundsen, 2008).

According to Ryan and Deci (2000, p. 54), motivation refers to being driven to do something. The definition by Ryan and Deci suggests a difference in the level of motivation, thus how motivated a person is on a dimension ranging from unmotivated to motivated, for example. Ryan and Deci (2000, p. 54) suggest that people do not only differ on the level of their

motivation, but also on the different kinds of motivation. The different kinds of motivation are usually referred to as motivational orientation, or the *why* of doing something. Triandis unpacks motivational orientation in his definition of motivation: ‘...the study of motivation is concerned with why people initiate, persist, and terminate actions in particular circumstances’ (1995, p. 13). According to Ryan and Deci (2000), motivation orientations play an important role in an educational context.

Self-determination theory proposes two distinctive motivation orientations based on essential attitudes and goals, namely an ‘intrinsic’ or ‘extrinsic’ motivation orientation (Elliot & Harackiewicz, 1994, p. 968; Ryan & Deci, 2000, p. 55). Motivation orientation points to the reason for doing a task, thus intrinsic motivation suggests that a person is doing a task because he or she enjoys doing it or finds the task interesting. Extrinsic motivation, on the other hand, suggests that a person is doing a task because he or she is expecting to achieve a valued outcome. Students who are extrinsically motivated tend to show competence in the task by the setting and achieving of performance standards and comparing one’s performance with that of others (Elliot & Harackiewicz, 1994, p. 970; Lindenberg, 2001). According to Busato et al. (2000, p. 1058) achievement motivation is regarded as a component of an extrinsic motivation orientation.

Ryan and Deci’s taxonomy of motivation provides a comprehensive explanation on the different motivation orientations and further differentiates between different types of extrinsic motivation. The taxonomy further differentiates between the reasons for performing a task and perceived locus of causality when performing the task (Ryan & Deci, 2000, p. 61).



**Figure 2.7. Ryan and Deci's taxonomy of human motivation** (Ryan & Deci, 2000, p. 61)

According to the taxonomy of human motivation (in an educational context specifically) a person can have either an unmotivated, extrinsic or intrinsic motivational style with associated reasons or the perceived influence from the environment. According to the 'Organismic Integration Theory' (OIT) which incorporates the taxonomy of motivation, there are six different types of motivation, ranging from being apathetic ('amotivation') to being intrinsically motivated (Ryan & Deci, 2000, p. 61). A student who is apathetic has no intention or commitment to work toward the attainment of a goal and there is no causal influence from the environment or from the person self. According to research, amotivation is the result of having no value for the task, feeling incompetent to do the task (low self-efficacy), or expecting that the outcome will not be achieved regardless of the effort expended on the task (Ryan & Deci, 2000, p. 61).

Extrinsic motivation is sub-divided in four regulatory styles. The first 'external regulation' refers to doing a task because of causal influence from the environment. The influence

could be an external punishment or a reward. The second 'introjection' refers to doing a task to maintain personal levels of self-esteem. The causal influence is still regarded as external because the person does the task to avoid anxiety or to establish superiority over another person (see Nicholls, Patashnick, Cheung, Thorkildsen & Lauer, 1989, p. 1880).

The third 'identification' refers to doing a task because the person has recognised the importance of the task to achieve valued outcomes. The causal influence is thus more personal. The fourth 'integrated regulation' refers to tasks that have been recognised as important and have been fully incorporated into the valued outcomes of the person. This is slightly different from intrinsic motivation where a task is done for the pure enjoyment thereof, and because the valued outcome is regarded as something separate from the behaviour (Ryan & Deci, 2000, p. 62). A study by Phinney et al. (as cited in Rodgers & Summers, 2008, p. 178) determined that an internal form of extrinsic motivation was indicated as the reason of many students to enrol for higher education, thus integrated regulation.

A study conducted by various researchers in Rodgers and Summers (2008, p. 178) on the OIT indicates that African students more frequently indicate helping their family and to prove that they can succeed academically as reasons for attending higher education, in contrast to white students. The African students are thus more extrinsically motivated and according to the researchers this could be related to the socio-economic status of African students in general. The research however shows that 'introjected regulation' as displayed by African students can support learning behaviour. In general, introjected regulation is positively associated with effort, but the research also indicated a positive association with anxiety and poor coping skills for failures (Ryan & Deci, 2000, p. 63). Research by Pintrich and De Groot (1990, p. 34) suggests that students with high anxiety levels are usually ineffective learners and have been associated with people with an extrinsic motivation orientation (Pintrich & Garcia, 1991). The research also suggests that the more autonomous or intrinsic the extrinsic motivation orientation becomes, the more it is likely to be positively related to engagement, academic achievement, persistence, quality of learning and psychological well-being (Ryan & Deci, 2000, p. 63).

According to Ryan and Deci (2000, p. 55), the majority of tasks in an educational context is not intrinsically motivated, but extrinsically motivated. High levels of intrinsic achievement motivation would be similar to having *integrated regulation* and high levels of extrinsic achievement motivation would then be similar to having external regulation. According to Wingfield et al. (2004) there is some association between the utility value of a task and extrinsic motivation (see Ryan & Deci, 2000). The intrinsic value of a task refers to the pure enjoyment of a task. There is also some association between the intrinsic value of a task and intrinsic motivation.

Research on expectancy theory suggests that expectancy was positively associated with students' academic marks after controlling for preparation time, historical grades and perceived ability (Geiger & Cooper, 1995). Within-persons studies also found that individual effort levels and academic achievement are closely related to valence decisions. The research also indicated the value of an outcome to be more motivational than the perceived expectation of attaining the outcome, regardless of the differences in effort expended on the task (Geiger & Cooper, 1995). According to Tinto (1993), highly motivated students are willing to commit themselves fully to the attainment of valued goals and expend effort and resources to do so. Bandura states that value and expectancies of success (achievement motivation) affect task performance indirectly through their influence on goal acceptance, rather than having a direct influence on performance (Bandura, 1986, p. 473; Elliot & Harackiewicz, 1994, p. 977; Nicholls et al., 1989, p. 1880).

According to Sternberg and Grigorenko (2002, p. 8), achievement motivation plays an important role in activating various skills, such as planning and self-evaluation skills, as well as learning and thinking skills. Schunk (1991) shows in his research how motivation is related to self-regulated learning through four processes that provide feedback information that influences motivation.

Self-regulated learning is regarded as a very important component in any learning task (Pintrich & De Groot, 2000):

- The first is 'self-observation' of a person's own behaviour. This provides information as to how the person is doing in relation to their goals. It helps to indicate gaps and allows for goals to be changed where necessary. Self-observation thus provides the impetus to plan and monitor goals (see Bandura, 2006, p. 165; Maddux, 2002, p. 282). The observation should, however, be timely, frequent and focus on the correct behaviour that needs to be monitored.
- The second, according to Schunk (1991), is 'self-evaluation' of current performance based on set goals. Evaluation judgements are made based on the standards used, the type of goals that were set (performance or mastery), the importance or value of reaching the goal, as well as the causal attributions of success. These judgements are seen as influencing motivation indirectly through feedback of actual performance (Bandura, 1986). The third is 'attributions' about the causal influence of performance which has an effect on success expectancy, behaviour, and affective reactions toward the task (most prominently anxiety). The last is 'self-reaction' about reaching the goals. Self-reaction is highly related to causal attributions and self-efficacy (Schunk, 1991, p. 90; Bandura, 2006, p. 165).

The commonly held notion about achievement motivation is that students who are high in achievement motivation set challenging goals and students who are low in achievement motivation set low performance goals. Sternberg and Grigorenko (2002, p. 7) state that achievement motivators set moderately high goals that are challenging enough with a high likelihood of attaining the goal in an area where they are able to excel in (subject-specific). In contrast to this perspective the relationship does not reflect low or high level goals, but the setting of a different type of goal. High achievement motivators usually set performance goals (achieving 75% in a test), while low achievement motivators set mastery goals, thus valuing competence and task involvement (Elliot & Harackiewicz, 1994, p. 977).

The following motivation related construct will be discussed in the following sections:

#### **2.4.1.2. Self-efficacy theory**

Bandura's theory of self-efficacy is defined as '...peoples' judgments of their capabilities to organize and execute courses of action required to attain designated type of performances' (Bandura, 1986, p. 391). In an academic environment self-efficacy refers to a belief in one's ability, based on past experiences to perform academically and to achieve set goals within a domain-specific context (Bean, 2005; Bean & Eaton, 2000). Ayayee defines self-efficacy as '...learners' beliefs in their capabilities and what is required of them to do well' (2008, p. 169). From Bandura's definition, perceived self-efficacy is a judgment of what one is capable of doing according to one's own set of standards. It focuses on performance capabilities rather than actual personality variables (Zimmerman, 2000, p. 82).

Zimmerman states that self-efficacy judgements indicate if a person expects to be able to do the task and does not indicate how well a person will do on the task (Zimmerman, 2000, p. 84; Maddux, 2002, p. 278). According to Wingfield and Eccles' expectancy-value theory, Bandura differentiates between '...efficacy expectations, or the individual's belief that he or she can accomplish a task, and the outcome expectation, or the belief that a given action will lead to a given outcome' (2000, p. 70-71). Bandura argues to a difference between the 'judgments' regarding the behaviour and the outcome of the behaviour, which is a consequence of the behaviour (see Jacobs, Prentice-Dunn & Rodgers, 1984). Self-efficacy judgments refer to how well one is able to the task, while the outcome is the anticipated result of completing or executing the act.

The reasoning that Bandura follows is that '...outcomes flow from actions. Hence, how one behaves largely determines the outcomes one experiences' and '...the types of outcomes people anticipate depend largely on their judgments of how well they will be able to perform in given situations' (Bandura, 1986, p. 392). Although distinct from each other, they are highly correlated with each other as is evident from the expectancy-value theory (Bandura, 1986, p. 392; Jacobs et al., 1984; Wingfield & Eccles, 2000, p. 70).

According to Bandura (as cited in Wingfield & Eccles, 2000, p. 71), efficacy expectations are better predictors of performance and task choice than outcome expectations (see Jacobs et al., 1984; Zimmerman, 2000, p. 82).

Bandura thus defends his theory against the then developed expectancy-value theory. Bandura (1986, p. 391) describes self-efficacy as the 'trigger' that sources the necessary skills (cognitive, social and behavioural) and incorporates it in planned action. Accordingly, success is only achieved after evaluating what has been learned, in relation to one's goals and making the necessary changes to one's learning strategies to achieve one's goals.

Zimmerman describes self-efficacy as a multidimensional disposition, because there are certain factors that influence self-efficacy judgements that lead to uncertainty in what people perceive to be able to do and their actual behaviour. Zimmerman refers to differentiations in context and differences in the domain content or subject field as factors influencing self-efficacy judgements (2000, p. 83). Some people, however, only judge themselves to be able in specific focus areas, thus domain-specific. These domain-specific contexts have different levels of difficulty that influence performance (Zimmerman, 2000, p. 83). Solving domain-specific problems, even elementary ones, does not always have clear outcomes and therefore it requires various cognitive abilities.

Even sound efficacy judgements at the beginning of an academic year will lower after continuous failures, especially if the failures occur early in a student's first year. The students with accurate high self-efficacy judgements are however more likely to look at other reasons for failure (causal attribution) than ability, such as insufficient effort or poor learning strategies. 'The extent to which people will alter their perceived efficacy through performance experiences will depend upon, among other factors, the difficulty of the task, the amount of effort they expend, the amount of external aid they receive, the circumstances under which they perform, and the temporal pattern of their successes and failures' (Bandura, 1986, p. 401). Thus indicating a recursive feedback loops among the factors of the expectancy-value theory and the achievement outcomes.

Schunk (as cited in Ayayee, 2008, p. 169) indicates that results on academic achievement are not clear-cut. Students with low efficacy judgments do not necessarily have low academic achievement and high achievers do not necessarily have high self-efficacy judgments. This could be due to disconnectedness between the outcomes that one expects and the efficacy judgement of achieving the outcomes (Bandura, 1986, p. 393). As mentioned earlier, efficacy judgements about expected outcomes have a regulatory influence on behaviour. According to Bandura, dissociation will occur when 1. taking no action will produce the desired outcome; 2. external influences have an effect on the desired outcome; 3. the outcome is not associated with the level of performance (expectancy-value theory).

In an educational context, the second and third points of dissociation are important. Students who are pressured by their parents to study a specific degree (external influence) will not be motivated to pursue the outcome when the proposed degree does not fit their interests, regardless of high efficacy judgements. Students who perform poorly due to external influences and not due to a lack of skill, regardless of consistent effort, will not necessarily have poor efficacy judgements. Bandura summarises these external influences as a lack of incentives, inadequate financial or material resources and physical or social constraints.

Schunk (1991) does not only show a relationship between efficacy judgement and effort, but also to the levels of persistence (behaviour regulation to acquire expected outcome). Students with high self-efficacy levels will increase their effort and work more persistently to reach their goals (Bean & Eaton, 2000, p. 53). Bean and Eaton (2000) differentiate between efficacy in a social and an academic context. Students who for instance believe that they are able to make friends are more likely to become socially integrated into the social system of the institution. Similarly, students who believe that they will be able to perform academically and actually achieve their outcomes are more likely to become academically integrated into the academic system of the institution. In both cases, having high efficacy judgements for social and academic situations affect students' levels of integration and persistence. 'A strong sense of self-efficacy with regard to the particular events and situations that compose campus life enables a

student to gain confidence in his or her ability to survive and adapt' (Bean & Eaton, 2000, p. 53). Levels of self-efficacy are also dependent on positive feedback from behaviour in a specific context (Bean, 2005).

According to Bandura the relationship between intellectual tasks and positive outcomes, for example academic achievement, is highly positive for people with high levels of self-efficacy judgments. People who do not have confidence in their abilities, thus with a low level of self-efficacy, will expect poor performance and possibly not continue with the task at hand (Bean & Eaton, 2000, p. 52). People with low self-efficacy judgements do not persist with their self-regulatory behaviour when their initial attempts prove to be lacking (Bandura, 1986). This corresponds with the propositions of expectancy-value theory.

A study with children and their perceived learning ability by Salomon (as cited in Bandura, 1986, p. 395) shows that children who regard the work to be learned as easy will exert less effort learning the material compared to children who regard the material as challenging, self-efficacy being high in both cases. This applies to skills that have been acquired and are being implemented. The children who spend more effort because of the perceived difficulty of the material doubted their abilities. Bandura states that self-doubt might lead to increased effort but it might actually hinder the use of previously learned skills when engaging in learning tasks (Bandura, 1986, p. 395). Self-doubt can either impede or be the impetus for sustained effort. This indicates a relational link between efficacy judgements and effort.

Racial differentiation on self-efficacy judgements by Rodgers and Summers (2008, p. 177) indicates that African-American students that attend Historically White Institutions have lower levels of perceived efficacy judgements than students who are enrolled at Historically African Institutions. The reason for this, according to Rodgers and Summers, is possibly due to the efficacy expectations, especially vicarious experiences and social persuasion as proposed by Bandura (1986). Through vicarious experiences, African students are able to model people from similar racial and cultural background.

Social persuasion is a form of establishing relationships with other African students whereby they can support and motivate one another. Through vicarious learning and social persuasion, African students incorporate the group's expectations and efficacy judgements (see Triandis, 1995). There are usually less opportunities for African students to model people from similar racial backgrounds in a Historically White Institution and therefore the lower perceived levels of efficacy.

#### **2.4.1.3. Achievement goal theory**

Goals specify valued outcomes of students, educational and occupational, toward which activities are directed and reflect both aspiration and expectations (Locke, 2002; Schunk, 1991, p. 85; Tinto, 1993). According to Pintrich (2000, p. 93), there are three general perspectives on goals, each at a specific levels of analysis. At the first level are target goals which specify a specific level of performance by which a person can evaluate performance (see Bandura, 1986; Harackiewicz & Sansone, 1991, p. 21). On the second level are more general goals that indicate the reason for pursuing a task (purpose goals) and could apply to all areas of life (see Harackiewicz & Sansone, 1991, p. 21). At the third level are achievement goals that incorporate target and purpose goals, but used specifically when an achievement task, like higher education, is pursued. 'Given this general definition, current achievement goal constructs address the issue of the purpose or reason students are pursuing an achievement task as well as the standards or criteria they construct to evaluate their competence or success on the task' (Pintrich, 2000, p. 93). Achievement goal theory, as explained by Pintrich, shows that achievement goals are not just a combination of target and purpose goals, but also indicates beliefs about ability, competence, success and effort. Pintrich proposes an integrated approach to achievement goal theory and motivational constructs.

Pintrich (2000) states that there is some concern regarding the theoretical and operational definitions of the construct. There also seems to be some overlap in relationship between the goal orientations and outcomes. The reason for the performance becomes measurable by the expected outcome. Various researchers in Pintrich (2000, p. 95) show a positive relationship between 'outcomes such as attributes, self-efficacy, levels of cognitive engagement and self-regulation, affect, interest,

persistence, and choice behaviours...’ and mastery goals and to a lesser extent a positive relationship with performance goals.

According to Pintrich’s (2000, p. 94) achievement goal theory, target goals are used as specific criteria to evaluate performance (see Schunk, 1991). According to Harackiewicz and Sansone (1991, p. 21), target goals guide behaviour and influence the performance of a person. Bandura (1986, p. 473) argues that various conditions apply that affect performance on various tasks. Bandura (1986) reasons that goals should firstly be clear by indicating the type and amount of effort required. Secondly, the goals should be set at a challenging level, but not be entirely unattainable (Bandura, 1986; Schunk, 1991). When goals are clear in terms of what performance is needed to accomplish the goal, it heightens the attainability of the goal. When a goal, especially a challenging goal, is attained it increases efficacy judgements and motivation to continue with the task. Thus, supporting a cyclical interaction effect among goals, self-efficacy, expected difficulty of the task and the achievement behaviour, such as increasing effort to reach a valued outcome (Wingfield & Eccles, 2000).

According to Harackiewicz and Sansone (1991, p. 21), purpose goals indicate the reason for behaviour and influence the way a person will approach a task and how one will evaluate one’s performance in an achievement context (see Pintrich, 2000, p. 94). Pintrich (2000) suggests that mastery and performance goals indicate the reason for performance. In this instance, mastery goals lead to the development and attainment of skills or mastering the content of a subject. Performance goals lead to the attainment of some performance standard and showing competence in relation to other people according to some set standard (Bandura, 1986, p. 476; Elliot & Harackiewicz, 1994, p. 970).

A further differentiation of dichotomous constructs such as mastery and performance goals in approach and avoidance goals seems to provide richness to interpretations of goals and outcomes. Performance goals can be sub-divided in what Elliot and Harackiewicz (as cited in Pintrich, 2000, p. 95; Rodgers & Summers 2008, p. 181) call

'performance-approach' and 'performance-avoid' goals. Students who have performance-approach goals strive to be the best achiever in their class, relative to others in the class. Students who have performance-avoidance goals try to avoid being the worst achieving student in the class, relative to others in the class. According to research in Pintrich, performance-approach goals can have positive correlations with actual achievement, while performance-avoidance goals are negatively correlated with interest and actual achievement.

Pintrich (2000, p. 99) suggests that mastery goals can also be differentiated in approach and avoidance goals. According to research in Pintrich, mastery goals are associated with interest in the task or content, thus mastery-approach goals refer to a focus on mastering the task through standards of improvement and setting standards to aid a deep understanding of the task. Mastery-avoidance goals refer to avoiding not to learn or to misunderstand through standards on what not to do to do the task incorrectly. Mastery-avoidance goals seem to be only the inverse of mastery-approach goals.

Research in Pintrich (2000, p. 101) indicates that a third type of goal 'work avoidant' goals could be used to explain mastery-avoidance goals. 'In this case, it may be that an avoidance of mastery reflects an avoidance of work and effort, just as an approach to mastering the task will involve higher levels of effort and involvement in the work of the task' (Lathan & Locke, 1991; Pintrich, 2000, p. 101).

The motivational constructs of expectancy-value theory are goals, self-efficacy and evaluations of the difficulty of the task. Bandura comments specifically on the relationship between task difficulty and goal setting by reference of Atkinson and Locke. Firstly, there is not necessarily a linear relationship between task difficulty and goal setting. A curvilinear relationship is proposed by Atkinson (as cited in Bandura, 1986, p. 473). This implies that '...hard goals have a low success expectancy but high value, easy goals have a high success expectancy but low value...' (Bandura, 1986, p. 473). This implies that effort and consequent performance will be higher for goals of

intermediate difficulty. Expectancy-value theory, as mentioned in Bandura (1986), indicates a negative linear relationship between goal difficulty and performance.

Contrary to Atkinson, Locke (as cited in Bandura, 1986, p. 473; also see Lathan & Locke, 1991) proposes a strong positive relationship between the setting of goals and performance. The relational effect between the setting of goals and performance is that more challenging goals lead to more effort which leads to higher performance. This is however only applicable when goals are strongly valued by the individual and according to this research, goals that are regarded as unattainable will be discarded by the individual. Research by Erez and Zidon (as cited in Bandura, 1986) however indicates that many individuals will persist with unrealistic goals even when there is ample information or feedback that indicates to the contrary. This research thus indicates that long-term goals could stimulate effort in such a way that even though goals seem unattainable now they could be reached with continuous effort over a long period of time.

Bandura (1986, p. 476) argues that the mere setting of goals will have little impact on future behaviour when there is little personal commitment to the goals (also see Tinto, 1993). Bandura indicated that people who set their own goals and who are committed to a valued outcome will be more inclined to increase effort to reach the goals and be more intrinsically motivated (Locke, 2002; Wingfield & Eccles, 2000). It is, however, not always necessary for people to make their own goals for them to be committed toward them. Bandura (1986, p. 477) argues that goals set by external parties can be internalised by committing oneself fully to those goals. Bandura theorises that committing oneself to external goals has certain consequences, social and personal, when the goals are abandoned. One will therefore exert the necessary effort to accomplish these goals in an attempt to maintain self-esteem (Ryan & Deci, 2000).

Bandura (1986, p. 474) differentiates between 'proximal' and 'distal' goals. Proximal goals refer to short-term goals that can be used to benchmark performance and to set new short-term goals. Short-term goals have a regulatory function that enables a person to achieve distal goals. Distal goals are seen as long-term goals or aspirations. A

student studying a Bachelors of Commerce (Accounting Sciences) usually aspires or hopes to become a Chartered Accountant. The student however has to master the curriculum over a number of years before becoming a Chartered Accountant. The student should however plan and set short-term goals during the programme to regulate his effort, learning strategies, and behaviour, and achieve the required performance levels in order to achieve the student's distal goal.

According to Bandura (1986), people who procrastinate are unlikely to achieve their long-term goals due to not setting short-term goals that regulate behaviour such as increasing effort, planning and self-evaluation of progress in relation to current levels of effort. 'Those who set no goals for themselves achieve little change in performance, those who set goals to sustain their level of effort make modest improvements, while those who set themselves goals to better their past attainments accomplish large performance gains' (Bandura, 1986, p. 475). Bandura's theory indicates the positive correlation between self-regulated learning as discussed by Pintrich and De Groot (1990, p. 34) and intrinsic motivation, mastery goals and self-efficacy, which leads to increased effort and increases the likelihood of reaching challenging goals (Bandura, 1986; Locke, 2002).

According to Nolen (as cited in Meece, 1991), goal orientation is associated with different learning strategies. People with task oriented goals (mastery goals) will more likely make use of deep learning strategies, while students with ego oriented goals (performance goals) will more likely use surface learning strategies. Joubert (2002) indicates an association between a person's motivational orientation and learning strategy. Intrinsic motivators are more likely to have deep learning strategies because they set mastery goals, while extrinsic motivators are more likely to have surface learning strategies because of performance goals. According to Elliot and Harackiewicz (1994, p. 977), motivation orientations are associated with goal orientations. Intrinsic motivators usually set mastery goals and extrinsic motivators usually set performance goals.

#### **2.4.1.4. Attribution theory**

Bean and Eaton's (2000) model indicates that attributions are important factors as students enter the institution. Attribution theory provides a theoretical framework to understand why events occur (Weiner, 1972, p. 203) and how this relates to thinking and behaviour (Attribution Theory, B. Weiner, n.d.). According to Weiner (as cited in Ayayee, 2008, p. 169) attribution theory refers to the factors that have a perceived influence on academic success or failures. Attribution theory has been used extensively in an educational context and has been used to explain the difference between high and low achieving students (Attribution Theory, n.d.).

According to Weiner (as cited in Rodgers & Summers, 2008, p. 180) there are three causal dimensions to which students can attribute their academic outcomes: 'locus (internal versus external), controllability (controllable versus uncontrollable) and stability (stable versus unstable)'. Causes of success or failure that relate to locus indicate origins of factors within the person (internal) or the environment (external). Students who believe that the cause of success or failure is stable believe that the outcome will be the same when performed at a later time, while students who believe the cause is unstable will believe the outcome will be different each time. Those students who believe that the cause is controllable believe that they can change the factors that cause success or failure (see Henson, 1976). Factors that are believed to be uncontrollable cannot easily be changed (Attribution Theory, n.d.). The combination of causal dimensions generally lead to an optimistic (positive) or a pessimistic (negative) style of attribution (Haugen, Ommundsen, & Lund, (2004); Haugen, Lund, & Ommundsen, 2008).

Weiner (as cited in Attribution Theory, B. Weiner, n.d.) identified four factors affecting attributions for achievement: ability, effort, task difficulty and luck. These four factors are usually used to attribute the reasons for success or failure in an academic context and are influenced by the students' attribution style (Haugen et al., 2004; Haugen et al., 2008).

According to Weiner (as cited in Attribution Theory, n.d.) the four factors can be analysed as followed:

- Ability is a relatively internal and stable factor over which a student does not have much direct control;
- Task difficulty is an external and stable factor which a student does not have much control over;
- Effort is an internal and unstable factor over which a student has much control over;
- Luck is an external and unstable factor which a student does not have much control over.

The causal dimension: controllability is seen as a distinct factor from locus and stability (Attribution Theory, n.d.). Even though an outcome can be perceived to be external and unstable, for instance caused by luck, a student can still control the outcome to an extent by putting more effort into the work. Weiner (1972, p. 204) postulates that failure is usually attributed to low ability and/or lack of effort.

Locus of control has been the most frequently studied construct and refers to attributing internal or external causal influences from past behaviour (Bean, 2005; Bean & Eaton, 2000). The initial attributions as mentioned in Bean and Eaton's model (2000), according to Rodgers and Summers (2008, p. 180), affect students' academic self-efficacy, which affects students' coping skills. Attributions are also strongly correlated with motivation (Attribution Theory, B. Weiner, n.d.; Joubert, 2002, p. 54; Rodgers & Summers, 2008, p. 173). According to Joubert (2002), a person with an internal locus of control usually has an intrinsic motivational orientation and *vice versa*. In both locus of control and motivational orientation there is a differentiation in the level of responsibility toward personal development by investing time and effort, as well as the level of flexibility by adjusting learning strategies according to the type of work that needs to be learned, planning study sessions by setting proximal goals for learning and monitoring by using feedback information.

According to Weiner (as cited in Bean & Eaton, 2000, p. 54), students who believe that they have control over the outcomes of a task will be more motivated to invest the necessary effort to achieve the outcomes. Studies conducted in the seventies indicate a strong relationship between locus of control and achievement (Ayayee, 2008, p. 170). According to the results, low achieving students were more likely to have an external locus of control, thus attributing their failures to factors out of their perceived control. Various studies in Bean and Eaton (2000, p. 54) indicate a positive correlation between locus of control and academic achievement. Joubert (2002, p. 54) states that the relationship between the meta-cognitive functions of planning and monitoring, which are associated with academic achievement, and locus of control is complex.

An internal locus of control for instance does not necessarily activate the meta-cognitive functions to increase academic achievement. The strong association between motivation and meta-cognition could provide the impetus to achieve academically, because motivation to achieve could activate the meta-cognitive functions (Lemmens, 2005). According to the Organismic Integration Theory of Ryan and Deci (2000, p. 61), students' locus of control affects their motivational orientation. Locus of control therefore does not directly affect academic achievement, but indirectly through the motivational orientations.

Crocker and Major's paradoxical study (as cited in Rodgers & Summers, 2008, p. 180) indicates that African-American students are able to maintain a positive self-esteem even when they fail academically. Crocker and Major explain these findings based on three attribution patterns: firstly, 'attributional ambiguity' refers to African students who attribute their failure to internal and external factors. Uncontrollable factors such as race and gender are in some cases unequivocally associated with poor academic achievement and are accepted by the racial group.

Secondly, 'selective comparison' refers to students comparing their abilities with other specific student groups, such as African students comparing themselves with white students. Crocker and Major, however, argue that African students have high self-

esteem and academic self-concepts because they tend to make 'within' group comparisons, thus comparing themselves with other African students.

Thirdly, 'selective devaluing' usually occurs in cultural groups who accept biases in academic achievement by devaluing its importance. African-American students tend to devalue academic achievement because they perceive themselves to not have the ability to excel, thus using a protective mechanism to keep their self-efficacy judgements intact. Research by Van Laar (as cited in Rodgers & Summers, 2008, p. 180) indicates that African students make more external attributions for failure, thus having lower expectations for success which leads to lower academic achievement (Eccles, Wingfield, Flanagan, Miller, Reuman & Yee, 1989).

#### **2.4.1.5. Beliefs and values**

According to Bean and Eaton (2000, p. 50), a belief is a representation of a quality that is assigned to something. Bean and Eaton allude to assigning an attribute to something or evaluating something. 'Belief systems thus help to provide structure to life. Because personal identity and security become heavily invested in belief systems, they are not readily discarded once acquired' (Bandura, 1986, p. 36). Bentler and Speckart (as cited in Bean & Eaton, 2000, p. 50) defined normative beliefs as '...the individual's beliefs regarding whether those referents who are important to him or her think that he or she should perform a given behaviour'. These important people could be parents, siblings, friends or role models and it is proposed that these people play an important role in students' beliefs about the institution, their ability and the possibility of obtaining a degree and choosing a career (Herriot & Ecob, 1979).

Being affiliated with a sub-group within the institution enforces and strengthens the beliefs that are valued by that group. A person does not necessarily have to value the beliefs of the group upon entry, but could be fond of or be attracted to people they meet for the first time. Thus becoming part of this group could alter the choices of a person, for the good or to the detriment of the person. Bandura (1986, p. 35) provides the example of a religious cult that provides an ideology that gives 'purpose and meaning to

one's existence'. Social sub-groups at university can thus provide both the support to a student to persist until degree completion or to the other extreme to become involved in anti-social behaviour that leads to exclusion from the university. According to Bandura (1993), beliefs are able to provide direction or distort reality to the perceptions of the group. Reality is constructed according to beliefs about the environment, interpreted and acted on according to these beliefs. Low socio-economic status students typically do not have well developed 'meaning making' systems and therefore run the risk of withdrawal (Kuh & Love, 2000, p. 203). Their norms, values and beliefs are thus different to other students.

Values are regarded as conscious, cognitive and evaluative representations of that which is important to a person (Biernat, 1989). To be able to play an active role to achieve what one values requires the development of skills, high self-efficacy judgments and self-monitoring and self-regulation (Bandura, 1986, p. 38). According to Bandura (1986, p. 38), these personal resources enable a person to become an active participant in the choice of his or her own life course, by 'selecting, influencing and constructing their own circumstances' (see Biernat, 1989). Bandura however states that individuals as active role players in their own destiny are dependent on social support to help overcome life's challenges. Social support also provides the values and belief systems that provide structure and direction during life's journey.

Higher education institutions as social micro-systems do not always provide the necessary support for the challenges that students from under-represented cultural groups face. Van Laar (as cited in Rodgers & Summers, 2008, p. 178) found that African-American students value higher education equal or more than white students upon entering a university. African students however lower their overall value of education near the end of their first year.

The expectancy-value model of Eccles et al. (as cited in Rodgers & Summers, 2008, p. 178) was used to understand the value system of African-American students. According to the research, African students tend to believe that the cost of attending a

Historically White Institution is to dissociate themselves from their cultural background (Rodgers & Summers, 2008, p. 178). As stated earlier, the African students lower their expectancies for economic and academic success and start to believe that pursuing the degree is not worth the cost of dissociation. 'As a protective mechanism, these students begin to make more external attributions for failure and lower their perceived value of the outcome associated with academic achievement in college' (Rodgers & Summers, 2008, p. 180).

Further research in Rodgers and Summers shows that the perceived influence of factors external to the person on educational or occupational outcomes can have a negative correlation with effort and academic achievement. The external factors that Rodgers and Summers highlight are related to racism. The students who however strongly value their cultural background are able to safeguard against the effects of external factors, for example racism. This possibly shows that external factors such as racism have a negative effect on effort and academic achievement, but the students who are able to understand the system and who value their culture can buffer the negative effects of these and other external factors (Sedlacek, 2004).

#### **2.4.1.6. Coping strategies**

According to Bean (2005), 'approach' and 'avoidance' behaviour are ways in coping with an environment to reduce the stress and anxiety that the environment creates. Approach and avoidance behaviour seem to be the actual behaviour that is associated with academic success. These behaviours provide feedback to students and have the potential to increase or decrease a person's feeling of self-efficacy and could lead to various attitudes toward persistence (Bean, 2005). Approach behaviours are regarded as proactive behaviour to reduce the perceived stress from the institutional environment and avoidance behaviours are regarded as passive behaviour to avoid the institutional environmental stressor (Bean & Eaton, 2000, p. 53).

According to Rodgers and Summers (2008, p. 173), '[A]n effective coping process is shown to lead to stress reduction and increases confidence....'. Coping strategies are

used to change the circumstances or solving the problem. If this is not possible, coping strategies can be used to change perception, accepting the circumstance or avoiding the problem (Brown, et al., 2009). According to Lazarus, Folkman and Antonovsky (as cited in Brown et al., 2009, p. 451), coping strategies are important in the coping process and students who are successful at coping are more likely to be integrated academically and socially and are less likely to withdraw from their studies (Bean & Eaton, 2000, p. 51).

#### **2.4.1.7. Personality traits**

According to Feist (as cited in Sternberg, 1995, p. 596), personality refers to traits, dispositions or characteristics of an individual that are relatively stable over time and between contextual situations. McAdams and Pals (as cited in Strümpher, 2007, p. 504) proposed a three-faceted taxonomy of personality. The first relates to dispositional or trait-like factors that provide broad information about people without specifying a specific context. These traits are seen to be stable over time and in different contexts. Traits answer the question 'What kind of person is this?' (Strümpher, 2007, p. 504).

The second relates to 'characteristic adaptations' that have clear conditions and are context specific. 'These include, for instance, values, motives, goals, strategies, developmental tasks, schemas, self images, and mental representations of others' (Strümpher, 2007, p. 505). Unlike personality traits, the characteristic adaptations are state-like and are therefore likely to change over time and from one context to another. In summary, characteristic adaptations answer the question 'Who is this person?' (Strümpher, 2007, p. 505).

The third level relates to 'narrative identity' that develops from the way a person constructs his life and gives meaning and importance to events (Strümpher, 2007, p. 506). According to McAdams and Pals (as cited in Strümpher, 2007, p. 506), narrative identity helps to shape behaviour, establish identity, and integrate individuals into a socio-cultural environment. It also provides a person with a sense of purpose and meaning to life (Strümpher, 2007). In summary, narrative identity answers the question 'Who am I?' (Strümpher, 2007, p. 506).

## 2.4.2. Personal and Demographic Characteristics

### 2.4.2.1. Gender

Gender differences in attitudes about learning may be explained by the identity development differences of male and female students (Chee, Pino & Smith, 2005; Harris & Lester, 2009, p. 100). Harris and Lester discuss two distinct theories on gender identity development, namely 'feminist poststructuralism' and the 'social constructionist' model. The assumption of both these models is '...that gender is not a fixed characteristic, but rather one that is produced, negotiated, and reinforced within social structures' (Harris & Lester, 2009, p. 107).

The 'feminist poststructuralism' model argues that female identity development occurs due to the social relationships of females (Harris & Lester, 2009). Research by Chodorow's (as cited in Chee et al., 2005) psychoanalytic feminist theory and Gilligan's (as cited in Chee et al., 2005) theory of women's development and social capital theory confirm the importance of social relationships in the development of female identity. Gilligan (as cited in Chee et al., 2005) hypothesises that both men and women's academic achievement is largely determined by their social capital. Feminist poststructuralism proposes that identity development is fluid, contextual and subjective (Harris & Lester, 2009). According to Harris and Lester (2009), social relationships use 'language' to express societal norms and values. The 'message' that society promulgates about females is one that places females in lesser positions below males. 'Specific contexts alter the messages of gender thus affecting identity development' (Harris & Lester, 2009, p. 105). Institutional 'messages', from the academic or social communities about gender could affect the development of an academic identity of male and female students differently. Male-dominated courses, for instance the sciences and engineering, send out the 'message' those female students do not fit the profile of the course and have traditionally not been associated with these types of career.

Women who have constructed their identities around these messages have in part succumbed to what Steele (as cited in Sedlacek, 2004, p. 43) calls the 'stereotype threat', which refers to internalised biased beliefs about a group that negatively

influences the intellectual functioning and identity development of an individual belonging to that group (Rypisi, Malcolm, & Kim, 2009, p.125). Research in Sedlacek (2004) and Rypisi et al. (2009) indicates that African-American and female students are usually negatively influenced by stereotype threat. A female student who believes not to be able to study engineering just because women are not regarded as good engineers, have developed an identity that engineering is not a fitting career for a woman (see Biernat, 1989).

Harris and Lester (2009) argue that a female student can have many identities, relating to race, socio-economic status, and family background and that all these identities meet at any given point in different situations. The argument by Harris and Lester (2009) could imply that messages from one social context such as the institution or the fraternity will not be internalised if opposing messages from other social contexts have already crystallised the academic identity of the female student. A family background of female engineers, for example, will enforce academic values and form an identity that females are good engineers, regardless of messages from the engineering fraternity that are opposed to female engineers (Biernat, 1989).

The 'social constructionist' model explains that male identity is developed through learned roles and behaviours that are reinforced through social relationships (Harris & Lester, 2009, p. 107). The assumptions that male identity is developed through social interaction are similar to the identity development of female students. Socialising also takes place in specific situations and contexts. The difference in gender identity development is that female students tend to develop multiple identities and male students develop fewer identities (Harris & Lester, 2009).

Males are required to conform to narrowly defined masculine behavioural norms that are regarded as socially acceptable and therefore have fewer identities than females. 'Female college students take on multiple identities while in college that are often-times related to their involvement in campus activities and organizations' (Harris & Lester, 2009, p. 101). Male students, on the other hand, have to develop specific identities, such

as being emotionally stable, being physically strong, and showing sexual dominance over females (Whitson as cited in Harris & Lester, 2009, p. 108).

Student identity issues result in both male and female students, largely because of the influence of socialisation. Male students have to conform to narrowly defined norms and behaviour that sometimes lead to male gender role conflict (Harris & Lester, 2009, p. 102). These role conflicts, according to research in Harris and Lester (2009) lead, among other, to substance abuse, poor coping strategies, depression, and obsession with success.

Gilligan's (1982) research indicate that male student have higher grade point averages (GPA) largely because they tend to care more about individual achievement and place more value on extrinsic rewards than female students. Women's higher GPAs probably result from the benefits of their social relationships (in other words, social capital) that contribute to socialising and channelling their attitudes and behaviours to facilitate learning. Harris and Lester (2009) indicate that female students are more engaged in purposeful academic activities than male students. Female students develop multiple identities that are related to the different activities that are involved on campus. When conflicts occur in any of these identities, female students tend to develop psychological stress and show physical stress (Harris & Lester, 2009, p. 101). It is these feelings of stress with the accompanied physical symptoms that influence academic success negatively.

Studies conducted by De Lange, Waldmann and Wyatt (as cited in Du Plessis, Müller, & Prinsloo, 2005, p. 687) found three distinct differences between male and female students on academic achievement for an introductory accounting module. According to the results, male students are more likely to achieve distinction marks, whereas female students are more likely to achieve high distinction marks and credit grades compared to male students. Thirdly, female students are more likely to fail the module, compared to male students. Nourayi and Cherry (as cited in Du Plessis et al., 2005, p. 687) indicated no statistical significant difference between male and female students on academic

achievement for an accounting module. Du Plessis et al. (2005, p. 696) in their own study showed that male students achieved significantly better academically than female students on an accounting science module.

Research in Nora, Barlow and Crisp (2005, p. 145) shows a difference in the persistence rates of male and female students. Female students tended to have higher persistence and graduation rates than male students. Harris and Lester (2009) indicate that in the year 2000, 56% of the enrolled students were female and female students have higher graduation rates than male students. Nora et al. (2005) hypothesise that social and academic networks probably lead to the difference in male and female withdrawal behaviour. It also has to do with the way the identity conflicts of male and female students present themselves and how they are dealt with that determine identity development (Harris & Lester, 2009).

Another reason for female withdrawal or failure relates to acquiring 'cultural capital'. Bourdieu (as cited in Rypisi et al., 2009, p. 124) defined cultural capital as a set of standards and evaluations that a set up by a dominant group in an institution and are imposed upon a minority group. Female and minority groups such as African-American students are usually required to conform to the standards and evaluations of a white, male student and faculty body. In order for female students to advance within such a system, they have to comply with the set of standards prescribed by the dominant group (Rypisi et al., 2009). These standards, consisting of values, norms and behaviour are set in such a way that hardly any student from the minority group will ever reach these standards. These standards are quite frequently set up in the curriculum, the methods used to lecture and the modes of assessment (Rypisi et al., 2009).

#### **2.4.2.2. Race and cultural background**

Broadly speaking, culture consists of '...shared ideas, which are learned and affected by experience, and which constitute a system of knowledge expressed in social interaction and in patterned behaviour' (Van Heerden, 1997). According to Van Heerden the 'social interaction' wherein knowledge is expressed takes place in various 'fields of activities'

which constitute a 'network of relationships' with unique 'artefacts or material goods'. The important fields of activities are the 'domestic field, the field of the neighbourhood, that of kinship, occupation, politics, religion, and the field of university' (Van Heerden, 1997). This network of relationships with its 'artefacts' and 'languages', unique to each field of activity, indicates the complexity of the society a person of a particular race or ethnic background is part of.

Van Heerden published an ethnographic study in 1997 on the influences of socio-cultural circumstances on learning approaches prior to 1994. Van Heerden (1997) summarises various socio-cultural and psycho-social factors that influenced the academic performance of students from ethnic backgrounds studying at an open and distance learning institution (UNISA). The socio-cultural factors are for instance the economic circumstances, domestic environment and school education. The students participating in Van Heerden's ethnographic study indicated that their parents were of low socio-economic status and mostly illiterate or semi-literate.

The domestic environment of African students also proved to be limiting in terms of the artefacts that are necessary to stimulate learning and development of children, which is said to be necessary for the school environment and later for university performance (Van Heerden, 1997). The school environment was seen as foreign in terms of the concepts and ideas that were taught. The language of tuition was either in Afrikaans or English and many learners found the language difficult, especially understanding foreign concepts and ideas in a foreign language. Schools were mostly poorly equipped and quite frequently the teachers emphasised rote learning. The African students in the study also indicated a lack of good study habits and an inability to plan their studies. The students were also not fluent enough in the languages of instruction at the university.

Prior to 1994 one can make the deduction that there was a great distance between the cultures of the African student and the culture of a Historically White Institution (HWI). Practically it became a challenge for African students to persist and graduate at HWI's due to the 'distance' between the two cultures (refer to Chapter 1 for the national and

institutional graduation and failure rates, Scott et al., 2007). The research cited in Rodgers and Summers (2008) could shed some light on the phenomenon experienced in South African universities.

According to Grantham and Ford (as cited in Rodgers & Summers, 2008, p. 182), African-American students and many minority student groups face both psycho-social (self-perceptions and perceptions of interactions with others) and social-cultural (perceptions of interactions with others with respect to ethnicity or race) challenges in higher education. Rodgers and Summers (2008) strongly indicate that African-American students have to develop what they call a 'double consciousness' in order to persist at a HWI. Birman (as cited in Rodgers & Summers, 2008, p. 182) termed double consciousness as 'biculturalism' and refers to the ability to function in two individual cultures (Rendón, Jalomo & Nora, 2000, p. 133).

Rodgers and Summers reason that African-American students should '...establish a sense of biculturalism, maintaining an identity with their ethnic group as well as developing an identity as a member of the larger, predominantly White campus climate' (Rodgers & Summers, 2008, p. 182). Tinto (1993) revised his initial proposition of integration of African-American students to the institutional culture by demonstrating biculturalism. Research in Van Heerden (1997) shows that irrespective of the perceived disharmony of functioning in two individual cultures where contradictory ideas and activities exist, the individual chooses the ideas and activities and might not be in conflict with each other. Kuh and Love calls the difference between the culture of the individual and that of the institution 'cultural distance' (2000, p. 204).

The greater the distance between the values, norms and ideas of the individual and institution's culture, the more difficult it will be for the student to become integrated into the dominant culture or sub-cultures of the institution. Cultural distance would then also be associated with a minority student's ability to demonstrate biculturalism. Cultural distance is by default dependent on the socio-cultural circumstance of an individual because the socio-cultural circumstance of an individual determines the various

resources available for students to be successful at university and the value the students places on earning a higher education degree (Kuh & Love, 2000, p. 203).

According to Rodgers and Summers (2008), ethnic identity might be a stronger predictor for retention than the 'psychological processes' (for example self-efficacy and motivation) as mentioned in Bean and Eaton's model (as cited in Bean, 2005). Sedlacek (2004) indicated that the 'understanding of racism' as one factor together with the other psychological factors are better predictors of retention and academic success for African-American students than for white students (see Tracey & Sedlacek, 1989, p. 638). The factor 'understanding of racism' refers to '...the ability to understand the role of the system in life and to develop a method of assessing the cultural or racial demands of the system and respond[ing] accordingly/assertively' (Sedlacek, 2004, p. 51).

According to research in Sedlacek (2004), African-American students who understand racism and are prepared to address it have higher academic achievement and are more able to adjust to a HWI than those who do not. Steele (as cited in Sedlacek, 2004, p. 43) defines the 'stereotype threat' as internalised biased beliefs about a group that negatively influences the intellectual functioning and identity development of an individual belonging to that group (Rypisi et al., 2009, p. 125). Research in Sedlacek (2004) and Rypisi et al. (2009) indicates that African-American and females students are usually negatively influenced by 'stereotype threat'.

Research by Steele (as cited in Sedlacek, 2004, p. 43) on the stereotype threat indicates that African-American students who internalise the biased beliefs about academic achievement of their culture will have poorer test results than their white counterparts. Quaye, Tambascia, and Talesh (2009), referring to Steele, indicate that African students who are in their primary phase of developing an academic identity will more likely react negatively to stereotypes regarding their cultural group. The primary phase refers to identifying with the education institution and feeling a sense of belonging at the institution. Minority students who are able to identify with the institution and feel a sense

of belonging have higher levels of self-efficacy and reject the cultural stereotypes (Quaye, et al., 2009, p. 165).

Motivation, according to Van Heerden (1997), is regarded as an important component that influences academic achievement of African students. Cultural background or racial grouping is perceived to influence the motivation orientation of a student based on the causal attributions and the type of goals different cultural group set. African students from the collectivist culture usually have an external locus of control and focus on achieving collective goals. The family as a whole usually decide what the student should study and the student is required to conform to the wishes of the family to maintain group dynamics. Students from the collectivist culture thus predominantly have an external motivation orientation.

An external motivation orientation is not exclusively associated with a collectivist culture or African students only. White students from 'Calvinistic' background had to conform to the expectations of their parents without questioning their decision (Van Heerden, 1997). In general, students from individualistic cultures have the freedom to choose their own educational goals with the purpose of self-development, pleasure or to reach independence from their parents (Van Heerden, 1997).

The socio-economic shift of a large number of African people due to Affirmative Action and Employment Equity policies over the last decade in South Africa has arguably led to a shift in the cultural perspective of African students to accommodate the principles of an individualistic culture together with their own ethnic culture (Morris, 2006), thus becoming 'biculturally oriented' (Rodgers & Summers, 2008, p. 182) and consequently showing an ability to 'handle the system' (Sedlacek, 2004). The rise in socio-economic status of more African people indicates that the artefacts that are necessary to stimulate learning and development of children are now part of the domestic environment, supported by greater access to quality schools, with active role models from the same cultural background means that the stereotype threat can be diminished (Rodgers and Summers, 2008).

A reason for higher African-American withdrawal and failure rates compared to white students relates to the disparities in acquiring 'cultural capital'. Bourdieu (as cited in Rypisi et al., 2009, p. 124) defined cultural capital as a set of standards and evaluations that are set up by a dominant group in an institution and are imposed upon a minority group. Minority groups such as African-American students are usually required to conform to the standards and evaluations of a white, male dominated student and faculty body. In order for African students to advance within such a system, the minority students have to comply with a set of standards (Rypisi et al., 2009).

These standards consisting of values, norms and behaviour are set in such a way that hardly any student from the minority group will ever reach these standards. These standards are quite frequently set up in the curriculum, the methods used to lecture and the modes of assessment (Rypisi et al., 2009). This implies that minority students such as African students in a HWI will have a negative learning experience because the standards set up in the curriculum, the methods used to lecture and the modes of assessment are core to the academic performances of students and their learning experience in general.

#### **2.4.2.3. Family background**

Tinto refers to the work of authors like Weidman (1985) and Bean and Vesper (1990) to show how the 'external communities' influence persistence (Tinto, 1993, p. 62). The relationship between the intentions or goals and the external communities has the following pattern of interaction: students who have weak intentions to stay at university and poor goals could be influenced positively by external communities where these communities motivate the student to persist.

The external communities could influence the persistence behaviour negatively in terms of a lack of support (Stage & Hossler, 2000, p. 179). Based on these premises, Tinto made a hypothesis that students from communities with high academic non-involvement (first-generation students) are more at risk for withdrawal (see Furr & Elling, 2002). The

reason is that the home or community social groups do not necessarily understand the transition that the student has to make and that the student is ‘...forced to at least partially reject membership in communities that have been part of their upbringing’ (Tinto, 1993, p. 62).

Just as parental influence for first-generation students have a negative effect on persistence, it can have a positive effect too. Authors like Jones et al. (2008) and Johnston (2000) show that first-generation students are actually more likely to persist because of high levels of motivation. Parents, for example, can provide additional motivational support to students. Motivational support from parents could however, if too forceful, actually lead to students withdrawing rather than persisting. According to Tinto (1993, p. 63), this tension between parental support being too demanding or being totally uninvolved is particularly intensely experienced by first-generation students.

Family responsibilities have been associated with lower levels of academic success and higher withdrawal levels (Cabrera, Burkum & La Nasa, 2005, p. 170). The research in Cabrera et al. indicates that students from lower socio-economic status (SES) levels are slightly more likely to have family responsibilities due to falling pregnant than high SES students. In general, being part of a family structure or community away from campus could assist persistence.

#### **2.4.2.4. Financial pressures**

According to Schuh (2005, p. 279), students and institutions find it challenging to secure funds for students to access higher education and for institutions to provide higher education. Students, according to Schuh, usually pay for higher education through savings, their parents, bursaries or loans. The impact of finances was regarded as very straight forward by many researchers, but Tinto argues that there are unresolved questions on the ‘how’ and ‘why’ finances has an effect on persistence (Tinto, 1993, p. 65). According to Tinto, the greatest effect of family finances is seen at or before entry to university. Students with financial difficulty will have to decide on the type of institution and which degree to enrol for if additional support in the form of loans or bursaries is not

available, or not to study at all. According to Astin (1975, p. 53), parental financial support increases the probability of a student persisting at a higher education institution (see Bean, 2005, p. 235).

Astin (1975, p. 35) shows a direct relation between the financial income of parents and withdrawal rates. According to the results of Astin, the effect of parental income becomes insignificant in a regression analysis with other variables. This indicates that other variables influence the effect of parental income and withdrawal. 'The greater dropout-proneness of students from low-income families is attributable to their less educated parents, lesser ability and lower motivation, and greater concern about finances' (Astin, 1975, p. 35). According to Astin and Oseguera (2005), the educational level of both parents contributes to students completing their degrees. Parental education level is most often associated with the socio-economic status (SES) of the family (Astin, 1975; Furr & Elling, 2002).

This means that students coming from socio-economically disadvantaged families are more likely to withdraw from their studies than students from socio-economically advantaged families. Cabrera, Burkum and Nasa (2005, p. 156) confirm that students from low socio-economic status families tend to have parents who are less involved in the students' school education and are less informed about how to pay and plan for higher education. Socio-economically deprived students are usually also less prepared for higher education and have less knowledge of what to expect at university than higher SES students (Kuh & Love, 2000, p. 203).

Cabrera et al. (2005) provide evidence from research that although socio-economically deprived students are less prepared for higher education, they show similar levels of involvement with the institution in general as higher SES students. The research by Cabrera et al. (2005) indicates that lower SES students work longer hours at their work with less involvement in the academic and social communities, resulting in greater improvement of critical thinking skills than higher SES students. Regardless of the improvements of low SES students when entering a supportive environment, Cabrera et

al. (2005, p. 157) still indicate higher withdrawal levels for low SES students than for higher SES students. According to Cabrera et al. (2005, p. 158) the main reason for the lower persistence rates of low SES students is because of them being academically unprepared in general. Further research however indicates that some low SES students with minimal academic resources and who enter a four-year degree do show resilience to complete a degree in spite of the odds against such students. Resilience is defined as an ability to adapt under difficult circumstances (Masten & Reed, 2002).

Various researchers (as cited in Schuh, 2005, p. 281) indicate that students from lower SES families are more sensitive to changes in tuition fees and lowered financial aid than middle and high SES family students. Students from low income households are more likely to withdraw from studies when there are fluctuations in financial resources (St. John, Cabrera, Nora & Asker, 2000, p. 42). Bean (2005) indicated that African-American students specifically shy away from loans in general and according to Schuh (2005) lower income families are at risk for not being able to repay loans.

In South African contact universities the majority of students who withdraw from their studies are students from low-income households and in many cases these households face additional social difficulties like domestic violence and teen pregnancy that contribute to increased attrition rates at higher institutions (Macgregor, 2007). At one of the historically disadvantaged universities in South Africa, 82% of the students who withdrew from their studies were from low-income households. On average, 70% of the students that withdrew from the seven participating universities were from low-income households (Macgregor, 2007).

Jones et al. (2008) add that students from distant and rural areas face additional financial challenges that keep these students from applying to institutions. Paying application and registration fees is a problem for these students, not yet stating the challenge of paying for accommodation, food, textbooks or transport. According to Jones et al. (2008), students cannot be fully engaged academically or socially when they are

barely able to sustain their physical needs (see St. John et al., 2000, p. 40). Students who are not able to buy food or pay rent will not persist until graduation.

Jones et al. (2008) argue that the financial needs of disadvantaged students have a negative impact on their academic success and leads to social isolation. Having sufficient financial resources are necessary for academic and social integration (Tinto, 1993). Nora et al. (2005, p. 135) add that financial pressures also affect students' ability to engage in formal and informal academic activities, to stay committed to earning a degree and to eventually persist until degree completion (see Bean, 2005, p. 236; Furr and Elling, 2002).

#### **2.4.2.5. Work responsibilities**

The financial situation of the family affects students' decisions to work part-time to supplement the educational expenses and living costs while studying. Result from Schuh's (2005, p. 282) study indicates that it is the students from low-income and middle-income families that are more likely to work during the year – an average of 22.6 hours per week (see Macgregor, 2007; Tinto, 2008). Bean states that working more than 20 hours per week could have negative consequences for the academic and social life of the student (2005, p. 236). Working full-time, according to Schuh (2005, p. 282), is negatively associated with persistence. Thus working full-time lowers persistence levels.

The effect of work responsibilities is not always straight forward in terms of outcomes. Tinto states that work obligations, especially work off-campus that is not related to the academic programme will limit the time available for interaction with academic staff and peers (Tinto, 1993, p. 63). The reason for this is caused by the added responsibilities of commuter students, like family and work responsibilities. Astin (1975, p. 79) however indicates that part-time work facilitates persistence in some cases, because some students are able to spend time on work without suffering the negative consequences from a lack of lecturer and peer involvement. Students who work to earn money to pay for their studies are usually more motivated to complete their studies than the students who work to support their social expenditure (Bean, 2005, p. 236). Persistence levels increase by

13% for African students attending a predominantly white institution when African students have campus jobs (Astin, 1975, p. 75).

#### **2.4.2.6. Institutional residence**

Institutional residences are seen as an extension of the university environment and according to Astin (1975), living in university residences influences persistence. According to Astin and Oseguera (2005, p. 260), students who live in residence are more likely to complete their degrees (see Astin, 1975, p. 92). The research in Astin (1975) shows that living in university residences is associated with lower probabilities of withdrawal compared with living with parents or in private residences, irrespective of race or gender. Astin's theory on this research outcome is that students living at university residences are more involved with campus activities than commuting students. Research in Tinto (1993) confirms the advantages of being socially and academically integrated into the communities of the university.

Research in Astin (1975, p. 94) further suggests that living in a private residence, like an apartment or flat, rather than with parents is beneficial to male students but not so for female students. The reason according to Astin (1975) is the degree of difference in autonomy and independence between male and female students during the high school years. Astin reasons that male students have more freedom to be autonomous during high school years than female students and as a result '...women living away from home for the first time in a private room may not be able to handle the interpersonal peer pressure associated with such an acute shift in degree of independence' (1975, p. 94).

### **2.4.3. Cognitive Predictors**

#### **2.4.3.1. Academic ability**

Research indicates that academic achievement in high school is the best predictor of academic achievement in higher education (Astin, 1975; Astin & Oseguera, 2005;

Camara, 2005b; Sedlacek, 2004). High school academic achievement, however, seems to have mixed results as predictors of withdrawal behaviour (Astin, 1975, p. 30; Nora, Barlow & Crisp, 2005, p. 134). Some research in Nora et al. (2005) and in Astin (1975) shows that high school achievement does not have much influence on withdrawal behaviour, while other research shows that overall grade point average (GPA) is predictive of student withdrawal (Astin, 1975, p. 98; Nora et al., 2005, p. 134). Stage and Hossler (2000, p. 180) indicate that cognitive ability is a complex construct in some respects. The reason is that cognitive ability alone does not lead to good marks. Higher marks due to ability and effort subsequently lead to parental and lecturer support, which further increases belief about academic success and motivates students to achieve higher marks in future test and exams (Stage & Hossler, 2000).

In the American context, cognitive tests are regarded as important tests of ability and potential, for example the Scholastic Assessment Test (SAT) (Sedlacek, 2004). These tests measure general intelligence (g) or better known as the 'Intelligence Quotient' (IQ) (Spearman as cited in Gregory, 2000). According to Astin (1975, p. 33), college admissions tests like the SAT have less predictive power than high school academic achievement and less so among African-American students for academic achievement at a higher education institution (see Astin & Oseguera, 2005, p. 247). Research in Nora et al. (2005, p. 147) shows that SAT scores do not have much predictive ability for withdrawal behaviour.

The reason for the popularity of the cognitive test according to Sedlacek (2004) is first of all based on the idea that it can be used to assess all students regardless of their entry characteristics. The problem with cognitive tests is that the tests were predominantly developed with a specific group of people in mind, specifically to determine the ability of army personnel in the United States and also for assessing school readiness of white middle class learners (Sternberg, 2007). According to Sternberg (2007), the student population has become so diverse that it could be reasoned that these tests need to accommodate other variables that do not exclude students from non-traditional backgrounds. Ability tests are, however, still preferably used because they are easy to administer and provide numerical scores that can be compared to norm groups (norm-

referenced) or can be compared to students in an entry group (criterion-referenced) (Sedlacek, 2004).

#### **2.4.3.2. High school academic preparation**

Students who are academically and socially under-prepared for the challenges of the university are usually unable to make the transition to university and withdraw from their studies (Conley, 2005, 2007, 2009). These students are more frequently from under-resourced schools where students are taught to use surface learning strategies, like rote learning (Cabrera et al., 2005; Jones et al., 2008; Sternberg, 2007). Astin (1975, p. 32) indicated in his study that students' ratings of the quality of their high school was associated with withdrawal behaviour. According to Astin's study, the students were able to indicate with some accuracy the quality of their high schools. Students that rated their school poorly were more likely to withdraw from a higher education institution.

Students who are not fluent in the language of tuition also have difficulty to write scientifically and use critical thinking to engage with the literature (Jones et al., 2008). Wong and Chia (as cited in Du Plessis et al. 2005, p. 689) measured the impact of proficiency of English in non-English speaking countries. In this study it was found that students who were taught accounting science in English as their second language had poor performance in mathematics and accounting science. Bohlmann and Pretorius (as cited in Du Plessis et al. 2005, p. 689) also investigated the effect of English reading ability of English second and third language users on mathematical performance. Their study found that regardless of the language use (first or second users), the students' reading ability was of greater importance of success in a mathematical module. Du Plessis et al. (2005, p. 696) in their own study used Grade 12 English final examination marks as an indication of English proficiency. The results of the study showed no statistical significant difference between first and second language users. The important component of reading ability according to the Du Plessis et al. research project was comprehension or understanding of what is being read. The results indicated that more than half of what was read was not understood by the weak readers, irrespective of language use.

## 2.5. THE RELATIONSHIP BETWEEN WITHDRAWAL AND ACADEMIC ACHIEVEMENT

Tinto (1993, p. 48) uses the term 'difficulty' to refer to students who struggle to be in good academic standing or are at high risk for failing. Furthermore, Tinto states that students that fall in the risk for failure group are likely to withdraw voluntarily, although some students do persist until they are involuntarily discontinued by the institution. Bean (2005, p. 224) agrees that the true reasons for withdrawal might not be academic ability, as measured by high school academic achievement, but due to other reasons. Some students decide to withdraw from their studies because they do not know how else to get out of the system with a valid excuse.

Both Tinto (1993) and Bean (2005) make a distinction between the association between ability in the form of prior school performance and voluntary and involuntary withdrawal. According to Tinto, students that are involuntarily discontinued are usually of lower ability, thus having lower academic achievement at school. Students that withdraw voluntarily do not necessarily have poor school performance. Bean states that even students with high academic performance in school might withdraw from an institution and therefore retention is based on more factors than only academic ability.

Tinto (1993) also adds the general comment that prior school performance is not highly correlated with withdrawal (Cronbach's alpha less than 0.50). Research in Astin (1975, p. 98) even of a seminal nature, suggests that high school academic achievement is directly related to withdrawal, independent of variations of entry characteristics. The research of Astin also shows that about 20% of top performing students withdraw from their studies even though it was predicted that they will not withdraw at all. Thus this implies that other factors contribute to withdrawal behaviour and that predicting academic achievement based on high school achievement alone is limiting (Bean, 2005, p. 226).

The other factors that contribute to withdrawal behaviour according to Tinto are associated with academic achievement and withdrawal behaviour, either directly or indirectly. Firstly, Tinto (1993) refers to having weak 'intentions' or 'goals' and how these culminate and show itself in poor academic achievement and then presumably leads to withdrawal, voluntary or involuntary. Secondly, Tinto states that high school achievement on its own is not a good predictor of the study skills necessary for success at university, nor is high school achievement a good predictor of the inter-personal skills necessary to become involved in the academic and social system of the institution. Thirdly, Tinto (1993) associates the development of study skills directly to the quality of school preparation and indirectly to the type of school and its effect on withdrawal behaviour. Based on this proposition, Tinto leans on other researchers to make a point that students of lower socio-economic status who are more likely to be enrolled in poorer quality or government schools are less prepared for university and are more likely to have poor achievement and have greater risk for withdrawal.

## **2.6. DEVELOPMENT OF A READINESS AND RETENTION MODEL**

The point of departure for this study is the development of a theoretical retention model that includes readiness for university education. To conceptualise the model, readiness theory (Conley, 2007), transition theory (Schlossberg et al., 1995; Tinto, 1993), the longitudinal model of student departure (Tinto, 1993), the psychological model of college student retention (Bean & Eaton, 2000), and the expectancy-value theory of motivation (Wingfield & Eccles, 2000) will be used.

The assumptions for the readiness and retention model are borrowed from Bandura (1986), Bean and Eaton (2000) and Conley (2007), namely:

- action precedes outcomes;

- cognitive processes such as evaluating, intending and monitoring precede behaviour;
- psychological processes lead to attitudes about one-self;
- behaviour, personal variables and the environment are in dynamic and in reciprocal interaction with each other; and
- the elements of readiness are neither mutually exclusive, nor perfectly nested in the model.

The readiness and retention model will focus predominantly on the characteristics that students present upon entering the institution and the contextual or environmental dimension in which the readiness characteristics are nested. Conley (2007) suggests a broad definition of readiness that includes cognitive strategies, acquiring content knowledge, academic behaviours, and contextual knowledge and skills to be included in a readiness model. The inclusion of additional theories, as discussed in this chapter, will ensure a broad definition of readiness and how these readiness characteristics interact with the institutional and environmental dimension to lead to the measured outcomes and behaviour, namely academic achievement and persistence, respectively.

The contextual or environmental dimension in this model can be sub-divided into four dimensions that together determine an individual's unique contextual situation. The four sub-dimensions are the institutional, parental, socio-cultural, and financial dimensions. The institutional dimension only starts to become applicable when a student has his first contact by gathering information about the institution, the programmes and choices that are available to the student. The bureaucratic interactions that Bean and Eaton refer to are part of the institutional sub-dimension. The extension of the institutional sub-dimension becomes relevant when the student is incorporated in the academic and social communities of the institution.

The parental sub-dimension incorporates the educational level of the parents or guardians and the level of support that this sub-dimension is able to provide to the student before entering and during the student life cycle at the institution. The socio-

cultural sub-dimension refers to the domestic environment where the student grew up and is extended in stereotypical behaviour due to socio-cultural influences and affiliations. Affiliations refer to being associated with an organization, party or system. The parental and socio-cultural dimensions will ultimately influence the quality of the interactions with the academic and social communities in the institutional sub-dimension (social capital). The financial sub-dimension refers to the socio-economic circumstance of the students. This sub-dimension is highly related to the parental and socio-cultural dimensions and can have a direct effect on decisions to withdraw. The financial sub-dimension also indicates the likelihood of a student to take up employment during their studies, which could have an indirect effect on failure and withdrawal.

The contextual dimension functions as the 'cradle' for the development of psycho-social and cognitive skills that are expressed in behaviour, thoughts and emotions of the personal dimension. The personal dimension will be divided into three distinct but connected sub-dimensions, namely the non-cognitive sub-dimension (for example, beliefs, values, and self-efficacy), cognitive sub-dimension (high school achievement) and the biological sub-dimension (race and gender).

The contextual or environmental dimension, unique to each student, influences what is valued. According to Bandura (1986, p. 35), that which is valued gives purpose and meaning to one's life and it also provides the standards against which one can measure behaviour. The socio-economic status of the family and the education level of the parents also influence the values and beliefs of students. Personal past experiences, especially ones related to academic achievement, influence perception of academic abilities and skills. High school achievement (cognitive sub-dimension) forms the base for the evaluations of cognitive ability.

High school achievement is a measure of the academic preparedness of students and consists of content knowledge that Conley (2007) deems to be important for readiness. The key cognitive strategies discussed in Conley are a reflection of the abilities and skills that students have gained at high school. Other factors like the evaluation of the quality

of the school environment also impact on perceived abilities and perceptions of preparedness for university. These factors subsequently influence perceptions of self-efficacy and locus of causality as well as the goals that students will set for future performance. Locus of causality is the perception of influence on the environment and has a direct influence on perceptions of self-efficacy (Bean, 2005).

The self-efficacy judgements indicate future expectations of performance on tasks. Efficacy expectations refer to the ability to do the task and do not indicate how well a person will do on the task. Therefore it is important for students to set task-specific goals that are able to enhance performance and effort. When a goal is attained, especially a challenging goal, it increases efficacy judgements and motivation to continue with the task. In both these cases there is a cyclical effect between goals, self-efficacy and effort.

According to Wingfield and Eccles, expectations and task value of students in an educational context are influenced by self-efficacy, the perceived difficulty of different tasks, individuals' goals, educational values, and current evaluations of ability (2000, p. 69). The expectations and task values subsequently influence students' motivation and goal orientation. Motivation and goal orientation refers to the reason for achievement and influences the way a person will approach a task. High achievement motivators usually set performance goals (achieving 75% in a test), while low achievement motivators assign mastery goals, thus valuing competence and task involvement (Elliot & Harackiewicz, 1994, p. 977). In a sense the expectancy for achievement motivation is success, persistence or choice, and beliefs about the value of the outcome together with perceived causal attribution.

A student with a certain personal and contextual make-up has to make the transition from the known to the unknown institutional environment. The student however does not divorce himself from his personal and contextual dimension when entering the institution. The bureaucratic, academic, and social systems (institutional dimension) interact with the contextual or environmental dimension external to the institution, together with the personal dimension ('psychological processes'). There is reciprocal interaction between

the three dimensions which leads to subsequent expectancy-values of motivation that are determined from self-regulated behaviour. The result of the expectancies of motivation leads to what Bean and Eaton (2000) call 'intermediate outcomes' (academic and social incorporation and academic achievement). The intermediate outcomes lead to behaviour of withdrawal or persistence.

The personal and contextual dimensions give an indication of the students that are more likely to persist or withdraw (behaviour that is being measured). Students that show a more positive non-cognitive dimension and have the cognitive capabilities to excel academically, have mastered the content knowledge of the module and have a supportive contextual environment, will be more inclined to benefit from the academic environment and will be more likely to persist and achieve academically.

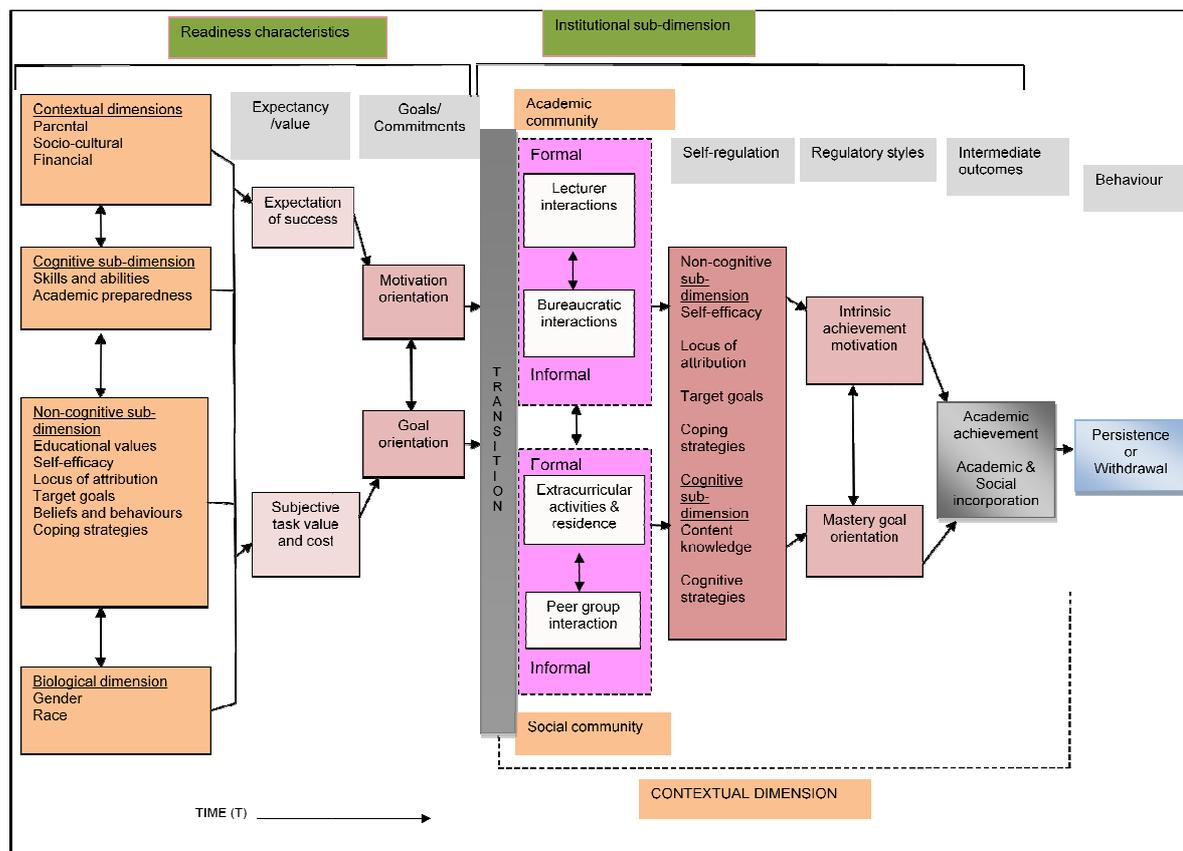


Figure 2.8. Model of student readiness and retention for university education

## 2.7. CONCLUSION

The concluding remarks revolve around the model of student readiness and retention for university education. A number of theoretical models, theories and perspectives were investigated to determine the readiness characteristics and explained in the context of a higher education environment. The possible output of this inter-relationship was also discussed. The model of student readiness and retention provides a possible conceptual framework to understand retention and success in terms of readiness for university education.

In the next chapter, various non-cognitive questionnaires will be discussed to identify further entry characteristics as well as possible items for the Academic Readiness Questionnaire (ARQ). The reader will be guided through a typical test development process as the ARQ was developed, translated and standardised.

## CHAPTER 3

### QUESTIONNAIRE DEVELOPMENT

#### 3.1. INTRODUCTION

In Chapter 2 the readiness characteristics were identified through a number of theoretical theories, models and perspectives. The non-cognitive or psychological factors cannot be measured directly, such as high school results or as demographic variables. It is therefore necessary to measure the latent psychological perceptions and perspectives with something else. A structured questionnaire is proposed to measure the latent non-cognitive perspectives of students. According to Sedlacek (2005) non-cognitive variables are useful to predict performance in all students and seem to be positively related to retention and graduation.

A review of various questionnaire items and constructs follows. These questionnaires form the foundation for the development of items and constructs of the 'Academic Readiness Questionnaire' (ARQ). The six phases in the development of a psychological instrument, as suggested by Foxcroft (2005, p. 55) was used to standardise the ARQ. The ARQ is regarded as a concise measurement instrument that measures the readiness characteristics identified in the synthesised model of readiness for university education that is discussed in Chapter 2.

#### 3.2. QUESTIONNAIRE REVIEW

A review and evaluation of the main academic readiness instruments will follow. The questionnaires were chosen because they measure various non-cognitive readiness characteristics that were discussed in Chapter 2 of this report. Research on the

questionnaires seems to show reliable results for the use of the questionnaires in higher educational settings to predict retention, graduation and academic performance, with or without the use of cognitive instruments:

- Non-Cognitive Questionnaire
- Survey of Academic Orientations
- Trait Self-Regulatory Inventory
- Motivated Strategies for Learning Questionnaire
- Institutional Integration Scale
- Vocational Identity Scale
- Metacognitive Awareness Inventory
- Locus of Control Inventory
- International Personality Item Pool
- Alpha Baseline Questionnaire

### **3.2.1. Non-Cognitive Questionnaire (NCQ)**

The NCQ is a questionnaire developed by Tracey and Sedlacek in 1984 to assess the non-cognitive dimensions that were important in minority students' (Asian, African-American and Hispanic students in the USA) academic success (Tracey & Sedlacek, 1989). The 1984 NCQ was tested empirically for its psychometric properties through various empirical studies and showed to be content valid, predictive of grades, persistence and eventual graduation. Some of the scales were found to have low internal consistency estimates and a study was conducted to improve the reliability and validity of the questionnaire (Tracey & Sedlacek, 1989).

The NCQ was revised and consists of 67 items that comprise of two sets, one set which directly assesses the non-cognitive dimensions (38 items) and a second set of experimental items. The non-cognitive items made use of a 5 point Likert-type scale and ranged from 1 Strongly agree to 5 Strongly disagree. The other items cover, for instance,

background information and goals and extra-curricular activities that can be listed in an open section. The study was restricted to the statistical analysis of the non-cognitive items only. A confirmatory factor analysis was used to determine the factor loadings of the instrument and the main objective was to determine the validity of the instrument with minority students.

A split-half reliability method was used to determine an independent estimate of the validity of the factor loading estimates for the black student group by splitting the black student group into two sub-samples. The estimated Cronbach's coefficient alphas for the original black group ranged from 0.55 to 0.84, with a mean of 0.66 (Tracey & Sedlacek, 1989). According to Tracey & Sedlacek (1989) the estimates of internal consistency appear to be adequate if taken into account the difficulty in defining the constructs. The reliability for each sub-scale across the three samples showed similar patterns, however the second black and white sample had lower reliability estimates on academic self-concept and support for academic plans. According to Tracey & Sedlacek (1989) this could be due to the few items in these sub-scales.

Finally, a random sample of white students with similar sample size as the black sub-samples was used to determine the invariance of the parameter estimates across race. Goodness-of-fit indices (Chi-square) were used to test the model derived from the first black sample on a random sample of white students. Results from the Chi-squares revealed no difference between the variances of the first and second black sub-groups and between the black model and the white group. Thus the proposed model is sufficient for all three groups based on the goodness-of-fit indicators. Based on the findings, the NCQ-R has adequate support for application with white and African students (Sedlacek, 2004, 2005).

Alternate forms of the NCQ have been subjected to empirical analysis and demonstrated good test-retest reliability estimates that range between 0.74 and 0.94 with different sample groups (Sedlacek, 2005). The alternate forms of the NCQ contain similar items, although the NCQ-R contains more items with a revised factor structure. Sedlacek

(2004) provides two alternate forms of the NCQ. Alternate form A has 29 non-cognitive specific questions while the Alternate form B has 31 non-cognitive specific questions.

The NCQ posits eight non-cognitive dimensions. These eight dimensions are:

**3.2.1.1. Academic self-concept**

Self-concept refers to the way students feel about themselves. Accordingly, a student with a positive self-concept is able to show confidence, determination and independence. Bandura (1986) indicates self-concept to be a related but distinct construct to self-efficacy.

**3.2.1.2. Realistic self-appraisal**

Self-appraisal is the ability to understand your strength and weaknesses and to learn from them so that one can improve and strengthen them. In an educational setting a motivated student would work hard to address deficiency. Academic apathy would be the opposite (see Survey of Academic Orientations in 3.2.2).

**3.2.1.3. Understanding of and ability to deal with racism**

Understanding of and ability to deal with racism refers to dealing with various forms of prejudices (racism, sexism, etcetera.) based on personal experiences within the institutional environment that hinder the development of students.

**3.2.1.4. Preference for long range goals**

Preference for long range goals refers to students' ability to set aside the need for immediate gratification for long-term outcomes.

**3.2.1.5. Support of others for academic plans**

Parents and relatives play a supportive role to help students persist through to graduation. According to Moxley, Najor-Durack & Dumbrigue (2001), students do not

arrive at university isolated from their parents and in many cases relatives and people with strong influence support students when they face a crisis.

#### **3.2.1.6. *Successful leadership experience***

Students with leadership ability are those with an ability to organize and influence others. These students therefore have to show assertiveness in order to do so.

#### **3.2.1.7. *Demonstrated community service***

Demonstrating community service refers to having a community with which students can identify and who provides needed support when necessary. According to Moxley et al. (2001) the function of external communities is firstly to transmit the value of a higher education degree, secondly to provide resources to support entry to higher education (financial and otherwise), thirdly to provide access to support that is otherwise not available from the institution, and lastly to help form support communities based on social, cultural or other types of identities (also see Jones et al., 2008).

#### **3.2.1.8. *Non-traditional knowledge***

Non-traditional knowledge refers to the ability of students to gain knowledge out of a formal learning environment by using methods that are non-traditional or more experiential in nature.

**Table 3.1. Internal consistencies of the Non-Cognitive Questionnaire constructs by sample**

<b>Construct</b>	<b>n items</b>	<b>Black 1</b>	<b>Black 2</b>	<b>White</b>
<b>Academic positive self-concept</b>	4	0.60	0.49	0.40
<b>Realistic self appraisal</b>	5	0.58	0.56	0.49
<b>Support for academic plans</b>	3	0.84	0.53	0.49
<b>Leadership</b>	5	0.79	0.83	0.82
<b>Long range goals</b>	7	0.65	0.72	0.68
<b>Community ties</b>	8	0.61	0.57	0.70
<b>Racism</b>	4	0.55	0.54	0.37
<b>Academic familiarity</b>	4	0.66	0.74	0.60

Tracy and Sedlacek (1989, p. 642)

An evaluation of the non-cognitive dimensions of the NCQ in general shows positive relations with retention and graduation and could lead to diversity in the student population, because criteria other than academic or cognitive variables are used. Non-cognitive dimensions also show normal distribution, similar to cognitive measures, when administered in a scholarship programme (Sedlacek, 2005). For each of the eight dimensions, positive self-concept, having a supportive person, and a realistic self-appraisal have shown positive correlation with academic performance, retention, and graduation by various research studies for all types of students (Sedlacek, 2005). These dimensions seem to be universal factors necessary for academic success.

The remainder of the dimensions did not show direct relations with academic performance, retention, or graduation, but for academic success in general. For example, having an understanding of racism and knowing how to handle a racist system could help break down stereotypes with an empowering and positive approach and

positive academic expectations (Sedlacek, 2005). Having long-range goals seem to correlate with persistence for international students and in general students perform better academically with such goals. Students with leadership abilities seem to be more successful at university, specifically for minority and female students.

Culture and gender-related activities need to be taken into account when assessing leadership abilities, because cultural and gender influences present different ways of expressing leadership abilities. Culture and gender-related experiences should also be taken into account when communities are formed around these differences. In many cases white students have ample opportunities to join communities of interest, but minority and female students do not have the same opportunities. However, when minority students do join a specific community they learn how to 'handle the system, exhibit leadership, and develop their self-concepts in such groups' (Sedlacek, 2005, p. 185).

A different study confirms the use of non-cognitive dimensions for academic success (Schmitt, Oswald & Gillespie, 2005, p. 199). These dimensions were isolated after an analysis of 35 United States colleges' and universities' mission statements. The purpose of these dimensions is to measure the 'ultimate criterion' that includes academic knowledge, citizenship and leadership and the 'actual criterion' of academic performance and graduation (Schmitt et al., 2005, p. 199).

Of the 12 dimensions isolated in the Schmitt et al. (2005) study, five of the dimensions correspond almost directly with five dimensions of the NCQ (Camara, 2005a):

- Leadership versus successful leadership experience
- Social responsibility, citizenship, and involvement versus demonstrated community service
- Perseverance versus preference for long range goals

- Multicultural tolerance and appreciation versus understanding of and ability to deal with racism
- Continuous learning, intellectual interest, and curiosity versus non-traditional knowledge

The non-cognitive dimensions in Schmitt et al. (2005) that could have a direct effect on academic success, that are not represented in the NCQ is having clear career-related goals, being physically and mentally healthy to pursue a degree and being able to adapt to changing environments. Results from a statistical analysis on the 12 dimensions show only moderate relations between grade point average (GPA) and health, adaptability, and knowledge. Schmitt et al. (2005) indicated that the dimensions added incremental validity above that of the GPA to predict academic performance.

### **3.2.2. Survey of Academic Orientations (SAO) (Davidson, Beck & Silver, 1999)**

The SAO is a short international questionnaire that assesses undergraduate students' perceptions of key college-environment features. The survey consists of 36 items and is measured on a 5 point Likert-type scale. The SAO measures six academic orientations, namely: structure dependence (S), creative expression (C), reading for pleasure (R), academic efficacy (E), apathy (A), and mistrust of instructors (M) (Davidson et al., 1999, p. 680).

#### **3.2.2.1. Structure dependence**

Structure dependence (S) refers to individuals that prefer structure over ambiguity by knowing exactly what is expected of them in class. Students who are structure dependent (S) on the SAO show concurrent validity with the sub-scale: a need for structure of the Personal Need for Structure Scale (PNS). High S scores were also associated with scores high in extrinsic motivation and grade orientation and dependence on external guidance in order to achieve academically. These students also tended to be self-doubting of their ability (Davidson et al., 1999, p. 687).

### **3.2.2.2. *Creative expression***

Creative expression (C) refers to individuals that enjoy creative expression and they are predominantly learning oriented. Students who score high on creative expression usually have high intrinsic motivation scores, are learning oriented, score high on the sub-scale 'openness' of the 'Big Five' measure, have high scores on reading for pleasure (R) of the SAO and they have low grade orientations (Davidson et al., 1999, p. 688).

### **3.2.2.3. *Reading for pleasure***

Reading for pleasure (R) refers to individuals who enjoy reading a variety of literature for non-degree purposes. Students who have high R scores value achievement through their own effort. High R scores are correlated positively with the sub-scale 'openness' and the creative expression subscale of the SAO as well as with high intrinsic motivation score. They also show high levels of learning orientation and low levels of grade orientation (Davidson et al., 1999, p. 689).

### **3.2.2.4. *Academic efficacy***

Academic efficacy (E) refers to individuals who are confident that they will achieve their academic goals. They do not succumb to self-doubt and are able to overcome failures and obstacles. Students with high E scores have high learning orientation and independence score and low grade orientation score. High E scores are also related to low levels of self-doubt and low mistrust score (M) on the SAO. Self-efficacious students usually set achievement goals and make use of self-regulated learning (Davidson et al., 1999, p. 689).

### **3.2.2.5. *Apathy***

Apathy (A) refers to individuals who will exert minimal effort to attain a grade. They set low academic standards and do not exert the necessary effort in academic task to achieve high marks. Concurrent validity with the LOGOII survey indicates that high apathy scores are associated with high grade orientation and low learning orientation

scores. These students tend to think concretely, have poor study skills and usually experience test anxiety. Because of their tendency to have grade orientation, they aspire to make have good marks but frequently do not have the skill to obtain them (Davidson et al., 1999). 'As a consequence, they reduce their effort, which provides a less threatening reason (low effort) for low grades than does an attribution of low capability' (Davidson et al., 1999, p. 689).

### **3.2.2.6. *Mistrust of instructors***

Mistrust of instructors (M) refers to individuals who believe their instructors to be devious when it comes to assessment and assigning grades. These students also blame academic staff for their failures, rather than themselves. Students with high M scores are highly grade orientated and steer away from independence in academic situations. 'Their tendency to focus on grades, combined with their lack of confidence in grade givers, apparently makes them reluctant to pursue tasks that encourage self-directed accomplishments' (Davidson et al., 1999, p. 689).

**Table 3.2. Internal consistencies of the Survey of Academic Orientation constructs by sample**

<b>Constructs</b>	<b><i>n</i> items</b>	<b>Alpha</b>
<b>Structure dependence</b>	6	0.59
<b>Creative expression</b>	6	0.70
<b>Reading for pleasure</b>	6	0.85
<b>Academic efficacy</b>	6	0.74
<b>Apathy</b>	6	0.66
<b>Mistrust</b>	6	0.67

(Davidson et al., 1999, p. 688)

In general, high scores on the C, R, and E orientations are regarded as desirable because they are generally associated with positive outcomes. High scores on the S, A, and M orientations are regarded as undesirable because they are generally associated with negative outcomes (Davidson et al., 1999).

The SAO provides predictive information on students who are at risk of experiencing academic stress (Davidson & Beck, 2006), receiving poor grades or not persisting to graduation and therefore functions as an early warning indicator to identify students at risk (Beck & Davidson, 2001). Two of the six orientations provided good prediction for GPA, namely: academic efficacy and academic apathy. According to Beck and Davidson (2001, 2006) there is ample evidence from literature to suggest the importance of these orientations for academic success. For the SOA to be used as an early warning indicator, the results of the SOA have to predict academic success and risk for withdrawal. To determine academic success, a summary metric (AI) was developed to determine a student's overall orientation toward the institution. Results from the Beck and Davidson (2001) study indicate that the predictive value for the AI scores was lower than that of the six orientations entered individually when predicting GPA.

Two studies in Beck and Davidson (2001) to provide external validity evidence were conducted that provide consistent results indicating statistically significant correlations between the SOA and GPA and suggesting the use of the SOA as an early warning indicator at some institutions. A limitation of the study is the lack of empirical evidence of the predictive validity of the SAO on retention or withdrawal. Conclusions made regarding the other orientations that have not shown statistical significance with retention and adjustment are based on anticipated relationships and not empirical evidence.

### **3.2.3. Trait Self-Regulation Inventory (TSRI)**

The Trait Self-Regulatory Inventory is a questionnaire that was developed by O'Neil, Baker, Ni, Jacoby and Swigger (as cited in Hong & O'Neil, 2001, p. 189). An adapted

version of the original TSRI is used to measure trait self-regulation in Hong and O'Neil's (2001) study. The adapted version of the TSRI consists of 34 items and four first-order constructs were identified, namely planning, self-checking, effort and self-efficacy. The model that was developed from a Confirmatory Factor Analysis of the items indicates a complex structure (Hong & O'Neil, 2001, p. 191). The hierarchical model indicates self-regulation as the third-order factor, which consists of two second-order factors, namely trait meta-cognition and motivation. Meta-cognition consists of two of the first-order factors, namely planning and self-checking. Motivation consists of two of the remaining first-order factors, namely effort and self-efficacy. According to the results of Hong and O'Neil (2001), planning and self-checking correlated strongly with each other and effort and self-efficacy correlated strongly with each other.

According to Zimmerman (as cited in Hong & O'Neil, 2001, p. 191) 'self-regulated learners plan and self-monitor (meta-cognitive component) and perceive themselves as self-efficacious and put forth effort on tasks (motivational component)'. According to Borkowski (as cited in Hong & O'Neil, 2001, p. 187) self-regulation is regarded as the highest level of meta-cognition. Meta-cognition is regarded as the ability to think about your thinking while doing a task and includes activities such as self-checking, planning or goal setting and rehearsing (Hong & O'Neil, 2001).

Various research studies in Hong & O'Neil (2001) indicate a strong positive relationship between motivation, self-efficacy and self-regulation. Zimmerman (as cited in Hong & O'Neil, 2001, p. 187) has also shown that effort has a positive relationship with intrinsic motivation, self-efficacy and persistence in a learning environment. Bandura and Schunk (as cited in Hong & O'Neil, 2001, p. 187) indicate that self-efficacy influences motivation by the amount of effort that is implemented into a task and the levels of persistence to continue with the task in the face of challenges. Bandura adds that motivation also contributes to the goals that people set for themselves (1986).

**Table 3.3. Internal consistencies of the Trait Self-regulatory Inventory constructs by sample**

Constructs	<i>n</i> item	Alpha
Planning	9	0.76
Self-checking	5	0.60
Effort	10	0.83
Self-efficacy	10	0.85

**3.2.4. Motivated Strategies for Learning Questionnaire (MSLQ)** (Pintrich & De Groot, 1990)

The Motivated Strategies for Learning Questionnaire consists of 56 items measured on a 7 point Likert-type scale. A factor analysis indicated five first-order factors, namely self-efficacy, intrinsic value, test anxiety, cognitive strategy use and self-regulation. Two second-order factor were also identified, namely motivational beliefs and self-regulated learning strategies. According to the factor model, motivational beliefs consist of self-efficacy, intrinsic value, and test anxiety. Self-regulated learning strategies consist of cognitive strategy use and self-regulation. Academic performance on various classroom tasks was used as the dependent variable.

Research in Pintrich and De Groot (1990) suggests there are three important aspects to self-regulated learning, namely: meta-cognitive strategies, implementation of effort, and learning strategies that are important in academic achievement. Motivational beliefs are also seen as important to academic achievement (Pintrich & De Groot, 1990, p. 33). The authors made use of the expectancy-value model as theoretical framework to show how the three components of self-regulated learning are associated with individual differences in motivation.

Accordingly the expectancy component of motivation has to do with beliefs that academic achievement is possible and that such performance is due to personal responsibility. The expectancy component, according to Pintrich and De Groot (1990), has been associated with meta-cognition, learning strategy use and effort. The value component involves task-goals and the beliefs about the importance and interest of the task. The affective component involves the emotional reactions to tasks and could refer to feelings of anger or anxiety toward the task.

The relationship between the components of the expectancy-value model and self-regulation is not always considered to be a linear one. Research by Pintrich and De Groot suggests that the expectancy and value components are positively related to the three self-regulated learning components, whereas research on test anxiety does not suggest such simple relations (1990, p. 34). Multiple Analyses of Covariates (MANCOVA) results from Pintrich and De Groot's (1990, p. 36) research for the motivational variables indicated a significant and positive relationship between self-efficacy and cognitive strategies, as well as for self-regulatory strategies. 'Students who believed that they were capable were more likely to report use of cognitive strategies, to be more self-regulatory in terms of reporting more use of meta-cognitive strategies, and to persist more often at difficult or uninteresting academic tasks' (Pintrich & De Groot, 1990, p. 37).

As soon as cognitive engagement variables are included in a regression analysis, self-efficacy showed a statistical non-significant relationship with academic achievement on various tasks. The results indicate that self-efficacy plays a supportive role to cognitive strategy use and that cognitive strategy use is a better predictor of actual academic achievement. Self-efficacy did, however, have a significant and positive relationship with average academic achievement. The results of the MANCOVA further indicated a significant and positive relationship between intrinsic value and cognitive strategies, as well as for self-regulatory strategies.

Similar to self-efficacy, intrinsic value did not show statistical significant relationships with academic achievement when cognitive strategy use or self-regulation strategies are included in a regression analysis. Intrinsic value therefore also plays a supportive role in using cognitive and self-regulatory strategies to predict actual academic achievement. Test anxiety did not show significant results between any of the other constructs in a MANCOVA. Test anxiety was predominantly negatively related to academic achievement, but showed mixed results for academic achievement on various types of task in a regression analysis. As for academic achievement, zero-order correlations indicated a significant and positive relationship between intrinsic value and academic achievement for all tasks assessed, as well as for self-efficacy and academic achievement on the same tasks.

As for the self-regulated learning strategies, zero-order correlations indicate that self-regulation and cognitive strategy use are highly correlated with academic achievement. These two constructs are also highly correlated with each other ( $r = 0.83$ ) and according to Pintrich and De Groot (1990, p. 37) cognitive strategy use was a suppressor variable when included in a regression analysis with self-regulation. This indicated that self-regulation was the better predictor of actual academic achievement, indicating that self-regulating strategies, such as monitoring, goal setting, planning, and effort management and persistence are essential for academic achievement (Pintrich & De Groot, 1990, p. 38).

**Table 3.4. Internal consistencies of the Motivated Strategies for Learning Questionnaire constructs by sample**

Constructs	<i>n</i> item	Alpha
Self-efficacy	9	0.89
Intrinsic value	9	0.87
Test anxiety	4	0.75
Cognitive strategy use	13	0.83
Self-regulation	9	0.74

### 3.2.5. Institutional Integration Scale (IIS)

The Institutional Integration Scale was developed by Pascarella and Terenzini and is based on Tinto's longitudinal model of student withdrawal and assesses social and academic integration in academic environments (Caison, 2007, p. 439; French & Oakes, 2004, p. 89). The questionnaire consists of 30 items and five subscales. The sub-scales are: 1. Peer-group interactions, 2. Interactions with faculty, 3. Faculty concern for student development and teaching, 4. Academic and intellectual development, and 5. Institutional and goal commitment. The questionnaire was revised by French and Oakes (2004) and they included four more items that improved the internal consistency reliability, item discrimination, and correlations among subscale and full scale scores.

The revised model, based on a confirmatory factor analysis indicated that the questionnaire assesses academic and social integration based on interactions between faculty, peers and the institutional environment (French & Oakes, 2004, p. 97). Two new factors were identified, namely 'Faculty' and 'Student' and academic and social integration items consisted of both these factors. According to the authors, this indicates that academic and social integration, in this sample is not mutually exclusive. The faculty factor suggests '...that students may have a sense of social and academic integration that is specific to the faculty members with whom they have interacted during the 1st

year' and the student factor '...assesses aspects of social and academic integration but in relation to peers and the general university environment' (French & Oakes, 2004, p. 97).

**Table 3.5. Internal consistencies of the Institutional Integration Scale constructs by sample**

Construct	<i>n</i> items	Alpha
Peer-group interactions	7	0.84
Interactions with faculty	5	0.89
Faculty concern for student development and teaching	5	0.88
Academic and intellectual development	7	0.82
Institutional and goal commitment	6	0.76

French and Oakes (2004, p. 91)

Research by Caison (2007, p. 449) indicates that the Institutional Integration Scale provided some predictive information on persistence, but that data sourced from students prior to entering the institution provided better predictive information. The usefulness of the IIS for retention-related counselling was not determined with this study and other studies in Caison have demonstrated the usefulness of the questionnaire in retention studies.

### **3.2.6. Vocational Identity Scale (VIS)**

The Vocational Identity Scale is a sub-scale from the My Vocational Situation and consists of 18 true-false questions that measure the extent to which a person has developed clear and consistent goals, understand their interests and talents and their

personality traits (Blinne & Johnston, 1998). Test-retest reliability studies indicated the VIS to have a Cronbach's coefficient alpha value of 0.64.

### **3.2.7. Metacognitive Awareness Inventory (MAI)**

The Metacognitive Awareness Inventory was developed by Schraw and Dennison (1994) and measure two main constructs, namely knowledge of cognition and regulation of cognition. The questionnaire consists of 52-items and is answered on a 5 point Likert-type scale. The items are organized in two scales and eight sub-scales. The sub-scale definitions are as follows: (Schraw & Dennison, 1994, p. 460)

#### **3.2.7.1. Knowledge of cognition**

- *Declarative knowledge*: knowledge about your own learning skills and abilities
- *Procedural knowledge*: knowledge of how to implement a learning strategy
- *Conditional knowledge*: knowledge of when and why to use a learning strategy

#### **3.2.7.2. Regulation of cognition**

- *Evaluation*: analysis of your performance and learning strategies used after the task has been completed.
- *Debugging strategies*: implementation of strategies to improve performance and comprehension.
- *Information processing strategies*: strategies to organize, develop and summarise information.
- *Monitoring*: continuous calculation of the learning process and the strategies that have been used.
- *Planning*: planning en goal setting before one commences with a learning task.

**Table 3.6. Internal consistencies of the Metacognitive Awareness Inventory constructs by sample**

Constructs	<i>n</i> items	Alpha
Knowledge of Cognition	17	0.88
Regulation of Cognition	34	0.88

(Schraw & Dennison, 1994)

### 3.2.8. Locus of Control Inventory (LCI)

The Locus of Control Inventory was developed by Schepers (1998). The LCI measures three factors, namely internal locus of control, external locus of control, and autonomy. The current version of the inventory consists of 88 items and is measured on a 7 point Likert-type scale. This questionnaire was developed for a South African population and is regarded as highly reliable for this population. Construct definitions are as follow:

- Internal locus of control is defined as an active and inquisitive focus.
- External locus of control is defined as a person who is dependent on other people for support.
- Autonomy is defined as a person who takes personal responsibility for learning (see Keyes & Lopez, 2002).

**Table 3.7. Internal consistencies of the Locus of Control Inventory constructs by sample**

Construct	<i>n</i> items	Alpha
Internal locus of control	30	0.77
External locus of control	27	0.81
Autonomy	29	0.80

(Schepers, 1998)

### 3.2.9. International Personality Item Pool (IPIP)

The International Personality Item Pool is an international web-based research database that provides raw data, norms and items on personality related questionnaires. The pool of items is related to proprietary psychological tests like Cattell's 16 Personality Factor Questionnaire (16PF), Six Factor Personality Questionnaire (6FPQ), and the Hogan Personality Inventory (HPI).

**Table 3.8. Internal consistencies of the International Personality Item Pool constructs by sample**

Construct	Alpha
Methodicalness	0.78
Internality (LOC)	0.61
Intellect/Self-efficacy	0.76-0.86
Resourcefulness	0.81
Sociability	0.66-0.87
Adaptability	-0.67

### 3.2.10. Alpha Baseline Questionnaire (ABQ)

The Alpha Baseline Questionnaire is a comprehensive questionnaire developed by the University of Stellenbosch that determines student perceptions before the commencement of their studies. This instrument is used in conjunction with the Alpha Process Questionnaire (APQ), with the view to measure the change in perception from the beginning of the first year to the end of the first academic year (Bitzer, 2003). The ABQ is the only South African questionnaire that relates to the objectives of academic readiness, but was not available for comparative studies.

The 2002 version of the instrument consisted of 174 items and were grouped into 14 sections, namely biographical, study patterns at school, informal activities at school, time management patterns, perceptions of own abilities, influences regarding study decisions, financial concerns, reasons for studying at the institution, assistance needed, view on the self, involvement/participation in activities, career goals, views and values, and personal wellness (Bitzer, 2003). In 2003 the instrument was subjected to a number of validation measures and was completely reconfigured for use in 2004. The 2004 version of the instrument has 120 items that are organized in 12 categories. The categories related to 'view on the self' and 'involvement/participation in activities' were discarded.

There is no fixed rating scale for the ABQ because each section serves a different purpose. The majority of students who completed the questionnaire were predominantly white, Afrikaans speaking students and more females than males responded. Only eight isolated questions from the ABQ were subjected to statistical analysis. These items are related to generic outcomes as required by the South African Qualifications Framework (Bitzer, 2005). According to a Chi-square analysis, only writing, problem solving and research associated strongly to academic performance. Goodman and Kruskal Gamma values also indicated a positive relationship between ABQ confidence levels and first-year marks in the areas of writing, problem solving and research (Bitzer, 2005).

### **3.3. ACADEMIC READINESS QUESTIONNAIRE DEVELOPMENT**

Foxcroft (2005, p. 55) suggests six phases in the development of a psychological instrument. These six phases will be used as broad guideline for the development of the Academic Readiness Questionnaire. The six phases are planning, item selection, construct and pilot testing of the questionnaire, item analysis, revising and standardising of the questionnaire and technical evaluation and establishing norms.

### 3.3.1. Planning Phase

#### 3.3.1.1. *Rationale of the construct*

From the literature there is a covariance between the various motivational constructs. Murphy and Alexander (as cited in Pintrich, 2000, p. 101) indicate positive correlations between goals, attributions, self-efficacy, interest, and intrinsic motivation. Regardless of the close correlation between the constructs, Pintrich argues for a clear distinction between the constructs during empirical research and not to combine them in one general factor called 'motivation'. Pintrich (2000) argues for differences among individual motivations which will only be analysed effectively when the constructs are regarded separately as independent predictors of academic achievement.

Fraser and van Staden (as cited in Du Plessis et al. 2005, p. 690) 'found that successful learners were committed to a study programme, studied on the basis of a pre-planned study schedule, established achievable and realistic learning objectives, had self-confidence and completed tasks within the allotted time-frame. Regular and constructive feedback increased the students' ability to self-evaluate and collectively led to increased success'.

#### 3.3.1.2. *State or trait constructs of motivation*

According to Hong and O'Neil (2001, p. 187), 'states' refers to the attributes of people that are relatively changeable over time or in different contexts. 'Traits' refers to the attributes of people that are relatively stable over time or in different contexts. Murphy and Alexander (as cited in Pintrich, 2000, p. 102) suggest that a goal orientation specifically represent relatively stable attributes of a person's personality. Pintrich (2000, p. 102) argues to the contrary that goals as 'cognitive representation or knowledge structures [which] are sensitive to both contextual and internal personal factors'. Pintrich suggests that 'knowledge structures' can be activated before entering a task and can be changed due to influence from the context the task is nested in or by the individual self, thus being more state-like. Pintrich adds that knowledge structures can however be stable over time and in different contexts, thus more trait-like. Some people for instance may be more mastery orientated while others are more performance orientated in

various contexts. Pintrich (2000, p. 102) also indicates that personality traits are at times affected by external or contextual influences.

Hong and O'Neil (2001, p. 187) confirm the point of view of Pintrich (2000) that motivational constructs can be state or trait-like. Hong and O'Neil adopted Spielberger's state-trait theory of anxiety to indicate that self-regulation can be state or trait-like depending on the demands of the context. Research in Hong and O'Neil (2001, p. 187) also indicates that state and trait constructs are highly related, thus people with high trait attributes usually have high state behaviour of the attribute. Hong and O'Neil also indicate that self-regulation (consisting of planning and self-checking) is more trait-like than state-like.

According to Pintrich (2000, p. 103) goals are potentially conscious and accessible motivational constructs. Goals are not trait-like in relation to personality related traits, but show intra-individual stability and contextual sensitivity. It is reasoned that the other motivational constructs (self-efficacy, locus of attribution and values) show intra-individual stability and contextual sensitivity due to the strong relationship between the motivational constructs and self-regulation. Maddux (2002) argue that self-efficacy is neither trait nor state like but is a belief about one's ability that develops over time. Constructs like locus of control, self-esteem and values are regarded as personality traits.

### **3.3.1.3. Criteria for selection of the constructs**

According to Pervin (as cited in Owen, 1996, p. 21) there are three approaches to identify constructs. The first is the 'rational construct approach' that was used to identify the constructs in this research. According to this approach, the items are chosen based on a theoretical definition of the construct. The second is the 'empirical criterion approach' in which knowledge of the differences between groups is used to develop a questionnaire. The third approach, the 'factor analysis approach', was also used. According to this approach, a large number of items are administered to a sample of the intended population and a factor analysis is conducted to determine the constructs. A

test developer can use more than one approach in developing an instrument. The researcher followed the rational and factor analysis approach for purposes of this study. This allows for the constructs to have a sound theoretical foundation which is scientifically tested with a factor analysis (Durrheim, 1999a; Owen, 1996, p. 21).

Criteria for the selection of the constructs were the following:

1. Good psychometric properties (validity and reliability);
2. The definition of the factors must show that it is has a correlation with academic performance and/or retention;
3. The frequency of the citation of a factor in the literature;
4. The close relationships between factors in the literature (for example the relationship between goals and values);
5. The differentiation of one main factor for purposes of identification (for example there is a close relation between self-efficacy and self-esteem but only self-efficacy was used).

#### **3.3.1.4. Definitions of the constructs**

Based on the specified criteria, the following constructs were identified from the literature and current questionnaires. The factors from the main study with its corresponding questions will also be mentioned here.

**Table 3.9. Construct definitions**

<b>Constructs</b>	<b>Definition</b>
Self-efficacy	Confidence in one's own ability to achieve one's academic goals.
Vocational identity	Ability to settle on an occupational identity.
Educational values	The importance of pursuing a higher education degree.
Goal orientation	The ability to set task oriented goals.
Academic apathy	The lack of interest in academic work and an inclination to do as little as possible.
Autonomy and Locus of Control	The degree to which one takes personal responsibility for learning.
Reading behaviour	The tendency to find pleasure in extensive, broad reading.
Institutional integration	The sufficiency of information from the University of Pretoria.
Financial support	The degree of financial support during one's studies.
Family support	The degree of family support during one's studies
Social integration	The extent to which one can relate easily to others.
Cultural integration	The extent to which one can relate easily to people from other cultures.

#### **3.3.1.5. Purpose of the questionnaire**

The purpose of the Academic Readiness Questionnaire is to function as a screening test for first-year students that enter the University of Pretoria. Its purpose is therefore to identify, and not to diagnose, students who may possibly be at risk for failure or withdrawal. Its purpose is also to be used as a placement test for support services.

### 3.3.2. Item Selection

Items for the questionnaire were selected based on their relevance to the higher educational environment and their ability to measure the main constructs that were identified through the literature discussion and the review of various questionnaires. The researcher decided beforehand that the length of the questionnaire should be such that the questionnaire can be completed within 30 minutes, administration time included. This meant a questionnaire with between 60 and 80 items should be developed.

Developing the items consisted of several stages. In the first stage a pool of items was developed based on the literature reviews and on the sample questionnaires (rational construct approach). The pool of items that was useable for the proposed questionnaire was in excess of 130 items. The items were all phrased to be measured on an interval scale, as the intention is to measure the extent to which a construct is present in a student (Gregory, 2000, p.119).

In the second stage the pilot questionnaire items and constructs were reviewed by a group of specialists, consisting of a Statistician, Research Psychologist, Clinical Psychologist, Career Counsellor and an Educationist. This approach is known as 'panelling' and is used to establish face validity, eliminate linguistic problems and analyse the sufficiency of the item pool (Griffin, Coates, Mcinnis, & James, 2003, p. 262). In the third stage changes were made based on the recommendations of the panel of experts. The questionnaire for the pilot study consisted of 84 items. A Likert-type scale was used because the items can be scored easily and quickly when administered to a large sample (Owen, 1996, p. 23). According to Gregory (2000, p. 123), this is a widely used method for scaling attitudes and allows a researcher to obtain items scores as well as total scores for scales. A 5 point Likert-type scale was used and the answers ranged from 1 *Definitely disagree* to 5 *Definitely agree*. This scale was used for items 1 to 82. Item 83 was a dichotomous question and item 84 used a 3 point Likert-type scale and the answers ranged between 1 *Not at all*, 2 *Sometimes*, and 3 *Definitely*.

### 3.3.3. Construct and Pilot Testing of the Questionnaire

The pilot questionnaire was administered to 368 students from three Faculties, namely Humanities, Natural and Agricultural Sciences, and Economic and Management Sciences. This questionnaire was piloted in English only due to the time-constraints the researcher faced.

**Table 3.10. Data Collection during the pilot study in three faculties**

Faculty	Department	Number of students	Language group
Humanities	Ancient Languages	32	Afrikaans
Humanities	Psychology	37	English
Humanities	Psychology	18	Afrikaans
<b>Total</b>		<b>87</b>	
Economic and Management Sciences	Accountancy	105	Afrikaans
Economic and Management Sciences	Accountancy	75	English
<b>Total</b>		<b>180</b>	
Natural and Agricultural Sciences	Plant Biology	59	Afrikaans
Natural and Agricultural Sciences	Plant Biology	51	English
<b>Total</b>		<b>110</b>	

### **3.3.4. Item Analysis**

According to Gregory (2000, p. 127) the purpose of item analysis is to determine which items should be retained, revised or thrown out. Various methods can be used, depending on the type of instrument that is being developed. For surveys and questionnaires the 'item-reliability index' is sufficient. This method is used to determine an item's strength of relationship with the rest of the items in the scale. Point-biserial correlations are expressed as a coefficient ranging from 0 to 1, similar to the Pearson correlation coefficient (Gregory, 2000, p. 128).

#### **3.3.4.1. Point-biserial correlations**

Point-biserial correlations showed rather low to average correlations and ranged between 0.04 and 0.55. According to Owen (1996, p. 36) items with values lower than 0.20 should be discarded from the test but added that regardless of statistical findings, the final decision rest with the researcher to discard the items or not.

#### **3.3.4.2. Factor analysis**

An oblique factor analysis identified five factors with canonical correlations ranging between 0.086 and 0.96. The variance explained was 26.35%. The five factors, following rotated factor loadings, were clustered as follow:

Factor 1: Values, goals and academic apathy

Factor 2: Vocational identity and self-efficacy

Factor 3: Reading for pleasure

Factor 4: Autonomy and locus of control

Factor 5: Integration and support (institutional integration, family support, social integration, cultural integration)

The factor correlations showed low correlations between factors which show that the factors are independent constructs (between -0.044 and 0.286).

#### **3.3.4.3. Cronbach's coefficient alpha**

Cronbach's coefficient alpha is used to determine a scale's internal consistency. This refers to the degree to which scale items measure the same construct or factor (Pallant, 2007, p. 95). It also measures the strength of the relationship between two variables (Durrheim, 1999b). The Cronbach's alpha coefficient should ideally be above 0.70 (Field, 2005). The Cronbach's coefficient alpha for the total scale was 0.86, thus indicating to the internal consistency and reliability of the scale for the selected sample.

#### **3.3.5. Revising and Standardising the Questionnaire**

In total, 18 questions were discarded and in some cases questions were rephrased because the questionnaire was to be administered during orientation week and not at the beginning of March 2008 as was initially intended. The questions that measured lecturer involvement, for instance, had to be discarded because students would not have had contact with lecturers during the orientation week. Other items were revised because linguistic reasons (differences in the use of English among researchers from the United States, Britain and South Africa). 'The same words in the same language may not have semantic equivalence across cultures or countries' (Van Widenfelt, Treffers, De Beurs, Siebelink & Koudijs, 2005, p. 138).

The final Academic Readiness Questionnaire consists of 70 questions and is answered on a 5 point Likert-type scale. The answers ranged from 1 *Definitely disagree* to 5 *Definitely agree*. Four questions (items 15, 18, 19 and 26) were removed from the analyses due to potential sensitivity issues. The number of items used for this sample is 66 items.

The Academic Readiness Questionnaire was developed in English and had to be translated in Afrikaans (Language Policy, University of Pretoria). According to Van Widenfelt et al. (2005, p. 137) the goal of a translation is to have a questionnaire in the new language that measures the same construct and has the same meaning as the questionnaire from the source language. When translating questionnaires, it is

important to maintain semantic understanding of the item in both the Afrikaans and English versions.

According to Van Widenfelt et al., (2005, p. 139) it is beneficial to have at least two independent translators who are native speakers and who are bilingual. It is also beneficial if the translators have an understanding of the context and expertise of the field (Sireci, Yang, Harter & Ehrlich, 2006). An adapted 'forward-translation design' as discussed in Kanjee (2005, p. 60) was used as the design for translation of the Academic Readiness Questionnaire. The questionnaire was initially translated from English into Afrikaans by the researcher. Instead of presenting a version to test-takers the Afrikaans and English questionnaires were then handed to translators that have an understanding of the context and expertise of the field (Educationist and Instructional Designer). The Afrikaans and English questionnaires were also handed to an independent editor to determine equivalence of two translations items. Changes were made to the Afrikaans and English translations of the questionnaire based on the feedback of the translators.

### **3.3.6. Technical Evaluation and Establishing Norms**

The technical evaluation of the ARQ will be discussed in Chapter 5. The technical information includes descriptive and inferential statistics. Norm groups were not established for the purposes of this study, although the raw scores from each factor were standardized to z scores for some of the statistical techniques. The z scores can be used to compare the factors because they all measure the distance from the mean in standard deviation units (Durrheim, 1999b; Gregory, 2000). It therefore gives an indication of the size and direction of the relationship.

### 3.4. THE ACADEMIC READINESS QUESTIONNAIRE

The Academic Readiness Questionnaire (ARQ) was compiled through a scientific process of measure development. The constructs for the ARQ were informed by the theoretical review and confirmed by some of the constructs from the 11 questionnaires. The items were in many cases sourced from the mentioned questionnaires and pilot tested to determine its relevance and comprehensibility in a South African context. The ARQ was translated to measure academic readiness of the Afrikaans student group.

Table 3.11. shows how the ARQ item statements and constructs are arranged around the factors. The five factors of the ARQ were identified through a factor analysis (see Results in Chapter 5). The item statements that loaded on the factor are sorted to cluster around the construct that it measures. The item statement, as it is found in the ARQ, is next to the item number. The item statement is referenced back to the original construct and questionnaire scale.

**Table 3.11. Academic Readiness Questionnaire items, constructs and reference scale**

Factor	Item number	Item statement	Construct	Scale	Original construct
Achievement motivation orientation	4	I have the ability to be successful in my studies this year.	Vocational identity	VIS	Vocational identity
	7	I feel I made the right decision in choosing to study this degree programme.		IIS	Institutional and goal commitments
	20	I know exactly what I want to major in.		VIS NCQ	Vocational identity
	59	I have the ideal personality to pursue my field of study.		VIS	Vocational identity



	29	It is important to always be prepared for class.	Educational values	MSLQ	Intrinsic value
	43	It is important to have a good university education to make a success in life.		IIS	Institutional and goal commitments
	63	Getting good grades is important to me.		IIS	Academic and intellectual development
	22	Grades provide me with an ideal goal to work towards.	Goals	SAO	Structure dependence
	62	I usually double check things; just to make sure they are correct.		IPIP (TSRI)	Methodicalness (Self-checking)
	64	I know what I want to be doing 10 years from now.		NCQ	Long range goals
	68	I have clear and reachable goals for my studies this year.		NCQ	Target goals
	45	I expect to do very well in my degree.	Self-efficacy	MSLQ	Self-efficacy
	25	The structure and routine of a person's work should be determined by himself/herself.	Autonomy and Locus of control	LCI	Internal LOC
	34	Getting good grades is mainly related to a person's dedication.		LCI	Internal LOC
	46	It is important to have people recognise the work I have done.*		LCI	External LOC
	53	I will ask for help if I am battling with a complex problem.		MAI	Regulation of cognition
	57	I take responsibility for my own intellectual development.		LCI	Internal LOC



Factor	Item number	Item statement	Construct	Scale	Original construct
Learning- efficacy	9	I like to occupy a leadership position.	Autonomy and Locus of control	LCI	Autonomy
	35	I feel in control of my life.		IPIP (LCI)	Internality (LOC) (Internal LOC)
	42	I have confidence in sharing my own opinions, even if they might be different from the way most other people think.		LCI	Autonomy
	54	I am generally satisfied with my life.		IPIP	Internality (LOC)
	67	I will continue working on a complex task even if I do not succeed at it with the first try.		TSRI (LCI)	Effort (Autonomy)
	13*	I expect to have a harder time to perform academically than most students here.*	Self-efficacy	NCQ (MSLQ)	Academic positive self-concept (Self-efficacy)
	16	I can easily adjust to different styles of teaching.		IPIP	Flexibility
	23	I am as skilled academically as the best students here.		NCQ (MSLQ)	Academic positive self-concept (Self-efficacy)
	24	I enjoy working on complex, intellectually demanding problems.		LCI (IPIP) (MSLQ)	Autonomy (Intellect/Self-efficacy) (Intrinsic value)
	31	I know what I want and I usually make sure that I get it.		NCQ (TSRI)	Realistic self appraisal (Self-efficacy)
	47	I am quick to grasp new concepts and ideas.		IPIP	Intellect/Self-efficacy
	70	I learn things more quickly than most people.		IPIP	Intellect/Self-efficacy



Factor	Item number	Item statement	Construct	Scale	Original construct
Goal orientation	27*	I tend to study in spurts rather than at a regular consistent pace.*	Academic apathy	SAO	Academic apathy
	38*	My goal is to get the best grade I can without spending a lot of effort on my course work.*		SAO (TSRI)	Academic apathy (Effort)
	50*	I often don't see things through to the end.*		IPIP	Resourcefulness
	69	I plan my study sessions in advance and pretty much stick to the plan.		SAO (IPIP) (TSRI)	Academic apathy (Methodicalness) (Planning)
	5	I'm a very methodical person.	Goals	IPIP	Methodicalness
	11	I set specific goals before I begin learning for tests/exams.		MAI (MSLQ)	Regulation of cognition (Self-regulation)
	56	I like to have a routine to follow.		IPIP	Methodicalness
	58	I organise my study time to best accomplish my goals.		MAI	Regulation of cognition
	60*	I prefer to be spontaneous rather than to set goals when I study for tests/exams.		NCQ	Long range goals
	36	I have the ability to plan my work (study time)		Self-efficacy	LCI (TSRI)
65	I can motivate myself to study when I need to.	MAI	Knowledge of cognition		
Factor	Item number	Item statement	Construct	Scale	Original construct
Integration &	1	I had sufficient information about	Institutional	Theory	Institutional support



Support		the University of Pretoria before enrolling.	support		
	2	I acquired information about my degree programme before I enrolled at the University of Pretoria.		NCQ (CSI)	Long range goals (Career planning)
	14	I was informed about the career possibilities for a specific degree programme.		Theory	Career planning
	49*	I worry about financing my way through higher education. *	Financial support	Theory	Financial concern
	66*	I need to undertake paid employment in order to help fund my studies.*		Theory	Financial concern
	6	My family has always wanted me to go to University.	Family support	NCQ	Support of academic plans
	39	My family is a source of encouragement and support.		NCQ	Support of academic plans
	52	If I run into problems at university, I have someone who would help me.		NCQ	Support of academic plans
	33	I enjoy meeting new people.	Social integration	NCQ (IPIP)	Ability to establish community ties (Sociability)
	51*	I try to avoid becoming involved with social groups and organisations.*		IPIP	Sociability
	55	I expect to be involved in many off-campus activities while enrolled here (social, sport, etc.).		NCQ	Ability to establish community ties
	61	My friends are extremely important		IIS	Peer-group interactions



		to me.		(IPIP)	(Sociability)
	48*	I find it difficult to accept criticism.*	Autonomy and Locus of control	IPIP	Adaptability
	32	I have talked about my career goals with someone who has worked in that field.	Goals	NCQ	Academic familiarity
<b>Factor</b>	<b>Item number</b>	<b>Item statement</b>		<b>Scale</b>	<b>Original construct</b>
Reading behaviour	8	It is important to learn about other cultures and ways of life.	Creative expression	SAO	Creative expression
	30	I am comfortable interacting with people from other races and cultures.		NCQ (SAO)	Ability to establish community ties (Creative expression)
	10	I enjoy reading books on a variety of topics.	Reading behaviour	SAO	Reading for pleasure
	21	I will try to do optional reading even though I know it will not influence my performance.		SAO	Reading for pleasure
	28	Reading is one of my favourite pastimes.		SAO	Reading for pleasure
	37	I like to look through the library for books that spark my interest.		SAO	Reading for pleasure
<b>Deleted</b>	<b>Item number</b>	<b>Item statement</b>	<b>Construct</b>	<b>Scale</b>	<b>Original construct</b>
Deleted	44	When working on a project I prefer to work as part of a team.	Social integration	NCQ	Ability to establish community ties
	12	I get more comfortable in a new place as soon as I make some good friends.		NCQ	Ability to establish community ties
	17*	I prefer to do things on my own.*		NCQ	Ability to establish community ties



	15*	My parents/ guardians negatively influenced my achievement at school because of interference in my affairs.	Family support	LCI	External LOC
	3	I was informed about the combination of subjects needed to fulfil the requirements of my degree programme.	Institutional integration	Theory	Institutional integration
	41	My high school grades don't really reflect what I can do at university.	Self-efficacy	NCQ	Academic positive self-concept
	18	I sometimes wonder if I am really university material.		SAO	Academic efficacy
	40	I try to break studying down into smaller steps.	Goals	MAI	Regulation of cognition
	19	I will try to make time for outside reading despite the demands of my course work.	Reading behaviour	SAO	Reading for pleasure

Questionnaire scale acronyms: NCQ (Non-Cognitive Questionnaire); SAO (Survey of Academic Orientations); MAI (Meta-cognitive Awareness Inventory); LCI (Locus of Control Inventory); IIS (Institutional Integration Scale); TSRI (Trait Self-Regulatory Inventory); MSLQ (Motivated Strategies for Learning Questionnaire); VIS (Vocational Identity Scale); IPIP (International Personality Item Pool).

\*Negatively worded item statement

### 3.5. CONCLUSION

This chapter set out to investigate a number of questionnaires that measure non-cognitive entry characteristics that are associated with readiness for university education. The questionnaires that were investigated are by no means the only questionnaires that measure readiness characteristics. Due to saturation of the item pool, during the item development and testing phase, no additional questionnaires were

sourced or mentioned. The questionnaire items and constructs have shown to relate to academic success and retention. Furthermore, the questionnaires have also shown to have good psychometric properties.

The aim of developing a concise measurement instrument would be to provide empirical evidence to the readiness characteristics that are associated with risk and to test the hypotheses of the study (refer to Chapter 1). The ARQ consists of 70 items that can be used as a screening tool to identify students at risk for failure or withdrawal. The ARQ was administered to students from the Faculty of Economic and Management Sciences and analysed with various statistical techniques. The results of the study will be discussed in Chapter 5.

## CHAPTER 4

### METHODOLOGY

#### 4.1. INTRODUCTION

In this chapter, the aim of the study that was discussed in Chapter 1 will be repeated. The sampling design and methodology will be discussed next, followed by the data collection methods for both the quantitative and qualitative part of the study and the various statistical methods that were used to analyse both the quantitative and qualitative data. The way missing data were used will be discussed briefly in the last place.

#### 4.2. AIM OF THE STUDY

The aim of the study is to determine the relationship between a student's entry characteristics and (1) withdrawal and (2) academic failure. The proposed hypotheses for this study are:

- Students who score high on the 'Academic Readiness Questionnaire' factors will have higher academic performance than students who perform lower on the questionnaire factors.
- Students who score low on the 'Academic Readiness Questionnaire' factors are more likely to withdraw from their studies than students who score higher on the questionnaire factors.
- Student readiness characteristics directly affect the likelihood of withdrawal.
- Student readiness characteristics directly affect academic performance at first year.

- Academic performance is an intervening variable for withdrawal.
- The predictors of risk for failure will differ between the racial groups.
- The predictors of risk for withdrawal will differ between the racial groups.

This study would benefit academia on a theoretical and practical level. On a theoretical level the study will contribute to the current readiness and retention models by focussing on the cognitive and non-cognitive readiness characteristics of first-year students at a South African tertiary institution. The range of theories and models investigated as a guide for the theoretical model on readiness for university education and statistical analyses of the factors is regarded as a contribution to academia, specifically in a South African higher education environment.

The practical benefit would be the development and standardisation of a concise measurement instrument from the theoretical model that can be used by faculty, firstly as a screening tool and secondly as part of an early warning system to determine 'risk'. The readiness characteristics can thus be used to profile students in need of academic or personal support (Seidman, 2005, p. 302).

#### **4.3. SAMPLING DESIGN AND METHODOLOGY**

A quantitative and qualitative approach for the research design was taken. The research project was completed in three phases. In the first phase a literature study was done (in 2007) to determine the various constructs that explain academic readiness, retention and withdrawal and a model will be developed. Current questionnaires on academic readiness were used in conjunction with a literature study to develop a contextually relevant questionnaire. A sample was selected to administer a pilot study to test the questionnaire's item constructs and scales before it was administered to the final sample. The data of the pilot study was analysed using various descriptive and inferential statistical methods.

In the second phase the 'Academic Readiness Questionnaire' was administered to students from the Faculty of Economic and Management Sciences at the end of January 2008. The data was analysed using various descriptive and inferential statistical methods to report on the research problem. Students were monitored at the end of the academic year to determine those students who have withdrawn from their studies. Student marks at the end of the academic year was used as an indicator of academic performance.

Because there is a difference in the number of credits needed to pass an academic year in the different programmes in a Faculty, a standardised method of classification was used. In view of these considerations, academic performance was normalised by dividing the number of credits passed by the total number of credits registered for by the student in the particular academic year.

In the third phase students were interviewed at the end of the academic 2008 year to understand student withdrawal behaviour. The reason for this is that '...theory on departure should develop from the direct experiences of college students' (Braxton et al., 2004, p. 19). The semi-structured telephonic interviews were directed towards discovering the main reason for withdrawal from studies, as well as sub-reasons that may have contributed to the decision to discontinue studies. In addition, information was obtained about which support structures the participants made use of to address problems prior to discontinuation, including the reasons for seeking support.

In both the pilot and main study, a convenience sample was used. The researcher recognizes the possible bias due to this sampling method. However, in the pilot study a convenience sample was used to determine the item constructs and reliability of the items. During a pilot study it is not necessary to use a random sample as long as the sample is from the population that the questionnaire is intended for.

During the main study the questionnaire was administered to a convenience sample from students registered in the Faculty of Economic and Management Sciences. The intention was to do a census study. Attendance at the orientation week is compulsory for all first-year students, but not all students attend it hence not all students could be assessed. Nevertheless, the large number of students who completed the questionnaire proved to be representative of the Faculty's demographics in terms of language, gender, race, M-score and faculty school, most of the time.

#### **4.4. DATA COLLECTION**

The following data collection techniques were used:

##### **4.4.1. Questionnaire**

A structured questionnaire that measures a student's readiness for university was used. Current questionnaires that propose to measure non-cognitive factors associated with retention and academic performance were also used. The main factors were identified and items were selected based on their relevance to the identified constructs from the theoretical framework and questionnaires. The pilot study contributed toward the development of the final Academic Readiness Questionnaire based on statistical results, most notably a Factor analysis and Cronbach's coefficient alpha (refer to section 3.3.4. Item Analysis). Measurement is usually associated with the use of standardised tests to measure certain attributes of a person and using the data to make decisions about the performance of a person. 'A questionnaire can be defined as a group of written questions used to gather information from respondents, and is regarded as one of the commonest tools for gathering data in the social sciences' (Kasimjee, 1999, p. 293). A structured questionnaire is seen as a good method of collecting data when working with large populations. It is also imperative to design a questionnaire that is reliable and valid.

#### **4.4.2. Database Mining**

Demographic data as mined from the institutional database of the University was used (BIRAP, 2008). The following demographic variables can be drawn from the database to be correlated with student academic readiness:

- Student's school performance (M-score)
- School subjects registered for
- Home language
- Preferred language of tuition
- Age
- Race
- Gender
- Parents studied at UP
- Type of student accommodation
- Faculty school
- Credits registered
- University marks
- Reason for withdrawal

#### **4.4.3. Exit Interviews**

Semi-structured telephonic interviews were conducted with participants who discontinued their studies in 2008 and who agreed to participate in the research study. Interviews were recorded and referred back to when necessary. This was done to increase the validity of the data gathering process. The interviews were directed towards discovering the main reason for withdrawal from studies, as well as sub-reasons that may have contributed to the decision to discontinue studies. In addition, information was obtained about which support structures the participants made use of to address problems prior to discontinuation, including the reasons for seeking support. Participants were also asked to indicate whether they intended to further their education and if so, at which institution they would enrol.

Data were gathered during a two-week block in May 2009. Two interviewing researchers were involved in gathering the data, where the one researcher conducted the interviews and the other one took written notes on the responses of the participants. The supervising researcher monitored the overall quality of the interviews and consistency was assured by training the interviewing researchers on conducting telephonic interviews, for example listening skills and probing, and sensitising them to the field of retention, withdrawal and attrition.

A semi-structured interview schedule was developed prior to 2006 to assist in telephonic exit interviews with students. The interview schedule was informed by an extensive literature review and the questions were tested during a pilot study in 2006. A codebook was also developed during this period.

## **4.5. DATA ANALYSIS**

### **4.5.1. Assumptions**

According to Field (2005), most inferential statistical methods that are based on normal distributions have four basic assumptions that have to be met.

- *Normality of the data:* Normality of the data refers to a bell shaped curve where the majority of scores lie around the centre and as the scores start to deviate from the centre their frequency start to decline, thus producing the bell shaped curve (Field, 2005, p. 8). Two components related to normality, namely kurtosis and skewness are assessed. Skewness determines the symmetry of the distribution by investigating the mean in relation to the midpoint and kurtosis determines the peakedness of a distribution (Tabachnick & Fidell, 2007, p. 79). The assumption of normality of distribution is regarded as a minimum standard for the majority of inferential statistics that is used in our analysis (Tabachnick & Fidell, 2007).

- *Homogeneity of variance*: This assumption refers to the variances that should remain the same throughout the data. When different groups are tested, the samples from the populations for each group should have the same variance (Field, 2005).
- *Interval data*: The data from a scale should be measured at an interval level.
- *Independence*: Data from different participants should be independent from one another, thus without influence.

The four assumptions are regarded as primary while additional secondary assumptions are applicable with different types of inferential statistical analyses. The secondary assumptions will be mentioned when a specific type of analysis is discussed.

#### **4.5.2. Descriptive Statistics**

Descriptive statistics were performed to explore the data. These descriptive statistics include the frequency, mean, and standard deviation, range of scores, skewness and kurtosis (continuous variables). These statistics are important to collect to make sure that none of the follow-up analysis 'assumptions' are violated (Pallant, 2007, p. 53). For categorical variables (nominal data) frequencies and percentages were used. Summary statistics also provide information to assess normality of the dependent variable(s), to determine where groups could be combined to get a composite score or to omit variables that have low case numbers.

#### **4.5.3. Factor Analysis**

Factor analysis is regarded as a technique to reduce data into a smaller number of components or factors. According to Pallant (2007, p. 179) factor analysis is extensively used to develop and test questionnaires and surveys. A number of assumptions are applicable to conduct factor analysis. These include the following:

- A sufficient sample size of at least 300 cases (Field, 2005, p. 639; Tabachnick & Fidell, 2007, p. 613) to be able to generalise the findings or at least 10 cases for each item (Pallant, 2007);
- The variables should have a normal distribution (Tabachnick & Fidell, 2007). Field (2005, p. 641) adds that the assumption is important if the results of the analysis is to be generalised beyond the sample used;
- The relationships among pairs of variables are linear (Tabachnick & Fidell, 2007);
- An absence of multicollinearity and singularity (Tabachnick & Fidell, 2007). Multicollinearity refers to variables that are highly correlated and singularity refers to variables that are perfectly correlated;
- The factorability of the correlation (Tabachnick & Fidell, 2007). Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sample adequacy, as provided in SPSS outputs, will be used to determine the adequacy of the factor analysis; and
- The absence of outliers among variables. This is determined with the strength of the correlations amongst items. Tabachnick and Fidell (2007, p. 657) recommend coefficients greater than 0.3.

Oblique rotation factor analysis was done firstly to explore the number of factors. Three, four and five factors were consecutively extracted from the factor analysis and it seemed that three factors would work the best. The first factor of the three factor analysis had many items loading on it and it seems that there are finer dimensions to this factor. This view was supported when extracting five factors during an analysis. A Varimax rotation was also conducted by extracting three, four and five factors to compare the two rotations with one another. The items in the Varimax rotation were similar in dispersion to the oblique rotation. On face value, it however seemed as if the Varimax rotation had a better dispersion and all further analyses were done using the Varimax method of rotation instead of the oblique rotation.

#### **4.5.4. Internal Consistency Reliability**

##### **4.5.4.1. Cronbach's coefficient alpha**

Cronbach's coefficient alpha is used to determine a scale's internal consistency or reliability. This refers to the degree to which questionnaire items consistently measure the same construct or factor (Field, 2005, p. 666; Pallant, 2007, p. 95). Measuring a single construct is referred to as 'unidimensionality' by Field (2005, p. 668). The alpha value provides an indication about the strength of that construct. Two caveats from Field (2005) should be mentioned here; the first is that a larger number of items in a scale could increase the alpha value, and the second is that an alpha value can be achieved with various numbers of factors. This indicates that an alpha value should not be used as a measure of unidimensionality. It is recommended to have an alpha value for each factor separately. Cronbach's alpha coefficient should ideally be above 0.70 but values below 0.70 are satisfactory in social sciences because of the diversity of the constructs that are measured (Field, 2005, p. 668). As is the case for factor analysis, Cronbach's alpha coefficient is sample sensitive and the reliability should be determined with each sample.

##### **4.5.4.2. Split-half reliability**

Split-half reliability is an additional way of determining reliability of a scale. To conduct a split-half analysis of a scale, the scale is randomly divided in two halves (Field, 2005, p. 667). A score for each case is calculated based on each half of the scale and a person's score on one half of the scale should be similar to the score in the other half of the scale (Field, 2005). According to the Spearman-Brown split half coefficient (StatSoft, Inc, 2010), a scale is seen as reliable if the two halves are highly correlated (above 0.70).

#### 4.5.5. Predictive Validity

##### 4.5.5.1. *Logistic regression analysis*

According to Field (2005, p. 218) a logistic regression is used to predict the likelihood of a binary outcome based on certain variables. Tabachnick and Fidell (2007, p. 437) describe logistic regression as a technique to determine the predicted likelihood of a variable. Logistic regression has no assumptions about the distributions of the predictor variables, the predictors do not have to be normally distributed, linear, or of equal variance within different groups (Tabachnick & Fidell, 2007). The predictor variables can be a mix of continuous, discrete or binary variables. The dependent variable is always coded binary. Some notes of caution when conducting a logistic regression analysis:

- *Sample size*: According to Pallant (2007, p. 167), there should be an adequate sample size and the number of predictors should not be too many. A reasonable rule of thumb is to have at least 30 times as many cases as parameters estimated in the model (SPSS manual, 2006, p. 3.4).
- *Multicollinearity*: Multicollinearity refers to the strength of the inter-correlations between independent variables. The strength of the relationship between variables should not be high as they could complicate the model without significantly improving the prediction (Pallant, 2007; Tabachnick & Fidell, 2007). Co-linearity statistics are conducted in SPSS to determine high inter-correlations (values less than 0.1).
- *Absence of Outliers*: Outliers refers to cases that do not have the same characteristics as that sample group and would not be predicted to fall in the correct group and could influence the goodness-of-fit of the model (Pallant, 2007, p. 167).

##### 4.5.5.2. *Multiway frequency analysis*

Multiway frequency analysis determines the relationship among variables. Based on the relationship among variables, a linear model with the expected cell frequencies is developed (Tabachnick & Fidell, 2007, p. 858). The cells have their own combination of parameter estimates that are used to predict cell frequency. Thus, according to Tabachnick and Fidell (2007, p. 859), the odds that a person falls into one of the categories can be predicted from the cell's combination of parameter estimates.

The SAS CATMOD analysis was used for the multiway frequency analysis. The CATMOD provides Maximum Likelihood Analysis of Variance tables with likelihood ratio Chi-square test of each effect individually (Tabachnick & Fidell, 2007, p. 884). CATMOD is a log-linear analysis that produces a hierarchical model. A multiway frequency analysis is a type of log-linear analysis that determines the associations among more than two categorical variables and produces the best fitting model based on the expected and observed frequency counts (Field, 2005, p. 704; Tabachnick & Fidell, 2007). Similar to the Chi-square test the log-linear analysis tests the hypothesis that the expected frequencies predicted by the model are significantly different from the observed frequencies. With a log-linear analysis a non-significant result on the goodness-of-fit statistics is expected, to show a good fit between the model and the data (Field, 2005).

Multiway frequency analyses, like logistic regression analyses, are flexible techniques. Practical limitations according to Tabachnick and Fidell (2007) are the requirements for independence, adequate sample size and the size of the expected frequency in each cell should be adequate. The size of the expected frequency in each cell should be greater than one, and no more than 20% is less than five (Tabachnick & Fidell, 2007, p. 862). Multiway frequency analysis and logistic regression analysis can both be used to fit and compare models (Tabachnick & Fidell, 2007, p. 439). Multiway frequency analysis allows the development of a full model, consisting of all possible effects in the model and different order effects, based on the number of variables in the model.

#### **4.5.5.3. Cross-tabulations with Chi-square test for independence**

Cross-tabulations are used to determine the relationship between categorical variables (Field, 2005). A Pearson's Chi-square test is frequently used with cross-tabulations to compare the observed frequencies in certain categories with the expected frequencies in the categories (Field, 2005, p. 682). According to Field (2005) the Chi-square test determines whether the variables are independent. A significant value on the Chi-square test means that the hypothesis that the variables are independent can be rejected and the variables are thus related in some way (Field, 2005). This non-parametric statistical method is used when the independent variables are not normally distributed or when all

the variables are discrete. When some variables are continuous they are recoded into discrete or categorical variables. Assumptions for a Chi-square test are firstly that at least 80% of cells should have expected frequencies counts of 5 or more and secondly, a repeated measure design is not used (Field, 2005, p. 686; Pallant, 2007, p. 214).

#### **4.5.5.4. Multiple regression analysis**

The purpose of a regression analysis is to determine the relationship between a number of independent variables with a dependent variable (Tabachnick & Fidell, 2007, p. 118). The intention of a regression analysis is to predict a dependent variable based on a number of independent variables, or to determine if a variable adds anything to the prediction equation when entered with covariates, or to find the best prediction equation by entering various sets of independent variables in a model (Tabachnick & Fidell, 2007).

Multiple regression analysis can have either continuous or dichotomous (binary) independent variables. Discrete variables have to be dummy coded to be dichotomous. The dependent variable is continuous. A standard multiple regression analysis was performed, where all predictor variables are entered into the analysis and each variable is evaluated in terms of what it adds to the prediction of the dependent variable (Tabachnick & Fidell, 2007, p. 136).

The assumptions of multiple regression analysis are:

- *Sample size*: According to Tabachnick and Fidell (2007) there should be an adequate sample size and the number of predictors should not be too many. A reasonable rule of thumb is  $N \geq 50 + (8 \times \text{number of independent variables})$  for testing multiple correlation and  $N \geq 104 + \text{number of independent variables}$  (Tabachnick & Fidell, 2007, p. 123).
- *Absence multi-collinearity*: Multi-collinearity refers to the strength of the inter-correlations between independent variables. The strength of the relationship

between variables should not be high as they could complicate the model without significantly improving the prediction (Pallant, 2007; Tabachnick & Fidell, 2007).

- *Absence of outliers*: Outliers refers to cases that do not have the same characteristics as that sample group and would not be predicted to fall in the correct group and could influence the goodness-of-fit of the model (Tabachnick & Fidell, 2007, p. 124).
- *Normality, linearity, homoscedasticity of residuals*: The assumption of normality refers to the errors of prediction that are normally distributed around each predicted dependent variable score. Linearity refers to the relationship between predicted dependent variables scores and the errors of prediction. 'Failure of linearity of residuals in regression does not invalidate an analysis so much as weakens it' (Tabachnick & Fidell, 2007, p. 127). The assumption of homoscedasticity refers to the standard deviations of errors that are equal for all predicted dependent variable scores (Tabachnick & Fidell, 2007).

#### **4.5.5.5. Classification tree analysis**

Classification tree analysis aims to predict membership of cases, constructs or items to a dependent variable. The method used by classifications tree analysis is to sort independent variables according to some criteria to get the most accurate prediction. Each independent variable placed in the model is independently associated with the dependent variable to determine its effect (StatSoft, Inc, 2010). This produces a hierarchical structure with the least number of variables to predict the dependent variable. Both Classification & Regression Tree (C&RT) analysis and Chi-square Automatic Interaction Detector (CHAID) analysis can be used to predict continuous or categorical dependent variables (StatSoft, Inc, 2010). CHAID analysis requires the independent variables to be categorical and in approximate equal number of cases, while C&RT analysis allows for continuous and categorical independent variables.

In CHAID analysis an F-score will be computed for a continuous dependent variable and a Chi-square test will be computed for a categorical dependent variable (StatSoft, Inc, 2010). C&RT analysis computes a Chi-square measure and a G-square measure (which is similar to the maximum likelihood Chi-square). In both CHAID and C&RT analysis these measures are used to determine the goodness-of-fit of the branch node. CHAID

analysis will provide non-binary trees that have more predictor variables or categories to a branch, while C&RT analysis will produce only binary trees (StatSoft, Inc, 2010).

#### **4.5.5.6. Data analysis of the exit interviews**

Data were qualitatively analysed using the principles of content analysis. Content analysis is a qualitative technique to gather and analyse the content of texts (Neuman, 1997, p. 273). According to Neuman (1997) the content of the text can be quantified with systematic counting and recording procedures, like absolute frequencies, cross-tabulations or Chi-square analysis. Constructs that are to be measured are identified and placed in a 'codebook', which is a set of instructions and list of themes that indicate how the content should be analysed (Neuman, 1997).

When developing a codebook, one can approach it both inductively (explore patterns emerging from the content) or deductively (applying or validating researched patterns). The codebook that was developed during a pilot study in 2006 was used deductively during the analysis of students' feedback. Additional items that occurred during the analysis phase were added to the codebook (inductive analysis). According to Neuman (1997, p. 275), coding the content of a text according to a codebook is called 'manifest coding' and it allows one to count the number of times a phrase, word or construct appears in a written text. Consistency of assigning the codes between the interviewers was established by cross-referencing between interviewers. The coded data was then quantified for statistical analysis utilizing SPSS.V17® statistical software package.

#### **4.6. MISSING DATA**

Missing data in the analysis were deleted 'pairwise' and 'listwise'. Descriptive analysis and correlations made use of the pairwise exclusion of cases. The factor analysis and logistical regression analysis, together with the multiway frequency analysis made use of the listwise exclusion of cases. This was done to explore a hierarchical categorical

model that is sensitive to missing values. According to Pallant (2007, p. 57), in pairwise exclusion a case is excluded only if the data for that analysis is missing. In listwise exclusion a case is excluded if any of the data is missing. There were six cases with frequency missing on more than 10 items. They ranged between 11 and 62 missing items with an average of 24.5 missing items.

## **4.7. DEFINITION OF KEY VARIABLES**

### **4.7.1. Retention**

Retention refers to the ability of an institution to retain a student from admission to the university through graduation (Berger & Lyon, 2005). The basic assumption of the Successful Course Completion Ratio (SCCR) is that students who enrol for a degree are declaring the goal of completing the programme (Hagedorn, 2005, p. 98). Hagedorn proposes four types of retention based on the level of analysis, namely institutional, system, retention in the major (programme) and retention in the module. Institutional retention will be used as the level of analysis for this study and refers to the proportion of students who remain enrolled at the same institution from year to year (Hagedorn, 2005). System retention refers to the measure of retention across institutions. Retention in a major or programme refers to the monitoring of migration between programmes. Retention in the module refers to completion of units within a programme.

According to Mortenson (2005, p. 32) various measures can be used to measure retention. These include retention rates, completion rates, and cohort survival rates. These data are gathered to assess educational performance. These rates determine how students are progressing through the student life cycle and how many students have withdrawn or transferred to other schools of faculties (BIRAP, 2008). The SCCR, according to Hagedorn (2005), indicates a mathematical calculation of completion ratios. The SCCR measures completion ratios by comparing the proportion of courses that a student completes to the number of courses students enrol for. The weakness of the SCCR is the inconsistency of the calculation result, because the use of various

secondary data which if interpreted could mean retention has dropped, increased or stayed the same.

It is also important to measure the persistence rates of first-year students because of their vulnerability at the beginning of their studies. According to empirical findings in American higher education institutions, the institutions that are highly selective tend to have higher persistence rates for undergraduate graduation, compared to open or less selective universities (Mortenson, 2005). Students with the most successful academic records in high school are more likely to be academically successful in higher education institutions and institutions who admit these students will have better retention rates.

#### **4.7.2. Withdrawal**

Withdrawal refers to the departure of a student from a university campus (Berger & Lyon, 2005). Just as in Tinto (1993, p. 36) we need to define the different forms of withdrawal. A cross-sectional view of withdrawal will typically indicate the type of student that is more likely to withdraw and according to Tinto (1993) this refers to a descriptive approach to student departure. The tendency of this research is to take a cross-sectional view of withdrawal. The uses of questionnaires focus on the traits or dispositions that students have or use when functioning in a specific environment and imply a descriptive perspective. Our next focus is on a working definition of withdrawal.

Tinto (1993, p. 140) uses the term 'drop-out' to describe withdrawal from institutions. To him an institution has to decide which forms of behaviour are to be defined as withdrawal. This becomes necessary when institutions theorise that all forms of withdrawal can be addressed with a single policy and in essence be treated by institutional action. This term should only be used for a small number of withdrawals where the perception of failure can be applied to both the student and the institution. For example, when there is incongruence between the goals and commitments of the students and the institution, there is not much that the institution can do to stop a student

from leaving. This however does not mean that a student will not come back to the original institution at a later stage. It might, however, mean that a student has transferred to a different institution. It is therefore important to develop a theory that clearly explains the longitudinal process of student withdrawal while taking cognisance of the behaviours that underlie the phenomenon.

Berger and Lyon (2005, p. 7) definitions:

- Drop-out refers to ‘...students whose initial educational goal was to complete at least a bachelor’s degree but who did not complete it.’
- Stop-out refers to ‘... a student who temporarily withdraws from an institution or system.’
- Mortality refers to ‘...the failure of students to remain in college until graduation.’
- Attrition refers to ‘...students who fail to reenrol at an institution in consecutive semesters.’
- Withdrawal refers to ‘... the departure of a student from a college or university campus.’
- Involuntary withdrawal refers to ‘...the institution that does not permit the student to reenrol due to poor academic achievement’ (faculty discontinuation).

These concepts seem to be synonymous with each other but are only closely related with each other and are not synonyms. Further according to Berger and Lyon (2005, p. 7) it is important to distinguish between ‘voluntary’ and ‘involuntary’ withdrawal as well as ‘institutional’ and ‘system’ departure. Voluntary withdrawal refers to a student who does not reenrol by his own decision; involuntary withdrawal refers to the institution that does not permit the student to reenrol due to poor academic achievement. Institutional withdrawal describes the departure from an institution and systems departure refers to the departure from the higher education system.

Berger and Lyon (2005) gives a clearer picture of what student withdrawal refers to, according to their synthesis of various authors. Bean (1990) agrees with Tinto that students should not see their withdrawal as failure because the students might have

achieved their goals in the first year of studies. Astin (1977) argues for a sound definition of withdrawal by stating that 'drop-outs' may become 'non drop-outs' in time; the so-called 'stop-outs' according to Berger and Lyon. Once again it is irrelevant to this study if a student returns at a later stage or not. A discussion regarding 'stop-outs' does not fall within the scope of this research. The term 'withdraw' is used to describe the 'state' of the student at a certain point in time.

It is therefore important to decide what constitutes withdrawal and which definition is to be used to describe withdrawal. It is possible to interview a student during deregistration and ask students in 'real time' what their reasons are for withdrawal, have they achieved their stated goals, are they planning to return to the institution or register at another institution and do they see their decision as indicating a failure on their part. This in practice does not happen because some students depart without notifying the institution, they are not willing to talk about the reasons for departure and in many respects information about student departure is received *ex post facto* the departure.

#### **4.7.3. Academic Success**

Academic success refers to the number of credits passed at the end of the academic year divided by the number of credits prescribed for that academic year, differentiated by programme. The 21 different programmes offered by the faculty has different prescribed total credits for the first academic year and contributed to the complexity of standardising credit values for the faculty as a whole. A differentiation is made between the students who have a success ratio of 1 and those students who have not passed all of their credits registered, thus with a pass ratio less than 1. There is an overlap, operationally among students included in risk for withdrawal and risk for academic failure. Students with academic failure include students from category D2, D3 and D4 as well as those students who persist but did not pass all registered module credits in relation to the prescribed module credits.

#### **4.7.4. Non-Cognitive Variables**

Non-cognitive refers to variables relating to adjustment, motivation and self-concept (Sedlacek, 2005). According to Sedlacek (2005) non-cognitive variables are useful to predict performance in all students, but they are particularly useful for non-traditional (African-American) students. Certain non-cognitive factors also seem to be positively related to retention and graduation. Certain non-cognitive measurements can also be used for admission, counselling, teaching, and in student service programmes. Sedlacek (2005) indicates that non-cognitive variables can refer to various attributes such as student involvement (Astin, 1993), academic and social integration (Braxton, Hirschy & McClendon, 2004; Tinto 1993), and socio-economic background that can also be categorised in one of Camara's broad categories.



**Table 4.1. Defining the independent and dependent variables**

<b>INDEPENDENT VARIABLES</b>	<b>DEFINITION</b>
Achievement motivation orientation	The degree to which one has an intrinsic interest in higher education and an expectation to achieve academically.
Learning-efficacy	The degree of confidence in one's own ability to achieve one's academic goals.
Goal orientation	The degree to which one is able to plan for learning by setting task-specific goals.
Integration/support	The degree to which the student experience institutional, social, family and financial support.
Reading behaviour	The degree to which one enjoys reading for pleasure.
M-score	An aggregate score based on the six best senior certificate subjects and ranges between 0 - 30.
Credits registered	A count of the number of credits registered for during the first year.
Parental education at UP	One or both parents completed a degree at the University of Pretoria.
Housing	Where a student lives while attending university.
Distance of school	Distance of school from the university, clustered by Province.
Race language	Combination between race, home language and preferred language of tuition.
Gender	Differentiation between male and female students.
<b>DEPENDENT VARIABLES</b>	<b>DEFINITION</b>
Risk for withdrawal (Binary)	Students, who were discontinued, are on probation or have withdrawn.
Risk for failure (Binary)	Students who passed less than 100% of the credits registered for and who are at risk for withdrawal.
Academic success (Continuous)	Ratio representing the number of credits passed over the number of credits prescribed by the programme.

#### 4.8. LIMITATIONS

African students were under-represented in the sample, compared to white students, thus the sample could have been biased in the results of the analysis. Students were conveniently targeted during the orientation week. Attendance at the orientation week is compulsory for all first-year students, but not all students attend it. The students who do not attend the orientation week seem to place themselves at risk because they do not receive valuable information about the university, what is expected of students and where students can receive support. These students also miss out on the social dimension of the orientation week and to a lesser extent become integrated within the social and institutional system of the university. Students who miss the orientation week are therefore by default 'at risk'.

It might be argued that the African students in the sample are mostly students in good academic standing. Referring to the sample, it could be that the African students who attended the orientation week are least in need of support and have adequate support, applied and enrolled in time and are therefore less at risk than the African students who did not attend. REAP (Jones et al., 2008) information shows that their students enrol and have bursaries prior to the orientation week, but that similar disadvantaged students without the needed support frequently did not enrol in time, do not have sufficient funds and quite frequently are still trying to register and search for accommodation.

The M-scores of the African and white students were not similar and contrary to the above argument, the majority of African students' M-scores were lower on average than the white students' M-score and there was a good distribution for both racial groups. The argument that mostly high academic achieving African students enter, does not hold in this case.

#### 4.9. CONCLUSION

In this chapter an overview of the sample design and methodology was provided. A quantitative and qualitative approach for the research design was proposed. A structured questionnaire was used as part of the quantitative study to measure the non-cognitive readiness characteristics. Data from BIRAP was used to mine demographic variables associated with readiness as well as high school academic achievement. Interviews were conducted as part of the qualitative part of the study to determine salient reasons for withdrawal.

The various statistical techniques used to analyse the quantitative and qualitative data were discussed. The assumptions of each statistical method was mentioned in the discussion, firstly to sensitise the reader to these assumptions and secondly to adhere to these assumptions in the process of standardising the readiness questionnaire. A violation of the assumptions would bring the research results into question by lowering the validity and reliability of the study.

The results of the data collection methods and statistical analysis will be discussed in Chapter 5.

## CHAPTER 5

### RESULTS

#### 5.1. INTRODUCTION

Data were collected during the 2008 first-year orientation week. A total of 1 222 responses were received following its distribution among students who attended two sessions of the orientation week (one Afrikaans and one English session). Responses with more than 10 uncompleted questions were regarded as missing and left out from the analysis. Data were cleaned to make sure that only first-time entrants (FTE's) of the 2008 cohort in the Faculty of Economic and Management Sciences were included in the analysis. Forty two responses were left out because of incomplete questionnaires. Six students were left out because they were not newly enrolled first-year students in 2008 (FTE's). Thirty nine of the students were not registered in any faculty and a further 20 students were discarded because of insufficient information from the student database (BIRAP) and nine students were discarded because they were registered in an international educational model (for example Cambridge model) and did not have six subjects that could be counted toward the M-score.

In total, 963 students' responses on the questionnaire were regarded as complete (82% workable questionnaires from the original sample total). An additional criterion was added during the data analysis phase to include only (FTE's) who wrote the Senior Certificate exam in 2007 to make the group more homogeneous. Only 829 of the 963 students who completed the questionnaire complied with the criteria and thus the sample for further analysis is  $N = 829$ . The number of FTE's on undergraduate level at the Faculty of Economic and Management Sciences in 2008 is 1928 students. The total number of students from this faculty who completed the questionnaire is 50%.



## 5.2. DESCRIPTION OF THE SAMPLE

**Table 5.1. Enrolment by race of the 2008 cohort of first-time entrants**

Year	African	Coloured	Indian	White	Total
UP	30.2%	2.2%	4.0%	63.5%	6853
EMS	37.4%	2.2%	5.7%	54.7%	1928
Sample	24.4%	2.5%	2.7%	70.4%	829

Source: BIRAP (2008) – Adapted summary of student numbers: 2008

The enrolment by race in Table 5.1. reflects the 2008 intake cohort of FTE's at the University of Pretoria, the Faculty of Economic Management Sciences and the sample group from the Faculty of Economic Management Sciences, respectively (BIRAP, 2008). Table 5.2. indicates that the sample group from the faculty is somewhat biased toward the white students. The sample size is however large enough to allow for meaningful comparisons between white and African students. Coloured and Indian students, unfortunately, have to be discarded from further analysis where race is to be included as an independent variable because of their low numbers.

**Table 5.2. Racial differentiation of the sample**

Race	Frequency	Percentage
White	584	70.4
Coloured	21	2.5
Indian	22	2.7
African	202	24.4
Total	829	100.0

**Table 5.3. Gender differentiation of the sample**

Gender	Frequency	Percentage
Female	510	61.5
Male	319	38.5
<b>Total</b>	829	100.0

Table 5.3. indicates the differentiation based on gender. The sample from the Faculty of Economic and Management Sciences indicates a bias toward female students.

**Table 5.4. Differentiation of the sample by matriculation score**

M-Score	Frequency	Percentage
9-16	205	24.7
17-23	387	46.7
24-30	237	28.6
<b>Total</b>	829	100.0

Table 5.4. indicates the differentiation based on the matriculation score (M-score). The M-score is a metric score based on the academic achievement of the six best subjects in Grade 12. This is a continuous variable ranging from 1 to 30, but has been categorised for representation purposes as well as for the logistic regression analysis.

**Table 5.5. Differentiation of the sample by home language**

Home language	Frequency	Percentage
<b>Afrikaans</b>	464	56.0
<b>English</b>	144	17.4
<b>African</b>	187	22.6
<b>Other</b>	34	4.1
<b>Total</b>	829	100.0

Table 5.5. indicates the differentiation based on home language. Home language refers to the language that is spoken at home. There are 11 official languages in South Africa, including Afrikaans and English. The nine official African languages were clustered in the African group of languages. The 'other' languages in Table 5.5. refer to foreign languages, such as French and German.

**Table 5.6. Differentiation of the sample by enrolment status**

Enrolment status	Frequency	Percentage
<b>Discontinuation</b>	25	3.0
<b>Withdrawal</b>	53	6.4
<b>Persist</b>	733	88.4
<b>Probation</b>	18	2.2
<b>Total</b>	829	100.0

Source: BIRAP (2008) – Adapted summary of student numbers: 2008

Table 5.6. is a summary of the enrolment status of students as they are presented in the student data-base (BIRAP, 2008). 'Discontinuation' represents those students who were dismissed by the faculty due to poor academic performance (institutional withdrawal).

Withdrawal refers to students who withdraw on a voluntary basis. Students who persisted represent those who have passed more than 8 modules (minimum requirement) and are allowed to proceed to the second year of their study, irrespective of academic performance in other modules (EMS, 2008). Probation represents students who have poor academic performance and have to apply for permission to continue with their second year of study with the faculty.

A number of challenges were experienced during the analysis phase. These included the following:

- Different programmes did not have the same credit value, ranging from 88 credits to 171;
- Students from the different programmes did not register for the prescribed number of credits;
- Students are allowed to register for modules from other faculties;
- Some programmes have very low student numbers (below 10 students).

It was therefore decided to convert academic achievement into a ratio to make the dependent variable equitable. The ratio, called academic success, consists of the number of credits passed over the number of credits prescribed by the programme for which the student is registered (refer to Table 4.1.). The programme credit ratio is regarded as one of the ways in which academic achievement is measured by the institution (Smit & Owen, 2007).

### **5.3. FACTOR ANALYSIS**

The 66 items of the Academic Readiness Questionnaire were subjected to a factor analysis using SPSS.V17®. Prior to performing exploratory factor analysis, the suitability of data for factor analysis was assessed. The Kaiser-Meyer-Okin value was 0.86, exceeding the recommended value of 0.6 (Kaiser as cited in Pallant, 2007) and Bartlett's

Test of Sphericity (Bartlett as cited in Pallant, 2007) reached statistical significance, supporting the factorability of the correlation matrix. For the factor analysis both an orthogonal and oblique factor-analysis were conducted to explore the number of factors. Maximum likelihood factoring was chosen as the approach to identify the number of underlying factors and Kaiser's criterion was used to assist in the decision to retain the number of factors (Pallant, 2007).

The two approaches produced very similar results and the assumption that the factors are not highly related was confirmed in every analysis. Kaiser's rule of only retaining eigenvalues larger than 1.0 was used more stringently by only including factors with eigenvalues larger than 2.0. According to Tabachnick and Fidell (2007, p. 617) only factors with larger eigenvalues are retained, because each eigenvalue corresponds to a different potential factor. The higher the eigenvalue, the higher the corresponding variance explained by a factor. There were 18 factors with eigenvalues larger than 1.0. Based on the 2.0 criteria the researcher was able to reduce the number of factors from 18 to only 5 factors. The 5 factors explained 14.4%, 6%, 4.4%, 3.5% and 3.4% of the variance respectively.

The two factor analysis approaches (orthogonal and oblique) produced very similar results. The orthogonal approach was, however, chosen for further analysis because the result of this approach is regarded as easier to interpret (Pallant, 2007). From the Varimax rotated factor loading patterns there were items in the first three factors that loaded on more than one factor, indicating the possibility of one single factor (Fa) for the first three factors (f1, f2, and f3). A confirmatory factor analysis was done to determine the likelihood of three factors, also using an orthogonal approach. The 'forced' 3 factor analysis explained 14.4%, 6% and 4.4% of the variance respectively. The 5 factor solution explained a total of 31.7% of the cumulative variance, while the 3 factor solution explained 24.8% of the cumulative variance. The 3 factor solution however produced better Cronbach's alphas for each of the sub-scales.

It was decided to explore the 3 factor solution further to determine items to be removed in order to improve the reliability coefficient of each factor. Corrected Item-Total Correlations were monitored to determine the degree to which each item correlates with the total score. According to Pallant (2007) and Field (2005), values less than 0.3 indicate that the item is measuring something different from the scale as a whole. The 'Cronbach's alpha if deleted' was also evaluated to determine the effect of removing items from each sub-scale. The items with low communalities (less than 0.06) and low loadings were discarded. These items were 3, 6, 12, 17, 40, 41 and 44. The raw score Cronbach's alpha for the three factors were  $F_1 = 0.87$ ,  $F_2 = 0.63$  and  $F_3 = 0.75$ .

As with the original 3 factor solution the last 3 factor solution (without deleted items) indicated many items loading on  $F_1$ . The items of  $F_1$  were subjected to a separate factor analysis and the Kaiser-Meyer-Olkin value was 0.88. Three factors were identified in  $F_1$  with eigenvalues larger than 2.0. This factor analysis ( $F_1$ ) explained 17.9%, 6.4%, and 4.7% of the variance respectively (see Appendix Table B.1. for the factor loadings). Factor  $F_1$  was subjected to further analysis to determine if further items should be deleted that did not contribute to the reliability of each of the three factors in  $F_1$ . Two separate Cronbach's alphas were subsequently done with:

- only those items that loaded heavy on only one factor and had Item-Total Correlations larger than 0.3; This set of alphas provided fair reliability statistics ( $f_1 = 0.70$ ,  $f_2 = 0.60$  and  $f_3 = 0.52$ );
- all the items in  $F_1$  as they loaded on  $f_1$ ,  $f_2$ , or  $f_3$ . This set of alphas provided improved reliability statistics ( $f_1 = 0.79$ ,  $f_2 = 0.75$  and  $f_3 = 0.75$ ).

The Cronbach's coefficient alpha supported the notion that no more items needed to be removed from  $F_1$ , irrespective of some items showing low communalities. The three factors that emerged were named 'achievement motivation orientation', 'learning-efficiency', and 'goal orientation'. Factor labels were created based on the five items with the highest factor loadings and named according to the construct identified in literature or the source questionnaire.

Factors F2 and F3 were consequently analysed separately in a ‘forced’ 2 factor analysis and the Kaiser-Meyer-Okin value was 0.72. The 2 factor solution (Fb) explained 15.3% and 13.3% of the variance respectively. Cronbach’s alpha was also done for the 2 factor solution and provided the following Cronbach’s alphas: F2 = 0.63 and F3 = 0.75. The 2 factor solution with F2 and F3 was renamed to f4 and f5 respectively and this scale was termed Fb for further analysis (see Appendix Table B.2. for the factor loadings). The two factors that emerged were named ‘integration and support’ (f4) and ‘reading behaviour’ (f5). The combined alphas for Fa was 0.87 and explained 28.8% of the variance, while the combined alphas for Fb was 0.61 and explained 28.6% of the variance. The overall Cronbach’s alpha for the ARQ was 0.87, which indicates very good reliability for the scale with this sample (Pallant, 2007).

**Table 5.7. Academic Readiness Questionnaire factors and item numbers**

<b>Factor</b>	<b>Item number in the ARQ</b>
<b>f1. Achievement motivation orientation</b>	4, 7, 20, 22, 25, 29, 34, 43, 45, 46, 53, 57, 59, 62, 63, 64, 68 = <b>17</b>
<b>f2. Learning-efficacy</b>	9, 13, 16, 23, 24, 31, 35, 42, 47, 54, 67, 70 = <b>12</b>
<b>f3. Goal orientation</b>	5, 11, 27, 36, 38, 50, 56, 58, 60, 65, 69 = <b>11</b>
<b>f4. Integration and support</b>	1, 2, 14, 32, 33, 39, 48, 49, 51, 52, 55, 61, 66 = <b>13</b>
<b>f5. Reading behaviour</b>	8, 10, 21, 28, 30, 37 = <b>6</b>

Refer to Table 3.11. for a listing of the questionnaire item text corresponding to each of the five factors.

#### **5.4. SCALE RELIABILITY**

The reliability of each scale was assessed with Cronbach’s coefficient alpha and the Spearman Brown formula (SPSS.V17®).

#### 5.4.1. Cronbach's Coefficient Alpha

The cumulative variance explained for factors 1, 2 and 3 is 28.8%. For factors 4 and 5 the cumulative variance explained is 28.6%. The loss in reliability, according to the drop in Cronbach's alpha value for Fb, is somewhat surprising (refer to Table 5.8. below). The overall Cronbach's alpha for the Academic Readiness Questionnaire is 0.87 which is higher than the recommended 0.70 for social sciences. Except for f4 with a Cronbach's alpha value of 0.63, the remaining four third-order factors produced Cronbach's alpha values above 0.70. The second-order factors had Cronbach's alpha values of 0.87 and 0.61. Table 5.8. shows the Cronbach's coefficient alpha of the factors.

**Table 5.8. Cronbach's coefficient alpha of the factors**

Third-order factors	Alpha	Second-order factors	Alpha	Variance	Overall alpha
f1	0.79	Fa	0.87	28.8%	0.87
f2	0.75				
f3	0.75				
f4	0.63	Fb	0.61	28.6%	
f5	0.75				

#### 5.4.2. Spearman Brown Formula

The split-half method or the Spearman Brown formula estimates the reliability of the scale by comparing two random halves of the scale with each other. The output from Table 5.9. provides the Spearman Brown formula, the Cronbach's alpha and the Guttman split-half coefficient.



**Table 5.9. Spearman Brown formula, the Cronbach's alpha and the Guttman split-half coefficient**

Cronbach's Alpha	Part 1	Value	0.811
		N of Items	30 <sup>a</sup>
	Part 2	Value	0.747
		N of Items	29 <sup>b</sup>
		Total N of Items	59
		Correlation Between Forms	0.637
Spearman-Brown Coefficient		Equal Length	0.778
		Unequal Length	0.778
		Guttman Split-Half Coefficient	0.774
<p>a. The items are: V1, V2, V4, V5, V7, V8, V9, V10, V11, V14, V16, V20, V21, V22, V23, V24, V25, V28, V29, V30, V31, V32, V33, V34, V35, V36, V37, V39, V42, V43.</p> <p>b. The items are: V45, V46, V47, V52, V53, V54, V55, V56, V57, V58, V59, V61, V62, V63, V64, V65, V67, V68, V69, V70, vv13, vv27, vv38, vv48, vv49, vv50, vv51, vv60, vv66.</p>			

The coefficients from the Spearman Brown formula and the Guttman split-half coefficients are 0.78 and 0.77 respectively, which indicate good reliability of the full scale. According to Gregory (2000, p. 85) a coefficient of 0.70 on the Spearman Brown formula is equivalent to an estimated full-test reliability of 0.82. The Cronbach's alpha for the two scales was 0.64, which is lower than the Cronbach's alpha from the overall scale. The Cronbach's alpha represented here is the mean of all possible split-half coefficients (Gregory, 2000, p. 85). The Cronbach's alpha of 0.63 is below the recommended 0.70 which could indicate that some of the items do not correlate positively with one another. Factor Fb had a low internal consistency and could influence

the values of the Cronbach's alpha. The Spearman Brown formula is however reassuring in terms of the reliability of the scale as a whole.

### 5.5. DESCRIPTIVE STATISTICS OF THE FACTORS

Descriptive statistics allows a researcher to explore the data through a range of analyses. Table 5.10. shows the measure of central tendency, namely the mean and median, which indicate the arithmetic average and middlemost score in the factor (Gregory, 2000, p. 60). The 5% trimmed mean refers to the deleted top and bottom 5% of the cases when the mean is calculated. These statistics, when compared, indicate the effect of outliers in the sample or whether the number of high and low scores is equal or not (SPSS Inc, 2007). The mean and 5% trimmed mean should ideally be close to each other to indicate limited outliers or extreme scores for a scale.

**Table 5.10. Descriptive statistics of the Academic Readiness Questionnaire factors**

Factor	Descriptive technique		Statistic	Std. error
Achievement motivation orientation	Mean		70.8183	0.23847
	95% Confidence interval for mean	Lower bound	70.3502	
		Upper bound	71.2864	
	5% Trimmed mean		70.9492	
	Median		71.0000	
	Variance		43.505	
	Std. deviation		6.59582	
	Minimum		35.00	
	Maximum		85.00	



	Range		50.00	
	Interquartile range		10.00	
	Skewness		-.378	0.088
	Kurtosis		.707	0.177
Learning-efficacy	Mean		45.7013	0.18960
	95% Confidence interval for mean	Lower bound	45.3291	
		Upper bound	46.0735	
	5% Trimmed mean		45.7532	
	Median		46.0000	
	Variance		28.400	
	Std. deviation		5.32915	
	Minimum		29.00	
	Maximum		60.00	
	Range		31.00	
	Interquartile range		7.00	
	Skewness		-.139	0.087
	Kurtosis		-.113	0.174
	Goal orientation	Mean		40.0694
95% Confidence interval for mean		Lower bound	39.6676	
		Upper bound	40.4712	
5% Trimmed mean			40.1704	
Median			41.0000	
Variance			32.010	
Std. deviation			5.65770	
Minimum			18.00	
Maximum			55.00	
Range			37.00	
Interquartile range			7.00	



	Skewness		-.367	0.088
	Kurtosis		.476	0.177
Integration & support	Mean		49.0558	0.20055
	95% Confidence interval for mean	Lower bound	48.6621	
		Upper bound	49.4494	
	5% Trimmed mean		49.1893	
	Median		49.0000	
	Variance		31.733	
	Std. deviation		5.63320	
	Minimum		26.00	
	Maximum		64.00	
	Range		38.00	
	Interquartile range		7.00	
	Skewness		-.422	0.087
	Kurtosis		.376	0.174
	Reading behaviour	Mean		20.8764
95% Confidence interval for mean		Lower bound	20.5781	
		Upper bound	21.1747	
5% Trimmed mean			20.9279	
Median			21.0000	
Variance			18.493	
Std. deviation			4.30040	
Minimum			9.00	
Maximum			30.00	
Range			21.00	
Interquartile range			6.00	
Skewness			-.132	0.086
Kurtosis			-.531	0.173

The achievement motivation orientation factor indicates measures of central tendency that are very close to each other (70.8-71.0), indicating that there are not many outlier scores and that the number of high and low scores is balanced. The minimum score is 35 and the maximum score is 85 with a range of 50. The mean of 70.8 indicates that the majority of the students in the sample had high scores on this scale.

The measures of dispersion for the achievement motivation orientation factor indicate a standard deviation of 6.6 points around the mean (70.8). The interquartile range is 10 and indicates that the middle 50% of the sample lies within a range of 10 points. The standard error is 0.24 and suggests that the mean will fall within scores ranging between 70.3 and 70.8, 95% of the time (level of confidence). The skewness value indicates that the cases are clustered toward the right (-0.38). The kurtosis indicates the shape of the distribution. The kurtosis value is positive and indicates a leptokurtic distribution, which is peaked toward the middle with longer tails.

The learning-efficacy factor indicates measures of central tendency that are very close to each other (45.7-46.0), indicating that there are not many outlier scores and that the number of high and low scores is balanced. The minimum score is 29 and the maximum score is 60 with a range of 31. The mean of 45.7 indicates that the majority of the students in the sample had high scores on this scale. The measures of dispersion for the learning-efficacy factor indicate a standard deviation of 5.3 points around the mean (45.7). The interquartile range is 10 and indicates that the middle 50% of the sample lies within a range of 7 points. The standard error is 0.19 and suggests that the mean will fall within scores ranging between 45.3 and 46.1, 95% of the time. The skewness value indicates that the cases are clustered toward the right (-0.139). The kurtosis value is negative and indicates a platykurtic distribution, which is flattened toward the middle (SPSS Inc, 2007).

The goal orientation factor indicates measures of central tendency that are very close to each other (40.1-41.0), indicating that there are not many outlier scores and that the number of high and low scores is balanced. The minimum score is 18 and the maximum

score is 55 with a range of 37. The mean of 40.1 indicates that the majority of the students in the sample had high scores on this scale. The measures of dispersion for the goal orientation factor indicate a standard deviation of 5.7 points around the mean (40.1). The interquartile range is 7 and indicates that the middle 50% of the sample lies within a range of 7 points. The standard error is 0.21 and suggests that the mean will fall within scores ranging between 39.7 and 40.5, 95% of the time. The skewness value indicates that the cases are clustered toward the right (-0.367). The kurtosis value is positive and indicates a distribution which is peaked toward the middle.

The integration and support factor indicates measures of central tendency that are very close to each other (49.0-49.2), indicating that there are not many outlier scores and that the number of high and low scores is balanced. The minimum score is 26 and the maximum score is 64 with a range of 38. The mean of 49.1 indicates that the majority of the students in the sample had high scores on this scale. The measures of dispersion for the integration and support factor indicate a standard deviation of 5.6 points around the mean (49.1). The interquartile range is 7 and indicates that the middle 50% of the sample lies within a range of 7 points. The standard error is 0.20 and suggests that the mean will fall within scores ranging between 48.7 and 49.5, 95% of the time. The skewness value indicates that the cases are clustered toward the right (-0.422). The kurtosis value is positive and indicates a distribution which is peaked toward the middle.

The reading behaviour factor indicates measures of central tendency that are very close to each other (20.9 -21.0), indicating that there are not many outlier scores and that the number of high and low scores is balanced. The minimum score is 9 and the maximum score is 30 with a range of 21. The mean of 20.9 indicates that the majority of the students in the sample had high scores on this scale. The measures of dispersion for the reading behaviour factor indicate a standard deviation of 4.3 points around the mean (20.9). The interquartile range is 6 and indicates that the middle 50% of the sample lies within a range of 6 points. The standard error is 0.15 and suggests that the mean will fall within scores ranging between 20.6 and 21.2, 95% of the time. The skewness value indicates that the cases are clustered toward the right (-0.132). The kurtosis value is negative and indicates a distribution which is flattened toward the middle.

## 5.6. TEST OF NORMALITY

The Kolmogorov-Smirnov and Shapiro-Wilk statistics are used to test for normality of the factors (Pallant, 2007). Test of normality can also be achieved through a graphical representation of the peakedness of a distribution (kurtosis) and the skewness of a distribution (Tabachnick & Fidell, 2005, p. 79). These outputs were achieved with the descriptive statistics of the factors and indicated that all the factors were skewed, either positive or negative and all had some form of kurtosis, either positive or negative. The indication is that the factors are not normally distributed. Additional tests were conducted to determine normality of the factors with the Kolmogorov-Smirnov and Shapiro-Wilk statistics (refer to Table 5.11.).

**Table 5.11. Tests for normality of the factors**

Factors	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Achievement motivation	0.046	765	0.001	0.985	765	0.000
Learning-efficacy	0.049	790	0.000	0.994	790	0.004
Goal orientation	0.077	764	0.000	0.988	764	0.000
Integration and support	0.071	789	0.000	0.987	789	0.000
Reading behaviour	0.073	801	0.000	0.987	801	0.000

Tests for normality of the factors, according to Kolmogorov-Smirnov and Shapiro-Wilk statistics, indicated a violation of the assumption of normality (SPSS.V17 *Explore* function). Significance was reached by both the Kolmogorov-Smirnov and Shapiro-Wilk test and therefore the hypothesis that the factors are normally distributed should be

discarded (Field, 2005, p. 94). The results for achievement motivation orientation is  $df(765) = 0.05$ ,  $p = 0.001$ , learning-efficacy is  $df(790) = 0.05$ ,  $p < 0.001$ , goal orientation is  $df(764) = 0.08$ ,  $p < 0.001$ , integration and support is  $df(789) = 0.07$ ,  $p < 0.001$ , and reading behaviour is  $df(801) = 0.07$ ,  $p < 0.001$ . The statistics indicated that none of the five factors of the Academic Readiness Questionnaire were normally distributed, which according to Pallant (2007) and Field (2005) is common in large samples. The result of the descriptive statistics also confirmed that the scores from the factors were skewed toward the right or the left and the mean for each of the factor indicated that most of the students scored high on each of the five factors. Tests for normality are important because a normal distribution is usually necessary for most inferential analyses (Tabachnick & Fidell, 2005).

#### **5.7. SPEARMAN CORRELATION COEFFICIENTS**

Spearman correlation coefficients between the five factors were used because the factors were not normally distributed, as indicated by the Kolmogorov-Smirnov and Shapiro-Wilk statistics (see Table 5.12. below).

**Table 5.12. Spearman correlation coefficients between the five factors**

Factor	Achievement motivation orientation	Learning- efficacy	Goal orientation	Integration and support	Reading behaviour
Achievement motivation orientation	1.000				
Learning- efficacy	0.489(**)	1.000			
Goal orientation	0.500(**)	0.319(**)	1.000		
Integration and support	0.194(**)	0.404(**)	0.152(**)	1.000	
Reading behaviour	0.311(**)	0.220(**)	0.200(**)	-0.044	1.000

\*\* Correlation is significant at the  $p < 0.01$  level (2-tailed).

The Spearman correlation coefficients between the factors were not particularly high, ranging from low (-0.04) to average (0.50). It is important that the factors are not highly correlated with each other in order to avoid multicollinearity (Tabachnick & Fidell, 2007, p. 88). According to Tabachnick and Fidell (2007) the correlation coefficient should not exceed 0.90, otherwise some of the factors become redundant in an analysis and contribute to Type I and II errors. The highest correlations occurred between goal orientation and achievement motivation orientation, and between learning-efficacy and achievement motivation orientation. In both cases the correlations were positive, indicating higher scores on the one factor are associated with higher scores on the other factor. There was not much difference between the Pearson and Spearman correlation coefficients, indicating that the large sample size compensates for the lack of normality (Pallant, 2007).



## 5.8. CROSS-TABULATIONS

Cross-tabulations are used to compare groups and to explore the relationships of variables as part of a multiway frequency analysis. Significance was determined by the Chi-square 'goodness-of-fit' analysis.

**Table 5.13. Cross-tabulation of enrolment status and academic success**

Enrolment status		Academic success			Total
		<50%	50<100%	100% +	
Probation	Count	15	2	1	18
	% within enrolment status	83.3%	11.1%	5.6%	100.0%
Faculty discontinuation	Count	25	0	0	25
	% within enrolment status	100.0%	.0%	.0%	100.0%
Voluntary withdrawal	Count	44	7	2	53
	% within enrolment status	83.0%	13.2%	3.8%	100.0%
Persisting to second year	Count	63	415	253	731
	% within enrolment status	8.6%	56.8%	34.6%	100.0%
Total	Count	147	424	256	827
	% of Total	17.8%	51.3%	31.0%	100.0%

Significant at  $p < .001$  (Pearson's Chi-Square Tests)

According to Table 5.13., the cross-tabulation indicates a significant relationship between academic success and enrolment status. Students who find themselves in the risk categories of enrolment status, namely on probation, faculty discontinuation and voluntary withdrawal are highly concentrated in the poor academic success column (less than 50% credits passed). The students who persist to second year are mostly concentrated in the average academic success column (passing between 50% and 99%

of their credits) and to a lesser extent in the high academic success column (passing 100% and more of the credits).

The relationship between enrolment status and academic achievement is highly significant with  $p < 0.001$ . Students with better academic achievement are more likely to persist to the second year and are less at risk for withdrawal or faculty discontinuations. Research in Astin (1975, p. 31) indicate that students who withdraw and stop-out show similar patterns of academic high school achievement as those who persist. This pattern does however not hold for withdrawal profiles in a South African university. The relationship between probation, faculty discontinuation and withdrawal with poor academic achievement was expected. Students who are on academic probation or are discontinued by the faculty have poor academic achievement. Students who withdraw voluntarily are usually not motivated to perform academically and consequently have poor academic achievement.

The cross-tabulations from the multiway frequency analysis are summarised in Tables 5.14. and 5.17. The significant variables explaining risk for failure were subsequently highlighted with additional cross-tabulations to show the relationship between those categorised variables (refer to Tables 5.15., 5.16., 5.18., 5.19. and 5.20.).

**Table 5.14. Cross-tabulations of the independent variables with risk for failure**

		Independent variables	Risk for failure
ARQ	Motivation orientation	Achievement motivation orientation	Low score is associated with risk
		Learning-efficacy	Low score is associated with risk
		Goal orientation	Low score is associated with risk
	Support and reading	Integration/support	Low and high score is associated with risk
		Reading behaviour	High score is associated with risk
Biographical information		M-score***	Low score is associated with risk
		Parental education (UP)	No difference between groups
		Housing	Private residence is associated with risk
		Race language***	No difference between groups
		Gender	No difference between groups
		School location	Other provinces is associated with risk

Significance at  $p < 0.05^{***}$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$

Table 5.14 provides a descriptive analysis of the independent variables with the dependent variable, namely risk for failure. Only two independent variables were statistically significant on the Chi-square test of independence from a maximum likelihood analysis of variance. These independent variables were 'race language' and 'M-score' and will be presented in the following two cross-tabulation tables.



**Table 5.15. Cross-tabulation of risk for failure and race language**

<b>Race language</b>		<b>Fail</b>	<b>Pass</b>	<b>Total</b>
African	Count	92	42	134
	% within race	68.66	31.34	22.30
Afrikaans	Count	264	121	385
	% within race	68.57	31.43	64.06
English	Count	57	25	82
	% within race	69.51	30.49	13.64
Total	Count	413	188	601
	% of total	68.72	31.28	100.00

An interaction effect occurred between race, home language and preferred language of tuition and it was decided to collapse the three variables into one independent variable, called 'race language'. The coloured and Indian students have low frequency counts compared to the white and African students in the sample and will be removed during the analysis. From Table 5.15. the three race language groups are African, Afrikaans and English.

Overall, the results show that the majority of students do not pass all the credits that are prescribed by each programme (68.7%). Inversely, approximately a third of the students pass all the credits that are prescribed by the programme (31.3%). The distribution according to race language is skewed toward Afrikaans students (64%). African students make up 22% of the sample and English students 14%. The relationship between race language and risk for failure, indicate no difference between the three race language groups in terms of risk for failure. The percentage of difference within race language is virtually similar at 69% for the three groups.

There seems to be an incongruity with the results because the maximum likelihood of analysis of the multiway frequency analysis reached significance, but there is no difference in risk for failure present between the three race language groups in the cross-tabulations (refer to Table 5.15.). The cross-tabulations should therefore be used descriptively because other factors could lead to this incongruity, which will be discussed in the multiway frequency analysis results.

**Table 5.16. Cross-tabulation of risk for failure and M-score**

M-score		Fail	Pass	Total
Low	Count	129	4	133
	% within M-score	96.99	3.01	22.13
Medium	Count	224	61	285
	% within M-score	78.60	21.40	47.42
High	Count	60	123	183
	% within M-score	32.79	67.21	30.45
Total	Count	413	188	601
	% of total	68.72	31.28	100.00

The cross-tabulation of risk for failure and M-score indicates a large difference between the M-score category and academic achievement. From Table 5.16. it is apparent that 129 students who are in the fail category have low M-scores (97%) and only four students in the low M-score category are able to pass all the credits that are prescribed by the programme (3%). Students with medium M-scores have a greater chance of passing, compared to the low M-score students. Roughly about 21% of the students in

the medium M-score category passed all the prescribed credits and 79% failed and are in the risk category. Students from the high M-score category have the greatest chance of passing, if compared to students with a medium or low M-score. Roughly about 67% of students in the high M-score category pass all the credits prescribed by the programme. Inversely, 33% of the students in the high M-score category did not pass all the prescribed by the programme credits.

**Table 5.17. Cross-tabulations of the independent variables with risk for withdrawal**

		Independent variables	Risk for withdrawal
ARQ	Motivation orientation	Achievement motivation orientation	Medium score is associated with risk
		Learning-efficacy	Medium score is associated with risk
		Goal orientation	Low score is associated with risk
	Support and reading	Integration/support	High score is associated with risk
		Reading behaviour	Medium score is associated with risk
Biographical information		M-score***	Low score is associated with risk
		Parental education (UP)	Parental education at the University of Pretoria is associated with risk
		Housing	No association
		Race language***	Afrikaans students are associated with risk
		Gender	Male students are associated with risk
		School location	Gauteng province schools are associated with risk
		Credits registered***	Ratio of less than 1 credits registered is associated with risk

Significance at  $p < 0.05^*$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$

From Table 5.17., the cross-tabulation results show the profile of a student at risk for withdrawal. Four independent variables were statistically significant on the Chi-square test of independence from a maximum likelihood analysis of variance. These independent variables were 'race language', 'M-score', and 'credits registered'. The variables will be presented in the following cross-tabulation tables.

**Table 5.18. Cross-tabulation of risk for withdrawal and race language**

Race		Withdraw	Persist	Total
African	Count	4	130	134
	% within race	2.99	97.01	22.30
Afrikaans	Count	56	329	385
	% within race	14.55	85.45	64.06
English	Count	11	71	82
	% within race	13.41	86.59	13.64
Total	Count	71	530	601
	% of total	11.81	88.19	100.00

Overall from Table 5.18., irrespective of race language, the students in this sample were more likely to persist to the second academic year (88%) than to withdraw from their studies, voluntarily or involuntarily (12%). In terms of the relationship between race language and risk for withdrawal, the Afrikaans students have the greatest risk for withdrawal (14.6%) compared to African (3%) and English (13%) students in the sample. The African students in this sample have the lowest risk for withdrawal (3%) and the highest percentage of students progressing to the second academic year (97%). The difference between Afrikaans and English students who withdrew from their studies is marginal and show similar frequencies.



**Table 5.19. Cross-tabulation of risk for withdrawal and M-score**

<b>M-score</b>		<b>Withdraw</b>	<b>Persist</b>	<b>Total</b>
Low	Count	32	101	133
	% within M-score	24.06	75.94	22.13
Medium	Count	33	252	285
	% within M-score	11.58	88.42	47.42
High	Count	6	177	183
	% within M-score	3.28	96.72	30.45
Total	Count	71	530	601
	% of total	11.81	88.19	100.00

The results in Table 5.19. show that students in the high M-score category are the least likely to be at risk for withdrawal. Roughly about 97% of students in the high M-score category persist and 3% of these students withdraw. Roughly about 12% of students in the medium M-score category withdraw from their studies and about 24% of students in the low M-score category withdraw from their studies. There is roughly a 20% difference between the low and high M-score categories.



**Table 5.20. Cross-tabulation of risk for withdrawal and credits registered**

Credits		Withdraw	Persist	Total
Less than 1	Count	44	149	193
	% within credits	22.80	77.20	32.11
Equal to 1	Count	4	213	217
	% within credits	1.84	98.16	36.11
More than 1	Count	23	168	191
	% within credits	12.04	87.96	31.78
Total	Count	71	530	601
	% of total	11.81	88.19	100.00

Overall, the results from Table 5.20. show an almost equal frequency distribution among credit registered categories (less, equal or more credits registered as prescribed by the programme). The results in Table 5.20. indicate that students who registered for less than the prescribed number of credits have the highest percentage of students that withdraw from their studies (23%). Roughly about 12% of the students that registered for more credits than was prescribed by the programme have withdrawn from their studies. Only 2% of the students that registered for the prescribed number of credits withdrew from their studies. The students that register for the equal number of credits that are prescribed by the programme have the least risk for withdrawal, while students registering for fewer credits are most at risk for withdrawal.

## 5.9. RISK FOR FAILURE PREDICTION MODEL

### 5.9.1. Multiway Frequency Analysis

A multiway frequency analysis was performed with the SAS CATMOD procedure. Multiway frequency analysis is usually used for model building and according to Tabachnick and Fidell (2007) the SAS CATMOD procedure provides separate tests for each effect in the model. The partial effects causal model is based on the maximum likelihood analysis of variance.

Based on Appendix Table B.5., the following observations regarding the maximum likelihood estimates for risk for failure can be made:

- Race language, M-score and reading behaviour reached significance.
- Race language indicated a significant difference between African and English students and between Afrikaans and English students. English students were used as the reference group.
- M-score indicated a significant difference between a low M-score and a high M-score, but no significant difference between a medium M-score and a high M-score. A high M-score was used as the reference category.
- Reading behaviour indicated a significant difference between a low reading behaviour score and a high reading behaviour score, but no significant difference between a medium reading behaviour score and a high reading behaviour M-score. A high reading behaviour score was used as the reference category.

Table 5.21. displays the category log odds, which indicates the likelihood of a student being academically successful.



**Table 5.21. Multiway frequency analysis odds index for risk for failure**

Category	n	Odds index	Estimated odds
<b>Mean</b>	601	0.294	(Mean odds × category odds)
Race language*			
• African	134	2.245	0.66
• Afrikaans	385	0.639	0.18
• English	82	0.697	0.20
M-score*			
• Low	133	0.089	0.03
• Medium	285	1.011	0.30
• High	183	11.14	3.34
Gender			
• Male	225	1.268	0.37
• Female	376	0.789	0.23
Parental education			
• Parent/s has/have a degree at UP	160	0.932	0.27
• First generation student to UP	441	1.073	0.30
Distance of school			
• Pretoria CBD	247	1.070	0.30
• Gauteng province	129	1.360	0.40
• Other provinces	225	0.687	0.20
Housing			
• UP residence	211	0.996	0.29
• Private residence	390	1.004	0.30
Achievement motivation orientation			
• Low	187	0.903	0.26
• Medium	196	1.100	0.32
• High	218	1.007	0.30



Learning-efficacy			
• Low	183	1.296	0.38
• Medium	188	0.792	0.23
• High	230	0.974	0.29
Goal orientation			
• Low	185	0.830	0.23
• Medium	198	1.081	0.30
• High	218	1.115	0.34
Integration and support			
• Low	164	0.880	0.26
• Medium	227	1.252	0.37
• High	210	0.907	0.26
Reading behaviour			
• Low*	190	1.433	0.41
• Medium	184	0.944	0.28
• High	227	0.739	0.22

\* Indicates variables that reached statistical significance

The full model with all the variables included in the model produced a likelihood ratio Chi-square value of 523.91,  $df(562)$ ,  $p = 0.873$ . According to Tabachnick and Fidell (2007), a good model has a non-significant  $G^2$ . The likelihood ratio Chi-square value did not reach significance and the difference between the observed and expected frequencies therefore indicates the model to be satisfactory. The maximum likelihood computations also converged with an intercept Chi-square of (1) = 30.24,  $p < 0.001$ .

According to the SAS CATMOD model, students are more likely to fail than to pass the programme credits (0.29), thus more than two thirds of the students are at risk for failure

(refer to Table 5.21.). Of the independent variables in the model, race language, M-score, and reading behaviour were statistically significant.

Parameter estimates are usually used to determine the relative strength of effects (Tanachnick & Fidell, 2007, p. 902). The low M-score category has the relative highest effect in the model with a parameter estimate of -2.4216. A low M-score thus has the largest effect on risk for failure. The second largest effect is for African students with a parameter estimate of 0.8088.

The estimated odds of a variable can be determined by multiplying the odds of each category in the model with the mean odds. Using the mean odds as base, the following odds for each factor/variable was calculated:

- **Race language:** African students are 2.25 times the mean odds likely to be successful academically (estimated odds of 0.66), even if they have been adjusted for other variables. The estimated odds of Afrikaans students and English students to pass are 0.18 and 0.20 respectively. In terms of race language, both Afrikaans and English students, all else being equal, are at risk for failure.
- **M-score:** Students in the high M-score category are 11 times the mean odds likely to pass (estimated odds of 3.3). Students in the average M-score category are at the baseline or average of the group. Students in the low M-score group, all else being equal, are extremely at risk for failure (estimated odds of 0.03).
- **Gender:** Male students tended to have higher odds of success (estimated odds of 0.37) and female students have lower odds of success (estimated odds of 0.23). Female students are therefore more at risk for failure.
- **Parental education:** Students whose parents were never enrolled for a tertiary qualification at the University of Pretoria (estimated odds of 0.30) are less at risk for failure than students whose parents have enrolled for a tertiary education at the University of Pretoria (odds of 0.27). This variable measures if a student is first-generation to the University of Pretoria and it could therefore imply that the

remainder of students are either real first-generation students or that their parents studied at another institution.

- **Distance from school:** Students who attended schools in Gauteng (estimated odds of 0.40) and the Pretoria CBD (estimated odds of 0.30) are more likely to pass. Students who attended school from other provinces are more at risk for failure (estimated odds of 0.20). The distance of the school from the university is used to indicate the distance between the student and his/her support base.
- **Housing:** No difference in risk for failure could be determined for students who live in private dwelling or university residence. Both are at the mean odds.
- **Achievement motivation orientation:** A student who has an average achievement motivation score (estimated odds of 0.32) is more likely to pass than students with either a low or high achievement motivation score, all else being equal.
- **Learning-efficacy:** Students with a low learning-efficacy score are more likely to pass (estimated odds of 0.38). Cross-tabulations indicate that African students tended to cluster in the lower category on the learning-efficacy scale.
- **Goal orientation:** Students who are able to plan their study time and expend a lot of effort into their work are more likely to pass (estimated odds of 0.34). Interaction effects occurred between 'goal orientation' and 'race language'. Interaction effects between goal orientation and race language showed significance, but did not show significant results for any of the categorical combinations (see Appendix Table B.20.).
- **Integration and support:** Students who scored average on this scale are more likely to pass (estimated odds of 0.37). Integration and support show interaction effects with learning-efficacy and goal orientation. The statistically significant interaction effects between 'integration and support' and 'learning-efficacy', indicate that an average score on both the variables decreases the category and overall odds by 0.57 (see Appendix Table B.18.). There is no clear order or relationship between the other combinations and this hinders clear interpretations. The statistically significant interaction effects between 'integration and support' and 'goal orientation' indicate that a low score on both variables increases the category and overall odds by a factor of 1.81, indicating a negative interaction (low category relationship) contributes the most to academic success in this model (see Appendix Table B.19.).

- **Reading behaviour:** Students who enjoy reading are most at risk for withdrawal (estimated odds of 0.22). Students who have poor reading behaviour are more likely to pass than any of the other students (estimated odds of 0.41).

### 5.9.2. Multiple Regression Analysis

Multiple regressions were used because it indicates the net effects of each variable in a regression equation and thus shows the relative importance of each independent variable. The dependent variable 'academic success' is expressed as a ratio between the number of credits passed and the number of credits registered for (Smit & Owen, 2007). This ratio indicates the degree of academic achievement at university (continuous variable). The minimum is 0 and the maximum score is 1.38, with a standard deviation of 0.28, a mean of 0.76 and the variance is 0.077. The independent variables were either continuous or dichotomous. 'Distance of school' consisted of three categories, namely Pretoria, Gauteng and other provinces. Pretoria and Gauteng were collapsed into one variable called 'Gauteng province' to make 'distance of school' a dichotomous variable. 'Home language' and 'preferred language of tuition' were not added because of its covariance with race.

Standard multiple regressions were used to determine the variance explained in the dependent variable 'academic success'. Missing cases were deleted 'list-wise', meaning that records with any missing data on any of the 12 variables used in the regression were omitted from the analysis. The adjusted  $R^2$  of 0.38 indicate that more than a third of the variance in academic success is explained by the independent variables. This model reached statistical significance with  $F(12) = 32.9$ ,  $p < 0.001$ , indicating that the independent variables in the model are significant predictors of the academic success (see Appendix Table B.7. for the full regression model). The regression analysis tests the linear relationship between each independent variable with the dependent variable after adjusting for the effects of all the other independent variables.

In this model, seven variables explained academic success with statistical significance. M-score, credits registered, goal orientation, and race were highly significant on the  $p$ -value of each variable ( $p < 0.001$ ). Learning-efficacy (-2.1), gender (2.3) and distance of school are significant (-2.0) at the  $p \leq 0.05$  level. The remainder of the variables did not show a linear relationship with academic success and was not statistically significant.

The beta weight (standardised regression coefficient) indicates whether the relationship between the dependent and independent variable is positive or negative, as well as the relative importance of each variable. The variables with the largest beta weight was M-score (0.593), followed by race (0.255), credits registered (0.149), goal orientation (0.131), learning-efficacy (-0.085), gender (0.081) and distance of school (-0.068). By squaring the zero-order correlation, the variance of each variable can be determined. According to the zero-order correlations ( $r$ ) the variance of 40% can be accounted for almost entirely by M-score, with a zero-order correlation of 0.547. The rest of the variance is explained by credits registered (0.162), race (0.122) and goal orientation (0.166) followed by the last of three variables, thus indicating the importance of M-score in the model.

The estimated regression ( $B$ ) coefficient for M-score is 0.034 after controlling other variables. This indicates that a one-unit increase in M-score is associated with higher academic success, with a ratio increase of 0.034. According to the beta weight, academic success will increase by a factor of 0.593 if M-score increases with a unit, thus indicating that an increase in M-score would enhance a student's chance of academic success.

The estimated regression ( $B$ ) coefficient for race is 0.175 after controlling other variables. This indicates that a one-unit change in race (moving from white to African students) is associated with an increase of academic success, with a ratio increase of 0.175. According to the beta weight, an increase of one standard deviation unit in race would increase academic success by 0.255 standard deviation units. The regression indicates that African students have higher academic success than white students.

The estimated regression ( $B$ ) coefficient for credits registered is 0.002 after controlling other variables. This indicates that a one-unit change in credits registered (one-digit increase in the ratio) is associated with an increase of academic success, with a ratio increase of 0.002. According to the beta weight, an increase of one standard deviation unit in credits registered would increase academic success by 0.149 standard deviation units. This indicates that for each credit registered extra a student would increase the standard deviation of academic success by 0.149 standard deviation units, thus indicating that students registering for more credits have more academic success.

The estimated regression ( $B$ ) coefficient for goal orientation is 0.006 after controlling other variables. This indicates that a one-unit change in goal orientation (one digit increase in the scale score) is associated with an increase of academic success, with a ratio increase of 0.006. According to the beta weight, an increase of one standard deviation unit in goal orientation would increase academic success by 0.131 standard deviation units. The scores for goal orientation range between 18 and 55. A score increase from 18 to 19 would increase the standard deviation of academic success by 0.131 standard deviation units, thus indicating that students with higher goal orientation scores are more successful academically.

The estimated regression ( $B$ ) coefficient for learning-efficacy is -0.004 after controlling other variables. This indicates that a one-unit change in learning-efficacy (one digit decrease in the scale score) is associated with an increase of academic success, with a ratio increase of 0.004. According to the beta weight, a decrease of one standard deviation unit in learning-efficacy would increase academic success by 0.085 standard deviation units. Scores range between 29 and 60. A score decrease from 60 to 59 would increase the standard deviation of academic success by 0.085 standard deviation units, suggesting a negative linear relationship between learning-efficacy and academic success.

The estimated regression ( $B$ ) coefficient for gender is 0.047 after controlling other variables. This indicates that a one-unit change in gender (moving from female to male students) is associated with an increase of academic success, with a ratio increase of 0.047. According to the beta weight, an increase of one standard deviation unit in gender would increase academic success by 0.081 standard deviation units. The regression indicates that male students have higher academic success than the female students.

The estimated regression ( $B$ ) coefficient for distance of school is -0.040 after controlling other variables. This indicates that a one-unit change in distance of school (moving from other province to Gauteng province) is associated with a decrease of academic success, with a ratio of 0.040. According to the beta weight, a decrease of one standard deviation unit in distance of school would increase academic success by 0.068 standard deviation units. The regression indicates that students who attended schools closer to the university (Gauteng province) have higher academic success than students who attended school further away from the university (other provinces).

In summary, the multiple regression analysis indicates the following linear relationships with academic success: M-score relates positively to academic success, indicating that students with higher M-scores have more academic success. African students tend to have more academic success than white students. The higher the total number of credits students registered for, the more successful they will be. Students who scored higher on the goal orientation scale will be more successful academically. Students with lower scores on the learning-efficacy scale are more successful, indicating a negative linear relationship. Male students tend to be more successful academically than female students, and students who attend schools closer to the university (Gauteng province) are more successful than students who attend schools from other provinces.

Predicting academic success would be possible by using the  $B$  coefficients in the following equation (refer to Appendix Table B.7.):

Academic success =  $0.034 \cdot \text{M-score} + 0.002 \cdot \text{Credits registered} + 0.047 \cdot \text{Gender} + 0.175 \cdot \text{Race} + 0.006 \cdot \text{Goal orientation} - 0.004 \cdot \text{Learning-efficacy}$ .

#### **5.9.2.1. Multiple regression analysis: white students**

Standard multiple regressions were used to determine the variance explained in the dependent variable 'academic success' for white students (see Appendix Table B.8.). The adjusted  $R^2$  is 0.404, indicating that 40% of the variance is explained by the model for white students. This model reached statistical significance with  $F(11) = 30.8$ ,  $p < 0.001$ . In this model there were six variables that were statistically significant in explaining academic success. The variable with the largest beta weight was M-score (0.631), followed by goal orientation (0.133), credits registered (0.132), learning-efficacy (-0.114), gender (0.102) and parent education (-0.090). According to the zero-order correlations ( $r$ ) the variance of 40% can be accounted for almost entirely by M-score, with a zero-order correlation of 0.601. The rest of the variance is explained by credits registered (0.167) and goal orientation (0.157) followed by the last of four variables.

The estimated regression ( $B$ ) coefficient for M-score is 0.037 after controlling other variables. This indicates that a one unit increase in M-score is associated with higher academic success, with a ratio increase of 0.37. According to the beta weight, an increase of one standard deviation unit in M-score would increase academic success by 0.631 standard deviation units, thus indicating that white students with higher M-scores are more successful academically.

The estimated regression ( $B$ ) coefficient for goal orientation is 0.007 after controlling other variables. This indicates that a one-unit change in goal orientation (one digit increase in the score of the scale) is associated with an increase of academic success, with a ratio increase of 0.007. According to the beta weight, an increase of one standard deviation unit in goal orientation would increase academic success by 0.133 standard deviation units. The scores for goal orientation range between 18 and 55. A score increase from 18 to 19 would increase the standard deviation of academic success by

0.133 standard deviation units, thus indicating that white students with higher goal orientation scores are more successful academically.

The estimated regression ( $B$ ) coefficient for credits registered is 0.002 after controlling other variables. This indicates that a one-unit change in credits registered (one-digit increase in the ratio) is associated with an increase of academic success, with a ratio increase of 0.002. According to the beta weight, an increase of one standard deviation unit in credits registered would increase academic success by 0.132 standard deviation units. This indicates that for each credit registered extra a student would increase the standard deviation of academic success by 0.132 standard deviation units. White students registering for more credits have more academic success.

The estimated regression ( $B$ ) coefficient for learning-efficacy is -0.006 after controlling other variables. This indicates that a one-unit change in learning-efficacy (one digit decrease in the scale score) is associated with an increase of academic success, with a ratio increase of 0.006. According to the beta weight, a decrease of one standard deviation unit in learning-efficacy would increase academic success by 0.114 standard deviation units. Scores range between 29 and 60. A score decrease from 60 to 59 would increase the standard deviation of academic success by 0.114 standard deviation units, suggesting a negative linear relationship between learning-efficacy and academic success.

The estimated regression ( $B$ ) coefficient for gender is 0.061 after controlling other variables. This indicates that a one-unit change in gender (moving from female to male students) is associated with an increase of academic success, with a ratio increase of 0.061. According to the beta weight, an increase of one standard deviation unit in gender would increase academic success by 0.102 standard deviation units. The regression indicates that white male students have higher academic success than white female students.

The estimated regression ( $B$ ) coefficient for parent education at UP is -0.057 after controlling other variables. This indicates that a one-unit change in parent education at UP (moving from parents have a UP degree to UP first-generation students) is associated with an increase of academic success, with a ratio increase of 0.057. According to the beta weight, a decrease of one standard deviation unit in parent education at UP would increase academic success by 0.090 standard deviation units. The regression indicates that students who are first-generation to the University of Pretoria have higher academic success than students whose parents graduated at the University of Pretoria.

#### **5.9.2.2. Multiple regression analysis: African students**

Standard multiple regressions were used to determine the variance explained in the dependent variable 'academic success'. The adjusted  $R^2$  is 0.289, indicating that 29% of the variance is explained by the model for African students (see Appendix Table B.9.). This model reached statistical significance with  $F(11) = 5.9$ ,  $p < 0.001$ . In this model there were three variables that were statistically significant in explaining academic success for African students. The variables with the largest beta weight was M-score (0.463), followed by credits registered (0.203) and parent education at UP (0.175). According to the squared zero-order correlations ( $r$ ) the variance of 29% can be accounted for almost entirely by M-score, with a zero-order correlation of 0.432. The rest of the variance is explained by credits registered (0.303) and parent education at UP (0.093).

The estimated regression ( $B$ ) coefficient for M-score is 0.025 after controlling other variables. This indicates that a one-unit increase in M-score is associated with higher academic success, with a ratio increase of 0.025. According to the beta weight, an increase of one standard deviation unit in M-score would increase academic success by 0.463 standard deviation units, thus indicating that African students with higher M-scores have higher academic success.

The estimated regression ( $B$ ) coefficient for credits registered is 0.002 after controlling for other variables. This indicates that a one-unit change in credits registered (one-digit increase in the score) is associated with an increase of academic success, with a ratio increase of 0.002. According to the beta weight, an increase of one standard deviation unit in credits registered would increase Academic success by 0.203 standard deviation units. This indicates that for each credit registered extra an African student will increase the standard deviation of academic success by 0.203 standard deviation units.

The estimated regression ( $B$ ) coefficient for parent education at UP is 0.129 after controlling other variables. This indicates that a one-unit change in parent education at UP (moving from UP first-generation students to Parents have a UP degree) is associated with an increase of academic success, with a ratio increase of 0.129. According to the beta weight, an increase of one standard deviation unit in parent education at UP would increase academic success by 0.175 standard deviation units. The regression indicates that students whose parents graduated at the University of Pretoria have higher academic success than students who are first generation to the University of Pretoria.

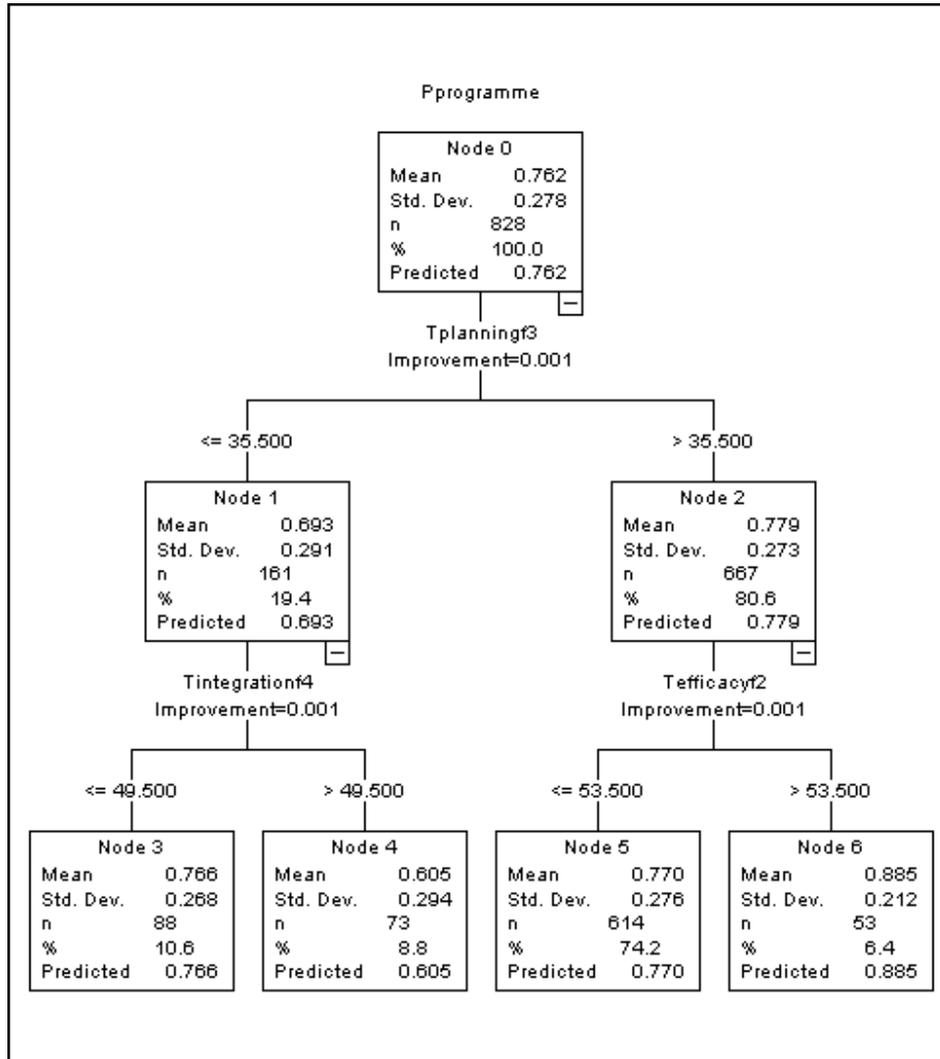
### **5.9.3. Tree-analysis of the Academic Readiness Questionnaire Factors**

Classification tree-analysis (CRT) was performed to determine the contribution of the factors of the Academic Readiness Questionnaire with academic success. The tree-analysis indicated that only three of the five factors from the Academic Readiness Questionnaire are able to predict academic success. According to the analysis, 76% of the sample was predicted correctly. The primary factor that predicted academic success was goal orientation (planning in the model).

Students with goal orientation raw scores greater than 35.5 almost have a 10% higher chance of being successful than students with a score lower or equal to 35.5. Of the students who have high goal orientation scores, the students with learning-efficacy scores greater than 53.5 are more than 10% likely to achieve academically than

students with scores equal to or lower than 53.5. The results thus indicate that students who believe they are goal oriented by planning their learning tasks and who believe they have the ability to reach their academic goals are more likely to be successful academically than students who have the same goal orientation scores but have lower efficacy expectations of reaching their academic goals.

Of the students with lower goal orientation scores, the students who have integration and support scores equal to or lower than 49.5 are more than 15% likely to be successful academically than students who have scores greater than 49.5. The results indicate that students who do not plan their study time (goal orientation) and who place too much emphasis on support from the institution, family and social indicators are less likely to be successful than students with low goal orientation scores but need less support from the institution and the environment.



**Figure 5.1. Tree-analysis (CRT) of Academic Readiness Questionnaire Factors**

#### 5.9.4. Tree-analysis of the Academic Readiness Questionnaire Items

Tree-analysis indicates that a number of items from the Academic Readiness Questionnaire are able to predict academic success. According to the analysis, 76% of the sample was correctly predicted. The item that predicted academic success the best was item 13: *I expect to have a harder time to perform academically than most students here*. Students with a low score on the item did not expect to have a harder time to perform academically.

This item was reverse scored in the analysis and thus in the tree-analysis those students who score higher than 3 on this item were academically more successful (79.9%) than students who scored equal to or below 3 (69.7%). This means that students who believe that they do not expect to have a hard time to perform academically, actually performed better than those who expect to have a hard time to perform academically.

Item 52 was related to the students who scored equal to or less than 3 on item 13. Regarding item 52: *If I run into problems at university, I have someone who would help me*, students who feel that they have a hard time to perform academically and who think they have the necessary support when they run into problems ( $>4$ ) are less successful academically (57.9%) than those who believe they do not have sufficient support ( $\leq 4$ ) (72.8%). This could indicate that students who have lower learning-efficacy beliefs and who have high expectations of support (external attribution style) or do not take much personal responsibility have lower academic performance.

Higher scores on item 13 are subsequently informed by item 23 and item 24 (Item 23: *I am as skilled academically as the best students here*; Item 24: *I enjoy working on complex, intellectually demanding problems*). The students who do not expect to have a hard time to perform academically (Item 13) believe they are skilled academically as the best students (83.6%) and enjoy working on complex and intellectually demanding problems (86.5%). This is in contrast to students who believe they are not as skilled as the best students (72.2%) and do not like working on complex and intellectually demanding problems (77.4%).

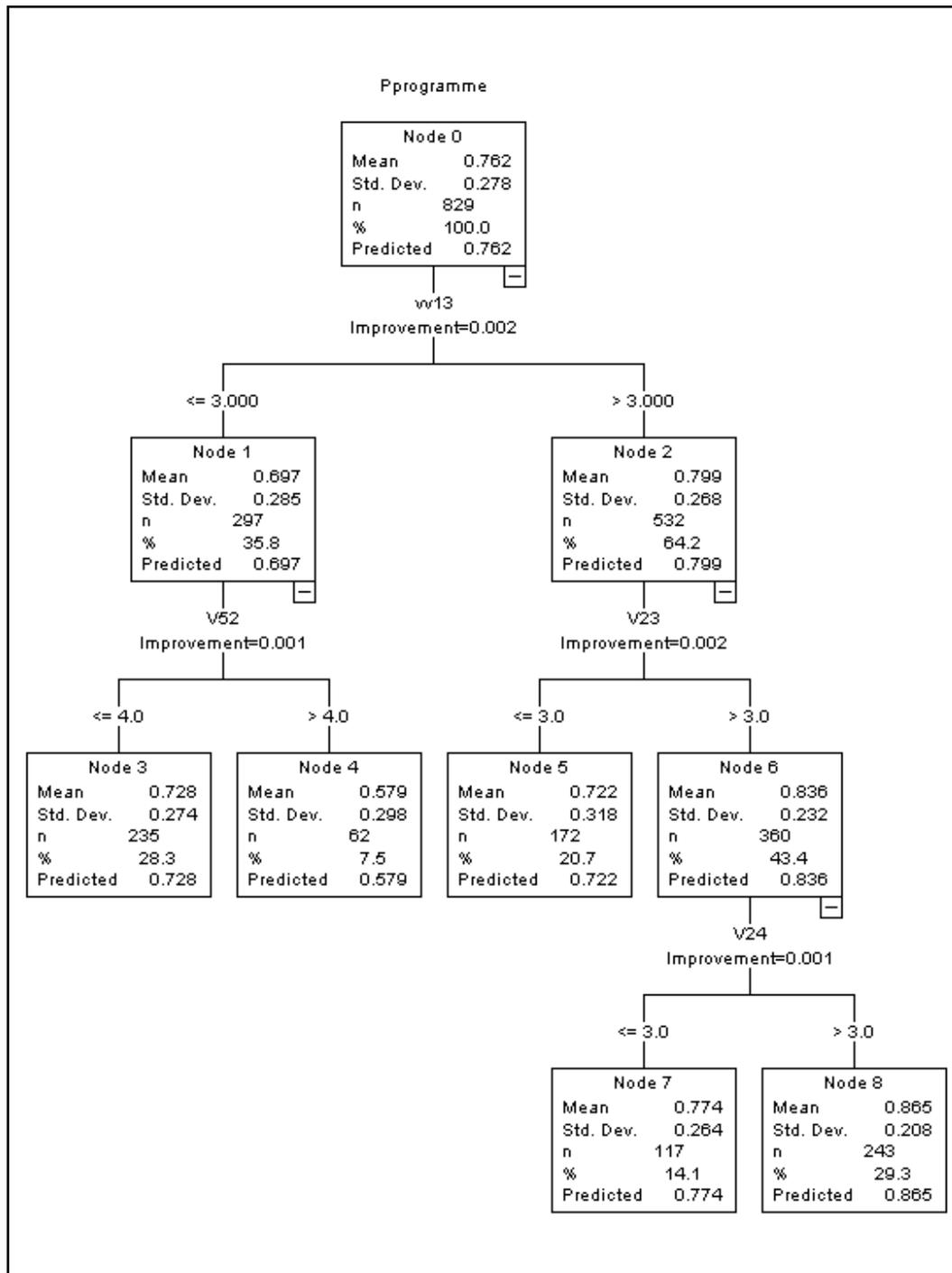


Figure 5.2. Tree-analysis (CRT) of Academic Readiness Questionnaire Items

## 5.10. RISK FOR WITHDRAWAL PREDICTION MODEL

The multiway frequency analysis performs categorical data modelling that can be represented by a contingency table. For this procedure, all the variables were placed in categories and a multiway frequency analysis was performed with  $n = 601$ . Observations with missing values for any variable listed in the model were omitted from the analysis. The maximum likelihood estimates for risk for withdrawal are shown in Appendix Table B.6.

Based on Appendix Table B.6., the following observations regarding the maximum likelihood estimates for risk for failure can be made:

- Race language, M-score, credits registered and reading behaviour reached significance.
- Race language indicated a significant difference between African and English students and between Afrikaans and English students. English students were used as the reference group.
- M-score indicated a significant difference between a low M-score and a high M-score, but no significant difference between a medium M-score and a high M-score. A high M-score was used as the reference category.
- Credits registered indicated a significant difference between students with a low credit ration and a high credit ratio and between a one credit ratio and a high credit ratio. A high credit ratio was used as the reference category.
- Reading behaviour indicated a significant difference between a medium reading behaviour score and a high reading behaviour score, but no significant difference between a low reading behaviour score and a high reading behaviour M-score. A high reading behaviour score was used as the reference category.

### 5.10.1. Multiway Frequency Analysis

The model indicated the strength of association between dependent and independent variables by way of likelihood or odds. For example, when three students from the three

categories in Race language, namely; African, Afrikaans and English are compared with one another and these three students are identical in all the other variables, the African student will be 3.8 times the mean odds likely to persist to the second year.

**Table 5.22. Multiway frequency analysis odds index for risk for withdrawal**

Category	<i>n</i>	Odds index	Estimated odds
<b>Mean</b>	601	15.07	(Mean odds × category odds)
Race language*			
• African	134	3.844	57.93
• Afrikaans	385	0.491	7.69
• English	82	0.529	7.97
M-score*			
• Low	133	0.423	6.37
• Medium	285	0.967	14.57
• High	183	2.447	36.88
Credits registered*			
• <1	193	0.436	6.57
• =1	217	3.145	47.40
• >1	191	0.729	10.99
Gender			
• Male	225	0.888	13.38
• Female	376	1.126	16.97
Parental education			
• Parent(s) has/have a degree	160	0.827	12.46
• First-generation student	441	1.209	18.22
Distance of school			
• Pretoria CBD	247	1.213	18.28
• Gauteng province	129	1.012	15.25



• Other provinces	225	0.814	12.27
Housing			
• UP residence	211	0.844	12.72
• Private residence	390	1.185	21.16
Achievement motivation			
• Low	187	1.234	18.60
• Medium	196	0.926	13.95
• High	218	0.875	13.19
Learning-efficacy			
• Low	183	1.158	17.45
• Medium	188	0.840	12.66
• High	230	1.028	15.49
Goal orientation			
• Low	185	0.824	12.42
• Medium	198	0.966	14.56
• High	218	1.256	18.93
Integration and support			
• Low	164	1.062	16.00
• Medium	227	1.042	15.70
• High	210	0.904	13.62
Reading behaviour			
• Low	190	1.291	19.46
• Medium*	184	0.662	9.98
• High	227	1.169	17.62

\* Indicates variables that reached statistical significance

According to the multiway frequency analyses, students are 15 times more likely to persist to the second year, thus one in 15 students are at risk for withdrawal (Table 5.22.). Of the independent variables in the model, race language, M-score, credits registered and reading behaviour were statistically significant. Interaction effects from a

hierarchical analysis were unstable due to the low frequency counts in some of the table cells and will not be discussed here.

According to the model, and using the mean odds as a baseline:

- **Race language:** African students are 3.8 times the model average likely to persist to the second year. The estimated odds of persisting for African students are 57, even if they have been adjusted for other variables. The estimated odds of persisting for Afrikaans students in the model are 7.69 and English students 7.97. In race language, both Afrikaans and English students, all else being equal, are at risk for withdrawal.
- **M-score:** Students in the high M-score category are 2.45 times more likely to persist to the second year, thus with an odds of 36.7 to persist. Students in the average M-score category are almost at the baseline or average of the group. Students in the low M-score group, all else being equal, are at risk for withdrawal.
- **Credit registered:** Students who registered for more credits than prescribed and students who register for less than the credits prescribed are at risk for withdrawal, all else being equal. Students who register for fewer credits than is prescribed are most at risk for withdrawal with an estimated odds of 0.657. Students registered for exactly the prescribed number of credits (a ratio of one) have an estimated odds of 47.43 to persist to the second year.
- **Gender:** Female students tended to have higher odds of persisting (estimated odds of 16.97) and male students have higher odds of withdrawing (estimated odds of 13.38).
- **Parental education:** Students who are first-generation students to the University of Pretoria are more likely to persist (estimated odds of 18.22) than students whose parent(s) has/have graduated from the University of Pretoria.
- **Distance of school:** Students who attended schools in the Pretoria CBD are more likely to persist to the second year than students who attended from schools in the Gauteng province or schools in other provinces. The proposition is that the further the distance of a school, the more at risk a student is for withdrawal.
- **Housing:** Students who live in private residences are more likely to persist to second year and living in university residences places a student at more risk for withdrawal.

- **Achievement motivation orientation:** A student who has a low achievement motivation orientation is more likely to persist to the second year (estimated odds of 18.6) than students with either a medium or high achievement motivation, all else being equal.
- **Learning-efficacy:** Students with a low learning-efficacy score are more likely to persist to the second year (estimated odds of 17.45).
- **Goal orientation:** Students with a high goal orientation score are more likely to persist to the second year (estimated odds of 18.93).
- **Integration and support:** Students from all three categories are virtually at baseline (1), thus performing at the model average of 15.
- **Reading behaviour:** Students who are average leisure readers are most at risk for withdrawal (estimated odds of 9.98). Students who do not read that much for leisure are actually more likely to persist to the second year than any of the students in the low or high M-score categories.

### 5.10.2. Binary Logistic Regression Analysis

A binary logistic regression analysis was performed to assess the impact of a number of factors on the likelihood of risk for withdrawal. Logistic regression analysis allows one to assess how well a set of predictor variables predicts or explains the dependent variable. It gives an indication of the adequacy of a model by assessing 'goodness-of-fit'. It also provides an indication of the relative importance of each predictor variable or the interaction among the variables (Pallant, 2007).

The model contained 12 independent variables (race, M-score, parent education at UP, gender, residence, school location, credits registered, achievement motivation, learning-efficacy, goal orientation, integration and support and reading behaviour).

From the logistic regression analysis ( $n = 619$ ), only three of the independent variables made a unique statistical significant contribution to the model (race, M-score and credits registered). Goodness-of-fit is measured using the Hosmer-Lemeshow statistic where a

good model gives a non-significant Chi-square result (Tabachnick & Fidell, 2007, p. 459).

The full model containing all predictor variables was statistically non-significant using the Hosmer-Lemeshow statistic with  $p = 0.918$ . The model as a whole explained 23.3% (Nagelkerke  $R^2$ ) of the variance in risk for withdrawal. Classification for the withdrawal group was very low, with 12.2% of withdrawing students and 99.3% of persisting students correctly predicted, for an overall success rate of 88.9%.

Logistic regression analysis is thus unable to predict risk for withdrawal, but is accurate in predicting who will persist to the second year. Table 5.23. show regression coefficients, Wald statistics, odds ratios, and 95% confidence intervals for odds ratios for each of the twelve predictors.

**Table 5.23. Logistic regression predicting likelihood of risk for withdrawal**

Factor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Odds ratio	95.0% C.I. for EXP(B)	
							Lower	Upper
Race(1)***	-2.238	0.587	14.531	1	0.000	0.107	0.034	0.337
Credits registered*	-0.015	0.006	5.444	1	0.020	0.986	0.974	0.998
M-score***	-0.204	0.034	36.823	1	0.000	0.816	0.764	0.871
Gender(1)	-0.165	0.306	0.292	1	0.589	0.848	0.465	1.544
Residence(1)	0.156	0.293	0.282	1	0.596	1.168	0.658	2.075
Achievement motivation	-0.020	0.028	0.512	1	0.474	0.980	0.927	1.036
Learning-efficacy	0.050	0.034	2.178	1	0.140	1.051	0.984	1.123
Goal orientation	-0.012	0.027	0.208	1	0.648	0.988	0.937	1.041
Integration/support	0.018	0.031	0.341	1	0.559	1.018	0.958	1.082
Reading behaviour	0.036	0.038	0.890	1	0.345	1.036	0.962	1.116
Distance of school	0.256	0.297	0.743	1	0.389	1.292	0.721	2.315
Parent education at UP	0.423	0.298	2.013	1	0.156	1.526	0.851	2.736
Constant	2.145	1.987	1.166	1	0.280	8.543		

Significance at  $p \leq 0.05^*$ ,  $p \leq 0.01^{**}$ ,  $p \leq 0.001^{***}$

As shown in Table 5.23., only three of the independent variables made a unique statistical significant contribution to the model, namely race, M-score and credits registered. The Wald statistic indicates that M-score has the greatest effect size (36.8), followed by race (14.5) and credits registered (5.4).

The odds ratio of 0.107 for race is less than 1, indicating that for each unit change in the predictor, thus moving from white to African the odds of being at risk for withdrawal is 0.11. The odds for African students to be at risk for withdrawal is decreased by almost 90%. From the cross-tabulations of the multiway frequency analysis, only four African students withdrew from their studies, while 70 white students withdrew from their studies.

The odds ratio of 0.816 for M-score was less than 1, indicating that for each change in unit, the odds of being at risk for withdrawal is 0.82. Thus, as students' M-scores increase by one unit, the odds for withdrawal are decreased by 18%. Generally speaking, the students with a low M-score have a higher probability to withdraw from their studies.

The odds ratio of 0.986 for credits registered was also less than 1, indicating that for each change in unit, the odds of being at risk for withdrawal is 0.99. The odds are virtually at 1, indicating that the effect size is virtually zero. For completeness, as the number of credits registered increase, the odds for withdrawal is decreased by 1%. Cross-tabulations between the variables indicate that students who register for the prescribed number of credits are less at risk for withdrawal than students who register for more or less than the prescribed number of credits. Students who are more realistic in choosing their credit load are therefore less at risk for withdrawal.

### **5.10.3. Tree-analysis (CHAID)**

A classification tree-analysis (CHAID) was conducted with the binary dependent variable 'withdraw and persist'. The independent variables in the analysis were the items from the Academic Readiness Questionnaire. The overall prediction of the dependent variable, risk for withdrawal when analysing the items was only 11.6%. It is not worth mentioning the items that contributed to the prediction of risk for withdrawal due to its poor predictability of risk for withdrawal. It should however be noted that when separated from

the biographical variables, none of the five factors from the ARQ were able to predict risk for withdrawal.

The various analyses that were made to determine the predictability of risk for withdrawal was only marginally successful and it was decided to conduct telephonic interviews with the students who discontinued their studies to determine the salient factors that contribute to withdrawal. The 'exit interviews' would provide students an opportunity to voice their reasons for withdrawal. The exit interviews become necessary because none of the factors or items from the ARQ were able to predict risk for withdrawal and the interviews would provide additional information that could be assessed as entry characteristics.

#### **5.11. EXIT INTERVIEWS**

At the University of Pretoria, the withdrawal rate of the first-year entering student population typically measured up to the end of the first-year exams is 8.6% (BIRAP, 2008). This percentage excludes institutional withdrawal due to being absent from exams, exclusions from exams (due to poor academic performance) and students who do not pass the supplementary exams.



**Table 5.24. Summary of institution-wide first-year student discontinuation (2008 cohort)**

UNDERGRADUATES	Number discontinued				
	White	Coloured	Asian	African	Total
First-time entrants (Full-time)	451	10	22	138	621
% with regard to total enrolled first-time entrants					<b>8.6%</b>
% with regard to enrolled per population group	<b>10.0%</b>	<b>6.2%</b>	<b>7.5%</b>	<b>6.2%</b>	

Source: BIRAP (2008) – Adapted summary of student numbers: 2008

From Table 5.24. it is evident that the majority of students who withdraw from their studies institutionally from all faculties and programmes are white students. Thus, 10% of the white student population have withdrawn from their studies, compared to only 6.2% of the African student population. The results from the Economic and Management Sciences sample correspond well with the overall institutional withdrawal rates, including the distribution in terms of race. BIRAP data for the Faculty of Economic and Management Sciences reveals that 82 students discontinued their studies during the 2008 academic year. The known racial differentiation indicated that 10 students were African, 63 were white students, five students were Indian and four of the students' racial group was unknown. The number of students that completed the Academic Readiness Questionnaire and withdrew from their studies was  $N = 53$ , but only 42 students were available for telephonic interviews (79% of the  $N$ ). From the 42 students that were interviewed only two students were African and 40 students were white. The results from the multiway frequency analysis, logistic regression and the exit interviews are thus highly biased toward the white student sample. All interpretations on these analyses should keep the statistical bias in consideration. A note of confidence in the results are that the trend experienced are consistent with cohort research on withdrawing students over a number of years (Du Plessis et al. 2006; Lemmens, Du Plessis, Rai, De Klerk,

Mitchell, Julie, Barker, & Van Niekerk, 2008; Lemmens, Du Plessis, Roopen, Solomon, Rungasamy, & Reynolds, 2010).

### 5.11.1. Reasons for Withdrawal and Sub-reasons Contributing to Withdrawal

Participants were asked to indicate the reason for withdrawing from their studies and, in addition, they were probed for contributing reasons that influenced their decision to withdraw. Ten broad reasons/categories were identified for withdrawal. During the study it was found that the primary reason participants withdraw from their studies was due to choosing the wrong programme (study choice). The findings by reason/category (Table 5.25.), are summarised in the following sections.

**Table 5.25. Main reason for withdrawal**

Reason from students	Frequency	Percentage
Academic	3	7.1
Study choice	26	61.9
Family responsibilities	3	7.1
Work responsibilities	1	2.4
Health	3	7.1
Financial	2	4.8
Personal	1	2.4
Institutional	2	4.8
Faculty discontinuation	1	2.4
Total	42	100.0

#### **5.11.1.1. Academic reasons**

Academic problems were named by 7.1% of the participants as the main reason for withdrawal. The most prominent reason given was unmanageable workload, which resulted in unexpected poor academic performance. Some participants also mentioned that they felt unprepared for tertiary education from the start. Additional contributing reasons related to study choice, with an uncertainty about the career choice that were 'forced' down as a result of not getting admitted for their first programme choice or being pressured (by parents) into a certain career field. A few personal sub-reasons for discontinuation included academic backlog due to unforeseen circumstances, or social/sport responsibilities.

#### **5.11.1.2. Study choice reasons**

Study choice was the largest main contributing reason, with 61.9% of the participants citing study choice as their main reason for withdrawal. The majority of these participants were uncertain about their choice of career or found that the programme was not interesting, not what they expected it to be, or that they simply did not enjoy the course they enrolled for. Some students commented that the university should communicate better with prospective and current participants. This applies to areas such as programme information, where participants should be better informed about the various programmes available, the core and elective modules that are available for a programme and what these modules entail, as well as the career opportunities that are related to each programme. In addition, prospective students should be better informed on the admission criteria for specific programmes when they are still at high school, in order for them to choose the correct subjects at school.

Contributing reasons are that a few participants were accepted for their first career choice at another tertiary institution (refer to Table 5.26.). Academic reasons contributing to withdrawal were poor academic performance resulting from unsuccessful study methods, clashes in the programme roster or a heavy workload. Financial concerns were also mentioned by some participants, stating that they could not continue due to financial difficulties in the family or needing to work to fund their studies. Personal factors

contributing to their decision were mostly transport and/or residential issues and inability to balance academic and other activities.

#### **5.11.1.3. Family responsibility**

Only 7.1% of the participants indicated family responsibility as the main reason for withdrawal, stating the need to support the family due to death, sickness or financial pressure. Heavy workload, disinterest in the programme and isolation from family were also named as contributing reasons for withdrawal.

#### **5.11.1.4. Work responsibility**

Work responsibility was the main contributor for 2.4% of the participants. Some students accepted a good job opportunity, others needed to work to fund their studies, or worked part-time and found that this impeded their studies.

#### **5.11.1.5. Health reasons**

Health problems caused the discontinuation of 7.1% of the participants. They suffered academic backlog due to physical illness or emotional distress and poor academic performance followed. One participant also mentioned peer pressure as a contributing factor.

#### **5.11.1.6. Financial reasons**

Two students discontinued their studies due to financial reasons, mainly because their funding ran out or the cost associated with studying became too much. The financial needs of their family added to their financial concerns. Under personal concerns, transport and/or residential issues placed further pressure on these participants. Other contributing factors associated with their programme were insufficient material, uncertainty about career choice or disinterest in the course.

#### **5.11.1.7. Personal reasons**

Personal reasons were named as the main reason for withdrawal by 2.4% of the participants. They mentioned an inability to balance academic and other activities, transportation and/or residential problems, inability to adjust to campus life and feeling isolated due to the distance from their family. Academic contributors mentioned were unexpected poor academic performance and insufficient interaction with lecturers. Study choice also influenced their decisions, with uncertainty about programme or career choice and disinterest in the programme. Family problems named were death or illness in the family and financial needs of the family. Financial difficulties (high cost of studies) affected one participant.

#### **5.11.1.8. Institutional problems**

A number of participants indicated institutional concerns as their reason for withdrawal (4.8%). One of the students had a negative academic experience and the other students had difficulty with social/sport responsibilities. Academic reasons that contributed to withdrawal decisions were a clash in the roster and unmanageable workload. A few participants were accepted at other institutions for their first choice of studies. The only personal problem mentioned was insufficient support from family members.

#### **5.11.1.9. Faculty discontinuation**

A small (2.4%) proportion of participants were discontinued by the faculty due to poor academic achievement.



**Table 5.26. Sub-reasons for withdrawal**

Sub-reasons from students	Responses	
	Frequency	Percentage
Not performing as expected	5	5.6%
Unsuccessful study methods	1	1.1%
Inadequate material, facilities or equipment	1	1.1%
Organisation of programme	1	1.1%
Clash in roster	1	1.1%
Workload of programme	7	7.8%
Not prepared for study	1	1.1%
Unable to balance social and academic	1	1.1%
Wrong career choice	15	16.7%
Uncertain career goals	7	7.8%
Course does not fit my interest	4	4.4%
Programme not what I expected	3	3.3%
Not admitted for first study choice	4	4.4%
External pressure to study a degree	1	1.1%
Realisations about job responsibilities	1	1.1%
Did not enjoy the programme	8	8.9%
Accepted at another institution for 1 <sup>st</sup> choice	4	4.4%
Doubt the job prospects	1	1.1%
Family responsibilities	2	2.2%
Death or sickness in family	2	2.2%
Received a good job opportunity	1	1.1%
Academic backlog because of sickness	1	1.1%
Acute/chronic emotional illness	1	1.1%
Financial pressures – associated costs	1	1.1%
Struggle to fit into campus community	1	1.1%
Experience a feeling of isolation – distance from	3	3.3%



parents		
Other activities take up too much time	1	1.1%
Not receiving sufficient support from family	1	1.1%
Peer pressure	2	2.2%
Transport problems	1	1.1%
Residential issues	2	2.2%
From small town – struggling to adapt	1	1.1%
Negative academic experience at UP	1	1.1%
Unhappy with language of tuition	1	1.1%
Social/sport responsibilities	1	1.1%
Total	90	100.0%

### 5.11.2. Major Influences on Studies

From Table 5.27. it is evident that the major influences that the particular problem had on participants' education was that they were not motivated to study, they performed poorly academically, and it caused intolerable stress and pressure. The primary reason for withdrawal is incorrect study choice and from the influence one can infer that making the incorrect study choice has severe influences on academic performance, motivation to continue with the particular programme and causes stress. The stress is partly due to poor academic performance but also due to the confusion of changing programmes in many cases. According to Bean (2005), some levels of stress can provide motivation but too much stress can have a negative influence on retention, reducing one's institutional fit and commitment.



**Table 5.27. The major influences on studies**

<b>Problem influence</b>	<b>Frequency</b>	<b>Percent</b>
Caused stress/pressure	7	14.0%
Wanted to give up	2	4.0%
Disrupted studying	2	4.0%
Not motivated	10	20.0%
Not go to class	5	10.0%
Not enough time to study	6	12.0%
Perform poor academically	10	20.0%
Difficulty concentrating	1	2.0%
Did not study	2	4.0%
Lack of engagement	2	4.0%
No influence on studies	<b>2</b>	<b>4.0%</b>
Positive influence	<b>1</b>	<b>2.0%</b>
Total	50	100.0%

## **5.12. CONCLUSION**

In this chapter the statistical techniques used to analyse the data were discussed. Descriptive statistics were used to explore the data. Factor analysis was used to group the questionnaire items in meaningful factors for further analysis. Reliability statistics indicated that the factors have good internal consistency. Further analyses were chosen on its ability to measure the dependent variables. The statistical techniques used to measure risk for failure include cross-tabulations, multiway frequency analysis, multiple regression analysis and tree-analysis. The statistical techniques used to measure risk for withdrawal include cross-tabulations, multiway frequency analysis, logistic regression analysis and telephonic interviews. The interpretation of the results follows in Chapter 6. The interpretation will follow a similar format as the results. Firstly, risk for failure will be interpreted, followed by risk for withdrawal and lastly the standardisation of the Academic Readiness Questionnaire will be discussed.

## CHAPTER 6

### INTERPRETATION

#### 6.1. INTRODUCTION

The purpose of this chapter is to integrate the results from Chapter 5 and to interpret it with the theoretical framework discussed in Chapter 2. The significant predictors from each risk model, namely failure and withdrawal, will be discussed separately because of the different trends that were observed following analysis of the data. Risk for failure's significant predictors will be discussed first, followed by the significant predictors of risk for withdrawal. The risk for withdrawal model includes the results from telephonic exit interviews. The salient results from the exit interviews will be discussed in this chapter. Finally, the Academic Readiness Questionnaire's psychometric properties will be discussed as part of the aim of the research to standardise the instrument.

The interpretation of the results is largely limited to the academic achievement and withdrawal of first-year students. The white students were somewhat over-represented in the sample, compared to African students which could have influenced the statistical results.

#### 6.2. PREDICTING RISK FOR FAILURE

The different type of analyses that were conducted to determine the predictability of academic achievement consisted of cross-tabulations, multiway frequency analysis (SAS CATMOD), multiple regression analysis and classification tree-analysis. The cross-tabulations are used descriptively to determine the relationship among categorical variables. Cross-tabulations are co-frequency tables of frequencies and are used to explore the relationship between each independent variable with the dependent variable. This procedure is usually followed by a multiway frequency analysis.

The multiway frequency analysis and multiple regression analysis measure the relationship between a dependent variable and a number of independent variables. In multiway frequency analysis, the dependent and independent variables are categorical, whereas in a multiple regression analysis the dependent variable is continuous and the independent variables can be continuous and dichotomous (Tabachnick & Fidell, 2007). The dichotomous variable for academic achievement is thus coded pass/fail and the continuous variable consists of a ratio of the number of credits passed and the number of credits prescribed by the programme.

It became evident that the stringent criterion that all the credits prescribed by a programme should be passed in the final exam in order to be considered as successful leads to an outcome that only one third of the students in the sample could fulfil. The stringent criterion further leads to fewer independent variables to emerge as significant predictors. The classification tree-analysis identified both factors and items in the Academic Readiness Questionnaire that have a relationship with academic success.

From the multiway frequency analysis cross-tabulation tables, it is evident that 31% of the students in the sample passed all the credits that were prescribed by the programme. The cross-tabulations thus indicate that almost 70% of the students in the sample are at risk for failure. The multiway frequency analysis confirms that students have mean odds of 0.30 of being academically successful, all else being equal. The only significant predictors of the multiway frequency analysis (SAS CATMOD) were (first-order effects):

- race language;
- M-score; and
- reading behaviour.

The multiple regression analysis produced seven variables that were statistically significant in explaining academic success. The  $R$  for regression was significantly

different from zero, with  $F(12) = 32.9$ ,  $p \leq 0.001$ . The adjusted  $R^2$  of 0.38 indicates that more than a third of the variance in academic success is explained by the independent variables. The significant predictors explain virtually all the variance in the model. These are:

- M-score (0.593);
- race (0.255);
- credits registered for (0.149);
- goal orientation (0.131);
- learning-efficacy (-0.085);
- gender (0.081); and
- distance of school (-0.068).

The size and direction of the relationships suggest that risk for failure (inverse of academic success) is associated with:

- white female students;
- with a low M-score;
- who registered for less credits than is prescribed by the programme;
- who have lower scores on the goal orientation scale;
- who have higher scores on the learning-efficacy scale; and
- who attended schools from other provinces.

### **6.2.1. The Influence of Racial Background and Language**

The influence of racial background by the authors of the three retention models as discussed in the literature review is highly evident. Relationships between academic success and race language showed contradictory results, which could be due to the sample bias. The multiway frequency analysis indicate that African students are more likely to be successful academically (estimated odds of 0.66), after adjusted for other variables. In race language, both Afrikaans and English students, all else being equal, have higher odds of being at risk for failure (estimated odds of 0.18 and 0.20 respectively) than African students. The cross-tabulations demonstrated virtually no

difference in performance between the three race-language groups. African, Afrikaans and English student groups share similar averages in failure (31.28%).

Multiple regression analysis for the white and African students combined indicates that African students are more successful academically than white students during the first year of study. Race, as a variable, was highly significant ( $p < 0.001$ ) and had the second largest beta weight (0.255) after M-score, indicative of the relative importance of race in explaining academic success. The zero-order correlation is a reflection of the Pearson correlation coefficient and indicates the strength and direction of relationship between race and academic success. The low correlation between race and academic success (zero-order correlation of 0.122) could indicate that the relationships between the two variables are not completely linear, but more curvilinear due to the different academic success profiles of the white and African students.

Race, as a variable, was split between white and African students with the 'Split-file' option in SPSS.V17® to allow for separate multiple regression analysis between the two racial groups. The same variables were used as in the student sample regression analysis, except for race that was excluded. It is clear from the output that the independent variables that predict academic success differ for the two race groups. The variables that are able to predict academic success for white students are M-score, goal orientation, credits registered, learning-efficacy, gender, and parental education at UP. The variables that are able to predict academic success for African students are M-score, credits registered, and parental education at UP. The variables that predict academic success in the white students are similar to that of the student sample model when compared to the African students and one can reason that the predictor variables in the student sample model are highly influenced by the white students' profile. The conclusion from the results is that a broader spectrum of risk variables is available to predict risk for failure for white students (six variables), while the spectrum of risk variables for African students is very narrow and limited to three predictor variables.

African students from the sample registered at a Historically White Afrikaans Institution are performing academically better than their white counterparts at first-year level. A proposed hypothesis for the improved academic achievement of African students compared to white students stems from the literature of Rodgers and Summers (2008, p. 182). The African students who enter Historically White Institutions face both psycho-social (self-perceptions and perceptions of interactions with others) and social-cultural (perceptions of interactions with others with respect to ethnicity or race) challenges. For African students to be successful they have to develop 'biculturalism' because they have to function in two individual cultures.

It could be argued that the majority of the African students in the sample have developed an ability to balance the cultural or racial demands of the system and can address racial issues that might affect their studies (Sedlacek, 2004). According to Sedlacek (2004), the African students who understand the system have higher academic achievement and are more able to adjust to a Historically White Institution than those who do not. This hypothesis cannot be substantiated by the data collected in this study and the search for other possibilities in the available data to support the racial differences in academic performance continues.

Racial or cultural background in South Africa was highly linked with poor literacy levels of households, low socio-economic status and impoverished academic school environment in the past (Van Heerden, 1997). These and other factors influenced African students' high school academic achievement in the past and to some extent these factors are still present (Jones et al., 2008). A shift in the socio-economic status of many African people in South Africa led to the improvement of the socio-economic status of many African people which indicates that the artefacts that are necessary to stimulate learning and development of children are more so part of the domestic environment. African children also have greater access to quality schools and have active role models from the same cultural background which can counter the 'stereotype threat' (Rodgers & Summers, 2008).

On the other hand, it could be argued that the African students who enrolled at the Faculty of Economic Management Sciences at the University of Pretoria have higher academic ability and that racial background has nothing to do with the African students being more successful than the white students on first-year level. Scott (2009) argues that the African students who enter universities have high academic ability and is a highly selective group. African students could therefore, based on Scott's argument, achieve academically better than white students, irrespective of the type of institution.

The sections on high school achievement and the number of credits registered will provide some answers to the differences in academic achievement between the two racial groups.

### **6.2.2. The Influence of High School Achievement**

High school academic achievement is widely regarded as the best predictor of first-year academic achievement by various researchers (Astin, 1975; Astin & Oseguera, 2005; Camara, 2005b; Sternberg & Grigorenko, 2002). M-score was used as a measure of high school achievement for the 2008 cohort. A positive relationship was demonstrated using cross-tabulations between M-score and pass/fail, where low M-score is associated with more students being in the fail group than in the pass group. As the M-scores progressively increased, a shift from the low to the high M-score category, more students passed. Graduation rates at the institution under study confirm that students with higher M-scores are more likely to graduate within the minimum time (BIRAP, 2008).

The multiway frequency analysis also confirms these relationships. Students in the low M-score category are less likely to be academically successful (0.089 times the overall odds of 0.294). This indicates that students with low M-scores are extremely likely (more than a 99% chance) to be in the risk for failure category. Students with an average M-

score are 70% less likely to be successful with three out of every 10 students being academically successful.

Results from the multiple regression analysis confirmed that students with low M-scores are extremely at risk for failure and students with average M-scores become progressively less at risk for failure. A relatively strong correlation between M-score and academic success was demonstrated (zero-order correlation of 0.55) which elevates M-score to the single best predictor of academic success in the model, which corresponds to international and national research results.

M-score is a marginally stronger predictor in the case of white students than of African students (Rodgers & Summers, 2008). International research indicates that high school achievement is a poorer predictor of academic success for African students. The results of this research support this finding. Sternberg (2007) and Bean (2005) confirm the association between socio-economic status, quality of the school and academic preparedness of some students. The study by Jones et al. (2008) confirms that a large number of African students are still entrenched in an impoverished environment and the poorer resourced schools contribute to a lack of academic preparedness of students. African students from these under-resourced schools do not necessarily have less ability than African students from well-resourced schools or even white students, but that they are prepared differently or under-prepared, hence the weaker ability of M-score to predict academic success for African students. Nevertheless, M-score is still the single best predictor of academic success for African and white students and has to be included in a prediction model for both racial groups.

The interaction effect between race language and M-score that resulted from the multiway frequency analysis is worth noting (see Appendix Table B.17.). When M-score and the factors from the readiness questionnaire are removed from the model, virtually no difference in the odds of the three race language groups was found, with Afrikaans students having marginal better odds of academic success. The reason for the difference in the model compared to the cross-tabulation has to do with the partial effect

of M-score in the model. As mentioned earlier, African students do not show the same pattern of prediction along M-score categories as for instance the English students. This finding indicates that African students, relative to Afrikaans and English students, achieve academically better, M-score being equal. Theoretically the finding could indicate that the negative effect of prior schooling (ex-DET schools) can be overcome with time and that African students do pick up on the skills and resources when entrenched in a supportive academic environment. Afrikaans students show similar but less significant patterns of success as African students. It can thus be argued that African students show higher academic success than white students. Afrikaans and English speaking students are thus at risk for failure.

The difference in M-score patterns for the three race language groups does not, however, provide the full picture to explain the differences in predicting risk for failure. The number of credits that the students registered for differs by race and provides additional clues to the differences in predicting risk for failure.

### **6.2.3. The Influence of Credits Registered**

Credits registered refers to the number of credits students registered for in their first academic year. In the beginning of each academic year, students register for a number of modules with assigned credits based on the notional hours that students have to spend on each module in a programme. The variable does not take account of the prescribed number of credits by the programme or the number of credits that were failed or passed. Credits registered was not included in the multiway frequency analysis because the dependent variable, academic success, was coded binary and in this instance the number of credits registered as a variable would have led to the exclusion of some of the cases.

The multiple regression analysis indicated a highly significant positive correlation between the number of credits that students register for and their academic success ( $p < 0.001$ ). The results indicate that students who register for more credits are usually

more successful academically (based on the expected change in the standard deviation of academic success of 0.149 if there is a one-unit change in the number of credits registered).

The low correlation between the variables suggests a curvilinear relationship which indicates an optimal number of credits with students at either side of the curve being at risk for withdrawal. Students who register for fewer or for more credits than is prescribed are at risk for failure. The students with fewer credits are usually more at risk for failure than the students who register for more credits than prescribed. A cross-tabulations with a Chi-square 'goodness-of-fit' test showed statistical significant differences between the number of credits registered (binned in thirds with SPSS.V17@ Visual Binning option) and risk for failure (binary variable fail/pass) with Pearson's Chi-square  $< 0.001$ ,  $df(2)$  (see Appendix Table B.10.).

The cross-tabulations indicate that the students who registered for less than 139.1 credits (low credits registered category) and the students who registered for more than 148.0 credits (high credits registered category) are highly clustered in the risk for failure category (83.4% and 80.4% respectively). Students in the average category, or who registered close to the number of credits prescribed by the programme (139.1-148.0 credits) have a lower chance of being at risk for failure (44.6% clustered in the risk category). Evident from exploring the data is that students with low M-scores have a smaller range between the minimum and maximum number of credits that they register for (76.5-197.0 credits). Students with average M-scores registered for credits with a range of 90.5 to 215.0 credits and students in the high M-score category registered for credits with a range of 88.0 to 231.0.

Analysis of variance (ANOVA) however indicated on the Levene test that the variances are not homogenous and the Brown-Forsythe and Welch test was used to determine the difference between the three M-score categories and the number of credits that students register for (see Appendix Table B.11.). Both tests point to a highly significant difference in the number of credits registered between the three M-score groups, which is consistent with the standard ANOVA results ( $F(2) = 6.551$ ,  $p = 0.002$ ). The Games-Howell method was used in Post hoc tests because homogeneity of variance did not hold in the data, which was determined by the Levene test. The Games-Howell method

indicates significant differences between students in the low and high M-score category ( $p = 0.001$ ), but not between low and average or between average and high M-score categories. A Scheffe test indicated significant differences between the low and average M-score categories as well as between the low and high M-score categories, but these results are only tentative because of the lack of homogeneity of the data (see Appendix Table B.12.).

Cross-tabulations further indicate significant differences between the M-score category and the credits registered category with Pearson Chi-square  $< 0.001$ ,  $df(4)$  (see Appendix Table B.13.). Trends highlighted by the cross-tabulations show that students in the low M-score category (which are highly at risk for failure), tend to register for either fewer credits, thus being in the low credits registered category (49.3%) or in the high credits registered category (32.2%). Students with average M-scores follow the same trend as the low M-score students with 35.9% of the students in the low credits registered category and 35.9% in the high credits registered category. Both the low and high credits registered categories have already been identified as at risk for failure, especially for students in the low M-score category and this enhanced the risk. Students with high M-scores tend to be in the average credits registered category (58.2%) and only 15.6% of the students are in the low credit registered category and 26.2% of the students are in the high credit registered category. Even though high M-score students register for more credits than prescribed, these students have good odds of passing and their odds of failure is very low. It is the low and average M-score students that are at greater risk when they register for more credits than they can cope with because they increase their odds of failure.

The distribution of credits registered differentiated by race indicates a significant difference with a Pearson Chi-square  $< 0.001$ ,  $df(2)$  (see Appendix Table B.14.). The cross-tabulations indicate that almost half of the African students are clustered in the low credits registered group (48.5%), while 28.6% of white students are clustered in the low credits registered group. White students progressively move to the higher credit registered group (average credits = 33.6% and high credits = 37.8%), while African students regressively move toward the higher credit registered group (average credits = 35.6% and high credits = 15.8%). When comparing the M-score category and race, the

results indicate that 35.1% of African students are clustered in the low M-score category and 51.5% of African students are clustered in the average M-score category.

Cross-tabulations indicate that African students tend to register for fewer credits and should therefore be more at risk for failure. Yet, African students have a lower risk for failure than white students. This indicates that a number of the African students in the average M-score category and possibly the high M-score category are clustered in the low credits registered category, (a lower credit load) even though some African students show an ability to register for more credits based on their high school marks. The interaction effect that is present in the multiway frequency analysis for race language and M-score could be explained in that African students with ability take less credits and are then able to achieve academically better than white students, all else being equal.

Overall it seems as if African students tend to register for fewer credits than white students with the same high school academic achievement, measure by the M-score category. This finding is contrary to Van Heerden's (1997) study which indicated that African students usually underestimated the workload and the quality of the work required. It seems that African students from the study are overly cautious when loading their programme credits and this behaviour is actually benefiting the African students.

#### **6.2.4. The Influence of Goal Orientation**

Goal orientation measured here consist of three related components, namely effort or academic apathy, planning of study time by setting goals, and being methodical in ones behaviour. The suggestion is that the components measured by goal orientation coincide with one of Conley's academic behaviours, namely study-skill behaviours. The study-skill behaviours compose of time management, which according to Conley (2007) refers to planning a task, setting up the study environment, breaking up the tasks into manageable chunks and balancing competing tasks.

Goal orientation has a positive linear relationship with academic success, but with low zero-order correlations, ranging between 0.157 and 0.166. Goal orientation emerged as the second strongest predictor on the student sample model (beta weight of 0.131), after M-score (beta coefficient of 0.593), thus indicating the importance of the variable even

though its contribution to the variance explained is only 1.7%, according to the squared partial correlations. Goal orientation on its own is a weak predictor of academic success, but contributes some variance to the student sample and white student prediction model.

Goal orientation however emerged in a classification tree-analysis as the best predictor of academic success among the five factors of the Academic Readiness Questionnaire, irrespective of race (see Perna & Thomas, 2008). Goal orientation as a form of study-skill behaviour (Conley, 2007) and recognised as a form of self-regulated learning (Pintrich & De Groot, 2000) is regarded as an important component in any learning task. The students with high goal orientations scores will be able to plan their learning tasks, have self-evaluation skills which provides the drive to plan and monitor goals and provide feedback as to how the student is doing in relation to academic performance and goals (Bandura, 2006).

Why did goal orientation as study-skill behaviour explain only 1.7% of the variance in the regression model? Possible reasons from theory suggest that multiple factors interact with goal orientation and the reciprocal relationship with academic success could lead to changes in goal orientation and in subsequent academic behaviours and motivation while students are in the institutional environment. Pintrich (2000) argues that achievement goals are formed based on beliefs or perceptions about ability, competence, success and effort. Schunk (1991) adds that these perceptions are based on some form of self-evaluation that are themselves based on subjective standards (see Bandura, 2006), the type of goals that were set (performance or mastery), the importance or value of reaching the goal as well as the causal attributions of past achievements.

Students thus enter the university with certain beliefs that influence their goal orientation and based on their initial goal orientation they evaluate their performances. When the self-evaluations indicate that the goals are not reached, it decreases perceptions about ability, lowers motivation and leads to lower effort (Pintrich, 2000). Subsequent causal attributions about the influence of performance have an effect on success expectancy, behaviour, and affective reactions toward the task (most prominently anxiety) (Schunk,

1991). In summary, the environment has an important influence on goal orientation and academic achievement, regardless of initial goal orientations.

Furthermore, a curvilinear relationship could be present between goal orientation and academic success as is evident in the multiway frequency analysis. Multiple regression analysis assumes a linear relationship between variables and when this is not achieved it renders the variable insignificant. Goal orientation was not a significant predictor of African students' academic achievement (multiple regression analysis) and showed a curvilinear relationship (multiway frequency analysis) which supports this theory. White students, on the other hand, have significant positive relationships with academic success on both analyses.

An approach or avoidance goal orientation could be used to interpret the goal orientation factor. According to Bean and Eaton's model (as cited in Bean, 2005) an approach or avoidance behaviour is associated with academic achievement. Students who have avoidant behaviour are at risk for failure and withdrawal, compared to students who have an approach orientation (refer to Pintrich's 'work avoidant' goals). Achievement motivation orientation, which differentiates between mastery and performance, was not statistically significant in predicting risk for failure and this suggests that in this study it does not matter whether your goal is to master the subject or to reach a specific performance goal, but whether you approach or avoid the achievement goal that has been set.

Goal orientation is a significant predictor of academic achievement in the multiple regression analysis for the main effects as well as for the white students, but not for the African students. The multiway frequency analysis's hierarchical structure (interaction effects) between goal orientation and risk for failure indicated a low but significant relationship between race language and goal orientation ( $p = 0.045$ ). Tree-analysis cannot differentiate between races and could not support or discard the results of the multiple regression or multiway frequency analysis. The findings of Rodgers and

Summers (2008) confirm that motivational constructs such as goal orientation are not the same for African-American students as it is for white students.

Overall, the multiway frequency analysis showed that students in the medium goal orientation category (students who are flexible in their planning, with sufficient effort and who are not completely methodical) are more successful academically. The students at risk for failure are the students with a goal avoidance orientation, thus with low effort, little planning and low structure dependence or methodicalness. The picture however differs from the overall effects when comparing the white and African students. Successful African students have a balanced goal orientation, are flexible in planning learning tasks, apply sufficient effort and are not completely methodical. African students with an avoidance goal orientation are also successful to an extent, and African students with an approach goal orientation have the lowest odds of success, thus at risk for failure.

Hierarchical effects of the multiway frequency analysis show that African students in the low goal orientation category increase the odds of the goal orientation scale with 33% (Factor of 1.6 x Factor of 0.83 = Odds of 1.33), and African students in the medium goal orientation category increase the odds of the goal orientation scale by a factor of 1.34 (Factor of 1.34 x Factor of 1.16 = Odds of 1.55). The African students in the medium goal orientation thus increase the overall odds of academic success by 55%. African students in the high goal orientation category actually decrease the odds of goal orientation by 50%. African students with a medium goal orientation score are least at risk for failure compared to the African students with a high goal orientation score who have a high risk for failure. Even though African students in the low goal orientation category have the highest factor change in goal orientation, the main effect for the low goal orientation category is the lowest.

The question now is: why are African students with an avoidance goal orientation more successful than African students with an approach goal orientation? This question is asked because the opposite trend is apparent in the main effects of goal orientation. African students with an approach goal orientation have the highest odds for failure and

it could be reasoned that the African students in this category believe that they have adequate study goals and usually put effort into their work, but this does not necessarily indicate success. Some students are regarded as 'actively failing students', which refers to students who work hard at their studies with good study habits but still fail, regardless of all their effort (Buskist & Howard, 2009). Other students are regarded as 'passively failing students', which refers to students who procrastinate studying and therefore fail (Buskist & Howard, 2010). Passively failing students do not have clear educational or career goals, were pressured to study a degree and were apathetic toward their work (Buskist & Howard, 2010).

Goal avoidance behaviour is associated with 'self-handicapping' and leads to less effort and lower academic performance (Urduan, Ryan, Anderman, & Gheen, 2002). According to Urduan et al. (2002), some students will purposefully conform to something known as 'self-handicapping', where they procrastinate preparing for a test or exam and use a lack of preparation time as an excuse for poor academic achievement. According to this research, self-handicapping is positively correlated with an external regulatory style and with performance goals and these relationships are stronger for African-American students compared to their white counterparts (Rodgers & Summers, 2008). Bandura (1986) states that people who procrastinate are unlikely to set short-term goals that regulate behaviour such as increasing effort, planning and self-evaluation.

Universities seem to bring out performance oriented learning environments and according to Kaplan and Maehr (as cited in Rodgers & Summers, 2008, p. 181) this environment 'emphasize[s] differences and encourage competition'. According to Steele and Anderson (as cited in Rodgers & Summers, 2008, p. 181), the accentuation of differences produced by the performance oriented environments are more salient and different for African-American students, compared to white students. According to the researchers, the African students take on what is known as a 'stereotype threat' which has a negative effect on academic achievement. According to Rodgers and Summers, students who identify with the stereotype are more likely to experience the negative effects associated with this phenomenon. In the absence of role models in African cultures, the stereotype will be kept alive in predominant white institutions.

Goal orientation was not a significant predictor of academic success for African students and one can reason that African students from less resourced schools are not taught to set goals for learning and it is possible that the concepts are not fully mastered by some African students (Van Heerden, 1997). These students are frequently from under-resourced and rural schools (Jones et al., 2008).

A further investigation into the interaction effects of the multiway frequency analysis indicates that the white students, consisting of the Afrikaans and English students, have a positive relationship with goal orientation. The Afrikaans and English students in the high goal orientation category increase the mean odds of the high goal orientation category by a factor of 1.41 and 1.53 respectively. The odds of the high goal orientation category is virtually one and the Afrikaans students thus increase the overall odds of success by 40% and English by 53%. The Afrikaans and English students that are at risk for failure are from the low goal orientation category. The Afrikaans students decrease the odds of goal orientation by 11% and English students decrease the odds by 30%. The results thus show a difference in prediction between the white and African students. The white student groups, Afrikaans and English, seem to have an approach goal orientation and are more successful academically than African students, with English students being the most successful. We also see that white students with an avoidance goal orientation are at risk for failure, and English students with an avoidance goal orientation are more at risk for failure than Afrikaans students.

The classification tree-analysis indicated goal orientation to be the best predictor among the factors of the readiness questionnaire. The critical raw score of the goal orientation scale is 35.5. Students who score less than 35.5 and who score greater than 49.5 on the integration and support factor are at risk for failure. Cross-tabulations indicate significant differences between race and the integration and support factor (Pearson Chi-square  $p < 0.001$ ,  $df(2)$ ). The cross-tabulations indicate that 80% of white students tend to cluster highly around scores of 48 and higher on the integration and support scale, while 86% of African students tend to cluster highly around scores of 52 and lower on the same scale. The trend on the goal orientation scale is that successful African students cluster

predominantly in the low goal orientation group with lower scores on the integration and support factor.

The classification tree together with the cross-tabulations indicate that of the students who are at risk – thus the students who have an avoidance goal orientation (score less than 35) – the African students are least at risk for failure and the white students are more at risk for failure. The differentiating factor seems to be the difference in the scores on integration and support for African and white students. The successful African students have a balanced or an avoidance goal orientation for their studies and have fewer family and financial support and are less sociable. The white students who are at risk for failure have an avoidance goal orientation and have higher integration and support scores. The white students at risk therefore avoid exerting effort into their studies, spend less time planning their studies and are less methodical in their behaviour, together with high family and financial support and high sociability scores.

The white students with an avoidance goal orientation experience more stress and are more dependent on external sources for support (external locus of control). The African students have less family and financial support compared to white students and African students do not expect to become socially involved within the university, which is necessary for social integration (Tinto, 1993). African students also receive less information regarding the university and the programmes that are available, yet the African students in the risk group are less at risk for failure. The African students thus show some signs of resilience regardless of their circumstances (Masten & Reed, 2002).

An item that emerged as a predictor of academic success that relates to the integration and support factor is item 52 of the readiness questionnaire: 'If I run into problems at university, I have someone who would help me'. Students with scores equal to or lower than 4 on this item are less dependent on support from others and confirms the relationship that African students have lower support structures than white students, yet students in this category have a 70% prediction of success, compared to students with high scores (higher than 4) who have a 59% prediction of success. From the results we find that students in the risk category, thus an avoidance goal orientation and low

integration and support scores, are also successful, but the odds are lower and therefore the risk for failure is higher (refer to Appendix Table B.19.).

In summary, goal orientation emerged as the best predictor from the ARQ. The trend of prediction however differs among the racial groups, where white students with high scores are more successful and African students with average scores are more successful.

#### **6.2.5. The Influence of Learning-efficacy**

Learning-efficacy measured in this study consists of two main components, namely internal locus of control and academic self-efficacy. According to Bandura (1986) there is a strong relationship between locus of control and self-efficacy, but they are regarded as independent constructs even though they have been clustered together on a factor analysis. Students with high scores on the learning-efficacy scale think they have the academic skills to be successful at university and have an internal locus of control. Zimmerman (2000) states that self-efficacy indicates if a person expects to be able to do the task and does not indicate how well a person will do on the task.

Learning-efficacy has a significant relationship with academic success, as indicated with the multiple regression analysis for the student sample model as well as for the white students, but not for the African students. A discrepancy in the direction of the relationship exists for the student sample model as well as for the white students, because the beta weight indicated a negative relationship and the zero-order correlations indicated a positive relationship. The African students' output shows consistency in that both the beta weights and zero-order correlations are positive, but the relationship is not significant.

The multiple regression analysis indicated a very poor positive relationship with academic success and learning-efficacy (and then only in the case of white students). Learning-efficacy contributed less than 1% of the variance in the model and had a zero-order correlation ranging between 0.069 and 0.071. The poor predictability of learning-

efficacy could indicate that some students enter the university with high efficacy expectations, not knowing what is expected of them and then perform poorly. Bandura (1986) reasons that people who do not have accurate efficacy judgements will not completely know which skill-set to use in order to attain their goals (see Ochse, 2003).

Furthermore, the learning environment at university does not always provide clear guidelines on what is expected from students and contributes to inaccurate efficacy expectations. When there is limited information to feed back into efficacy judgements, it leads to reductions in effort to continue with a learning task (Bandura, 1986). Some students could have high learning-efficacy expectations when entering the university, but due to ill-defined learning expectations and poor academic marks at the beginning of the semester, students lower their efficacy expectations which could lead to further poor performance (see Henson, 1976). Bandura states that the lapse in time between assessments of self-efficacy and the behaviour influences the accurate prediction of the behaviour (1986). The reason for this is that people re-evaluate their efficacy judgements over time in order to develop skill and ability to pursue tasks under various circumstances and at different levels of difficulty.

An assumption that can be made based on Bandura's seminal research is that white students with high learning-efficacy scores make clear efficacy judgements based on the factors mentioned by Bandura, even though these factors are not measured by the questionnaire directly (1986). The factors relate to differences in time, level of the performance, generality of the task, strength of the beliefs, clarity of the circumstances, clarity of goals and self-awareness. Good efficacy judgements do not guarantee academic success because continuous failures, especially failures early in a student's first academic year, will lower perceived efficacy judgements. The students with high self-efficacy judgements are, however, more likely to look at other reasons for failure (internal locus of control) than ability, such as insufficient effort or poor learning strategies.

A classification tree-analysis showed that learning-efficacy is an important predictor of academic success among the factors of the readiness questionnaire. The relationship in the tree-analysis is positive, indicating that students with a learning-efficacy score greater than 53.5 and a goal orientation score greater than 35.5 are more successful academically than students with the same goal orientation score, but who have learning-efficacy scores equal to or less than 53.5. According to Pintrich (as cited in Rodgers & Summers, 2008) self-efficacy is always related to some goal in mind. The students with low learning-efficacy under-estimate their abilities and consequently do not set effective goals. Students with high self-efficacy levels will increase their effort and work more persistently to reach their goals (Bean & Eaton, 2000). Students with high self-efficacy levels who usually have an internal locus of control are more likely to pursue academic activities because they believe that they will have a positive influence on their environment (Bean, 2005).

Tree-analysis of the items from the readiness questionnaire indicates that items 13, 23 and 24 are important in predicting academic success. These items all relate to learning-efficacy. The most important, item 13, relates to students' expectations to be academically successful. The item that predicted academic success the best was item 13: 'I expect to have a harder time to perform academically than most students here'. Students with a low score on the item did not expect to have a harder time to perform academically (high learning-efficacy), and actually performed better than those students who expected to have a hard time to perform academically (low learning-efficacy). Furthermore, item 23 relates to students' beliefs about their skills. Students who believe to have the necessary skills to be successful at university, together with an optimistic view of being academically successful have higher academic success than the students who do not believe they have the necessary skills to be successful. Student who doubt their abilities exert less effort toward their studies and attribute poor academic achievement to luck (Weiner, 1972).

Students who enjoying complex and intellectually demanding tasks (item 24), are more successful academically. Students who score above 3, together with higher beliefs in their academic skills and have high learning-efficacy, are more successful academically. There were no significant differences between race and items 23 or 24. This shows that African and white students have equal perceptions of their academic skills and both

enjoy working on complex problems. This result is contrary to the finding that African-American students tend to devalue academic achievement because they perceive themselves to not have the ability to excel, thus using a protective mechanism to keep their self-efficacy judgements intact (Rodgers & Summers, 2008). 'Selective devaluing' usually occurs in cultural groups who accept biases in academic achievement by devaluing its importance.

There were no significant differences on a Chi-square analysis between race and the learning-efficacy scale as a whole, but there was a significant difference present between race and item 13 of the Academic Readiness Questionnaire ( $p < 0.001$ ,  $df = 4$ ). The cross-tabulations indicate that African students clustered in the lower scores (low learning-efficacy), thus having a lower prediction of success and white students tended to cluster in the higher scores (high learning-efficacy), thus expecting to be successful. African students thus expect to have a harder time to perform academically, compared to white students.

Racial differentiation on self-efficacy judgements by Rodgers and Summers (2008) indicates that African-American students who attend Historically White Institutions have lower levels of perceived efficacy judgements than students who are enrolled at Historically African Institutions. The research results of this study confirms the research done by Rodgers and Summers that African students from the sample have lower learning-efficacy scores than white students from a Historically White Institution. The reason for this, according to Rodgers and Summers, is possibly due to the efficacy expectations, especially vicarious experiences and social persuasion as proposed by Bandura (1983). Research by van Laar (as cited in Rodgers & Summers, 2008, p. 180) indicates that African students make more external attributions for failure, thus having lower expectations for success which leads to lower academic achievement (see Eccles et al. as cited in Rodgers & Summers, 2008, p. 180).

The results indicate that students who believe they have an approach goal orientation by planning their studies and exerting the necessary effort and who believe they have the ability to reach their academic goals are more likely to be successful academically than students who have an approach goal orientation but with lower efficacy expectations. The differences between the races relate to the 'expected difficulty' of being successful

academically. In our findings the African students with medium and low learning-efficacy scores have higher academic achievement than African students with high learning-efficacy scores. This could be related to the fact that African students in the sample register for fewer credits and are therefore able to be more successful academically. It is possible that the effect of the African students' prediction probability on the model influenced the direction of the relationship with academic success as well as the shape (non-linear). White students with high learning-efficacy scores have clear efficacy judgements and have an internal locus of control which is positively associated with academic success.

#### **6.2.6. The Influence of Gender**

Gender produced significant results on a multiple regression analysis for the overall model and for white students, but not for African students.

The results from the regression analysis indicate that female students are significantly more at risk for failure than male students. There is some inconsistency between the beta weight (0.081) and the zero-order correlation (-0.053) for white students and the student sample model. The beta weight indicates that male students have more academic success, while the zero-order correlations indicate that female students are more likely to be successful academically. Cross-tabulations from the multiway frequency analysis and the multiway frequency analysis itself indicated that gender had a non-significant relationship with academic achievement.

The inconsistency in the direction of the relationship between gender and academic achievement together with the non-significant results of the cross-tabulations and the multiway frequency analyses makes gender a questionable predictor variable. The results by South African researchers also indicate the inconsistencies experienced by adding gender as a predictor of academic success (Du Plessis, Müller, & Prinsloo, 2005).

### **6.2.7. The Influence of Distance of High School**

The distance of the high school that students attended was categorised by the province where students attended high school. The multiway frequency analysis differentiated between schools that are in Pretoria, the Gauteng province and 'other' provinces. The three groups were collapsed into two groups consisting of Gauteng province (Pretoria and Gauteng combined) and 'other' provinces for the multiple regression analysis. The multiway frequency analysis produced a non-linear relationship between the geographic locality of the school and risk of failure. The trend is that students from schools that are in other provinces, geographically the furthest, have greater odds for failure than any of the other groups (odds of 0.21). These relationships were not significant; however the trend is noteworthy.

The multiple regression analysis showed significant results for the student sample model, but not for the white or African students. The relationship pointed to a low negative relationship, indicating that students from Gauteng province are more successful academically than the students from other provinces ( $p = 0.045$ ). The emotional separation that students from other provinces have to make is understandably greater than for students who are closer to their familiar environment and could have contributed to feelings of incongruence and isolation (Bean, 2005; Tinto, 1993) which affect academic achievement and in some instances lead to withdrawal (Jones et al. 2008). Even though this variable shows significant results, its contribution to the model is very low.

### **6.2.8. The Influence of Parental Education at the University of Pretoria**

Parental education at the University of Pretoria produced significant relationships for the white and African students' multiple regression analysis, but not for the student sample model. Parental education at the University of Pretoria produced significant results, however its contribution is very low. The direction of the relationships between African and white students also differed. This variable does not specify true first-generation status, but whether a student's parent(s) studied at the University of Pretoria.

The relationship between parental education and academic success for white students is negative (beta weight: -0.060; zero-order correlation: -0.034). White students' parent(s) who did not study at the University of Pretoria or whose parents have no university degree, are marginally more successful than the white students whose parents studied at the University of Pretoria. The practical difference from the beta weight and correlation is so low that no difference really exists within the group.

White students are traditionally from form Model-C or 'privileged' schools. Kuh et al. (2007) argue that students from privileged high schools are usually well prepared for higher education, which has a confounding effect on being a first-generation student. First-generation students are thus able to be just as successful academically as second-generation students if they are well prepared academically.

The opposite is relevant for the African students. The African students whose parent(s) studied at the University of Pretoria are marginally more successful than the African students whose parent(s) did not study at the University of Pretoria or who have no university degree (beta weight: 0.175; zero-order correlations: 0.093). It seems that in the case of African students the parents' familiarity with the university environment contributes to the students' academic achievement. These parents are able to provide additional motivational support to students (Jones et al., 2008; Johnston, 2000).

#### **6.2.9. The Influence of Reading Behaviour**

Reading behaviour produced a significant relationship with academic success in a multiway frequency analyses and a multiple regression analysis ( $p < 0.10$ ). Reading behaviour included in the multiway frequency analysis pointed to a negative linear relationship. Students in the low reading category have greater odds of passing than students in the average and high reading categories (odds of 0.43, 0.28 and 0.22 respectively).

The multiple regression analysis only showed significant results for the African students ( $p = 0.081$ ), but not for the white students or the model overall. Students who read less are more likely to be academically successful (beta weight: -0.150; zero-order correlation: -0.138). Neither reading comprehension, nor reading ability is assessed by this item, as it rather focuses on the reading behaviour of the students in the sample. The assumption that students who have a reading 'culture' and enjoy leisure reading would be more successful, is therefore questioned.

It could be hypothesised that students who spend too much time reading non-academic material could limit the time being engaged with their academic work. Reading ability and comprehension are regarded as more important in predicting academic compared to mere reading behaviour or language use (first or second) (Du Plessis et al., 2005).

### **6.3. PREDICTING RISK FOR WITHDRAWAL**

Research points to a relationship between high school academic achievement and risk for withdrawal and between academic success and withdrawal, but this research is not always clear cut (Bean, 2005; Tinto, 1993). Both Tinto (1993) and Bean (2005) make a distinction between the association between ability in the form of prior school performance and voluntary and involuntary withdrawal. According to Tinto, students that are involuntary discontinued are usually of lower ability, thus having lower academic achievement at school. Students who withdraw voluntarily do not necessarily have poor school performance. Bean (2005) states that even students with high academic performance in high school might withdraw from an institution and therefore retention is based on more factors than only academic ability alone.

Cohort research shows that about 30% of undergraduate students nationally withdrew from their studies by the end of their first academic year in 2008 (Scott, 2009). From the findings it seems that the first-year experience plays an important role in the persistence behaviour of students. It is especially in the first academic year that the majority of

students withdraw from their studies and for various reasons (Braxton et al., 2004; Du Plessis, Lemmens & Boardman, 2006; Jones et al., 2008; Scott et al., 2007; Seidman, 2005; Tinto, 1993). At the University of Pretoria the withdrawal rate of the first-year entering student population typically measured up to the end of year exams is 8.6% (BIRAP, 2008).

The withdrawal rate excludes institutional withdrawal due absenteeism from exams, exclusions from exams due to poor academic performance and students who fail the supplementary examinations. The attrition rate of the 2000 student cohort at the institution being studied indicated that the first-year attrition rate in relation to the total attrition rate over five years was estimated at 29%. This indicates that first-year withdrawals up to registration for the second year make up a sizeable portion of all institutional withdrawals.

As shown in a logistic regression analysis (Table 5.23.), only three of the independent variables made a unique statistical significant contribution to the model, namely (in order of Wald effect size statistic): M-score (36.8), race (14.5), and credits registered (5.4).

### **6.3.1. The Influence of Racial Background and Language**

According to the multiway frequency analysis model, African students are more likely to persist to the second year (3.8 times the model average). African students are thus more likely to persist (57 times), followed by Afrikaans students (7.4 times) and English students (7.9 times). In race language, both Afrikaans and English students, all else being equal, are at risk for withdrawal. The odds of African students to be at risk for withdrawal is decreased by 90%, indicating that only one in 10 African students are at risk for failure.

From the cross-tabulations of the multiway frequency analysis, only four African students withdrew from their studies, while 70 white students withdrew from their studies. A binary logistic regression analysis also confirmed that the odds based on the first-year withdrawal rates are in favour of African students completing their degrees. One would reason that the results indicate a change in the trends seen from the national attrition rates in professional Bachelor degrees in Business/Management (33% of African students and 83% of white students graduate after five years) (Scott et al., 2007; Scott, 2009).

Institutional withdrawal rates indicate that African students have a lower overall percentage of withdrawals when compared to white students (6% and 10% respectively). Referring to Rodgers and Summers' (2008) hypothesis that African-American students have to develop a 'double consciousness' in order to persist at a Historically White Institution (HWI) could indicate that African students from the sample have developed an ability to function in the predominantly Afrikaans traditions of the university while staying rooted to their ethnic identity. According to research in Sedlacek (2004), African-American students who understand racism and are prepared to address it have higher academic achievement and are more able to adjust to an HWI than those who do not. Sedlacek (2004) indicated that the understanding of racism as one factor together with the other psychological factors are better predictors of retention and academic success for African-American students than for white students (see Tracey & Sedlacek, 1989, p. 638).

The persistence behaviour of African students could also relate to the role of the family in deciding which programme the student should enrol for (Van Heerden, 1997). The student is required to remain in the programme to conform to group dynamics. Tinto shows that 'external communities' influence persistence through the type and amount of support that they give (Tinto, 1993). Authors like Jones et al. (2008) and Johnston (2000) show that first-generation students, by implication African students, are more likely to persist because of high levels of motivation and persistence. The external communities however do not always understand the way they should support the

student, especially when experiencing difficulties, which could influence the persistence behaviour of these students in the long run.

A possible reason that is noted with caution relates to the relationship between M-score and race, and the relationship between withdrawal and academic success in the first year. Firstly, the partial effect of M-score on the academic achievement of race language indicates that African students have higher odds of academic achievement, all else being equal. Another factor, namely credits registered, also come into play. African students tend to lower their credit load to be able to stay enrolled in the programme, hence fewer African students withdraw from their studies. Institutional findings indicate that African students are able to persist during the first year, but have lower throughput rates up and until the fifth year, compared to white students (BIRAP, 2010). This trend is evident for six cohorts, starting from 2003 until 2008. The institutional throughput rates therefore correspond to the national trends (Scott et al., 2007; Scott, 2009). African students from the 2008 cohort are therefore only persisting during their first year whereafter they have higher withdrawal rates than white students (refer to Appendix Table B. 16.).

The findings suggest that white students too easily decide to withdraw voluntarily from their programme in the first-year. African students tend to persist during the first-year whereafter they progressively start to withdraw during and beyond the second-year. Research in Furr and Elling (2002) show a similar trend where fewer African-American students withdraw in the first semester compared to white students, whereafter the rates change in the favour of white students. Furr and Elling (2002) reason that the institutional environment, a construct not measured in this study, could lead to African-American students feeling isolated because of the quality of their interactions in a HWI.

### **6.3.2. The Influence of High School Achievement**

A multiway frequency analysis showed that students in the high M-score category are likely to persist to the second year (estimated odds of 36.7 to persist). Students in the average M-score category are almost at the baseline or average of the group. Students in the low M-score group, all else being equal, are highly at risk for withdrawal.

A logistic regression indicated that M-score is the best predictor of withdrawal among all the other variables in the model. The results indicate that a low M-score is highly predictive of risk for withdrawal. Research indicates that high school academic achievement has mixed results as a predictor of withdrawal behaviour (Astin, 1975, p. 30; Nora, Barlow, & Crisp, 2005, p. 134). Some research in Nora et al. (2005) and in Astin (1975) shows that high school achievement does not have much influence on withdrawal behaviour, while other research shows that overall grade point average (GPA) is predictive of student withdrawal (Astin, 1975, p. 98; Nora et al., 2005, 134). Based on the results, high school academic achievement, as measured with an M-score, is a good predictor of persistence in the first academic year of Economic and Management Sciences students. The relationship is negatively correlated, where lower academic achieving students are more at risk for withdrawal.

Generally speaking, students who are academically and socially under-prepared for the challenges of the university are usually unable to make the transition to university and withdraw from their studies, irrespective of ability. These students are more frequently from under-resourced schools where students are frequently taught to use superficial learning strategies (Astin, 1975; Jones et al., 2008). According to Jones et al. (2008), the quality of the high school is highly related to the academic preparedness of students.

### **6.3.3. The Influence of Credits Registered**

A multiway frequency analysis indicated that students who register for more credits and who register for less credits than prescribed are at risk for withdrawal, all else being

equal. Students who register for fewer credits than is prescribed are most at risk for withdrawal. Students who registered for exactly the prescribed number of credits are three times more likely to persist to the second year than any other student. Cross-tabulations from the multiway frequency analysis between the variables indicate a similar trend.

A binary logistic regression analysis indicated that there was not much difference between the three credits registered groups and risk for withdrawal (for each unit increase in the number of credits registered, the odds of withdrawal are decreased by 1%).

There is consistency among the outcomes of the three types of analyses. The students with fewer credits are usually more at risk for withdrawal than the students who register for more credits than was prescribed. Students who are more realistic in choosing their credit load are therefore less at risk for withdrawal. The correlation between the variables suggests a curvilinear relationship which indicates an optimal number of credits to be registered for, with students at either side of the curve being at risk for withdrawal. Racial differences cannot be determined, because only four African students withdrew from their studies during the first academic year.

#### **6.3.4. The Influence of Reading Behaviour**

Students who have average leisure reading behaviours are most at risk for withdrawal. Students who have poor leisure reading behaviours are actually more likely to persist to the second year than any of the students in the low or high M-score categories. The findings suggest that students who do not like to read for pleasure are more likely to persist.

Astin and Oseguera (2005, p. 259) also found negative predictive betas for 'reading for pleasure' and graduating in four and six years (-0.03 and -0.04 respectively). It might be that reading for pleasure limits involvement in academic work because reading for pleasure actually becomes a distracter of learning, or a legitimised form of procrastination. Successful and persisting students actually avoid reading too many books that are not prescribed, or reading for pleasure, and focus more on reading what is prescribed by the lecturer.

#### **6.4. EXIT INTERVIEWS**

No other variables could show significant prediction of withdrawal behaviour in its broadest form (voluntary withdrawal, probation and institutional exclusions). The tree-analysis showed very low predictions and even the variables that were able to predict risk for withdrawal were highly influenced by the low number of African students who withdrew from their studies, compared to the white students. It was therefore decided to conduct telephonic interviews with the students who withdrew voluntarily from their studies to determine their reasons for withdrawal.

The results of this study show that it is not completely possible to isolate singular reasons for withdrawal and that clusters of reasons fall into a number of broader orientations (Willging & Johnson, 2004). Even though the different orientations are regarded as theory driven by different authors, the reality is that these orientations are inherently interwoven with each other. Not all students will experience the same set of primary and secondary reasons for withdrawal. Irrespective of the set of reasons, there usually is an interactive effect between the reasons that eventually lead to withdrawal. The orientations used broadly refer to perspectives of reasons for withdrawal.

The aim of the exit interviews was to investigate the reasons why first-year students withdraw from their studies as well as establishing trends among student withdrawal. Various reasons for student withdrawal were identified and explored in order to gain a

more comprehensive understanding of the reasons for first-year student withdrawal. Ten different broad categories of reasons as registered on the cancellation letter for first-year student withdrawal were used. These reasons include academic reasons, career/study choice, family responsibility, work responsibility, health reasons, financial reasons, dismissal, personal reasons, institutional reasons and faculty discontinuation. During the study it was found that the primary reason students withdraw from their studies are because of incorrect career/study choices.

#### **6.4.1. Scope of Withdrawal**

The following orientations were identified from the literature as a way to cluster the reasons that are associated with student withdrawal, namely a psychological orientation, sociological orientation, academic orientation, organisational influences and external environment.

##### **6.4.1.1. *Psychological orientation***

Psychological orientation refers to the individual characteristics that could have a direct impact on a student's decision to withdraw. Students enter the institution with various abilities, values and traits (Braxton et al., 2004).

Students with clear occupational goals are seen as having strong goals (intentions) and/or commitments (motivations) which usually lead students to persist until degree completion (Bean, 2005; Tinto, 1993). From the exit interviews it is evident that the majority of students withdraw from their studies due to incorrect study choices. These students, for instance, choose the wrong career or programme or have uncertain career goals. The influence of the wrong career/programme choice is a lack of motivation that influenced these students to be uncommitted to the attainment of their initial goals which consequently resulted in poor academic achievement. Persons lacking the motivation, regardless of great goals, will be unable to commit themselves to the attainment of initial goals (Tinto, 1993).

Tinto (1993, p. 54) postulates that a sense of incongruence is experienced when students make poor or uninformed decisions regarding the university or the programme they enrol for, compared to their actual career needs and interests. Making poor programme choices or not being able to study a programme of first choice could contribute to a feeling of incongruence. According to Tinto, choosing a university leads to a set of 'expectations' and the nature of these expectations informs the final decision of the student (Tinto, 1993). Students usually self-evaluate their pre-entry expectation with early experiences within the institution's social and academic systems. The closer the match between perceived expectations and actual experiences, the more likely students will feel a sense of belonging.

The wrong career/programme choice is also regarded as a salient secondary reason that contributes to any of the primary reasons that influence a student's withdrawal behaviour. The assumption here is that students become unsure and doubt their study choice when they start experiencing a problem at university. Secondary reasons usually also contribute to decisions to withdraw and students have to weigh the extent of the problem with the future hope of attaining the goal of graduating and the likelihood of working in the chosen field (Tinto, 1993). Having a number of contributing challenges, in this instance, outweighs any hope of attaining future occupational goals.

A large number of students who provided study choice as reason for withdrawal changed their course during the study year. These students are thus not true withdrawals and should be regarded as course changers. Study choice and academic reasons were the main reasons for students for changing their study course.

It seemed that most students who changed their study course due to 'study choice' either:

- (i) did not get accepted for their first choice and planned on changing their course to their first choice later in the year, or

- (ii) identified the study course they really want to follow and decided to change.

It seemed that most students who changed their study course due to 'academic reasons' changed because they either:

- (i) could not cope with the demands and workload of their course, or
- (ii) struggled with the subject matter of the course and changed to a less demanding study course.

Changing courses is common among university students. Various intrinsic and extrinsic factors have been identified in course change among university students. Extrinsic factors include supportive, but not meaningful directive parents, a lack of familial guidance, and a lack of knowledge regarding the chosen career. Intrinsic factors include students finding it difficult to make long-term decisions, the course does not fit their personal interests and they have a desire for one that does, as well as satisfaction with majors that met those requirements (Firmin & MacKillop, 2008, p. 5).

Students who are also not able to study in their first choice of study, for whatever reason, will feel discouraged, feel less loyal and believe their education is of less practical value (Bean 2005, p. 229). Braxton et al. agree that psychological influences such as levels of motivation and self-efficacy are highly related to risk for withdrawal in commuter institutions (2004). Some students are able to make changes to their situation when there is a mismatch, and change courses or decide to transfer to another institution (Tinto, 1993, p. 54). Some students go ahead to study their second choice, but withdraw because there is a mismatch between the programme and their interest (Du Plessis et al., 2006; Johnston, 2000; Jones et al., 2008).

The most notable reason why students do not make informed choices is because information about the social and academic system of the university that is most important for integration is usually not available in the brochures (Jones et al., 2008). As determined earlier, it is the social and academic systems of the university that affect

withdrawal behaviour. The difficulty is that these systems are best known by personal experience and peer communication. The formal attributes of the university: size, academic staff, and students are important sources of information on the character of the institution, but institutions do not provide substantial information of what is to be expected of the informal campus climate (Tinto, 1993, p. 55). Disadvantaged students furthermore have less access to career guidance and limited financial resources to change course once they have enrolled (also see Du Plessis et al., 2006; Jones et al., 2008).

There were a number of students who indicated that the programme was not challenging and according to Bean and Eaton (2000, p. 57) such students will revert to avoidance behaviour such as not going to class, not studying or doing poorly academically. These and other reasons were indicated by students during the interviews as the effect of the problem on their studies which eventually led to the students withdrawing from their studies.

#### **6.4.1.2. Sociological orientation**

A number of students indicated as their secondary reasons that they felt isolated because of the distance from their families and in some instances some students could not adapt to the campus environment. Some students also experience residential issues which contributed to their decision to withdraw. According to Tinto (1993), the social and academic systems, both formal and informal, are interwoven with each other and events in one may directly or indirectly influence events in the other over time. It is possible that a student who is sufficiently incorporated in the academic system but not in the social system can still decide to withdraw. Institutions, however, do not perceive social integration as a minimum standard for compulsory withdrawal, but does so with academic integration. Therefore, even though it is important for students to be socially involved in different informal or formal social communities, it is more important to be involved academically (Tinto, 1993).

A few students indicated external pressures to study for a degree as a secondary reason. According to Johnston (2000), parents should not pressure students into taking unsuitable programmes, thus forcing their choice of a programme on to the student. Students who are free to choose the 'university of choice' and their programme, without parental enforcement, are more likely to persist, according to Johnston (2000).

#### **6.4.1.3. Academic orientation**

The results showed that a number of students indicated insufficient interaction between lecturer(s) and the students and in exceptional instances perceived discrimination or racism against students from the lecturer(s)' side. According to Bean (1980, 2005) the lack of substantial interaction decreases the subsequent commitment to the institution and influences students' decisions to withdraw. When academic staff is not supportive, the institution is perceived to be unsupportive and this leads to withdrawal behaviour as seen in this sample and in the literature (Bean, 2005).

A number of students were discontinued by the faculty and indicated as secondary reason, an inability to adapt to the campus environment, or they experienced insufficient interaction with the academic staff. Braxton and Lien (2000, p. 25) associate these reasons as having a lack of 'normative integration' that leads to intellectual isolation. Braxton and Lien (2000, p. 25) argue that students who were not able to find their programme interesting had a feeling of 'intellectual isolation'. Intellectual isolation may occur when students have limited choices of courses to choose from or when a programme is not challenging enough for the student. Braxton and Lien (2000) explain that feelings of isolation could influence feelings of institutional fit and commitment. According to Bean (1980, 2005), feelings of fit influence decisions to withdraw from the institution directly.

Intellectual isolation occurs when students do not find their programme as interesting or intellectually stimulating. Both a lack of integration and isolation are seen as factors that could lead to voluntary withdrawal and poor academic performance (Bean, 1980;

Braxton & Lien, 2000, p. 25). When students are also not permitted to study their first choice, these students are more likely to withdraw and go to another institution (Tinto, 1993).

Students who reported personal reasons for withdrawing from their studies either experienced (i) transportation and accommodation problems, (ii) struggled to fit into the campus community and experienced a feeling of isolation because of the distance from their parents. Students who experienced transportation and accommodation problems usually reported financial reasons as the main reason for withdrawing from their studies.

Students who struggled to fit into the campus community were also likely to report that they come from a small town, struggle to adapt to both the academic and social environment, and experience a feeling of isolation because of the distance of their parents. When the academic and social systems of the institution are weak, the additional external demands placed on the student can lead to increased decisions of withdrawal. Consequently, the students that experienced intellectual isolation were not able to meet the expectations of the institution academically and this led to institutional discontinuation (Tinto, 1993).

#### **6.4.1.4. Organisational influences**

Some students also experienced institutional reasons for withdrawing from their studies. The problems which were identified were transportation issues to and from campus, as well as between campuses; poor facilities such as the library, food facilities, lacking air-conditioning in classes; students felt that their safety was threatened; students had problems with lecturers, including being unprepared for class, unavailability and inapproachability, poor language and teaching skills and 'racism' towards some students. When the institution is committed to the students' welfare by showing respect toward students and having concern for the growth and development of students, these students will be more committed to the institution and will have stronger intentions of persisting (Braxton & Hirschy, 2005). Students in general should feel a sense of belongingness and integration, even more so is that minority students are more

dependent on a supportive institutional environment to become socially and academically oriented (Rodgers & Summers, 2008).

#### **6.4.1.5. External environment**

The factors represented here are family and peer support, work and family obligations and community influences (Braxton et al., 2004). The external environment can have a positive or negative influence and plays an important role in decisions to enrol for a degree programme (Braxton et al., 2004). Bean indicated that parental support is an important factor that influences persistence rates (also see Moxley, Najor-Durack & Dumbrigue, 2001). More specifically, a parent's educational level provides the impetus for students to persist at their studies (Bean, 2005, p. 228). Accordingly, parental education gives a student an advantage in their interaction with the institution and adjustment to the institution.

Some students also experienced personal problems after the onset of a family crisis, such as experiencing feelings of isolation from their parents because of an illness in the family or marital challenges. Students who perceive that their participation at university create hardship for their families are less likely to continue (Braxton & Hirschy, 2005). Support or discouragement from friends, community and family members also serves as external influences that affect students.

#### **6.4.1.6. Economic influence**

In South Africa a large part of the population is dependent on public funding in order to complete a degree (Jones et al., 2008). This means that a large group of students with less financial resources are at risk for not fitting in and consequently withdrawing from their studies. Some authors point to a direct link between the ability to pay for studies and retention because money directly affects a student's ability to pay for studies (Braxton et al., 2004; Tinto, 1993). These students may experience a combination of financial issues, work responsibilities, and family responsibilities, which in turn have a negative influence on academic performance. These students either have to withdraw due to the inability to afford university, their obligation to work and to support their family

or discontinuation from the faculty due to poor academic performance. According to Jones et al. (2008) students cannot be fully engaged academically or socially when they are barely able to sustain their physical needs. Scott et al. (2007) indicate that financial reasons are significant factors but that there is little systematic knowledge as to the underlying reasons for withdrawal, both exclusions and voluntary.

Many authors mentioned in this thesis points to the direct relationship between finances and withdrawal (Bean, 2005; Du Plessis et al., 2006; Schuh, 2005, St. John et al., 2004; Tinto, 1993). According to Seidman (2005) some students will mention financial problems as reasons for withdrawal even though there might be another reason, in other words personal reasons (see Bean, 2005, p. 234). The essence of financial reasons for withdrawal, according to Tinto, is 'merely an end product of decisions regarding withdrawal. It reflects the weighing of benefits as well as costs and as such mirrors the nature of the student's academic and social experiences on campus' (Tinto, 1993, p. 67). According to Astin and Oseguera (2005), students who have financial support during their studies are more likely to complete their studies. Thus students from disadvantaged backgrounds could be assisted to enter the university and persist to degree completion with financial assistance if the total costs of the financial pressures are covered (Nora et al., 2005, p. 141).

## **6.5. STANDARDISATION OF THE ACADEMIC READINESS QUESTIONNAIRE**

The purpose of the Academic Readiness Questionnaire is to function as a screening tool for students prone to risk for failure and withdrawal. For a questionnaire to screen for risk, the instrument has to be reliable, valid and be free of bias.

### 6.5.1. Reliability

A scale is regarded as reliable when the identified constructs are measured consistently (Durrheim, 1999a; Field, 2005). Two types of reliability statistics were used for the Academic Readiness Questionnaire (ARQ). The first is the Cronbach's coefficient alpha and the second is the Spearman-Brown split-half reliability coefficient. A value of 0.70 is regarded as satisfactory for social research, according to Field (2005). Two caveats from Field (2005) should be mentioned here; the first is that a larger number of items in a scale could increase the alpha value, and secondly that an alpha value can be achieved with various number of factors. This indicates that an alpha value should not be used as a measure of 'unidimensionality'. It is recommended to have an alpha value for each factor separately.

The overall Cronbach's alpha for the ARQ is 0.87 which is 0.17 higher than the recommended 0.70 for social sciences. The final ARQ consists of 59 items. According to Field (2005, p. 668) the number of items could increase the Cronbach's alpha value. Unidimensionality was not assumed for the ARQ and therefore the five factors identified were subjected to separate reliability analysis. Four of the five third-order factors produces Cronbach's alpha values above 0.70, except for f4 (integration and support) with a Cronbach's alpha value of 0.63. The second-order factors had Cronbach's alpha values of 0.87 and 0.61. The loss in reliability, according to the drop in alpha value for Fb, is ascribed to the fact that the scale measures diverse themes of integration and support, which explains the relative lack of consistency within the factor. It was decided to conduct Spearman Brown formula and the Guttman split-half coefficient to confirm the reliability statistics of the Cronbach's alpha.

The coefficients from the Spearman Brown formula and the Guttman split-half coefficient are 0.778 and 0.774 respectively, which indicate good reliability of the full scale. According to Gregory (2000, p. 85), a coefficient of 0.70 on the Spearman Brown formula is equivalent to an estimated full-test reliability of 0.82. The Cronbach's alpha for the two scales was 0.64, which is lower than the Cronbach's alpha from the overall scale. The Cronbach's alpha represented here is the mean of all possible split-half

coefficients (Gregory, 2000, p. 85). The Cronbach's alpha of 0.63 is below the recommended 0.70 which confirms the low inter-item correlations of the ARQ and that the items do not relate well with one another in the full scale. Factor Fb, consisting of integration and support and reading behaviour had very low inter-item correlations (0.08) that could influence the values of the Cronbach's alpha here. The Spearman Brown formula is however reassuring in terms of the overall internal consistency of the scale.

The inter-item correlations should be examined by viewing the mean correlations for the items of the scale (Field, 2005). The average inter-item correlations for the ARQ was 0.114, indicating that the items of the scale did not relate that well with each other. The mean inter-item correlations for the five third-order factors ranged from 0.119 to 0.322, indicating that the items did not seem to relate well with each other for all the factors. The numbers of items in the third-order factors are much less than in the full scale and these factors produced average inter-item correlations.

Each of the five scales, as well as the full ARQ scale, was subjected to reliability analysis to investigate each individual item's 'Cronbach's alpha if deleted'. Any item that has a substantially greater Cronbach's alpha value than the overall Cronbach's alpha value for the scale was deleted, thus contributing to the increased reliability of the scales. The 'corrected item-total correlation' indicate the correlations between each item and the total score. Depending on the size of the sample, item-total correlations should ideally be above 0.30 (Field 2005). The five scales of the ARQ had item-total correlations between 0.2 and 0.3, which is adequate if one has a large sample, such as is the case here. The integration and support scale had item-total correlations below 0.2, effectively rendering the particular scale unreliable.

## **6.5.2. Validity**

Validity refers to the extent to which the conclusions made from a test are appropriate, meaningful and useful (Gregory, 2000, p. 96). Four types of validity have been achieved to some extent with this research.

### **6.5.2.1. Face validity**

Face validity is achieved when a test or questionnaire seems valid to test users and other stakeholders. Face validity is, however, not achieved through scientific methods, but is nevertheless important to achieve social acceptability (Gregory, 2000). For the purposes of this study, the ARQ has good face validity because the questionnaires that were used are well recognised and the literature review confirmed the use of the specific non-cognitive variables. The design and layout of the ARQ also contributed to face validity.

### **6.5.2.2. Content validity**

The second type of validity, content validity, is achieved when the items on a questionnaire are representative of the total spread of traits, abilities or preferences that are supposed to be measured by the test. During the development phase of the questionnaire, an extended literature search was conducted to investigate the factors associated with failure and withdrawal. Numerous questionnaires and test items were investigated to identify relevant constructs and items for the ARQ. Experts in the field, as suggested by Gregory (2000), were considered for their expert opinion on the items and the item constructs to measure academic readiness from a non-cognitive perspective. The ARQ therefore has adequate content validity because the processes that were followed correspond to the requirements of content validity.

### **6.5.2.3. Predictive validity**

The third type of validity, predictive validity is a type of criterion-related validity. 'Criterion related validity is demonstrated when a test is shown to be effective in estimating an examinee's performance on some outcome measure' (Gregory, 2000, p. 99). According to Gregory, predictive validity is measured with regression type equations. Various

regression type analyses were performed to determine the predictive validity of the ARQ, such as multiple regression analysis and logistic regression analysis. These techniques were used to predict the two criterion outcomes, namely risk for failure and risk for withdrawal. The above discussion on the prediction of risk indicated that goal orientation and learning-efficacy of the ARQ are predictors of risk for failure, but none of the ARQ factors were able to predict risk for withdrawal on a logistic regression analysis.

Goal orientation was a significant predictor of academic achievement in the multiple regression analysis for the main effects as well as for the white students, but not for the African students. It is concluded that goal orientation has predictive validity for the white students, but not for the African students.

The next assessment related to prediction is the practical value of this predictor, thus to what extent goal orientation, as measured with the ARQ, is able to predict a change in academic success. Goal orientation has a positive linear relationship with academic success, but has low zero-order correlations, ranging between 0.157 and 0.166. Goal orientation emerged as the second strongest predictor, after M-score, thus indicating the importance of the variable even though its contribution to the variance explained is only 1.7%, according to the squared partial correlations. The practical value of the predictor on its own is rather weak in terms of predicting academic achievement and contributes limited variance to the overall prediction model.

Learning-efficacy consists of two main components, namely internal locus of control (autonomy) and academic self-efficacy. High scores on the learning-efficacy scale refer to students who believe they have the academic skills to be successful at university and who have a general internal locus of control. Learning-efficacy had a significant relationship with academic success, as indicated in the multiple regression analysis for the student sample model as well as for the white students, but not for the African students. A discrepancy in the direction of the relationship exists for the student sample model as well as for the white students, because the beta weights indicate a negative relationship and the zero-order correlations indicate a positive relationship.

The African students' output shows consistency in that both the beta weights and zero-order correlations are positive, but the relationship is not significant. Learning-efficacy in a multiple regression analysis contributed less than 1% of the variance in the model and has a zero-order correlation ranging between 0.069 to 0.071, indicating a very poor positive relationship with academic achievement and is only applicable to white students. Learning-efficacy was not a significant predictor of risk for withdrawal and thus has no predictive validity.

#### **6.5.2.4. Construct validity**

Construct validity is achieved when a test or questionnaire measures a proposed construct or trait that it sets out to measure (Gregory, 2000). Two statistical methods were used to determine construct validity, namely test homogeneity and factor analysis. Test homogeneity refers to the point-biserial correlation, or the correlation between the individual items and the total score. Tests that have internal consistency are regarded as being homogenous because the items are closely related to the total score of the test. The point-biserial correlation is frequently used to determine the internal consistency of an item and is used for both the item-reliability index and item-validity index (Gregory, 2000). A correlation of below 0.30 for an item is regarded as the cut-off point.

The point-biserial correlations for the items ranged between 0.28 and 0.85. Only one item had a correlation below 0.30, namely item number 44. Item 44 was deleted from further analysis based on the results of the factor analysis and scale reliability statistics, together with a number of other items. The deduction can be made that the ARQ has both good item reliability (internal consistency) and construct validity.

The second method of determining construct validity was with a factor analysis. The purpose of a factor analysis is to identify the minimum number of cluster or factors to account for the inter-correlations among items from a test (Gregory, 2000, p. 112). According to the factor analysis conducted with the sample from the faculty of Economic and Management Sciences, five clear factors were identified. The five factors were

named achievement motivation orientation, learning-efficiency, goal orientation, integration and support, and reading behaviour respectively. The five factors were then combined to develop two second-order factors, namely a motivational scale (Fa) and an integration and reading scale (Fb). The combined alphas for Fa is 0.87 and the scale explained 28.8% of the variance while the combined alphas for Fb is 0.61 and scale explained 28.6% of the variance. The overall alpha for the ARQ was 0.87.

Based on the test for homogeneity and the factor analysis of the test items, it can be concluded that the ARQ has good levels of construct validity.

### **6.5.3. Bias in Predictive Validity**

Test bias in predictive validity occurs when a test does not predict future performance equally well for different populations (Gregory, 2000, p. 244). Test bias in predictive validity is usually associated with intelligence and ability tests, but will be discussed here because of the differentiation that was made on the multiple regression analysis for the white and African student samples. The regression analysis outputs for the two student sample groups were not similar and the 'criterion of homogeneous regressions' could not be achieved (Gregory, 2000, p. 244). According to this finding, it can be said that the ARQ is biased toward the African students because the ARQ is not able to predict academic success with near-identical accuracy. Sedlacek (2005) proposed that motivational constructs like self-efficacy, goal orientation and self-concept are more able to predict retention and academic achievement for African students than for white students.

Research by Rodgers and Summers (2008) contradicts the research of Sedlacek, because they indicate that motivational factors such as self-efficacy and goal setting are less predictive for African students than for white students. The adaptation process is different for African students due to the differences in the learning experiences these students face. A linear relationship, which is presumed in regression analysis, does not

apply to African students as it does for white, middle-class students. Goal orientation, consisting of effort or academic apathy, planning of study time by setting goals, and being methodical in one's behaviour, is not universally shared and is regarded as necessary in order to achieve academically.

## 6.6. CONCLUSION

The multiple regression analysis and multiway frequency analysis produced nine variables that were statistically significant in explaining risk for failure (academic success). The variables are M-score, race language, credits registered, goal orientation, learning-efficacy, gender, distance of school, reading behaviour and parental education at the University of Pretoria. The binary logistic regression analysis and the multiway frequency analysis produced four variables that were statistically significant in explaining risk for withdrawal. The variables are M-score, race language, reading behaviour and credits registered. In addition to the predictor variables in risk for withdrawal, academic achievement seems to have a high negative correlation with withdrawal behaviour, thus indicating that the higher a student's academic achievement, the lower the risk for withdrawal. The Academic Readiness Questionnaire in conclusion is regarded as a reliable measurement instrument. Its reliability increases when the scales of the ARQ are measured separately (unidimensional). The integration and support scale is less reliable than any of the other four scales. The items with low item-total correlations could have been removed during the analysis phase of the research to improve the internal reliability of the scale more (Field, 2005) and should be done in future. The ARQ has good face, content and construct validity. Predictive validity is low because only goal orientation, learning-efficacy and reading behaviour scales achieved predictive validity.

## CHAPTER 7

### CONCLUSION AND RECOMMENDATIONS

#### 7.1. TESTING THE HYPOTHESES

The aim of study was to investigate the readiness characteristics that determine risk, for either failure or withdrawal. The initial hypothesis was that student readiness characteristics directly affect the student's likelihood of withdrawal or failure. These hypotheses were subsequently refined to the following hypotheses for this study:

1. Students who score high on the 'Academic Readiness Questionnaire' factors will have higher academic performance than students who perform lower on the questionnaire factors.
2. Students who score low on the 'Academic Readiness Questionnaire' factors are more likely to withdraw from their studies than students who score higher on the questionnaire factors.
3. Student readiness characteristics directly affect the likelihood of withdrawal.
4. Student readiness characteristics directly affect academic performance at first year.
5. Academic performance is an intervening variable for withdrawal.
6. The predictors of risk for failure will differ between the racial groups.
7. The predictors of risk for withdrawal will differ between the racial groups.

**Hypothesis 1** regarding the Academic Readiness Questionnaire's ability to predict risk for failure could not be verified in its entirety. Only two of the sub-scales, namely goal orientation and learning-efficacy, demonstrated predictive validity in screening for a risk for failure. Students who score high on the two sub-scales will have higher academic performance compared to students who has lower scores on the sub-scales. The

practical significance of the two sub-scales on its own is limiting if high school academic achievement (M-score) and biographical variables are excluded in the risk model. Contrary to expectations, the two ARQ sub-scales are therefore only able to provide incremental validity, and should be considered as one of a series/range of measures proposed as part of an early warning system.

**Hypothesis 2** regarding the Academic Readiness Questionnaire's ability to predict risk for withdrawal could not be verified. Only the reading behaviour sub-scale showed a significant relationship in screening for risk for withdrawal. This relationship was in a negative direction, indicating that students who score high on the reading behaviour factor are more at risk for withdrawal.

**Hypothesis 3** relates directly to the proposition that Tinto (1993) made. The hypothesis was accepted partially because four variables were statistically significant in explaining risk for withdrawal. The variables are M-score, race language, reading behaviour and credits registered. The major reason for withdrawal as identified during exit interviews was study choice, resulting in being unmotivated, not going to class and having poor academic performance. Thus, not enjoying the course or not identifying with it has an adverse effect on academic achievement. Students who study their second choice are also at risk for withdrawal, because there is a mismatch between the programme and their interest (Du Plessis et al., 2006; Johnston, 2000; Jones et al., 2008). The distance of the parental home seems to be a predictor of risk for withdrawal. Financial pressure on the student has a direct influence on the ability to pay for studies and living costs while studying at university and contributes to withdrawal early in the year.

**Hypothesis 4** is partially accepted, because only nine variables were statistically significant in explaining risk for failure (academic success). The variables are M-score, race language, credits registered, goal orientation, learning-efficacy, gender, distance of school, reading behaviour and parental education at the University of Pretoria.

**Hypothesis 5** is accepted, because risk for withdrawal is highly correlated with prior academic performance (M-score). Academic achievement has a high negative correlation with withdrawal behaviour. Students with lower academic achievement at school are more likely to be discontinued by the faculty and to withdraw on a voluntary basis.

**Hypothesis 6** is accepted, because the predictors of risk for failure differ between the racial groups. The variables that predict risk for failure for white students are M-score, goal orientation, credits registered, learning-efficacy, gender, and parental education at UP. The variables that predict risk for failure for African students are M-score, credits registered, and parental education at UP.

**Hypothesis 7** could not be verified, as race language is grossly skewed for risk for withdrawal where actual frequencies (cross-tabulations) indicate that only 3% of African students are at risk in comparison to Afrikaans (14.6%) and English (13.4%) students who are at risk. Subsequent analyses that differentiate between races are therefore not possible.

## 7.2. SUMMARY OF A READINESS AND RETENTION MODEL

Based on the statistical analysis, the readiness and retention model discussed in Chapter 2 will be reviewed to include the readiness characteristic that reached statistical significance, as well as the salient readiness factors that emerged from the exit interviews. The assumptions for the readiness and retention model are borrowed from Bandura (1986, 2006), Bean and Eaton (2000) and Conley (2007), namely:

- action precedes outcomes;

- cognitive processes such as evaluating, intending and monitoring precede behaviour;
- psychological processes lead to attitudes about one-self;
- behaviour, personal variables and the environment are in dynamic and in reciprocal interaction with each other; and
- the elements of readiness are neither mutually exclusive nor perfectly nested in the model.

The readiness characteristics, based on the analysis are:

- High school achievement (M-score);
- Race language;
- Credits registered;
- Goal orientation;
- Learning-efficacy;
- Gender;
- Distance of school;
- Reading behaviour;
- Parental education at the University of Pretoria;
- Study choice;
- Distance of parental home; and
- Financial pressure of the student to pay for studies and living costs.

The readiness and retention model will focus predominantly on the readiness characteristics that students present upon entering the faculty and institution and the contextual or environmental dimension in which the readiness characteristics are nested.

Students undergo a transition phase as they enter the institutional environment. According to the readiness and retention model, the students who are ready for university education are more likely to have a smoother transition phase, be academically successful, and persist (Conley, 2007). These students are more able to adapt to the university environment because they are able to strengthen their resources

(Schlossberg et al. 1995). These resources consist of a support structure of family and friends, personal psychological resources like self-efficacy and locus of control, and strategies like coping, information seeking and increasing effort.

The contextual dimension in this model can be subdivided into three sub-dimensions that together determine an individual's unique contextual situation. The three sub-dimensions are the parental, school, and financial dimensions. The contextual dimension functions as the 'cradle' for the development of psycho-social and cognitive skills that are expressed in behaviour, thoughts and emotions (Bandura, 1986).

The parental sub-dimension incorporates the educational level of the parents or guardians and the level of support that this sub-dimension is able to provide to the student before entering and during the student life cycle at the institution. The parental sub-dimensions will ultimately influence the quality of the interactions with the academic and social communities in the institutional dimension. The parental sub-dimension was predictive of risk for failure only (refer to Appendix Table B.8. and B.9.).

The school sub-dimension indicates where students completed their senior certificate. The province where students completed their high school certificate does not only provide some indication of the distance of the school from the university, but also gives an indication if the school is centred in an urban or rural region. The schools from other provinces that are part of the feeding schools of the university are more frequently rural, farm communities or medium sized cities. The distance of the school also gives an indication of the distance of the parental or family support of the students. Students usually go to the school nearest to their parents' or family's home.

The financial sub-dimension refers to the socio-economic circumstance of the students and their ability to pay for their studies. Students who interpret the cost of their education to be more than the perceived value of an education are more likely to withdraw from their studies. We find that those students who are not able to pay for their studies have

academic difficulties and eventually withdraw from their studies. The financial sub-dimension is highly related to the parental and school sub-dimensions as well as the cognitive dimension. Students of lower socio-economic status who are more likely to be enrolled in poorer quality or government schools, are less prepared for university and are more likely to have poor achievement and have greater risk for withdrawal (Tinto, 1993). The financial sub-dimension did not have a significant relationship with risk for withdrawal, but emerged as a salient factor during the exit interviews.

The cognitive dimension, especially those related to academic achievement at high school, forms the base for the evaluations of cognitive ability. High school achievement is a measure of the cognitive preparedness of students and consists of content knowledge that Conley (2007) deems to be important for readiness. The key cognitive strategies discussed in Conley are a reflection of the abilities and skills that students have gained at high school. Other factors like the evaluation of the quality of the school environment also impact on perceived abilities and perceptions of preparedness for university. These factors subsequently influence perceptions of self-efficacy and locus of control as well as the goals that students will set for future performance. Locus of control is the perception of influence on the environment and has a direct influence on self-efficacy (Bean, 2005).

The cognitive dimension also includes the reading behaviour of students. Students who read for leisure or pleasure are more disengaged in the learning process, which leads to poor academic achievement.

The personal dimension consists of race (language) and gender. Race (language) played a significant role in predicting both risk for failure and risk for withdrawal. Race (language) represents the students' cultural background as it is expressed through language (Bandura, 1986). A language does not only indicate a difference in the words that are used, but also a difference in a 'meaning making system' and includes the values and beliefs or cultures associated with a specific language (Kuh & Love, 2000). The socio-cultural background of students also incorporates the domestic environment

where the students grew up and is extended in stereotypical behaviour due to socio-cultural influences and affiliations (Van Heerden, 1997).

Gender and racial differences influence the expectancies and values of students, their learning-efficacy judgements and goal orientations and their academic behaviours and choices. Subsequently it has a direct influence on academic achievement and withdrawal. The difference of the goal orientation and learning-efficacy scales among African and white students when predicting academic success confirms that cultural differences lead to differences in the way the non-cognitive factors are interpreted (Rodgers & Summers, 2008).

The non-cognitive factors are influenced by perceptions of personal past experiences, perceived academic ability, race, gender and socio-cultural influences (Wingfield and Eccles, 2000). The non-cognitive dimension represents the expectations and values of students and their self-efficacy judgements and goal orientations.

Goal orientation measured here consists of three related components, namely effort or academic apathy, planning of study time by setting goals, and being methodical in ones behaviour. The goal orientation scale confirmed the research that higher levels of effort and planning are positively related to academic achievement (Geiger & Cooper, 1995). The suggestion is that the components measured by goal orientation coincide with one of Conley's academic behaviours, namely study-skill behaviours. The study-skill behaviours compose of time management, which according to Conley (2007) refers to planning a task, setting up the study environment, breaking up the tasks into manageable chunks and balancing competing tasks. Goal orientation is regarded as short-term goals that are important regulators of behaviour, but dependent on the importance or value of the outcome as well as the expected success of achieving the outcome (Eccles & Wingfield, 2000).

Learning-efficacy consists of two main components, namely an internal locus of control (autonomy) and academic self-efficacy. Students with high scores on the learning-efficacy scale have the academic skills to be successful at university and have a general internal locus of control. The self-efficacy judgements indicate future expectations of task difficulty and the student's locus of causality. Efficacy expectations refer to an ability to do the task and do not indicate how well a person will do on the task (Zimmerman, 2000). Therefore, it is important for students to set task-specific goals that are able to enhance performance and effort. When a goal, especially a challenging goal, is attained it increases efficacy judgements and motivation to continue with the task. There is thus a cyclical effect between goals, self-efficacy and effort (see Perna & Thomas, 2008).

The results from this study indicate that the expectation of task difficulty and success together with the effort expended on a learning task is associated with academic success. Task value did not show a significant result and therefore contradicts the results of Geiger and Cooper (1995) that showed that the value of an outcome can be more motivational than the perceived expectation of attaining the outcome.

In summary, a reciprocal interaction is evident between the variables of the contextual, cognitive, non-cognitive and personal dimensions (Bandura, 1986; Bean & Eaton, 2000). These dimensions subsequently influence future expectations of task difficulty and the perceived value and cost of pursuing a degree at the institution. Expectations of success and task difficulty subsequently determine the learning-efficacy and goal orientation of the student, which lead to academic behaviours and choices. The academic behaviours in this model refer to students increasing their effort, being more methodical and planning their learning (Conley, 2007). The academic choices the students make relate to choosing a programme or career and the number of credits to register for.

The bureaucratic, academic, and social systems (institutional dimension) interact with the contextual dimension external to the institution, together with the other dimensions. The dimensions give an indication of the students who are more likely to be at risk for failure or withdrawal (behaviour that is being measured). Students that show a positive

non-cognitive dimension and who have the cognitive capabilities to excel academically and have a supportive contextual environment, will be more inclined to benefit from the academic environment and will be more likely to persist and achieve academically.

In addition, academic achievement has a high negative correlation with withdrawal behaviour, thus indicating that the higher a student's academic achievement, the lower the risk for withdrawal.

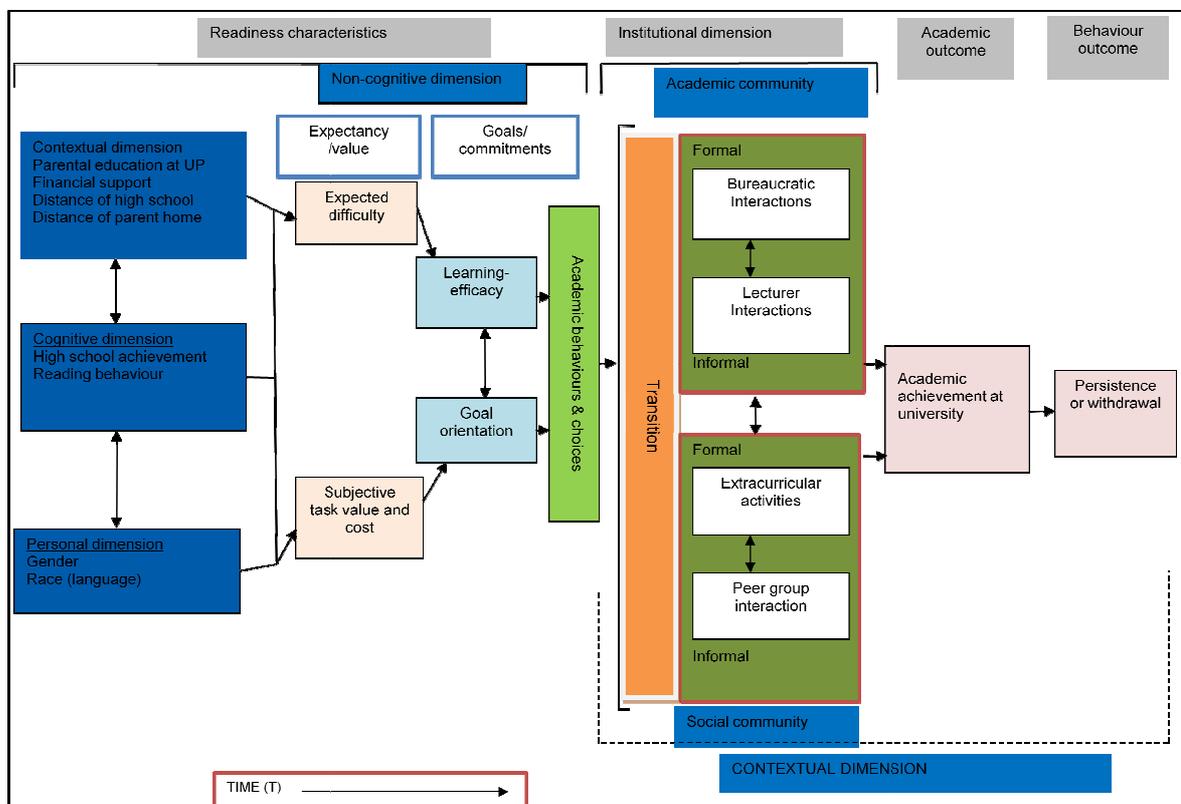


Figure 7.1. Model of readiness for university education

### 7.3. CONCLUDING REMARKS

The research set out to determine the readiness characteristics associated with important academic behaviours, namely academic achievement and persistence. Astin's (1970) model of student development in a higher education institution was used, most prominently the input – output relationship. The environment component was not measured during this study, to allow for the direct relationship between the readiness characteristics and the academic behaviours.

The use of a quantitative and qualitative methodology to measure the readiness characteristics allowed for additional variables to be included in the model and to test the research hypotheses, which were not assessed by the Academic Readiness Questionnaire.

The research results showed that African students have higher academic achievement and are less likely to withdraw, when compared to white students. This result is unexpected because it contradicts national trends and some of the findings of the literature. The literature of Rodgers and Summers (2008) and Sedlacek (2005) indicate that minority students, such as African-American students, are more likely to have poorer academic performance than white students when attending an HWI. Astin (1975, p. 143) indicates that African students attending an HWI are more likely to withdraw from their studies than African students attending Historically African Institutions.

The differences in academic success and withdrawal rates among African and white students are due to high school achievement and the number of credits the students register for. African students tend to register for fewer credits, with M-scores being equal. Registering for fewer credits should place the African students at risk, but this is not the case because some African students with average and high M-scores register for fewer credits. In the past, the African students tended to misjudge the workload of a university curriculum (Van Heerden, 1997). The results of the present study show that

successful African students in the sample are more cautious when registering for credits which are bearing positive fruits.

The academic achievement of African students allows for fewer students to be discontinued by the faculty and the results indicate that African students seldom withdraw voluntarily. Many African students have grade point averages below 50% which place them at risk for failure, but they still persist to the second year.

White students tend to register for more credits in comparison to African students with similar M-scores. Some white students' credit overload contributes to poorer academic achievement. The white students possibly feel pressure to complete their degree in the minimum duration. The research indicates that white students are more likely to withdraw voluntarily, mostly within the first couple of weeks or months mainly due to choosing the wrong study choice.

High school academic achievement is widely regarded as the best predictor of first-year academic achievement and has been confirmed by the study (Astin & Oseguera, 2005; Astin, 1975; Camara, 2005b; Sternberg & Grigorenko, 2002). M-score is a measure of high school achievement and represents the key cognitive strategies that are developed as part of the high school curriculum as well as the content knowledge that is achieved through the subjects taken at high school (Conley, 2005, 2007). The two elements interact with and affect one another extensively to such an extent that acquiring content knowledge is dependent on developing and using cognitive strategies. Content knowledge is formally measured by end-of-course exams at high schools and students who score high on these exams have higher M-scores. M-score therefore represents the academic preparedness of entering students.

M-score is a marginally stronger predictor in the case of white students than for African students on both risk for failure and withdrawal. The quality of schools and socio-economic circumstances of African students are some of the reasons given for this

difference (Jones et al., 2008; Scott, 2009). Tinto (1993) leans on other researchers to make a point that students of lower socio-economic status who are more likely to be enrolled in poorer quality or government schools are less prepared for university and are more likely to have poor achievement and have greater risk for withdrawal.

Goal orientation and learning-efficacy were predictive of risk for failure, but failed to show a significant relationship with withdrawal. Proposition 3 (Tinto, 1993), which specifically points to the direct relationship of goals and motivations with withdrawal behaviour could not be confirmed with the results. An indirect relationship was present due to the significant relationship between academic achievement and withdrawal in the first year.

Racial differences on both the goal orientation and learning-efficacy scales contributed to the decisions made by African and white students to register for their credit load. The evaluation of expected difficulty and ability specifically, together with contextual influences contributed to the decisions. African students have low to average goal orientation and learning-efficacy scores which could have contributed to their decision to take fewer credits, thus showing a negative relationship between the variables. The white students showed a positive relationship on both goal orientation and learning-efficacy, pointing to a possible reason for taking on a larger credit load.

Goal orientation, learning-efficacy and reading behaviour (three of the scales from the Academic Readiness Questionnaire) were significant predictors of academic achievement, but the correlation was lower than expected. Within the broader scope of academic success, academic achievement is but one factor (Camara, 2005; Perna & Thomas, 2008). It could be that the factors of the ARQ are associated with more of the facets of academic success, which are developed over the period that students are enrolled in the institution. High school achievement and the number of credits that students register for had a confounding effect on the ARQ scales which in turn influenced the scales' ability to predict risk for failure. The three scales therefore have an indirect effect on risk for failure and presumably also on risk for withdrawal. No evidence

could be found to indicate a relationship between risk for withdrawal and the factors of the ARQ which inhibits any conclusions to be drawn on possible relationships.

#### **7.4. CONTRIBUTION OF THE STUDY**

The study contributed to scientific knowledge by showing the readiness characteristics of first-year students that are related to risk at a South African tertiary institution. Racial differences relating to readiness characteristics are regarded as a very important contribution toward the readiness and retention models. Institutions do not always understand the entering student, nor do they know what the between and within-group differences are, if any. A scientific approach to measuring the readiness characteristics and producing risk profiles could contribute to improving the retention rates of an institution.

High school achievement measured with M-score will not be available from 2009, when the Admissions Point Score (APS) replaces it. The APS will be under investigation for a number of years until national norms are determined (Umalusi, 2009). Students entering the higher education sector during this period might not be selected accurately by universities, especially if selection is based on high school marks alone. Students are generally under or differently prepared which, contributes to the possible dilemma of universities (Scott et al., 2007). Non-cognitive and demographical elements should therefore be used to help identify students at risk.

A further contribution to scientific knowledge is the development of a concise measurement instrument from the theoretical foundation that can be used by faculty, firstly as a screening tool and secondly as part of an early warning system to determine 'risk'. The Academic Readiness Questionnaire proved to be a reliable screening instrument by giving an accurate measure of the non-cognitive readiness characteristics.

The ARQ showed somewhat disappointing predictive validity statistics, especially for African students.

According to Seidman (2005, p. 307), some students will not fit the profile of an at risk student at the beginning of the year, but present problems which affect the predictability of readiness characteristics in general. The use of the ARC as a screening test has the advantage of profiling students at risk, as opposed to absolute prediction of risk. It does not mean that students with a risk profile have no chance of success, but rather that they might encounter more challenges along their way in attaining success. The overall contribution of the ARQ is however recognised.

## **7.5. RECOMMENDATIONS**

Astin's (1970) model of student development in a higher education institution was used; most prominently the input – output relationship. The following broad recommendations can be made:

- The environment component should also be measured to determine how this component contributes to student outputs. The student learning experience (Upcraft et al., 2005), profiles of student engagement (Kuh et al., 2007) and development (Pascarella & Terenzini, 2005) can be measured when the learning component is added to the readiness and retention model. Including the environment component into an investigation could provide valuable information as to the process of development of students, from entry through to second year and eventual graduation.
- The second recommendation relates to a policy decision to measure readiness for university education as part of an early alert and referral system. Early alert refers to the identification of a student who is potentially at risk of being

unsuccessful at a university, either academically or personally (Beck & Davidson, 2001; Seidman, 2005). This could manifest at any point in the student's life cycle, albeit at registration for entry into a programme, at the first examination period or when students present with personal problems. To provide effective support, various sources of readiness information are necessary to profile students upon entry.

- Within the framework of an early alert and referral system, it is recommended that:
  - The ARQ be extended to include items that cover career exploration, general well-being, academic support needed, and anxiety levels during learning engagement and examinations.
  - The ARQ should also be administered to all first-year entering students enrolled at the institution. The purpose is to develop faculty-specific norm groups over time so that new entering students' profiles can be compared to the norm group to determine risk for withdrawal or failure. Each faculty should determine their risk profile and students should be short-listed based on the specific risk profiles. Additional questionnaires or interviews can follow the ARQ screening test to determine the extent of a problem or other contributing factors that influence the students' current risk profiles. These students can then be allocated to support services to address the specific needs of the students.
  - Students have to be identified as early as possible and their progress tracked. Continuous tracking of student performance becomes necessary because the ARQ can only be considered as a screening test for risk. Additional indicators, such as class attendance, poor academic achievement in tests or assignments should be indicators of early academic risk. A Learning Management System could also be used to place all biographical information of students into the database, together with the information of the ARQ and other ability or potential instruments to better inform the risk profile of students.
  - For an early alert and referral system to be effective in dealing with at risk student issues, support programmes have to capture the students (Jones, Coetzee, Bailey & Wickham, 2008). A contributing suggestion is to include

developmental programmes that support students on various levels (Sedlacek, 2004). The developmental implications refer to the long-term view that an institution should have to support students through their learning experiences, from entry through to graduation.

- Career advising and support should play an important role on campus and should be done in such a way that it gives information on students' abilities and how the abilities relate to the subjects they propose to enrol for, so that students can make informed academic decisions (Bean, 2005). Linking course decisions with possible job opportunities is also an important part of advising for career goals. Study choice questions need to be addressed in greater extent in future assessments when students enter. Strategic questions that assess career guidance were not included in the ARQ. The inclusion of such questions could have increased the validity of the instrument. According to Stage and Hossler (2004), searching and gathering of information about a programme and the institution is regarded as early indicators of students' motivation and involvement in their education, and has been linked to the academic success of students.
- According to Jones et al. (2008), under-resourced students are predominantly African students from rural environments. Grants or bursaries should therefore be given to under-resourced students to improve their ability to persist. The worldwide tendency on reduced public investment in higher education implies that, relatively speaking, universities are receiving less funding and can therefore not provide bursaries to students to cover all their educational needs (Cloete et al., 2006). The lack of funding will therefore have an influence on institutional retention rates and student persistence rates specifically.
- The credit load of students and its relation to both risk for failure and withdrawal has implications for curriculum development. The debate regarding the implementation of extended programmes is a point of discussion on various higher education societies and interest groups, such as the Higher Education Learning and Teaching Association of South Africa (Young & Scott, 2009). The research findings do not argue for or against extended programmes in South

African universities, because registering for the prescribed number of programme credits is positively associated with academic achievement and persistence. A trend from African students indicates that registering for fewer credits can be advantageous. African students consciously register for fewer credits and are successful at first year. White students do not have the same successes when registering for fewer credits over the first year.

- The finding that African students progressively have higher withdrawal rates than white students from second year registration indicates that lowering the number of credits only does not serve in the best interest of the students. The recommendation is to not only lower the credit load, but also implement developmental programmes. Students from these programmes should be supported in such a way that they are able to make a transition to mainstream in the second or third year. This transition should be gradual with high support with many developmental programmes in the beginning of the first year with less support toward the end of the extended programme.



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**APPENDIX A.**

**ACADEMIC READINESS QUESTIONNAIRE – ENGLISH VERSION**

The aim of this questionnaire is to establish your preferences and feelings related to your readiness to benefit from university education. There are no correct or incorrect responses to these statements.

There is no time limit; however, most people take about 10 minutes to complete the questionnaire.

**Instructions**

1. You are asked to rate each statement on a scale of 1 to 5. When you have chosen the response appropriate for you, record this by crossing the corresponding number next to the particular statement.

2. Apply the following scale when responding to the statements:

1. **Definitely disagree**
2. **Disagree**
3. **Neutral**
4. **Agree**
5. **Definitely agree**

Example:

Statement	Definitely disagree	Disagree	Neutral	Agree	Definitely agree	Office use only
1. I made the right choice to attend this university.	1	2	3	<del>4</del>	5	V1 <input type="checkbox"/>
2. I expect to meet lots of people who are like me her.	<del>1</del>	2	3	4	5	V2 <input type="checkbox"/>

When answering the statements, please remember the following:

1. Please read each statement carefully and ensure that you react to **all** the statements.
2. Do not spend too much time on each statement.
3. Please try to avoid the middle (**neutral**) option wherever possible.
4. Please be as truthful as you can. Don't give an answer just because it seems to be the right thing to say.
5. If you wish to change a response, please erase it and insert your new response.





16. I can easily adjust to different styles of teaching.	1	2	3	4	5	V16	<input type="checkbox"/>
17. I prefer to do things on my own.	1	2	3	4	5	V17	<input type="checkbox"/>
18. I sometimes wonder if I am really university material.	1	2	3	4	5	V18	<input type="checkbox"/>
19. I will try to make time for outside reading despite the demands of my course work.	1	2	3	4	5	V19	<input type="checkbox"/>
20. I know exactly what I want to major in.	1	2	3	4	5	V20	<input type="checkbox"/>
21. I will try to do optional reading even though I know it will not influence my grade.	1	2	3	4	5	V21	<input type="checkbox"/>
22. Grades provide me with an ideal goal to work towards.	1	2	3	4	5	V22	<input type="checkbox"/>
23. I am as skilled academically as the best students here.	1	2	3	4	5	V23	<input type="checkbox"/>
24. I enjoy working on complex, intellectually demanding problems.	1	2	3	4	5	V24	<input type="checkbox"/>
25. The structure and routine of a person's work should be determined by himself/herself.	1	2	3	4	5	V25	<input type="checkbox"/>
26. My parents/guardians do not feel I should be at university.	1	2	3	4	5	V26	<input type="checkbox"/>
27. I tend to study in spurts rather than at a regular consistent pace.	1	2	3	4	5	V27	<input type="checkbox"/>
28. Reading is one of my favourite pastimes.	1	2	3	4	5	V28	<input type="checkbox"/>
29. It is important to always be prepared for class.	1	2	3	4	5	V29	<input type="checkbox"/>
30. I am comfortable interacting with people from other races and cultures.	1	2	3	4	5	V30	<input type="checkbox"/>
31. I know what I want and I usually make sure that I get it.	1	2	3	4	5	V31	<input type="checkbox"/>
32. I have talked about my career goals with someone who has worked in that field.	1	2	3	4	5	V32	<input type="checkbox"/>
33. I enjoy meeting new people.	1	2	3	4	5	V33	<input type="checkbox"/>
34. Getting good grades is mainly related to a person's dedication.	1	2	3	4	5	V34	<input type="checkbox"/>
35. I feel in control of my life.	1	2	3	4	5	V35	<input type="checkbox"/>



36. I have the ability to plan my work (study time)	1	2	3	4	5	V36	<input type="checkbox"/>
37. I like to look through the library for books that spark my interest.	1	2	3	4	5	V37	<input type="checkbox"/>
38. My goal is to get the best grade I can without spending a lot of effort on my course work.	1	2	3	4	5	V38	<input type="checkbox"/>
39. My family is a source of encouragement and support.	1	2	3	4	5	V39	<input type="checkbox"/>
40. I try to break studying down into smaller steps.	1	2	3	4	5	V40	<input type="checkbox"/>
41. My high school grades don't really reflect what I can do at university.	1	2	3	4	5	V41	<input type="checkbox"/>
42. I have confidence in sharing my own opinions, even if they might be different from the way most other people think.	1	2	3	4	5	V42	<input type="checkbox"/>
43. It is important to have a good university education to make a success in life.	1	2	3	4	5	V43	<input type="checkbox"/>
44. When working on a project I prefer to work as part of a team.	1	2	3	4	5	V44	<input type="checkbox"/>
45. I expect to do very well in my degree.	1	2	3	4	5	V45	<input type="checkbox"/>
46. It is important to have people recognise the work I have done.	1	2	3	4	5	V46	<input type="checkbox"/>
47. I am quick to grasp new concepts and ideas.	1	2	3	4	5	V47	<input type="checkbox"/>
48. I find it difficult to accept criticism.	1	2	3	4	5	V48	<input type="checkbox"/>
49. I worry about financing my way through higher education.	1	2	3	4	5	V49	<input type="checkbox"/>
50. I often don't see things through to the end.	1	2	3	4	5	V50	<input type="checkbox"/>
51. I try to avoid becoming involved with social groups and organisations.	1	2	3	4	5	V51	<input type="checkbox"/>
52. If I run into problems at university, I have someone who would help me.	1	2	3	4	5	V52	<input type="checkbox"/>
53. I will ask for help if I am battling with a complex problem.	1	2	3	4	5	V53	<input type="checkbox"/>
54. I am generally satisfied with my life.	1	2	3	4	5	V54	<input type="checkbox"/>



55. I expect to be involved in many off-campus activities while enrolled here (social, sport, etc.).	1	2	3	4	5	V55	<input type="checkbox"/>
56. I like to have a routine to follow.	1	2	3	4	5	V56	<input type="checkbox"/>
57. I take responsibility for my own intellectual development.	1	2	3	4	5	V57	<input type="checkbox"/>
58. I organise my study time to best accomplish my goals.	1	2	3	4	5	V58	<input type="checkbox"/>
59. I have the ideal personality to pursue my field of study.	1	2	3	4	5	V59	<input type="checkbox"/>
60. I prefer to be spontaneous rather than to set goals when I study for tests/exams.	1	2	3	4	5	V60	<input type="checkbox"/>
61. My friends are extremely important to me.	1	2	3	4	5	V61	<input type="checkbox"/>
62. I usually double check things; just to make sure they are correct.	1	2	3	4	5	V62	<input type="checkbox"/>
63. Getting good grades is important to me.	1	2	3	4	5	V63	<input type="checkbox"/>
64. I know what I want to be doing 10 years from now.	1	2	3	4	5	V64	<input type="checkbox"/>
65. I can motivate myself to study when I need to.	1	2	3	4	5	V65	<input type="checkbox"/>
66. I need to undertake paid employment in order to help fund my studies.	1	2	3	4	5	V66	<input type="checkbox"/>
67. I will continue working on a complex task even if I do not succeed at it with the first try.	1	2	3	4	5	V67	<input type="checkbox"/>
68. I have clear and reachable goals for my studies this year.	1	2	3	4	5	V68	<input type="checkbox"/>
69. I plan my study sessions in advance and pretty much stick to the plan.	1	2	3	4	5	V69	<input type="checkbox"/>
70. I learn things more quickly than most people.	1	2	3	4	5	V70	<input type="checkbox"/>



## ACADEMIC READINESS QUESTIONNAIRE – AFRIKAANS VERSION

Die doel van die vraelys is om jou voorkeure en persepsies wat verband hou met jou gereedheid om by universiteitstudie te baat, te bepaal. Daar is geen korrekte of verkeerde antwoorde op die stellings nie.

Daar is nie 'n tydsbeperking nie, maar die meeste persone voltooi die vraelys in 10 minute.

### Instruksies

1. Elke stelling moet op 'n skaal van 1 tot 5 beantwoord word. Trek 'n kruisie oor die nommer wat jou die beste pas.
2. Gebruik die volgende skaal wanneer jy op die stellings antwoord:

1. **Stem glad nie saam nie**
2. **Stem nie saam nie**
3. **Neutraal**
4. **Stem saam**
5. **Stem volkome saam**

Voorbeeld:

Stelling	Stem glad nie saam nie	Stem nie saam nie	Neutraal	Stem saam	Stem volkome saam	Slegs kantoor gebruik
1. Ek het die regte keuse gemaak om by die universiteit te.	1	2	3	<del>4</del>	5	V1 <input type="checkbox"/>
2. Ek verwag om baie mense soos ek hier te ontmoet.	<del>1</del>	2	3	4	5	V2 <input type="checkbox"/>

Wanneer jy die volgende stellings antwoord, onthou asseblief die volgende:

1. Lees elke stelling deeglik en maak seker jy antwoord al die stellings.
2. Moet nie te veel tyd spandeer op een stelling nie.
3. Probeer om so ver moontlik die middel (**neutraal**) opsie te vermy.
4. Wees asseblief eerlik wanneer jy die vrae beantwoord. Moenie 'n antwoord merk net omdat jy dink dis wat van jou verwag word nie.
5. Indien jy 'n antwoord wil verander vee dit uit en merk die nuwe antwoord.



STUDENTE NOMMERR OF I.D / PASPOORT NOMMER

Stelling	Stem glad nie saam nie	Stem nie saam nie	Neutraal	Stem saam	Stem volkome saam	Slegs kantoor gebruik
1. Ek het genoeg inligting oor die Universiteit van Pretoria gekry voordat ek ingeskryf het.	1	2	3	4	5	V1 <input type="checkbox"/>
2. Ek het genoeg inligting oor my graad gekry voordat ek by Universiteit van Pretoria ingeskryf het.	1	2	3	4	5	V2 <input type="checkbox"/>
3. Ek is ingelig oor die kombinasie van vakke wat nodig is om in die vereistes van my graad te voldoen.	1	2	3	4	5	V3 <input type="checkbox"/>
4. Ek het die vermoë om in hierdie jaar suksesvol in my studies te wees.	1	2	3	4	5	V4 <input type="checkbox"/>
5. Ek is 'n baie gestruktureerde persoon.	1	2	3	4	5	V5 <input type="checkbox"/>
6. My familie wou nog altyd gehad het ek moet universiteit toe gaan.	1	2	3	4	5	V6 <input type="checkbox"/>
7. Ek dink ek het die regte besluit gemaak om die graad te studeer.	1	2	3	4	5	V7 <input type="checkbox"/>
8. Dit is belangrik om van ander kulture te leer.	1	2	3	4	5	V8 <input type="checkbox"/>
9. Ek hou daarvan om in 'n leierskapsposisie te staan.	1	2	3	4	5	V9 <input type="checkbox"/>
10. Ek hou daarvan om boeke oor verskeie onderwerpe te lees.	1	2	3	4	5	V10 <input type="checkbox"/>
11. Ek stel spesifieke doelwitte voordat ek vir toetse/eksamens leer.	1	2	3	4	5	V11 <input type="checkbox"/>
12. Ek is gewoonlik meer op my gemak in 'n nuwe plek sodra ek 'n paar vriende gemaak het.	1	2	3	4	5	V12 <input type="checkbox"/>
13. Ek verwag om akademies swakker te presteer as die meeste van die studente.	1	2	3	4	5	V13 <input type="checkbox"/>
14. Ek is ingelig oor die moontlike loopbaan moontlikhede wat 'n spesifieke graad inhou.	1	2	3	4	5	V14 <input type="checkbox"/>
15. My ouers/voogde het my skoolprestasie negatief beïnvloed omdat hulle in my sake ingemeng het.	1	2	3	4	5	V15 <input type="checkbox"/>



Stelling	Stem glad nie saam nie	Stem nie saam nie	Neutraal	Stem saam	Stem volkome saam	Slegs kantoor gebruik
16. Ek kan maklik by verskillende onderrigstyle aanpas	1	2	3	4	5	V16 <input type="checkbox"/>
17. Ek verkies om dinge op my eie te doen.	1	2	3	4	5	V17 <input type="checkbox"/>
18. Soms wonder ek of ek regtig goed genoeg is om universiteit toe te kan gaan.	1	2	3	4	5	V18 <input type="checkbox"/>
19. Ek sal tyd vir lees maak al is my studies druk.	1	2	3	4	5	V19 <input type="checkbox"/>
20. Ek weet presies wat my hoofvak moet wees.	1	2	3	4	5	V20 <input type="checkbox"/>
21. Ek sal tyd vir addisionele leeswerk maak selfs al tel dit nie ekstra punte nie.	1	2	3	4	5	V21 <input type="checkbox"/>
23. Ek is akademies net so vaardig soos die beste studente.	1	2	3	4	5	V23 <input type="checkbox"/>
24. Ek geniet dit om met komplekse, intellektueel stimulerende probleme te werk.	1	2	3	4	5	V24 <input type="checkbox"/>
25. Elkeen moet self die struktuur en roetine van jou werk bepaal.	1	2	3	4	5	V25 <input type="checkbox"/>
26. My ouers/voogde dink nie ek moet universiteit toe gaan nie.	1	2	3	4	5	V26 <input type="checkbox"/>
27. Ek studeer eerder op die ingewing van die oomblik as op 'n gereelde basis.	1	2	3	4	5	V27 <input type="checkbox"/>
28. Lees is my gunsteling tydverdryf.	1	2	3	4	5	V28 <input type="checkbox"/>
29. Dit is belangrik om altyd vir klas voorbereid te wees.	1	2	3	4	5	V29 <input type="checkbox"/>
30. Ek is gemaklik om met mense van ander kulture en rasse te kommunikeer.	1	2	3	4	5	V30 <input type="checkbox"/>
31. Ek weet wat ek wil hê en ek maak seker dat ek dit kry.	1	2	3	4	5	V31 <input type="checkbox"/>
32. Ek het iemand wat in my gekose beroep staan geraadpleeg oor my loopbaandoelwitte.	1	2	3	4	5	V32 <input type="checkbox"/>
33. Ek geniet dit om mense te ontmoet.	1	2	3	4	5	V33 <input type="checkbox"/>
34. Goeie prestasie is hoofsaaklik die gevolg van 'n persoon se toewyding.	1	2	3	4	5	V34 <input type="checkbox"/>
35. Ek voel in beheer van my lewe.	1	2	3	4	5	V35 <input type="checkbox"/>



Stelling	Stem glad nie saam nie	Stem nie saam nie	Neutraal	Stem saam	Stem volkome saam	Slegs kantoor gebruik
36. Ek het die vermoë om my werk (studietyd) te beplan.	1	2	3	4	5	V36 <input type="checkbox"/>
37. Ek geniet dit om in die biblioteek te soek na boeke wat my belangstelling prikkel.	1	2	3	4	5	V37 <input type="checkbox"/>
38. My doel op universiteit is om goed te presteer sonder om te veel aandag aan my klaswerk te gee.	1	2	3	4	5	V38 <input type="checkbox"/>
39. My familie is 'n bron van ondersteuning en bemoediging.	1	2	3	4	5	V39 <input type="checkbox"/>
40. Ek deel die studiemateriaal op in kleiner dele.	1	2	3	4	5	V40 <input type="checkbox"/>
41. My hoërskoolpunte is nie 'n ware refleksie van dit wat ek op universiteit kan bereik nie.	1	2	3	4	5	V41 <input type="checkbox"/>
42. Ek het selfvertoue om my mening te lig, selfs al verskil dit van ander s'n.	1	2	3	4	5	V42 <input type="checkbox"/>
43. Dit is belangrik om 'n goeie universiteitskwalifikasie te kry om sukses in die lewe te behaal.	1	2	3	4	5	V43 <input type="checkbox"/>
44. Ek verkies om as deel van 'n span te werk.	1	2	3	4	5	V44 <input type="checkbox"/>
45. Ek verwag om baie goed te presteer in my graad.	1	2	3	4	5	V45 <input type="checkbox"/>
46. Dit is belangrik dat mense erkenning gee aan die werk wat ek gedoen het.	1	2	3	4	5	V46 <input type="checkbox"/>
47. Ek verstaan nuwe konsepte en idees vinnig.	1	2	3	4	5	V47 <input type="checkbox"/>
48. Ek vind dit moeilik om kritiek te aanvaar.	1	2	3	4	5	V48 <input type="checkbox"/>
49. Ek bekommer my oor finansiering vir my studies.	1	2	3	4	5	V49 <input type="checkbox"/>
50. Ek sien gewoonlik nie take deur tot die einde nie.	1	2	3	4	5	V50 <input type="checkbox"/>
51. Ek vermy dit om betrokke te raak by sosiale groep en organisasies.	1	2	3	4	5	V51 <input type="checkbox"/>
52. Daar is iemand wat my kan help indien ek enige probleme by die universiteit sou ondervind.	1	2	3	4	5	V52 <input type="checkbox"/>
53. Ek sal vir hulp vra indien ek 'n komplekse probleem het.	1	2	3	4	5	V53 <input type="checkbox"/>



Stelling	Stem glad nie saam nie	Stem nie saam nie	Neutraal	Stem saam	Stem volkome saam	Slegs kantoor gebruik
54. Ek is oor die algemeen tevrede met my lewe.	1	2	3	4	5	V54 <input type="checkbox"/>
55. Ek verwag om by baie nie-akademiese aktiwiteite betrokke te wees. (sosiaal, sport, ens.).	1	2	3	4	5	V55 <input type="checkbox"/>
56. Ek verkies om volgens 'n roetine te werk.	1	2	3	4	5	V56 <input type="checkbox"/>
57. Ek neem verantwoordelikheid vir my eie intellektuele ontwikkeling.	1	2	3	4	5	V57 <input type="checkbox"/>
58. Ek organiseer my studietyd sodat ek my doelwitte kan bereik.	1	2	3	4	5	V58 <input type="checkbox"/>
59. Ek het die ideale persoonlikheid vir my studieveld.	1	2	3	4	5	V59 <input type="checkbox"/>
60. Ek verkies om nie doelwitte te stel wanneer ek vir toetse/eksamens leer nie.	1	2	3	4	5	V60 <input type="checkbox"/>
61. My vriende is vir my baie belangrik.	1	2	3	4	5	V61 <input type="checkbox"/>
62. Ek maak gewoonlik dubbeld seker dat dinge reg is.	1	2	3	4	5	V62 <input type="checkbox"/>
63. Dis vir my belangrik om goed te presteer	1	2	3	4	5	V63 <input type="checkbox"/>
64. Ek weet presies wat ek oor 10 jaar van nou af wil doen.	1	2	3	4	5	V64 <input type="checkbox"/>
65. Ek kan myself motiveer om te leer wanneer ek moet.	1	2	3	4	5	V65 <input type="checkbox"/>
66. Ek moet werk om my studies te help finansier.	1	2	3	4	5	V66 <input type="checkbox"/>
67. Al het ek die eerste keer met 'n komplekse probleem gefaal, sal ek aanhou.	1	2	3	4	5	V67 <input type="checkbox"/>
68. Ek het duidelike en bereikbare doelwitte vir my studies hierdie jaar.	1	2	3	4	5	V68 <input type="checkbox"/>
69. Ek beplan my studieprogram vooruit en hou gewoonlik daarby.	1	2	3	4	5	V69 <input type="checkbox"/>
70. Ek leer konsepte vinniger aan as die meeste mense.	1	2	3	4	5	V70 <input type="checkbox"/>



**APPENDIX B**

**Table B.1. Rotated factor loadings of the three factor solution with goodness-of-fit test and Scree plot – motivational factor (fa)**

<b>Goodness-of-fit Test</b>			
Chi-Square	df	Sig.	
1662.885	663	.000	
<b>Rotated Factor Matrix<sup>a</sup></b>			
Item	Factor		
	1	2	3
V4	.324	.115	.258
V5	.112	.400	.166
V7	.332	.195	.188
V9	.181	.086	.362
V11	.301	.514	.129
V16	.060	.067	.460
V20	.242	.163	.152
V22	.414	.243	.111
V23	.227	.115	.468
V24	.086	.106	.455
V25	.307	.046	.164
V29	.441	.325	-.023
V31	.407	.096	.367



V34	.386	.115	.094
V35	.250	.148	.298
V36	.271	.537	.168
V42	.248	-.026	.454
V43	.369	-.003	-.006
V45	.580	.131	.143
V46	.413	-.086	.055
V47	.146	-.116	.604
V53	.399	.137	.128
V54	.073	.023	.317
V56	.241	.407	-.007
V57	.368	.187	.201
V58	.351	.619	.032
V59	.464	.035	.282
V62	.373	.223	.092
V63	.318	.090	-.026
V64	.307	.232	.186
V65	.359	.317	.201
V67	.338	.149	.273
V68	.397	.300	.242
V69	.252	.536	.107

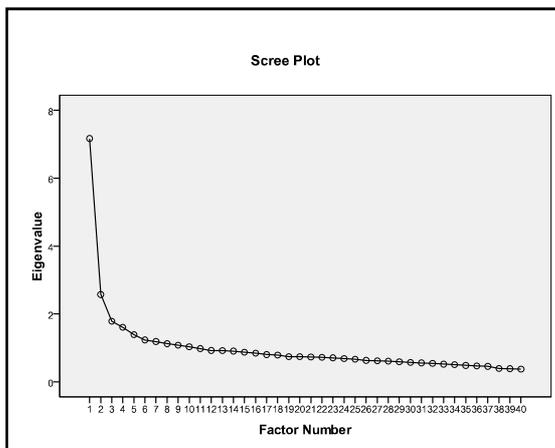


V70	.049	-.098	.555
vv13	-.005	.119	.369
vv27	.084	.436	.002
vv38	-.033	.308	-.059
vv50	-.040	.238	.265
vv60	-.004	.421	.054

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.





**Table B.2. Rotated factor loadings of the two factor solution with goodness-of-fit test and Scree plot  
– integration and reading factor (fb)**

<b>Goodness-of-fit Test</b>		
Chi-Square	df	Sig.
827.764	134	.000
<b>Rotated Factor Matrix<sup>a</sup></b>		
	Factor	
	1	2
V1	.008	.319
V2	.119	.257
V14	.155	.173
V32	.081	.321
V33	.140	.442
V39	.189	.251
vv48	-.077	.189
vv49	-.184	.328
vv51	-.032	.503
V52	.013	.344
V55	.022	.561
V61	-.070	.455
vv66	-.101	.243
V8	.305	.087

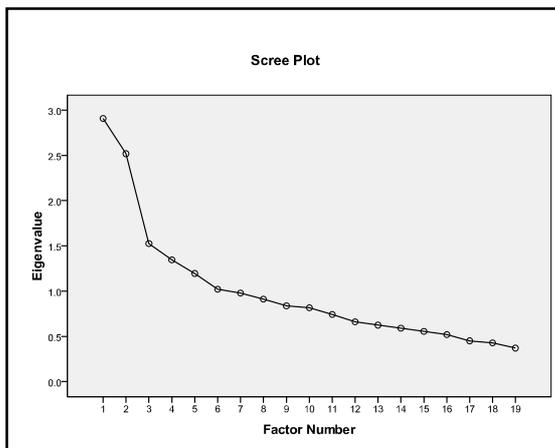


V10	.729	-.025
V21	.529	-.048
V28	.754	-.153
V30	.367	.110
V37	.685	-.205

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.





**Table B.3. Reliability statistics and item-total statistics of the motivational factor**

<b>Reliability Statistics</b>					
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items			N of Items	
.866	.879			43	
<b>Item-Total Statistics</b>					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
V4	162.8640	213.179	.377	.252	.863
V5	163.7757	209.322	.374	.278	.862
V7	163.1766	209.577	.417	.273	.862
V9	163.6049	208.935	.350	.291	.863
V10	163.9320	211.052	.234	.158	.865
V11	163.5543	205.473	.502	.418	.860
V16	163.9812	211.001	.302	.251	.864
V20	164.1187	207.841	.291	.216	.865
V22	163.3010	209.915	.433	.285	.862
V23	163.8205	207.310	.427	.315	.861
V24	163.9421	210.344	.315	.289	.863
V25	163.1737	213.019	.287	.178	.864
V29	163.2026	210.457	.395	.354	.862
V31	163.3025	208.577	.486	.333	.861



V32	164.2012	208.106	.263	.185	.866
V34	162.9595	212.268	.350	.237	.863
V35	163.4284	210.187	.379	.343	.862
V36	163.4182	207.119	.492	.399	.860
V42	163.5152	208.569	.373	.303	.862
V43	163.2287	213.666	.172	.145	.866
V45	163.1389	209.653	.466	.360	.861
V46	163.4805	213.085	.202	.194	.866
V47	163.5745	212.419	.317	.355	.863
V53	163.2127	211.049	.388	.303	.862
V54	163.3719	213.988	.230	.285	.865
V56	163.7265	208.787	.344	.296	.863
V57	163.1954	211.215	.439	.316	.862
V58	163.5152	205.995	.518	.499	.860
V59	163.4240	209.074	.414	.285	.862
V62	163.3401	210.057	.384	.266	.862
V63	162.9841	210.642	.470	.382	.862
V64	163.7395	203.929	.399	.323	.862
V65	163.3111	208.687	.472	.310	.861
V67	163.3922	209.534	.416	.304	.862
V68	163.5311	206.435	.516	.366	.860



V69	164.2127	205.518	.462	.403	.860
V70	164.1172	212.657	.214	.326	.865
vv13	163.7453	210.405	.274	.251	.864
vv27	164.4732	208.597	.295	.229	.864
vv38	164.5152	214.239	.103	.172	.869
vv50	163.4703	211.128	.274	.227	.864
vv51	163.4891	214.891	.123	.190	.868
vv60	164.0492	209.809	.246	.241	.866



**Table B.4. Reliability statistics and item-total statistics of the integration and reading factor**

<b>Reliability Statistics</b>					
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items				N of Items
.610	.624				19
<b>Item-Total Statistics</b>					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
V1	65.9477	44.777	.209	.170	.598
V2	66.1569	43.894	.255	.213	.592
V14	66.2771	43.805	.229	.154	.594
V32	66.6954	42.419	.227	.144	.595
V33	65.7346	44.329	.287	.236	.590
V39	65.5359	44.519	.276	.097	.591
vv48	67.0248	45.522	.095	.052	.613
vv49	66.7190	43.752	.138	.328	.611
vv51	66.0052	44.086	.211	.219	.597
V52	66.0850	44.190	.211	.099	.597
V55	66.0275	43.823	.253	.256	.592
V61	65.7085	45.387	.148	.185	.605
vv66	66.2706	43.868	.155	.291	.607
V8	65.9229	44.799	.191	.216	.600



V10	66.4340	42.327	.321	.417	.581
V21	66.6863	43.153	.268	.252	.589
V28	66.9752	42.160	.243	.468	.592
V30	65.9895	44.005	.244	.274	.593
V37	66.8627	43.270	.199	.402	.599



**Table B.5. Analysis of maximum likelihood estimates – risk for failure**

Parameter		Estimate	Standard error	Chi-Square	Sig.
Intercept		-1.2238	0.2225	30.24	<.0001
Race language	African***	0.8088	0.3616	12.20	0.0005
	Afrikaans*	-0.4485	0.2067	6.04	0.0140
M-score	1***	-2.4216	0.2484	44.84	<.0001
	2	0.0113	0.2103	0.00	0.9563
Gender	Male	0.2372	0.1250	3.60	0.0577
Parental education	Yes	-0.0704	0.1310	0.29	0.5907
School location	Pretoria	0.0680	0.1558	0.19	0.6626
	Gauteng	0.3075	0.1846	2.78	0.0957
Residence	Yes	-0.0038	0.1167	0.00	0.937
Achievement motivation	Low	-0.1021	0.1903	0.29	0.5917
	Medium	0.0954	0.1583	0.36	0.5468
Learning-efficacy	Low	0.2593	0.1832	2.00	0.1569
	Medium	-0.2333	0.1619	2.08	0.1496
Goal orientation	Low	-0.1865	0.1815	1.06	0.3040
	Medium	0.0776	0.1572	0.24	0.6217
Integration and support	Low	-0.1280	0.1783	0.52	0.4729
	Medium	0.2251	0.1514	2.21	0.1371
Reading behaviour	Low*	0.3596	0.1782	4.07	0.0436
	Medium	-0.0577	0.1612	0.13	0.7205

Significance at  $p < 0.05^{***}$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$



**Table B.6. Analysis of maximum likelihood estimates – risk for withdrawal**

Parameter		Estimate	Standard error	Chi-Square	Sig.
Intercept		2.7127	0.2910	86.91	<.0001
Race	African	1.3466	0.4018	11.23	0.0008
	Afrikaans	-0.7104	0.2555	7.73	0.0054
M-score	1	-0.8613	0.2484	12.02	0.0005
	2	-0.0337	0.2103	0.03	0.8728
Credits registered	<1	-0.8292	0.2461	11.36	0.0008
	=1	1.1458	0.3748	9.34	0.0022
Gender	Male	-0.1183	0.1565	0.57	0.4496
Parental education	Yes	-0.1896	0.1593	1.42	0.2338
School location	Pretoria	0.1931	0.2077	0.86	0.3526
	Gauteng	0.0124	0.2276	0.00	0.9565
Residence	Yes	-0.1694	0.1548	1.20	0.2738
Achievement motivation	Low	0.2106	0.2407	0.77	0.3815
	Medium	-0.0766	0.1994	0.15	0.7007
Learning-efficacy	Low	0.1465	0.2447	0.36	0.5493
	Medium	-0.1738	0.1997	0.76	0.3840
Goal orientation	Low	-0.1930	0.2211	0.76	0.3826
	Medium	-0.0350	0.2037	0.03	0.8635
Integration and support	Low	0.0602	0.2401	0.06	0.8021
	Medium	0.0407	0.2007	0.04	0.8394
Reading behaviour	Low	0.2553	0.2229	1.31	0.2522
	Medium	-0.4118	0.2033	4.10	0.0428

Significance at  $p < 0.05^{**}$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$



**Table B.7. Complete multiple regression analysis for academic success**

Model	<i>R</i>	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	Std. Error of the Estimate	Sig. F Change	
					<i>df</i> 1	<i>df</i> 2
1	.628	.395	.383	.22207	606	.000

ANOVA <sup>b</sup>						
Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
1	Regression	19.486	12	1.624	32.928	.000 <sup>a</sup>
	Residual	29.885	606	.049		
	Total	49.370	618			

	Un-standardised Coefficients		Standardised Coefficients	<i>t</i>	Sig.	Zero order <i>r</i>
	<i>B</i>	Std. Error	Beta	<i>B</i>	<i>p</i>	
(Constant)	-.133	.135		-.988	.323	
Achievement motivation	.000	.002	-.010	-.241	.810	.059
Learning-efficacy*	-.004	.002	-.085	-2.056	.040	.069
Goal orientation**	.006	.002	.131	3.415	.001	.166
Integration and support	-.002	.002	-.033	-.879	.380	-.054
Reading behaviour	-.004	.002	-.058	-1.560	.119	.050
Credits registered***	.002	.000	.149	4.552	.000	.162
M-score***	.034	.002	.593	17.441	.000	.547



Gender*	.047	.020	.081	2.332	.020	-.042
Distance of school*	-.040	.020	-.068	-2.009	.045	-.019
Race***	.175	.027	.255	6.579	.000	.122
Residence	-.002	.019	-.004	-.111	.911	.046
Parental education at UP	-.035	.021	-.054	-1.627	.104	-.060

Significance at  $p < 0.05^{***}$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$



**Table B.8. Complete multiple regression analysis for academic success for white students**

Model	<i>R</i>	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	Std. Error of the Estimate
1	.646 <sup>a</sup>	.417	.404	.22813

ANOVA <sup>b,c</sup>						
Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
1	Regression	17.613	11	1.601	30.768	.000 <sup>a</sup>
	Residual	24.616	473	.052		
	Total	42.229	484			

	Un-standardised Coefficients		Standardised Coefficients	<i>t</i>	Sig.	Zero order <i>r</i>
	<i>B</i>	Std. Error	Beta	<i>B</i>	<i>p</i>	
(Constant)	-.208	.155		-1.342	.180	
Achievement motivation	.001	.002	.027	.562	.574	.039
Learning-efficacy *	-.006	.003	-.114	-2.459	.014	.071
Goal orientation*	.007	.002	.133	3.127	.002	.157
Integration and support	-.002	.002	-.037	-.930	.353	-.041
Reading behaviour	-.003	.003	-.039	-1.019	.309	.028
Credits registered***	.002	.001	.132	3.682	.000	.167
M-score***	.037	.002	.631	16.681	.000	.601
Gender**	.061	.023	.102	2.613	.009	-.053



Distance of school	-.038	.023	-.060	-1.659	.098	-.034
Residence	-.008	.023	-.013	-.368	.713	.010
Parental education at UP*	-.057	.023	-.090	-2.474	.014	-.054

Significance at  $p < 0.05^{***}$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$



**Table B.9. Complete multiple regression analysis for academic success for African students**

Model	<i>R</i>	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	Std. Error of the Estimate
1	.590 <sup>a</sup>	.348	.289	.18500

ANOVA <sup>b,c</sup>						
Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
1	Regression	2.225	11	.202	5.910	.000 <sup>a</sup>
	Residual	4.176	122	.034		
	Total	6.400	133			

	Un-standardised Coefficients		Standardised Coefficients	<i>t</i>	Sig.	Zero order <i>r</i>
	<i>B</i>	Std. Error	Beta	<i>B</i>	<i>p</i>	
(Constant)	.522	.272		1.921	.057	
Achievement motivation	-.005	.004	-.138	-1.541	.126	-.065
Learning-efficacy	.000	.004	.006	.060	.952	.053
Goal orientation	.005	.004	.119	1.296	.198	.127
Integration and support	-.002	.003	-.052	-.609	.543	.064
Reading behaviour	-.010	.006	-.150	-1.758	.081	-.138
Credits registered*	.002	.001	.203	2.552	.012	.303
M-score***	.025	.004	.463	5.884	.000	.432
Gender	.029	.040	.059	.729	.468	.093



Distance of school	-.047	.038	-.103	-1.239	.218	-.157
Residence	.026	.034	.061	.780	.437	.105
Parental education at UP*	.129	.058	.175	2.225	.028	.093

Significance at  $p < 0.05^{***}$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$



**Table B.10. Cross-tabulation between the number of credits registered and risk for failure.**

Academic success		Student Credit (Binned)			Total
		<= 139.00	139.01 - 148.00	148.01+	
Pass	Count	46	158	52	256
	% within Academic success	18.0%	61.7%	20.3%	100.0%
	% within Student credit (Binned)	16.6%	55.4%	19.6%	31.0%
Fail	Count	231	127	213	571
	% within Academic Success	40.5%	22.2%	37.3%	100.0%
	% within Student credit (Binned)	83.4%	44.6%	80.4%	69.0%
Total	Count	277	285	265	827
	% within Academic Success	33.5%	34.5%	32.0%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	122.539 <sup>a</sup>	2	.000
Likelihood Ratio	120.194	2	.000
Linear-by-Linear Association	.814	1	.367
N of Valid Cases	827		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 82.03.



**Table B.11. Brown-Forsythe and Welch test of equality of means**

<b>Robust Tests of Equality of Means</b>				
Student credit (Binned)				
	Statistic <sup>a</sup>	df1	df2	Sig.
Welch	6.901	2	475.326	.001
Brown-Forsythe	6.688	2	652.002	.001
a. Asymptotically F distributed.				



**Table B.12. Scheffe and Games-Howell test method used in *Post hoc* tests**

Dependent Variable: Credits registered (Binned)							
	(I) M-score	(J) M-score	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	1	2	-.171*	.070	.050	-.34	.00
		3	-.276*	.077	.002	-.46	-.09
	2	1	.171*	.070	.050	.00	.34
		3	-.105	.066	.284	-.27	.06
	3	1	.276*	.077	.002	.09	.46
		2	.105	.066	.284	-.06	.27
Games-Howell	1	2	-.171	.076	.063	-.35	.01
		3	-.276*	.075	.001	-.45	-.10
	2	1	.171	.076	.063	.00	.35
		3	-.105	.060	.183	-.25	.04
	3	1	.276*	.075	.001	.10	.45
		2	.105	.060	.183	-.04	.25

\*. The mean difference is significant at the 0.05 level.



**Table B.13. Cross-tabulation between the number of credits registered and M-score.**

Credits registered		M-score			Total
		1	2	3	
<= 139.00	Count	101	139	37	277
	% within credits registered	36.5%	50.2%	13.4%	100.0%
	% within M-score	49.3%	35.9%	15.6%	33.4%
139.01 - 148.00	Count	38	109	138	285
	% within credits registered	13.3%	38.2%	48.4%	100.0%
	% within M-score	18.5%	28.2%	58.2%	34.4%
148.01+	Count	66	139	62	267
	% within credits registered	24.7%	52.1%	23.2%	100.0%
	% within M-score	32.2%	35.9%	26.2%	32.2%
Total	Count	205	387	237	829
	% within credits registered	24.7%	46.7%	28.6%	100.0%
	% of total	24.7%	46.7%	28.6%	100.0%



Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	101.492 <sup>a</sup>	4	.000
Likelihood Ratio	101.716	4	.000
Linear-by-Linear Association	12.595	1	.000
N of Valid Cases	829		
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 66.03.			



Table B.14. Cross-tabulation between the number of credits registered and race.

Credits registered		Race		Total
		White	African	
<= 139.00	Count	167	98	265
	% within credits registered	63.0%	37.0%	100.0%
	% within race	28.6%	48.5%	33.7%
139.01 - 148.00	Count	196	72	268
	% within credits registered	73.1%	26.9%	100.0%
	% within race	33.6%	35.6%	34.1%
148.01+	Count	221	32	253
	% within credits registered	87.4%	12.6%	100.0%
	% within race	37.8%	15.8%	32.2%
Total	Count	584	202	786
	% within credits registered	74.3%	25.7%	100.0%



Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40.423 <sup>a</sup>	2	.000
Likelihood Ratio	42.670	2	.000
Linear-by-Linear Association	39.983	1	.000
N of Valid Cases	786		
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 65.02.			



**Table B.15. Cross-tabulation between the integration/support factor and race**

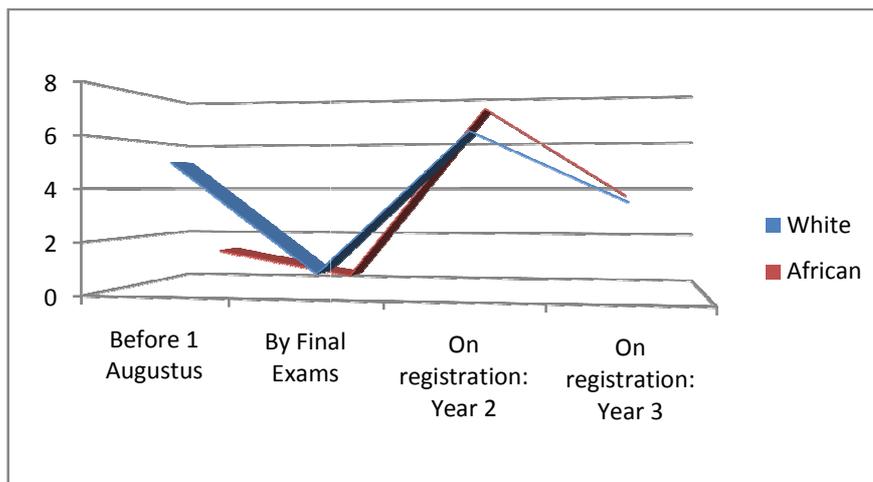
		Race		Total
		White	African	
<b>Integration and support</b>				
<= 47.00	Count	157	114	271
	% within integration and support	57.9%	42.1%	100.0%
	% within race	28.0%	61.0%	36.2%
48.00 - 52.00	Count	220	48	268
	% within integration and support	82.1%	17.9%	100.0%
	% within race	39.2%	25.7%	35.8%
53.00+	Count	184	25	209
	% within integration and support	88.0%	12.0%	100.0%
	% within race	32.8%	13.4%	27.9%
Total	Count	561	187	748
	% within integration and support	75.0%	25.0%	100.0%



Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	68.230 <sup>a</sup>	2	.000
Likelihood Ratio	67.426	2	.000
Linear-by-Linear Association	60.593	1	.000
N of Valid Cases	748		
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 52.25.			

**Table B.16. Withdrawal rates of African and white students measured over three year of registration (2008 cohort)**

2008 cohort	Before 1 Augustus: Year 1	By Final Exams: Year 1	On registration: Year 2	On registration: Year 3	Total
White	5%	0.8%	6.1%	3.5%	15.40%
African	1.3%	0.3%	7.3%	3.7%	12.70%



**Table B.17. Interaction between race language and M-score category**

Category	n	Odds Index	
Mean	601	0.104	
Index	M-score category		
Race language	Low	Medium	High
African	11.06	0.383	0.236
Afrikaans	4.826	0.311	0.665
English	0.019	8.385	6.364



**Table B.18. Interaction between learning-efficacy and Integration and support**

Category	n	Odds Index		
Mean	601	0.228		
Index	Integration and support			
Learning-efficacy	Low	Medium	High	
Low	1.617	1.520	0.407	
Medium	1.193	0.570	1.471	
High	0.519	1.154	1.671	

**Table B.19. Interaction between goal orientation and integration and support**

Category	n	Odds Index		
Mean	601	0.228		
Index	Integration and support			
Goal orientation	Low	Medium	High	
Low	1.812	0.672	0.822	
Medium	0.795	0.872	1.443	
High	0.694	1.707	0.843	

**Table B.20. Interaction between race language and goal orientation**

Category	n	Odds Index		
Mean	601	0.305		
Index	Goal orientation			
Race language	Low	Medium	High	
African	1.602	1.341	0.465	
Afrikaans	0.889	0.800	1.407	
English	0.702	0.932	1.527	



**APPENDIX C.**

**TABLE C.1. Independent and dependent variables code-book for the multiway frequency analyses.**

One-way frequencies		
Variable	Value	Frequency
Risk for failure	No	188
	Yes	413
Risk for withdrawal	No	530
	Yes	70
Race language	African	134
	Afrikaans	385
	English	82
M-score category	1	133
	2	285
	3	183
Credits registered	<1	193
	=1	217
	>1	191
Gender	Male	225
	Female	376
Parental education at UP	Yes	160
	No	441
Distance of School	Pretoria	247
	Gauteng	129
	Other provinces	225



Residence	Yes	211
	No	390
Achievement motivation orientation	Low	187
	Medium	196
	High	218
Learning-efficacy	Low	183
	Medium	188
	High	230
Goal orientation	Low	185
	Medium	198
	High	218
Integration and support	Low	164
	Medium	227
	High	210
Reading behaviour	Low	190
	Medium	184
	High	227



**Table C.2. Code-book of the independent variables for the logistic regression analysis**

Variable	Code	Description
M-score (originally continuous)	1	Low (9-16)
	2	Medium (17-23)
	3	High (24-30)
Race	1	White
	2	Coloured
	3	Indian
	4	Black
Gender	1	Male
	2	Female
Parent studied at UP	1	One or both
	2	None (first time student)
Age (originally continuous)	1	18-19
	2	20-27
Residence	1	Yes
	2	No
School location	0	None mentioned
	1	Pretoria
	2	Gauteng province
	3	Other provinces
Preferred language of instruction	1	Afrikaans
	2	English
Home language	1	Afrikaans



	2	English
	3	Afrikaans/English
	6	African languages
	9	Other
Withdraw	1	No (persist)
	2	Yes (withdraw)