ACADEMIC ACHIEVEMENT IN MALE SECONDARY STUDENTS

A thesis in partial fulfillment of the requirements for the degree of

Master of Arts in Psychology

Massey University

Michaela Drum

2001

Acknowledgements

Many people have contributed and helped with this thesis, and without them, it would never have been completed. Firstly, thanks to my supervisor, Dr Richard Fletcher, who was prepared to take me on board. Your enthusiasm and faith helped keep the research project moving to its completion.

I would also like to acknowledge the participating schools who were kind enough to allow their students to take time out from class to take part in this research. I appreciate the time and help given to me from the staff who I dealt with from these schools. I am also very grateful to the students who participated in the research and wish you all well for your futures.

Working on a thesis can be both isolating and frustrating, so thanks to my friends for your support and encouragement, particularly Katherine, my long time study partner and close friend, for your sympathy and understanding.

My family has been incredibly encouraging and supportive of me also, especially my sister Jackie. Their total unwavering faith in me has been a lifeline over this last year. Above all, I would like to thank my two children Michael and Monique. You have both been inspirational and very patient. I hope this long journey will benefit us all in future years.

Table of Contents

List of Tables and Figures

List of Appendices

Abstract

This study explored academic underachievement of fourth form boys in male secondary schools within the Auckland area. There were two aspects to this study; firstly, to identify students who are underachieving relative to their abilities and secondly, to explore possible psychological differences between underachievers and non-underachievers. An underachiever for the purpose of this study is a student who is achieving lower grades than expected in accordance with his abilities (McCall, Evahn & Kratzer, 1992).

598 of the 770 students enrolled in the participating schools had the necessary data for regression analyses to identify underachievers. Of the 598 students with valid data, 315 consented to participate in the questionnaire. The sample for this study comprised 315 fourth form boys. A discrepancy model using regression analysis was carried out on the 315 students to identify underachievers within the schools. 82 students were identified as underachievers using this method, which resulted in 13.9% of the sample being defined as underachievers. In addition, a self-report questionnaire was administered to the 770 students. The questionnaire measured six psychological dimensions that have been identified in previous research to be related to academic achievement. The responses of the underachievers and non-underachievers were compared to ascertain whether these two groups differ on the psychological dimensions measured. These psychological constructs measured in the questionnaire included study strategies (cognitive/self-regulation, persistence/effort, and disorganisation), social support, self- efficacy, test anxiety, intrinsic motivation/interest in school subjects, and outcome expectancies. There was a significant mean difference between non-underachievers and underachievers on the disorganisation scale. This finding suggests that underachievers had more disorganised study habits than their non-underachieving comparison group. There were also significant mean differences between underachievers and non-underachievers for intrinsic value in English and science. These findings suggested that underachievers were more intrinsically motivated in English than their non-underachieving comparison group, but less intrinsically motivated in Science.

Chapter 1

Introduction

Academic underachievement

Academic achievement is considered within Western culture to be an important step in one's life course, whereby great significance and worth is placed on an individual's ability to achieve (Covington, 2000; Harackiewicz & Barron & Elliot, 1998). These performance oriented values induce many adolescents to judge their worth as students by the grades they receive (Covington, 2000; Harackiewicz et al., 1998). Accordingly, those adolescents who may not be performing to their ability levels or potential in their secondary school years may be adversely affected. These lower than expected outcomes by some students may detrimentally affect their self-efficacy and outcome expectancies, which may result in an undesirable downward spiral effect whereby motivation to study and study skills could also be diminished, resulting in lowered grades. In addition, underachieving students may make internal attributions about their abilities with the possibility that they give up trying because they believe that they have no control over their academic performances (learned helplessness) (Mineka & Henderson as cited in Covington, 2000; Weiten, 1995). Therefore, it seems important to identify those students who are not reaching their potential so they can be given opportunities to help reach their potential, thus preventing any possible downward spiral in either achievement or loss of belief in their abilities. Underachievement (or not performing to one's academic capabilities) also has the potential to adversely affect secondary students' future decisions regarding further study and/or careers (Gohm, Humphries & Yao, 1998; McCall, Evahn & Kratzer, 1992). If students are failing to reach their academic potential at secondary school, future career options may be foreclosed, as may acceptance into various tertiary institutions (Francis, 2000). Accordingly, underachievement may have far reaching consequences on an individual's life course.

Identifying underachievers

Academic underachievement traverses countries, gender, socioeconomic status, race and culture (Carr, Borkowski & Maxwell, 1991; Francis, 2000; Noble & Bradford, 2000; Rimm, 1986). However, academic underachievement appears to be more specific to males. The ratio of underachievers is generally two or three males for every female (McCall et al., 1992; Noble & Bradford, 2000). Research has found differences in educational achievement between girls and boys in spite of their comparable IQ test scores. Moreover, girls do better than boys in each ethnic group, particularly in English (Education Review Office, 1999; McCall et al, 1992; Noble & Bradford, 2000). Two thirds of students who attend reading recovery programs in New Zealand are boys (Education Review Office, 2000; Education Review Office, 1999). Furthermore, the relative underachievement of boys to girls in England has been described as an educational crisis (Noble & Bradford, 2000). Boys are achieving less than girls in most subjects, but especially in English and other subjects that call for higher level language and organisational skills. The consequences of failing to investigate underachievement of boys will be detrimental to both the underachievers and society. The likely societal consequences include loss of potential and talent in a changing workplace. The possible consequences to the individual include lost opportunities, experiences and low-paid jobs in a society that demands workers who are highly educated, well organised and communicative; the very skills boys are lagging behind in (Education Review Office, 2000; Francis, 2000; McCall, Beach & Lau, 2000; Noble & Bradford, 2000). Accordingly, addressing the issue of underachievement in secondary school boys is a focus of this study.

Wilson and Cone (1984) assert that the factors that may contribute to academic success and failure cannot be accurately researched without a valid discrepancy measure. In addressing underachievement as a problem, it is necessary to investigate both achievement and ability information to ascertain which students are not achieving as well as they could, using objective and valid discrepancy measures. The Dictionary of Psychology (Chaplin, 1985) defines an underachiever to be a person who does not perform at the level indicated by his or her aptitude. Although the conceptual definitions of academic underachievement in the literature appear to be similar, it appears that operational definitions on underachievement are ambiguous and inconsistent (Carr, Borkowski & Maxwell, 1991; McCall, Beach &

Lau, 2000; Peters & Van Boxtel, 1999). McCall et al. (2000) argue that empirically, very little is known about underachievement and assert that "systematic, broad-based methodologically sophisticated research on underachievers per se is generally lacking" (p. 785). Furthermore, underachievement is not easy to recognize by academic achievement alone. For example a gifted student, especially, may be underachieving while scoring perfectly averagely in comparison to peer's achievement test scores (Peters & Van Boxtel, 1999). Moreover, previous research on underachievement found that the highest proportion of underachievers were found among the students with average ability (Noble & Bradford, 2000). Therefore, it seems important to explore methods that can validly identify those students who may not be performing to their capabilities across the whole range of student ability levels. This is one of the aims of this study.

Once underachievers have been accurately and validly identified, this research aims to explore possible mechanisms that may be linked with individuals who are not performing to their respective abilities. The constructs that this study will focus on that are predicted to influence academic performance include; study strategies/skills, social support, self- efficacy, intrinsic motivation/interest in school subjects, test anxiety and outcome expectancies. The rationale for examining these variables is primarily based on prior research that suggests that all these variables have positive relationships with academic achievement (Anderman & Midgeley, 1997; Archer, 1994; Covington, 2000; Gohm, Humphries & Yao, 1998; Miller, Greene, Montalvo, Ravindran & Nicholls; 1996; Pintrich & De Groot, 1990; Reynolds, 1999; Stanton, 1999; Wentzel, 1998; Zimmerman, 2000). Since these variables have been associated positively with academic achievement, it seems reasonable to suggest that these same variables could have negative relationships with academic underachievement. In addition, the variables selected for this study are closely aligned with certain characteristics of underachievers. These include lack of persistence and failure to implement problem solving strategies (study strategies), lower educational and occupational aspirations and lack of integration toward goals (outcome expectancies); low perception of abilities (by self-efficacy); and anxiousness (test anxiety).

Specifically, it is hypothesised that underachievers will have lower scores on study strategies/skills, social support, self- efficacy, intrinsic motivation/interest in school

subjects, test anxiety and outcome expectancies than non-underachievers. This research aims to examine whether underachievers differ in their responses from the non-underachievers on the psychological constructs selected for this study.

Chapter 2

Literature Review

Underachievement

Although researchers seem able to agree on a conceptual definition, variances can be found when it comes to operationally defining underachievement for research purposes (Butler-Por, 1993; McCall et al., 1992; Peters & Van Boxtel, 1999). The general conceptual definition of an underachiever is the student who performs less well than expected on the basis of their ability. However, the measures defining academic underachievement seem to vary. Underachievement has been defined as the discrepancy between an intelligence test score and school results or achievement test scores. The discrepancy is often indexed as one standard error of estimate below the value predicted on the basis of their test scores. Other definitions include: the difference between two standardised measures; the difference between a standardised measure and performance on some nonstandardised measures; and the difference between two nonstandardised measures (Butler-Por, 1993; Colangelo, Kerr, Christensen & Maxey, 1993; Peters & Van Boxtel, 1999). Each method by its very nature will operationally define underachievement differently. Consequently, each method will likely identify different students as underachievers. This means that unless researchers all use the same methods to identify underachievers, each study will be classifying underachievers inconsistently. These inconsistencies of definitions within the literature, combined with varying sample characteristics (e.g. gifted underachievers versus those that cover the range of abilities) complicates the issue of identifying underachievers accurately and reliably. Hence replication of various studies will be difficult. For example, Annesley et al. compared(as cited in McCall et al., 1992), four different methods/measures for identifying underachievers and found that only 16 of the 57 underachievers classified under one of the four definitions were classified by all four definitions. Due to the varied procedures used to define underachievers, and the varying sample populations used, past studies claiming the defining characteristics of their particular identified underachievers, may not be generalisable across studies. For example, if one study defines underachievers using the arbitrary split method (i.e., those students who score above 90 in an IQ test, but receive standardised test scores one or more years below their

age level) and another study uses the regression definition (those students whose grades are more than one standard error of estimate below the value predicted on the basis of their test scores) they will have different classification outcomes for underachievers (McCall et al., 1992). It is therefore also likely that as underachievement has different meanings for the two studies, each study's underachievers will differ in their characteristics. This makes it difficult to find meaningful relationships between underachievement and other salient factors such as personal, behavioural, or environmental variables.

The stability of underachievement offers further definition complications. Because underachievers do not learn as much in school as expected, their mental ability may decline to match their grades, thereupon they will no longer be underachieving. For example, decreases in performance have been observed via percentile scores, which decline steadily when students begin underachieving (McCall et al., 1992; Rimm, 1986). The possibility of excluding those individuals that have been underachieving for a long period of time is a crucial consideration regarding the construct of underachievement. A further important factor to consider is that these chronic underachievers are possibly the students who need identifying the most. Any measure that is cross sectional in nature as opposed to longitudinal may exclude these long- term underachievers. Although longitudinal research is more likely to identify the chronic underachievers, it is beyond the scope of this research.

Despite inconsistencies in accurately and consistently identifying underachievement having been found in the literature, some methodological guidelines have been advocated. These guidelines help to both standardise methods for identifying underachievement and enhance the correct identification of underachievers (McCall et al., 1992; McCall et al., 2000; Reynolds, 1984; Wilson & Cone, 1984). These methodological guidelines also provide a useful direction for this study.

Measuring underachievement

Discrepancy model

Measuring underachievement normally involves using some sort of sort of discrepancy model which involves comparing an individual student's academic achievement with a measure of ability (McCall et al., 1992) (Refer to Table 1). However, some studies have merely used teacher, parent or student ratings to define underachievers. An academic/achievement discrepancy refers to the difference between what a student is predicted to achieve and what they actually achieve as defined by the discrepancy model implemented. A discrepancy model requires two measurements for comparison purposes: a measure of academic achievement and a measure of mental ability.

Academic performance measures

A commonly used measure of academic achievement for the purposes of the discrepancy model is students' school grade averages over all subjects. For example, grade point average, rank in class, or grade level on an academic test (Guerney, 1985; Miller et al., 1996; McCall et al., 1992; McCall et al., 2000; Pintrich & De Groot, 1990; Wentzel, 1998). The disadvantage of school grades is that they lack standardisation, but are the most practical and ecologically valid measure of scholastic performance (Pintrich & De Groot, 1990). As grades can be awarded differentially among schools, the use of grade averages is a potential problem regarding uniformity of underachievement. For example, a student may be awarded an A in English at one school, whereas at another school the same standard of work may receive a B. These differences could also influence the regression of grades on test scores. Such differential awarding of grades across schools thereby affects the definition of underachievement and consequently affects who is or is not assessed as an underachiever. Another potential problem with using grade averages is that essentially teachers have the potential to be subjective in their marking, thereby compromising the objectivity of the grades averages measure. However, grades are the major index of academic performance and they have ecological validity (i.e. grades are closely related to classroom teaching and learning) (McCall et al., 2000;

Pintrich & De Groot, 1990). Furthermore, grades can be standardised within schools so they are comparable across schools (McCall et al., 1992).

Ability measures

There are various ways to measure abilities of an individual. Some form of IQ test is preferable as it relates to a range of mental performances. However, scholastic achievement tests are often used as proxies for IQ tests, as academic achievement is closely related to school performance (McCall et al., 1992). Furthermore, correlations between specific IQ tests, aptitude tests and achievement tests correspond closely, meriting use of either as a measure for mental ability (Humphries, 1974; Kaplan & Sacuzo, 1982; Sternberg cited in McCall et al., 1992). An important issue concerning both IQ tests and achievement tests is that they are standardised and objective measures of ability. This allows comparisons of school performance (as assessed by grades) with the standardised tests to start from an objective platform to accurately ascertain possible performance discrepancies (or underachievement). One of the commonly used standardised tests for testing students' ability levels used in New Zealand schools is the Test of Scholastic Abilities (TOSCA).

Learning Disabilities

Much of the literature on discrepancies between mental abilities and school performance is found in the learning disabilities arena. Although learning disabilities and underachievement are different concepts, they utilise similar methods in ascertaining discrepancy in performance. The major difference between the two is that underachievement focuses on students who do not have any apparent learning disabilities, but are not scholastically achieving as well expected based on their ability tests. In contrast, the field of learning disabilities focuses on those students who are not performing to their abilities due to an identifiable learning disorder. Learning disabled students suffer from some sort of learning impairment and are termed non-learners (McCall et al., 1992). Since most studies of underachievement revolve around some sort of discrepancy model between performance and ability, as do studies on learning disabilities, some of the methods and definitions for determining a discrepancy originate from the learning disabilities field. The

following table is a summary of the different methods for assessing underachievers found in the literature.

Table1

Methods for Measuring Underachievers

Definition	Measures	Methods	Source
Students in each of the regressions whose residuals from the regression line were equal to or more than one standard error below the regression line).	Used ability or achievement tests and school grades and included general grade average over all subjects plus specific grades in English and Math's.	The regression of grades on test scores was performed separately for the subjects of Chinese, English, and math's as well as for total test scores and general grades.	McCall Beach & Lau (2000).
Arbitrary absolute splits; underachievers defined to be higher than a certain minimum on a measure of mental ability but lower than a certain maximum on a measure of school performance.	IQ test plus reading or spelling subtest scores on the Wide Range Achievement Test		Broman Bien, and Shaunessy cited in McCall, et al., (1992).
Children with average, above average and even gifted abilities who are not performing up to their capabilities	Look at current IQ scores and have a psychologist or teacher administer a test battery. (Weschler intelligence tests) Compare school Grades, IQ scores, achievement tests, and intelligence tests	Ascertain whether IQ scores have declined ten or more points. Observe if there is a difference of two categories or more between IQ and achievement tests	Rimm (1986).

Definition	Measures	Methods	Source
Underachievement was defined as a statistical discrepancy between intellectual ability, and academic performance	Intellectual ability was measured by the MAT-SF (standardised test) and academic performance, was measured by GPA.	A linear regression equation was used to identify underachievers.	Lacasse, (2000).
Tolor (1969) defined underachievement in terms of ability in relation to predicted achievement – one standard error of estimate below expectance based in intelligence quotient	Potential often defined in terms of IQ scores and achievement on the basis of achievement tests and teacher grades	To identify gifted underachievers a large discrepancy between the student's school achievements and some indication of the child's potential such as intelligence, creativity, teachers' and parents' observations is required.	Butler-Por (1993).
Students whose GPA fell one category below that which was expected were classified as underachievers.	Using Serenes system, the nominated students' GPA s were compared with their IQ scores (Otis-Lennon group score tests. The Serene system provides expected grades for different IQ score categories.	The students were selected by participating teachers (students whom teachers felt were achieving below a standard that the teachers had set) were screened according to Serene's (1953) criteria.	Guerney (1985).
Procedures used for identifying achievement—ability discrepancies by school psychologists	1.Clinical judgement; 2.deviation from actual grade or age level; 3.expectancy formula deviation from expected grade level based on IQ or MA; 4. Difference between actual standard scores on an ability test and an achievement test,	5.regression model to determine expected standard score for achievement, which is compared with actual achievement score, 6. Percentage lag – functioning below a certain level compared to peers	Ross (1995).
Pupils who do not attain an academic level predicted from their measured performance on a standardised test eg. TOSCA, termed underachievers.	To make inter-test comparisons for individual pupils between scores made on the PAT and performance on the TOSCA, the scores on both types of measure should be converted to stanines as these scores represent broad categories of performance.	Where a pupil's stanine combination is outside the acceptable margin of error estimates, teachers should; check the marking and score conversion of both tests; check last years test scores and teacher ratings; evaluate the student's present class performance, in an attempt to ascertain if there is a real discrepancy between in scholastic abilities and achievement	Reid Jackson, Gilmore & Croft, (1981).

Definition	Measures	Methods	Source
The current standard of some students' work is often found to be below the level at which they have consistently performed in the past.	In accurately identifying students whose performance is lower than expected using test scores, regression effects and standard errors of measurement need to be taken into consideration.	The following approaches can contribute to identifying students underachieving; A. comparison of reading percentile ranks with results obtained from an individual intelligence test (WISC-R). B. Comparison of reading scores over the years to ascertain any significant decline in level score. C. Comparison of reading assessment with those based on other group tests, especially those with less emphasis on reading.	Reid & Elley (1991).
Definition Of learning disabilities; An individual Not achieving commensurate with his/her age and ability when provided with appropriate educational experiences.	Frequency of regression prediction discrepancy uses as the discrepancy score the residual $Y-Y_i$ based on the regression of aptitude on achievement. The discrepancy $Y-Y_i$ is significant when it equals or exceeds the value SD Za $\sqrt{1-r^2_{xy}}$ when both measures (IQ and achievement) are expressed in a common metric.	Assesses the magnitude or severity of this discrepancy by comparing it against the base rate in the population from which the correlation r_{xy} was derived.	Reynolds (1984).

Issues to consider when selecting a discrepancy model

Regression to the mean

There are some important considerations to heed when attempting to define and measure underachievement. A crucial consideration is regression to the mean, which is the tendency of extreme scores on one measure to be less extreme on a second related measure. The second scores regress or "move" toward their mean. Therefore, if scores on two tests are positively correlated (or related), then individuals who have extreme scores on one test will almost always have a score more in line with the population average (i.e. regress toward the mean") on the other test. The extent of the regression toward the mean depends on the strength of the correlation between the two variables. This is pertinent for measuring underachievement, as most people with extreme IQ scores will tend to have less extreme achievement levels. That is, achievement measures regress upon IQ. For underachievement to have any meaning, it is important to make allowances for the regression effect. Thorndike (cited in McLeod, 1979) asserts that underachievement needs to be defined "as the discrepancy of actual achievement from the predicted value, predicted on the basis of the regression equation between aptitude and achievement" (p. 326).

It is clear that due to regression effects, expected achievement will not necessarily be as extremely high or low as the IQ score. Failing to take into consideration regression effects may result in some students with high IQ scores being incorrectly identified as underachievers. Similarly, students with below average mental abilities are more likely to be under-identified as underachievers. For example, if teachers use standardised test results as a benchmark for assessing students, they may expect that a student who scores 99 in their TOSCA (Test of Scholastic Abilities) should score 99% or thereabouts in their school exams. Therefore measures or methods that fail to consider regression effects will be excluding those students who need identifying the most, and including unnecessarily those students who are achieving on a par with their abilities. According to the underachievement literature, up to 50% of gifted children are classified as underachievers. McLeod (1979) suggests that this may be due to failing to take into consideration the effects of the regression

to the mean phenomenon. Methods of underachievement, therefore, need to include regression effects to be useful.

Measurement Error

Measurement error is an important factor to consider when defining underachievement. Thus when determining what is an acceptable discrepancy the measurement errors that are inherent in both IQ and achievement/aptitude measures both need to be considered. Wilson and Cone (1984) further explain measurement error through test theory which states that any specific score comprises both the true value and an error element that can either add to the true value of a score, or lower it, thereby making the actual score either too large or too small. The error of measurement is a computation that predicts the probable range of fluctuation in an individual's test score due to unknown or irrelevant chance factors (Anastasi & Urbina, 1997). The standard error of measurement is therefore used to estimate the 'reasonable limits' of the true score with any actual attained score. In other words, rather than using an actual attained score of an individual in a test, it is preferable to interpret test results in the context of a range as produced by the standard error of estimate equation. By using the standard error of estimate, when comparing test results against school performance, small differences that may well be attributable to chance are not mistakenly interpreted as significant. Many studies on underachievement establish the need for a large discrepancy to classifying students as underachievers due to chance errors inherent in single test scores. This discrepancy is normally at least one standard error of estimate below the predicted school performance, measured by grade average (Butler- Por, 1987; McCall et al., 1992; Reid & Gilmore, 1981; Wilson & Cone, 1984).

Norm Groups

Another important element to consider when selecting measures to identify discrepancies between students' abilities and performance is norm groups. If two different test scores are gained from tests that have not been standardised on the same sample of children i.e., they have different norm groups, differences between the two may be due to systematic differences in the norming samples between the

tests rather than discrepant performance (Cone & Wilson, 1981). This factor is pertinent for this study, as TOSCAS are the aptitude tests used for this study and have been standardised using NZ norms (Reid, Jackson, Gilmore & Croft, 1981). Furthermore, Cone and Wilson (1984) maintain that comparability of the norm groups is important rather than necessitating the same norm groups for valid comparative purposes between two tests.

Students schooling experiences

A further important point to regard when selecting a discrepancy measure is the number of years a student has been in school. Cone and Wilson (1981) exhort the need for caution with using chronological age as part of a discrepancy model. Not all students start school at the same age and students may progress with their learning at different rates, giving rise to different age groups in various class levels. These factors need to be considered when measuring underachievement. Similarly, Reid and Gilmore (1984) maintain that for the TOSCA test to be a reliable and assessment measure of a student's abilities, it is assumed that all students have had similar opportunities and have had the same exposure to test material. Any measure for underachievement must also be able to ascertain underachievers at all levels of mental ability consistently. For example, measures that systematically over or under identify students at particular IQ levels are inadequate and will produce biased classifications. In order to identify underachievers as accurately as possible, it is judicious to consider all the factors discussed when selecting a method that will exhibit discrepant achievement.

Summary/Conclusion

The regression analyses method suggested by Wilson and Cone (1984) incorporates all the important elements necessary in a discrepancy model. Therefore, based on the preceding arguments, the regression analyses appears to be the most valid/appropriate method for identifying underachievers for this study.

Characteristics of underachievers

There are certain hallmarks of underachievement recognisable in students (Butler-Por, 1987). These behavioural characteristics have been cited in the literature and include; lack of attention in class, not completing assignments, failing to do homework, inconsistent effort and performances, poor or nonexistent study skills, disruptiveness, lateness and absenteeism (McCall et al., 1992; Rimm, 1986). Previous studies on underachievement have discovered certain defining characteristics of underachieving students, although some of the findings seem to be contradictory. This may be explained by the heterogeneous nature of underachievement. Within the learning disabilities arena, which has many similarities to underachievement, Mercer, Hughes and Mercer (1985) assert that within the population of learning disabled students exists heterogeneity. They believe that it is important to investigate these students to define meaningful subgroups. Previous research has unearthed various characteristics of underachievers, which are displayed in Table 2.

Table 2

Characteristics of Underachievers

Characteristics of underachievers	Source
Lower opinions of their abilities/competence	Butler & Por (1993); McCall et al. (1992).
Lower educational and occupational desires and expectations	Colangelo et al. (1993); Gohm et al. (1998); McCall et al. (1992).
Think less about their future careers	McCall et al. (1992).
Poor self-concept and low self-esteem	Butler & Por (1993); McCall et al. (1992); Peters & Van Boxtel (1993), McCall et al. (1992).
Self critical. Fear of failure/ success	McCall et al, (1992); Peters & Van Boxtel, (1999).
Anxious/nervous	McCall et al. 1992
Unrealistic standards	Peters & Van Boxtel (1999); McCall et al. (1992).
Lack of persistence External locus of control	Peters & Van Boxtel (1999).
Inadequate problem solving strategies	Colangelo et al., (1993).
A less positive attitude toward their high school education. Lack of integration toward goals	Butler-Por, (1993).

Table 3

Parental Characteristics of Underachievers

Parental characteristics of underachievers	Source
Indifference or disinterest Low affection Neutral to negative attitudes to education or conversely, overemphasis on achievement Parental disagreement, conflict	McCall et al., (1992).

Of particular interest to this study regarding characteristics of underachievers is recent research which suggests that (McCall et al., 1992) whilst controlling for both ability and grades, underachievers, relative to their comparison groups, lacked persistence in the face of challenge. Within the realms of study, persistence refers to a continued application to learning when the going gets cognitively tough (Elliot, McGregor & Gable, 1999). A more recent study found a tendency for the stability of underachievement to be higher for different subjects, especially the harder ones, in their study on underachievers (McCall et al., 2000). These authors suggest that this indicated a need for further study on the persistence of underachievement pertaining to the extra effort and challenge needed in these more difficult subjects in light of the finding that lack of persistence appears to be a characteristic of underachievers.

Lack of persistence may be due to a variety of factors. The psychological constructs selected for this study are associated with certain defining personality characteristics of underachievers, in addition to their positive relationships with academic performance. By measuring the constructs that are associated with characteristics of underachievers as well as academic achievement, further insight into the underachievement issue may be found. For example, underachievers' lack of persistence may influence their study strategies. Contrastingly, underachievers' levels of the psychological constructs in this research may also influence lack of persistence. For example, could lack of persistence be related to parental social support (too much or too little)? Do these underachieving students think that there is little point in doing well at school (outcome expectancies) and fail to persist at difficult or boring tasks? Or do they believe that they lack the capabilities to perform (self-efficacy)? Do these students perform less well than expected due to test anxiety/poor study skills and are those poor study skills related to lack of persistence? This study's constructs also involve other personality traits found to be associated with underachievement. These include lower educational and occupational aspirations and lack of integration toward goals which are associated with outcome expectancies; low perception of abilities included in the construct self-efficacy; anxiousness encompassed in test anxiety and failure to implement problem solving strategies which is covered by study strategies. Although measuring the characteristics found in underachievers (e.g. lack of persistence) is beyond the scope of this study, the association between the constructs and characteristics may aid further understanding of underachievement. Furthermore, measuring both the

personality traits found in underachievers in conjunction with self–efficacy, outcome expectancies, study strategies, intrinsic motivation, and social support could be a useful future research project.

Psychological constructs and underachievement

Social Support

Evidence in the literature suggests social support may contribute to academic performance (Archer, 1994; Levitt, Guacci-Franco & Levitt, 1994; Pintrich & De Groot, 1990; Reynolds, 1999; Stanton, 1999; Veil & Baumann (Eds.), 1992; Wentzel, 1998; Zimmerman, 2000). It follows that if social support is linked to academic achievement in a positive way, then academic underachievement could be linked to social support in a negative way. Social support refers to the clarity or certainty with which an individual experiences being loved, valued and able to count on others should the need arise (Veil, H.O.F. Baumann, U. (Eds.)., 1992). Social support is a broad construct that embraces one's network of supportive family, friends and peers (Cheung, 1995). Pertinent to this study is the suggestion that perceived social support from students' parents, teachers, and peers has been found to positively influence adolescents' academic outcomes (Cheung, 1995; Cutrona, Colangelo, Assouline & Russell, 1994; Reynolds, 1999; Wentzel, 1998).

There are several theories in the literature to help explain the positive link between social support and academic achievement. It has been suggested that supportive relationships might be related directly to academic achievement through learning assistance, encouragement and positive feedback. For example, supportive family members may provide instructional support by way of helping students with their homework, explaining a difficult maths equation, or editing an assignment in addition to emotional support. This type of instructional support could contribute directly to academic achievement (Wentzel, 1998). In addition, social support per se may enhance academic outcomes indirectly through motivation. If individuals feel a sense of belonging, loved and supported, they are more likely to take up socially valued goals and objectives, which in turn should positively affect their motivation to

achieve at school. Also, in accordance with attachment theory, social support provides the psychological security (reassurance of worth) that helps students' self confidence and their self concepts, thus providing them with the skills to cope with the demands of scholastic requirements (Cutrona et al, 1994; Levitt et al., 1994; Wentzel, 1998).

Reynolds' (1999) study identified how the motivational support of families and teachers helped students' to persist in their scholastic work and goals. This finding may help explain the premise that there may be a link between lack of social support and lack of persistence. It seems reasonable that if parental support helps students to persist in their school work, a lack of parental social support in an adolescent's crucial schooling years may contribute to students' lack of persistence in their schoolwork and possible underachievement. An apparent parental disinterest in adolescent students' schoolwork is likely to affect students' aspirations, their motivation to do well, and other related variables (self concept, informational help) which in turn will affect persistence i.e. "What's the point?" This reasoning ties in with the literature on academic underachievers, which suggests that a parental characteristic of underachievers is indifference to education and scholastic achievement (McCall et al., 1992). Moreover, studies on how family environments affect students' academic aspirations and outcomes have found that students' academic aspirations and outcomes are positively related to supportive family environments which are in harmony with the school's learning environment (Marjoribanks, 1998). Similarly, Kellaghan, Sloane, Alvarez, and Bloom (cited in Marjoribanks, 1998) have suggested that "when the home and school have divergent approaches to life and to learning, children are likely to suffer in their school learning. Conversely, when home and school have similar emphases on motivation and learning, children are likely to do well" (p.145). Conceptually contrasting with the relationship between a lack of social support and underachievement, is the apparent relationship between underachievement and parental overemphasis on achievement. McCall et al. (1992) have found in their research on underachievement, that whilst a defining parental characteristic of underachieving students, is lack of interest in schoolwork, the opposite end of this spectrum is those parents who are too interested. These parents are preoccupied with achievement, and tend to place too much pressure on their children. Other aspects of parents that place too much emphasis on achievement are overindulgence, oversolicitous,

overprotective and too helpful. An intention of this study is to empirically explore
the relationships between perceived parental social support and adolescents'
academic achievement and underachievement.

Motivation

Previous research has demonstrated a strong relationship between high interest and
enjoyment of a topic (otherwise known as intrinsic motivation) and motivation for
that topic (Pintrich & De Groot, 1990; Remedios, Lieberman & Benton, 2000).
Previous research also suggests that there is an association between
underachievement and lack of interest and enjoyment of subjects (Gohm, Humphries
& Yao, 1998). Intrinsic motivation for a task has been defined by some theorists as
an individual's self reported ratings of interest and enjoyment of a task (Remedios et
al., 2000).

Students who are intrinsically motivated by their schoolwork are more likely to place
more importance, interest and understanding of their coursework than those students
who are not as intrinsically motivated by schoolwork. Consequently, they are also
more likely to exert more effort. Effort has been cited as a gauge of motivation to
learn (Lambert & McCombs (Eds.), 1998). It has been suggested that interest and
effort may have positive effects on each other. For example, if students are
intrinsically motivated by their coursework in a particular subject, it is likely that
they will they may become more attentive and diligent with their studies and as a
result perform at a higher level. These higher performances may further influence
the student's motivation in that course, with a possible upward spiral effect of
academic performance in other less intrinsically motivating courses (Harackiewicz et
al., 1998).

Students high in intrinsic value have been found to be more likely to use cognitive
strategies and possess more self regulatory study habits than students low in intrinsic
value (Printich & De Groot, 1990). In other words, the students who found their
coursework to be interesting, enjoyable and important reported higher persistence
and engagement in their schoolwork. These findings suggest that students who find
their schoolwork to be intrinsically motivating, choose to become self-regulating and
cognitively engaged. It follows that students, who are applying themselves more,

engaging in more metacognitive activity and utilising cognitive strategies to a greater degree, are more likely to have higher academic results than those students who do not engage in cognitive strategies to the same extent. Conversely, the students who do not find their schoolwork intrinsically motivating are less likely to engage in and persist at their schoolwork. Consequently, these same students may not perform academically in accordance with their ability levels.

Self-efficacy

Previous research suggests that self-efficacy is positively associated with academic achievement. High self-efficacy in students has been found to be positively related to persistence, level of effort, motivation, and cognitive strategies (Archer, 1994; Pintrich & De Groot, 1990; Stanton, 1999; Zimmerman, 2000). Conversely, low self-efficacious students should have negative associations with academic achievement. It is also predicted that low self-efficacy would be related to underachievement as low self-efficacious students would have lower levels of persistence, effort and cognitive strategies than the highly self-efficacious students. Furthermore, underachievers have been associated with a lack of persistence, (McCall et al., 1992) which may be associated with low self-efficacy.

The concept of self-efficacy is a component of Bandura's (cited in Zimmerman, 2000) social cognitive theory. Self-efficacy has been defined by Bandura as "personal judgements of one's capabilities to organise and execute courses of action to attain designated goals" (p.83). Perceptions of self-efficacy can differ across various aspects of a person's life. For instance, it is conceivable to have high self-efficacy in a specific domain, such as academic ability, yet low in another domain, such as musical ability (Zimmerman, 2000). According to Bandura (cited in Covington, 1999) the most influential source of self-efficacy is one's past performance. Favourable results generally enhance self-efficacy, whilst less favourable results lower self-efficacy. How individuals interpret their performance results affects their self-beliefs, which can then affect their subsequent performance. According to attributional theory, if the individual attributes their outcome to poor ability, their self-efficacy is likely to suffer. However, if they attribute their poor outcome to lack of effort, bad luck or task difficulty, self-efficacy is not likely to

suffer as badly (Schunk, cited in Stanton, 1999). Further, individuals who already have a high sense of self-efficacy are less likely to be affected by poor performance results.

Perceptions of one's abilities to successfully perform an activity (self-efficacy beliefs) affect behaviour in a myriad of ways. For example, they can influence a person's willingness to undertake an activity, the amount of effort they will expend, their level of persistence when faced with difficulties, and their resilience in the face of adversity (Miller et al., 1996; Pajares, 1996; Stanton, 1999). Individuals with high self-efficacy are more likely to exhibit greater amounts of effort, persistence and resilience than those with less self- efficacy (Pajares, 1996; Stanton, 1999; Zimmerman, 2000). These factors will positively affect performance of a given activity. Individuals with high self-efficacy are consequently more likely to achieve higher levels of performance in the goals they are seeking to attain (Pajares, 1996). Prior studies on self- efficacy demonstrate the mediational role it has to play in contributing to academic achievement. These studies suggest that high self-efficacious students used more cognitive strategies, worked harder, embraced more challenging roles and were more persistent in their academic tasks than less self-efficacious students (Pintrich & De Groot, 1990; Stanton, 1999; Zimmerman, 2000). It is evident how these behaviours could combine to positively affect academic grades. Thus, high self- efficacy is able to play a facilitative role in creating an upward spiral effect on academic achievement. Conversely, a lowering of one's self-efficacy as a consequence of poor academic performance could create a spiral effect whereby study efforts and skills are also lowered, resulting in a new set of lowered marks. Hence, self-efficacy has an important facilitative role for student academic outcomes.

Outcome expectancies/future consequences

Students who value future consequences and have high outcome expectancies are expected to have normal to high academic achievement status, as they are more likely to be more persistent in their academic work than students who do not value future consequences. The students who are underachieving relative to their abilities are expected to place less value on the future consequences that high academic achievement provide. The construct of outcome expectancy refers to both an

individual's expectancies for success and the incentive value of a particular task which in turn influence the persistence of achievement behaviour (Anderman & Midgely, 1997; Weiten, 1996). For these reasons, expectancy value theorists maintain that positive expectancy/value outcomes are motivational (Wigfield & Eccles, 2000). Therefore, outcome expectancies of individuals may play an important and instrumental role in their academic performances. The second component of outcome expectancy is essentially the incentive value of a specific task. Outcome expectancy encompasses both an individual's beliefs in their ability to succeed, and their beliefs that succeeding at the specified task is worth expending effort for. The first component of outcome expectancy is covered in this study by the construct self-efficacy. The second component of outcome expectancy will be measured by the scale future consequences. Previous research suggests that students who believe their class-work to be useful and valuable perform at a higher level than those who do not, illustrating the value of academic expectancy outcomes in school performance (Anderman & Midgeley, 1997; Miller et al., 1996; Pintrich & De Groot, 1990; Raynor, Atkinson & Brown, 1974). Previous research has found that those students who valued future goals more than other students had higher grades and reported higher study efforts than those who did not (Miller et al., 1996). Future consequences have been defined by Miller et al. (1996) as "anticipated and valued distant consequences thought to be at least partially contingent on task performance but not inherent in the performance itself" (p390). They embrace such goals as long term financial rewards, gaining entrance to a college (university), and attaining future career objectives.

Secondary school adolescents are at a crucial crossroad in their lives. Many are starting to look at various career options and educational opportunities and are starting to think seriously about their future (Anderman, Anderman & Griesenger, 1999). Those who recognise the value of high grades for future life choices (high outcome expectancy) are more likely to be motivated to work hard and strive for academic success, thus enhancing their future career options and life courses. Relatedly, recent research on adolescent schoolboys suggests that the changing nature of the workforce may be linked to boys' career expectations and consequent class performances. Many of the manual and/or trade jobs that were suitable for boys of average and below average academic ability have disappeared. The skills demanded now are communication and keyboard skills, which have often been

thought of as female domains. This poses two potential problems for boys; a perceived threat to their maleness, and uncertainty for their future job prospects (Francis, 2000; Noel & Bradford, 2000). There exist two opposing theories as to how the diminished demand for traditionally masculine unskilled jobs may affect sectors of adolescent boys: The first theory is that due to the lack of demand for unskilled work boys with average or below average school marks may have low expectations for gaining a job, and so tend not to try at school. The second proposition is that some boys are unaware of the changing demands in the workplace, and therefore believe they will be able to gain employment irrespective of their lack of qualifications, so may feel that they do not need to work on their school grades (Francis, 2000; Noel & Bradford, 2000). Both goal setting and discussing aspirations for the future beyond school have been advocated as motivational tools in schools to aid students in acquiring positive outcome expectancies and future consequences (Anderman et al., 1999; Miller et al., 1996). Previous research has found positive correlations between students' future consequences scores and schoolwork (Miller et al., 1996).

Study strategies

Evidence suggests that proficient study skills and habits also positively affect students' academic performances (Covington, 2000; Pintrich & De Groot, 1990). Although study skills seem an obvious requirement for academic success, research has found that many academically able students are unable to produce school results of which they are capable due to inadequate study skills (Crittenden, Kaplan & Heim, 1984). These able students may well be underachieving due to their poor study skills. Therefore study skills have been included as a construct in this study as a possible link to academic achievement and underachievement. Inadequate study skills may arise for various reasons. Some students may simply lack the necessary knowledge on how to study, others may lack the motivation and persistence needed for effective study strategies. Persistence is a salient characteristic of underachievers, therefore, investigating students' study habits may reveal an important understanding of underachievement. The term study strategies for the purposes of this research include cognitive strategy use and self-regulation strategies as measured by the Motivated Strategies Learning Questionnaire (MSLQ). In addition, persistence and effort represent motivational study strategies, derived from

achievement goal theory. Disorganisation is also included as a study strategy, with negative relationships to academic outcomes (Elliot, McGregor & Gable, 1999).

The learning strategies measurements in the MSQL are derived from a general cognitive model of learning and information processing whereby the student is viewed as an active processor of information whose cognition's and beliefs impact the actual teaching given (Pintrich, Smith, Garcia & McKeachie, 1993). Essentially, cognitive self- regulation necessitates that students are proactively engaged in their own learning. This involves planning monitoring and analysing both their schoolwork and homework (Pintrich & De Groot, 1990; Zimmerman & Schunk (Eds.), 1989). Cognitive strategies comprise different strategies that students utilise for processing information they have gained from both class lectures and textbooks. An example of a cognitive strategy is rehearsal (Pintrich et al., 1993). Elliot et al., (1999) maintain that persistence and effort study strategies act as mediators between achievement goals and exam results. They define persistence as a " continued investment in learning when obstacles such as comprehension difficult are encountered, and effort refers to the overall amount of effort expended in the process of studying (p.550)". Several theories have been proposed as to why some students employ favorable study strategies. Elliot et al., (1999) assert that students are motivated to employ healthy study strategies so they can achieve the goals they have set themselves. However, an important part of self- regulation is that students take on the responsibility of achieving their self-set goals (Zimmerman & Schunk, 1989). Literature reviews on underachievement suggest that a characteristic of some underachievers is their external locus of control, which may inhibit their abilities to set themselves goals let alone be responsible for their own study skills (McCall et al., 1992). Measuring both underachievers and achievers' study habits may contribute to our understanding of why some students are not performing to their capabilities.

Test anxiety

Test anxiety has been conceptualised by Printrich and De Groot (1990) as an affective motivational aspect of learning skills. Test anxiety has also been associated with cognitive strategy use and effort. One finding is that highly anxious students put in the same amount of effort and persistence as less anxious students. Opposingly, it has also been suggested that test anxiety may be a function of inadequate preparation for exams via lack of persistence and avoiding difficult tasks

(Pintrich & De Groot, 1990; Rothblum cited in Elliot et al., 1999). Test anxiety may also be related to a lack of self-esteem and self-efficacy, which have also been found to be defining characteristics of underachievers (McCall et al., 1992). Underachievers have also been characterised as high in anxiety. Students who suffer from test anxiety are thought to perform less well in their exams. Students may not believe they have the abilities to perform well, so when exam time is approaching, begin to feel anxious which in turn may affect their actual performance in the exams. Test anxiety therefore has been included as a construct of interest for this research. It is predicted that underachievers will suffer from test anxiety more than the non-underachievers will.

Summary

Of all the methods described in Table 1 for measuring underachievement, the method that best incorporates the elements considered important to validly identify a discrepancy is the regression equation. Wilson and Cone (1984) argue the following reasons why the regression equation method is deemed as the most appropriate for determining an academic discrepancy. The regression equation is the only method that takes into consideration regression (to the mean) and measurement errors. Moreover this method considers error measurement in the predicted as well obtained achievement scores. These authors explain that the regression equation produces the empirically determined expected achievement for a particular IQ score and it also automatically adjusts expected academic scores so that they are less extreme i.e. regression effects will be incorporated within the relationship. Furthermore, the more recent research on academic underachievement recommends and uses regression analyses to identify academic underachievers (Cone & Wilson, 1981; Lacasse, 2000; McCall et al., 1992; McCall et al., 2000; Reynolds, 1984; Wilson & Cone, 1984). Regression analyses will be used in this study to identify underachievers.

Study strategies employed by students are due to a myriad of influences that interact in complex ways with each other (Elliot et al., 1999). The constructs discussed in this study are all believed to be influential in students' employment of and persistence in studying. For example, if a student believes he is able to obtain high grades in a particular topic (self-efficacy), he is more likely to make the effort to

study and employ effective study strategies. In addition, if students are intrinsically motivated by their coursework in a particular subject, they are more likely to become more attentive and diligent with their studies and as a result perform at a higher level (Harackiewicz et al., 1998). Likewise, students who receive positive social support achieve psychological security (reassurance of worth) that helps students' self-confidence and their self-concepts. This in turn conceivably provides students with the skills to cope with the demands of scholastic requirements including effective study strategies. Relatedly, it has been found that students who value future goals more than other students had higher grades and reported higher study efforts than those who did not. Conversely, students who suffer from test anxiety are more likely to have poor study skills than students who do not feel anxious sitting examinations. Since the psychological constructs of this study have positive relationships with academic achievement, it seems reasonable that these same constructs will have negative relationships with underachievement. As suggested in the literature review, underachievers have been found to have certain characteristics, which may influence their self–efficacy, outcome expectancies, study strategies, test anxiety, social support or intrinsic motivation. The underachievers' responses to this study's constructs in comparison to the non-underachievers are a focus of this study.

Research Objectives

The primary objective of this study is to identify those students who are underachieving relative to their mental abilities using regression analyses. Secondly this study aims to investigate the differences between underachievers and achievers on the following constructs: self-efficacy, social support, test anxiety, intrinsic motivation, future consequences/outcome expectancies, and study strategy variables.

Chapter 3

Methodology

Introduction

An objective of this study was to identify underachieving secondary school males in a New Zealand context. Males were chosen due to their relatively higher underachievement status compared to females (McCall et al., 1992; Noble & Bradford, 2000). Auckland schools were chosen due to their geographic proximity and accessibility to the researcher. The second purpose of this study was to investigate psychological factors that may contribute to underachievement. These were explored via a questionnaire of approximately 40 minutes duration. The use of a single self-report questionnaire in the participating schools was thought to minimise disruption to schoolwork. The methodology has been separated into the two phases, identifying underachievers, and investigating psychological factors that may contribute to underachievement via a questionnaire.

Participants

Approval to undertake this research project was granted by the Massey University Ethics Committee. Participants were drawn from three Auckland secondary schools. In compliance with ethical requirements, all students from the participating schools were invited to participate in the questionnaire prior to the first stage of the data analysis. To be eligible for inclusion of the first stage of data analyses, each fourth form participant needed to have complete school records for all three sets of requested information. At this stage, many students were eliminated from the study, as they had missing data or had left the participating schools before the fourth form, or had not started until the fourth form, or were simply absent when either the standardised tests or school exams took place. Therefore there were 589 participants derived from an original sample size of 770 students, who were eligible for inclusion for the first stage of the study (identifying underachievers). Fourth formers are normally between 14 to 15 years old. Using regression analyses, generally 16% of

students are likely to be identified as underachieving (McCall et al., 1992). The schools who had already agreed to participate in this study agreed to allow access to their school records, on the basis that confidentiality of both students and schools was protected. The school records needed for regression analyses on fourth formers were; third form TOSCA results and fourth form school exam results of the core subjects, English, Maths, Social Studies and Science.

Phase 1; Underachievement

Measures used in discrepancy model

The data needed for the discrepancy model used to identify underachievers were archival and included mental ability tests for a measure of students' abilities and students grade averages as a measure of academic achievement. This information was accessed from the participating schools' existing records.

Measure of abilities (TOSCA).

The measure of students' ability levels used in this study was the TOSCA (test of scholastic abilities). This test was used in the present study as a measure of academic ability. The TOSCA is an official standardised test, given to third formers in many New Zealand schools. The normal ages of third form students range from 13 to 14 years. All participating schools had administered this test to students in their third form year. Therefore, schools were able to provide this data to the researcher. The TOSCA is designed to measure verbal and numerical reasoning abilities needed for academic success. Accordingly, test items in the TOSCA are included that assess school-related abilities rather than specific skills taught in the classroom. The TOSCA is a valid test of scholastic abilities as there is evidence that it combines both verbal and numerical reasoning abilities that reflect the skills needed for scholastic achievement (Reid & Gilmore, 1988). Factor analyses revealed that the TOSCA is "heavily saturated with a verbal/educational group factor providing strong evidence that the test is tapping the kinds of scholastic abilities it was designed to measure". (Reid & Gilmore, 1988, p5). Further, there are high to moderate positive correlations between the TOSCA, the tests in the Progressive

Achievement Tests (PAT) battery and WISC-R subtests of arithmetic and vocabulary. The TOSCA's reliability has been estimated in four different ways. The reliability coefficients for equivalent forms of the tests for secondary tests are .86. The split-half reliability coefficients range from .89 to .93. The Kuder-Richardson Formula 20 coefficients ranged from .90 to .92. Since the TOSCA comprises a wide range of item difficulties, these coefficients indicate reasonably high internal consistency. The test retest reliability coefficients range from .90 to .92. The standard error of measurement for the TOSCA was calculated at 3 raw score points.

Academic assessments (Standardised grade averages).

Most researchers focus on grade point averages in school exams and or tests as an assessment of student academic achievement (Guerney, 1985; Lacasse, 2000; Miller et al., 1996; McCall et al., 1992; McCall et al., 2000; Pintrich & DeGroot, 1990; Wentzel, 1998). Although grades lack standardisation, the justification for their use is that classroom assessments have ecological validity (McCall et. al., 1992; Miller et al., 1996; Wentzel, 1998; Pintrich & DeGroot, 1990). Grade averages were used in the present study as a measure of academic achievement. In addition, grades were standardized (mean of 0, standard deviation of 1), due to possible biases arising from potentially different awarding of grades by different schools. Furthermore, grades were standardised across schools rather than within schools so that the resulting identified underachievers would be more representative of New Zealand male secondary students, rather than of the particular schools. For example, if grades were standardised within schools, a student who may be an underachiever in their school, may well be a non -underachiever across the schools and vice versa, creating underachievement as a function of the school they are in rather than underachievement per se. The standardised, cumulative grade average (GA) represents the mean GA for English, mathematics, science, and social studies.

Identifying underachievers

The method used to identify underachievement was the regression model suggested by Wilson and Cone (1984). Using this method, students whose grades were more than one standard error of estimate below the value predicted on the basis of their test

scores using ability tests (TOSCAS) compared to grades were defined as underachievers.

Data Analysis

The regression method suggested by Wilson and Cone (1984) involved the following procedures:

1. The expected (i.e. average achievement) values were calculated for each participating student's mental ability using the students' standardised test score (TOSCA) as the Mental Ability Index. These TOSCA test scores were used to predict each student's school performance the regression equation (see Figure 1).

2. Averaged school exam marks of each student were standardised across the schools on the basis of the entire sample available and were a measure of school performance (converted to z scores). Standardised grades across the schools were used in the regression analyses in this research for identifying underachievers. Correlations between the TOSCA scores and achievement scores were carried out for the regression analyses as well as the means and standard deviations for both the TOSCAS and the averaged standardised grades. The correlations, means and standard deviations were needed for the following regression equation in order to determine a discrepancy figure for each student.

3   Regressions of standardised grade averages on the mental ability index were then calculated using the equation in Figure 1. The following equation gives the expected achievement score for a specific IQ (TOSCA).

$$Y = r\, S_y/S_x\, (IQ - \bar{X}) + \ddot{Y}$$

Where

Y = the expected achievement for a given IQ

r_{xy} = the IQ achievement correlation

S_y = the standard deviation of the achievement scores

$\bar{X}$ = the mean IQ

S_x = the standard deviation of the IQ scores

$\ddot{Y}$ = the overall mean achievement (Wilson & Cone, 1984).

Figure 1. Regression/prediction equation

The regression equation produces a predicted grade point average for each student based on his or her ability score (TOSCA). Actual grade point averages that were at least one standard deviation below the expected value depicted performance that was below potential (underachievement). A significant achievement discrepancy as suggested by McCall et al. (1992) was any residual standardised grade average that was one standard error of estimate or more below the predicted achievement value (see Figure 2). The IQ (TOSCA) /achievement (standardised grade averages) correlation and the standard deviation of all the achievement scores were data obtained in the preceding regression analyses equation that were needed to calculate the standard error of estimate. The standard error of estimate is the square root of the IQ/ achievement (r_{xy}) correlation squared multiplied by the standard deviation of all the achievement scores. Any values that were one standard error (or more) below the expected values were classified as a significant discrepancy.

$$SD_Y \sqrt{1 - r_{xy}^2}$$

Where SD_Y = the standard deviation of all the achievement scores

       r_{xy} = the IQ achievement correlation

Figure 2. Standard error of estimate equation

Underachievers were identified/defined in this study as those students whose residual values (actual grade average – expected grade average) were one or more standard error of estimate below their predicted achievement using the regression equation (McCall et al., 1992). Using this model, and assuming a normal bivariate distribution of grades on test scores, about 16% of the participating students should be classified as underachievers for each form/year at each time (McCall et al., 1992; McCall et al., 2000).

Selecting matching comparison groups with underachiever groups

In this study the underachievers' responses from the questionnaire were compared to two matched comparison groups of non-underachievers' responses. The matched comparison groups consisted of; normal achievers with similar grade averages to the underachievers, but with appropriately lower TOSCA scores (same grades) and normal achievers with similar TOSCA scores, but lower grades (same TOSCA). In other words, the non-underachiever comparison groups either had similar grades or similar TOSCA scores to the underachieving group. However, the non-underachiever comparison groups were achieving in accordance with their predicted grade averages, whereas the underachievers were achieving well below their expected grade averages. The purpose of matching underachievers with two comparison groups of non- underachievers with similar grades and similar TOSCA scores was to ascertain if there were significant differences between the underachiever groups and the matched groups whilst controlling for: (1) grades while allowing mental ability to be lower (same grades), and (2) controlling for mental ability while allowing grade averages to be consistent with predictions (same TOSCA) (McCall et al., 1992). McCall et al. (2000), assert that the most meaningful assessments of the differences between underachievers and non-underachievers are achieved when the compared groups are matched by either grades or test scores. McCall et al. (1992) argue that by not comparing non-underachieving students with underachievers with the same grades, it is possible that underachievement may not be distinguishable from lower achievement.

The matched grades comparison participants were selected on the following criteria as advocated by McCall et al. (1992). Each underachiever was matched with a comparison student from the same school, whose standardised grade average was as

close as possible to the underachiever's grade average, and whose residual standardised grade average (deviation from the GPA/TOSCA regression line) was small. Specifically, a comparison student was selected with a standardised grade average as close as possible to the underachiever's grade point average but not more than half a standard deviation from that of the underachiever standard deviation. The matched TOSCA comparison participants were also matched with an underachiever from the same school, and with as close a TOSCA score as possible and within a 5 percentile ranking of each other. All matched comparisons were chosen with small residuals. The matching data are presented in Table B.1 (see Appendix B). This table gives the number of identified underachievers whom answered the questionnaire, their grade averages and TOSCA percentile scores, and both the matched groups' grade averages and TOSCA scores.

Phase 2

Questionnaire

Students were given a questionnaire that included the following constructs; social support, outcome expectancies/future consequences, self-efficacy, intrinsic motivation and study strategies.

Social Support scales.

The Marjoribanks Perceived Family Scale, Revised, by Kevin Marjoribanks (1992) (MPFS) was used to assess parental social support of adolescents in relation to their schoolwork. A 20 item 5-point Likert scale was used in this questionnaire where the lower the respondents scored, the more they perceived to have family support for their schooling i.e. the lower the score, the higher the existence of the construct measured. However, the scorings were transposed so this measurement was in accordance with the other measurements for comparison purposes. This questionnaire was used to answer the broad question, "To what extent are the educational and occupational aspirations of adolescents related to measures of family learning environments?" However the question for the current study in relation to social support, was "To what extent are the academic achievements of adolescents related to measures of family learning environments?" The (MPFES) has been used in previous research and their findings indicate predictive validity (Marjoribanks,

1983; Marjoribanks, 1984; Marjoribanks, 1987). Adolescent's perceptions of their parents' support for learning had strong associations with their educational aspirations and generally moderate to strong relations to their occupational aspirations. The findings for the two scales labeled mother support and father support for learning suggested that the family environment measures have moderate to high concurrent validities in relation to adolescents' aspirations. A further study using this measure for assessing academic interactions with parents found that the two 10-item scales formed had alpha reliability estimates of .84 (Marjoribanks, 1983; Marjoribanks, 1998).

Self- efficacy, study strategies and intrinsic motivation scales.
The Motivated Strategies for Learning Questionnaire (MSQL) by Pintrich, Smith, Garcia and McKeachie (1991) was chosen to measure self- efficacy, study strategies and intrinsic motivation investigated in this study. This questionnaire was comprised of various scales (15) that can be used together or individually, and is intended to assess students' motivational orientations and learning strategies. The self- efficacy and test anxiety scales are part of the motivation section. The Motivated Strategies Learning Questionnaire (MSQL) used for this study was a slightly altered version used by Pintrich and De Groot (1990) for a particular research question. The scale correlations with final grades are significant, but modest (Pintrich et al., 1991) indicating predictive validity. Factor analyses results demonstrate that the MSLQ shows reasonable factor validity, establishing its psychometric integrity (Barker & Olson, 2000). Students rate themselves on a six point Likert scale from "not at all true of me to very true of me." Scales are constructed by taking the mean of the items that make up that scale. The MSQL has been used with satisfactory results, suggesting its utility and predictive validity (Barker & Olson, 2000; Pintrich & De Groot, 1990). Internal consistency estimates range from .62 to .93 for the motivational scale, and from .52 to .93 for the learning strategies scale. The questions in the intrinsic value scale used by Pintrich and De Groot (1990) were adapted for this study. The original nine questions were specifically for an English class. Therefore all the questions contained "in this class". As this study incorporated all the core subjects of fourth formers, it was thought that these questions needed to include all the core subjects. For example, rather than the question reading " I like what I am learning in this class" in this class was substituted

with English, Maths, Social Studies and Science. Therefore this particular questionnaire was somewhat lengthier than the original questionnaire.

Persistence, effort and disorganisation scales.

Study strategies as measured in this research included the persistence, effort and disorganisation scales within the cognitive/metacognitive study strategies developed by Elliot, McGregor and Gable (1999). A 6 point Likert scale was used for the items 'not at all true of me'(1) to 'very true of me '(6). Each of these constructs were measured using a 6 point Likert scale where the higher score depicts congruence with the construct measured. Pilot studies were also carried out by Elliot et al., (1999) out to obtain the final measure of disorganisation. Factor analysis revealed the disorganisation items loading on their designated factor. Testing disorganisation as a mediator variable revealed a significant negative relationship between disorganisation and exam performance. Testing persistence as a mediator variable revealed that persistence was a positive predictor of exam performance. The effort mediational model revealed that effort was a positive predictor of exam performance (Elliot et al., 1999).

Future Consequences scale.

The scale Future Consequences was taken from an 83 item instrument called the "Attitude Towards Mathematics Survey"(Miller, Greene, Montalvo, Ravindran & Nicholls, 1996). New items were developed for the future consequences measure (four items). Each of the future consequences items contained a variety of examples of possible outcomes for achieving high grades at school (e.g.. money, eligibility for extra curricular activities, college admission). It was expected that underachievers would score lower on the future consequences scale than the non-underachievers. The four items for this scale were on a 5 point Likert scale, with the higher score denoting a high level of the construct future consequences. The items were averaged to produce a total score for each respondent to the questionnaire.

The items intended to measure future consequences varied in their loadings. The loadings varied from .65 to .25. The Cronbach alpha reliabilities for future consequences ranged from .69 to .65 (Miller et al., 1996). Regression analyses carried out by the developers of the 'Attitudes Toward Mathematics Survey' suggested that future consequences was a significant contributor to the explanation of

variance in cognitive engagement and also contributed significantly to predicting achievement. These findings support the theoretical framework that guided the development of the future consequences scale.

Procedure

Phase 2; Psychological Factors and Underachievement

Minor word changes were made to the questionnaire to make it more applicable to New Zealand school students. Informed consent was obtained by providing participants with an information sheet about the study (attached) and by answering any queries they might have about the research. In addition, participants were asked to complete a consent form (attached) if they agreed to participate.

In addition to the questionnaire, the teachers administering the questionnaires on the researcher's behalf were given the oral instructions on a handout (see Appendix A). The oral instructions were to ensure that the administration of the questionnaires was standardised across teachers and schools. Once completed, the teachers returned the questionnaires with attached consent and information forms to the liasing staff member to be collected by the researcher. 770 questionnaires in total were distributed to the participating schools.

Data Analysis

Phase 2

The questionnaire data were submitted to maximum likelihood factor analysis to determine the factor structures underlying the social support, outcome expectancies, self-efficacy, and study strategies constructs. Internal consistency coefficients were obtained for each MSLQ scale, the MPFE scales, Future Consequences scale (from Attitudes towards Mathematics Survey) and the Persistence, Effort and Disorganisation scales derived from the Cognitive/Metacognitive Scale. Means and standard deviations were calculated for scores on each of the MSLQ scale, the MPFES, the Future Consequences scale (from Attitudes towards Mathematics Survey) and the Persistence, Effort and Disorganisation scales derived from the Cognitive/Metacognitive Scale. Pearson product-moment correlations describing the relationships among the MSLQ scores, the future consequences scores, the Persistence, Effort and Disorganisation scales, and the MPFE Scale were carried out. The differences between underachievers and non-underachievers on the variables in the questionnaire were examined using two one-way variance of analysis (ANOVA).

The two non-underachiever comparison groups consisted of the same TOSCA group and the same grades group. The two ANOVA'S were used to investigate whether underachievers responses on the scales in the questionnaire (test anxiety, cognitive-self regulation study strategies, disorganisation, persistence and effort, self-efficacy, future consequences, intrinsic value, and social support for mother and father) differed from the non-underachievers who had similar grades to the underachievers, or similar mental ability to the underachievers.

Chapter 4

Results

Underachievement

Phase 1

Descriptive Statistics

The decile ratings of the three participating schools consisted of one decile 10, and two decile 5 ratings. The total number of participants for identifying underachievers using regression analyses across the schools was 589. Students' grades were standardised across schools, giving a mean of .00, and standard deviation of 1. (See Table 4). The participants' mean and standard deviation for the TOSCA (measure of mental aptitude) are also displayed in the following table.

Table 4

Means and Standard Deviations of Standardised Grades and TOSCAS

	M	SD	N
Standardised GPA	00.00	1.00	589
TOSCA	60.61	26.63	589

Regression Analyses to Identify Underachievers

The results of the regression of standardised grades on test scores are presented in Table 5. The standard error of estimate for this analysis was .708 when using standardised grade averages (GA) across the schools. Any student whose residual grade average was less than - .708 (one standard error or more below the predicted value) were defined to be underachievers. Out of the complete data set of 589, 82 students were identified as underachievers. The percentage of underachievers was 13.9%. The results are presented in Table 5.

Table 5

Regression of Standardised Grades on TOSCA Scores

N	R	F	Standard error of estimate	Identified Underachievers
589	.706	583.733*	.708	82

*p<.05

Although 82 underachievers were identified out of 589 students retrieved from the participating schools' records, only 34 of these students answered the questionnaire in a way that was usable. *R* signifies the correlation between the overall TOSCA scores and the standardised grade averages of all the students, which was used in the regression equation for identifying underachievers. The *F* test represents the significance of the correlation between the standardised test scores (TOSCA) and the grades at the .05 level of confidence, and whether the TOCSA tests can predict grades at a significant level (Tabachnick & Fidell, 1989).

Results of the matching comparison groups

The comparison group matched TOSCAS, had a mean of 67.41 which was similar to the underachiever mean TOSCA of 67.69. The differences in their grades were considerable. The underachiever's mean standardised grade was -. 9397 whereas the group with comparable TOSCA scores had a mean standardised grade of .2404. Theoretically, if the underachieving students were achieving to their abilities, their grade average should be similar to the comparison group on matched TOSCA scores. Tables 6 and 7 show the results of the matching. Table 6 presents the numbers, means and standard deviations for underachievers and the matched grade average group (same GA).

Table 6

Means and Standard Deviations of the 'Same Grades' Group's Grade Averages (Same GA Grade) and their TOSCA Scores (Same GA TOSCA) Compared to the Underachievers TOSCA (UATOSCA) and Underachievers Grade Averages (UA Grade)

Group	N	Mean	Std deviation
Same GA Grade Average	24	-0.55	00.53
UA Grade Average	33	-0.94	00.84
Same GA TOSCA	24	34.60	19.94
UA TOSCA	33	67.69	23.67

Table 7 presents the numbers, means and standard deviations for underachievers and the matched TOSCA group (same TOSCA).

Table 7

Means and Standard Deviations of the Same TOSCA Group's Grade Averages,(Same TOSCA Groups Grade Average), and Same TOSCA Groups' TOSCA Scores (Same TOSCA Groups Average TOSCA) Compared to the Underachievers TOSCA (UATOSCA) and Underachievers Grade Averages (UA Grade)

Group	N	Mean	Std deviation
Same TOSCA Grade Average	27	00.24	00.64
UA Grade Average	33	-00.94	00.84
Same TOSCA Average TOSCA	27	67.41	24.06
UATOSCA	33	67.69	23.67

The mean TOSCA for the selected underachievers (ones who completed the questionnaire) is 67.69, compared to the non-underachiever matched grades comparison group's TOSCA mean of 34.6. Therefore, although these two groups had comparative grade averages (UA = -.93, matched grade = -.54), the underachievers TOSCA mean was considerably higher, as was expected. As McCall et al. (1992) argue, it is impossible to match the groups perfectly, hence the higher grade average of the matched grades group compared to the underachiever average.

Phase 2

Descriptive Statistics

Mean Scores on Questionnaire.

The items in the Motivated Strategies Learning Questionnaire (MSLQ) had a response range of 1-6, with 6 denoting the highest agreement with the question, and hence the construct measured. Mean values and standard deviations were calculated for the revised scales following factor analyses (see Table 8). The mean values for the scales in the MSLQ for this research were above the midpoints on the scales with the exception of test anxiety, which had a mean value of 3. The above midpoint mean values of the MLSQ scales indicated that overall the participants' were relatively intrinsically motivated in their core subjects, had reasonably positive self-efficacy beliefs, and had positive study strategies. The midpoint mean value for test anxiety indicated that participants did not feel particularly anxious when sitting exams. The responses by the students to the future consequences scale also resulted in a mean value over the midpoint of the scale, indicating that students did engage in schoolwork for the future rewards that high grades may produce. The responses to the cognitive study strategies questionnaire comprising disorganisation and effort/persistence produced a mean value below the midpoint of the scale, and a mean value above the midpoint of the scale, respectively. The low mean value for disorganisation suggests that overall the students do not consider themselves to be disorganised when studying. The higher midpoint value for effort/persistence suggests that students believe that they do put effort into studying and also persist when the subject matter becomes difficult. Both the scales mother and father support

on the MPFES were well above midway on their mean value scores, indicating students' perceived both parents as being supportive of their schoolwork.

Table 8

Means and Standard Deviations of Questionnaire Scales

	N	Range	M	SD
Motivated Strategy Learning Questionnaire				
Intrinsic value, science	315	1-6	4.2	1.10
Intrinsic value, maths	315	1-6	4.3	0.92
Intrinsic value, english	315	1-6	4.03	1.10
Intrinsic value, social studies	314	1-6	4	1.10
Test anxiety	315	1-6	3	1.20
Self efficacy	315	1-6	4.2	0.82
Cognitive/self regulated learning strategies	314	1-6	3.7	0.72
Future Consequences	313	1-5	3.6	0.76
Cognitive Study Strategies Effort/persistence	313	1-6	3.9	1.01
Disorganisation	314	1-6	2.9	1.20
Marjoribanks Perceived Family Environment Scale(MPFES) MPFES-mother	302	1-5	3.8	0.78
MPFES-father	298	1-5	3.7	0.95

Means and standard deviations were also calculated for the selected groups, underachiever, matched grades group (same GA), and matched mental ability group (Same TOSCA) on their responses to the scales in the questionnaire. The results are displayed in Tables 9 and 10. . The underachiever group means for the all the scales were over the midpoint range as were the other group means, suggesting that underachievers as a group were responding to the various scales in a similar direction to the other groups with the exception of the scale disorganisation. Both the 'same

grades' group and the underachiever group means for 'disorganisation' were over the midpoint range, which contrasts with the overall participants mean and the 'same TOSCA' mean for this scale. A higher mean for this scale denotes a higher level of disorganisation in study habits. These higher group means of underachievers and 'same grades' group for the disorganisation scale indicate that these two groups believed they had more disorganised study habits than the other two groups did.

Table 9

Means and Standard Deviations of the Questionnaire Scores for the 'Same TOSCA' Group and the Underachiever Group

Scale	Same TOSCA Group			Underachievers		
	N	M	SD	N	M	SD
Effort/persistence	27	3.87	1.05	34	3.57	0.97
Intrinsic value, science	27	4.31	1.20	34	3.50	1.30
Intrinsic value, social studies	27	3.90	1.36	34	4.03	1.13
Intrinsic value, maths	27	4.27	0.90	34	4.09	0.94
Intrinsic value, English	27	3.91	1.36	34	4.24	1.07
Self-efficacy	27	4.08	0.70	34	3.85	0.79
Cognitive-self regulation study strategies	27	3.75	0.69	34	3.64	0.75
PFES, father	27	3.61	0.89	34	3.54	1.25
PFES,mother	27	3.81	0.78	34	3.80	0.78
Future Consequences	27	3.60	0.69	34	3.63	0.71
Disorganisation	27	2.90	1.30	34	3.69	1.37
Test anxiety	27	3.01	1.29	34	3.25	1.21

The underachievers scored lower than their comparison groups and the overall participant group on the self-efficacy scale, although their mean score was also over the midpoint range. For the effort/persistence scale, the underachiever group mean was lower than the other group means. However, the entire participant mean was higher than the three selected groups for this scale. The matched grades group (same grades), had a higher mean than the other groups on the scale test anxiety, suggesting this group experienced more anxiety than the other groups while taking tests. The underachiever group had the second highest mean for this scale. The

underachiever's mean for the scale perceived family environment-father was slightly lower than that of the other three group means.

Table 10

Means and Standard Deviations of Questionnaire Scores for the Comparison Group 'Same Grades' and the Underachiever Group

Scale	Same Grades group			Underachievers		
	N	M	SD	N	M	SD
Effort/persistence	22	3.62	0.94	34	3.57	0.97
Intrinsic value, science	23	4.34	1.02	34	3.59	1.30
Intrinsic value, social studies	22	3.91	1.24	34	4.03	1.13
Intrinsic value, maths	23	4.43	1.18	34	4.09	0.94
Intrinsic value, English	23	3.69	0.92	34	4.24	1.07
Self-efficacy	23	4.10	0.83	34	3.85	0.79
Cognitive-self regulation study strategies	22	3.72	0.80	34	3.64	0.75
PFES, father	22	3.64	1.25	34	3.54	1.25
PFES, mother	22	3.74	0.86	34	3.80	0.78
Future Consequences	22	3.55	0.75	34	3.63	0.71
Disorganisation	22	3.22	1.26	34	3.69	1.37
Test anxiety	23	3.51	1.48	34	3.25	1.21

Factor Analysis

Factor structure of scales measured in the questionnaire; self –efficacy, intrinsic value, test anxiety, cognitive strategy use, self- regulation, disorganisation, effort, persistence, and future consequences.

The questionnaire used in this research originally contained ten scales and a total of 91 items. The outcomes from the correlational analysis (see Table 12) of this data indicated that significant relationships existed between the scales. Also, the directions of the relationships were consistent with the expectations of this research. Initially, factor analysis was carried out on the nine scales listed above to observe the factor structure/loadings of the various scales and their respective items, resulting in seventeen factors emerging. The scale intrinsic value was found to be loading separately onto its various subjects (Math's, English, Science, Social Studies) and the

separately onto its various subjects (Math's, English, Science, Social Studies) and the study strategies scales were loading on more than the two factors expected. Consequently, the intrinsic value scale was separated into five scales comprising general intrinsic value, intrinsic value Maths, intrinsic value English, intrinsic value science, and intrinsic value social studies. In addition, principal components factor analysis was replaced with maximum likelihood factor analyses, stipulating the number of factors in accordance with the number of scales. Also, three separate maximum likelihood factor analyses using oblimin rotation were carried out on the thirteen scales in accordance with the questionnaires the scales were derived from. The objectives of this analysis were to ascertain whether the items loaded onto the factors they were intended to, and to better understand the interrelationships between the variables.

Marjoribanks Perceived Family Environment Questionnaire

A maximum likelihood factor analyses using oblimin rotation was carried out for the MPFES. The two questions relating to how much education does your father/mother want you to achieve were not part of this analyses, and have been excluded from this research but have been retained for further possible analyses. The factor analysis resulted in two factors, representing the two scales, of mother and father within the MPFES. All items loaded satisfactorily on the appropriate scales, with loadings ranging from .341 to .895 (see Table 11) with eigenvalues of 5.4 for the father scale and 2.2 for the mother scale, with 41.8% of the total variance accounted for in the father scale and 17% in the mother scale (see Table B2, Appendix B). The reliability estimates for both scales were .81 for the mother scale and .89 for the father scale.

Motivated Strategies Learning Questionnaire

The first factor analyses contained nine scales derived from the MSLQ. The initial nine- factor structure indicated that a 7-factor structure best described the data, so another analysis using oblimin rotation was carried out. The following items were dropped as they were not loading onto the factors they were supposed to, and/or were in factors 8 and 9, which had no interpretable scales; Q32 in the self efficacy scales Qs 1, 16 and 25 from the general intrinsic value scale, Qs 43, 54, 42 and 53 from the self-regulation and cognitive strategy use scales. The 7-factor model consisted of 53

items representing seven constructs regarding motivational beliefs and study strategies of students. The 7-factor structure maximum likelihood oblimin rotation resulted in a clear factor structure as indicated by the pattern matrix, with all the scale items loading onto the appropriate factors (see Table 11). This 7-factor structure explained 51% of the total variance, with all eigenvalues being over 1 (see Appendix B, Table B.3).

This factor analysis found that overall the factors did represent the scales they were intended to. However, cognitive strategy use and self-regulated study strategies were merged onto one scale, as the 9-factor structure analysis suggested that this was more appropriate. Since both original scales were used to measure study strategies, and both scales loaded on the one factor it seemed conceptually valid to merge them. There was only one double loading of an item, being question 33 from the self–efficacy scale. However the loading for the factor representing self- efficacy was the highest.

Three Factor Structure for the scales effort, disorganisation and effort
The three scales, effort, disorganisation and persistence were derived from the questionnaire from the Metacognitive Study Strategies Questionnaire developed by Elliot et al. (1999). A maximum likelihood oblimin rotation was undertaken. The three different scales loaded appropriately on their factor loadings. The 3- factor structure explained 68.5% of the variance, with loadings ranging from .65 to 1. However, only two of the three scales had eigenvalues of 1 or more. So, a further factor analysis was carried out whereby the items were loading onto two factors. Persistence and effort were loading onto one factor, and disorganisation loading onto the other factor. Therefore, the two scales of persistence and effort were merged into one scale for the remaining data analyses (refer Table 11), which explained 38% of the variance and had an eigenvalue of 1.09. Disorganisation explained 15% of the total variance with an eigenvalue of 2.7 (refer Appendix B). Internal consistency estimates for these scales were all over .7.

One Factor Structure for the scale Future Consequences

As the scale future consequences was the only scale extracted from the questionnaire "Attitudes towards Mathematics Scale", a one-factor analysis had to be run to ascertain the factor structure of the scale future consequences. The items in this scale loaded up as expected on this factor, with the lowest loading being .337. The eigenvalue for this factor was 1.7, and it explained 42% of the total variance. The reliability for this scale was reasonable, at .73 (refer Table 11).

Internal Consistency

Coefficient alpha estimates were calculated in order to measure the internal consistency of the scales used in the questionnaire. Each scale in the questionnaire was estimated separately, with the alpha coefficients ranging from .73 to .93 (see Table 11). The reliability estimates for the MSLQ ranged from .66 to .90 before secondary analyses were carried out. The reliability estimates following further factor analyses ranged from .82 to .92. These internal consistency measures were in line with the estimates obtained from the developers of the instrument, which reports estimates ranging from .52 to .93 (Pintrich & De Groot, 1990). The scale with the lowest internal consistency was self–regulation (which after factor analyses gets merged with cognitive strategy use as one scale-study strategies). Self-regulation scale comprised part of the learning strategies scale in the MSLQ. The reliability estimate for the Marjoribanks Perceived Family Environment Scale was .85, which is consistent with previous internal consistency findings of .84 (Marjoribanks, 1998). When the two scales of mother's view on education, and fathers' view on education were separately factor analysed, their reliability alpha estimates were .81 and .89 respectively. The scales Disorganisation, Effort, Persistence and Future Consequences all produced satisfactory internal consistency estimates ranging from .73 to .93.

Table 11

Reliability Estimates and Range of Factor Loadings for Questionnaire Scales

	Range of Factor loadings	N	Number of Items	Coefficient Alpha
Motivation Strategies For Learning Questionnaire Motivational Beliefs				
Self-efficacy	.40-.72	301	8	.88
Intrinsic value, maths	.46-.89	304	8	.85
Intrinsic value, social studies	.56-.85	306	6	.92
Intrinsic value, science	.62-.87	311	5	.89
Intrinsic value, english	.70-.82	303	6	.91
Test anxiety	.62-.82	308	4	.82
Study strategies	.30-.50	293	17	.86
Disorganisation	.62-.82	314	2	.80
Effort/persistence	.45-95	309	2	.82
Future Consequences	.34-.82	310	4	.73
Marjoribanks Perceived Family Environment Questionnaire				
MPFE: father	.59-.89	292	7	.89
MPFE: mother	.34-.88	301	6	.81

Intercorrelations

Correlation coefficients were calculated for intercorrelations among the ten scales. The results of the analyses as shown in Table 12 reveal that many of the intercorrelations are significant at the .05 level. Both negative and positive intercorrelations are evident among the scales.

Motivated Strategy Learning Questionnaire

The scales representing the motivational belief section of the MSLQ include self-efficacy, test anxiety and intrinsic value. Self-efficacy and all the intrinsic value scales interrelated positively and significantly at the .05 level. Self-efficacy and test anxiety had a negative relationship that reached significance at the .05 level. Test anxiety had a significant and positive correlation with the cognitive strategies/self-regulation scale, but did not correlate significantly to the other MSLQ scales. Test

anxiety only reaches significance with one other scale, disorganisation, which is a positive relationship. Interrelations between intrinsic value and test anxiety were both positive and negative, but were non- significant. Self-efficacy and intrinsic value also correlate positively and significantly with other constructs in the matrix excluding disorganisation, which is a negative, significant relationship. The cognitive strategies/self- regulation scale also has significant correlations with all the other variables. The significant correlations of self-efficacy and cognitive strategies/self-regulation are all positive except for disorganisation, which are negative and significant. The intercorrelations between the scales are congruent with the expectations of this research with the exception of the positive and significant relationship between test anxiety and the cognitive/self-regulation scale, which was expected to be a negative correlation.

Future Consequences

Future consequences correlates positively and significantly at the .01 level with all the scales except for test anxiety and disorganisation. Test anxiety and disorganisation are both negatively related to future consequences, but only disorganisation reaches significance with future consequences.

Disorganisation and Persistence/ Effort (Study strategies)

These scales all correlate significantly with each other, as expected. Disorganisation reaches significance with all other scales except for intrinsic value in maths and English. All the significant relationships with other scales are negative except for test anxiety, which is positive. Persistence/effort also correlates significantly and positively with all the other scales except for test anxiety.

Marjoribanks Perceived Family Environment Scale

The mother scale correlates positively with all the other scales except for disorganisation and test anxiety, which was negative, but only disorganisation reached significance. All of the positive correlations with the mother scale reached significance except for intrinsic value in Math's and Science. The father scale appeared to show stronger correlations with the other variables than the mother scale,

with similar positive and significant relationships, except that the father scale also had significant and positive relationships with intrinsic value, maths and science. Also, the father scale had a significant and positive relationship with effort at the .05 significance level whereas the mother scale had a significant and positive relationship with effort at the .01 level significance level. The father scale had negative relationships with disorganisation and test anxiety, but only had a significant and negative relationship with disorganisation.

Table 12

Intercorrelations between the MSLQ Scores, MPFES Scores, Future Consequences Scores, and Study Strategies Scores on all Participants

Motivated Strategies Learning Questionnaire	1	2	3	4	5	6	7	8	9	10	11	12
1. Self efficacy												
2. Test anxiety	-.13*											
3. Intrinsic value social Studies	.28**	.03										
4. Intrinsic value maths	.51**	-.04	.18**									
5. Intrinsic value English	.28**	.08	.43**	.19**								
6. Intrinsic value, science	.50**	-.05	.29**	.36**	.20**							
Study strategies												
7. Cognitive	.51**	.14*	.39**	.35**	.42**	.38**						
Strategies/self- regulation												
Marjoribanks Perceived												
Family Environment Scale												
8. PFES Mother	.16**	-.06	.15**	.10	.19**	.06	.15**					
9. PFES Father	.21**	-.09	.21**	.14*	.26**	.15*	.29**	.40**				
10. Future consequences	.30**	-.02	.21**	.19**	.23**	.14*	.40**	.24**	.32**			
11. Persistence/Effort	.56**	-.04	.20**	.29**	.25**	.32**	.65**	.15**	.20**	.31		
12. Disorganisation	-.34**	.37**	-.09	-.10	-.09	-.16**	-.15**	-.11*	-.14*	-.19**	-.33**	

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2 tailed)

Underachiever intercorrelations

Self-efficacy for the underachievers' intercorrelation matrix resulted in significant and positive correlations with intrinsic value in Math's and intrinsic value in Science, cognitive study strategies, future consequences and effort/persistence (see Table 13). Disorgansiation correlated significantly but negatively with self-efficacy for underachievers. As with the overall correlation matrix, cognitive study strategies and disorganisation also produced significant and positive correlations with test anxiety. Test anxiety also correlated significantly and positively with intrinsic value in English for underachievers. The scale effort/persistence reached a positive and significant relationship with cognitive study strategies, which was a much stronger correlation than in the original matrix. The underachievers' correlations for the remaining variables had a similar pattern to the original correlation matrix, but with less significant relationships.

Table 13

Intercorrelations between the MSLQ Scores, MPFES Scores, Future Consequences Scores and Study Strategies Scores for Underachievers

Motivated Strategies Learning Questionnaire	1	2	3	4	5	6	7	8	9	10	11	12
1.Self efficacy												
2.Test anxiety	.01											
3.Intrinsic value social Studies	.26	.05										
4.Intrinsic value maths	.62**	.08	.23									
5. Intrinsic value English	.29	.36*	.44*	.35*								
6. Intrinsic value, science Study strategies	.53**	.17	.35**	.33	.15							
7.Cognitive Strategies/self-regulation Marjoribanks Perceived Family Environment Scale	.58**	.38*	.55**	.48**	.45**	.55**						
8. PFES Mother	.09	-.02	-.08	.04	-.05	.01	.23					
9 PFES Father	.17	-.06	.20	.02	.31	.22	.37*	.51**				
10. Future consequences	.45**	.14	.31	.25	.38*	.10	.36*	-.09	.09			
11. Effort/persistence	.74**	.06	.38**	.59**	.07	.59**	.68**	.30	.32	.22		
12. Disorganisation	-.41*	.41*	-.05	-.22	-.03	-.05	-.14	-.25	-.31	-.23	-.22	

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Differences between the intercorrelations for 'same TOSCA' and Underachievers
The relationship between disorganisation and test anxiety for the 'same TOSCA' matrix was not significant, whereas for underachievers, this relationship was positive and significant (see Table 14). The correlation between intrinsic value in social studies and intrinsic value in science for underachievers was both positive and significant, whereas for 'same TOSCA', this intercorrelation was positive but not significant. For underachievers, intrinsic value in English and cognitive study strategies had positive and significant correlations with intrinsic value in Math's, whereas these same correlations for 'same TOSCA' were positive but not significant. Intrinsic value in English correlated positively and significantly with future consequences for underachievers only and effort/persistence only correlated significantly with intrinsic value in English for 'same TOSCA'. For intrinsic value in Science, there was a positive and significant relationship with effort/persistence for underachievers, but not for 'same TOSCA'. The correlations between perceived family environment-father and study strategies for underachievers were positive and significant, whereas this relationship for 'same TOSCA' was positive but non-significant. However, the relationship between effort/persistence and future consequences for 'same TOSCA' was both significant and positive, and for the underachievers, this relationship was positive but non-significant. Overall, with a couple of exceptions, underachievers produced more significant relationships between the variables in the questionnaire than the 'same TOSCA' comparison group did.

Table 14

Intercorrelations between the MSLQ Scores, the MPFES Scores, Future Consequences Scores and the Study Strategies Scores for the Comparison Group 'Same TOSCA'

Motivated Strategies Learning Questionnaire	1	2	3	4	5	6	7	8	9	10	11	12
1. Self efficacy												
2. Test anxiety	.12											
3.Intrinsic value social Studies	.18	.10										
4. Intrinsic value maths	.42*	-.07	.21									
5. Intrinsic value English	.39*	.47*	.46*	.25								
6. Intrinsic value, science	.40*	.12	.18	.05	.45							
Study strategies												
7.Cognitive Strategies/self-regulation	.45*	.38*	.67**	.26	.65**	.41*						
Marjoribanks Perceived Family Environment Scale												
8. PFES Mother	.07	.18	.23	-.10	.34	-.22	.09					
9. PFES Father	-.15	.14	.25	-.14	.08	-.18	.00	.41*				
10. Future consequences	.54**	.05	.53**	.11	.15	.22	.43*	.31	.12			
11. Effort/persistence	.55**	.06	.54**	.22	.38*	.03	.58**	.15	.23	.52**		
12.Disorganisation	-.15*	.33	-.26	-.06	.04	.13	.25	-.31	-.22	-.34	-.17	

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Intercorrelations between the variables for the comparison group 'same grades'.

There were a lot less significant relationships between the questionnaire's variables for the 'same grades' intercorrelations matrix (see Table 15). The noticeable difference between the matrix for 'same grades' and underachievers was the number of significant correlations found between intrinsic value in Math's and other scales for 'same grades'. Intrinsic value in Math's had significant relationships with cognitive/self-regulation study strategies, self-efficacy, future consequences, effort/persistence and perceived family environment–father. These correlations were all positive with the exception of perceived family environment-father and intrinsic value in Math's, which was negative and significant. In addition, the 'same grades' matrix produced a positive and significant relationship between future consequences and perceived family environment-father, which neither the underachiever matrix or the 'same TOSCA' matrix managed.

Table 15

Intercorrelations between the MSLQ Scores, the MPFES Scores, Future Consequences Scores and the Study Strategies Scores for the Comparison Group 'Same Grade Average' (Same Grades)

Motivated Strategies Learning Questionnaire	1	2	3	4	5	6	7	8	9	10	11	12
1. Self efficacy												
2. Test anxiety	.00											
3. Intrinsic value social Studies	.47*	.14										
4. Intrinsic value maths	.62*	.00	.00									
5. Intrinsic value English	.11	.25	.59*	-.19								
6. Intrinsic value, science	.63**	-.17	.30	.34	.25							
Study strategies												
7. Cognitive Strategies/self-regulation	.45*	.30	.34	.52*	.24	.33						
Marjoribanks Perceived Family Environment Scale												
8. PFES Mother	.00	.11	.07	.28	.25	-.02	.24					
9. PFES Father	.30	-.09	.17	-.55**	.20	.26	.63**	.49*				
10. Future consequences	.16	-.16	.23	.44*	.08	.08	.45*	.26	.52*			
11. Effort/persistence	.30	.25	-.11	.46*	-.23	.28	.52*	-.15	.29	.03		
12. Disorganisation	-.07	.14	-.27	.15	-.12	-.39	-.02	.12	.00	-.17	-.16	

* Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

Differences between underachievers and non-underachievers in: self-efficacy, intrinsic value, test anxiety, study strategies, social support, and outcome expectancies.

To ascertain if underachievers do differ to non-underachievers on intrinsic value, self-efficacy, test anxiety, study strategies, outcome expectancies and social support, the means of the constructs for underachievers' responses and non-underachievers' responses were compared. To compare underachievers responses to the questionnaire with the matched groups of similar grades (same grades) and similar TOSCA scores (same TOSCA) two one-way analysis of variance analyses were carried out separately for both the 'same grades' (GA) group and the 'same TOSCA' group. The results are displayed in Tables 16 and 17.

Table 16

Results of Analysis of Variance for Underachievers and Same TOSCA Group at Significance Level p<.05 for the Dependent Variables

Variables	*df*	*F*	*Sig.*
Effort/persistence	1,59	1.30	.26
Intrinsic value, science	1,59	4.92	.03*
Intrinsic value, social studies	1,59	0.17	.68
Intrinsic value, maths	1,59	0.61	.44
Intrinsic value, English	1,59	1.06	.31
Self-efficacy	1,59	1.50	.23
Cognitive-self regulation study strategies	1,59	0.36	.55
Perceived family environment scale, father	1,55	0.05	.82
Perceived family environment scale, mother	1,59	0.00	.98
Future Consequences	1,59	0.03	.87
Disorganisation	1,59	5.10	.03*
Test anxiety	1,59	0.52	.47

The one way analysis of variance between the underachievers and the comparison group 'same TOSCA' resulted in two significant mean differences on the variables, disorganisation and intrinsic value in science. The underachiever group mean was lower than the non-underachiever group with the same TOSCA scores for intrinsic value in science, and higher for the disorganisation scale (see Table 9). These significant mean differences between the two groups indicate that underachievers were less intrinsically motivated in science and had more disorganised study habits than did the non-underachievers peers with similar mental ability.

Table 17

Results of ANOVA between Underachievers and Comparison Group: 'Same GA' at Significance Level $p < .05$ Level for the Dependent Variables

Variables	Df	F	Sig
Effort/persistence	1,54	0.05	.83
Intrinsic value, science	1,55	5.35	.02*
Intrinsic value, social studies	1,54	0.14	.71
Intrinsic value, maths	1,55	1.44	.23
Intrinsic value, English	1,55	3.95	.05*
Self-efficacy	1,55	1.34	.25
Cognitive-self regulation study strategies	1,54	0.16	.68
Perceived family environment scale, father	1,52	0.07	.78
Perceived family environment scale, mother	1,54	0.08	.78
Future Consequences	1,54	0.19	.67
Disorganisation	1,54	1.61	.21
Test anxiety	1,55	0.53	.47

The one way analysis of variance between the Underachiever group and the same grades non-underachiever group produced two significant mean differences on the scales intrinsic value in science and in intrinsic value in English. ANOVAS were tested at the .05 level. The underachiever group mean for intrinsic value in science was lower (see Table10) than the 'same grades' group suggesting that non-

underachievers were more intrinsically motivated in science than their underachieving peers with similar grades. However, the underachiever group mean for intrinsic value in English was higher than the 'same grades' group mean (see Table 10), suggesting that underachievers were more intrinsically motivated in English than their comparison group with similar grades.

Chapter 5

Discussion

This study had two facets. The first facet involved identifying underachievers within three male secondary schools using regression analyses. The second facet consisted of comparing the students identified as underachievers with non-underachieving students on various psychological measures to find out if underachievers differed psychologically from other students.

Identifying Underachievers.

Adolescent secondary school boys were chosen as the focus of this study, since boys have been found to underachieve in their schoolwork at a higher rate than girls (Francis, 2000; McCall et al., 1992; Noble & Bradford, 2000). The regression analyses method was selected for identifying underachievers in this study. Using this method, 16% of the students were expected to be identified as underachievers (McCall et al., 1992; McCall et al., 2000). The measures used in the regression equation were a New Zealand based standardised test (TOSCA) as a measure for mental ability, and standardised school grade averages for an achievement score. Those students whose predicted grades were one or more standard error of estimate below their regression of standardised grades on their TOSCA scores were defined as underachievers. Any student defined as an underachiever was assigned to the underachiever group for further analyses. Consequently, this research did not have randomised samples of underachievers or non-underachievers.

This study identified 13.9% of the participating male adolescent secondary students as underachievers. In addition, the comparison non-underachiever group, 'same TOSCA' were achieving higher grades than the underachievers were. Theoretically, if the underachieving students were achieving to their abilities, their grade average should be similar to the comparison group 'same TOSCA'. Similarly, the matched non-underachiever group 'same grades' had lower average TOSCA scores than the underachievers, which was also expected. These findings indicated that there were achievement differences between the underachievers and non-underachievers when ability levels were taken into consideration. Furthermore, the students identified

from the regression analyses as underachievers had a broad range of ability levels. Identifying underachievers who encompass the spectrum of ability levels and backgrounds is an important aspect of the regression method for identifying underachievers. Therefore the regression method appeared to be identifying the New Zealand adolescent males in this study who were underachieving in accordance with expectations based on the literature concerning regression analyses and underachievement.

A possible explanation for the lower than 16% classification of students as underachievers in this study could be due in part to the absence of girls in the sample. Since girls purportedly have lower underachievement rates relative to boys (Francis, 2000; McCall et al., 2000; Noble & Bradford, 2000), their actual standardised grade averages (GA means) relative to their TOSCAS would theoretically be higher. Hence, the absence of girls would affect the distribution of grades and scores in this sample of students. This would alter the overall prediction equation thereby altering the predicted standardised grade averages of all the participants. This in turn would alter the standard error of estimates, which could affect the proportions of students identified as underachievers. In other words, a sample of only boys will be more likely to have a lower predicted grade average due to their lower average achievement than girls' achievement. Consequently, a boys' only sample is more likely to produce a smaller percentage of underachievers than a more representative sample of fourth form student population, which includes girls.

Problems in matching the comparison non-underachievers with underachievers
Two non-underachiever comparison groups were formed so that any characteristics associated with underachievers could be discerned from non-underachieving students with similar ability levels and same grades to underachievers (McCall et al., 2000). The non-underachievers were selected on the basis of their similar TOSCA scores and same grade averages to the underachievers. It was important that both of the comparison groups needed to have small residuals, i.e., their achievement scores needed to be near the regression line (see methodology). The need for small residuals of the non-underachievers was to ensure that these students were achieving as closely as possible to their predicted scores based on the regression equation.

Matching grade averages of the underachiever group with the non-underachievers proved difficult in the lower grade averages, as the majority of the students with very low grades were underachievers. Trying to match underachievers' grade averages proved particularly difficult whilst adhering to the small residual (achievement score less predicted score) criteria. There was a proportionately larger amount of underachievers with low grades than non-underachievers with low grades. Therefore, there were relatively less non-underachieving students with similar grade averages than the underachievers in the matched grade average group. However, since low grades are an inherent aspect of underachievement, this outcome was expected. Matching underachievers with non-underachievers with similar TOSCA scores was less difficult, however this comparison group was also smaller than the underachiever group. In spite of the difficulties in matching underachievers with non-underachievers using the above criteria, the effort is worthwhile, as the comparisons that can be made between the groups are more meaningful than non-matched groups. These matched comparisons between underachievers and non-underachievers allow for the separation of underachievers' possible psychological differences from non-underachievers while controlling for grades and mental ability levels (McCall et al., 1992; McCall et al., 2000).

Summary

Within the group of adolescent boys studied, approximately 13.9% were found to be underachieving relative to their respective mental abilities. That is, their actual school performance (measured by grade averages) fell significantly short of their predicted grade averages, based on their third form Test of Scholastic Abilities (TOSCA) scores. Having a sample of boys without girls may have affected the regression on grades and subsequent predictions arising from the regression equation. Two comparison groups were formed and matched with the underachievers in order to address the research question of whether any characteristics associated with underachievement were unique to underachievers or merely correlates of grades or correlates of mental ability (McCall et al., 1992).

Psychological variables and underachievement

Low response rate

Of the eighty-two students identified from the regression model as underachievers, only thirty-four (41%) of these students completed the questionnaire. Consequently, further analyses comparing the underachievers with non-underachievers were carried out on small sample sizes of twenty-seven for the comparison group 'same TOSCA' and twenty-two for the comparison group 'same grades'. These small sample sizes impact the power of the statistical analyses. Accordingly, possible mean differences on the constructs between the groups may have lacked statistical power. However, some significant differences were found, suggesting that underachievers may differ on some dimensions than non-underachievers.

Factor Structure of the psychological variables

The MSLQ scales used in this study produced factor loadings similar to the original MSLQ scales, which lends support to the validity of these scales. However, the intrinsic value scale, and two self-regulated learning strategies scales, cognitive strategy use and self regulation had slightly different factor loadings from the original scales. An apparent explanation for the differences in the factor loadings for the cognitive strategy use and self- regulation scales is their conceptual similarity. Both the scales encompass self-regulated learning strategies, which the participants for this study may have found difficult to differentiate, since they were younger than the participants in the original sample. The original MSQL was developed for university age students, whereas the students in this study were fourth formers. Also, for this study, there were four scales relating to each core subject for intrinsic value as opposed to one scale in the original questionnaire. However, each intrinsic value factor loaded appropriately onto its separate core subject. Correspondingly, the two scales, persistence and effort from the Study Strategies questionnaire loaded onto to one factor in this study, whereas in the original study, persistence and effort were loading onto two factors. The participants in this study were also younger than the

participants in the original study, and may have found the differences between the two study strategies scales too subtle to be able to discriminate between them.

The remaining factors in this study including the Marjoribanks Perceived Family Environment Scale (MPFES), Future Consequences, and Disorganisation scale all produced similar loadings to their original scales they derived from and had reasonable reliability estimates, providing confidence that they were reflecting their appropriate constructs.

Relationships between the scales in the questionnaire

Most of the correlations between the constructs within the questionnaire were congruent with the expectations of this research and in accordance with the theoretical backgrounds of the constructs (Anderman & Midgeley, 1997; Cutrona, et al., 1994; Elliot et al., 1999; Harackiewicz & Barron, 1998; Marjoribanks, 1998; Miller et al., 1996; Levitt et al., 1994; Pajares, 1996; Pintrich & De Groot, 1990; Reynolds, 1999; Wentzel, 1998; Zimmerman, 2000). Since these constructs were all expected to correlate with students' school performances, it was also expected that they would correlate with each other. For example, self-efficacy related positively and significantly to all four intrinsic value scales, study strategies, future consequences and perceived support of families. Self-efficacy also related negatively and significantly to test anxiety and disorganisation as was expected. Therefore, the students with high self-efficacy were also intrinsically motivated, possessed positive study strategies, recognised the future benefits of schoolwork, and received perceived social support from family members. In addition, these highly self-efficacious students did not report having disorganised study habits, and did not become anxious while test taking. These findings are consistent with previous studies on self-efficacy (Archer, 1994; Covington, 2000; Stanton, 1999; Zimmerman, 2000).

Most of the scales within the questionnaire correlated with test anxiety as expected also. However, many of the relationships did not reach significance. Test anxiety only related negatively and significantly with self-efficacy. Those students who reported high levels of anxiety when sitting exams also reported low self-efficacy,

which was expected. These students did not appear to believe that they were capable in the academic arena. Unexpectedly, test anxiety related positively with self-regulation/cognitive study strategies. This correlation suggests that those students who were employing cognitive strategy use and self-regulatory study strategies, still felt worried and nervous when sitting exams. This could indicate that these students did not have confidence in their exam sitting abilities. Since test anxiety and self-efficacy were negatively related, this may well be the case. Disorganisation correlated significantly and positively with test anxiety, which was expected. Those students that reported high levels of anxiety whilst sitting exams, also reported having disorganised study habits. The disorganised study habits may possibly explain why students were anxious when sitting exams. It was interesting that the students who reported high levels of test anxiety, also reported having disorganised study habits, as well as reporting high levels of cognitive strategy use and self-regulatory study strategies. It is possible that the combination of high test anxiety, low self–efficacy, disorganised study habits, and positive study strategies reflect a lack of confidence in these students' study habits, even if they were proficient in them.

Most of the intrinsic value scales related positively and significantly with all the constructs they were expected to, suggesting that students who intrinsically valued their schoolwork also employed healthy study strategies, enjoyed high self-efficacy, received perceived support from their family members, and recognised the importance of future consequences. Positive study strategies in this study encompass persistence, effort and cognitive study strategies/self-regulation. The relationships between these scales were all positive and mostly significant except for the two constructs, disorganisation and test anxiety. It appears that the students who engaged in beneficial study strategies also recognised the value of schoolwork for their future outcomes, were intrinsically motivated, received perceived family support and enjoyed high self-efficacy.

Relationships between the scales in the questionnaire for underachievers, 'same TOSCA' group and 'same grades' group

The relationships between the scales for underachievers were not markedly different from either the overall group data correlation matrix or the comparison groups' matrices. These few differences suggest that the constructs in the questionnaire correlate in the same way as they do for non-underachievers. An interesting finding for the underachiever correlation matrix, was the positive correlation between test anxiety and intrinsic value for English. Underachievers who were intrinsically motivated in English were also anxious about taking tests. This outcome may indicate that these underachievers suffered from anxiousness, a personality trait found to be associated with underachievers (McCall et al., 1992; Peters & Van Boxtel, 1999).

Also of interest was the significant and positive relationship between intrinsic value in English, and effort/persistence for the non-underachiever comparison group 'same TOSCA', which was only positive but non-significant for underachievers. This outcome suggests that the non-underachieving 'same TOSCA' group of students that were motivated and interested in English, also made an effort to study, whereas the students in the underachiever group that were less intrinsically motivated by English were also less inclined to persist at studying. This relationship contrasts with the positive and significant relationship for underachievers between intrinsic value in science, and effort/persistence. It appears that those underachievers that were intrinsically motivated by Science would put more effort into studying. Furthermore, in the underachievers' correlation matrix, intrinsic value in Math's displayed positive and significant relationships with cognitive/self-regulation and effort and persistence whereas the same TOSCA group had non-significant relationships between these variables. These correlations suggest that underachievers were prepared to persist with study and were employing positive study strategies if a particular subject intrinsically motivated them.

Study strategies

The various study strategies that were included in the questionnaire consisted of disorganisation, persistence/ effort and cognitive/self-regulation strategies. Responses from the three selected groups (two non-underachiever comparison groups and one underachiever group) on the study strategy dimensions were compared using two one-way analyses of variance to examine whether underachievers as a group, have poorer study strategies than their non-underachieving peers. Differences between the non-underachieving groups with the underachieving groups in respect to their study strategies, were thought to contribute to the understanding of why some students are not achieving to their capabilities. Specifically, it was predicted that underachievers would have poorer study strategies than the non-underachievers thereby affecting their grade averages. Prior studies have found that positive study strategies correlate positively with high grades (Pintrich & De Groot, 1990). However, underachievers, when compared with non-underachievers, did not significantly differ in their responses on the scale cognitive/self-regulated study strategies, although underachievers had the lowest mean score. This result was surprising, as was the result for the scale persistence/effort. This scale did not show significant mean differences between the underachievers and non-underachievers either, which was particularly unexpected since a lack of persistence has been cited as a salient characteristic of underachievers (McCall et al., 1992). However, underachievers did have the lowest mean for \persistence/effort of the three selected comparison groups. Since underachievers were scoring lower on these two scales than the non-underachiever comparison groups, larger sample sizes could possibly result in significantly different means between the groups. Furthermore, underachievers may have been less persistent and effortful than the non-underachievers in reality, but perceived that they were as persistent and effortful when responding to the questionnaire.

Underachievers had significantly higher mean scores on the dimension disorganisation when compared with the non-underachievers group 'same TOSCA'. Due to the correlational nature of this research, any significant finding needs to be interpreted cautiously. However, this finding indicates that the more disorganised study habits of the underachievers may be a contributing factor to their underachievement status. Particularly when the items in the disorganisation scale

include; " I'm not sure how to study for exams" and "I don't know what to study or where to start", which would seem to have some affect on academic achievement.

The finding that underachievers were more disorganised in their study habits than their non-underachieving peers with similar TOSCA scores were ties in with some of the characteristics found in underachievers. Previous research has found underachievers to have an external locus of control, whereby they tend to believe that their outcomes are due to forces beyond their control (McCall et al., 1992; Peters & Van Boxtel, 1999). Relatedly, Findley and Cooper (cited in Weiten, 1995), found that students with an internal locus of control achieved higher grades than students with an external locus of control did. So, it is possible that there is an association between underachieving students who are more disorganised in their study habits and external locus of control. For instance it could be surmised that these students believe that external forces make more difference than their own study skills and strategies, so do not bother to take responsibility for their own study strategies. Other characteristics of underachievers previously found include; inadequate study skills, incomplete homework and assignments, and inadequate problem solving strategies (Crittendon, 1984; McCall et al., 1992; Rimm, 1986). These characteristics imply lack of planning and organisation regarding schoolwork, and school study habits. Therefore, the finding that underachievers were more disorganised in their study habits was expected, and conceptually fits with some of the defining characteristics of adolescent underachievers.

Self-efficacy

Previous research has suggested that students who had high self-efficacy beliefs were more persistent in difficult or boring tasks, worked harder, were more motivated, and more self-regulating in their study habits (Archer, 1994; Pintrich & De Groot, 1990; Stanton, 1999; Zimmerman, 2000). It is evident how highly self-efficacious students engaging more in cognitive strategies would positively impact their academic grades. Therefore, underachievers may not be performing to their capabilities (i.e. poor academic performance), due to their lack of belief in their scholastic abilities. This lack of self-efficacy could be reflected in motivation, study habits and test anxiety, and ultimately grades. However, although self-efficacy displayed positive

correlations with study strategies and intrinsic value, and negative correlations with disorganisation and test anxiety, there were no significant mean differences found between underachievers and non-underachievers in self-efficacy beliefs. The small sample sizes may have been an attributing factor in the outcomes. A further explanation could be that both many underachievers and many of the non-underachievers have low grades. Therefore, although non-underachievers may be performing to their capabilities, their beliefs that they can do well at school may be realistically low. Conversely, some underachievers may realise they are capable of high academic performance, but simply cannot be bothered to put in the required effort to attain high grades.

Intrinsic value

The results for intrinsic value in Maths, and Social Studies did not reveal any significant differences between the two comparison groups and underachievers. However, the results for intrinsic value in science suggest that underachievers were less intrinsically motivated in science. They did not feel that it was as important to learn what is being taught in science, as the non-underachievers. They did not like science as much as the non-underachievers, nor did they find it as interesting. The underachievers did not think that what they learnt in science was as useful to know as their non-underachieving comparison groups, and they did not think that they could use what they learnt in these subjects in other classes to the same extent that the non-underachievers did. Underachievement may be due to a diverse range of factors. Intrinsic value is intertwined with motivational learning. Previous research suggests that intrinsic value plays an important role in students choosing to apply themselves in the classroom and in study (Pintrich & De Groot, 1990). It was interesting that intrinsic value in science produced a significant difference between the underachievers and non-underachievers for both groups. These findings clearly suggest that underachievers were less intrinsically motivated by Science than non-underachievers. Harackiewicz and Barron (1998) maintain that if students are intrinsically motivated by their coursework in a particular subject, it is likely that they will become more attentive and diligent with their studies overall and as a result perform at a higher level. These higher performances may further influence the student's motivation in that course, with a possible upward spiral effect of academic

performance in other less intrinsically motivating courses. Therefore, since underachievers were significantly less intrinsically motivated by Science than non-underachievers, it could be speculated that they were less attentive and diligent with their studies, which could have negatively affected their school performances. However, the significant mean difference between underachievers and the non-underachiever group 'same grades' for English negates the previous explanation. For this scale, English intrinsically motivated the underachievers significantly more than their 'same grades' comparison group. It may be possible that although underachievers may find English more enjoyable, interesting, important and relevant than their comparison group, they may not have become any more diligent or attentive as a result. Another possible explanation for the conflicting findings for intrinsic value in science, and intrinsic value in English may have been due to the measure for academic achievement used in this research. Students' grade averages were not split into their various separate subjects for measuring academic achievement so underachievement in certain areas may have been concealed. By investigating underachievement more specifically in future research, it may be possible to identify students underachieving in one subject, but not necessarily in any of the other school subjects.

Test anxiety

There were no significant differences between any of the underachiever and non-underachiever groups on the test anxiety scale. Test anxiety is related to feelings of competence (Pintrich & De Groot, 1990), so it would seem reasonable to expect that it would relate negatively, but significantly to self-efficacy. The results from the correlations between the scales reflected this expectation. Although test anxiety, like self-efficacy, is related to feelings of competence, test anxiety is associated more with feelings of incompetence, whereas self-efficacy is a belief in one's capabilities to perform a particular activity. Moreover, test anxiety is more specific than self-efficacy. It was predicted that underachievers would score significantly higher on the test anxiety scale, since underachievers have been characterised as being anxious with low self-concepts (Butler-Por, 1993; McCall et al., 1992). Furthermore, test anxiety is considered to interfere with test performance. Therefore, it follows that if underachievers do possess the trait anxiousness, this could be manifested in a test

situation. However, this expectation was not met in this research. There are various explanations for this non-significant result between the underachievers and non-underachievers. Firstly, underachievers as a group are diverse in their characteristics, ability levels, and backgrounds. Therefore, it may be possible that the underachievers identified in this particular study may not experience anxiety per se or in a test situation. Secondly, the underachievers in this study may have developed learned helplessness from previous poor exam performances, therefore they may have taken a defensive pessimistic stance whereby they no longer care about their exam performances (Covington, 1999). Thirdly, the sample size of underachievers may have been too small to ascertain if underachievers as a group do experience more test anxiety than non-underachievers do.

Future Consequences

Previous research has found positive correlations between students' future consequences scores and schoolwork (Miller et al., 1996). Students who value future consequences and have high outcome expectancies were expected to have normal to high academic achievement status, as they are more likely to be more persistent in their academic work than students who do not value future consequences. The students who were underachieving relative to their abilities were expected to score lower on the future consequences scale than their non-underachieving peers. However, there was no significant mean difference found between the two groups in this research. The means for both the groups were both just above the midway point on the scale, and were very similar. The scale future consequences measures students' beliefs that achieving good grades produces outcomes that they value. The questions within this scale consisted of specific outcomes, e.g. "I do the work assigned in this class because good grades lead to other things that I want e.g. money, university acceptance" as well as more general outcomes e.g. " I do the work assigned in this class because I get some reward or recognition for doing well". A possible explanation for the non-significant difference between the non-underachievers and underachievers may be due to the generality of some of the questions. For example, some of the participants may not have known when responding what sort of recognition or reward was being offered, which may have affected all the groups' responses. However, regardless of which group the

participating students fell into, their mean scores were over the midpoint score for future consequences. This finding suggests that all the participating students consider that future consequences contribute to their decisions to complete assigned class work.

Social support

The MPFES for the mother and the father represented the construct social support. It was predicted that the students who were not achieving to their abilities were not receiving perceived support for their schoolwork from their parents. However, no mean significant differences were found between underachievers and non-underachievers. The students who did participate in the questionnaire felt that their parents were interested in and supportive of their schoolwork, felt encouraged by their parents to stay at school, and that their parents considered a good education important. The non-significant mean differences between the non-underachievers and the underachievers was surprising, as previous research has linked social support to academic achievement. It appears that in this study, both underachievers and non-underachievers feel supported by their families in respect to their schoolwork. There are a few possible reasons for these unexpected findings: Firstly, only fifty-two percent of the five hundred and ninety eight eligible students participated in the questionnaire. A further one hundred and seventy two students had been eliminated due to incomplete data records. Therefore, the remaining participants may not be representative of the original, larger sample of fourth formers. Both the students excluded from the underachievement analysis due to incomplete data sets and the students who chose not to participate may be the students who did not receive support from their families regarding their education. The possible reasons for students' incomplete data sets are absenteeism and turnover, which may be a reflection of lack of parental interest in education. Secondly, those non-underachieving students who do not perceive that they receive parental support regarding their education, may be long term underachievers who are not able to be identified in this cross-sectional study due to their deteriorating performance in both standardised tests and school exams over the course of several years (McCall et al., 1992; Rimm, 1986). Thirdly, self- report bias may be taking effect. Self-report bias may be more exaggerated than normal when students are reporting about their

parents with whom they are emotionally close. Fourthly, the underachieving students may feel that their parents are too supportive, which has been cited a characteristic of underachievers' parents (McCall et al., 1992). Parents over concern with their children's academic success may put too much pressure on their children, affecting their school performance.

Limitations

When measuring an individual's mental ability (cross-sectional) as a snapshot in time, it may preclude those individuals whose ability levels have decreased over time because they have not been learning as much they are capable of. Therefore, their mental ability may have "declined to match their grades, at which point they will no longer be underachieving" (McCall et al., 1992, p.18). Longitudinal studies are more likely to identify the chronic underachievers, however longitudinal research is beyond the scope of this research. Furthermore, the questionnaire for this study was self-report, therefore, the accuracy of the responses may be limited. A further limitation of this study was the small sample size of underachievers, affecting the results and generalisability of the results. The relatively small sample size may also have impacted the regression equation and resultant percentage of identified underachievers.

Future Recommendations

Findings in the literature suggest that boys are underachieving relative to girls predominantly in the language domain (Education Review Office, 1999; Francis, 2000; Noble & Bradford, 2000). The current study used grade averages as a measure of academic achievement for identifying underachievers, which may conceal specific areas of underachievement. However, it may be useful to investigate underachievement more specifically in future research. To better address possible specific areas of underachievement in boys, separating school subjects in both measures of academic achievement and mental ability is recommended. In doing so, assessment of underachievement should be more accurate. Investigating specific

subject areas is especially pertinent for research on adolescent students, as research suggests that underachievement becomes more subject specific over time and generality of underachievement across subject areas tends to decrease with age (McCall et al., 2000).

In addition, one of the scales under the study strategies umbrella, disorganisation appeared to be negatively impacting the performance of underachievers. High scores on the disorganisation scale implies an uncertainty in how to go about studying (e.g. "I'm not sure what to study or where to start"). It seems evident that these underachievers would benefit from some sort of instruction on how to study and how to structure their study. Further research regarding study strategies, especially disorganisation is recommended to help combat underachievement of future underachieving adolescent boys.

Implications and conclusions

This research has addressed the issue of academic underachievement in adolescent males in a New Zealand context. Using a regression discrepancy model, underachievers were identified in this research within the three participating Auckland secondary schools. Consequently, underachievement in male secondary schools within New Zealand is apparent. This finding indicates that many male students may not be producing grades of which they are capable, which may detrimentally affect their future life courses. These students may not even realise that they are capable of performing above their current achievement levels. Underachieving students are limiting their future options, and therefore possibly shortchanging themselves of a future worthy of their abilities.

Although most of the scales comprising the questionnaire failed to show significant mean differences between underachievers and non underachievers, the scales intrinsic value in English, intrinsic value in science, and disorganisation (study strategy) displayed significant mean differences between non-underachievers and achievers. These findings suggest that there are differences between underachievers and non-underachievers on certain dimensions. Moreover, these mean differences between underachievers and non-underachievers may contribute to our

understanding of why some students are not achieving to their abilities, and conversely, why their non-underachieving peers are achieving to their abilities.

The existence of male underachievement in secondary schools is concerning. These adolescent boys are at a crucial point in their lives in which their futures can be detrimentally affected due to their relatively poor grades. Secondary school is the precursor to either tertiary education or the job market. Therefore, students' academic performance can play a crucial, pivotal role for adolescents' life paths. It seems important firstly to correctly identify these students, even if just to make them aware that they are capable of better. Moreover, if underachievers can be encouraged to explore any topics within the school curriculum that interest them, they may be induced to making some effort in that topic, which may eventually positively impact other schoolwork. Underachievers as a group scored significantly higher on the scale disorganisation, which indicates underachievers are more disorganised than non-underachievers in their study habits. These disorganised study habits of the underachievers may be one of many explanations for their scholastic underachievement. Perhaps if students were taught how to go about studying, their grades would improve. The subsequent improvement of grades could in turn improve students' feelings of self-efficacy, which could further motivate students to persist in studying, creating an upward spiral effect on academic achievement, which in turn should improve the future outlook of these underachieving adolescent boys.

References

Anastasi, A., & Urbina, S. (1997). 7th edition. *Psychological Testing*. New Jersey: Prentice Hall International, Inc.

Anderman, E.M., Anderman, L. H., & Griesenger, T. (1999). The relation of present and possible academic selves during adolescence to GPA and achievement goals. *The Elementary School Journal, 100, 1 ,3-17.*

Anderman ,E.M., & Midgeley, C. (1997). Changes in achievement goal orientations, perceived academic competence and grades across the transition to middle level schools. *Contemporary Educational Psychology, 22, 269-298.*

Archer,J. (1994). Achievement goals as a measure of motivation in university students. *Contemporary Educational Psychology, 19, 430-446.*

Barker, J.R., & Olson, J.P. (2000). Medical students learning strategies. Evaluation of first year changes. Retrieved April, 2001, from University of Missisippi Medical Centre, Department of Institutional Research. Web site http://www. msstate.edu/org/mas/ejour2.html

Butler-Por, N. (1993). Underachieving gifted students. In K.A. Heller, F.J. Monks & A.H. Passow (Eds.). *International Handbook of Research and Development of Giftedness and Talent* (pp.649-668). Oxford: Pergamon Press.

Carr, M., Borkowski, J.G., & Maxwell, S.E. (1991). Motivational components of underachievement. *Developmental Psychology, 27, 108-118.*

Chaplin, J. P. (1985). *Dictionary of Psychology* (2nd rev. ed.). New York: Dell Publishing. Cheung, S.K. (1995). Life events, classroom environment, achievement expectation and depression among early adolescents. *Social behaviour and personality, 23, 83-91.*

Colangelo, N., Kerr, B., Christensen, P., & Maxey, J. (1993). A comparison of gifted underachievers and gifted high achievers. *Gifted Child Quarterly, 37,* 155-160.

Cone, T.E., & Wilson, L.R. (1981). Quantifying a severe discrepancy: A critical analysis. *Learning Disability Quarterly, 4, 359-371.*

Covington, M.V. (2000). Goal theory motivation and school achievement: An integrative review. *Annual Review of Psychology, 51, 171-200.*

Crittendon, M.R., Kaplan, M.H., & Heim, J.K. (1984). Developing effective study skills and self-confidence in academically able adolescents. *The Gifted Child Quarterley, 28, 25-30.*

Cutrona, C.E., Cole, V., Colangelo, N., Assouline, S.G., & Russell, D.W. (1994). Perceived parental social support and academic achievement: An attachment theory perspective. *Journal of Personality and Social Psychology, 66,* 369-378.

Education Review Office. Education Evaluation Reports (1999). *The Achievement of Boys.* Retrieved from May 2001 from http://www.ero.govt.nz/Publications/index.htm

Education Review Office. Education Evaluation Reports (2000). *Promoting Boys Achievement.* Retrieved May 2001 from http://www.ero.govt.nz/Publications/index.htm

Elliot, A.J., McGregor, H.A., & Gable, S. (1999). Achievement goals, study strategies, and exam performance: A mediational analysis. *Journal of Educational Psychology ,91,(3),* 549-563.

Francis, B. (2000). *Boys, Girls and Achievement. Addressing the classroom issues.* New York: Routledge / Falmer.

Gohm, C.L., Humphreys, L.G., & Yao, G. (1998). Underachievement among spatially gifted students. *American Educational Research Journal, 35,* 515-531.

Guerney, B. (1985). Effects of counsellor directed relationship enhancement training on underachieving poorly communicating students. *School Counselor, 32,(3).* 231-238.

Harackiewicz, J.M., Barron, K.E., & Elliot, A.J. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychology, 33,* 1-21.

Hawk, K., & Hill, J. (1996). *Towards making achievement cool. Achievement in multicultural high schools.*

Humphreys, L.G. (1974). The misleading distinction between aptitude and achievement tests. In D.R. Green (Ed.), *The aptitude-achievement distinction.* Monterey, C.A: CTB/ Cole

Kaplan, R.M., & Sacuzzo, D.P. (1982). *Psychological testing: Principles, applications, and issues.* Pacific Grove, CA: Brooks/Cole

Lacasse, M.A. (1996). Personality types among gifted underachieving adolescents: *Dissertation Abstracts International: Section B: The Sciences & Engineering.* Vol 60(10-B), US. Abstract obtained from *PscyINFO: Database Record* © *2000,APA.*

Lambert, N.M., & McCombs, B.L. (Eds). (1998*). How students learn: Reforming schools through learner centred education.* Washington DC: American Psychological Association.

Levitt, M.J., Guacci-Franco, N., & Levitt, J. (1994). Social support and achievement in childhood and early adolescence: A multicultural study. *Journal of Applied Developmental Psychology, 15*, 207-222.

Marjoribanks, K. (1983). Social class, environments, and adolescents' aspirations. *Educational Studies, 9, (3)*, 136-143.

Marjoribanks, K. (1984). Occupational status, family environments, and adolescents' aspirations: The Laosa model. *Journal of Educational Psychology. 76, (4)*, 690-700.

Marjoribanks, K. (1987). Gender/social class, family environments and adolescents' aspirations. *Australian Journal of Education, 31*, 43-54.

Marjoribanks, K. (1998). Family background, social and academic capital, and adolescentss' aspirations: A mediational analysis. *Social Psychology of Education 2*, 177-197.

McCall R.B., Beach, S.R., & Lau, S. (2000). The nature and correlates of underachievement among elementary schoolchildren in Hong Kong. *Child Development, 71*, 785-801.

McCall, R.B., Evahn, C., & Kratzer, L. (1992). *High School underachievers; what do they achieve as adults?* London: Sage Publications.

McLeod, J. (1979). Educational underachievement: Toward a defensible psychometric definition. *Journal of Learning Disabilities, 12, (5)*, 322-30.

Mercer, C.D., Hughes, C., & Mercer, A. R. (1985). Leaning disabilities definitions used by state education departments. *Learning Disability Quarterly, 8*, 45-55.

Miller, R.B., Greene, B.A., Montalvo, G.P., Ravindran, B., & Nicholls, J.D. (1996). Engagement in academic work: The role of learning goals; future consequences, pleasing others and perceived ability. *Contemporary Educational Psychology, 21*, 388-422.

Multon, K.D., Brown, S.D., & Lent, R.W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology, 38,(1)*, 30-38.

Noble, C., & Bradford, W. (2000). *Getting it right for boys....and girls.*: New York: Routledge.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*, 543-578.

Peters, W.A.M., & Van Boxtel, H.W. (1999). Irregular error patterns in Raven's test. *High Ability Studies, 10*, 213-232.

Pintrich, P.R., & De Groot, E.V. (1990). Motivational and self regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82, (1)*, 33-40.

Pintrich, P.P., Smith, D.A.F., Garcia, T., & McKeachie, W.J. (1993). Reliability and predictive validity of the Motivated strategies for Learning Questionnaire (MSQL). *Educational and Psychological Measurement, 53, 801-813.*

Raynor, J.O., Atkinson, J.W., & Brown, M. (1974). Subjective aspects of achievement motivation immediately before an examination. In J.W. Atkinson & J.O. Raynor (Eds.), *Motivation and achievement* (pp. 155-171). New York: Winston & Sons.

Reid, N.A., & Elley, W.B. (1991). *Progressive achievement tests of reading. Teachers manual.* Wellington: NZCER.

Reid, N.A., & Gilmore, A. (1988). *Test of Scholastic Abilities. Technical Supplement.* Wellington: NZCER.

Reid, N.A., Jackson, P., Gilmore, A., & Croft, C. (1981). *Test of Scholastic Abilities. Teacher's Manual.* Wellington: NZCER.

Remedios, R., Lieberman, D.A., & Benton, T.G. (2000). The effects of grades on course enjoyment. *British Journal of Educational Psychology, 70, 353-368.*

Reynolds, A.J. (1999). Educational success in high risk settings. Contributions of the Chicago Longitudinal Study. *Journal of School Psychology, 37(,4)*, 345-354.

Reynolds, C.R. (1984). Critical measurement issues in learning disabilities. *Journal of Special Education, 18, 451-477.*

Rimm, S. B. (1986). *Underachievement syndrome; causes and cures.* Australia: Hawker Brownlow Education.

Ross, R. P. (1995). Impact on psychologists of state guidelines for evaluating underachievement. *Learning Disability Quarterly, 18, 43-56.*

Shell, D.F., Murphy, C.C., & Bruning, R.H. (1989). Self-efficacy and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology, 81,(1)*, 91-100.

Stanton, R. J. (1999). *The effects of attributional feedback on perceived self- efficacy and achievement.* Masters Thesis, Massey University. Massey Univeristy Library, Albany.

Tabachnick, B.G., & Fidell, L.S. (1989). (2nd ed.) Multiple regression. Chapter from *Using multivariate statistics.* (pp 123-191) New York: Harper & Row.

Tempest, N.R. (1974). *Teaching clever children 7-11.* London: Routledge.

Veil, H.O.F., Baumann, U. (Eds.). (1992). *The meaning and measurement of social support.* Hemisphere publishing corporation: New York.

Weiten, W. (1995). (3rd ed.). *Psychology: Themes and variations.* New York: Brooks/Cole.

Wentzel, K.R. (1998). Social relationships and motivation in middle school. *Journal of Educational Psychology, 90,(2)*, 202-209.

Wigfield, A., & Eccles, J.S. (2000). Expectancy value theory of achievement motivation. *Contemporary Educational Psychology, 25, 1,* 68-81.

Wilson, L.R., & Cone, T. (1984). The regression equation method of determining academic discrepancy. *Journal of School Psychology, 22,* 95-110.

Zimmerman, B.J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25,* 82-99.

Zimmerman, B.J., & Schunk, D. H. (Eds.). (1989). *Self-regulated learning and academic achievement. Theory, research and practice.* New York: Springer-Verlag.

Appendix A

An exploratory study on factors affecting academic achievement
in male secondary students

INFORMATION SHEET

My name is Michaela Drum and I am completing a Master of Arts in psychology at Massey University. My supervisor is Dr Richard Fletcher who is based in the School of Psychology at Massey University. I can be contacted at michaela1@quicksilver.net.nz. Please feel free to contact me if you have any questions or queries. My supervisor can be contacted through the school of psychology at Massey University, phone (09) 4439700. With your school's approval, you are a group of Form Four students invited to participate in this project.

The intention of the study is to gain further understanding of how students' performances are affected within the academic domain. There are many possible factors that may contribute to an individual's academic achievement and the aim of the questionnaire is to explore some of these.

We hope to gain information through your responses that may be unique to New Zealand youth, which will in turn further our understanding of the factors involved in academic performance. If you agree to participate in the study, I would like you to complete a questionnaire/survey. I will be administering the questionnaire at school within school hours. The questionnaire should take no more than 40 minutes.

You have the right to decline to participate. Your identity will be protected throughout the study. No names will be used on any of the materials. If you agree to take part in the study, you have the right to;

Withdraw from the study up until the time of the drafting of the thesis

Ask further questions at any time

Refuse to answer any particular questions at any time

Provide information on the understanding that it is completely confidential to the researcher

To have access to a summary of the findings, which will be sent to your school.

An exploratory study on factors affecting academic achievement
in male secondary students

CONSENT FORM

I have read the information sheet and have had the opportunity to discuss details of the study with Michaela Drum. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand that I can withdraw from the study up until the drafting of this thesis.

I agree to provide information/participate in the study at any time.

I understand that I can decline to answer any particular questions.

I agree to provide information to the researcher in the understanding that it is anonymous and completely confidential.

The information will be used only for this research and publications rising from this research project. A short summary will also be sent to my school.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signed: ....

Name: ....

Demographic Questionnaire

Your schoolwork will be influenced by factors unique to you. To give us some information about these, could you please answer the following questions regarding your background and identity. Remember this information will only be seen by the researchers, and will thereafter be nameless and no one will be able to be identified.

Name: …………………………………………………………..

Age:

With which ethnic group do you most closely identify?

☐ Asian
☐ Indian
☐ New Zealander of European descent
☐ New Zealander of Maori descent
☐ Pacific Island Polynesian
☐ Other (please specify)

How many years have you lived in New Zealand? — years.

Please now answer the following questions as honestly and accurately as possible.

The questionnaire comprises various different constructs and measurement scales representing the constructs. The items from these various scales have been mingled together so the constructs are difficult to identify. The questionnaire contains items from four different existing measurements. The following table shows the question numbers that accompany each different measurement and their attendant scales used in this questionnaire. The questionnaire numbers were not present when the students completed the questionnaires, they have been added to clarify which questions relate to the various scales measured.

Measurement Scale	Item numbers on questionnaire
1.Motivated Strategies Learning Questionnaire	
Motivational beliefs	
a. Self efficacy	2,8,12,13,20,23,28,32,33
b. Intrinsic Value	1,3,5,7,9,10,11,14,15,16,17,18, 19, 22,24,25,26,27,29,30, 31,34,35,37,52
c.Test Anxiety	4,21,36,38
Self-Regulated Learning Strategies	
d. Cognitive Strategy Use	39,40,42(R),44, 45,46,49,51,55,58,60
e. Self-Regulation	41,43(R), 47,48,50,53(R),54(R),56,57,59
2.Attitudes Towards Mathematics Survey	
a. Future Consequences	68-71
3. Cognitive/Metacognitive Scale	
a. Persistence	63-65
b. Effort	66-67
c. Disorganisation	61-62
4. Marjoribanks Perceived Family Environment Scale	A1-B8

Auckland male secondary school students: Motivational beliefs, learning strategies (study skills), outcome expectancies (or future consequences) and social support.

Please indicate the extent to which you believe the following statements are true of you (please circle).

	Not at all true of me	Mostly not true of me	Not that true of me	Quite true of me	True of me	Very true of me
1. I prefer class work that is challenging so I can learn new things	1	2	3	4	5	6
2. Compared with other students in my class I expect to do well	1	2	3	4	5	6
3. I think I will be able to use what I learn in Maths in other classes.	1	2	3	4	5	6
4. I am so nervous during a test that I cannot remember facts I have learned.	1	2	3	4	5	6
5. It is important for me to learn what is being taught in Maths.	1	2	3	4	5	6
6. I like what I am learning in Maths.	1	2	3	4	5	6
7. I think that what I am learning in Maths is useful for me to know.	1	2	3	4	5	6
8. I'm certain I can understand the ideas taught in my classes.	1	2	3	4	5	6
9 I think I will be able to use what I learn in English in other classes.	1	2	3	4	5	6
10. I think that what we are learning in English is interesting.	1	2	3	4	5	6
11. I like what I am learning in Science.	1	2	3	4	5	6
12. I expect to do very well in my class.	1	2	3	4	5	6

	Not at all true of me	Mostl y not true of me	Not that true of me	Quite true of me	True of me	Very true of me
15.I think that what we are learning in Maths is interesting	1	2	3	4	5	6
16. I often choose paper topics I will learn something from even if they require more work.	1	2	3	4	5	6
17. It is important for me to learn what is being taught in English.	1	2	3	4	5	6
18.I like what I am learning in English.	1	2	3	4	5	6
19.I think that what we are learning in Social Studies is interesting.	1	2	3	4	5	6
20. I am sure I can do an excellent job on the problems and tasks assigned for me in class.	1	2	3	4	5	6
21. I have an uneasy, upset feeling when I take a test.	1	2	3	4	5	6
22. I think I will be able to use what I learn in Social Studies in other classes.	1	2	3	4	5	6
23. I think I will receive good grades in my class.	1	2	3	4	5	6
24. Understanding Social Studies is important to me.	1	2	3	4	5	6
25. Even when I do poorly on a test I try to learn from my mistakes.	1	2	3	4	5	6
26. I think that what I am learning in Social Studies is useful for me to know.	1	2	3	4	5	6
27. I think I will be able to use what I learn in Science in other classes.	1	2	3	4	5	6
28. My study skills are excellent compared with others in my class.	1	2	3	4	5	6
29. Understanding Science is important to me.	1	2	3	4	5	6
30. It is important for me to learn what is being taught in Science.	1	2	3	4	5	6

	Not at all true of me	Mostly not true of me	Not that true of me	Quite true of me	True of me	Very true of me
32. Compared with other students in this class I think I know a great deal about the subject.	1	2	3	4	5	6
33. I know that I will be able to learn the material for my classes	1	2	3	4	5	6
34. It is important for me to learn what is being taught in Social studies	1	2	3	4	5	6
35. I like what I am learning in Social Studies	1	2	3	4	5	6
36. I worry a great deal about tests.	1	2	3	4	5	6
37. Understanding Maths is important to me.	1	2	3	4	5	6
38. When I take a test I think about how poorly I am doing.	1	2	3	4	5	6
39. When I study for a test, I try to put together the information from class and from the book.	1	2	3	4	5	6
40. When I do homework, I try to remember what the teacher said in class so I can answer the questions correctly.	1	2	3	4	5	6
41. I ask myself questions to make sure I know the material I have been studying.	1	2	3	4	5	6
42. It is hard for me to decide what the main ideas are in what I read.	1	2	3	4	5	6
43. When work is hard I either give up or study only the easy parts.	1	2	3	4	5	6
44. When I study I put important ideas into my own words.	1	2	3	4	5	6
45. When I study for a test I try to remember as many facts as I can.	1	2	3	4	5	6
46. When studying, I copy my notes over to help me remember the material.	1	2	3	4	5	6
47. I work on practice exercises and answer end of chapter questions even when I don't have to.	1	2	3	4	5	6
48. Even when study materials are dull and uninteresting, I keep working until I finish.	1	2	3	4	5	6
49. When I study for a test I practice saying the important facts over and over to myself.	1	2	3	4	5	6

	Not at all true of me	Mostly not true of me	Not that true of me	Quite true of me	True of me	Very true of me
50. Before I begin studying I think about the things I will need to do to learn.	1	2	3	4	5	6
51. I use what I have learned from old homework assignments and the textbook to do new assignments.	1	2	3	4	5	6
52. Understanding English is important to me.	1	2	3	4	5	6
53. I often find that I have been reading for class but don't know what it is all about.	1	2	3	4	5	6
54. I find that when the teacher is talking I think of other things and don't really listen to what is being said.	1	2	3	4	5	6
55. When I am studying a topic, I try to make everything fit together.	1	2	3	4	5	6
56. When I'm reading I stop once in a while and go over what I have read.	1	2	3	4	5	6
57. When I read material for this class, I say the words over and over to myself to help me remember.	1	2	3	4	5	6
58. I outline the chapters in my book to help me study.	1	2	3	4	5	6
59. I work hard to get a good grade even when I don't like a class.	1	2	3	4	5	6
60. When reading I try to connect the things I am reading about with what I already know.	1	2	3	4	5	6
61. I'm not sure how to study for exams.	1	2	3	4	5	6
62. I often find that I don't know what to study or where to start.	1	2	3	4	5	6
63. When I become confused about something I'm reading, when I'm studying, I go back and try to figure it out.	1	2	3	4	5	6

	Not at all true of me	Mostly not true of me	Not that true of me	Quite true of me	True of me	Very true of me
64. Regardless of whether or not I like the material, I work my hardest to learn it.	1	2	3	4	5	6
65. When something that I am studying gets difficult, I spend extra time and effort trying to understand it.	1	2	3	4	5	6
66. I put a lot of effort into preparing for exams.	1	2	3	4	5	6
67. I work very hard to prepare for the exams	1	2	3	4	5	6

Please indicate the extent to which you agree on the following statements

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
68.I do the work assigned in this class because good grades lead to other things that I want (e.g. money, graduation, university acceptance or scholarships, eligibility for extracurricular activities).	1	2	3	4	5
69.I do the work assigned in this class because my grades have a personal payoff for me (e.g " rewards from my family, graduation, scholarships, college acceptance").	1	2	3	4	5
70.I do the work assigned in this class because I get some reward or recognition for doing well.	1	2	3	4	5
71.I do the work in assigned in this class because if I do well I get praise or rewards from other people.	1	2	3	4	5

In the following questionnaire there are statements about the support your parents give to you in relation to your schooling.

After reading those statements, place a circle around the number that comes closest to indicating how you feel about the statement.

A: These statements relate to your mother/main female caregiver

	Strongly agree	Agree	Not Certain	Disagree	Strongly Disagree
1. My mother is very interested in my schoolwork.	1	2	3	4	5
2. My mother often helps me with my homework.	1	2	3	4	5
3. My mother often speaks to me about my schoolwork.	1	2	3	4	5
4. My mother is a great support to me while I'm at school.	1	2	3	4	5
5. My mother encourages me greatly to stay at school.	1	2	3	4	5
6. My mother often tells me of the importance of getting a good education.	1	2	3	4	5

7.How much education does your mother want you to achieve. (Place a circle around the number that corresponds to your answer.)

1. Leave school as soon as possible.

2. Finish high school or as much high school as possible.

3. Finish high school, plus a training college such as Unitec, Manukau Technical Institute, but not go to university.

4. At least some university.

5. Graduate from university with a general degree, such as a Bachelor of Arts (BA) or a Bachelor of Science degree (BSc).

6. Graduate from university with a degree from a professional faculty dentistry, engineering, law or medicine.

7. Graduate from university after postgraduate education. That is, with a higher degree such as a Master's degree or a doctoral degree.

8. When you were in high school what job or occupation do you think your mother really wants you to have, if at all possible, after your education?

(Write down the ideal job in this space): _--

B: The following statements relate to your father/main caregiver.

	Strongly Agree	Agree	Not Certain	Disagree	Strongly Disagree
1. My father is very interested in my schoolwork.	1	2	3	4	5
2. My father often helps me with my homework.	1	2	3	4	5
3. My father often speaks to me about my homework.	1	2	3	4	5
4. My father often praises me for things I do at school.	1	2	3	4	5
5. My father is a great support to me while I'm at school.	1	2	3	4	5
6. My father gives me great encouragement to stay at school.	1	2	3	4	5
7. My father often tells me the importance of getting a good education.	1	2	3	4	5

8. How much education does your father want you to achieve? (Please circle the number that corresponds to your answer.)

1.   Leave school as soon as possible.

2.   Finish high school or as much high school as possible.

3.   Finish high school, plus a training college such as Unitec, Manukau Technical Institute, but not go to university.

4.   At least some university.

5.   Graduate from university with a general degree, such as a Bachelor of Arts (BA) or a Bachelor of Science degree (BSc).

6.   Graduate from university with a degree from a professional faculty dentistry, engineering, law or medicine.

7.   Graduate from university after postgraduate education. That is, with a higher degree such as a Master's degree or a doctoral degree.

8.   What job or occupation do you think your father really wants you to have, if at all possible, after your education?

(Write down the ideal job in this space):---

Thank you very much for completing this questionnaire.

Oral Instructions for the teachers

Thank-you for taking the time to administer this questionnaire on my behalf.

Could you please read out the following to all students to help clarify parts of the questionnaire that may be confusing to students who do not live in a two parent family.

"Any part of the questionnaire that is not applicable to you will not need to be answered."

"For example, families do not necessarily have two parents. Some families may be single parent families, which may be mother only or father only. Although this questionnaire asks about your mother and your father regarding your schoolwork, some of these questions may not apply to your family situation. If this is so, you do not need to answer any questions that do not apply to your family makeup. For example, if you do not have a father, don't answer the questions about fathers and the same applies for questions about mothers. Also, you can substitute mother for your main female caregiver (e.g. foster mother, aunt, and grandmother), if this situation applies to you. You can also do the same for main male caregiver in the absence of a father".

Appendix B

Table B.1

Standardised grade averages and TOSCA scores of the underachievers and matched comparison groups

	Underachievers		Non-underachievers same grades gp		same TOSCA gp	
Grade z	TOSCA	Grade z	TOSCA	TOSCA	Grade z
-0.78	58	-0.79	18		
-0.75	85	-0.72	8	82	0.57
-0.64	93		22	76	0.33
-0.52	75	-0.52	45	72	0.19
-0.45	89	-0.47	43	87	0.54
0.25	99	0.24	61	97	0.92
0.12	95	-0.12	66	96	0.94
0.04	89	0.04	61	92	1.00
-0.08	95	-0.08	42	96	0.94
-0.03	99	-0.04	48	99	1.00
-0.14	85	-0.14	63	86	0.86
-0.25	80	-0.25	57	80	0.57
-0.76	61			57	-0.06
-2.62	38			40	-0.68
-2.43	54			51	-0.41
-2.27	54			51	-0.21
-2.14	36			36	-0.43
-1.87	25			25	-0.90
-1.57	33	-1.54	13	36	-0.92
-1.34	44	-1.36	20	44	-0.57
-1.47	45	-1.23	22		
-1.14	74	-1.14	30		
-0.98	75	-0.98	23	72	0.21
-2.47	23			22	-1.21
-1.59	29	-1.43	11	35	-0.03
-0.83	58	-0.88	10	53	0.26
-0.59	73	-0.64	25	75	0.50
0.06	99	0.04	47	97	1.08
0.14	95	0.21	43	95	0.79
-2.49	12				
-1.77	59			60	0.35
-1.08	66			66	0.14
-0.59	76	-0.50	47	77	0.37
-0.48	75	-0.34	48		

Table B.2.

Pattern matrix of maximum likelihood factor analysis of the Marjoribanks Perceived Family Environment Scale

Factors

Dimensions	Item No.	Father	Mother
Perceived family environment-father	B1	0.89	
	B2	0.82	
	B5	0.77	
	B2	0.68	
	B4	0.68	
	B6	0.64	
	B7	0.59	
	A5		0.88
	A6		0.80
	A1		0.61
	A3		0.60
	A4		0.57
	A2		0.34
% of total variance		41.80	17.00
Eigenvalue		5.40	2.20

Table B.3:
Maximum Likelihood Factor Analysis of Motivated Strategy Learning Questionnaire scales

Dimensions	Item no.	Intrinsic value, maths	Intrinsic value, science	Intrinsic value, social studies	Intrinsic value, english	Test anxiety	Self-efficacy	Cognitive/self regulation
Intrinsic value, maths	6	-0.89						
	15	-0.84						
	7	-0.72						
	37	-0.63						
	5	-0.62						
	3	-0.46						
Intrinsic value, science	29		-0.88					
	31		-0.87					
	11		-0.81					
	30		-0.81					
	27		-0.62					
Intrinsic value, social studies	35			-0.91				
	19			-0.85				
	24			-0.83				
	34			-0.78				
	26			-0.75				
	22			-0.56				
Intrinsic value, english	9				-0.84			
	14				-0.82			
	10				-0.82			
	18				-0.76			
	17				-0.74			
	52				-0.70			
Test anxiety	21					0.82		
	36					0.78		
	4					0.74		
	38					0.62		
Self-efficacy	23						0.72	
	2						0.61	
	12						0.55	
	28						0.47	
	8						0.46	
	13						0.45	
	20						0.42	
	33		-0.36				0.40	

Table B.3:
Maximum Likelihood Factor Analysis of Motivated
Strategy Learning Questionnaire scales

Dimensions Cognitive strategies /self regulation		Intrinsic value, maths	Intrinsic value, science	Intrinsic value, social studies	Intrinsic value, english	Test anxiety	Self-efficacy	Cognitive/ self regulation
	57							0.50
	51							0.49
	40							0.49
	58							0.48
	56							0.48
	44							0.47
	46							0.46
	49							0.46
	50							0.44
	60							0.40
	47							0.36
	48							0.33
	45							0.30
% of total variance	21.13	8.80	5.20	4.90	4.08	3.70	3.04	51%
Eigenvalues	10.98	4.60	2.70	2.50	2.12	1.90	1.58	

Table B.4

Pattern matrix for Maximum Likelihood
Factor Analysis of Cognitive Study strategies

Dimension	Item	Disorganisation	Persistence/ effort
Disorganisation	61	0.62	-0.36
	62	0.82	-0.45
Persistence/effort	67		0.96
	66		0.89
	65		0.55
	64		0.45
% of total variance		15.00	38.00
Eigenvalues		2.70	1.09

Table B.5

Pattern matrix for Maximum Likelihood Factor for Future Consequences

Dimension	Item	Future consequences
Future consequences	70	00.82
	71	00.79
	69	00.55
	68	00.34
% of total variance		42.83
Eigenvalues		1.71