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Setting Academic Achievement Goals in Primary Schools

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Abstract

Goal setting has been identified in recent research as being an indicator of academic achievement, self-efficacy, and motivation, yet there is still much debate as to what the key factors are that lead to successful student goal setting within an academic environment. Thus, the major purpose of the studies in this thesis concern two interrelated issues of goal setting research, namely the importance that primary students place on goal setting in academic settings, and the role of teachers and their teaching of goal-setting strategies within primary school classrooms in New Zealand. This thesis is comprised of three studies. The first study investigated the extent to which students set goals for themselves. An additional focus was to determine who students identified as being their main sources of encouragement for setting goals and who they shared goals with. The second study focused on the impact of teaching students specific learning goals relating to mathematics, which were mastery in orientation. The aim was to determine whether having students construct their own mastery learning goals, with the support of their classroom teachers, improved academic achievement when compared with a control group. The final study sought to examine the significance of attention, motivation, and goal setting strategies in relation to goal setting behaviour. It was found that students recognised that goal setting was beneficial to them in the classroom, and that they set multiple goals in their learning. Further, the majority of the goals that students did set on their own were typically performance rather than mastery in orientation. When taught specifically how to set mastery oriented goals, students showed an overall increase in their mathematics achievement. Finally, it was found that student motivation, attention, and goal setting strategies were crucial factors in determining the degree to which goal setting behaviour occurred.

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Table of Contents

Abstract	ii
Acknowledgements	iii
List of Tables	viii
List of Figures	ix
Chapter 1: Introduction	1
Historical Overview.....	2
Significance of the Research	4
Purpose of the Research	6
Synopsis.....	7
Chapter 2: Literature Review	9
The Pioneering Research by Locke and Latham	9
Measuring Goal Setting in Education.....	11
Mastery versus Performance Goals Model of Framework	13
Mastery Goals	13
Consequences of adopting mastery goals	14
Performance Goals	14
Approach versus avoidance in goals	15
Mastery-approach goals	15
Mastery-avoidance goals.....	16
Performance approach.....	16
Performance avoidance	17
Multidimensional perspective of goals	17
Achievement Goals in the Social Domain.....	18
Goal Difficulty and Challenge.....	20
Proximal versus Distal Goals	23
Self-Efficacy and Goal Setting	25
Effects of low self-efficacy	26
Self-Regulated Learning.....	28
Top-down self-regulation.....	29
Bottom-up self-regulation	30
Age Differences in the Setting of Goals	31
Gender Differences in Self-Efficacy, Self-Regulated Learning and Goal Setting	31
The Importance of Feedback	33
Teacher Feedback to Students	35
Goal Setting as a Motivational Tool.....	36
Setting the Learning Intention Goals with Students	38
Goals and Teacher Expectations.....	39
Peer Influence	40
Potential Pitfalls in Goal Setting	41
Conclusions	43

Chapter 3: Study 1: Exploring the Types, Reasons, and Roles of Others in Students' Personal Goal Setting 46

Method.....47
 Participants.....47
Scale Development.....49
 Instrument49
 Goal and goal setting questionnaire pilot.....51
Procedure.....52
Administration.....52
Ethical Considerations.....53
Results53
 Data analyses53
 Missing data55
 Descriptive Analysis55
 Exploratory factor analysis of the Goal and Goal Setting Questionnaire56
 Structural equation modelling of the Goal and Goal Setting Questionnaire.....58
Goals Set.....61
Discussion.....66

Chapter 4: Study 2: Investigating the Impact of Individual Student Mastery Goals in Mathematics on Academic Performance..... 72

Method.....73
 Design73
 Threats to validity73
Participants74
Sampling.....75
Scale Development.....77
 Overview.....77
Goal Setting Self-Review (GSSR) Booklet.....77
 Design77
 Structure.....78
 Pilot.....79
 Assessment tool for teaching and learning (asTTle).....80
Procedure.....81
 asTTle administration81
 Goal Setting Self-Review (GSSR) booklet administration83
 Control group83
 Intervention84
 Teaching teachers goal setting strategies85
 Intervention classes85
 Ethics.....86
Statistical Analysis86
Performance Analysis.....91
Discussion.....94

Chapter 5: Study 3: Students' Attention, Motivation and Goal Setting 98

Method.....99
 Participants.....99

Sampling	99
Scale development	100
Procedure	101
Results	103
Statistical analyses	103
Academic goals.....	109
Discussion.....	110
Chapter 6 Discussion	113
Findings	113
Implications	117
Limitations.....	119
Future Research	121
Contribution.....	122
Addendum	126
Appendices.....	130
Appendix A: Goal Setting Questionnaire	131
Appendix B: Goal Setting.....	136
References.....	142

List of Tables

Table 1 <i>Relationship Between Ideal Conditions, Processes and Outcomes for Setting Goals</i>	11
Table 2 <i>Relation Between Goal Difficulty, Goal Specificity, and Feedback on Performance</i>	12
Table 3 <i>Effect Sizes Between Measuring Goal Difficulty and Performance</i>	21
Table 4 <i>Difficult Goals Compared to “Do Your Best” Goals</i>	21
Table 5 <i>Goal Setting: Common Problems and How to Overcome Them</i>	42
Table 6 <i>Constructs and Items in Goals and Goal Setting Questionnaire (N=33 Fixed-choice Items)</i>	49
Table 7 <i>Means, Standard Deviations, and Internal Consistencies of Goal and Goal Setting Questionnaire Categories</i>	56
Table 8 <i>Exploratory Factor Analyses With Six Sources</i>	57
Table 9 <i>Correlations Between Six Sources of Goal Setting Factors</i>	58
Table 10 <i>Types of Goals Set as a Function of Gender and Age (Means With Standard Deviations in Parentheses)</i>	63
Table 11 <i>Reasons to Set Goals as a Function of Gender and Age (Means with Standard Deviations in Parentheses)</i>	64
Table 12 <i>Percentages Demonstrating Who Encouraged Students to Set Goals (Items 10–17)</i>	65
Table 13 <i>Percentages Demonstrating Who Taught Goal Setting to the Students (Items 18–25)</i>	66
Table 14 <i>Percentages Demonstrating to Whom Students Shared Their Personal Goals (Items 26–33)</i>	66
Table 15 <i>Distribution of School Sample by Group Condition</i>	76
Table 16 <i>Goal Setting Tasks in Eight Lessons</i>	88
Table 17 <i>Correlations Among Pre-test (Time 1) Goal Setting Tasks</i>	90
Table 18 <i>Alpha Coefficients for the Three Factors Across the Eight Lessons</i>	91
Table 19 <i>asTTle Mathematics and Attitude Mean Scores and Score Differences on Pre-test and Post-test Measures</i>	92
Table 20 <i>asTTle Scores on Pre-test and Post-test and Differences Between the Intervention and Control Groups According to Gender</i>	93
Table 21 <i>Distribution of School Sample by Age and Gender</i>	100
Table 22 <i>Constructs and Closed-ended Items (n = 15) for the School Work Goals Questionnaire (SWGQ)</i>	101
Table 23 <i>Means, Standard Deviations, and Internal Consistencies of the School Work Goals Questionnaire Constructs</i>	104
Table 24 <i>Effects of Age and Gender on Attention, Motivation, and Goal Setting Scores</i>	108

List of Figures

<i>Figure 1.</i> Structural equation model showing various sources of goals to the areas in which students set achievable goals and the importance of goals.	60
<i>Figure 2.</i> Male aMs performance across groups across both time periods.	94
<i>Figure 3.</i> Structural Equation Model showing the hypothesised three constructs and related closed-ended items in the School Work Goals Questionnaire. Note: See Table 22 for item stems.	107
<i>Figure 4.</i> Student goal setting response means by age.....	109

Chapter 1: Introduction

This thesis investigated the role of goal setting with primary (elementary) school students aged 10–13 years. Further, it focused on the probable effect that goal setting had on their academic achievement. The questions addressed in this thesis came from the researcher's observation as a principal of a primary school that, while on the one hand, there is much research related to the importance of goals (especially mastery goals), there is little research concerned with determining how students set these goals in academic settings, if indeed they set them at all. There has also been limited research into the role of teachers and their teaching of goal setting strategies, and whether classroom teachers understand the different types of goals and if they know how to teach goal setting strategies effectively.

Although there is an agreed understanding with New Zealand primary school teachers about the importance of students setting goals, it appears that there has not been any specific guidance given to teachers about how to go about setting effective goals with students. It seems that there may be a gap between what the teacher sets and whether or not the children identify and connect with these intentions. According to Hattie (2012):

Many students cannot articulate the goals of the lesson and at best, their goals are performance-related with an emphasis on 'finish the task'; 'make it neat'; 'include as many resources as possible.' Rarely are the goals mastery-related: 'understand the concept'; 'master the skill'. Part of this is that so many lessons are about 'the facts', teachers talking, and 'covering the curriculum', which relate closely to performance goals, because students have little notion of what mastery looks like. (p. 117).

If teachers were taught how to set mastery goals with their students, this may result in higher levels of academic achievement and increased self-efficacy.

In our primary school classrooms there is currently a predominant focus on goal setting that is performance based. Children, who are exposed to a performance goal orientation, focus on the end result, have apprehensions of failure, and focus on the consequences of their poor performance, especially the disapproval of others. Where possible, they choose tasks that enable them to demonstrate their competence at the expense of learning something new. In contrast, those children who have a mastery goal

orientation seek challenging tasks that provide them with the opportunity to develop their competencies. Errors made are perceived as a natural, instructive part of the process, resulting in an outcome that is often an increase in self-efficacy (Bandura, 1986).

This thesis, using the results from three studies, intended to determine whether there was a strong link between the student's level of attention and motivation, the feedback and support they received from their classroom teacher and their academic achievement in mathematics. It is hypothesised that an increase in academic achievement, student motivation and self-regulatory learning can be created by the classroom teachers' interest and attention given to the purposeful teaching of mastery goals with students in mathematics.

Historical Overview

Goals and target setting have been extensively explored in diverse domains including educational and personality psychology (Bandura, 1977); industrial and organisational psychology (Locke & Latham, 2002); sport and exercise psychology; and social psychology (Musket & Thompson, 2005). Locke and Latham are generally considered to be the founders with regards to the area of goal theory. Locke and Latham (1990) used the term "goal" as a general concept that included "intention, task, deadline, purpose, aim, end, and/or objective" (p. 2). Their goal setting theory assumed that goals influenced what people would do and how well they would perform. While most of their research was conducted with adults, it is highly probable that these messages could be powerful for school students and teachers. Locke and Latham (2002) stated that the goals we have for tasks influence not only what we do but also how well we perform.

Locke and Latham's (1990) goal setting theory proposed two key elements, goal choice and goal commitment, as being essential to the acceptance and perseverance required to achieve goals. Locke and Latham have provided compelling evidence, including many meta-analyses (but few with school achievement as the outcome) that include how critical goals are for enhancing performance. A major finding of Locke and Latham's research was that achievement is enhanced to the degree that students and teachers set challenging goals rather than "doing your best" goals, relative to the students' present competencies.

Locke and Latham (1990) posited that goals serve a variety of functions that are essential in the teaching process; goals regulate action and they explain the nature of the

link between the past and the future; and goals assume that human action is directed by conscious goals and intentions, although they do not assume that all human action is under fully conscious control. Within the theory of goal setting there are at least two main types of goals which have been identified: mastery and performance (Ames, 1992; Dweck & Leggett, 1988; Elliot, 1999; Nicholls, Patashnick, & Nolen, 1985). There has been conflicting evidence about which approach has had the better influence on behaviour and learning achievement, and more recently, the two main constructs have been extended to include other methods such as approach and avoidance within them (Elliot, 1999; Elliot & McGregor, 2001). This thesis posits that the best approach for primary students is that of a mastery focus, where the emphasis is on task-based skills and standards of competence as opposed to performance based, where the outcome is perceived in relation to others or by comparing one's mark with others.

Although goals provide direction, they do not guarantee successful performance. It is not sufficient to just have a goal; goals need to be accompanied by effective study strategies and plans. The use of individual goal setting accompanied by appropriate feedback and teacher support, is crucial in building effective motivational approaches and self-regulatory learning strategies that can promote academic success (Schunk & Zimmerman, 2007). Indeed, students who set goals and develop plans to achieve them take responsibility for their own learning (Dembo, 2000) and one aim of our education system could be to develop independent and life-long learners.

According to Paris and Paris (2001), goals and goal setting play a central role in self-regulation, influencing learning and motivation, and goals are integral components of motivation and learning (Bandura, 1986; Carver & Scheier, 2000; Pintrich & DeGroot, 1990; Winne, 1995). They have argued that setting goals for learning that are specific, challenging, and proximal have often resulted in greater motivation and better achievement outcomes, when compared with goals that are non-specific or unrelated to learning outcomes. Carver and Scheier (2000) also discovered that the goal systems of the most effective learners were hierarchical, with proximal processes that were linked to distal outcomes. Bandura (1986) stated that goals provided both direction and incentives for action, while also playing a prominent role in the development of self-efficacy.

O'Connell (1991b) and Meece (1994) advocated that schools should assist children in developing learning goals and that teachers should reinforce these same goals. They contended that the school may be the only source of goal development for some children,

particularly in relation to achievement and associated school work. In classrooms, goals could inform teachers and students about the type or level of performance to be attained so that they can direct and evaluate their actions and efforts accordingly. Extensive research undertaken by Kaplan, Middleton, and Midgley (2001) has demonstrated that there is a strong correlation between students' achievement with regards to their personal goals and performance and the individual teacher's approach to instruction. If setting goals is effective in raising academic achievement, then recognition of this could help teachers with planning and teaching the importance of goal setting and goal setting strategies to their students. Although teachers and students may set goals, it is not clear how much is actually understood about this process, or how much this activity is shared between teachers and their students.

To summarise, the psychological literature suggests that goal setting leads to greater performance by directing attention toward a task, by affecting the intensity of our actions, by affecting our persistence, and by encouraging us to search for the appropriate strategies to complete the task.

Significance of the Research

The professional significance of this research relates to teachers being able to make the best use of the important contributions that goal setting can play in achievement. Clarke, Timperley, and Hattie (2003) demonstrated that, in classrooms, goals informed individuals "as to what type or level of performance was to be attained so that they (i.e., teachers and students) could direct and evaluate their actions and efforts accordingly" (p. 39). Academic goal setting can thus play a part in the self-regulatory activities of all students. Students can set specific learning goals, use various learning strategies, and systematically evaluate their progress towards the goals they set (Butler & Winne, 1995; Pintrich, 2000; Schunk, 1990).

As Ames (1992) argues, the role of the teacher in the classroom, in terms of the instructional approaches that they use, has a direct influence not only on the motivation of their students, but also their academic achievement. Classroom environments that have a mastery goal structure where the emphasis is on the importance of learning, understanding, and personal improvement, allow for the focus to be on improvement and developing confidence through learning (Ames, 1992). On the other hand, Ames also found that teachers who overemphasise the importance of doing well on tests by achieving high marks and competing against other students, thus emphasising a performance goal

structure. In a performance oriented goal structure the student's performance goals focused on the demonstration of competence or avoiding the demonstration of incompetence, which in school was often demonstrated by outperforming others or succeeding with little effort (Ames, 1992; E. Anderman & Maehr, 1994; Dweck & Leggett, 1988; Nicholls, 1984).

According to Kaplan and Maehr (2007), a learning environment with a mastery oriented goal structure emphasised to students that what was valued is effort, hard work, challenge seeking, and real understanding. Thus, allowed the opportunity for every student to have personal growth in their learning, given that their learning was measured against individual progress and not in relation to others in the classroom. The goals are broken into measurable, achievable steps and, through effective feedback the student is able to monitor and review their progress. In environments with a mastery goal structure, students were less likely to feel threatened, more likely to be oriented toward investing effort in academic tasks, and to feel more successful, and therefore, develop a positive self-efficacy in their learning (Kaplan & Maehr, 2007; Roeser, Midgley, & Urdan, 1996).

This research will contribute to the body of research that has been undertaken within the area of goal setting by examining the effect of an intervention programme that uses both teachers and students working together with a mastery goal focus to determine whether this type of intervention could lead to an increase in academic achievement within the subject of mathematics. It had the originality of linking students and their classroom teachers in an intervention that highlighted the significance of teaching mastery goal setting strategies to students.

This thesis brings the original dimension that it is set within a primary school in New Zealand. This type of research has not been conducted within a New Zealand primary school to date and it was hoped that, as a result of the findings, it will have a positive influence on teachers in New Zealand. This study highlighted that there was an apparent need to develop programmes to educate our New Zealand teachers in the importance of goal setting with their students in our primary schools. Further, that there was a current lack of understanding about goal setting strategies and the effect that these can have on their students' academic achievement. Currently, goal setting is not taught specifically as an educational process in the professional development of New Zealand teachers. In addition the researcher was not aware of any courses offered in this significant area of learning and motivation. As a result of this research, this information can be shared with

the teaching community with a view to being able to provide feedback in the field of goal setting and how it can be incorporated more fully into the teaching curriculum.

This thesis has shown that students were interested in participating in goal setting and that they recognised that it was important for them. Further, the studies here measured whether the goals that students and teachers were using in their classrooms had a predominant focus on performance goal setting rather than having a mastery orientation.

As will be highlighted in the following chapter and from the studies in this thesis, goal setting has been identified as an indicator of academic achievement, self-efficacy, and motivation, yet it has not been fully embraced by teachers due to their lack of understanding of the importance of this key element in their students' learning. Further, although many teachers are involved in setting goals with their students, few have appeared to have had an understanding of the deeper principles or types of goals that they need to be teaching.

Thus it is the researcher's experience that is a common process in New Zealand primary schools that at the beginning of the year students are asked to set goals for themselves. More frequently than not, these goals are not reviewed or evaluated in terms of feedback to the student or shared with their parents. Unfortunately, this potentially has the negative outcome of reinforcing to students' a sense of failure when they are unable to achieve their goals. Thus, it is the researcher's opinion, that the use of effective goal setting, with a mastery orientation, has so much to offer to our students and that currently goal setting is a powerful yet underutilised tool in our classrooms.

Purpose of the Research

The three studies conducted in this thesis were designed to establish whether pre-adolescent students were able to, and did, set goals for themselves, and whether this led to improved academic achievement. This study also sought to determine whether, by implementing an intervention programme that used mastery goal setting strategies including teachers and their students, this would result in academic achievement in mathematics.

The first study investigated whether students set goals and if they did so, what types of goals they set and with whom they shared their personal goals. The first proposition of this thesis was that students aged 10–12 years recognised the importance of

setting goals and set their own independent goals. Study 1 was designed to test this proposition using a survey as the chosen methodology.

The second study used an experimental design whereby students were taught through an intervention, to set mastery goals, develop their own intention to learn, and measure their own success within mathematics, with the support and encouragement of their classroom teachers. Their classroom teachers were also taught how to set mastery goals so that they were able to guide their students in this intervention. The intervention used personalised goal setting student booklets and involved students recording their own personal mastery learning goals in consultation with their classroom teacher. Student self-evaluation and reflection were also incorporated into the intervention. Thus, the proposition here was that by implementing a collaborative goal setting strategy, with a mastery focus, student achievement levels in mathematics would increase. This proposition was tested through an analysis of the pre- and post -test mathematics results as well as an examination of the types of goals set (mastery or performance), and student motivation levels.

The final study in this thesis stemmed from the results of Study 1 and Study 2 and had a focus on the role of student attention and motivation on the influence of goal setting beliefs. A larger and more diverse and representative group of students than in Study 1 participated in Study 3. Here, the proposition was that attention, motivation and goal setting beliefs were key elements necessary for students to set goals that lead to academic achievement. This proposition was examined in Study 3 through the use of a questionnaire that measured student attention and motivation in goal setting behaviours.

Synopsis

This chapter has presented an introduction and overview of the research project.

Chapter 2 presents a literature review in relation to the many aspects of goal setting. It begins with an overview of the history of goal setting, with a particular focus on social psychologists Locke and Latham (1990) as they are viewed as the seminal researchers in the field of goal setting. The review then moves to discuss the theory of goal setting. Meta-analyses in the field of goal setting are used to illustrate the importance of goals and how they can best be structured to encourage student learning. Models of goals, particularly the performance versus mastery approach, are then reviewed. Elements such as goal difficulty and challenge, whether goals need to be proximal or distal and the factors

necessary to enhance academic achievement are discussed. The review then investigates goal setting as a motivational tool and the effects of self-efficacy and how that relates to the setting of goals and goal achievement. Various moderators are identified such as gender, feedback, teacher expectations, and the influence of peers. Finally, the review concludes with highlighting the potential pitfalls of goal setting as discussed by Locke and Latham (2006).

Chapter 3 presents the first study, which investigated whether students set goals and, if they did, what types of goals they set and whom they shared their personal goals with. This study measured various dimensions of goal setting. These items were based on three major categories relating to goals: the person who teaches the student to set goals, how often a student was encouraged to set goals and work towards achieving them, and with whom the student shared their goals.

Chapter 4 introduces and reports the major study in this project. This study used an experimental design in which students were taught to set mastery goals, develop their own learning intentions, and to measure their own success working within the area of mathematics with the support and encouragement of their classroom teacher. Results of this experimental design are reported and discussed.

Chapter 5 includes the final study, which used a questionnaire with a larger group of students and took an in-depth look at the role of student attention and motivation in goal setting. The questionnaire also repeated some of the questions posed in Study 1 to see whether comparisons could be established.

Chapter 6 presents conclusions in the light of the findings and comments on the professional significance of the findings to teachers and students. The chapter further describes the contribution to professional knowledge in the area of goal setting and student motivation.

Chapter 2: Literature Review

This chapter explores the key factors that lead to effective student goal setting within an academic environment. Specific focus is given to the various theories and constructs that have been adopted in subsequent studies in this thesis. The chapter begins with a review of the work of Locke and Latham, who, as explained in Chapter 1, are generally considered to be pioneers in the area of goal theory. Although their work has predominantly focused on an adult population within the disciplines of industrial/organisational psychology, their theory has been applied to research across many social science disciplines, which is a testament to its wide-ranging scope and versatility.

The review then presents the theory of goal setting and the specific use of meta-analyses to demonstrate the importance of goal setting. Models of goals, particularly the performance versus mastery approach are then examined. Elements such as goal difficulty and challenge and whether these are necessary for academic achievement along with other factors, such as whether goals need to be proximal or distal, are discussed. The review then investigates goal setting as a motivational tool and the relationship between self-efficacy and goal setting. Various moderators are identified, such as the significance of gender, feedback, teacher expectations, and the influence of peers. Finally, the review concludes with a look at the potential pitfalls in goal setting, and sets the foundations for the three studies that have arisen out of this literature review.

This chapter also questions the nature of academic goals that students set, and explores the relationship between student goal setting and teacher goal setting. The review defends the claim that the central core of goal setting theory is that conscious goals can regulate human action, and that much human behaviour is goal-directed and naturally purposeful.

The Pioneering Research by Locke and Latham

For two decades Locke and Latham have conducted comprehensive field research related to goal theory. Their initial research question was: “Why do some people perform better on work tasks than others?” They demonstrated that a major reason people performed differently was because they had different goals. As a result of these different goals, they had different outcomes when they worked on a task. It was the individual’s idea of, and desire for, the goal or end result that appeared to cause the subsequent action. Once

understood and accepted, the goal remained in the periphery of consciousness as a reference point, guiding the mental and physical actions that led to accomplishing the goal.

Locke and Latham used the term “goal” as a “general concept that included intention, task, deadline, purpose, aim, end, and/or objective” (1990, p. 2). Their goal setting theory assumed that goals would influence what people would do and how well they would perform. Locke and Latham recognised that cognitive factors also affected goals, and the relationship between action and performance in terms of both choices and success.

Locke and Latham’s theory proposed two important aspects of goals: goal choice and goal commitment. Goal choice referred to the actual goals that individuals were trying to obtain and the level at which they were trying to attain them. “Goal commitment represented how strongly individuals were attached to the goal, how enthusiastic they were about the goal, or how determined they were to achieve the goal” (Locke & Latham, 1990, p. 125). In addition, they noted that goal commitment could be assessed through behaviour and action because the simple selection of a goal was often not enough to spur action. There must be a volitional element to goal commitment:

Believing that a goal is desirable and reachable does not automatically force an individual to act. The individual must choose to put his or her judgment into action. Individuals who simply wait for their conscious and subconscious estimates of a situation to ‘turn them on’ more often than not find themselves doing nothing or drifting without any sustained purpose. (Locke & Latham, 1990, p. 127)

The basic premise behind Locke and Latham’s theory of goal setting was that conscious goals and intentions were regulators of individual task performance (Locke, 1968). Although their theory did not specifically address the ways in which goals were set, the importance of participation in the goal setting process was implied:

It is not enough to know that an order or request was made, one has to know whether or not the individual heard it and understood it, how he appraised it and what he decided to do about it before its effects on behaviour can be predicated and explained (Locke, 1968, p. 174).

Table 1 summarises the conditions under which goal setting, according to Locke and Latham, is effective, the processes involved, and the consequences. As indicated in Table 1, goals would only have a motivating effect if their three conditions were met. First,

these conditions included the recognition by the students that they could meet the goal either by themselves or with support from others. Second, it was also necessary for the student to demonstrate commitment to the goals and third, that they understand and value them. As such, it was important that the goals were specific and unambiguous. Locke and Latham proposed that where there was evidence of these three conditions being present the outcomes presented in Table 1 would probably be consequential (see Table 1). These include higher performance and learning for the students, a sense of purpose and priority, increased sense of efficacy and self-management, and finally, an increased enjoyment of the task.

Table 1
Relationship Between Ideal Conditions, Processes and Outcomes for Setting Goals

Conditions required	Processes involved	Consequences
<ul style="list-style-type: none"> • Capacity to meet goals • Commitment to goals • Specific and unambiguous goals 	Goals: <ul style="list-style-type: none"> • Create a discrepancy between current and desired action or outcomes • Motivate persistent goal-relevant behaviour • Focus, attention, and effort 	<ul style="list-style-type: none"> • Higher performance and learning • Sense of purpose and priority • Increased sense of efficacy and self-management • Increased enjoyment of task

Measuring Goal Setting in Education

One technique for measuring the magnitude of various influences such as goal setting has been to use a meta-analysis. Meta-analysis assists in identifying trends in research even though there is often a small sample size. This approach was first introduced by Glass (1976) whereby the effects in each study, where appropriate, were converted to a common measure (an effect size). This approach permits the overall effects to be quantified, interpreted, and compared, and further allows the various moderators of this overall effect to be uncovered and followed up in more depth. This method has become very popular across many disciplines, and by the mid-1980s more than 100 meta-analyses in education alone were available. For example, Hattie (2012) outlined the details surrounding over 500 meta-analyses that have occurred in education (and there are many more in medicine in particular) since Glass introduced this technique. Hattie (2009) established that the mean effect of any new curriculum, process, and teaching method, and of not implementing anything new on student achievement is 0.40. He therefore argued that an intervention should exceed 0.40 to be considered worthwhile. From Hattie's (2009) research, Table 2 shows several meta-analyses that are specifically related to goal setting research conducted within an educational context. The studies of Wright (1992), Mento,

Steel, and Karren (1987), Wood, Mento, and Locke (1987), and Chidester and Grigsby (1984) examined effects on performance achievement of students being given difficult, rather than easy goals. Overwhelmingly, they found that students achieved enhanced outcomes when they were given challenging, rather than easy or “do your best” goals (range of $d = 0.44$ to $d = 0.58$). Similarly, Tubbs (1986) in his studies on goal difficulty, specificity, and feedback, found that students achieved at a higher academic level if the goal had a challenge, was clearly defined, and the teacher had provided specific feedback to the students in relation to the goals ($d = 0.58$).

Table 2
Relation Between Goal Difficulty, Goal Specificity, and Feedback on Performance

Authors	Year	Number			Effect size	Focus of study
		Studies	Students	Effects		
Chidester & Grigsby	1984	21	1,770	21	0.44	Goal difficulty
Tubbs	1986	87		147	0.58	Goal difficulty, specificity and feedback
Wood, Mento, & Locke	1987	53	6,635	53	0.43	Goal specificity
Mento, Steel, & Karren	1987	70	7,407	118	0.58	Goal difficulty
Wood, Mento, & Locke	1987	72	7,548	72	0.58	Goal difficulty
Wright	1990	70	7,161	70	0.55	Goal difficulty
Donovan & Radosevich	1998	21	2,360	21	0.36	Goal commitment
Klein, Wesson, Hollenbeck, & Algae	1999	74		83	0.47	Goal commitment
Burns	2004	55		45	0.82	Degree of challenge
Carpenter	2007	48	12,466	48	0.24	Mastery goals on achievement
Gollwitzer & Sheeran	2007	63	8,461	94	0.72	Goal intentions on achievement
Hulleman, Schrager, Bodman, & Harackiewicz	2010	243	91,087	243	0.12	Approach goals on achievement

The commonality amongst these studies has been their focus on the circumstances that make goal setting effective, rather than looking at the specific goals themselves and what type or characteristics they had.

There are at least two main specific types of goals, that which has either a mastery and performance orientation. Since the early days of achievement-goal research, researchers have investigated mastery and performance goals to see which yields most beneficial effects and should therefore be promoted in achievement situations (Elliot, 2005; Payne, Youngcourt, & Beaubien, 2007).

The reader is reminded that mastery oriented goal focus on task-based skills and standards of competence, whereas performance goals focus on interpersonal standards of competence. The approach of achievement goals in terms of motivation has been studied in

terms of a framework for understanding how people respond to competence-relevant situations (Dweck, 1986; Nicholls, 1984).

Mastery versus Performance Goals Model of Framework

The goals of mastery and performance have been extensively researched and are studied and associated with approaches to how students learn, and their cognitive strategies (Ames, 1992; Dweck & Leggett, 1988; Nicholls et al., 1985). There is conflicting evidence about which has been the better influence on performance and learning, with research tending to support the idea that mastery goals have an adaptive influence on cognition, affect, and behaviour, whereas there is conflicting evidence about the influence of performance goals. Most research to date has focused on goal orientation as if it were a dichotomous construct (usually either performance or mastery goals) and the effects of having one orientation or the other on various aspects of students' motivation and academic performance (Ainley, 1993; Meece & Holt, 1993). However, other researchers (Babad, 2009; Hidi & Harackiewicz, 2000) have argued that mastery and performance goals should not be considered in isolation as separate orientations, but rather that the multidimensional nature of goal orientation should be further studied. With this in mind, the next section begins by reviewing mastery and performance goals as separate constructs, but it is noted that these are not necessarily dichotomous.

Mastery Goals

A mastery goal is an orientation towards learning that involves a desire to develop new skills, strive for understanding, improve in competence, or achieve a sense of mastery that is self-referenced (Ames, 1992; Elliot, 1999). Thus, students who seek a thorough conceptual understanding of a topic out of curiosity, or who have a desire to gain knowledge or improve their ability, would be considered to be mastery-goal oriented. A range of different factors can influence the setting of mastery goals, including factors such as students' competence beliefs and the school and classroom environment. According to Dweck and Leggett (1988), the adoption of mastery goals is associated with beliefs that intelligence is not fixed but malleable. This incremental view of intelligence proposes that a covariance between effort and achievement outcomes helps sustain a mastery-goal orientation (Ames, 1992).

Adopting mastery goals is facilitated by school policies and pedagogical approaches that focus on understanding and effort, promote tasks with high intrinsic

interests, attribute success to effort-based strategies, promote metacognition and self-regulation as well as task enjoyment, and encourage a sense of belonging and a tolerance of failure (Ames, 1992). Maehr and Midgley (1996) also found that an emphasis on self-comparison facilitated the adoption of mastery goals. By the same token, mastery goals can be subverted if school policies and pedagogy put the emphasis on performance, and promote social comparison with ability grouping and competition (Ames, 1992).

Consequences of adopting mastery goals

The general consensus in the literature is that mastery goals promote a wide range of adaptive processes and outcomes (Ames, 1992; Dweck & Leggett, 1988; Pintrich & Schunk, 1996; Urdan, 1997). These positive processes and outcomes can be defined as motivational, cognitive, affective, behavioural, and academic.

Meece, Blumenfeld, and Hoyle (1988) showed that students who exhibit mastery goals aim to independently master and understand their work, and demonstrate high cognitive engagement in learning activities. Mastery-oriented students view self-improvement and skill mastery as rewarding in their own right. They strive to master tasks and to improve and develop intellectually, and they are interested in problem solving and challenge (Anderman, Maehr, & Midgley, 1999). A mastery-goal orientation has a positive influence on students' cognition, affect, and behaviour (Pintrich & Schunk, 1996). Mastery goals also have a positive effect on students' metacognitive knowledge, use of strategies, and academic effort (Ames, 1992), and have been positively associated with deep processing of knowledge, persistence, and effort (Elliot, McGregor, & Gable, 1999). The outcomes from mastery goals seem to lead students to feel proud and successful, or guilty if they are not successful (Ames, 1992). Researchers agree that mastery goals are consistently associated with positive learning behaviours and outcomes.

Performance Goals

Students who are performance oriented are focused on demonstrating their competence and knowledge and gain their personal self-efficacy from extrinsic variables such as gaining recognition and impressing others. These students who pursue performance goals aim to demonstrate high ability in relation to others (Meece, 1991), and pursue external reinforcement (Meece et al., 1988). Performance goals have also been associated with cognitive and metacognitive strategies (Nicholls et al., 1985) and the view that success in school leads to high status employment, which can help enhance one's wealth

and socioeconomic status (Nicholls, 1992). Performance-oriented students align being successful is related to with being intelligent, performing at a higher level than their peers, having teachers and parents who expect them to do well, and knowing how to impress others (Nicholls, 1992). Research studies that were carried out focusing on performance goals were unable to substantiate whether such goals were associated with either cognition patterns or affect and behaviour (Kaplan & Maehr, 2007). It was as a result of these inconsistencies that researchers such as Elliot (1997), and Middleton and Midgley (1997) began to characterise performance goals in two areas, these being performance approach and performance avoidance.

Approach versus avoidance in goals

More recently the performance versus mastery model has been extended to include the approach–avoidance distinction that has long been identified by researchers in achievement-motivation research (Atkinson, 1957; Lewin, Dembo, Festinger, & Sears, 1994). A more elaborate 2x2 achievement-goal model was posited (Elliot, 1999; Elliot & McGregor, 2001) in which the mastery- and performance-goal construct was divided into the two areas of approach and avoidance. As stated, approach goals focused on positive outcomes, whereas avoidance goals focused on avoiding negative outcomes. Another goal model that was proposed posited a trichotomous approach (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Vandewalle, 1997). This goal construct partitioned performance goals into two separate areas of approach and avoidance; however, the mastery goal was only treated as one area, that being an approach goal. A significant amount of research has been conducted on the trichotomous achievement-goal model (Elliot, 2005; Payne et al., 2007), while empirical work on the 2x2 model has been far less prevalent resulting in some researchers questioning the need to place importance on the mastery-avoidance goal construct (DeShon & Gillespie, 2005).

Mastery-approach goals

Within this construct, mastery-approach goals are those goals that have a focus on increasing personal levels of competence by acquiring new knowledge or skills. In terms of behavioural outcomes, Ames (1992) argues that mastery goals are also associated with seeking challenging work and taking risks because the focus is on personal growth and development of competence and not the “adequacy of one’s ability” (p. 263). In terms of learning (i.e., specifically deep or surface learning) mastery goals have been known to lead

to long-term learning acquisition and the integration of new material with prior knowledge (Anderman, Maehr, & Midgley, 1999).

Achievement outcomes include grades, test scores, GPAs and other forms of assessment. Meece and Holt (1993) found that students with a mastery-approach orientation in the upper elementary grades displayed the most adaptive achievement profile, which included strategy use, grade and achievement-test scores (as cited in Anderman et al., 2002).

Mastery-avoidance goals

Mastery-avoidance goals are focused on avoiding self-referential or task-referential incompetence. These goals differ from the mastery approach in that the focus of the student is a fear of losing one's skills or abilities by forgetting what they have learned, misunderstanding what has been asked, or leaving a task incomplete. Mastery-avoidance goals refer to goals where the emphasis is on avoiding mistakes or failures. Mastery avoidance has been associated with test anxiety (Elliot & McGregor, 2001), and negatively related to intrinsic motivation (Cury, Elliot, Da Fonseca, & Moller, 2006) and help seeking (Karabenick, 2003). Mastery avoidance is mostly unrelated to students wanting to achieve high marks or cognitive strategies (Kaplan & Maehr, 2007).

Recent studies, however, have demonstrated that mastery-avoidance goals appear to have been more prevalent in academic contexts than had originally been thought (Elliot & McGregor, 2001). Studies indicate that individuals who identified that mastery-avoidance goals were the most important to them, ranged from 15% in a sport setting (Van Yperen & Renkema, 2008), to 33% in an academic setting (Van Yperen, 2006), and to 49% in a work setting (Van Yperen, Elliot, & Anseel, 2009).

Performance approach

Performance-approach goals have been shown to be related to more positive processes than negative outcomes. These goals have been linked to the following positive consequences: higher levels of aspiration, absorption during task engagement, challenge-related affect while studying, effort while studying, persistence while studying, calmness during evaluation due to adequate preparation, high performance outcomes, and intrinsic motivation (Elliot & Church, 1997; Elliot & Harackiewicz, 1996).

Performance avoidance

The underlying focus of performance avoidance is to avoid the demonstration of incompetence relative to others. As a result of this focus, performance avoidance has been linked to a number of negative processes and outcomes. These include low self-determination while studying, less self-regulated learning, an unwillingness to seek help with schoolwork, and anxiety prior to tests. These outcomes often resulted in poor performance and reduced intrinsic motivation (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & McGregor, 2001). Research has identified low absorption during task engagement as a mediator of the relation between performance-avoidance goals and intrinsic motivation (Elliot & Harackiewicz, 1996; Elliot & McGregor, 2001)); and anxiety (worry) during evaluation and disorganised studying have been documented as mediators of the relation between performance-avoidance goals and performance outcomes (Elliot & McGregor, 2001).

Multidimensional perspective of goals

There has been on-going debate as to which types of achievement goals, that is those with a mastery or a performance focus, result in optimal motivation. A number of theorists support the mastery-goal perspective while others endorse a multiple-goal perspective, that is one in which they recognise that both mastery and performance can be beneficial. Other researchers argue that the partitioning of goals into approach and avoidance, constrains and limits opportunities for researchers to investigate the multidimensional nature of goals such as academic and social goals and the relationship between such goals (McInerney & Ali, 2006). Brophy (2005) suggested that goal theorists should phase out the term “performance goals” and categorise goals differently by using multiple goals. He argued that students did not identify that performance goals, including peer comparison and competition, were relevant to their achievement. It is of note, however, that the studies covered have focused on goal orientation rather than goal setting. There is a dearth of literature related to goal setting as opposed to goal orientation. Hence, it is unclear whether younger students actually set goals with teacher support, or whether instead they have reflected a particular orientation (mastery or performance) but do not actively set goals with that intention.

Achievement Goals in the Social Domain

However, an important outcome criterion of achievement goals that has so far received only limited research attention has been interpersonal behaviour. Researchers have recently become increasingly interested in the interpersonal effects of mastery and performance goals. Together, these investigations have given support to the idea that different achievement goals have resulted in a variety of different perceptions of situations, and these perceptions have led to differences in social outcomes especially in an achievement environment.

Mastery goals are associated with a perception of other people as helpers, whereas performance goals are linked to a perception of other people as threats (Darnon, Muller, Schragger, Pannuzzo, & Butera, 2006). Accordingly, mastery goals predict epistemic-conflict regulation, a constructive form of regulation (e.g., trying to understand different viewpoints), whereas performance goals predict relational-conflict regulation, a more competitive form of regulation (e.g., arguing that their viewpoint was the correct one while the other viewpoint was wrong). Darnon, Butera, and Harackiewicz (2007) in their study, assigned students the task of working on an academic text and then having to answer questions about the text. They were then confronted with a partner who either agreed (no conflict) or disagreed by arguing over their answer. Results demonstrated that conflict was beneficial for learning when placed within the context of enhancing mastery goals, whereas in a context of enhancing performance, conflict was harmful for learning (Darnon, Butera, et al., 2007; Darnon, Harackiewicz, Butera, Mugny, & Quiamzade, 2007). Goals have also been found to affect social-comparison intentions (Darnon, Dompnier, Gillieron, & Butera, 2010; Regner, Escribe, & Dupeyrat, 2007). Performance goals always predict intention to compare with others, whereas mastery goals do so only when they are accompanied by a strong performance goal focus (i.e., in a “multiple goals” situation).

Another recent area of research has also demonstrated that goals affect social judgment. The extent to which one has endorsed different goals, appears to strongly modify the way one is perceived by others (Darnon, Dompnier, Delmas, Pulfrey, & Butera, 2009). Janssen and Van Yperen (2004) found that individuals with mastery goals established higher quality work relationships with their supervisors, relative to individuals with performance goals. This finding shows that interpersonal processes such as performing well and having job satisfaction may effectively act as being instrumental in

behaviours that have resulted in the pursuing of achievement goals on task-related outcomes at the individual level.

Building on these findings, Poortvliet, Janssen, Van Yperen, and Van de Vliert (2007) showed that mastery goals lead to more honest information sharing, and being less suspicious toward information-exchange partners than performance goals. Their research identified two distinct exchange orientations. First, relative to individuals with performance goals, those with mastery goals reported a stronger reciprocity orientation - the perception that exchanging information had the result in obtaining information from the exchange partner that was useful. Second, performance goals led to a stronger exploitation orientation - the willingness to profit from task-related efforts of exchange partners paired with a reluctance to offer information in return.

It would appear from the recent research that in social contexts, mastery goals can lead to a variety of beneficial outcomes relative to performance goals, such as the opportunity to work with differences of opinions and integrate feedback resulting in the establishment of positive working relationships. In contrast, performance goals can result in the endorsement of maladaptive social behaviours such as competition and conflict resulting in the individual being focused on their own personal gains and at times the exploitation of others. Achievement goals appear to not only have affected individual outcomes, but also to have strongly predicted interpersonal behaviours. Even though mastery goals are individualistic in nature they rely on the positive interdependence from others, and as a result, individuals with a mastery goal orientation will take advice from others to assist their learning and improve their performance. On the other hand performance-driven individuals will often perceive others as adversaries and this can often lead them to behave competitively and therefore not desire to work cooperatively or seek support (Poortvliet et al., 2007).

The next section in the literature review will examine what the research identifies as influencing goal setting. Further, it will identify the types of goals that have appeared to be most effective in terms of enhancing student achievement, and will discuss such factors as goal difficulty and challenge, proximal versus distal goals, and also the use of goal setting as a motivational tool.

Goal Difficulty and Challenge

Goal setting research suggests that pride in performance is greatest when one achieves challenging goals (Mento, Locke, & Klein, 1992). Research into self-efficacy suggests that success on tasks that are difficult, enhances one's efficacy and control (Bandura, 1977) and motivation (Bandura, 1989). Vygotsky (1978) suggested that individuals are most engaged when levels of challenge realistically exceed their skill. Another factor that contributes to the setting of challenging goals can be found in the research into task value, which suggests that students gain both attainment value (satisfaction in performing well) and utility value (perceived usefulness and relevance of the task) in performing well on challenging and meaningful activities (Wigfield & Eccles, 1992).

In a study with school children, Schunk (1983) found that compared with easier goals, difficult goals raised children's motivation during arithmetic instruction. Giving children persuasory information ("You can work out 25 problems") increased self-efficacy; difficult goals plus persuasory information led to the highest skill. Further, goal difficulty during brainstorming was explored by Locke, Frederick, Lee, and Bobko (1984) with tertiary students. College students gave uses for common objects. Some participants were taught a strategy to generate uses; others were told to give only good uses (anti-brainstorming). Halfway through the study, the subjects were divided into two groups. One of the groups was assigned a difficult goal; while the other group was allowed to set their own personal goals. In subsequent trials, all of the participants set their own goals. They discovered that when the students had been assigned difficult goals and then given the opportunity to set their own personal goals, these students set more challenging goals than those who had been allowed to set their own goals without direction. These studies also demonstrated that self-efficacy was related positively to goal level and commitment. The use of strategy training also influenced self-efficacy indirectly through its effects on goal level.

In another study, Locke and Latham (1990) found that more challenging goals led to a higher level of performance than did easy goals, provided the task was voluntary and the person had the ability to achieve the goal. They went on to state that students tended to expend more effort to attain a goal they perceived as difficult. Locke and Latham however, argued that the goal must not be so difficult that it seemed unachievable because many students would have failed if this was the case. Locke and Latham also postulated that

there was a direct linear relationship between the degree of goal difficulty and performance, with performance levels increasing as the goal became more challenging. They demonstrated that more challenging goals did lead to greater performance. There are four meta-analyses that are relevant to this contention (Table 3) and the overall effect-size is high ($d = 0.62$).

Table 3
Effect Sizes Between Measuring Goal Difficulty and Performance

Authors	Year	Number		Effect size
		Studies	Students	
Chidester & Grisgby	1984	12	1,770	0.52
Mento, Steel, & Karren	1987	70	7,407	0.55
Tubbs	1986	56	4,732	0.82
Wood, Mento, & Locke	1987	72	7,548	0.58
Total		210	21,457	0.62

The five meta-analyses that compared difficult goals with “do your best goals,” found that difficult goals were the more effective, as long as they were realistic as shown in the effect sizes in Table 4.

Table 4
Difficult Goals Compared to “Do Your Best” Goals

Authors	Year	Number		Effect size
		Studies	Students	
Chidester & Grisgby	1984	17	2,400	0.51
Hunter & Schmidt	1983	17	1,278	0.80
Mento, Steel, & Karren	1987	49	5,844	0.42
Tubbs	1986	48	4,960	0.50
Wood, Mento, & Locke	1987	53	6,635	0.43
Guzzo, Jette, & Katzell	1985	NA	NA	0.65
Total		184	21,117	0.66

A major reason that difficult goals were more effective is that they lead to a clearer notion of success and directed the student’s attention to relevant behaviours or outcomes, whereas “doing your best” can fit with a very wide range of goals. However, it was not the specificity of the goals, but the difficulty that has appeared to be crucial to success. Klein, Wesson, Hollenbeck, and Alge (1999) discovered a strong relationship ($d = 0.47$) between goal difficulty and subsequent performance, and the effect between commitment and outcome increased as a function of goal difficulty.

The reason that specific, challenging goals resulted in higher performance than “do your best” or vague goals was related to the ambiguity inherent in vague goals. This

ambiguity allowed students to justify to themselves that they had tried hard enough at a point that fell below the performance level of someone who was trying for a specific goal (Locke & Latham, 1990). Here, specific goals contained more information, and served as a clearer focus for behaviour, and for seeking and receiving feedback. They also served as a measure by which to evaluate performance. This evaluation process allowed individuals to change strategies if satisfactory progress towards a goal was not being obtained (Locke & Latham, 1990). Locke et al. (1981) found that 99 out of 110 studies showed that specific, more challenging goals produced better performance than medium, easy, “do your best” or no goals.

Polivy and Herman (2002) studied the reasons why so many people tended to fail in their self-change attempts, and then examined how people interpreted these failures in such a way that they were led to keep trying repeatedly, despite apparently overwhelming odds. They discovered that the underlying factor that individuals either failed to reach goals or change and improve their behaviour was directly linked to the setting of unrealistically high goals. This resulted in goals that were unable to be achieved being abandoned rather than being revised. The authors talked about this cycle of failure as “false hope syndrome” which is often overemphasised by unrealistic expectations not only about the speed and skills required to complete a task but also the effort required of self-change attempts.

Deno, Fuchs, and Fuchs (1985) explored how student achievement related to ambitiousness of goal setting and to goal mastery. Using 58 special education students (learning disabled, emotionally handicapped, and educably mentally retarded) the students were administered a passage reading test and the Stanford Diagnostic Reading Test. They then asked 39 teachers to each assess the baseline performance of three or four students and set reading goals using a standard format. On the basis of the relation between baseline and the anticipated goal performance, students were then assigned to goal-ambitiousness groups. For 18 weeks, teachers focused their teaching on the students’ goals. End-of-treatment goal mastery was measured by the use of pre- and post-test achievement scores. The outcome of this study demonstrated that there was a link between setting ambitious goals and achievement levels; however, goal mastery was not related.

It was also important to consider why students would want to set goals that they perceived to be difficult or challenging to achieve. It has been proposed that challenging or difficult goals offered the greatest potential for satisfaction or fulfilment at a number of

levels, and when goals were challenging, individuals were more open to seeking and receiving feedback, which then enhanced their probability of attaining the goal (Martin,2006). The next section discusses the difference between proximal (short-term) and distal (long-term) goals and which type of goal research has suggested has being more effective.

Proximal versus Distal Goals

Research by Bandura and others has indicated that there is a direct relationship between cognitive efficacy, academic achievement, and interest in attainment if low-achieving students are taught to set proximal goals for themselves (Bandura & Schunk, 1981; Schunk, 1983). The Schunk (1990) model of self-efficacy and cognitive skill learning was heavily influenced by Bandura's concept of self-efficacy. The specific components of Schunk's model include entry characteristics (e.g., aptitude and prior experience), self-efficacy for learning, task-engagement variables (e.g., goals), and efficacy cues (e.g., willingness to be persuaded to take on learning).

Bandura and Schunk (1981) found that during a subtraction instruction programme, providing children with a proximal goal heightened motivation (rate of problem solving), self-efficacy, and skill acquisition, more than did providing them with a distal or general ("do your best") goal. The distal goal resulted in no benefits compared with the general goal. During a long-division instruction programme, Schunk (1983) showed that giving children specific performance goals, plus comparative information about peers that indicated the goal was attainable, led to higher skill acquisition than did either treatment alone. Goals by themselves enhanced self-efficacy; comparative information promoted motivation.

In a study of the interrelationship of goals in a comparison of the effects of proximal and distal goals on children's self-efficacy and mathematics performance, Bandura and Schunk (1981) concluded that:

Self-motivation can best be created and sustained by attainable sub-goals that lead to future larger ones. Proximal sub-goals provided immediate incentives and guides for performance, whereas distal goals are too far removed in time to effectively mobilise effort or direct what one does in the here and now. (p. 587)

Proximal goals gave more opportunity for knowledge of results because individuals could monitor their performance and make corrections as needed. Bandura and Cervone

(1983) tested this in a study that included 45 male and 45 female undergraduates. The students were asked to perform a strenuous activity with feedback that was divided into goals and performance feedback, goals alone, feedback alone, or without either factor. Their results confirmed that the condition that had the greatest motivational impact was combining performance information and a standard to achieve. Goals in isolation or feedback in isolation did not have an effect in changing motivation. They reported that the greater the self-dissatisfaction in relation to performance, and the stronger the perceived desire was for goal attainment, then there was an intensification of effort as a result. Bandura and Cervone (1983) concluded that distal goals helped keep the larger picture in mind by allowing the student to see what the long-term goal would look like once it had been achieved. However, they also concluded that focusing on the distant future may have led to more procrastination. When a distal goal was set, it needed to be broken up into proximal goals. However, according to these authors, one could not be assured that students would do this. It was important that, when planning long-term projects, students saw the relationship between what they were doing from day to day and how that worked towards the big picture for accomplishment, whereas general goals were vague with a non-specific outcome.

Goal setting affects planning in the sense that individuals usually saw the need to break down distal goals into manageable, concrete, proximal ones (Bandura, 1997; Locke, 1996). When planning, those who aimed to achieve specific proximal goals made specific plans to achieve them. In addition to planning, individuals tended to use strategies learnt from experience or from recent strategy training. In either case, specific goals acted as catalysts for applying a strategy in the particular learning situation (Locke, 1996; Schunk, 2003). Thus, as a cognitive strategy, goal setting might be scaffolded and taught successfully.

Goal setting has been shown to be a motivational tool leading to an extensive amount of research being undertaken in the areas of self-efficacy and self-regulated learning aimed at determining whether or not goal setting increases students' self-perceptions in these areas. The influence of student learning with regards to increases in self-efficacy and self-regulated learning has indeed been associated with students who are involved in goal setting. This is discussed below.

Self-Efficacy and Goal Setting

Self-efficacy again plays an important part in the goal-performance relationship in education. Self-efficacy is a personal judgment about one's ability to perform certain tasks in order to achieve specific outcomes. In education, these outcomes refer to academic performance. Educators have long recognised that there is a direct linkage between the individual academic capabilities that students hold and their motivation to achieve (Bandura, 1977; Zimmerman, 2000). Self-efficacy has been hypothesised to influence choice of activities, effort expenditure, persistence, and achievement (Bandura, 1997; Schunk & Zimmerman, 2001). It has been defined as "people's beliefs about their capabilities to exercise control over their own level of functioning and other events that affect their lives" (Bandura & Cervone, 1983, p. 67). Bandura and Cervone discovered that those students who held high self-efficacy for acquiring new skills worked harder and demonstrated persistence when they encountered difficulties, as compared to those students who have doubted their learning capabilities.

Research has overwhelmingly shown that self-efficacy is vital for the achievement of goals, given that it can predict students' academic motivation and learning (Pajares, 1996; Pintrich & Schunk, 1996). Bandura (1993) also reported that gains in mastery of tasks strengthened efficacy and fostered efficient thinking when compared with the erratic thinking and impaired performance that was displayed by those who were surpassed by others. This efficient thinking resulted in students being able to set and achieve their academic goals due to their increase in focus and motivation to do so.

Feedback about performance that focused on achievements instead of shortfalls reinforced one's belief in one's capabilities. "Learners obtain information to appraise their self-efficacy from their actual performances, experiences, forms of persuasion, and physiological reactions" (Schunk & Zimmerman, 2007). Learners also acquire self-efficacy information through exposure to others. Although adults can teach students skills, it is also evident that students derive the best self-efficacy information from those who are similar to themselves (e.g., peers) (Schunk, 1987). Feedback is also gained from information from others, especially teachers when they tell them "You can do it." Statements such as these can raise students' self-efficacy to engage in activities; however, this will be short-lived if students subsequently attempt the task and perform poorly. Outcome expectation (e.g., making a high grade on a test after studying hard) are

influential because learners engage in activities they believe will lead to positive outcomes (Shell, Murphy, & Bruning, 1989).

According to the research of Wigfield and Eccles (2002), students with high self-efficacy at times will not goal set or complete tasks if they have a perception that performance may not result in positive outcomes. There is a strong connection between the perceived value and behaviour because learners show little interest in activities that they do not value. Likewise students who value a goal and perceive a positive outcome (e.g., playing sport because they see that this will give them social status among their peers) may attempt the activity even if they do not have self-efficacy for performing well (Bandura, 1986).

Students' conceptions of ability also have an effect on self-efficacy. Dweck (1999) proposed that people may hold either an entity belief, that is, that ability is fixed and cannot be changed, or an incremental belief, that is, that ability can improved with effort and learning. This conception of ability is also related to whether students are willing to set goals. Schunk and Zimmerman (2007) discovered that with some exceptions, students who identify with an incremental theory are likely to adopt learning goals and demonstrate motivation and self-regulation in their learning. The opposite view was seen with those students who adopted an entity theory. They were less likely to engage in learning because they did not view that effort or engagement would raise their ability; as a result of this view, their self-efficacy might be lower. Thus, self-efficacy may have had its strongest positive effects on learning with students who adopted the incremental theory of ability.

As has already been discussed, challenging goals are more likely to be achieved than easy goals. Challenging goals also have implications for self-efficacy in that persons with stronger perceived self-efficacy exhibit greater commitment and resilience and set and achieve more challenging goals, and such goals lead to adaptive outcomes, which in turn may sustain or build self-efficacy (Locke, 1996). Goal setting and adaptive self-efficacy combine to strengthen commitment and encourage strategy modification, greater effort, and persistence even when the feedback on goal attainment is negative—that is, the goal has not been attained (Locke, 1996).

Effects of low self-efficacy

Low self-efficacy is usually related to maladaptive outcomes. It is associated with the tendency to visualise failure and focus on the possibility of negative outcomes, which

undermines performance. Low self-efficacy is also associated with the avoidance of difficulty, having low aspirations or a tenuous commitment to academic goals, learning difficulties, rumination of self-doubts, a focus on obstacles when faced with difficulty, and the attribution of failure to factors outside the control of the individual (Bandura, 2000).

When low self-efficacy students are confronted with hindrances or failure, they are prone to reducing their effort and sometimes to disengaging (Bandura, 1993). Low academic self-efficacy is also associated with depression and anxiety over unfulfilled academic goals or continuing incompetence. Research also shows that students with low academic self-efficacy may be drawn towards peers who do not place a high value on academic engagement and achievement (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996). Consequently, these students can be frequently disruptive, off-task, and display unacceptable behaviours that are consistent with non-interest and low academic achievement. Bandura et al. (1996) also argue that when students become morally disengaged (as they do in these circumstances), they are not subject to the self-sanctions that usually curb unacceptable behaviour. As a result, they may go along an undesirable academic path undisturbed.

Low academic self-efficacy also predisposes individuals to focus on themselves and the abilities that they lack rather than the competencies required for the task (Bandura, 1993). Individuals may try to avoid difficult tasks; recover very slowly, if at all, from failure; and show an under-commitment to their goals. They also lost competence because of their tendency to attribute failure to lack of ability (Bandura, 1993).

Schunk (2003) also argued that while low self-efficacy is generally maladaptive, extremely high levels can breed overconfidence, which can have the outcome of underperformance or poor learning outcomes. Schunk contended that some self-doubt may be a positive experience because it can spur on a greater effort or a more strategic approach as learners attempt to increase the likelihood of success. This was also reported by Bandura et al. (1996), who found that the effects of academic self-efficacy were mediated through varying levels of goal-related engagement that were associated with peer relationships. They discovered that students who associated with peers inclined towards academic achievement were positively influenced, set meaningful goals, and were motivated to achieve, while those who connected with non-conforming peers were disinclined to become meaningfully engaged in academic tasks, and as a result were not interested in

setting achievement goals. The area of self-regulated learning has also been extensively researched and this is discussed below with relationship to goal setting.

Self-Regulated Learning

Pintrich and Zusho (2002) defined self-regulated learning as a process whereby learners set their own academic goals then attempted to actively and purposefully regulate, monitor, and work towards achieving these goals through task-related behaviours and contextual factors. Researchers embracing this conceptualisation of self-regulated learning concur that the process occurs according to a four-phase cycle. This cycle comprises forethought, monitoring, control, and reaction and reflection (Pintrich, 2000; Pintrich & Zusho, 2002; Schunk & Zimmerman, 2001; Stone, 2000; Zimmerman, 2001).

Most self-regulated learning models are based on four theoretical assumptions. These assumptions are that self-regulated learners are active, constructive participants in the learning process; they have the potential for control of their cognition, motivation, and behaviour, as well as some aspects of their environment; they hold a specific goal, criterion, or standard against which they check their progress, so they can regulate their task-related behaviour; and use self-regulatory activities as mediators between person and contextual variables and actual achievement or performance (Pintrich & Zusho, 2002). According to Zimmerman (2000), self-regulated learners have three important characteristics: they use a variety of self-regulated strategies (active learning processes that involve agency and purpose); they believe they can perform efficaciously; and they set numerous and varied goals for themselves. Zimmerman (2002) discovered that self-regulated learners also engage in three importance processes: they have an ability to monitor themselves; an ability to make their own judgments in terms of assessing their own performance in relation to others; and they also demonstrate an ability to be able to react according to their performance outcomes.

Self-regulated learners display motivated actions (which are goal-directed), and controlled behaviours that they apply to specific situations (Paris & Paris, 2001). The goals that they set facilitate a high level of achievement. Self-regulated learners also try harder or exert greater mental effort (Pintrich & DeGroot, 1990). What this means is that they are adept at modifying their learning behaviours in response to dynamic situational demands or conditions. Thus, a goal setting strategy is important to the self-regulated learning process because it sets the target on which behaviour can be focused and directed.

The current thinking regarding goal pursuit disputes the notion that there is a direct, uninterrupted path from when goals are set to their accomplishment. Instead, goal pursuit is viewed as a complex path that has set-backs, engagement, and often delays. Gollwitzer (1990) describes this as the Rubicon model. He uses the analogy of two sides of a river which represent commitment. Gollwitzer believes that students begin to “cross the Rubicon” when they transform their motivation into a firm intention. Once this intention has been expressed then action plans and a focus on the best way to implement the goal is developed. On the other side of the river, goal striving then begins. Gollwitzer believes that once the Rubicon is crossed, individuals tend not to cross back to reconsider goals they have set

Although the Rubicon model poses some interesting thoughts, classroom learning is not as linear as this model implies. In school, students pursue multiple goals, not only intending to learn but also seeking positive experiences. Different types of goals interact in complex ways and change over time. Based on studies in mainstream psychology, Boekaerts (1997) and Boekaerts and Niemivirta (2000) proposed a model of self-regulation in which students face two priorities in classroom learning. Firstly, whether students sought to deepen their knowledge that is they had a desire to learn, and secondly an ability to maintain their emotional well-being (i.e., students try to protect their ego). Boekaerts hypothesised that students strive to balance these two priorities, straddling the divide between education and learning goals and emotional well-being. Boekaerts (1999) found that favourable appraisals of tasks and opportunities for learning (e.g., feelings of relevance, interest, and efficacy) lead students to mastery goals and activities, whereas a sense of difficulty, disinterest, or stress leads students to focus on well-being. Boekaerts’ model of classroom self-regulation distinguishes two parallel processes for the purposeful direction of action. These are top-down self-regulation and bottom-up self-regulation.

Top-down self-regulation

Top-down self-regulation is used to explain when students’ adopted learning goals steer the process; in other words, the student is in control of their own goals. The top-down approach is driven by a mastery focus that includes motivation such as personal interest, values, and rewards. Winne (1995) explained that the characteristics described above were indicative of self-regulated learners. Self-regulated learners according to Winne are aware of what they know, they have a grasp of where they want to go, and are able to plan and

engage with the task. They are also able to see the incremental steps and plan an overall strategy as they work towards their chosen goals (Winne, 1995).

Hadwin and Winne (1998) discovered that not all students adopt mastery goals when they first tackle tasks. Some students resent teachers' attempts to make them monitor and reflect on their learning, giving preference to established work habits and learning styles that may be maladaptive (Boekaerts & Minnaert, 2003; Corno, 1994). Others seek friendships and harmony with peers, social goals for example, preferring close collaboration with peers to a work situation in which opinions are criticised and friendships may be compromised. Still others begin work with competitive, performance goals but become oriented toward mastery goals as they work. Cues from the work environment trigger such evidence of cooperation with others and shifting goals (Volet & Lawrence, 1989).

Bottom-up self-regulation

When self-regulation occurs because of cues such as feedback from the task and classroom reward structures, it is known as bottom up. The main difference is that it does not begin with goals that are firmly established but instead it is feedback from the task and classroom reward structures that establish work habits and change. The problem with bottom-up self-regulation is that according to Boekaerts' (1997) model, students become concerned with emotional well-being and instead look for belongingness, self-determination, or safety goals particularly if they feel bored, isolated, or insecure. As a result of these feelings, students will employ different types of coping strategies that may include seeking social support and problem solving, which can be viewed as adaptive or could also be viewed as withholding effort, avoidance, and behavioural distraction; these types of behaviours are viewed as maladaptive (Skinner & Edge, 2002). However, from the students' point of view all these strategies may be adaptive, provided they successfully restore well-being.

Student characteristics have also been explored in relation to the goal setting literature. The following sections will outline goal setting research that has examined student variables in particular student age and gender

Age Differences in the Setting of Goals

Although there have not been any studies to date that measure at what age students are able to identify with goal setting research has demonstrated that students of primary and secondary age do set goals for themselves. From the studies that have been carried out, what is apparent is that the types of goals that students set are very much determined by the school system (e.g., the focus on performance and academic achievement). Studies conducted by Midgley, Aderman, and Hicks (1995) and Roeser, Midgley, and Urdan (1996) found that as students get older and progress through the education system there is a stronger emphasis placed on performance goals, rather than mastery-goal achievement, as the focus becomes one of attaining grades and passing examinations as students transition through secondary school (Anderman, Austin, & Johnson, 2002). This concurs with research that has demonstrated that adolescents perceive a change of classroom goals with an emphasis from mastery to performance as they transit from elementary to secondary school. Interestingly, this perception has also been associated with the attribution of failure to a lack of ability (Ames & Archer, 1988).

Gender Differences in Self-Efficacy, Self-Regulated Learning and Goal Setting

Gender differences in students' academic self-efficacy and in their self-efficacy to employ self-regulatory strategies and goal setting are often reported. For example, boys and girls report equal confidence in their mathematics ability during the primary (elementary) years, but by middle school, boys begin to rate themselves as more efficacious than do girls (Wigfield, Eccles, & Pintrich, 1996). When gender differences in the use of self-regulated learning strategies or in confidence to use these strategies have been reported, they typically favour female students. Zimmerman and Martinez-Pons (1990) interviewed students in Grades 5, 8, and 11 to explore whether gender differences could be detected in their use of self-regulated learning strategies including goal setting. They discovered that girls displayed more goal setting and planning strategies, and they kept records and self-monitored more frequently than did boys. Girls also surpassed boys in their ability to structure their environment for optimal learning so that they could achieve their goals. Pokay and Blumenfeld (1990) investigated the use of self-regulated learning strategies including goal setting by high-school students in geometry and found that, as the semester began, girls reported using more metacognitive, general cognitive, and specific geometry strategies than did boys. Girls also reported stronger effort management. At the end of the semester, girls continued to report stronger general cognitive strategy use.

The research on gender differences has identified that girls and boys have a different goal setting focus towards school, with girls being more mastery- and less performance-oriented than are boys and engaging in less disruptive behaviour in the classroom than do boys. Although some studies have not reported a significant sex difference in endorsement of mastery goals (Patrick, Ryan, & Pintrich, 1999; Ryan & Pintrich, 1997), most studies have found a difference that indicates that girls identify with a learning style that has a greater focus on mastery goals than do boys (Ablard & Lipschultz, 1998; Meece & Holt, 1993; Nolen, 1988). One reason put forward as to the mastery-goal focus that girls appear to have is that research has also shown that boys are more concerned than girls as to how they are perceived by their peers in terms of how smart, relative to others, they appear, and as a result of this they tend to focus on performance goals (Anderman & Midgley, 1997; Roeser et al., 1996; Ryan, Hicks, & Midgley, 1997; Stipek & Gralinski, 1996). Following on from this earlier research, Yailagh, Lloyd, and Walsh (2009) conducted a study to investigate whether there was a relationship between mathematics, self-efficacy beliefs and gender differences with regards to the achievement levels and goal setting of school children. The subjects were 99 seventh grade students. They also discovered that girls adopted heightened mastery over performance goals and engaged in less disruptive classroom behaviour than boys, which they believed fostered enhanced learning strategies. However, the achievement-test scores were much higher for boys in terms of test grades in mathematics. Studies of gender and motivation have reported that females hold lower expectations for success and are less likely to attribute success to ability than males in mathematics (Licht, Stader, & Swenson, 1989). Another factor that may be responsible for gender differences in self-efficacy and in confidence to use self-regulated learning strategies including goal setting, is the tendency of boys and girls to approach things differently. Boys are “self-congratulatory” when reflecting on their work whereas girls tend to be modest in their achievements. Boys are often “over-confident” in assessment of their skills and abilities, which may not be accurate and this results in them expressing an over-confidence in the skills they have (Wigfield et al., 1996).

Gender differences in self-efficacy can be minimised or eliminated if students are given clear performance information and feedback as to their individual progress in learning and their capabilities. Schunk and Lilly (1984) carried out research where middle-school students judged their self-efficacy for learning a novel mathematics task, after which they received instruction and opportunities to practise the task. The feedback was

given through the students checking answers to alternate problems. Their results indicated that initially females judged their self-efficacy at lower levels than males did; however, after receiving instructions and clear feedback, there was not a difference in achievement or self-efficacy. It was, however, feedback that was the most significant determinant in female self-efficacy increase over the males. Giving feedback to the students in relation to their achievement in the mathematics tasks resulted in a difference between males and females, with a higher reported self-efficacy for females as a result of this feedback. It would appear that females needed feedback to reassure them that they were achieving their goals more than males did.

The area of feedback as mentioned above is significant in the setting and achievement of academic goals for students. The next section in this literature review will examine the role of the teacher and the role of the student in the feedback and goal setting process. Factors such as peer influence and potential pitfalls in goal setting will also be discussed.

The Importance of Feedback

Feedback has been attributed by many researchers to enhance and aid in student goal achievement. “Feedback is information with which a learner can confirm, add to, overwrite, tune, or restructure information in memory, whether that information is domain knowledge, meta-cognitive knowledge, beliefs about self and tasks, or cognitive tactics and strategies” (Winne & Butler, 1994, p. 5739). Individuals require feedback that provides information about their progress in relation to their goals. Feedback is a moderator of the goal-performance relationship in that the combination of having a goal and gaining feedback on progress toward the goal is more effective than goals alone in improving performance (Locke & Latham, 2002).

In order for goals to be successfully accomplished, they must be accompanied by effective feedback. According to Sadler (1989) “effective” is defined as meaning “to produce a specified effect” (p. 121) and is seen as an important linchpin between goal achievement and the challenge of the goal set. Sadler also stated that feedback needed to be effective in order to enhance learning; students needed to know how they were progressing. According to Sadler, feedback is information that is conveyed to the student about their work in terms of performance, results, or task completion. Students can use this feedback to increase their effort, particularly when the effort leads them to tackle more challenging tasks or appreciate higher-quality experiences rather than simply completing

“more of the same”. DeNisi and Kluger (1996) stated that “students were more likely to increase effort when the intended goal was clear, when high commitment was secured for it, and when belief in eventual success was high” (p. 260).

Sadler (1989) suggested that three conditions were needed to achieve effective feedback:

The learner has to possess a concept of the standard (or goal) being aimed for, they have to be able to compare the actual or current level of performance with the standard, and they need to engage in appropriate action that leads to the successful attainment of the goal or standard. (p. 121)

Sadler argued that these were not three significant steps that needed to be taken, but rather were three necessary conditions.

These findings are also supported by Clarke (1998, p. 70), who contended that feedback needs to be based on clear learning intentions or success criteria, and it needs to take into account pupil self-evaluation. Feedback also needs to highlight where success has occurred and where improvement could take place. Clarke also argued that feedback must be accessible to the learner and it should give clear strategies for improvement if this is beyond the means of the learner. As Sadler (1989) convincingly argued, the power of feedback is in how it can help close the gap between where a student starts from and the goal they are aiming to achieve.

Locke and Latham (1990) described the relationship between feedback and goals as follows:

Goals inform individuals as to what type or level of performance is to be attained so that they [student] can direct and evaluate their actions and efforts accordingly. Feedback to the student allows them to set reasonable goals, and to track their performance in relation to their goals, so that adjustments in effort, direction and even strategy could be made as needed. (p. 197)

Butler and Winne (1995) also support this view, and provide an excellent summary in their claim that “feedback is information with which a learner can confirm, add to, overwrite, tune or restructure information in memory, whether that information is domain knowledge, meta-cognitive knowledge, beliefs about self and tasks, or cognitive tactics and strategies” (p. 574). Hence, feedback needs to be linked closely to the goal to be achieved.

Bandura (1997) argued that feedback should emphasise progress towards goals not deficiencies, as when feedback emphasised progress, personal capabilities were highlighted. This enhanced self-efficacy and aspirations. In contrast, feedback that emphasised deficiencies undermined the self-regulatory processes. Locke and Latham (1990) reviewed more than 30 studies and confirmed that feedback moderated the goal setting–performance relationship. Students needed to know how well they were performing to gauge what was left to achieve. Feedback seems to have its most positive effect when one’s performance is still short of goal attainment coupled with one’s dissatisfaction with that state of affairs (Locke & Latham, 1990). There is a large corpus of studies that have provided strong support for Locke and Latham’s (1990) proposition that specific goals combined with feedback improve performance (Bandura, 1977; Gaa & Schunk, 1981; Latham & Yukl, 1975; Locke, 1969; Locke et al., 1981; Schunk, 1983).

Teacher Feedback to Students

Airasian (1997) has studied the effect of feedback characteristics and has looked at such factors as immediacy, data form, and types of reward on the retention of learned material. He found that teachers tended to focus their feedback on information about the task and how well the task was being accomplished or performed, such as the student distinguishing correct from incorrect information, acquiring more information, and building more surface knowledge. This type of feedback was most common and was often termed corrective feedback or knowledge of results, and could relate to correctness, neatness, or behaviour, or to some other criterion related to task accomplishment. About 90% of teacher questions (sometimes written, but typically verbal) in classrooms were aimed at this information level. Clarke et al. (2003) in their studies, also supported these findings by commenting that feedback was largely unrelated to achieving success or in providing critical steps to take towards the goal.

Hattie and Timperley (2007) also suggested that the most effective forms of feedback related feedback to learning goals. Feedback was the mechanism by which students were able to monitor where they were in relation to their goals and enabled students to correct or readjust the strategies that they were using. In addition, Crooks (1988) found that for assessment to improve learning, the feedback given to students in class needed to be specific, constructive, and frequent. Feedback also needed to relate to individual student’s goals and not serve only social or classroom management purposes

(Black & Wiliam, 1998). To be effective, feedback needed to provide useful advice on exactly how the student could improve. This facilitated the achievement of learning goals.

A further factor is the student's perception of the accuracy of the feedback. Accepting that feedback is accurate can increase the attention and the focus on how to use the information to improve performance. Feedback perceived as inaccurate can distract the student from the power and value of the feedback presented (Brett & Atwater, 2001; Leung, Su, & Morris, 2001; Robertson & Stewart, 2006). Feedback will also not be effective if the goal is poorly defined as this will not allow students to see the gap between their current learning, what they need to achieve and the next steps they need to take (Earley, Northcroft, Lee, & Lituchy, 1990; Erez, 1977; Frost & Mahoney, 1976). When feedback is used effectively it can become a motivational tool for students assisting them to achieve their goals.

Goal Setting as a Motivational Tool

Ames (1992) defined student motivation as goal-directed behaviour that involved different ways of thinking and that was elicited under various internal and external conditions. Ames argued that motivational goals provided the mechanism for filtering perceptions and other cognitive processes.

Zimmerman and Risemberg (1997) identified six components of academic self-management. These components were: motivation, methods of learning, use of time, physical environment, social environment, and performance. In their study, the focus was on examining how students used goal setting as a motivational tool in the process of self-regulated learning. Zimmerman and Risemberg asked students to state the grade they expected to achieve in their work. The researchers conducted focus group discussions that examined why students put a specific grade as the one they expected, the barriers the students encountered in their goal setting, and whether goal setting was an effective motivational tool for the students in the study. A total of 182 sets of questionnaires were completed by students, and 79% of students agreed that goal setting helped them to achieve a better result in the course. The results also indicated that there was a positive relationship between the overall and the expected grade. Those students who expected a higher grade tended to score a higher grade in the overall assessment. When some students who did not set goals for their study were asked why not, participants provided a number of reasons. Some did not set goals because they perceived that goal setting had little effect

on their academic performance. Others did not set goals because they lacked the experience of setting goals.

Zimmerman and Risemberg's (1997) results have a number of implications for teachers. For example, teachers could enhance students' motivation by showing them how goal setting can improve academic performance and support self-regulated learning. Teachers could help students by teaching them goal setting techniques.

Hattie (2009) argued that:

In order for students to be able to demonstrate self-assessment, self-evaluation, self-monitoring and self-learning they have to have a reasonable understanding of where they are at, where they are going, what it will look like when they get there, and where they will go to next: that is, they have clear goals, learning intentions, and success criteria. (p. 165)

Martin (2006), in his motivation research, theorised that an effective method to assist students to set "task-specific and situation-specific goals was to use the notion of 'personal bests' (PBs). PBs hold implications for motivation and achievement in terms of their facilitating effects for self-efficacy, persistence, educational participation, enjoyment of school, and task interest and engagement" (p. 804).

Martin's research of personal bests differs from the term discussed earlier which is "do your best". Do your best goals are vague in that they are related to ambiguity. This ambiguity allows students to justify to themselves that they have tried hard enough without having to specifically evaluate what went wrong or why they had not achieved the goal. It is an "all" or "nothing" approach and is largely subjective (Locke & Latham, 1990). Martin's personal best goals, however, require the student to set specific goals that contain clear information and serve as a specific focus for behaviour, for seeking and receiving feedback and also serve as a measure by which to evaluate performance.

Martin (2006) proposed that personal bests were the "result of students' various levels of goal setting and that there existed particular goal-related profiles that were more likely to evince PBs than others" (p. 804). His study, which was based on a multidimensional model, focused on the point that students were most likely to attain personal bests on tasks or goals that were specific, challenging, competitively self-referenced, and based on self-improvement. This particular study used data from 1,016 students from five Australian high schools using data from Years 7 to 12 students. Martin

also found that students who were involved with setting personal bests had high positive relationships with educational aspirations, enjoyment of school, participation in class, and persistence on the task. Personal bests take the best features of mastery and performance goals, as personal bests “primarily reflect a mastery orientation because it is self-referenced and self-improvement based and yet holds a slice of performance orientation because the student competes with his or her own previous performance” (Martin, 2006, p. 816).

Setting the Learning Intention Goals with Students

In recent times, teachers have been introduced to setting goals with students by getting them to focus on the purpose and objectives of the lesson or study. These are known as the learning intentions or as goal setting. However, learning intentions differ from personalised goal setting in that learning intentions are usually developed by the teacher as a set of learning criteria for the class or group of students rather than individual students setting their own individual goals. According to Hattie (2009):

Learning intentions describe what is it we want students to learn in terms of the skills, knowledge, attitudes, and values within any particular unit or lesson.

Learning intentions should be clear, and provide guidance to the teacher about what to teach, help learners be aware of what they should learn from the lesson, and form the basis for assessing what the students have learnt and/or assessing what the teachers have taught well to each student. (pp. 162–163)

Building on Ames’ (1992) studies of mastery goals, Hattie (2009) went on to state that an important aspect of learning intentions was “knowing how they will be implemented. Learning intentions take the form ‘I intend to reach x’ and by articulating how they intend to reach ‘x’, teachers and students are expressing an ‘implementation intention’” (p. 163). Gollwitzer and Sheeran’s (2006) research tested the notion that “implementation should enhance people’s ability to initiate, maintain, disengage from, and undertake further goal pursuit and thereby increase the likelihood that strong goal intentions are realised successfully” (p. 20). It would appear that the setting of goals has to be appropriately challenging and there has to be a commitment to attaining the goals, as well as knowing the strategies needed to ensure the goals will be attained.

Clarke et al. (2003) argued that specifying the learning intention first helped to highlight the degree of challenge in a goal, particularly when the success factors were

identified. According to Clarke et al., success factors allowed students to know when they had reached the goal or how far away they were from the goal. Clarke et al., however, criticised teachers for the type of feedback that was given as it was often not on the main criteria of the task. For example, if the task was to retell a story with accuracy, then the feedback should be on the criteria related to a successful retell not on presentation, spelling, or how much was written in terms of quantity. Clarke et al. stress the importance of goals that not only have appropriate challenge but must also have a clearer understanding of the criteria if success is to be understood and achieved.

Hattie (2009) described feedback as an important correlate of student achievement, but advised caution about the type of feedback given because he was referring to a specific type of feedback when he referred to its impact on student achievement. He contends that it is the feedback to teachers about what students can and cannot do that provides the most powerful link to student achievement. Feedback is also required for teachers to see where they are in terms of the goals they have for their students, allowing teaching to address any misconceptions they have about what students have or have not learned. Feedback from assessment tests should be used to discern students' learning needs and to adapt teaching practice accordingly. This type of feedback is just as important as the feedback to students themselves (Hattie, 2009), particularly as it may help to address any erroneous expectations that teachers may have made about their students. Indeed, the expectations that teachers have for their students relate directly to the goal setting and the opportunity to learn that they provide (Rubie-Davies, Hattie, & Hamilton, 2006).

Goals and Teacher Expectations

Another important aspect to consider in the success of goal and student achievement is related to teacher expectations. Good and Brophy (2000) and Timperley and Phillips (2003) suggested that teachers' beliefs about students' expected achievement became their goals for the students. Teacher expectations is a significant factor as research does confirm that expectations that are not appropriate in terms of goals that teachers set for their students will affect their teaching and subsequently the achievement of their students. This is important especially if the teachers' have low expectations of their students. Then the outcome of this could be that they do not plan their teaching instruction at the correct level which could affect not only their planning but the instructional level that they are teaching at. Research has demonstrated that teachers expectations of their students can have an effect not only on academic achievement but also the classroom

climate and student behaviour (Darley & Fazio, 1980; Rosenthal, 1974, 1991). Good and Brophy (2000) suggested that teachers' expectations can be a self-fulfilling prophecy for student achievement. Research in New Zealand indicates that there are problems around some teacher expectations because some teachers in New Zealand may have inappropriately low expectations of some students with some expectations being "nearer the floor than the ceiling" (Rubie-Davies, 2003, p. 37). Teacher beliefs affect teacher actions in the classroom such as task selection and interactions with students, as well as feedback. When teacher expectations of students are low, teachers are likely to provide non-challenging tasks and teach less to students rather than more (Delphit, 1995). These expectations are not explicitly shared with individual students. Rather, they are more subtly enacted through teacher behaviours. However, teachers are not the only influence within the classroom; peer influence also contributes to individual student's academic achievement and fulfilment of learning goals.

Peer Influence

Students have been known to evaluate their own performance by comparing it to that of their peers. A peer network can influence the academic self-efficacy of its members through motivational socialisation. Motivational socialisation is a process whereby individuals adapt to the high- or low-motivation orientation of their peer group. High-motivation groups promote adaptive self-efficacy while low-motivation groups have a deleterious effect on it (Schunk & Pajares, 2002). There are three major forms of benchmarks that can define the goals: goals relating to comparative indicators (e.g., comparing to other students), to criteria (e.g., to some standard), and efficiency (compared to what can be completed in the time or with the resources available). A series of studies conducted by Carroll, Houghton, Durkin, and Hattie (2001) compared and examined the goal orientation of delinquent and at-risk adolescents (defined as students who exhibited anti-social behaviour) with adolescents who were not at risk. These studies developed a hierarchical model of goals whereby it was shown that at-risk adolescents lived by a specific set of goals related to a social and academic image. The level of importance that adolescents attached to various types of goals in some way assisted them in attaining a particular reputation. Carroll et al. (2001) demonstrated that individuals used conscious goals to regulate their human actions and performance levels and that reputations were different from goals, in that reputations could be conceived of as goals with commitment. Therefore, the greater the degree of commitment to these goals, the more challenging the

choice of goals, which in turn fed the reputation of the at-risk adolescents. While delinquents had often been depicted as goal-less, the studies conducted by Carroll et al. (2001) concluded that this was, in fact, not the case. What they did discover was that these particular groups of adolescents engaged in active goal setting because the greater the goal they set for themselves and achieved the stronger it enhanced their reputation among their peer group and their status within the group.

There are, however, potential difficulties that can arise with goal setting and these are outlined below. Although they largely relate to adults in work situations they can equally be applied to students in school settings.

Potential Pitfalls in Goal Setting

Locke and Latham (1990) have readily acknowledged that there are limitations to goal setting. Aspects of the limitations of goals and goal setting have been described with respect to the mediators and moderators of goal setting. According to Latham and Locke (2007), the mediators of goal setting are goal choice, effort, persistence, and the strategy used to achieve the goal. A mediator accounts for the relationship between performance and as such can affect the actual attainment of the goal. Moderators, on the other hand, influence the strength of the relationship between goals and performance. For example, the moderators of goal setting could include ability, commitment to the goal, feedback in relation to the goal, complexity of the task, and external influences that affect the situation in which an individual is operating, such as the provision of external resources. Locke and Latham (2006) discuss a number of potential pitfalls that can occur with goal setting and these will be outlined below. They believe that these pitfalls located within the work setting can be avoided if they are identified and understood. These common problems that can occur as a result of goal setting are outlined below in Table 5, which is a summary and adaptation taken from the ideas of Latham and Locke (2006).

Table 5
Goal Setting: Common Problems and How to Overcome Them

Problem	Strategy
<ul style="list-style-type: none"> • People lack the skills and knowledge to achieve the goal 	<ul style="list-style-type: none"> • Set relevant learning rather than performance goals
<ul style="list-style-type: none"> • Individuals' goals may be in conflict with each other 	<ul style="list-style-type: none"> • Set team or superordinate goals
<ul style="list-style-type: none"> • Failure to achieve goals is seen as a risk 	<ul style="list-style-type: none"> • Encourage and reward learning from mistakes
<ul style="list-style-type: none"> • Successful goal attainment can reinforce old strategies that are inappropriate in a changing environment 	<ul style="list-style-type: none"> • Invite robust critique of goals and strategies for reaching them
<ul style="list-style-type: none"> • Accountability for goal attainment can produce biased and inaccurate reporting 	<ul style="list-style-type: none"> • Check validity of a small sample of reports
<ul style="list-style-type: none"> • Important outcomes that are not set as goals may be ignored 	<ul style="list-style-type: none"> • Leaders model an ethical culture and show no tolerance for deviations • Set more inclusive goals • Set goals for all critical outcomes • Inquire into goal inter-relationships

Locke and Latham (2006) found that the first pitfall occurred when individuals were set performance goals but they did not have the knowledge or skills to attain the goals set for them. They may well give maximum effort and persistence; however, without the key ingredient of knowledge, they did not have a realistic chance of attaining their goals. According to Locke and Latham, a vital component is individual knowledge. If that knowledge is lacking then those involved in setting goals need to be assigned specific learning goals that will lead to discovering specific ways to master the tasks. Once they begin to master the tasks, this can often lead to high performance levels and achievement.

Another pitfall that Locke and Latham (2006) discussed is how a performance goal can have a detrimental effect on a group's performance if there is conflict, especially if the performance is related to being competitive with each other rather than working together. Locke and Latham stressed that an individual can pursue his or her own goals and have collaboration.

Goals may be presented as cooperatively or competitively related, or as unrelated (independent). Cooperation is likely to occur if two or more people view the attainment of their respective goals as interrelated, that is, as you reach your goals, I will attain mine. (p. 334)

Locke and Latham (2006) stated that creating a shared vision or a "superordinate" goal helped to unite people by creating a climate of cooperative interdependence.

Another area of goal setting that has the potential to cause problems is that, at times, goal setting can be viewed as a threat rather than a challenge, particularly if people feel threatened by the failure of not meeting the goals. The threat of failure to meet goals may mean some people are less willing to take a risk.

Whether or not goals are attained is a key factor in a person's satisfaction with their strategic decision making. It is the success of past goals that leads to the formation of future goal direction. Locke and Latham (2006) comment that sometimes goals can lead to a narrow focus and non-goal areas can sometimes be ignored as the focus becomes only on achieving what has been specifically set. It is important that feedback and discussion forms an integral component in this so that goals and people are adaptable. This includes re-planning of goals set and re-looking at performance dimensions.

Locke and Latham (2006) summarise goal setting as follows:

Goals regulate the direction of action by focusing attention on goal-relevant behaviour. Goals affect the intensity of our actions and our concomitant emotions, dependent upon the importance of the goal to us. The more difficult a valued goal, the more intense our effort to attain it, and the more success we experience following attainment. A valued goal affects our persistence. Committed people don't quit until the goal is attained. Goals encourage people to search for task relevant knowledge. Finally, goal effectiveness is based on context factors; thus goals have potential drawbacks. With sufficient foresight, however, these potential problems can be overcome or prevented. (pp. 337–338)

Conclusions

A review of the literature has drawn together several pertinent issues relevant to goal setting and academic achievement. These included that, while on the one hand there is much research supporting the importance of goals (especially mastery goals), there is, on the other hand, very little research determining how students set these goals in academic studies. Although Locke and Latham (1996) have provided a compelling set of critical elements, most of Locke and Latham's work has been in the fields of psychology and management. There is less research evidence on the critical elements of goals in enhancing academic performance within the school setting.

The literature review has demonstrated that goals and goal setting play a central role in self-regulation, influencing learning and motivation, and that goals are integral

components of motivation and learning. When students make a commitment to attain a goal, they are likely to engage in self-evaluation of their progress which raises their self-efficacy and sustains motivation.

Goals by themselves, however, do not enhance learning and motivation. Other factors as discussed in the literature review of them being challenging, specific, and being comprised of distal and proximal goals, are also contributing factors in whether or not goals can be achieved. Locke and Latham (1990), in their explanation of distal and proximal explained them as follows:

Goals that incorporated specific performance standards were more likely to enhance learning and activate self-evaluative reactions than were such general goals as “do your best”. Specific goals also promoted efficacy because it was relatively easy to evaluate progress towards an explicit goal. Further, goals could be distinguished by how far they extended into the future. Compared with temporary distal goals, proximal short-term goals were closer at hand, were achieved more quickly, and resulted in greater motivation and higher efficacy. Proximal goals (e.g., those that could be achieved in a few minutes) were especially influential with young children who could not fully represent distant outcomes in thought (pp. 120–121).

Dembo (2000) stated that although goals provided direction, they did not guarantee successful performance. It was not sufficient to just have a goal; goals needed to be accompanied by effective study strategies and plans. The use of individual goal setting accompanied with appropriate feedback and teacher support was crucial in building effective motivational approaches and self-regulatory learning strategies in enhanced academic success. Indeed, students who set goals and developed plans to achieve them took responsibility for their own learning.

O’Connell (1991a) advocated that schools should assist children in developing goals for themselves. O’Connell advised us that the school could be the only source of goal development for some children. From the literature reviewed, it would appear that this is an area that many schools have yet to embark on and that the goal setting that is carried out tends to be a shared learning intention that is set by the teacher and shared with the students. Many students do not appear to be actively involved in goal setting nor do schools understand the vital role that goal setting can have in academic achievement.

Hence, the current thesis was designed to investigate the role of academic goal setting among students aged 10–12 years. The thesis employed three studies, each of which addressed the following respective three questions: Do students aged 10–12 years recognise and set goals independently? Is it possible that by implementing a shared goal setting strategy with a mastery focus between the students and their teachers, that student achievement levels in mathematics would increase? What influence does student attention and motivation play in goal setting and does this have an effect on goal setting behaviours?

Chapter 3:

Study 1: Exploring the Types, Reasons, and Roles of Others in Students' Personal Goal Setting

This study seeks to examine the types of goals students set and associated goal setting behaviour and influences. In relation to areas in which goals are set and the reasons for setting goals, there is a particular focus on the impact of student age and gender. First, focus is given to the areas in which students perceive their goals as being achievable, and reasons why students believe that it is important to set these goals. Specifically, the types of environments that students set goals in will be assessed, for example, in the classroom, on the sports field, and within the social context. In addition to this, the reasons why students are motivated to set goals are identified, especially in relation to what they want to achieve as a tangible outcome of goal setting.

The second focus of this study relates to the significant relationships that students have in their lives, and the roles that these people have in the sharing and setting of goals. Within this context, the sharing of goals is referred to as the actual person with whom a student chooses to share the personal goals that they have listed. Additionally, emphasis is given to those who provide the main source of encouragement to students' goal setting behaviour, and further, those who teach students how to set goals. For example, research has proven that within the academic environment the teacher is seen as being an important element and has significant influence in the goal setting process, and the expectations that they have for their students (Good & Brophy, 2000; Rubie-Davies, 2003; Timperley & Phillips, 2003). Less focus, however, has been the impact of the other significant people that students have in their lives and any influence they may have on student goal setting.

Finally, from the goals recorded by students, this study sought to assess the degree to which these goals relate to performance-based outcomes in comparison to goals with an inherent mastery focus. For example, Anderman, Austin, and Johnson (2002) found that given schools' tendencies to place a greater emphasis on grades as students' progress through education, this translated into students having a predominant focus on performance based achievement. This finding strengthens previous studies (e.g., Ames & Archer, 1988; Weiner, 1985) that have demonstrated that adolescents perceive a change of classroom goal stresses from a mastery to a performance emphasis, as they transit from elementary to secondary school. Given that the cohort sampled (10–12 years) are close to transitioning

from elementary to intermediate/secondary level education, it is proposed that this is a particularly interesting cohort from whom to assess goal and goal setting behaviour. However, to date there has not been research that has specifically investigated the degree to which primary students, on the verge of making this transition, are already engaged in setting goals that are inherently performance based.

Given the areas of focus outlined above, the following research questions are posited for this study:

- In what areas do students set their goals, and do these areas differ by gender and age?
- Why do students perceive it to be important to set goals, and do these reasons differ by gender and age?
- Do students focus their goal setting predominantly on performance-based goals?
- Who are the people perceived to be teaching goal setting?
- Who are the people perceived to be providing the most encouragement towards goal setting?

Method

Participants

Participants were 101 students (46 males, 55 females) from three primary schools in Auckland, New Zealand. Students ranged in age from 10 to 12 years ($M = 11$; $SD = 0.78$) from primary and intermediate schools and in Years 5–8. Two classes in each school were used, with a total of six teachers involved in assisting the researcher with the administration of the questionnaire. Schools included in the research were one contributing school (Years 0–6), one state integrated, and one full primary school (Years 0–8). Contributing schools are those primary schools that only have students from Years 0–6. State integrated are those schools that are funded by the government but retain their special character (e.g., Catholic schools) and full primary schools are those schools that have students from Years 0–8.

In New Zealand, the Ministry of Education uses decile ratings as a measure of socioeconomic status to assign schools into bands of communities with similar characteristics. These deciles are calculated from national census information relating to

household income, parents' occupations and educational qualifications, household crowding, and recipients of government income support. Decile 1 schools are the 10% of schools with the highest proportion of students from low socioeconomic communities, whereas decile 10 schools are the 10% of schools with the highest proportion of students from high socioeconomic communities. The three schools in this sample were classified as decile 8, 9, and 10.

The principals from the schools that participated in the study were members of the Auckland Primary Principals' Association, and as such, were listed in the directory of that organisation. Given that 100% of all primary schools are members, the directory was used as a representative sampling frame from which simple random sampling could be conducted. From this method, 10 schools were randomly selected, one from each decile. Each school was initially approached by the researcher making personal contact with the principal of the school to further outline the research project, explain involvement required of school personnel, and to answer any questions related to the study. The experience of the researcher, both as a teacher and school leader, assisted in the presentation of the research. Specifically, the researcher designed the requirements of the research based on the researcher's understanding of school systems, so as to ensure minimal intrusion to the school's functioning. Three of the 10 schools agreed to participate in the research after receiving an information pack including introductory information, an information sheet, and informed consent forms for the Board of Trustees, the principal, and the participating teachers who had students from the ages of 10 to 12 years. The researcher then met with six teachers (two from each school) to discuss the logistics of data collection, how the survey was to be administered, and the survey content. Further, advice was given in regards to how to manage the students who were not taking part in the survey.

Unfortunately, given the low response to the initial invitation to take part in the research, this sample was overrepresented by schools of higher deciles since the schools were 8, 9, and 10 respectively. Given various logistical constraints surrounding this study, it was not possible to conduct another random sample, targeting the lower and medium decile stratas. As such, the resulting sample was one of opportunity rather than based on random selection. The seven schools that declined involvement cited issues such as, pre-existing workload, time pressures, and involvement in other research projects as reasons for not participating.

Scale Development

Instrument

Student participants completed the 34-item Goals and Goal Setting Questionnaire (GG-SQ—see Appendix A) which consisted of the five constructs examined in this study. Three sections of the questionnaire focused on the interaction that students have with other people in relation to who taught the students to set goals (8 items), how often goals were encouraged (8 items), and with whom students shared their goals and achievements (8 items). In addition, students responded to two sections investigating the types of achievable goals that were set (5 items), and the reasons why it was important to set goals (4 items). Table 6 presents the items and initial constructs in the questionnaire.

Table 6
Constructs and Items in Goals and Goal Setting Questionnaire (N=33 Fixed-choice Items)

Construct	Predicate question	Item No.	Item stem
Types of Goals	1. In which areas do you set achievable goals?	1	Classroom
		2	Sports field
		3	At home
		4	Social
		5	Other
Reasons for Goals	2. Why is it important to you to set goals?	6	To achieve better results
		7	To help try harder
		8	To help achieve something new
		9	To create a challenge
Goal Encouragement	3. How often does each of the following people encourage you to set goals?	10	Teachers
		11	Parents
		12	Caregivers
		13	Grandparents
		14	Brothers/sisters
		15	Whanau
		16	Coaches
		17	Others
Teachers of Goals	4. Out of the following people who teaches you to set goals?	18	Teachers
		19	Parents
		20	Caregivers
		21	Grandparents
		22	Brothers/sisters

Construct	Predicate question	Item No.	Item stem
		23	Whanau
		24	Coaches
		25	Others
Sharing of Goals	5. From the following list who have you shared your goals with?	26	Teachers
		27	Parents
		28	Caregivers
		29	Grandparents
		30	Brothers/sisters
		31	Whanau
		32	Coaches
		33	Others

Note. Maori, the indigenous peoples of New Zealand, use the term ‘whanau’ to describe ‘family’.

The final item in the measure (Item 34) was open-ended in inviting students to write down their own specific goals, and to indicate from the ones they listed which had been achieved. This item was included in the GG-SQ so as to evaluate the types of goals that students had undertaken and normally undertook. Specifically, from the goals listed, the researcher categorised these as representing either performance- or mastery-based goals.

Although the GG-SQ is a measure developed specifically for this study, its development was guided by the findings of Dembo (2000) and O’Connell (1991a), who both advocated students’ capability in setting their own achievable goals, and the importance of others in their goal setting success. Further, the underpinning theory and structure of the Patterns of Adaptive Learning Scales (PALS) (Midgley et al., 2000) guided the wording and areas of focus for the GG-SQ items. For example, many of the PALS student surveys are directed towards the perceptions of significant others in students’ lives (e.g., Perceptions of Parents, Home Life, and Culture; Perceptions of Teachers’ Goals; Personal Achievement Goal Orientations). The GG-SQ was designed so that these significant relationships were built into the measure as part of the fixed-response options. Thus, the three sections in the measure: share, encourage, and teach, were cross-tabulated with eight potential sources of the interaction: teacher, parent, caregiver, grandparents, brothers/sisters, whanau, coach, and other (e.g. peers, other relatives, adults not related to the family). These closed-ended items were rated based on a 4-point Likert scale (1 = “never”, 2 = “sometimes”, 3 = “often”, 4 = “always”). Each of the GG-SQ’s five sections began with a predicate question (see Table 6, 1–5). This design was used to clearly

separate the predicate item stem from the complexity of the cross-tabulated design that followed. In addition, the GG-SQ asked two demographic questions, the gender and the age of the student.

Goal and goal setting questionnaire pilot

The two schools selected for the pilot testing of the questionnaire were selected by the researcher as they had a high degree of similarity to those schools that were to be used in the main study in respect to participants and geographical area. Four teachers and a selection of students from two of the participating schools participated in focus groups aimed at providing feedback on the item meaning, structure, and comprehensibility. The latter was particularly important as many of the items taken from scales were aimed at an adult population, and thus, re-wording of these items was required so as to be appropriate for the 10–12-year-old age group. In addition, the structure and interpretability of the response categories adopted in the questionnaire were also assessed.

The items were selected and were modified so that they could be understood and were interspersed with child-friendly illustrations appealing to this particular age group. In the pilot questionnaire students were given several options of different definitions and as a result the definition that was most widely chosen by the students was the definition taken from the Oxford Junior Dictionary, which was:

<i>Goals are: Something that you want to achieve (Dignen, 2009)</i>

Based on focus group feedback, the items and questionnaire was modified. For example, the wording for some items was not deemed as being child-friendly, for example the question “What is significant about goal setting for you?” was changed to “Why is it important to you to set goals?” as was indicated by students seeking further clarification about what the statement was asking. The proposed final questionnaire was re-piloted with another group of teachers and students. This process was added so that feedback on the changes could be established, and to act as a final check for any ambiguities or readability issues that still may have existed. Based on the feedback from this second round of piloting, there were no further modifications to the GG-SQ. It is postulated that the two-stage piloting procedures conducted as part of the questionnaire’s construction assisted in establishing aspects relating to the construct validity of the final questionnaire. Specifically, the procedure was invaluable in gathering validity-supporting evidence relating to questionnaire content, construction of response options, and the internal

structure of the measure. Although face validity is not generally considered to be a legitimate, or at least a technical form of validity analysis, it is important as part of testing the appropriateness and relevance of the test and items that this information is gathered from the participant's perspective (Messick, 1989).

Procedure

The class teachers participating in this research assisted with distribution and collection of questionnaires. Reliability was strengthened, and potential sources of systematic measurement error decreased, by ensuring that in each of the three schools the survey was administered at the same time and on the same day. This ensured not only consistency relating to the administration of the GG-SQ, but also assisted in avoiding contamination from students sharing responses with peers in other classes.

Prior to the teachers undertaking the survey with their classes, the researcher ensured that each teacher was familiar with what was expected, before leaving them to complete the survey. No teachers reported any difficulties. As confidentiality of the data and anonymity had been assured, there was no information in the questionnaire that could identify a participant.

Administration

The students' teachers, who administered the questionnaire in a 30-minute period, were briefed about the structure, purpose, and administration of the goal setting questionnaire before giving it to the students. In particular, teachers were instructed not to interpret any of the questions, but they were allowed to explain terms, or answer any questions that the students may have had. They were also to instruct students to omit any item they did not understand, thus reducing measurement error introduced by aberrant item responses and teacher bias through leading suggestions towards the answers. The questionnaire was handed out to each child who had completed and returned the signed consent forms from their parents. The students participating were informed that the questionnaire was anonymous and that they were not to put their name on the paper. The students were also informed that they did not have to answer all of the questions and that when they had completed the questionnaire they were instructed to fold it in half and place it in a box. Students were advised that their participation was completely voluntary and that they were under no obligation to submit a questionnaire. Those students who had not

returned signed consent forms were instructed to read or complete work quietly while the survey was being completed in the classroom.

Ethical Considerations

Approval for the study was granted by the University of Auckland Human Participants Ethics Committee (Ref 2008/411) hence ensuring that the research complied with the committee's code of ethics pertaining to the conduct of research involving human participants.

The key ethical principles that underpinned this research were voluntary participation, informed consent, confidentiality of the data, and anonymity. Participants were informed that participation in the research was voluntary and they had a right to withdraw from the study before submitting the questionnaire within a specified time. Informed consent was obtained by providing schools and parents with an information sheet that explained the purpose of the research and the nature of involvement. Teachers gave students information to take home to their parents to obtain signed consent. Students were given assent forms to sign. Consent forms were collected from all principals, teachers, and parents and assent form from students. All the consent and assent forms will be held for a period of 6 years before being securely destroyed. Because the questionnaires were anonymous, the students were informed that completing the questionnaire would be deemed to be consent and that once questionnaires had been submitted that data could not be withdrawn as the researcher had no way of identifying individual questionnaires. Participants were assured of anonymity and this was achieved by assigning a generic identifier to all data.

Results

Data analyses

Analyses were conducted to assess the characteristics of the GG-SQ such as the means, standard deviations, and internal consistency estimates for the five categories. Exploratory factor analysis (EFA) was used to investigate the number of relationships among the interval-level variables. Statistical analyses surrounding the responses to the GG-SQ involved conducting descriptive and frequency analyses on the categories that students used to set goals. To examine the means and differences between the two demographic variables collected, age and gender, the inferential techniques of independent *t* tests and Analysis of Variance (ANOVA) were employed. To determine the specifics

surrounding which groups differ from each other, and based on tests of homogeneity of variances, either Tukey HSD (equal variances) or Games-Howell (unequal variances) post hoc multiple comparisons tests were applied.

Structural Equation Modelling (SEM) was used to show the relationship between the various sources of goals, the specific areas of these goals, and the reasons given as to why goal setting was important. On the basis of Hoyle and Panter's (1995) recommendation, both absolute and incremental goodness-of-fit indexes were used to assess the fit of the hypothesised model. The absolute fit index was represented by the chi-square statistics; however, it is noted that this statistic is sensitive to sample size, affected by the size of the correlations in the model (i.e., the larger the correlations the poorer the fit), and vulnerable to Type I errors when variables have non-normal distributions, especially kurtosis (Marsh, Balla, & McDonald, 1988). As argued by Byrne (2001), regardless of how good a postulated model might be, typically the hypothesised model is falsely rejected given one or more of the data characteristics listed above. A preferred measure of fit is the Tucker-Lewis index (1973) and the root-mean-square error of approximation (Steiger & Lind, 1980) that is similarly based on the χ^2/df , but does not carry the issues associated with the Tucker-Lewis index (such as being inappropriately affected by sample size). The incremental goodness-of-fit indexes used were the comparative fit index (CFI) (Bentler, 1992), the TLI, and the RMSEA. Both the CFI and the TLI have coefficient values ranging from 0 to 1.00, with values of .90 and higher traditionally being viewed as representing good fit (Bentler, 1992). However, Hu and Bentler (1999) argued that this criteria may require re-specifying, suggesting that a coefficient of .95 is a more accurate demonstration of good fit. Although there is conjecture around suggested fit values for the RMSEA, generally there is mediocre fit where values fall between .08 and .10 and reasonable fit where values are below .08 (Browne & Cudeck, 1993; Byrne, 2001; MacCallum, Browne, & Sugawara, 1996). Hu and Bentler (1999) suggested that an RMSEA less than or equal to .06 indicates good model fit.

All analyses were performed using SPSS 19, and for the structural equation modelling, AMOS version 18.0 (Arbuckle, 2006).

Missing data

Across the four categories in the GG-SQ, an average of 5% of item response data were missing for each of the categories represented in the GG-SQ. Specifically, the averages for within-category missing data were: 3.76% for goal encouragement, 6.07% for teachers of goals and sharing of goals, and 2.67% for reasons for goals. As the decision of how to handle missing data lies in establishing the mechanism and data patterns, missing value analyses was conducted. As the cases with missing patterns matrix indicated that while there was no obvious systematic pattern to the missing data, conditions for complete randomness (i.e., missing completely at random: MCAR) could not be assumed. Instead, Little and Rubin's (2002) definition of missing at random (MAR), was a more appropriate classification for this data. MAR exists when, given two variables, say A and B, the probability of the response depends on A but not on B (Allison, 2001). For example, if the likelihood that a student will provide his or her reasons for having goals varied according to that student's reasons, but not their gender or age, then the missing data is most reasonably classified as MAR. The most common method for handling such data is to adopt an ad hoc listwise deletion approach (Howell, 2007). This approach was used in this study. This meant that where missing data existed on any one of the variables used, the entire case was removed from further analysis. While this approach can be problematic where it results in a large proportion of the sample's cases being removed, there was only a small reduction in overall case size (see Table 7), with the greatest reduction being 15% of cases from the sharing of goals category.

Further, beyond the handling of missing data, a listwise method was used for assessing the internal consistency of the GG-SQ.

Descriptive Analysis

Table 7 shows the means, standard deviations, and estimates of reliability for the four interval-based categories. In general, the means were similar with the exception of the Reasons for Goals subscale, which had the lowest mean score ($M = 13.03$, $SD = 2.43$). Further examination of this finding showed that the mean across the four items for this subscale was 3.25 ($SD = .82$) indicating that students "often" achieved goals across the five options given (classroom, sports field, at home, socially, and other). However, after removing three extreme outliers for this subscale, the mean score increased to 21.96 ($SD = 7.96$), with a resulting item mean of 3.53 ($SD = .85$). This result showed that students nearly always set achievable goals across those activities. Across all categories, the

average Cronbach’s alpha was .78 ($SD = .04$), ranging between .72 and .81 (see Table 7). These results indicated that the items within each of the categories measured show reasonable and sufficiently high estimates of reliability such that these items and scores could be used in further analyses.

Table 7
Means, Standard Deviations, and Internal Consistencies of Goal and Goal Setting Questionnaire Categories

Category	Cases	<i>M</i>	<i>SD</i>	α
Goal Encouragement	90	20.40	7.55	.77
Teachers of Goals	86	18.74	5.61	.81
Sharing of Goals	85	18.64	5.88	.80
Reasons for Goals	99	13.03	2.43	.72

Exploratory factor analysis of the Goal and Goal Setting Questionnaire

To assess the structure of the GG-SQ, an exploratory maximum likelihood factor analysis with an oblique rotation was conducted to determine the items associated with the theoretical structure of the GG-SQ measure. Given the complex design of the GG-SQ, it was not anticipated that the measure would be orthogonal in nature. Therefore, an oblique rotation approach was used (Fabrigar, Wegener, MacCallum, & Strahan, 1999).

Kaiser’s (1960) eigenvalues rule (eigenvalues > 1) was used initially to investigate the latent structure of the ASWS. Although 10 factors had eigenvalues larger than 1.00, accounting for 64.74% of the variability, a six-factor solution was considered the most parsimonious explanation of the data based on two findings. First, the scree plot indicated that six factors best described the data, and second, based on Thompson and Dinnel’s (2003) criteria, the first six factors accounted for more than 5% of the total variability explained. Relating these findings and the clustering shown in the initial factor analysis produced by the EFA, four sources of goals were aggregated for further inferential analysis. Specifically, “caregivers” were combined with “grandparents”, with “siblings” being combined with “whanau”. Table 8 shows the pattern matrix across all sources, including the two new combined categories of “caregivers/grandparents” and “siblings/whanau”—resulting in six source response categories.

Table 8
Exploratory Factor Analyses With Six Sources

Sources	Caregivers/ grandparents	Parents	Others	Siblings/whanau	Coaches	Teachers
Caregiver teaches goal	1.03	0.03	-0.07	0.01	0.10	-0.19
Share your goals with caregiver	0.75	-0.15	-0.01	0.06	-0.10	0.17
How often caregiver encourages	0.61	0.23	0.15	-0.02	0.09	-0.11
Grandparent teaches goal	0.37	0.09	0.23	0.23	0.04	0.09
How often grandparents encourage	0.33	0.24	0.21	0.11	0.05	0.16
Share your goals with grandparents	0.18	-0.03	0.11	0.48	-0.16	0.42
How often parent encourages	0.04	0.90	0.01	0.15	0.09	0.02
Parent teaches goals	0.31	0.43	0.20	0.02	-0.04	0.17
Share your goals with parent	0.12	0.25	-0.12	0.24	-0.14	0.58
Other teaches goal	0.05	-0.02	0.96	-0.03	0.01	-0.08
How often other encourages	-0.03	0.11	0.70	0.02	0.04	-0.05
Share your goals with other	0.00	-0.15	0.62	0.21	0.02	0.12
Brother/sister teaches goal	0.05	-0.04	0.09	0.75	-0.03	-0.08
Share your goals with brother/sister	0.02	-0.06	0.05	0.73	0.04	0.01
How often brothers/sisters encourage	0.14	0.03	-0.09	0.68	0.11	-0.05
Share your goals with whanau	-0.03	0.05	0.11	0.69	0.00	0.11
How often whanau encourages	-0.03	0.09	0.00	0.67	0.17	-0.02
Whanau teaches goal	-0.11	0.21	0.24	0.55	0.19	-0.12
How often coach encourages	-0.09	0.08	-0.03	0.12	0.82	-0.03
Coach teaches goal	0.11	-0.10	0.17	-0.02	0.71	0.10
Share your goals with coach	0.16	0.04	-0.05	0.15	0.47	0.26
Share your goals with teacher	-0.05	-0.20	-0.04	0.00	0.11	0.68
How often teacher encourages	-0.01	0.13	0.12	-0.10	0.10	0.41
Teacher teaches goal	0.05	0.20	0.01	-0.08	0.14	0.340

Note: Bold factor loadings representing clusters by source.

Table 9 shows the factor correlations between the six factors representing the different sources of goal setting. These correlations show that the factors were only weakly correlated with each other. The highest correlation existed between “siblings/whanau” and “parents” ($r = .41$) which reflects the shared variability coming from the similarity between the respondents understanding of the “whanau” and “parents” items. Although mostly weak relationships, it is interesting to note that “teachers” correlate negatively against all the other sources of goal setting involvement.

Table 9
Correlations Between Six Sources of Goal Setting Factors

Sources	Caregivers/ grandparents	Parents	Others	Siblings/ whanau	Coaches	Teachers
Caregivers/ grandparents	–					
Parents	.139	–				
Others	.193	.219	–			
Siblings/whanau	.343	.412	.280	–		
Coaches	.040	.277	.194	.234	–	
Teachers	-.126	-.291	-.240	-.302	-.108	–

Structural equation modelling of the Goal and Goal Setting Questionnaire

Based on results from the EFA, an eight-factor SEM model was hypothesised (see Figure 1), which represented the six source response categories, and the two latent variables of areas and importance. Thus, this model related the various sources of goals (e.g., parents, coaches, others) to the areas in which students set achievable goals (e.g., classroom, sport, home) and the importance of goals (e.g., challenge, better results). The assumptions of multivariate normality and linearity were established using box plots and the Mahalanobis distance measure. There were no univariate or multivariate outliers, and missing data were handled through the use of the maximum likelihood estimation process. The choice of the maximum likelihood approach, over estimation options (e.g., weighted least squares, two-stage least squares, asymptotically distribution-free), was appropriate as the data were normally distributed (Kline, 2005). The hypothesised structural model showed a mediocre (or acceptable) fit to the data. The chi-square value provided data fit ($\chi^2 = 848.23$, $df = 97$, $p < .001$) with a χ^2/df ratio of 8.74. However, as previously outlined (see Methods), caution

is needed in the interpretation of this index. Relative fit indexes showed that the TFI = .92, CFI = .91; and the RMSEA = .081. Although, neither of these indexes meet the Hu and Bentler (1999) revised coefficient criteria ($> .95$), their criteria for acceptable goodness-of-fit ($> .90$) is met. Based on this, no post hoc modifications to the estimation process were conducted on the model.

A restricted factor analysis showed the relations between the factors, with those in bold representing statistically significant beta weights. Others (e.g., peers) showed the highest relationship to the areas of goals being set ($B = .67$). However, while the impact of teachers ($r = .17$), parents ($r = .14$), siblings/whanau ($r = .07$), and coaches ($r = .13$) was positive, the low strength of these relationships indicated that these sources had very little influence on the areas within which students set their goals. In relation to the importance associated with the student's goals, clearly parents ($r = .46$) and teachers ($r = .39$) had the greatest impact, although it is worth noting that the strength of this impact is weak to moderate. While both coaches ($r = .18$) and others ($r = .18$) showed little relationship to the importance attached to goals, caregivers/grandparents had a weak negative effect ($r = -.30$). This finding, in addition to the low correlations found in the EFA, suggests that there may be a disconnect occurring between grandparents and their grandchildren in terms of the teaching, sharing, encouragement, and importance associated with their goals.

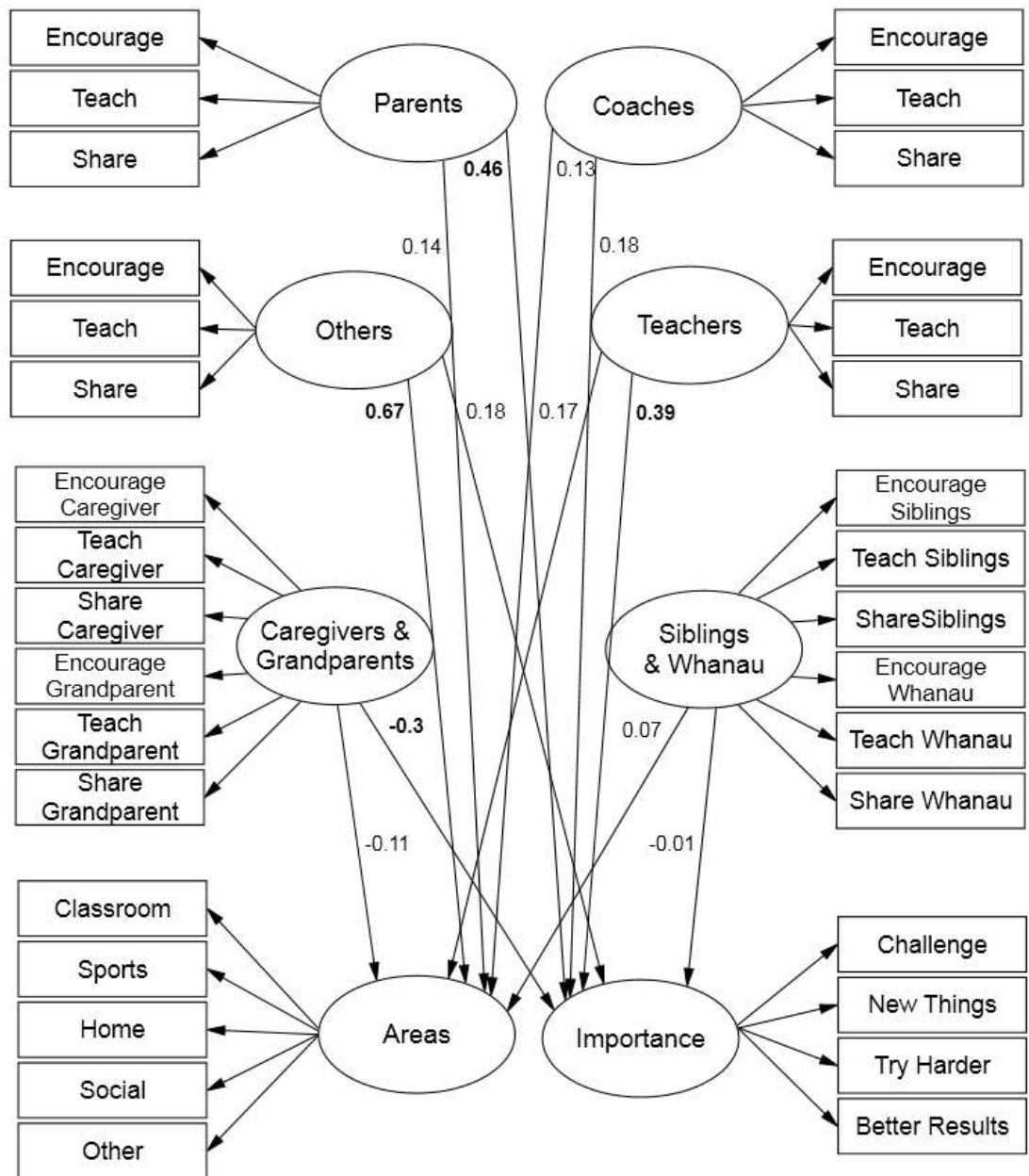


Figure 1. Structural equation model showing various sources of goals to the areas in which students set achievable goals and the importance of goals.

Note. Beta weights in bold indicate statistical significance.

Goals Set

As shown in Table 10, responses from Predicate 1 (*“In which areas do you set achievable goals?”*) demonstrated that students between the ages of 10 and 12 years do recognise and set independent goals. The goals were classified into: classroom; sports; at home goals (which included such areas as “being nicer to my brother”, “doing my chores without complaining”, and “keeping my room tidy”); and social goals (which tended to focus on classroom behaviours such as “not calling out in class”, and “focusing more on my work”). Those goals that did not fit into the four main categories were placed in the “other” category.

Of all the goals that students reported that they set in the open response item, the largest proportion was academic 81%. The academic goals (e.g., goal setting within the classroom) were predominantly general in nature. The remaining 19% “never” or “sometimes” saw the need to set goals within the classroom. Setting goals within their sporting codes was the second highest ranked place (62%) while goal setting at home or in social situations received 57%. Most academic goals typically related more to completion of work, being on time, or trying harder, than on the quality of the academic outcomes in relation to achievement in their school work. The words “to be better at” were frequently used. Other examples included “win the class mathematics prizes” and “get a good result in my report to please mum and dad”. As predicted, the majority of the academic goals were performance based where the students were concerned about demonstrating competence and had a focus on extrinsic variables such as gaining recognition and pleasing others.

On the sports field was the second largest category in terms of student responses for setting goals in the “always” or “often” categories at 64 % (although, at 32%, it was the largest category when looking at the “always” category alone). Sporting goals were also predominantly performance-based goals rather than mastery with examples such as “getting into the top school soccer team”, “winning a top three placing in the school running races”, and “winning my running race”. Conversely, social goals tended to focus on the students’ perceptions of their behaviour in class, for example, “to talk less when at my desk”, “to focus more on my work”, and to “stay on task more”.

An analysis of responses by gender showed that 8% of males responded that they “never” set classroom goals compared to females who had no responses in that category.

Only 13% of males “always” set classroom goals, compared with 26% of females. Males identified considerably more often than females with goal setting in sport, with 46% of males “always” setting a sporting goal compared with only 20% of females. The frequencies for the remaining categories were very small, indicating that the differences between genders were polarised in terms of an academic versus non-academic goal setting focus.

Table 10 also highlights the means and standard deviations for the five areas that students set achievable goals, according to gender and age. With the exception of sports, males demonstrated a lower mean score across the goal areas. Their lowest mean score was found in the domain of setting socially related goals ($M = 2.41$; $SD = 2.41$). Female student responses showed that they set most of the goals relating to the classroom ($M = 3.08$; $SD = .65$), and were least likely to set goals when goals were related to sports ($M = 2.67$; $SD = .88$). Independent samples t tests were run to assess whether these differences were statistically significant. Across the remaining four areas, results showed that males were not statistically significantly different from females in any of the areas within which they set goals.

A statistically significant difference was found among the three age groups on goals set relating to “at home”, $F(2, 97) = 10.73$, $p = .001$, and on “other” areas, $F(2,95) = 8.52$, $p = .001$. Table 5 shows the mean response score for students aged 10, 11, and 12 years. Given Levene’s statistic showed that both “at home” and “other” area categories were statistically significant ($p = .02$ and $p = .01$ respectively), the Games-Howell post hoc test for unequal variances was applied. Statistically significant mean differences for goals set “at home” existed for students who were 12 years old when compared to their 10-year-old peers (response mean difference = .94, $p = .001$), and further, between 12-year-old and 11-year-old students (response mean difference = .69, $p = .003$). Likewise, there were also statistically significant mean differences for “other” goals for students who were 12 years old when compared to 10-year-olds (mean difference = .86, $p = .004$) and between the 12- and 11-year-old groups (mean difference = .86, $p = .001$).

Table 10
Types of Goals Set as a Function of Gender and Age (Means With Standard Deviations in Parentheses)

		Goal areas				
		Classroom	Sports	At home	Social	Other
Gender	Male	2.82 (0.78)	3.07 (1.02)	2.50 (1.00)	2.41 (1.00)	2.43 (1.21)
	Female	3.08 (0.65)	2.67 (0.88)	2.75 (0.88)	2.69 (0.94)	2.73 (0.95)
Age	10 years	3.17 (0.57)	2.79 (0.93)	2.21 (0.83)	2.46 (0.98)	2.25 (1.03)
	11 years	2.94 (0.77)	2.79 (1.01)	2.41 (1.01)	2.56 (1.05)	2.26 (1.16)
	12 years	2.84 (0.75)	2.95 (0.96)	3.11 (0.73)	2.63 (0.91)	3.11 (0.83)
Overall		2.98 (0.75)	2.84 (0.10)	2.58 (0.09)	2.55 (0.102)	2.54 (1.05)

Table 11 provides the descriptive information relating to students' responses to Predicate 2 (*"Why is it important to you to set goals?"*). Results indicated that students regularly set goals in relation to the four reasons presented. The two main reasons for setting goals, were to first "achieve better results" (Item 6), with 86% of students responding in the "often/always category", followed closely by to "help me try harder" (Item 7) with 81% of participants responding either "often" or "always". The category "creating a challenge" (Item 9) was answered at both extremes of the range, with 72% identifying it as an "often" or "always" reason, while 23% responded that it was a reason only "sometimes" and the "never" category was indicated by 5%.

Independent samples *t* tests were run to assess differences among the male and female means outlined in Table 11. First, results from the Levene's *F* statistics showed that only the "to help you achieve something new" (Item 8) showed that equal variances could not be assumed ($F = 4.34, p = .04$). Taking this violation into account, this category showed a statistically significant difference in male and female means for this response option ($t(81) = -2.51, p = .01$). Thus, it can be concluded that females had a statistically significantly higher response mean on this item than did male students. The option of "to achieve better results" (Item 6) also showed a statistically significant difference ($t(98) = -2.44, p = .01$) in means between male and female students, indicating that females showed more motivation to set goals where these were results or performance being measured.

An examination of differences among the three age groups across these items found a statistically significant result for Item 8 “to help achieve something new” ($F(2, 96) = 4.06, p = .02$). As homogeneity of variances was confirmed between these two groups on Item 8 ($p = .90$), a Tukey HSD test was used to examine which pair of age groups means differed. Results showed that 10-year-old and 12-year-old age group means differed significantly (mean difference = .526, $p = .04$). This indicated that older students had a greater focus on achieving new things than the younger students (see Table 11).

Table 11
Reasons to Set Goals as a Function of Gender and Age (Means with Standard Deviations in Parentheses)

		Why set goals			
		Achieve better results	Help try harder	Achieve something new	Create a challenge
Gender	Male	3.20 (0.79)	3.24 (0.79)	3.00 (0.93)	3.07 (0.93)
	Female	3.55 (0.63)	3.31 (0.75)	3.43 (0.72)	3.17 (0.91)
Age	10 years	3.46 (0.66)	3.21 (0.72)	3.00 (0.83)	3.04 (0.91)
	11 years	3.29 (0.77)	3.43 (0.69)	3.08 (0.86)	3.16 (1.01)
	12 years	3.45 (0.72)	3.15 (0.84)	3.53 (0.76)	3.13 (0.89)
Overall		3.39 (0.72)	3.28 (0.77)	3.23 (0.84)	3.12 (0.94)

The responses to the third predicate “*How often does each of the following people encourage you to set goals?*” (Items 10–17) identified that the three main groups of people who taught goal setting to students were their teachers, parents, and coaches. Results indicated that students received most of their encouragement from their teachers with 78% indicating this in the “often” or “always” categories, followed by parents (68%). Although, grandparents and whanau showed reasonable representation with 40% and 50% respectively, it is important to note that just as many, or in the case of grandparents, more respondents indicated that they either “never” or only “sometimes” had encouragement from these sources. Responses to the “never” category saw that siblings (54%) were perceived as being least likely to be encouraging students to set goals, closely followed by caregivers (44%) and grandparents (37%).

Table 12
Percentages Demonstrating Who Encouraged Students to Set Goals (Items 10–17)

Category	Never	Sometimes	Often	Always
Teachers	6	17	44	34
Parents	7	26	24	44
Caregivers	44	12	28	16
Grandparents	37	23	20	20
Siblings	54	13	23	10
Whanau	30	20	30	20
Coaches	14	22	33	30
Others	28	25	33	14

Unsurprisingly, analysis of the people involved in teaching goal setting (Predicate 4, Items 18–25) was dominated by teachers, who were ranked the highest by the students, with 80% of students reflecting that their teachers “often” or “always” taught them to set goals (see Table 8). Parents were the second highest ranking source for teaching goal setting, with 73% of students responding that their parents either “always” or “often” taught them goal setting. Similarly, to the percentages in Table 7, siblings (77% “never” or “sometimes” categories) again did not feature as having a strong influence on the teaching of goal setting. The role of the coach continued to have a strong influence in goal setting with 49% indicating coaches in the “often” or “always” categories. However, with a third of responses in the “never” category (31%) it raises the question as to how many of the students had regular involvement with sports coaches.

Table 13
Percentages Demonstrating Who Taught Goal Setting to the Students (Items 18–25)

Category	Never	Sometimes	Often	Always
Teachers	5	15	36	44
Parents	15	12	36	37
Caregivers	48	14	22	16
Grandparents	42	14	28	17
Siblings	56	21	17	6
Whanau	42	18	27	14
Coaches	31	19	25	24
Others	36	23	25	16

Table 14 shows the relationship between students and the person that they have shared their personal goals with (Predicate 5, Items 26–33). Results showed a similar distribution to the encouragement and teaching of goals outlined above (see Tables 12 and 13), reinforcing the important role that teachers and parents have as part of the goal setting practice. Responses showed that in almost half of these occasions, parents (44%) and teachers (42%) were the adults that students always expressed their personal goals to. Conversely, siblings continued to be at the other end of the scale with 68% of responses represented across the “never” or “sometimes” categories.

Table 14
Percentages Demonstrating to Whom Students Shared Their Personal Goals (Items 26–33)

Category	Never	Sometimes	Often	Always
Teachers	15	9	33	42
Parents	14	14	27	44
Caregivers	43	21	18	19
Grandparents	45	10	25	20
Siblings	40	28	19	14
Whanau	42	20	21	17
Coaches	44	18	29	10
Others	43	19	23	15

Discussion

This study sought to identify the types of goals that students choose to set, and related to this, the reasons that students are motivated to set personal goals. Of particular interest here was the investigation of the differences between age groups and gender. An

evaluation of students' current goals also allowed for these to be categorised as being either mastery or performance based in nature. Beyond the types and reasons for goals, this research also focused on identifying the significant relationships that a student has with people who actively participate in the teaching, sharing, and encouragement of goal setting. Here, this study sought to identify who specifically had the greatest impact on activities associated with the implementation of goals that students set.

Locke and Latham used the term goal as a “general concept that included intention, task, deadline, purpose, aim, end, and/or objective” (Locke & Latham, 1990, p. 2). Their goal setting theory assumed that goals influence what people do and how well they perform. Specifically, this theory posited that there are distinct cognitive factors such as beliefs about what could be achieved, recollections of past performances, beliefs about consequences, and judgments of appropriateness to the situation, that all contribute to whether an individual would choose to set goals. The results of this study identified that students did recognise and identify with goal setting, and further, that this was an activity that they readily engaged with. Although their teachers were seen as being someone that they expressed their goals to, they were also independently setting goals in other areas of their personal life. Findings also indicated that students appeared familiar with, and comfortable setting their goals, however, these were predominantly limited to performance based goals as had been predicted.

The type of goals that most students aged between 10 and 12 years set were categorised as academic (classroom) or sports goals. Most classroom goals related to performance indicators, for example: “completion of work”, “being on time”, “winning an academic prize”, or “trying harder” rather than on the quality of specific learning academic outcomes, for example: “mastering how to achieve division in mathematics”. These findings support the research of Meece, Blumenfeld, and Hoyle (1988) who demonstrated that students who tend to set performance-oriented goals are typically concerned about demonstrating competence, gaining recognition, and pleasing others. Such motivators were clearly evident in the goals that students wrote down, and their reasoning behind goal setting. These goals had little mastery focus attached to them.

The goals that the students identified for themselves also had an emphasis on distal rather than proximal goals (Bandura, 1993; Schunk, 1981). There was an overemphasis on outcomes, such as “making the top cricket team” or “winning the mathematics prize”,

rather than evidence of setting short-term proximal goals. This may indicate that these students had not been taught how to set short-term goals. Bandura and Cervone (1983) concluded that distal goals helped keep the larger picture in mind by allowing the student to see what the long-term goal would look like once it have been achieved. However, according to these authors they postulated that students could not be assured that they would do this and that teacher intervention was necessary for this to be achieved. The results from this questionnaire support these findings that these students were unable to set proximal goals.

This study demonstrated that there was a gender difference in terms of the types of goals that the students set for themselves, and in regards to academic (i.e., classroom) and non-academic (i.e., sports) these differences were quite distinct. Males placed a strong influence on the importance of sporting goals, whereas females identified more strongly with classroom goals. Desiring to “get into the top team”, “running faster”, and “winning prizes” were some of the examples given. Reasons for this could be that New Zealand as a country has a strong emphasis on sport. Sport has a solid connection especially with young males and to excel at sport is seen by many males as a symbol of achieving success and popularity among their peers. Therefore, it is not surprising perhaps that many of our male students place a higher emphasis on this than their classroom goals. Conversely, females identified strongly with the setting of classroom goals. In regards to the reasons that goals were set, there was also a gender difference between the two main categories of “achieving better results” and “achieving something new”. The female students ranked “achieving better results” at a higher level of importance than male students. This finding could also be explained in the relationship between females’ greater motivation to set classroom goals and their self-monitoring strategies. Specifically, the findings of Zimmerman and Martinez-Pons (1990) similarly discovered that female students displayed more goal setting and planning strategies, with higher levels of self-monitoring strategies, than their male peers did in the classroom.

The results showed that the 10- and 12-year old age group means differed significantly with regards to their focus on “achieving something new”. This indicated that older students had a greater focus on achieving new things than younger students; thus, this result may be indicative of the development of greater confidence in older students. Further, most students who are 12 years of age are in the final year of their primary (elementary) schooling, with their next stage of education involving the progression into

secondary education. The priming for this transition, both within themselves and by their school and peers could have accounted for their motivation towards “achieving something new”. Moderating or indeed mediating the arguments for this finding might be the social age of these students. As 12-year-olds, many of these students are entering the pre-adolescent age where there is a stronger focus and connection to their peer groups, and the group’s motivation for choices and decision, the excitement for achieving something new might be much stronger than for the younger age students (Schunk & Pajares, 2002).

Setting a goal to create a challenge was also viewed positively by students, resulting in a high response rate. This result concurs with the research of Schunk (1983), and Mento, Locke, and Klein, (1992) and Vygotsky (1978) who proposed that individuals are most engaged when levels of challenge realistically exceed their skill. It would appear from this study that students identified with challenge as an underlying motivator for goal setting.

Based on the factorial results from the EFA, a structural model was developed to test the relationship between the people who teach and encourage goal setting, and with whom students share their goals, against the areas that goals were set in and the reasons for those goals. Where the model specified the relationship with the reasons for goals, parents and teachers showed a positive relationship, albeit weak to moderate, indicating that both of these roles have an impact in ensuring that the importance of setting goals is conveyed to a student. Interestingly, coaches, others, and siblings and whanau did not feature strongly as playing a prominent role in communicating the importance of goal setting. In relation to the areas in which students set goals, roles outside those clearly specified in the questionnaire feature the most prominently. Unfortunately, given that the true specifics around the sources encompassed as “others” was not available, it might be speculated that students’ peers may account for a reasonable proportion of this category, indicating that a social dynamic might mediate goal choice for this age group.

An interesting finding was that grandparents and caregivers appear to have a negative effect in relation to both the importance of goals and the areas that they are set in. In addition to the low correlations found in the EFA, this finding suggests that there may be a disconnect occurring between grandparents and their grandchildren in terms of the teaching, sharing, encouragement, and importance associated with their goals, and similarly with those people classified as being students’ caregivers.

At the specific behavioural levels (encourage, teach, and share) from each source as expected teachers and parents were seen as being important to students in the area of teaching goal setting and encouragement of student goals. Siblings were seen as having the least influence in terms of teaching and encouragement of goal setting and in terms of whom students aged 10-12 years shared goals with. Potentially it might be because they do not like sharing their personal goals with their siblings for fear of being teased. This could be particularly apparent if such students are performance based, thus are focused on achieving awards or making top teams. Many of the students could be concerned with failure if they were to share with siblings, particularly if they were older. This reinforces the research of Winne and Butler (1994) and Sadler (1989) who found that students choose who to share their goals with, and what they are going to share, especially with regards to encouragement and feedback. This is evident with the social goals that the students provided in this study. The majority of these goals that the students identified related solely to receiving feedback about their work habits or organisation in the classroom and goals such as “to talk less when working” or “to complete and hand my work in on time”. These goals required feedback in order for the student to be able to identify them as being significant.

In addition to the goals and goal setting constructs of focus, an outcome of this study was the development of a scale that specifically related the categories of personal goals and goal setting in relation to the roles of others. This measurement tool was developed due to the lack of pre-existing scales that focused directly on the goals and goal setting constructs that were represented in this study, particularly the sources of goal setting supports. As mentioned earlier, although the PALS (Midgley et al., 2000) paid a significant role in guiding the item writing process, the items’ response format was not designed to measure (or include) the specificity around the significant relationships in goal setting. Thus, the development of GC-SQ allowed both the important substantive aspects of the PALS to be integrated into a response design that allowed the cross-tabulation of both the frequency and the role of significant others.

Using the findings from this first study with regards to goal setting and the significance of the teacher- pupil relationship in the setting and sharing of goals, in the second study in this thesis an intervention is undertaken with students in the 10–12 years age group, and their teachers within the area of mathematics, to measure whether implementing mastery personalised goal setting with individual students would result in

significant developments in self-regulatory learning and academic achievement. This study is presented in the next chapter.

Chapter 4:

Study 2: Investigating the Impact of Individual Student Mastery Goals in Mathematics on Academic Performance

The present study sought to examine how the development of individual academic mastery-focused goals in mathematics would impact student achievement among primary-school students (10–12 years old). An additional aim was to explore the issue of gender differences in students' academic achievement in mathematics as a result of these goals. The New Zealand Curriculum divides mathematics into three main strands: number, geometry, and statistics—almost all primary schools start the year by teaching the number strand. For this reason, numeracy was chosen as the subject for the goal setting intervention because it meant a common strand would be taught in all four participating schools, and that the study could be carried out during the same time period.

Studies conducted by Midgley, Anderman, and Hicks (1995) and Roeser, Midgley, and Urdan (1996) have found that a mastery-oriented school environment is related to students' endorsement of mastery goals, which are also related to academic self-efficacy, positive affect and greater use of self-regulation strategies. Building from these findings, this study's focus was on investigating if, through the creation of such an environment, intervention students achieved higher gains in their mathematical performance when compared to their control-group peers. For this study, the mastery-focused environment was achieved by teachers in the intervention groups playing an active role in the teaching and reinforcing of mastery goal setting.

Gender differences in relation to academic achievement, and the variables that might mediate or moderate such differences, have been the subject of extensive research over the past decades (e.g., Fan & Chen, 1997; Kianian, 1996; Yailagh, Lloyd, & Walsh, 2009). This research has shown that not only have girls closed the gap with their male peers in mathematics performance (e.g., Byfield, 2000; Marsh & Yeung, 1998), but more recent research has indicated that they have surpassed them (Kenny-Benson, Pomerantz, Ryan, & Patrick, 2006; Martin, 2007; Weaver-Hightower, 2003). Kenny-Benson, et al. (2006) conducted research to investigate whether the reason that girls outperformed boys was due to differences in how girls and boys approached their schoolwork. Examining Grade 5 and 7 cohorts, Kenny-Benson et al. found that girls were more likely than males to

have mastery-oriented goals, and to maintain greater attention in class by tending to refrain from disruptive classroom behaviour. Zimmerman and Martinez-Pons (1990) discovered when interviewing students in Grades 5, 8 and 11, that girls were more motivated towards setting goals, employing planning strategies, and keeping records, and self-monitored more frequently than their male peers. To date, an exhaustive search of the literature has shown that there has not been any research undertaken with primary-aged students that has measured the impact of a teacher-supported mastery-based intervention on maths achievement between genders. Given this, two questions relating to gender differences have been posited for this study. First, is there a significant difference in the impact of the development of individual student academic goals on the academic achievement of male and female students in mathematics? Second, does the development of individual student academic goals with a mastery orientation result in a significant difference in student self-regulated learning and motivation between male and female students?

Method

Design

Two characteristics of an experimental design are the use of a control group, and the use of randomisation to assign participants to either the intervention or control groups. The advantage of using randomisation is that selection to either group is unbiased, resulting in more certainty that any differences between the two groups, with regards to the effect of the intervention, can be more assuredly attributable to the intervention itself, rather than to group differences.

Threats to validity

The experimental design negates many of the threats of internal validity through avoiding confounding variables (e.g., differential selection) that might invalidate the outcomes of the study. However, not all extraneous sources of variation can be overcome by the use of an experimental design. A source that might be particularly relevant to this study, given that groups are not isolated from each other, is what Campbell and Stanley (1963) referred to as treatment diffusion. Treatment diffusion occurs when participants in the intervention group “leak” information regarding the intervention to participants in the control group. This behaviour is particularly apparent where the intervention is educational in nature, because the knowledge or skill is seen as being advantageous. It is highly possible that students from the control group enquired as to what the intervention entailed

and what types of exercises were conducted. This could have resulted in rivalry or resentment behaviours among the control group, or simply the effect of the intervention could be diffused to the control, which could minimise the treatment effect. An attempt to reduce the potential impact of this threat to interval validity was to have the control group also participate in a goal setting exercise, albeit that theirs was self-directed in nature, and did not consist of the discussion relating to goal setting, and the teaching of the procedure and related strategies. In this way, it was believed it would be less likely that the intervention and control groups would compare what was happening, in relation to the interaction with the researcher since both groups were involved in some way. Hence, it appeared less likely that diffusion would occur.

The experimental approach used to measure the impact of the goal setting intervention was the pre-test-post-test control-group design. Here, both the intervention and control groups were administered a measure at Time 1 pre-intervention, with the experimental group only then receiving the intervention. At the end of the intervention period, participants receive a second administration of the measure/s. As groups were equivalent at the beginning of the intervention, it was assumed that differences found from the second measure were directly attributable to the intervention itself. Regardless of some arguments that propose the use of multiple assessments/measures used over time (e.g., Willett, 1997), pre-test-post-test control group design is still widely used to compare the changes exhibited by two or more groups in response to a treatment (Bonate, 2000; Collings, 1996; Williams & Zimmerman, 1996). The distinct advantages are twofold. First, the pre-test provides information about individual differences, which can be used to decrease estimates of error variance, thereby increasing power. Second, any pre-test differences between groups can be taken into account.

Participants

The sample was comprised of 207 primary-school students after listwise deletion of missing cases, from four primary schools in Auckland. Demographic information was collected from the participants, with females representing 52% (48% intervention and 56% control groups) and males representing 48% (52% intervention and 44% control group). Participants' ages ranged from 8–13 years, with the mean age 10 years ($SD = 1.05$) representing 42% of the sample.

Sampling

All principals in full primary, intermediate, or contributing schools are members of the Auckland Primary Principals' Association and as such were listed in the directory of that organisation. The directory was used as a representative sampling frame from which simple random sampling could be conducted. Using a stratified sampling method, 10 schools from each of the 10 decile groupings (i.e., 100 schools) were randomly selected, with schools used in Study 1 being removed from this pool. Using the same procedure as outlined in Study 1 (see Chapter 3), the schools that showed an interest in being involved in this study were approached by the researcher making personal contact with the principal of the school. The experience of the researcher, as a teacher and school leader meant that making initial contact with schools was a straightforward process, as the researcher was able to share a common understanding of school systems with the participants and ensure minimal intrusion in the school settings. An important criterion for involvement in this study was that schools needed to be using asTTle (Assessment Tools for Teaching and Learning) as part of their assessment in the teaching and delivery of their mathematics programme. Although generally used by most schools in New Zealand, this study required schools to be using asTTle as a formative assessment tool that involved their students in understanding their individual learning pathways. More details in relation to asTTle are provided below (see Scale Development).

Four schools agreed to participate in this research. It is unfortunate that given the low response to the invitation to take part in the research, particularly from low to medium decile schools, this sample was overrepresented by the high decile category, with schools ranging from decile 7–10. As with Study 1, logistical constraints (i.e., commitment to other research; time of the school year) meant it was not possible to conduct another random sample, targeting the lower and medium decile strata. Thus, the resulting sample was opportunistic, or a sample of convenience, rather than based on true random selection. The schools that declined involvement cited issues such as involvement in other research but the main factor was that they were only beginning to use the asTTle tool or that they were not using the tool and this limited whether they could become part of the research project. A brief description of each school is as follows:

School A: A suburban full primary school, decile 10, Years 1 to 8. Those involved in the study were composite classes of Year 6 and 7 students. The students were taught in home room classes and each class was randomly assigned to either condition. Within the

New Zealand context, home room classes are those classes that are taught by their classroom teacher as a combined group of students as opposed to streamed classes where students move to different teachers and groups according to their ability level.

School B: A large state full primary school, decile 7, Years 1 to 8. Those involved in the study were a sample of students from Year 7 and 8 classes. The classes were streamed for mathematics, with the sample derived from a top-stream and a low-stream class at each year level, to ensure a balance of achievement levels.

School C: An independent co-educational school, decile 10, Years 1 to 13. These students were derived from Years 5 and 6. As with School A, students were taught in home room classes, and were randomly assigned to be in either condition within their classes.

School D: An inner city contributing primary school, decile 9, Years 1 to 6. Participating students were from composite classes of Year 5 and 6. Like Schools A and C, classes were taught as home room classes, with students randomly assigned to either condition within their classes.

The participating schools were sent an information pack including introductory information, an information sheet, and informed consent forms for the Board of Trustees, the principal, and the participating teachers who had students from the ages of 10–12 years. The researcher then met with the teachers who would be involved in order to discuss the purpose of the research, and in particular, the logistics surrounding the intervention programme and requirements of administration. Within each of these schools, classes were randomly assigned into either intervention or control conditions. Using this approach, Table 15 outlines the distribution of students from each school and within each of the groups.

Table 15
Distribution of School Sample by Group Condition

School	Group condition		Total
	Intervention	Control	
A	21 (51%)	20 (49%)	41
B	30 (53%)	27 (47%)	57
C	36 (47%)	40 (53%)	76
D	16 (49%)	17 (51%)	33
Total	103 (50%)	104 (50%)	207

Scale Development

Overview

Two main sources of data were used in this study to evaluate the impact of the development of students' individual goals in mathematics on their mathematical ability and attitude. Thus, the primary dependent measure used was mathematical performance as measured by the asTTle Maths Score (aMs) at baseline (Time 1) and post-intervention (Time 2). Mathematical attitude was also measured at both time periods. However, as the main focus was the impact of the intervention on mathematics performance, the attitude measure was not the primary dependent variable of interest in this study.

First, data from the Goal Setting Self-Review (GSSR) booklet (see Appendix A) were used as a part of the intervention procedure to gather information on students' articulation and assessment of their goal setting practices. Second, asTTle mathematics score (aMs) together with maths attitudinal scores were collected from participants in both condition groups, from the administration of an asTTle mathematics test pre- and post-intervention.

The development of the GSSR booklet, and the pre-specified creation of the asTTle mathematics tests are outlined in the following sections.

Goal Setting Self-Review (GSSR) Booklet

Design

Although the GSSR was designed specifically for this study, like the development of the GG-SQ in Study 1, much of the content and themes were based on the underpinning theory and structure of the Patterns of Adaptive Learning Scales (PALS) (Midgley et al., 2000). In particular, PALS measures relating to personal mastery goals were incorporated into the questionnaire as these items were aligned with the focus of this study. Numerous studies have also reported that the PALS personal mastery goal scale was positively correlated with perceived academic efficacy (e.g., E. Anderman & Maehr, 1994; Middleton & Midgley, 1997; Midgley & Urdan, 1995; Roeser et al., 1996). Although academic efficacy was not the focus of this study, the mastery scale's close relationship with the actual domain specific performance and the adoption of adaptive learning strategies (e.g., Freeman & Anderman, 2005; Meece et al., 1988; Nolen, 1988) make it particularly relevant to this research. Further, Anderman, Urdan, and Roeser (2003, March) reported that the internal consistency for the personal mastery goal scale has been found to be

higher when the items have been associated with specific academic domains (e.g., mathematics), increasing non-domain internal consistency alpha of .85 to .86 and .89 or higher (Freeman & Anderman, 2005).

Structure

The GSSR booklet was composed of four distinct sections, namely, an information front section (1 page), pre- and post-lesson self-review section (pages 1 and 3 respectively), and lastly, an evaluation section. The second page of the booklet consisted of three subsections: first, demographic options (name, gender, and age) for the student, followed by a reminder outlining the SMART (specific, measurable, achievable, realistic, with a timeframe) acronym that had previously been introduced to the intervention group during their goal setting lesson. Lastly, there was an open-ended item where students were asked to write down three goals that they wanted to set for themselves in relation to the number unit lesson that they were going to be taught.

Proceeding from the opening section is the GSSR's pre-lesson self-review section. After students had completed the date and time, they responded to five items consisting of one open-ended item that asked the student to record their mathematics goal for the day, and four further items (one dichotomous Yes/No; three 5-point Likert scale) that were reflective in nature, for example, "How much do I already know about today's maths goal?" (Item 3), "I think today's lesson will be" (Item 4) with 5-point scale options ranging from "very hard" to "very easy", and last, Item 5 where students were asked "How much effort will I put into today's lesson?" with 5-point scale options ranging from "nothing" to "a great deal".

The third section of the booklet provided the opportunity for students to again reflect on what they had experienced after the delivery of the lesson. Students were asked to reiterate again "What was today's maths goal?" (Item 1), with the two preceding items, with associated 5-point Likert scale responses, asking students to assess whether they had achieved the maths goal that they had set for themselves (Item 2), and how much effort that they had put into their lesson (Item 3). The last item in this section (Item 4) built on what students' responses were to Item 2 "Did I achieve today's maths goal?" Students who had selected either "some", "quite a lot", or "achieved" were asked to select from the 20 possible response options in Box A, which consisted of statements that reflected their thoughts on the mathematics lesson in relation to their goals, for example, "I wanted to learn about today's lesson", "I worked out why I got it wrong", or "I wanted to achieve

today's goal". Conversely, where students had responded to this item by selecting either "not at all" or "a little bit" options, they were directed to Box B, which asked students to select from the multiple response items presented for the reason/s why they did not achieve the maths goal for that day. Response examples included options such as "I was distracted", "I didn't ask my teacher for help", or "I gave up". In total, 16 response choices were available for students to select.

The last section of the GSSR booklet was designed so that students could evaluate the goal setting activity they had undertaken over the past eight number unit lessons. The purpose of the evaluation was to gauge student feedback with items that specifically assessed the students' attitudes and beliefs towards setting goals, with some related specifically to the domain such as "I believe that setting goals helped me achieve better understanding in the number unit" (Item 1a), and "Did setting goals help you to focus more on your lessons in numbers?" (Item 2), to other items asking more broadly related maths questions, for example, "Has your attitude changed towards maths as a result of goal setting?" (Item 4). Consisting of seven items in total, there were a mixture of six fixed-response options with five (Items 1a, 2, 3, 5, and 6) requiring either a "yes" or "no", or "not sure" responses, a 4-point (Item 1b) and a 5-point (Item 4), with the final item (Item 7) open-ended in structure. Specifically, Item 7 was related to goal setting in general, asking students to write down any interesting points that they had learnt about goal setting.

Pilot

The two schools involved in the piloting of the GSSR booklet were selected by the researcher as they had a high degree of similarity to those schools that were to be used in the main study in respect to participants and geographical area. They were also the same teachers (four) and students that had been involved in the pilot testing of the GG-SQ used in Study 1. This familiarity was useful particularly in relation to the group of students, as in addition to developing a familiarity with the topic of goals and goal setting, they also felt more conversant with the researcher and their role in the pilot. As with Study 1, focus groups were directed to pay attention to the item meaning and response structure/design, as well as the overall comprehensibility and purpose of the booklet. Ensuring that the booklet was comprehensible to the younger students was particularly pertinent given that they were going to be engaging with the content over a period of time, and for the sake of collecting valid and reliable data.

Assessment tool for teaching and learning (asTTle)

The asTTle test is a widely used assessment tool in New Zealand primary schools for assessing literacy and numeracy against the objectives of the national curriculum levels. It is a curriculum-based resource that is able to be managed and used by an individual teacher and that takes advantage of item response modelling (IRT). Whilst a full presentation of the advantages of using IRT is beyond the scope of this study (see Hambleton, Swaminathan, & Rogers, 1991), one its main benefits lies in items having their own parameters, which are test and sample independent. This results in the ability for parallel tests to be constructed using different items, where those items have the same parameter (e.g., difficulty) values. This feature is of particular import to this study given that each school created their own tests, based on specific difficulty and curriculum specifications. In addition, asTTle provides dashboard reporting for individual students, thus enabling teachers to focus on educational interpretations and actions related to student learning (Hattie et al., 2005).

The asTTle tool enables teachers to create their own tests from an item database of 10,000-plus items that assess, in English or te reo Maori (pānui, tuhituhi, and pangarau), the literacy and numeracy development of students in Years 4 to 12 against the objectives of the national curriculum levels 2 to 6 and the national norms of performance of nearly 800,000 New Zealand students. Based on numerous standard setting workshops conducted with teachers, and using the Bookmark Standard Setting procedure (Mitzel, Lewis, Patz, & Green, 2000), cut-points subdivide each curriculum level into three sub-levels, namely, basic, proficient, and advanced. Having these sub-levels within each curriculum level provides the educator with more precise and specific information on a student's performance.

Teachers have a wide choice of, and control over, the asTTle tests, which provide rich interpretation of student performance. The test is created by the teacher according to curriculum foci that the teacher can select. In addition, the teacher can select the national curriculum levels (Ministry of Education, 1993) that the test should cover. Once the test is created and administered to the students, a weighted score for each item, which accounts for the item's difficulty, is converted into an asTTle subject scale. It is from this scale that standardised scores are derived (i.e., asTTle mathematics scale score), which are comparable to national means and aligned against the national curriculum levels.

The asTTle tool allows teachers to immediately analyse the achievement patterns of both individuals and groups of students and presents this analysis graphically in dashboard-style reports. Teachers can identify subsequent learning steps for individuals, groups, or classes by linking to an indexed online catalogue of classroom resources (“What Next”). The asTTle software also provides information on the strengths and weaknesses of individuals and groups, and can be used to identify whether progress is being made.

In addition to cognitive-based items, attitude sets are available for inclusion in the test. These sets are subject specific, with items covering the domains of attitude, engagement, motivation (general) and motivation (mathematics), interest, and self-regulation, for example “How much do you like doing maths at school?”, “How much do you like doing maths in your own time?” and “How good does your Mum or Dad think you are at maths?” The relationship between these attitudes towards a subject and achievement in a subject is valuable information that teachers can use to further understand some of the factors that make up their students’ learning.

The use of the asTTle tool allowed for the current study to measure whether students in both the intervention groups and the control groups had changed their attitudes from the pre-test to the post-test. The same items on attitude were included in both tests so as to ascertain a baseline attitude, and potentially any change in attitude post-intervention.

Procedure

asTTle administration

Prior to the intervention and post-intervention, all students participating in the study (intervention and control) were administered an asTTle test on number, based on national curriculum levels 3, 4, or 5 or a combination of these levels, as specified by their classroom teacher and based on the New Zealand Curriculum. In any one classroom, different students can be working at different curriculum levels, according to their ability. However, an average student is expected to progress through one curriculum level every two years. The pre-tests were administered before the classroom teachers taught the number strand of the mathematics curriculum. This set a benchmark before the teaching and informed all of the classroom teachers of the strengths and weaknesses of both the intervention and the control groups. The students were identified by a number assigned by the classroom teachers. The only other form of identification was the use of the letter “C” (control group) or “I” (intervention group). Five tests were set for the four schools, after

consultation with the classroom teachers at the four schools. The teachers were also consulted about the national curriculum levels their students were currently working at. This information was needed to determine which curriculum level to use as the benchmark for the tests. Once the curriculum level was established, the teachers also had to determine what they wanted the test to measure in each of four curriculum functions: number knowledge, number operations, algebra, and measurement. The classroom teachers were sent a copy of the asTTle test to be used for their class before it was administered to the students, to ensure that they were happy with the content of the test and that it would measure what they intended to teach in the number unit. There were also meetings with all of the teachers, before the tests were administered, to discuss their forthcoming unit of work and their learning intentions for the students. This ensured that the teachers of those classes who were involved in the intervention groups would be able to formulate specific goals they could use to assist students in their independent goal setting; it also ensured that these goals were to be specifically taught in the forthcoming unit of work in the number strand. The results from this discussion, and the type of tests set are outlined below.

School A required only one test for the control and intervention groups. This test was set at levels 2, 3, and 4 of the national curriculum. Of the 32 questions in the test, 16 were based on number knowledge, 11 used number operations, and five were from the algebra strand; in terms of cognitive processing, 18 questions were classed as surface learning questions and 14 were questions that tested deep learning. In terms of overall difficulty, some of the questions were set at level 2, most of the questions were at level 3, and a few were level 4.

School B required two tests, as the sample was taken from two classes that were streamed in the teaching of mathematics. The first test was designed for the top class in Years 7 and 8 (12-year-olds) and was set at levels 4, 5, and 6 of the national curriculum. Out of 33 questions, 20 were based on number knowledge and 13 were based on number operations. In terms of cognitive processing, 21 questions were surface-learning questions and 12 were classified as deep-learning questions. In terms of overall difficulty, most of the questions were set at level 4, some at level 5, and a few at level 6. School B's second test was set at levels 2, 3, and 4 of the national curriculum. Out of the 32 questions, 18 were based on number knowledge and 14 were based on number operations. The school did not request any algebra problems. The cognitive processing had the paper set at 20

surface-learning questions and 12 deep-learning questions. In terms of overall difficulty, a few of the questions were set at level 2 and most were at levels 3 and 4.

School C also required two tests. For one of its tests, the school agreed to use the test set for School A because it had the same curriculum coverage and levels that School C had requested. The second test was set at levels 3, 4, and 5 of the national curriculum. For this test, 17 of the 33 questions were based on number knowledge, 11 were based on number operations, and five were from the algebra component. The cognitive processing component comprised 20 surface-learning questions and 13 deep-learning questions. In terms of overall difficulty, some of the questions were set at level 3, most at level 4, and a few at level 5.

School D required only one test. Its asTTle test was set at levels 2 and 3 of the national curriculum. Of the 32 questions, 11 were based on number knowledge, 16 questions on number operations, and five were from algebra. In terms of cognitive processing, 19 of the questions were surface-learning questions and 13 were deep-learning questions. The overall difficulty of the paper was set at curriculum level 2, with only a few of the questions designed to assess level 3 of the curriculum.

Goal Setting Self-Review (GSSR) booklet administration

The GSSR booklet was given to all students in both the intervention and control classes. It began by asking the students to write down three goals for themselves based on the number unit they were about to study. Students in the intervention groups were also given the opportunity to look at their pre-test results from the asTTle test that had been marked prior to formalising their own learning goals. This test report was generated from asTTle and was individualised such that it highlighted each student's personal strengths and weaknesses according to the number strand. The goal setting process involved the teacher working with children in small groups, according to their mathematical abilities, and also individual discussion to assist each child to select and write down their mastery goals in their booklet based on test report information. These goals were seen as shared goals between the teacher and student.

Control group

In the control classes, the teachers were instructed to hand out the booklets and allow students time to write down their own three goals for the number unit. No instructions, examples, or talk about goal setting in any form was to be done by the

teacher; it was simply to be a student self-directed exercise. The control teachers were instructed not to offer any feedback in terms of the goals that the students wrote for themselves, or to read or ask the students to share their goals with them or their peers. At the conclusion of the students writing down their goals, the booklets were collected and stored until being given back to the students for the lessons in which the teachers chose to use the goal setting booklets. The booklets were used a total of eight times during the three- to four-week teaching programme; this was the same number as for the intervention groups.

For the individual class lessons, the booklet used the same format for eight lessons in both the control and intervention classes. It began by asking the student to write down the specific mathematics goal for that particular day's lesson. The teachers in the intervention groups were also instructed to get the students to refer back to their booklets and identify the goals that they had written so that they could establish if there was a link between what they had identified and what the teacher was going to be covering in the mathematics lesson. Once again, the lead teacher in each school ensured that this process was followed correctly. The control teachers, on the other hand, were instructed not to write down the specific lesson goal and to refrain from using the goal setting phrases during the teaching of the lesson. They were also asked not to instruct the students to refer back to their goals in their booklets at any time during the eight lessons.

Intervention

As with most classroom-based interventions, teachers played a pivotal role in both the teaching and reaffirming of goal setting to students, and in the administration of the pre- and post-asTTle tests, and in the distribution and collection of the GSSR booklets before and after each lesson. In addition, each school had a lead teacher appointed to the research project. It was the lead teacher's responsibility to meet regularly with the classroom teachers, in both the intervention and control groups, to ensure that the classroom teachers were following through with the instructions and process. Regular communication also ensured that all of the teachers in the project were adhering to the research protocols and could keep up with any issues that arose, and that all of the lessons were progressing, and the teachers would be able to administer the post-test at the time required for each school.

Teaching teachers goal setting strategies

The researcher met with all the teachers involved in the study to outline procedures around the intervention and administration of the measures. Teachers whose classes were to be part of the intervention programme were involved in two staff meetings where the research that had been conducted on goal setting, and that formed part of this thesis was explained in depth. In addition, the goal setting and significance of this intervention was thoroughly outlined to teachers, including their involvement in procedures.

The second staff meeting focused specifically on the types of goals, stressing the distinct differences between performance and mastery goals. The teachers were given the opportunity to write and set goals with the researcher to enable feedback to occur before the researcher commenced working with the intervention classes. As mentioned above, the teacher's role in the intervention was important, as they were present and actively part of the two consecutive sessions given to students in the intervention group. For example, in the first session, they supported students and gave feedback to the researcher as to the readiness of their class to use the GSSR booklets, and any additional relevant information. As such, it was essential to the success of the study that they were comfortable with the goal setting process, theory, and rationale.

Intervention classes

The intervention classes began with two consecutive sessions, of 45 minutes duration each, where the students were introduced to goal setting and taught strategies for setting personal goals for themselves in relation to the number unit about to be taught to them by their classroom teachers. The emphasis was on the teaching of how to write mastery goals. The researcher taught the students with their classroom teachers also in attendance, how to set and write mastery goals, how to break goals down into micro-goals for themselves, what challenge meant in a goal, and how to fill in the self-review questionnaire diary. At the end of each session, the researcher asked for feedback to ensure that the students understood what was being asked of them. The sessions were held a day apart so that the students could still remember the previous lesson; it also allowed for them to recall what they had been taught in relation to the smart, measurable, attainable, relevant, and time-bound objectives (SMART) for goal setting.

The same amount of time, in terms of teaching, was given to the control groups of students in their classrooms. These sessions were run by the classroom teachers and were

also held a day apart. However, these children were involved in problem-solving activities that, although related to the number strand they were studying, did not involve any discussion or teaching of goals and goal setting; neither were these students introduced to the GSSR booklets or shown how to complete these. The control group were administered the booklets and asked to complete them in the same manner as the intervention group. However, the point of difference being that the control group did not receive the teaching around goal setting and goal setting strategies. Therefore the control group were completing the booklet based on their own personal understanding or knowledge of goal setting. The lead teachers were responsible for the timing of the distribution of the booklets between the two groups.

Ethics

Approval for the study was granted by the University of Auckland Human Participants Ethic Committee (Ref 2008/411), thus ensuring that the research complied with the committee's code of ethics pertaining to the conduct of research involving human participants. The key principles that underpinned this research were voluntary participation, informed consent, confidentiality, and anonymity of data. Participants were informed that participation in the research was voluntary and that they had the right to withdraw from the study within a specified time. Informed consent was obtained by providing schools and participants with an information sheet that explained the purpose of the research and the nature of involvement. Teachers gave students information to take home to their parents to obtain signed consent. In addition, students were also asked to complete assent forms.

Statistical Analysis

All data were entered into, and analyses conducted using SPSS for Windows, 18.0. Data analysis involved ascertaining the psychometric properties of the GSSR, and analysis of performance across the groups, specifically, repeated measures ANOVA and when required, post hoc analysis. The psychometric properties were established first, by assessing the factorial validity of the GSSR using exploratory factor analysis (EFA). Given that data were normally distributed, a maximum-likelihood extraction method was applied. As it was expected that there would be some correlations between factors, an oblique rotation method was used to simplify and clarify the data structure. Based on the structure found, the GSSR was further assessed by examining the correlations among the established factors. Internal consistency was examined using item-total correlations, and Cronbach's

alphas are reported. Having established the psychometrics of the GSSR, the analysis proceeded to the examination of the differences between the intervention (experimental) and control groups, pre-test-post-test differences with groups, and the interactive effects of time and the intervention. After verifying the basic assumptions of normality, homogeneity of variance, and independence, a series of repeated measures ANOVAs were used to test for significant differences between students in the intervention and the control group, at the two time points in time, on the major variables of (a) students' performance on the asTTle mathematics test, and (b) students' attitude towards mathematics as a subject. In addition, repeated measures ANOVA interaction between these variables and students' gender were examined. Multivariate analysis was not conducted on students' age and school year as there was not the level of variability needed to make any meaningful inferences from the data. Similarly, a lack of variability and normality meant that the maths attitude items could not be analysed beyond a descriptive level.

The 20-item goal setting review of why students felt they had, or had not, achieved their learning goal for the lesson tasks was completed during each of the eight lessons. A clear three factor solution was found among the responses to the GSSR, where the factor loading criterion of .30 or higher was used (Kline, 2005). Specifically, items were found to load together where they related to issues of attention and motivation (Factor 1), goal setting strategies (Factor 2), and commitment to reach the goals set (Factor 3). Based on this analysis, no items were required to be eliminated due to cross loading or negative loading on a single factor.

Across all eight goal setting sessions, results showed that these three factors were extremely consistent, indicating the temporal stability of this solution over the 8-week period (see Table 16).

Table 16
Goal Setting Tasks in Eight Lessons

	Session 1			Session 2			Session 3			Session 4			Session 5			Session 6			Session 7			Session 8		
	Factors			Factors			Factors			Factors			Factors			Factors			Factors					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Attention and Motivation																								
I was not distracted	.72	.01	.15	.74	-.02	.08	.65	-.05	.25	.60	.06	.13	.70	-.02	-.03	.58	-.08	-.17	.74	-.11	-.08	.54	-.28	-.26
I listened and concentrated	.68	-.02	-.06	.69	-.03	-.19	.58	.02	-.03	.50	.13	.13	.57	.18	-.28	.72	.01	.04	.49	.28	-.07	.58	-.13	-.22
I stayed on task	.66	-.01	.19	.65	-.02	.03	.59	-.01	.05	.51	.05	-.02	.55	.20	-.22	.55	-.09	-.06	.72	-.22	.00	.51	-.24	-.13
I paid attention	.54	-.09	-.31	.34	.01	-.18	.70	-.29	-.10	.48	.29	.12	.62	-.08	-.03	.71	.04	.13	.43	.04	.02	.58	-.13	-.03
I felt positive	.36	.12	-.10	.29	.01	-.04	.70	-.04	.05	.34	.14	.14	.69	.38	.25	.63	.02	.01	.54	-.00	.15	.57	-.03	-.06
Strategies																								
I used a calculator	-.05	.48	.14	.02	.56	.07	.25	.48	-.18	.02	.30	.02	-.01	.42	-.13	.08	.53	-.06	.11	.38	.22	-.17	.52	-.07
I looked at examples	.11	.47	.19	.06	.30	-.11	.14	.33	-.14	.04	.48	.12	.14	.61	-.14	.17	.29	.10	.28	.49	.14	.25	.60	-.04
I looked back at previous work	-.03	.46	.02	.03	.51	.01	-.10	.55	.02	-.05	.57	.03	-.19	.75	-.15	.17	.34	.04	.38	.75	.03	-.07	.82	-.30
I reworked wrong examples	.11	.43	-.06	.01	.49	-.04	.03	.54	-.05	-.11	.60	.18	-.02	.67	.14	-.04	.58	.01	.17	.69	.10	.09	.41	-.27
I used a numeracy strategy	.19	.42	.21	.18	.22	.05	.15	.37	.11	-.04	.28	.08	.16	.21	.19	.25	.39	.12	.14	.37	.14	.04	.43	-.15
I used a computer	-.03	.36	-.16	.09	.33	.12	-.13	.27	.20	.09	.58	-.08	-.02	.48	.14	-.07	-.41	-.10	-.01	.51	.09	.01	.32	-.07
I checked my answers	.18	.35	-.25	.00	.24	-.28	.29	.28	.16	.16	.34	.15	.25	.37	.03	.18	.49	.10	.34	.47	.13	.13	.53	-.13
I worked out why I got it wrong	-.07	.35	-.11	-.12	.40	-.24	.05	.63	-.04	.07	.53	-.05	.07	.31	.21	-.02	.63	.04	.17	-.35	-.14	.08	.45	-.27
I asked a friend	-.03	.26	-.05	-.06	.35	-.06	-.18	.63	-.11	-.06	.51	-.05	-.08	.38	-.02	-.29	.48	-.16	-.01	-.42	.07	-.05	.30	-.15
I used maths equipment	.10	.25	-.10	-.01	.38	.02	.17	.27	-.04	.07	.41	.12	.03	.28	.21	.11	.30	-.16	-.09	.55	.06	.07	.60	.03

Table 16
Goal Setting Tasks in Eight Lessons (continued)

	Session 1			Session 2			Session 3			Session 4			Session 5			Session 6			Session 7			Session 8		
	Factors			Factors			Factors			Factors			Factors			Factors			Factors					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	Commitment to Reach Goals																							
I wanted to achieve today's goal	.27	.02	-.45	-.01	.04	-.67	.05	.08	-.24	-.01	-.04	-.79	.14	-.02	.32	.20	.14	-.54	.09	.29	-.40	.19	.30	.67
It was one of my personal maths goals	.00	.08	-.35	.06	-.03	-.22	.19	.17	-.36	-.08	.21	.80	.01	.08	.47	-.01	.13	-.34	.19	.03	.50	.14	.18	.50
I asked my teacher	.02	.10	-.34	-.08	.04	-.37	-.06	.24	-.41	.19	.38	-.57	.03	.17	.34	-.09	.16	-.35	.15	.10	.48	-.04	.18	-.37
I wanted to learn	.28	.13	-.32	.05	-.03	-.51	.14	.24	-.34	.04	.17	.42	.23	.04	.50	.21	.20	.35	.11	.27	-.47	.16	.22	-.42
It was easy	.18	.11	.31	.21	.04	-.28	.11	.13	.71	-.01	-.14	.31	.14	.04	.49	.09	-.03	-.33	.11	.03	.34	.18	.03	.70

Correlations between the three factors were conducted to determine if these factors were relatively constant across both time periods. Results showed that correlations found in Time 2 (post-test) were relatively similar to those found in Time 1 (pre-test), which indicated that the structure of the three factors was reasonably constant (see Table 17).

Table 17
Correlations for the Three Factors Across Pre-test (Time 1) and Post-test (Time 2) Goal Setting Tasks

Strategies	Attention and Motivation	Strategies	Commitment to Reach Goals
Attention and Motivation	–	.68	.82
Strategies	.65	–	.71
Commitment to Reach Goals	.79	.69	–

Note: The correlations for Time 2 are presented in bold.

To ascertain whether any of the items were problematic, item correlations were conducted between item responses and the sum of these responses to all other items under each of the three subscales. The resulting item/total correlations ranged from .39 to .79 for the Attention and Motivation subscale, .36 to .77 for the Strategies subscale, and .32 to .67 for the Commitment to Reach Goals subscale. Results showed that the elimination of the items with low correlations did not have a noticeable impact on the value of Cronbach's alpha values, hence, all the items were retained for further analyses.

In order to assess the reliability of the three factors across the eight goal setting lessons, coefficient alpha was used to measure the degree of internal consistency (see Table 18). Although the factor representing the Commitment to Reach Goals items appears to be less reliable than the other two, all three factors were deemed to have sufficient internal consistency to create total scores from each of these clusters. Given the lower coefficients for Commitment to Reach Goals, caution was taken when interpreting findings related to this factor.

Table 18
Alpha Coefficients for the Three Factors Across the Eight Lessons

Lesson	Attention and Motivation	Strategies	Commitment to Reach Goals
1	.73	.64	.55
2	.73	.63	.56
3	.77	.69	.57
4	.70	.68	.61
5	.78	.68	.62
6	.76	.67	.63
7	.71	.76	.59
8	.76	.74	.65

Performance Analysis

Table 19 shows the means, standard deviations, and gain score differences for both the experimental and control groups' performance on the asTTle mathematics test (aMs scores) and the mathematics attitude items, across both time periods. Differences in pre-test maths performance between the two groups were minimal ($d = .14$), which is clearly a desirable finding pre-intervention. Both groups had increased their aMs performance from Time 1 to Time 2 measures, which is not unexpected given the knowledge that students' gain as they are taught and progress through the maths modules. However, post-test results showed that this difference had increased fourfold, with the intervention group showing a 41.14 mean score difference compared with their control peers. In addition to the differences between each group at each time period, achievement results for each group across the two time periods showed the intervention group had an average increase of 70.18 in their maths scores, compared to the control group who gained on average 38.90. Thus, the intervention group had gained almost double the maths scores of the control group, over the two time periods.

Given the minimal changes in mean attitude scores for both groups, across the two time periods, no further analyses were conducted on this measure due to a lack of variability in scores. However, the means for this scale are presented below in Table 19.

Table 19
asTTle Mathematics and Attitude Mean Scores and Score Differences on Pre-test and Post-test Measures

Period	Scale	Group	<i>M</i>	<i>SD</i>	Mean score differences between Groups I–C	Mean score increases/decreases T2-T1 (+/-)
Pre-test (T1)	Pre-test aMs score	Intervention	580.16	129.98		
		Control	570.30	97.01	9.86	
	Pre-test maths attitude score	Intervention	2.89	.54		
		Control	2.85	.55	.04	
Post-test (T2)	Post-test aMs score	Intervention	650.34	134.09		+70.18
		Control	609.20	92.89	41.14	+38.90
	Post-test maths attitude score	Intervention	2.88	.58		-.01
		Control	2.90	.59	.02	+.05

Note. T1 = Pre-test (Time period 1) and T2 = Post-test (Time period 2) mean scores. I = Intervention group and C = Control group. Minus sign indicates a mean score decrease from pre-test to post-test, where a positive sign indicates a mean score increase between pre-test to post-test mean scores.

Several repeated measures were conducted to confirm these reported mean differences in performance. A repeated measures ANOVA, was conducted to assess whether the mean differences in performance post-test between the groups was statistically significant. A Greenhouse-Geisser correction was used given that the sphericity assumption was not met for the achievement data. Group by time interactions were found on the aMs, confirming the mean scores for the students in the intervention group were statistically significantly higher than the mean scores for peers in the control group ($F(1, 203) = 5.16, p < .05, R^2 = .44$). With respect to the degree of improvement achieved by each group over time, results indicated that the students in the intervention group improved more than the control group students ($F(1, 203) = 3.77, p < .05, R^2 = .36$).

Effect sizes were also used to interpret the performance differences between groups. To compare each group, effect sizes were calculated using the difference scores of both groups (as presented in Table 20). Following Cohen's criteria for effect size values, an effect size of 0.34 should be interpreted as small, the effect sizes of 0.59 and 0.61 should be interpreted as medium, and the effect size of 0.90 should be interpreted as large. The effect sizes on the aMs were 0.73 for the intervention group, and 0.41 for the control

group. Thus, a medium effect size was found in relation to the intervention group's performance.

As outlined in the introduction, an additional focus of this study was the examination of gender differences from the impact of the goal setting intervention. Therefore, a separate analysis was conducted to examine the effect of the goal setting intervention on the male and female students in this group on their mathematics performance. As Table 20 highlights, there were no statistically significant differences ($F(1, 203) = 10.29, p = .06$), in aMs scores between genders (males = 587.19; females = 571.63) in the intervention group. Similarly, no statistically significant differences were found among male (aMs = 595.82) and female (aMs = 553.80) students in the control group at Time 1 ($F(1, 203) = 12.63, p = .07$). Likewise, an examination of differences in performance between males from each group ($F(1, 103) = 5.77, p = .06$) and females ($F(1, 104) = 6.28, p = .06$) from each group pre-intervention were not statistically significant.

Table 20
asTTle Scores on Pre-test and Post-test and Differences Between the Intervention and Control Groups According to Gender

Test	Group	Gender	<i>M</i>	<i>SD</i>	<i>N</i>
Pre-test score (T1)	Intervention	Male	587.19	122.30	56
		Female	571.63	118.63	46
	Control	Male	592.82	91.33	46
		Female	553.80	98.48	58
Post-test score (T2)	Intervention	Male	639.44	131.44	56
		Female	627.73	126.85	46
	Control	Male	614.37	95.20	46
		Female	606.91	91.81	58
Difference between pre- and post-test	Intervention	Male	52.25		
		Female	56.10		
	Control	Male	21.55		
		Female	53.10		

Note. T1 = Pre-test (Time period 1) and T2 = Post-test (Time period 2) mean scores.

Post-test findings revealed within group similarities, but between group differences. Both male (aMs = 52.25) and female (aMs = 56.10) students in the intervention group showed similar gains in their aMs scores. However, male students from the intervention group showed over double the gains in their mathematics performance (aMs difference = 52.25), in comparison to their male peers from the control group (aMs difference = 21.55) (see Figure 2).

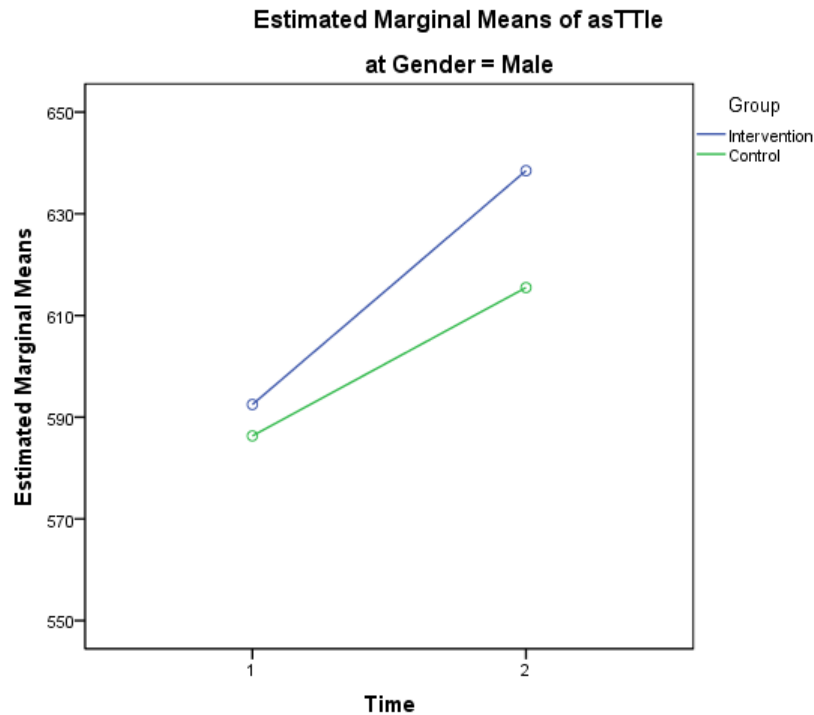


Figure 2. Male aMs performance across groups across both time periods.

Discussion

The current study measured the results of a goal setting programme that taught students the importance of personalised goal setting, of developing their own intention to learn, and of measuring their own success. A statistical analysis demonstrated a small effect size when the academic achievement and self-regulatory learning of the intervention group was compared to that of the control group.

This study was also interested in examining whether there was a significant difference in the impact of the development of individual student academic goals in terms of academic achievement between male and female students. The results indicated that the males who were in the intervention group produced the biggest gain in performance compared with the males who were in the control group. Although females in the intervention group also showed a gain over those females who were in the control group it was small in comparison to the gain of the males. This would indicate that the intervention method and teaching approach that were used perhaps worked more favourably for male students. The intervention approach involved the teacher being specific about what the daily learning mathematics goal was with a mastery focus and also directing the students to engage in the lesson by looking at their GSSR booklet and indicating whether it was their own personal goal and also how much effort they were going to put into the lesson. This

engagement with their students appeared to lead to an increase in motivation and attention, which was the underlying reason that the students identified as to whether they achieved their goals or not.

Males as previously discussed have a different goal setting focus towards schools and tend to be more performance based with regards to their learning (Patrick et al., 1999). It would appear that the GSSR booklet and the teacher-supported mastery learning worked strongly with the males in the intervention group and that they needed to be in the type of learning instruction that focuses on the next steps in their learning and allowing them some control over setting their learning goals.

Future research could test the malleability of student goal orientation and the contention that specific teaching of mastery goals may alter student views.

At the conclusion of each of the eight lessons, the students were asked to reflect on whether they had or had not achieved the specific lesson goal. They were then asked to indicate from a range of possible criteria the reasons why they believed they had, or had not achieved the goal. Such criteria as “I wanted to learn about today’s lesson” and “I paid attention” feature on the list of success criteria, while others such as “I was distracted” and “I didn’t understand what I was supposed to be doing” featured as some of the reasons the students did not have success. The students were asked to reflect on specific lessons twice-weekly for four weeks, thus, reflecting on a total of eight lessons. Findings showed that three factors were identifiable across each of the eight goal setting lessons. The first factor related to attention and motivation, the second to the actual strategies adopted by students in order to reach their goal/s, and the third related to the students commitment to reach the goal/s.

Results showed that the GSSR measure was a reliable and valid instrument for establishing the goal setting tasks that students performed over the duration of this study. Further results showed that the three subscales were reasonably correlated, indicating the relationship that these constructs have to the overall measurement of goal setting.

Unfortunately, two aspects of the GSSR were not analysed in this study. The students in the intervention groups were asked using an open-ended item to write down three goals that they wanted to achieve in relation to the number unit that they were going to be taught. Prior to this they had seen their individual asTTLe test results, had seen the areas that they still had weaknesses in and had also been through the two goal setting

sessions. In consultation with their classroom teacher either as a one-on-one exercise or as a small group, they were given the GSSR booklets and asked to write down their three goals. Because these goals were directed and assisted by the classroom teacher it was not felt that it was meaningful to analyse or code these items due to the difficulty in ascertaining how much assistance and support had been given. The objective was not what they actually wrote down but that the teaching exercise introduced by the classroom teacher was mastery oriented in its focus.

In the control group, the students were handed out the booklets by their classroom teacher and asked to write down three personal maths goals with no explanation or assistance from their teacher. When booklets were collected at the completion of the study, it was found that there were a significant number of students who had not written down all three of their personal goals. Given the large degree of missing data associated with this item, it was not possible to code these into any themes for further analysis. The only coding the researcher was able to determine was that the majority of the goals set by these students had a focus predominantly on performance-based goals that could also be classified as being general in terms of overall mathematics achievement and were not specifically related to the unit of work that they were studying.

The evaluation section was designed so that students could evaluate the goal setting activity with some self-reflective type questions. Unfortunately, this section was the poorest overall in terms of completion for both groups. This could have been because this page was missed out as it was right at the end of the booklet and it was simply forgotten. The low response rate made further statistical analysis not possible.

The role of teachers is essential to academic goal achievement in mathematics for students. The teachers in the intervention groups played an active part in the teaching and reinforcing of mastery goal setting with their students and as a result had higher academic mathematics results with their students than those teachers who did not engage in active goal setting. This supports the findings of Gollwitzer and Sheeran (2006) on the implementation of goals. The teachers, in working with the students are able to direct and also ensure that the goals set are known to both parties. These goals form the bases of learning intentions (Ames, 1992; Hattie, 2009). Teachers are able to ensure that the goal is achievable for the student and that the student has clear steps towards the mastery of that goal. This also supports the work of Martin (2006) who proposed that task-specific and situation-specific goals that have a strong relationship to why students want to achieve a

particular outcome, are necessary. Locke (1996) also emphasised the importance of individuals participating in the goal setting process by demonstrating that this led to a commitment to achieve the goal, especially if the individual had shared their goals with others. In the case of the intervention groups it was their teacher. It was this increase in commitment from the intervention group and especially the males that resulted in the increased academic achievement over the control group in mathematics.

For the students, the underlying key to success is to be able to tap into their attention and motivation levels. This comes about through the teacher engaging students in their own learning by ensuring that they understand the individual steps they need to take to attain mastery of the mathematics goals that were set by the student but shared with the teacher. This supports the findings of Timperley and Parr (2009) who posited that unless students have an in-depth understanding of specific learning goals and mastery criteria, they would be unable to set and monitor their own learning goals accurately, a statement also supported by Schunk (2003).

Building on the findings of the first two studies led to the design of Study 3, which surveyed students between the ages of 10–13 years from a larger and more diverse group of students across a wider socioeconomic level. Study 3, using a questionnaire took an in-depth look at the role of student attention and motivation in goal setting as well as revisiting some of the questions posed in the first survey of Study 1 to see whether attention and motivation were also identified by a larger group as being significant factors in their learning. This study is discussed in the next chapter.

Chapter 5:

Study 3: Students' Attention, Motivation and Goal Setting

The present study sought to examine whether the constructs of student attention, motivation, and goal setting beliefs which were highlighted as key elements in Study 2, were also prevalent across a larger and diverse groups of students. As such, the main focus of this study was, first to confirm the structure of attention, motivation, and goal setting beliefs and second, to explore the impact that students' age or gender might have on their own perceptions of these constructs. In addition to the latter, an examination of these moderators was applied to the type of school work goals that were set by students. Given the distinction that was apparent in Study 1 between the types of goal orientation (i.e., Mastery vs. Performance) by which listed goals could be categorised, this study similarly examined the degree to which this distinction could be applied to the academic goals listed by students, but across a much more diverse group.

Goal setting research has identified that elements such as goal difficulty and challenge (Mento et al., 1992; Wigfield & Eccles, 1992) and proximal versus distal goals (Bandura & Schunk, 1981; Schunk, 1990) are essential elements for successful goal setting outcomes. While these factors may be important, results from the previous study (Chapter 4), in which students were asked to reflect as to whether they felt they had achieved their goals and why, suggested these factors were not important in the students' eyes. Rather, the students identified attention, motivation, and strategies as being the reasons that they believed they achieved their learning goals. Given this finding and the areas of focus outlined above, the following research questions were posited for this study:

- Do a diverse group of students identify attention, motivation, and goal setting strategies as being important for achieving goals?
- What are the associations between the three variables: attention, motivation, and goal setting strategies?
- Are there differences in student self-report of attention, motivation, and goal setting strategies by gender?
- Are there differences in student self-report of motivation, attention or goal setting strategies by age?

Method

Participants

The sample was comprised of 422 primary and intermediate school students (Years 5 to 8) from five primary schools in Auckland, New Zealand. Participants' ages ranged from 9–13 years, with a mean age of 10.5 years ($SD = 1.16$), and an even distribution of male (51%) and female (49%) students across the sample.

Sampling

As in the previous two studies, the principals from the schools that participated in the study were members of the Auckland Primary Principals' Association. In order to ensure a wider spread of deciles and a larger sample size, ten school principals were personally approached by the researcher, with five agreeing to their schools' participation. To avoid the issue of resampling some of the same students used in the previous studies, the schools used previously in Studies 1 and 2 were excluded as part of this study. Hence, this was an independent sample. As a result of using a sample of convenience, unlike the previous two studies, a larger sample size and better representation of schools' deciles were obtained. A brief description of each school is as follows:

School A: A contributing Primary School, Years 1–6, decile 7, Year 5 and 6 students, three classes of students.

School B: A contributing Primary School, Years 1–6, decile 4, Year 5 and 6 students, two classes of students.

School C: A contributing Primary School, Years 1–6, decile 1, Year 5 and 6 students, two classes of students.

School D: A large intermediate Primary School Years 7–8, decile 6, three classes of students.

School E: An inner city contributing Primary School, Years 1–6, decile 6, Years 5 and 6 students, three classes of students.

The participating schools were sent an information pack including introductory information, an information sheet, and an informed consent form for the Board of Trustees, the principal, and the participating teachers who had students between the ages of 9 and 13 years. The researcher then met with the teachers who would be involved, in order to

discuss the purpose of the research, and in particular, the logistics surrounding the intervention programme and requirements of administration.

Table 21 shows frequencies and percentages for the age and gender of each student from each school, and respective totals.

Table 21
Distribution of School Sample by Age and Gender

School	Gender	Age					<i>N</i>
	Male/Female	9	10	11	12	13	Total (% of Total)
A	39/41 (49%/51%)	23 (29%)	44 (55%)	13 (16%)	0 (0%)	0 (0%)	80 (19%)
B	66/55 (55%/45%)	30 (24%)	60 (49%)	33 (27%)	0 (0%)	0 (0%)	123 (29%)
C	20/17 (54%/46%)	5 (14%)	19 (51%)	13 (35%)	0 (0%)	0 (0%)	37 (9%)
D	48/47 (51%/49%)	0 (0%)	0 (0%)	16 (17%)	45 (47%)	34 (26%)	95 (23%)
E	40/44 (49%/51%)	24 (28%)	37 (42%)	26 (30%)	0 (0%)	0 (0%)	87 (20%)
Total (% of Total)	213/204 (51%/49%)	82 (19%)	160 (38%)	101 (24%)	45 (11%)	34 (8%)	422 (100%)

Scale development

Instrument

Participants completed the 16-item School Work Goals Questionnaire (SWGQ). This scale consisted of seven goal setting items, four items measuring attention, and four items measuring student motivation. In addition, the SWGQ consisted of four demographic questions, specifically, gender, age, and the ethnicity of the student. Students were also asked what year they were currently in at school.

As outlined in Study 1, the underpinning theory and item structure (e.g., wording and focus) of these items came from the Patterns of Adaptive Learning Scales (PALS) (Midgley et al., 2000). Further scales were developed from items used in a large-scale project (Rubie-Davies & Hattie, 2012) in which motivation and engagement were measured.

Table 22 presents the constructs and fixed-choice items analysed in this study, which were based on a 5-point Likert scale (1= “false”, 2 = “mostly false”, 3 = “sometimes false”, “sometimes true”, 4 = “mostly true”, 5 = “true”).

Table 22
Constructs and Closed-ended Items (n = 15) for the School Work Goals Questionnaire (SWGQ)

Construct	Item No.	Item Stem
Goal Setting	1	Setting goals helps me to achieve better results
	2	I think that it is important to set goals in my class work
	3	Setting goals helps me to focus and try harder
	4	Setting goals can help you achieve something new
	5	My teacher has taught me how to set goals in my class work
	6	People that set goals do better than people who don't
	7	My teacher sets goals for me
Attention	8	I can easily concentrate on maths during class
	9	I can easily focus on my work during maths
	10	I can easily get myself to do maths homework when there are other interesting things to do
	11	I can easily arrange a place to study without distractions
Motivation	12	I really want to learn as much as I can in maths this year
	13	It's important to me that I improve my skills in maths this year
	14	Children succeed in maths if they work hard
	15	Maths is an important and really useful subject

The format of the final item (Item 16) was open-ended and invited students to write down their own specific academic work goals and to indicate, from those listed, which had been “achieved” and which were “yet to be achieved”. This item gave the students space for a maximum of four goals to be listed. The inclusion of Item 16 enabled the evaluation of the types of academic related goals that students had undertaken. Specifically, the goals listed, were categorised as representing either performance or mastery oriented goals (see below).

Procedure

Ethics approval was obtained for this study before it commenced. Class teachers participating in this research assisted with the distribution and collection of questionnaires. Consistency was strengthened and potential sources of systematic measurement error decreased by ensuring that the survey was administered by each school at the same time and on the same day. This ensured not only consistency relating to the administration of

the survey, but also avoided contamination within each school from students sharing responses with peers in other classes.

Prior to the teachers undertaking the survey with their classes, the researcher ensured that each teacher was familiar with what was expected, before inviting them to have their class complete the survey. No teachers reported any difficulties. As confidentiality of the data and anonymity had been assured, there was no information in the questionnaire that could identify a participant.

Ethical considerations

Approval for the study was granted by the University of Auckland Human Participants Ethics Committee (Ref 2011/521) ensuring that the research complied with the Committee's code of ethics pertaining to the conduct of research involving human participants.

The key principles that underpinned this research were voluntary participation, informed consent, confidentiality, and anonymity. Participants were informed that participation in the research was voluntary. Informed consent was obtained by providing schools and participants with an information sheet that explained the purpose of the research and the nature of involvement. Teachers gave students information sheets and consent forms to take home to their parents to obtain signed consent. Consent forms were collected from the parents of all participants and will be held for a period of six years. Students did not need to sign assent forms since completion of an anonymous questionnaire at the University of Auckland is deemed to indicate consent. Participants were assured of anonymity and this was achieved by assigning a generic identifier to all data.

Administration

The students' teachers, who administered the questionnaire in a 25-minute period, were briefed about the structure, purpose, and administration of the goal setting questionnaire before giving it to the students. In particular, teachers were instructed not to interpret any of the questions, but they were allowed to explain terms, or answer any questions that the students may have had. They were also asked to instruct students to omit any item they did not understand, thus reducing measurement error introduced by aberrant item responses and teacher bias through leading suggestions towards the answers. The questionnaire was handed out to each child who had completed and returned the signed

consent forms from their parents. The students participating were informed that the questionnaire was anonymous and they were not to put their name on the paper. The students were also informed that they did not have to answer all of the questions, and when they had completed the questionnaire they were instructed to fold it in half and place it in a box. Students were advised that their participation was completely voluntary and that they were under no obligation to submit a questionnaire. Those students who had not returned signed consent forms were instructed to read or complete work quietly while the survey was being completed in the classroom.

Results

Statistical analyses

Data analysis involved ascertaining the psychometric properties of the SWGQ, and analysis of students' responses using ANOVA. Given the application and findings of the previous studies in this thesis, the demographics of gender and age were again applied as moderators against which performance might be differentiated. Further, multivariate analyses of variance (MANOVA) was used to analyse the mean differences on these moderating variables simultaneously, and by doing so controlled for any intercorrelations between the variables. Where statistically significance differences were found, post hoc analyses were conducted.

Pearson's product-moment correlation was applied to ascertain consensus between each categorisation of goal orientation. Chi-square tests of independence were conducted for the open-ended item (Item 16) to examine the relationship between goal orientation (e.g., mastery or performance) and the demographics of age and gender.

The psychometric properties were established first, by assessing the factorial validity of the SWGQ using exploratory factor analysis (EFA). As data showed normality, a maximum-likelihood extraction method was applied. Based on the results of the EFA, confirmatory factor analysis was conducted to assess the fit of the three constructs and their associated items

Given the theory showed that these constructs would be correlated, an oblique rotation method was used to simplify and clarify the data structure. Based on the structure found, the SWGQ was further assessed by examining the correlations among the established factors. Estimates of reliability were examined using item-total correlations and Cronbach's alpha.

Table 23 shows the means, standard deviations, and reliability estimates for the three scales in the SWGQ measure. Means of the total scores showed that the Attention items had the lowest score ($M = 14.54$, $SD = 3.26$), whereas the mean of Goal Setting's total score was almost double ($M = 27.13$, $SD = 4.85$). These total scores were converted into mean response categories by transforming means across the items within each subscale. Attention ($M = 3.52$, $SD = .88$) showed that students' responses fell between "sometimes false, sometimes true" – "mostly true", whereas, the mean response category for Goal Setting ($M = 4.51$, $SD = .54$) fell one response category higher, "mostly true" – "true". Following George and Mallery's (2003) criteria for evaluating alpha coefficients, the alphas for each of the three subscales were acceptable (see Table 23). Further, overall the scale produced a good reliability estimate, $r = .83$.

Table 23
Means, Standard Deviations, and Internal Consistencies of the School Work Goals Questionnaire Constructs

Constructs	Cases (n)	(M)	SD	α
Attention	422	14.54	3.26	.74
Motivation	419	17.72	2.56	.71
Goal Setting	420	27.13	4.85	.78

Exploratory Factor Analysis of the School Work Goals Questionnaire

To assess the structure of the SWGQ an exploratory maximum likelihood factor analysis with an oblique rotation was conducted (Fabrigar et al., 1999). It was expected that there would be three factors corresponding to the theorised three scales. Only three factors had eigenvalues larger than 1.00, accounting for 42.70% of the variability. Given this, a three-factor solution was considered to be the most parsimonious explanation of the data. In addition to the scree plot indicating that three factors best described the data, based on Thompson and Dinnel's (2003) criteria, the first three factors accounted for more than 5% of the total variability explained.

Structural Equation Modelling of the Goal and Goal Setting Questionnaire

In order to confirm the three-factor structure as indicated by the analyses presented above, and to obtain estimates of the parameters of the model, a confirmatory factor analysis was conducted using structural equation modelling (see Figure 3). On the basis of the recommendation of Hoyle and Panter (1995), this study included both absolute and

incremental goodness-of-fit indexes for comparing models and analysing invariance. The absolute fit index was represented by the chi-square statistic, although this statistic is problematic in terms of its power, especially with larger samples (see Marsh et al., 1988). As Byrne (2001) noted, no matter how well postulated a model is, it will always be falsely rejected given sufficient sample size. Thus, the chi-square statistic is reported but is not overly emphasised in the results. Following Conroy et al.'s (2003) suggestion, greater emphasis was placed on the relative fit indexes, as these “are less sensitive to sample size and are more appropriate for evaluating badness of fit in regard to misspecification of factor loadings” (p. 407).

The incremental goodness-of-fit indexes used were the comparative fit index (Bentler, 1992), the Tucker-Lewis Index (TLI) (Tucker & Lewis, 1973), and the root-mean-square error of approximation (RMSEA) (Steiger & Lind, 1980). Both the CFI and the TLI have coefficient values ranging from 0 to 1.00, with values of (or near) .90 and higher traditionally viewed as representing good fit (Bentler, 1992). Although there is conjecture around suggested fit values for the RMSEA, generally there is mediocre to good fit where values fall between .08 and .10, and very good fit where values are below .08 (Browne & Cudeck, 1993; Byrne, 2001; MacCallum et al., 1996). The normed fit index (NFI) also has coefficient values ranging from 0 to 1.00. A value of greater than .90 has traditionally been used to indicate a good fit, but a .95 cut-off point has been suggested as more appropriate (Hu & Bentler, 1999). It should be noted that NFI tends to underestimate fit (Byrne, 2001). The incremental index of fit (IFI) was also used, however, and this index of fit was “developed by Bollen (1989b) to address the issues of parsimony and sample size which was known to be associated with the NFI” (Byrne, 2001, p. 83).

The assumptions of multivariate normality and linearity were established using box plots and the Mahalanobis distance measure. There were no univariate or multivariate outliers, and missing data were handled through the use of the maximum likelihood estimation process. The choice of the maximum likelihood approach, over estimation options (e.g., weighted least squares, two-stage least squares, asymptotically distribution-free), was appropriate as the data were normally distributed (Kline, 2005).

Model-data fit indexes confirmed that the hypothesised structural model showed excellent fit to the data. The chi-square value provided data fit ($\chi^2 = 692.71$, $df = 36$, $p < .001$) with a χ^2/df ratio of 9.36. However, as previously mentioned, caution is needed in the interpretation of this index. Relative fit indexes showed the TFI = .96, CFI = .97, IFI =

.97, and the NFI = .93. All but one of these indexes met the Hu and Bentler (1999) revised coefficient criteria ($>.95$), indicating strong fit to the data. Further, the RMSEA value for this model was .04, reflecting a strong level of accuracy for these three constructs. Based on this, no post hoc modifications to the estimation process were conducted on the model.

Figure 3 also presents the correlations between each of the three factors. The correlations were between .4 and .6, which indicated that they may all relate to a common second order factor. However, the important finding here is that these correlations showed that there is sufficient variance between these constructs to justify analysing them as three distinct measures. Thus, the following performance analysis was conducted based on each of the three subscales.

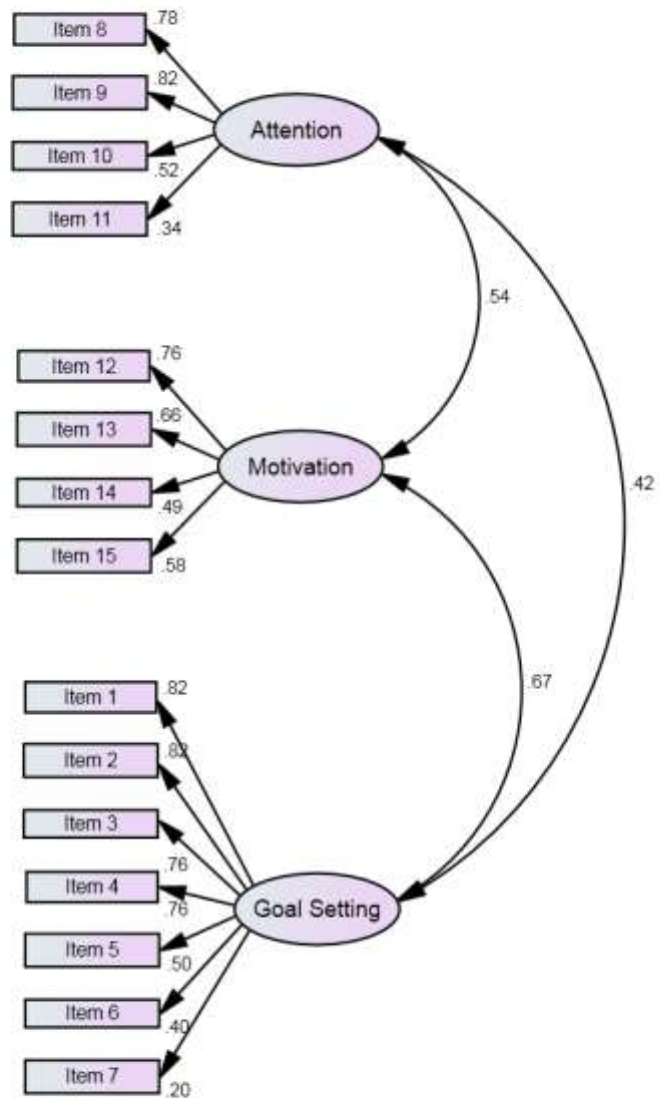


Figure 3. Structural Equation Model showing the hypothesised three constructs and related closed-ended items in the School Work Goals Questionnaire. Note: See Table 22 for item stems.

Performance Analysis

ANOVA results for the mean scores on the three scale fixed-choice items are presented in Table 24. Analyses were conducted to examine whether there were differences between students by age and gender for each of the three subscales. While no meaningful differences in subscale performance were found where gender was the moderating variable, $F(4, 401) = 3.19, p = .07$, a statistically significant main effect was found in relation to age and goal setting performance, $F(4, 401) = 7.68, p < .001$. Regression analysis also showed that a student's age significantly predicted goal setting scores, $B = -.05, t(180) = 22.89, p < .001$. Further, age also explained a significant proportion of variance in goal setting responses, $R^2 = .04, F(1, 225) = 7.56, p = .007$.

However, when both moderators were included in the model, the interaction of age and gender, $F(4, 401) = .15, p = .621$ was not statistically significant (see Table 24).

Table 24
Effects of Age and Gender on Attention, Motivation, and Goal Setting Scores

Source	Dependent Variable	<i>df</i>	<i>F</i>	<i>p</i>
Age	Attention	4	.32	.527
	Motivation	4	.29	.852
	Goal Setting	4	7.68	<u>.001</u>
Gender	Attention	1	3.19	.075
	Motivation	1	.51	.475
	Goal Setting	1	1.68	.195
Age x Gender	Attention	4	.25	.779
	Motivation	4	.12	.853
	Goal Setting	4	.15	.621
Error	Attention	402	10.48	
	Motivation	402	6.43	
	Goal Setting	402	22.05	

Note. Bold and underlined *p* value signifies the statistically significant finding.

Given the statistically significant result found between age and goal setting, a follow-up one-way between subjects ANOVA was conducted to compare this impact across each of the age groups on goal setting responses. Post hoc comparisons using the Tukey HSD test revealed that students who were either 12 years old ($M = 3.51, SD = .69$)

or 13 years old ($M = 3.53$, $SD = .71$) showed a statistically significant reduction in goal setting scores than those students in the 9, 10, and 11 year old age groups (see Figure 4).

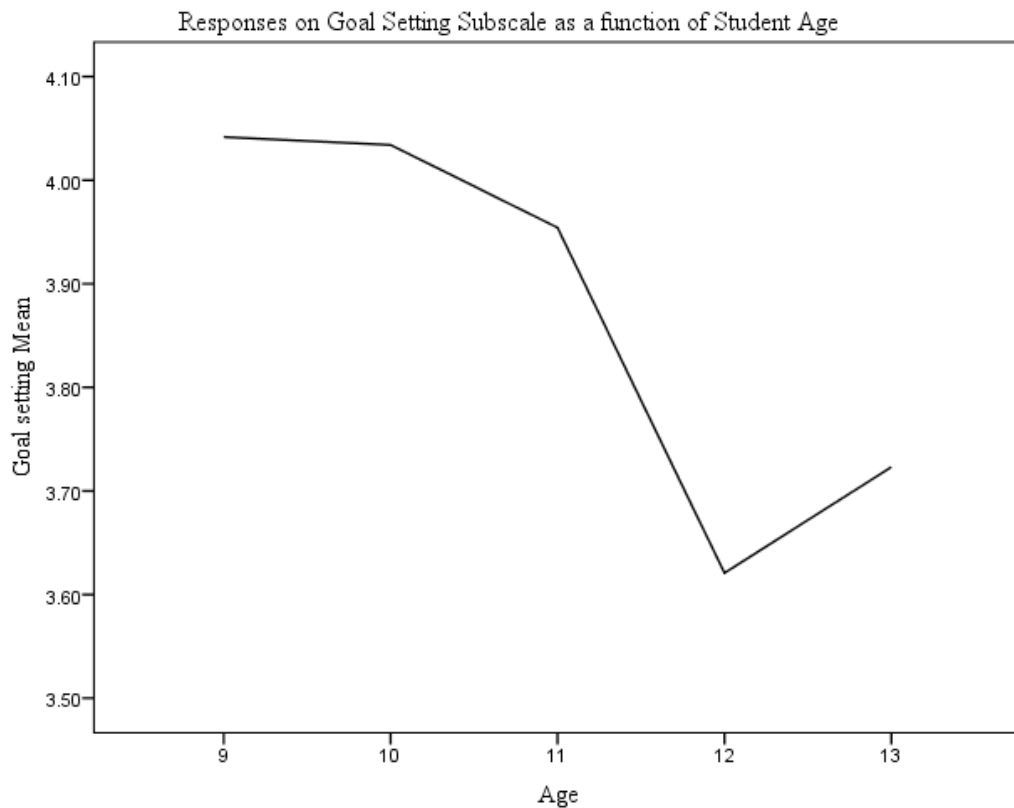


Figure 4. Student goal setting response means by age.

Academic goals

Of the 422 students in the study, 330 (78%) students completed the open-ended section (Item 16), providing one or more academic related goals, together with an indication of whether they had achieved or were still achieving the goal listed. Each goal was categorised as having either a mastery or performance orientation. The labeling of goals was conducted independently by two raters to ascertain the degree of consensus that had occurred. The extent of inter-rater reliability was analysed using a Pearson correlation. The correlation of .81 demonstrated that there was a high level of agreement amongst the raters given that only 19% represented random variation.

Analysis of the school work goal setting responses revealed that there was more performance than mastery goals that were listed by students. Of the 330 students who provided a response to the open-ended section of the questionnaire, 57% ($n = 187$) were performance related, whereas 43% ($n = 143$) had a mastery focus.

Findings showed that male students accounted for 54% of performance related goals, female students accounted for 46%. Conversely, female students accounted for 56% of mastery related goals whereas male students accounted for 44%. In relation to age differences, there were clear changes in types of goals focused on between students aged 10 and 11 years of age. Whereas at ages 9, 10, and 13 there were a similar number of mastery and performance goals reported, at 11 years of age, only 32% were reporting mastery related goals, compared to 68% who listed performance goals.

However, chi-square analyses revealed that neither gender nor age was a statistically significant factor that affected the chance of listing either mastery or performance oriented goals.

Discussion

The current study investigated whether the constructs of student attention, motivation, and goal setting beliefs that were highlighted as key elements in Study 2 in relation to students achieving their goals, were also identified across a larger and diverse groups of students. When analysing the associations among the three variables of attention, motivation, and goal setting the structural modelling equation found that across a more diverse sample, motivation had a stronger relationship to goal setting behaviour than did student attention. As discussed in the literature review, there is a strong relationship between student motivation and goal-directed behaviour (Ames, 1992; Hattie, 2009; Zimmerman & Risemberg, 1997). Zimmerman and Risemberg (1997) postulated that students who were involved in goal setting also had increased motivational levels towards their academic performance and self-regulated learning. Results from this study support their reasoning in that motivation and goal setting beliefs were strongly related to goal setting rather than student attention. This supports the research of Hattie (2009) who argued that students need to have an understanding of where they currently are at and what they need to learn, and more importantly how they will know when they have achieved it. Having clear goals and motivation in that they know they are able to meet the goal is a critical component.

Out of the three main constructs of attention, motivation, and beliefs about setting goals, goal setting had the highest mean score. This indicated a similar finding to that of Study 1, in that students from a wider and more diverse group also recognised and identified with goal setting. They too, saw goal setting as being important. An interesting

and unexpected finding with the goal setting means was that there was a statistically significant difference between the ages of 11 and 12 years and 13 years of age. In Study 1 there was an increase in the importance of goal setting with students as they became older, however this was the reverse for Study 3 with the mean dropping between 11 years of age and 12 years of age, indicating that goal setting was not seen as important to 12 year olds as 11 year olds. Interestingly, goal setting seems to start to increase again at the age of 12 to 13 years, although it is at its highest levels at the ages of 9 to 11. The age of 11 years is also important as this is when students move from their primary schooling to what is termed intermediate years (ages 11–13 years). For many of these students it means leaving their primary school where they have been for six years and moving to a different type of school for two years. Intermediate schools operate on a system very similar in structure to secondary schools, in that the students move from having a single classroom teacher who teaches most of the curriculum in a range of subjects to being taught by a range of subject teachers. Although they still have a classroom teacher, the time that they spend with their classroom teacher is reduced considerably when compared with that of the primary school teacher. This approach may contribute to the drop off in goal setting as the students adapt to a new way of learning. In addition, having a range of classroom teachers may mean that the students do not get the opportunity to goal set in the same way they did in a primary school setting. It may also be that goal setting is not taught to the students by the subject teachers as the focus is on completing the curriculum of work rather than individual goal setting strategies with their students.

There was no difference between male and female students in relation to their motivation, attention, and goal setting at school indicating that gender was not a significant factor in this study. There was a slight increase in females in terms of attention as a construct at the age of 12 years when compared to males, but this difference was not statistically significant. This trend could indicate, however, that females demonstrated high levels of attention within the classroom setting. The trend could also be attributed to the earlier maturation levels of females over males, and their willingness to engage more with their classroom lessons than that of males of a similar age.

At the end of the questionnaire, students were asked to record four academic goals with which they identified, and then indicate whether they had achieved them or not. This proved to be challenging for many of the students. Perhaps this is because they are not actively involved in setting goals within their classroom and with their teacher, and

therefore, they are unable to recall them, or perhaps they are not revisiting the goals and resetting them according to the next steps in their learning. This finding highlights the importance of teacher intervention in assisting and teaching mastery goal setting strategies. It would appear that without teacher intervention, students are not able to accurately recall their learning goals or indeed understand what they actually are. Students who acknowledged whether or not they had achieved their school goals, indicated that they assessed their goal achievement more readily when the goals were performance goals, rather than acknowledging goal achievement that was mastery in focus. Reasons for this could be that performance goals are easily measured in terms of attainment, particularly if the success is measured summatively against a grade or a mark. In a mastery environment, the focus is on personal growth and development of competence, not necessarily the outcome of a grade (Anderman et al., 2002). It would appear that students and teachers may benefit from being taught to understand the value and significance of mastery goals in terms of learning instead of a focusing only on the summative mark or grade. Feedback about performance might optimally focus on what has been achieved, instead of shortfalls in one's capabilities (Schunk & Zimmerman, 2007). The challenge this brings to our current assessment methods in primary schools, is that we need to develop a tool that allows for students and teachers to be able to measure success against mastery levels that also have a focus on personal best goals for each individual student, rather than measuring them against others or indeed specific standards. Teaching students to set personal best goals with a focus on long-term improvement (e.g., mastery oriented goals) is necessary if students are to recognise that they should compete with themselves, rather than focus on out-doing others (Martin, 2006).

Chapter 6

Discussion

The main aim of this thesis was to investigate the role that goal setting played among primary (elementary) school students. Accordingly, the research explored the goals that students set and the orientation of those goals, the relationships that are pivotal to the acquisition and sharing of goals, and the impact that the teaching of goals has on academic achievement. In addition, it examined the role that the constructs of attention and motivation have on students' goal setting behaviour. The research questions that were posited in this thesis came from the finding that, while there is significant research literature that supports the importance of goals, there is little research that determines how and why students set these goals within the academic environment. Furthermore, there has been scant research that has focused on the impact of goal setting on academic achievement, particularly for students between the ages of 9 and 13 years. Research has also been limited relating to the role that teachers play in the teaching and supporting of goal setting strategies among students across this age group.

This chapter discusses the findings and the implications of these, and outlines the possible research that might be developed as a consequence of this thesis. Further, the specific limitations associated with each study are outlined.

Findings

The findings from Study 1 demonstrated that students between the ages of 9 and 12 years did recognise and set independent goals and that goal setting was important to them. Similar to Pintrich's (2000) findings, the types of goals that most students set could be effectively categorised as either academic (classroom) or sports goals. Of the academic goals, there was a strong relationship to performance indicators, for example, the completion of a unit of work or winning an academic prize. Further, there was also a focus on specific academic learning outcomes which were inherently of a performance orientation.

Gender differences were found to moderate the type of goal setting reported, with males placing a stronger influence on the importance of sporting goals; whereas females identified more with classroom goals. The goals that the students set were able to be classified into the following four categories: classroom, sport, at home goals (which

included such areas as “doing my chores without complaining”) and social goals (which tended to focus on classroom behaviours such as “keeping my desk tidy,” and “not calling out”). This variety of types of goals reported by students demonstrated that students pursued multiple goals in their learning contexts (Pintrich, 2000).

Although this study found that students had the capacity to set goals independently, there appeared to be an overemphasis on goals that were performance based and distal in outcomes, such as “winning the mathematics prize”, or “winning the one length freestyle swimming race.” As suggested by Bandura and Cervone (1983), although distal goals help to keep the long-term goal in mind for the student in terms of what it will look like once it has been achieved, teacher intervention is necessary for this to happen. It is postulated that the reason the students focused on distal and performance based goals might be due to the lack of specific teaching of goal setting strategies by their classroom teachers, and further, that goal setting is not seen as being part of the learning in classrooms in New Zealand primary schools.

Developing from these findings regarding goals and the significance of the teacher–pupil relationship in the setting and sharing of goals, Study 2 used an experimental design whereby students were taught through an intervention, to set mastery goals and develop their own intention to learn with the support and encouragement of their classroom teacher. The proposition here was that by implementing a collaborative goal setting strategy with a mastery focus, student achievement levels in mathematics would increase.

An additional aim of this second study was to explore the moderating impact of student’s gender and age in relation to their academic achievement in mathematics as a result of these goals. Findings from the post-test mathematics achievement results of the intervention group compared to the control groups demonstrated an academic gain of a medium effect size. Both male and female students in the intervention group showed greater gains in their mathematics achievement scores when compared to the control group. Gender difference was also analysed with post-test findings revealing within group similarities, but between group differences. Here, both male and female students in the intervention group showed similar gains in their post-test scores. However, male students from the intervention group showed twice the gains in their mathematics performance in comparison to their male peers from the control group.

Based on student responses, three factors were identifiable across each of the eight goal setting lessons. The first factor related to attention and motivation, the second to the actual strategies adopted by students in order to reach their goals, and the third related to the students commitment to reach the goals. These findings indicated that for the students, the underlying key to success was to be able to tap into their attention and motivation levels. This came about through the teacher engaging students in their own learning by ensuring that they understood the individual steps they needed to take to attain mastery of the academic goals that they set for themselves. This supports the findings of Clarke (1998) and Timperley and Parr (2009) who commented that unless students have an in-depth understanding of specific learning goals and mastery criteria, they would be unable to monitor their own learning goals accurately—a statement also supported by Schunk (2003). The intervention model used in Study 2 involved firstly ensuring that the teachers had an understanding of the differences between performance and mastery goals and instructing them about how to set and evaluate goals with their students. Once the teachers had the necessary skills, instruction was then given to the students and they then set their mastery-focused goals with teacher support and assistance. Throughout the intervention, students were redirected to their goals, and the classroom teachers also supported the students by writing on the whiteboard what the specific goal for each mathematics lesson was. This intervention model while only short in terms of duration is a model that resulted in a moderate effect in academic achievement between the intervention and control groups. It is proposed that this model could be a successful tool to use in primary school classrooms.

Attention, motivation, and strategies used by the individual students were the three major constructs that were identified by students, as contributing to their success in attaining their personal goals. These findings indicated that engaging students in their learning and allowing them to have control over their learning goals with an understanding of why they were necessary, led to them having higher motivation towards what they were learning. Of particular interest, is that the males in the intervention group appeared to identify more positively with the intervention model, as evidenced by their statistically significant higher academic achievement results than males in the control group. As identified in the literature, males tend to demonstrate a natural tendency in their goal orientation towards performance based goals due to having a strong affinity to judge themselves against their peers when measuring their achievement and success (E. Anderman & Midgley, 1997; Roeser et al., 1996; Ryan et al., 1997; Stipek & Gralinski,

1996). Therefore, in order for males to adopt the use of mastery goals they need to have the mastery approach taught to them (Ablard & Lipschultz, 1998). Males also require help with self-regulation in terms of assessing whether they have achieved the goals and what the next steps are towards the goal being achieved. They have a tendency to be “over-confident” in assessment of their skills and abilities (Wigfield et al., 1996). By the teacher working with their male students, and giving them accurate and regular feedback, it appears that this intervention approach has motivated the males in their learning and attention levels and that they made gains in their achievement.

The proposition for Study 3 was two-fold. First, the purpose of the study was to examine whether the underlying structure of student attention, motivation, and goal setting behaviours would be evident across a larger more diverse group of students. The second purpose of the study was to investigate whether the moderating impacts of age and gender found in the previous studies would also be replicated within this larger and more representative sample of students. Findings supported that as per Study 1 these students also identified with individual goal setting. The three constructs that were identified in Study 2: student attention, motivation, and goal setting were evident also in this study, however when modelled together, motivation had a stronger relationship with goal setting behaviour than did student attention. This finding indicated that for these students they identified that being motivated had greater importance for them than paying attention in class. Specific motivation items that were posed, for example: “I really want to learn as much as I can in maths this year,” and “It’s important to me that I improve my skills in maths this year” were identified as holding greater significance to the students, than items that contained the attention construct for example: “I can easily concentrate on maths during class,” or “I can easily focus on my work during maths”. If motivation is the underlying construct, then this supports the findings of Zimmerman and Risemberg (1997) who identified that by motivating students in their learning through goal setting, this could lead to an increase in their academic performance and also an increase in student self-regulated learning. An interesting finding was that although gender did not impact on responses, there was a significant difference across the age groups. Specifically, responses from 11 to 13 year old students indicated that the importance of goal setting became less important as the students got older. This contradicts the finding in Study 1 that students who were older identified more strongly with setting goals. One reason given for this difference according to age could be that in Study 3, one of the schools used for the research was an intermediate school which only had students between the ages of 11–13

years. However, what is apparent is that these students indicated that they identified less with goal setting at the age of 11, and then began to put more effort into their setting of goals at the age of 13 years—indicating that 11 and 12 years are important ages for teachers to work with their students to keep them motivated towards their academic work through goal setting, and to ensure that they are setting goals which they are capable of achieving.

Findings from this research also suggested that students who did not have specific teacher direction in goal setting, tended to have a disposition to set goals that had a performance focus. Although not the focus of this study, this finding might indicate that perhaps these students may not have been introduced to the concept of mastery goal setting, or perhaps their teachers were not actively engaging in this as a focus within their classroom programme. Further, in relation to the list of goals supplied by students, only a small percentage of students were able to record four goals, and many wrote fewer than two (or none at all). Reasons for them not recalling their personal goals could be because of their perception that goal setting had little effect on their academic performance, or perhaps they lacked the experience of setting goals (Zimmerman & Risemberg, 1997), or it could be that they did not have any goals. As in Study 1, these findings demonstrated a positive correlation between teachers who taught goal setting and encouraged goal setting and the students who shared their goals with their teachers and set academic goals. This finding highlighted that the role of teachers is essential to motivate students to set and achieve goals in the classroom. It also demonstrated that the pathway to ensure that students identify with goal setting is through the purposeful teaching of goals by their classroom teachers in a shared partnership which also uses effective feedback and feedforward between teacher and student.

Implications

A number of implications can be drawn from this research. Teaching students to set academic achievement goals does make a difference to the achievement levels of students as well as increasing their attention and motivation levels. Specifically, students have the desire to set goals and recognise the importance of goal setting. However, the goals that they set for themselves tend to have an over emphasis on explicit and measurable performance outcomes. The potential outcome here is that if such performance goals are not achieved, which is greatly determined by how realistic the goals are, this will have detrimental effect on their ongoing motivation and attention levels (Ames, 1992). As

demonstrated by the intervention model, when students are taught and encouraged to set mastery orientated goals, the result is an increase in the levels of motivation, attention, strategies, and overall commitment to the goals. Further, this model appeared to be very successful with males which indicated that the intervention method and teaching approach that was used perhaps worked more favourably for male students, and this is something that could be continued to be developed within primary schools with an emphasis on developing the attention and motivation of male students.

These findings have important implications for practice in schools. First, this research has shown the clear academic advantage, albeit only shown in mathematics, gained from a supportive goal intervention in the classroom. For this to be effective, it requires schools to develop a learning environment where the development of goal setting strategies and mastery oriented goals is part of the delivered pedagogy. Therefore, in terms of professional development of teachers' understanding of goals and the setting of goals, there is a need to make explicit the different understandings teachers may have of goal setting to ensure that they are able to competently teach the strategies necessary to support effective goal setting with their students.

A further implication of this research is the feasibility of using the Goal setting intervention model and the GSSR questionnaire that was used in Study 2 in primary schools. This instrument could be used, for example, if focusing on the asTTle reading items. In this case, this intervention model would require no adaption to the new subject. As a result of the findings, it appeared that there was a shift in focus on goal setting that occurred while students are entering the final years of their primary education and looking to move into secondary education. It would appear that there is a need to introduce a specific programme at Years 7–8 (11–13 years of age) to refocus and motivate students in the setting of goals. There is also an indication from the studies that the goals that the students are setting have a predominant focus on performance. Therefore, an intervention teaching programme that has a focus on mastery based goals that are set against the students' personal bests (rather than in relation to their peers) may help to develop motivation and attention levels within these students as they move through the last two years of their primary education.

Perhaps not surprisingly, this thesis highlighted the perceived importance of the role of the teacher in relation to teaching academic goal setting. However, an issue of note was the apparent lack of encouragement perceived from other significant people in their

lives, and further, the lack of motivation to share these goals across these relationships. If schools and teachers are to develop a specific focus on the development of mastery goal setting and strategies as part of their teaching framework, it would seem to be equally important that students are supported in this process by parents, caregivers, whanau, and coaches. This would be the case particularly where distal goals are developed over the longer term.

Limitations

There were several limitations that were identified as being generic across all three of the studies in this thesis. In Study 1, the administration of the measurement tool was during an extremely busy period for schools, and as such, many schools were reluctant to give permission for the study to take place. The resulting small sample size lacked the within and between group variability to conduct more detailed statistical procedures such as MANOVAs. Further, due to the participation of medium to high decile schools only, it was problematic to generalise the findings beyond that strata. In Study 2, there were difficulties obtaining agreement to participate from schools that were using the asTTle tool in the way that was necessary for the features of the study. Specifically, although schools were using asTTle, they were not using it such that students could see their learning pathways results and discuss their next steps in their learning (formative assessment). Instead, many of the schools were using it as a summative assessment tool in that the results were not given as direct feedback to their students—rather they used it to inform their teaching in terms of planning units of work. This meant that such schools could not be used in the intervention. This significantly reduced the number of schools that could be used, and also resulted in not being able to have a wider decile spread of schools which would have been desirable.

Specific measurement issues featured across all three studies. In Study 1, three questions in the questionnaire had a response format whereby there were multiple categories, from which on a scale of ‘never’ to ‘always,’ students responded in relation to the impact that the listed people had on their goal setting. Although each response option was substantive, students’ response patterns resulted in problems of interpretation at a level of significance and effect. For example, in addition to the category of ‘parent,’ students also had the option of ‘caregiver’ or ‘whanau’. Originally the parent category did not consist of caregiver or whanau, however, feedback from the focus groups after completion of the pilot questionnaire indicated that there needed to be more response categories added

rather than just parents which resulted in caregivers and whanau being included in the parent category. Unfortunately, the result of this inclusion led to some students ticking only one or all three of these categories, and this made it difficult for further analysis other than to show these results in percentages. Another area which led to a limitation was the inclusion of grandparents or coaches. Some students did not select the 'grandparents' option. This may have been because they did not have grandparents living with them in New Zealand, or because they were no longer alive, or it could have been that the students did not share goals with their grandparents. Because of this, it was difficult to assess the reasons for non-selection and made the analyses difficult to generalise. Non-completion was an issue for the GSSR measure used in Study 2. As many of the booklets were not completed for all of the sessions, this meant that some of the results had to be discarded. The final evaluation section was poorly completed in terms of response rate by both groups. Reasons could have been that they were unaware of this section as it was at the back of the booklet, and by that time many had not completed all of the lessons which resulted in the evaluation section being left. Perhaps it would have been better to have had an evaluation section separately. The control group was also given the GSSR booklet to complete and perhaps there would have been a clearer response if this booklet had only been given to the intervention groups. Another area which led to a limitation was that this research did not use teachers or students in terms of feedback especially of a longitudinal nature in terms of ascertaining whether the students and teachers were continuing to use the mastery goal setting skills after the intervention and whether they had transferred these skills into other areas of the curriculum.

Although most items presented in Study 3's SWGQ showed strong factor loadings against their respective constructs, some loadings were close or below the common .30 criteria. Further trialling would develop more robust psychometric information on these items. In addition, a larger bank of items should be developed based on the findings from this study. For example, in order to help establish the goal orientations of students, items that specifically ascertain to the focus on either mastery or performance goals might be profitably integrated into the scale. This would allow for analysis between the responses to the Likert designed items and the orientation of the listed responses provided in the open-ended section.

Given that this study provided a more diverse representation of the primary and intermediate school population, the timing of the study for schools negated more schools being involved, and a greater number of schools at the intermediate level.

While some informative information could be gleaned from the open-ended responses to the listing of school work goals, more conclusive surmising would occur if students were asked to list as many goals as they could, and further, asked to prioritise those listed. This would help indicate the difficulty or otherwise that students might have in listing a number of goals, and whether there was a relationship between the number of goals listed and the orientation of these goals. Similarly to Study 1, it would also have been interesting to ask students to list goals beyond those only related to their school work. This again, would have helped profile the type of goals that students focus on, and test whether the clear divide between mastery and performance orientation exists across different areas of goal setting.

Future Research

Although causality cannot be assumed in the findings in this thesis, the main results of this research can be inferred to the greater population representing this cohort. Given this statistical confidence, there are many areas that should be investigated further in order to validate and replicate the findings from this thesis. At a measurement level, the development of additional items would provide higher factor loadings than those occurring among the items in this study, and thus, accounting for more of the variability and tighter clustering around the constructs measured.

The structural equation model technique applied in Study 3 tested for the factorial validity of the responses that emanated from the SWGQ, and used the structure based on findings from EFA and directed from the empirical findings from the previous two studies. Additional research should build from the psychometric information gained from this first-order factor analytic application by developing a test of the validity of a causal structure of a full latent hypothesised structural model.

In order to examine the impact of participant characteristics more fully, further examination should include moderators such as age, gender, and ethnicity across a larger stratified sample of students. Due to sample size restrictions, the interactions between age and gender were problematic at some levels. This was particularly so in relation to students' ethnicity. Further, the interactions of age and gender within these ethnic groups.

Similarly, future research could examine the possible impact of school-level variables, such as across the full range of deciles, school size and area (i.e., urban and rural), and across different school years and curriculum levels.

Another aspect of the study that requires further research would be to carry out an in-depth research project to investigate the effects of mastery goal setting strategies and the effects of academic achievement as a longitudinal study over a greater period of time. This would allow for more invention sessions to be conducted, and a longer intervention period would also permit the inclusion of a teacher focus, examining areas such as how teachers motivate and give feedback to their students about goal setting strategies, how these goals are incorporated into their lesson plans, and what this would look like in terms of actions in the classrooms. An additional expansion of the intervention developed for this thesis could be the inclusion of student and teacher perspectives on the intervention. In further research, it would be valuable to explore students' and their teachers' thoughts through the use of focus groups to obtain qualitative data on the intervention. Exploring students' and teachers thoughts would allow investigation into areas such as the continued use of goal setting strategies post-intervention, the degree of perceived motivation, and its possible effects in other subjects.

Although the goal setting intervention model was taught within the subject of mathematics, this approach to the teaching and setting of mastery goals with students is not limited to mathematics alone. Rather, the intervention approach has the adaptability to be able to be taught to students within all subjects. An area for future research would be to analyse the academic results of students who are setting mastery goals within a wider range of curriculum areas, and to measure their achievement, motivation, and attention levels.

Contribution

This thesis shows the impact that motivation has in relation to mastery oriented goals (Ames, 1992; Zimmerman & Risemberg, 1997). In relation to motivation, this thesis has shown that there needs to be a level of participation from the individual student, so that the student is actively involved in their goal setting. The student needs to understand the steps that they need to master to have academic success, and these steps must be task specific. The mastery goals must contain clear information and have an element of challenge in terms of the student having to put in personal effort to achieve the goals. These goals also need to be largely proximal in focus—proximal short-term goals help to keep the student motivated as these can be achieved more quickly and these are especially

influential with young children who often struggle with staying motivated if the goals have too much of a distal focus (Locke & Latham, 1990). Another necessary factor is that the mastery goals must be competitively self-referenced for the individual student so that they are aware that the goals are achievable (Martin, 2006). If these elements are incorporated, then as a result, students demonstrate increased motivation and attention levels in their learning which leads to academic achievement and self-efficacy.

As demonstrated in the model, the teachers played a pivotal role in both the teaching and reaffirming of mastery goal setting to their students. Therefore, it is important that the teachers themselves have the knowledge about goal setting in order for mastery goal setting to be implemented. Although students can and do set goals independently of teacher support, by introducing this intervention model which incorporated teachers teaching students how to set mastery goals and giving them clear direction as to the goals for the mathematics lessons, there was an increase in the academic achievement of the intervention group. This indicates that this mastery goal setting intervention model was successful in raising academic achievement and increasing motivation and attention levels of students. By ensuring that the students had clear learning intentions for the mathematics lesson, the students were able to identify how the learning intentions related to their specific learning goal and this led to an increase in their overall focus and motivation towards the teaching lessons.

All three studies in this thesis used measurement tools that were specifically developed to focus on the perceptions that students have in direct relation to their goal setting behaviours. Previously, there were no measurement tools available that specifically measured these areas, particularly with a readability that was appropriate for the 9 to 13 year old cohort. The development and administration of these tools is seen as being a significant contribution to the investigation of goal setting strategies and behaviours, and from which it is hoped that further modifications and improvements can be derived.

This research demonstrated that there are strong links between mastery goal setting, increased attention, and motivation. By students setting mastery goals that they were able to achieve, they demonstrated higher levels of attention and motivation to learn. They were able to see their progress through feedback from their classroom teacher and also their own ability to self-reflect. In order for motivation to occur for primary aged students, there needs to be an emphasis on mastery-focussed goal setting with their classroom teachers. Further, this research has highlighted the clear linkage between motivation and mastery.

Students who set mastery goals see them as being personal towards their own learning and competence by acquiring new knowledge or skills (Ames, 1992; Elliot, 1999). This was evident in students identifying with the constructs of attention and motivation, goal setting strategies, and commitment to reach the goals as being the underlying reasons they felt that they had achieved their personal goals. Mastery goal orientation takes away the focus from competing against others and becomes self-referenced. The increase in motivation is apparent in that the students have the belief that they have the ability to achieve the goals that they have set (Dweck & Leggett, 1988). It is this approach that allows for task enjoyment and the encouragement of a sense of self-comparison with an attitude that failure is also acceptable

Although it was not part of this thesis to measure the knowledge of goal setting strategies and goal setting orientation knowledge that primary school teachers had, it should be noted that the researcher found with the teachers that were involved in the intervention study that they possessed little knowledge and understanding of the type of goals. If we can create classroom environments that have a mastery goal structure where the emphasis is on effort, personal best, challenge seeking, and understanding then this will allow for every student to have personal growth in their learning as they are taught to measure their achievements against individual progress—not against others. In environments with a mastery goal structure, students are less likely to feel threatened, more likely to be oriented toward investing effort in academic tasks, and more likely to feel successful and therefore develop positive self-efficacy in their learning (Kaplan & Maehr, 2007; Roeser et al., 1996).

This thesis has contributed substantially to these areas of goal setting through the implementation and analysis of an intervention model that involved classroom teachers and their students setting mathematics goals that were mastery oriented, and relevant to the individual students' learning. Engaging students in their learning and allowing them to have control over their learning goals can lead to increased attention and motivation of students within the classroom. This result will naturally lead to an increase in achievement levels as students develop positive relationships towards their learning and see success in what they are doing.

The use of effective goal setting with a mastery focus has so much to offer to our primary students, and it is the researcher's opinion that currently goal setting is a powerful yet under-utilised tool in our classrooms. Although currently, mastery oriented goal setting

and the teaching of goal setting skills are not seen as being an essential aspect of the teaching curriculum and learning requirements, it is hoped that the research presented in this thesis has shown that positive outcomes will be gained from implementing programmes that focus on developing this skill in primary school students.

The thesis is concluded with an Addendum which briefly summarises the contribution that this inquiry has made to the larger body of research and specific approaches within the educational learning environment. Focus is also given to the additional methodological options that might be adopted by future researchers, in order to expand this area of knowledge and research.

Addendum

This research contributes to the body of research that has been undertaken within the areas of goal setting by examining the effects of an intervention programme that uses both teachers and students working together with a mastery goal focus to determine whether this type of intervention could lead to an increase in academic achievement within the subject of mathematics. It has the originality of linking students and their classroom teachers in an intervention that highlighted the significance of teaching mastery goal setting strategies to students. This is an original dimension of this thesis because to my knowledge there has not been a similar study undertaken in a primary school both locally in New Zealand or internationally that has focused on using the setting of mastery goals in an experimental study.

This thesis was constructed of three studies in order to answer my overall question for this thesis which was: Does setting mastery goals increase academic achievement in mathematics with primary school students? In order to answer this question there were three distinct studies that related to the theme of academic achievement and goal setting behaviours. Each study builds on from the previous one in terms of goal setting. Study 1 sought to ascertain which salient others students involved in terms of the teaching, sharing and encouragement of goal setting. The study also analysed the types of goals students set and the environments in which they used goal setting. From these findings, Study 2 consisted of the development and administration of an intervention, a quasi-experimental study. The intervention involved both teachers and students working together to set mastery goals in the subject of mathematics. Academic achievement was measured before the intervention and after; the control and intervention groups were compared. Factors were identified that related to the reasons students gave for why they felt they had achieved their mathematics goals. Three key factors were identified which were attention and motivation, use of mathematical strategies, and commitment to their goals. This led to the final study which focussed on these factors as well as revisiting some of the goal setting questions from Study 1. The purpose of the study was to ascertain whether the findings from the earlier study could be replicated across a wider and more diverse group of students. A second purpose of the study was to determine whether students did view attention, motivation, and goal setting strategies as being important in the development of

mastery goals, factors which had been identified in Study 1 from both the quantitative and the qualitative data.

The results of this thesis provided specific outcomes for theory, practice, and methodological approaches in the area of goal setting. In relation to theory, goal setting has been identified in recent research as being an indicator of academic achievement and motivation, yet there is still much debate as to what the key factors are that lead to successful student goal setting within an academic environment – especially among primary students. Within the field of goals there are two main approaches that are researched; these are goal setting and goal orientation. Researchers who have examined goal setting have their roots in organisational or management psychology. Their focus is primarily on motivation and consequently, the tasks they use in goal setting research have an emphasis on studying effort and persistence as well as looking at achievement. The other approach, goal orientation, has its roots in educational study. The tasks used in studies of goal orientation are usually complex, as the focus is on the acquisition of knowledge and skill, and performance includes both motivation and ability. Research has shown often that goal orientation is linked to academic outcomes. There is much work showing the importance of mastery goal orientation and this served as the point for the current research. This research contributed to the body of research that has been undertaken within the area of goal setting but incorporated a goal orientation framework, something that has not previously appeared in the literature.

In relation to practice within the academic learning environment, goal setting is not currently taught specifically as an educational process to pre-service teachers nor is it offered as part of the professional development of New Zealand in-service teachers. Further, the author is unaware or unable to substantiate as to whether goal setting is taught as part of the professional development of teacher training in other countries. As a result of this research, this information can be shared with the larger teaching community both locally and with an international perspective with a view to being able to provide feedback in the field of goal setting and how it can be incorporated more fully into the teaching curriculum. This thesis shows the impact that motivation has in relation to mastery goals and in relation to motivation, that there needs to be a level of participation from the individual student, so that the student is actively involved in their goal setting. The student needs to understand the steps that they need to master to have academic success, and these steps must be task specific. The mastery goals must contain clear information and have an

element of challenge in terms of the student having to put in personal effort to achieve the goals. Not surprisingly, this thesis has highlighted the perceived importance of the role of the teacher in relation to teaching academic goal setting, although it would seem to be equally important that students are supported in the goal setting process by parents and coaches.

This study showed that mastery goal setting is an optimal approach for primary school students to ensure that they are able to have, and recognise, individual success in their learning. From the author's role as a Principal and as Professor John Hattie has mentioned on numerous occasions, education in many countries is developing a greater emphasis on summative and performance based results of students rather than formative assessment. Recently New Zealand schools have been instructed to introduce National Standards for all primary students, which involve measuring students against their peers with an overall emphasis on summative assessment. Through my own experience, many primary school teachers recognise the importance of, and often teach goal setting to their students, but do not have an in-depth understanding of the different types of goals nor do they recognise the important tool that goal setting is and how it can complement and enrich their formative assessment practice as well as motivate their students.

When examining the impact of introducing goal setting into the learning environment, future researchers should consider incorporating classroom observations, as well as, adopting a longitudinal methodology. A longitudinal experimental study would allow for more data to be collected in order to measure on-going and sustained academic achievement between a control and intervention group. Further, it would be useful to run focus groups with the students and the teachers who were the participants in this thesis to see whether, post-intervention, they were still using goal setting techniques in their learning.

In conclusion, the use of effective goal setting with a mastery focus has much to offer to our primary students and it is my opinion and that of Ames (1992), Martin (2006) and others, that currently goal setting is a powerful, yet under-utilised, tool in our classrooms. It is hoped that the research presented in this thesis has shown that positive outcomes can be gained from implementing programmes that focus on developing goal setting skills in primary school students. This intervention model is a tool that could be used in primary schools providing that the teachers have been given instruction in how to set mastery goals. Professional development of teachers is necessary as is demonstrating the relationship

between formative assessment and goal setting. Clear academic advantage in mathematics was gained for male students from a supportive mastery-goal intervention in the classroom. However, for this to be effective it requires the schools to develop a learning environment where the development of goal setting strategies and mastery goals is part of the delivered pedagogy.

Appendices

Appendix A: Goal Setting Questionnaire

GOAL SETTING QUESTIONNAIRE

Instructions:

- This questionnaire is **anonymous**.
- You do not have to answer all the questions if you don't want to.
- When you have completed the questionnaire please fold it in half and hand to your teacher.

Thank you.

Please tick whether you are a boy or a girl

Boy

Girl

Age

10 years 11 years 12 years



- **What are Goals?...**

Goals are:
 Something that you want to achieve

- **In which areas do you set achievable goals ?**

Place a tick in the box under the word that is the right answer for you ✓

	Never	Sometimes	Often	Always
Classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sports Field	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At Home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Socially	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



- **Why is it important to you to set goals?**

	Never	Sometimes	Often	Always
To achieve better results	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To help you try harder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To help you achieve something new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To create a challenge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

• **How often does each of the following people encourage you to set goals?**

	Never	Sometimes	Often	Always
Teacher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caregiver	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brothers/Sisters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whanau	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

• **Out of the following people who teaches you to set goals?**

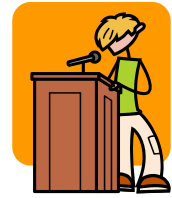
	Never	Sometimes	Often	Always
Teacher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caregiver	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brothers/Sisters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whanau	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



▪ **From the following list who have you shared your goals with?**

	Never	Sometimes	Often	Always
Teacher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caregiver	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grandparents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brothers/Sisters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whanau	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





- Please share your goals with me by writing them down below

	Achieved
.....
.....
.....
.....
.....
.....
.....

Put a tick ✓ beside any of the goals you have listed above that you have achieved.

Thank you for taking the time to complete this questionnaire.



Appendix B: Goal Setting

Goal Setting for the number unit

Remember that goals need to be S.M.A.R.T

- Specific
- Measureable
- Achievable
- Realistic
- within a Timeframe

Name:	_____	
Boy	<input type="checkbox"/>	Girl <input type="checkbox"/>
Age:	<input type="text"/>	

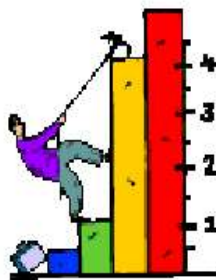


These are the three goals that I am going to set for myself in the number unit

1.

2

3



Booklet

Pre- Lesson Self Review



Date:

Time:

1. Today's goal for maths is

2. This goal is one of the maths goals I have set for myself Yes No

3. How much do I already know about today's maths goal - Place a tick in the box that is the right answer for you (1 nothing 2 very little 3 some 4 quite a lot 5 a great deal)

nothing

very little

some

quite a lot

a great deal

4. I think today's lesson will be

very hard

hard

OK

easy

very easy

5. How much effort will I put into today's lesson?

Nothing

quite a bit

some

very little

a great deal



Post Lesson



1. What was today's maths goal?

2. Did I achieve today's maths goal?

not at all

a little bit

some

quite a lot

achieved

3. How much effort did I put into today's lesson?

a great deal

quite a bit

some

very little

nothing

4. In question 2 if you ticked (some, quite a lot or achieved) then please complete Box A below
(Go to Box B if you didn't)

BOX A These are some of the reasons I achieved today's maths Goals

Please tick as many of these statements below that you think are true for you in today's lesson

- It was one of my personal maths goals
- I wanted to learn about today's lesson
- I wanted to achieve today's goal
- It was easy and I am good at maths
- I asked my teacher for help if I was unsure
- I paid attention
- I checked my answers
- I felt positive about achieving today's goals
- I worked out why I got it wrong
- I asked a friend or maths buddy



- I used maths equipment
- I stayed on task
- I used a computer
- I used a calculator
- I looked back at previous work
- I reworked the examples that I got wrong to find out where I made a mistake
- I used a numeracy strategy
- I listened and concentrated on the lesson
- I was not distracted
- I looked at examples in my maths textbook



In question 2, if you ticked (not at all or a little bit) then please complete Box B below

BOX B These are some of the reasons that I didn't achieve today's maths goal

Please tick as many of these statements below that you think are true for you in today's lesson

- I was distracted
- It was not one of my personal maths goals so I wasn't interested
- I didn't ask my teacher for help
- I didn't have the correct equipment. I wasn't organized for the lesson
- I didn't feel well
- I gave up
- It was too hard
- It was too easy – I couldn't be bothered
- I didn't understand what I was supposed to be doing



- I didn't check my answers
- I made silly mistakes
- I rushed my work because I wanted to finish quickly
- I had to leave the room during the lesson
- The teacher was too busy with other people
- I don't enjoy maths
- I'm not very good at maths



Evaluation Sheet



1. I believe that setting goals helped me achieve better understanding in the number unit

yes not sure no

Look at the three goals that you set for yourself in the number unit. Do you think you achieved them and if so how many?

none one two three

2. Did setting goals help you to focus more on your lessons in numbers?

yes not sure no

3. Do you think by setting these goals you achieved better results?

yes not sure no

4. Has your attitude changed towards maths as a result of goal setting?

A great deal quite a bit some very little not at all

5. Could goal setting help you in other School subject areas?

yes not sure no

6. Could goal setting help you in your daily life?

yes not sure no

7. Write down any interesting points that you have learnt about goal setting



If you need more room to write turn over the page and continue

References

- Ablard, K. E., & Lipschultz, R. E. (1998). Self-regulated learning in high-achieving students: Relations to advanced reasoning achievement goals, and sex. *Journal of Educational Psychology, 90*(1), 94–101.
- Ainley, M. D. (1993). Styles of engagement with learning: Multidimensional assessment of their relationship with strategy use and school achievement. *Journal of Educational Psychology, 85*(3), 395–405.
- Airasian, P. W. (1997). *Classroom assessment* (3rd ed.). New York, NY: McGraw-Hill.
- Allison, P. D. (2001). *Missing data*. Thousand Oaks, CA: Sage Publications.
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261–271.
- Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260–267.
- Anderman, E., Austin, C. C., & Johnson, D. M. (2002). The development of goal orientation. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 197–220). San Diego, CA: Academic Press.
- Anderman, E., & Maehr, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research, 64*, 287–309.
- Anderman, E., Maehr, M. L., & Midgley, C. (1999). Declining motivation after the transition to middle school: Schools can make a difference. *Journal of Research and Development in Education, 32*(3), 131–147.
- Anderman, E., & Midgley, C. (1997). Changes in achievement goal orientations, perceived academic competence and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*(3), 269–298.
- Anderman, E. M., Urdan, T., & Roeser, R. (2003, March). *The Patterns of Adaptive Learning Survey: History, development, and psychometric properties*. Paper presented at the Indicators of Positive Development Conference, Washington DC.
- Arbuckle, J. L. (2006). Amos 4.0. Chicago, IL: SmallWaters.
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behaviour. *Psychological Review, 64*(6), 359–372.
- Babad, E. Y. (2009). *The social psychology of the classroom*. New York, NY: Routledge.
- Bandura, A. (1977). *Social learning theory*. New Jersey, NJ: Prentice Hall.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. New Jersey NJ: Prentice Hall.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Education Psychologist, 28*(2), 117–148.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.
- Bandura, A. (2000). Social-cognitive theory. In A. E. Kazdin (Ed.), *Encyclopedia of Psychology* (Vol. 7, pp. 212–213). Washington, DC: American Psychological Association.

- Bandura, A. (Ed.). (1989). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Multifacet impact on self-efficacy beliefs on academic functioning. *Child Development, 76*(3), 1206–1222.
- Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology, 45*(5), 1017–1028.
- Bandura, A., & Schunk, D. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41*(3), 586–598.
- Bentler, P. M. (1992). On the fit of models to covariances and methodology to the Bulletin. *Psychological Bulletin, 112*, 400–404.
- Black, P., & Wiliam, D. (Eds.). (1998). *Inside the black box: Raising standards through classroom assessment*. London, UK: Kings College, School of Education.
- Boekaerts, M. (1997). Self-regulated learning: A new concept embraced by researchers, policy makers, educators, teachers, and students. *Learning and Instruction, 7*(2), 11–186.
- Boekaerts, M. (1999). Motivated learning: The study of student x situational transactional units. *European Journal of Psychology of Education, 14*(4), 41–55.
- Boekaerts, M., & Minnaert, A. (2003). Measuring behavioral change processes during an ongoing innovation program: Scope and limits. In E. De Corts, L. Verschaffel, M. Boekaerts, N. Entwistel & J. V. Merrienboer (Eds.), *Powerful learning environments: Unravelling basic components and dimensions* (pp. 71–81). New York, NY: Pergamon.
- Boekaerts, M., & Niemivirta, M. (2000). Self-regulated learning: Finding a balance between learner goals and ego-protective goals. In M. Boekaerts, P. R. Pintrich & Zeidner (Eds.), *Handbook of self-regulation* (pp. 417–451). San Diego, CA: Academic Press.
- Bonate, P. L. (2000). *Analysis of pre-test-post-test designs*. Boca Raton, FL: Chapman & Hall.
- Brett, J. F., & Atwater, L. E. (2001). 360-degree feedback: Accuracy, reactions, and perceptions of usefulness. *Journal of Applied Psychology, 86*(5), 930–942.
- Brophy, J. (2005). Goal theorists should move on from performance goals. *Educational Psychologist, 40*(3), 167–176.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park: CA:Sage.
- Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of Educational Research, 65*(3), 245–274.
- Byfield, L. (2000). If girls can succeed only at the expense of boys, maybe we need segregated schools. *Report/News Magazine., 26*(49), 4.
- Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahway, N.J: Erlbaum.

- Campbell, D. T., & J.C., S. (1963). *Experimenting, validating, knowing: Problems of method in the social sciences*. New York, NY: McGraw-Hill.
- Carroll, A., Houghton, S., Durkin, K., & Hattie, J. (2001). Reputation enhancing goals: Integrating reputation enhancement and goal setting theory as an explanation of delinquent involvement. In F. Columbus (Ed.), *Advances in psychology research* (Vol. 4, pp. 101–129). Huntington, NY: Nova Science.
- Carver, C. S., & Scheier, M. F. (2000). On the structure of behavioural self-regulation. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 41–84). San Diego, CA: Academic Press.
- Chidester, T. R., & Grigsby, W. C. (1984). A meta-analysis of the goal setting performance literature. *Academy of Management Proceedings*, 35, 202–206.
- Clarke, S. (1998). *Targeting assessment in the primary classroom: Strategies for planning, assessment, pupil feedback and target setting*. London, UK: Hodder & Stoughton Educational.
- Clarke, S., Timperley, H., & Hattie, J. (2003). *Assessing formative assessment*. Auckland, New Zealand: Hodder Moa Beckett.
- Collings, L. M. (1996). Is reliability obsolete? A commentary on 'Are simple gain scores obsolete?' *Applied Psychological Measurement*, 20, 289–292.
- Conroy, D. E., Metzler, J. N., & Hofer, S. M. (2003). Factorial invariance and latent mean stability of performance failure appraisals. *Structural Equation Modeling*, 10, 401–422.
- Corno, L. (1994). Work habits and work styles: Volition in education. *Teachers College Record*, 106, 1669–1694.
- Crooks, T. J. (1988). The impact of classroom evaluation practices on students. *Review of Educational Research*, 58(4), 438–481.
- Cury, F., Elliot, A. J., Da Fonseca, D., & Moller, A. (2006). The social-cognitive model of achievement motivation and the 2 X 2 achievement goal framework. *Journal of Personality and Social Psychology*, 90(4), 666–679.
- Darley, J. M., & Fazio, R. H. (1980). Expectancy confirmation processes arising in the social interaction sequence. *American Psychologist*, 35(10), 867–881.
- Darnon, C., Butera, F., & Harackiewicz, J. M. (2007). Achievement goals in social interactions: Learning with mastery vs. performance goals. *Motivation and Emotion*, 31(1), 61–70.
- Darnon, C., Dompnier, B., Delmas, F., Pulfrey, C., & Butera, F. (2009). Achievement goal promotion at university: Social desirability and social utility of mastery and performance goals. *Journal of Personality and Social Psychology*, 96(1), 119–134.
- Darnon, C., Dompnier, B., Gillieron, O., & Butera, F. (2010). The interplay of mastery and performance goals in social comparison: A multiple goal perspective. *Journal of Educational Psychology*, 102(1), 212–222.
- Darnon, C., Harackiewicz, J. M., Butera, F., Mugny, G., & Quiamzade. (2007). Performance- approach and performance-avoidance goals: When uncertainty makes a difference *Personality and Social Psychology Bulletin*, 33(6), 813–827.

- Darnon, C., Muller, D., Schragger, S. M., Pannuzzo, N., & Butera, F. (2006). Mastery and performance goals predict epistemic and relational conflict regulation. *Journal of Educational Psychology, 98*(4), 766–776.
- Delphit, L. (1995). *Other people's children: Cultural conflict in the classroom*. New York: NY: The New Press.
- Dembo, M. (2000). *Motivation and learning strategies for college students: A self-management approach*. London, UK: Lawrence Erlbaum Associates.
- DeNisi, A., & Kluger, A. N. (1996). The effects of feedback, interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin, 119*(2), 254-284.
- Deno, S. L., Fuchs, L. S., & Fuchs, D. (1985). The importance of goals, ambitiousness, and goal mastery to student achievement. *Exceptional Children, 52*(1), 63–71.
- DeShon, R. P., & Gillespie, J. Z. (2005). A motivated action theory account of goal orientation. *Journal of Applied Psychology, 90*(6), 1096-1127.
- Dignen, S. (Ed.) (2009) Oxford Junior Dictionary. Oxford, England: Oxford University Press.
- Dweck, C. (1986). Motivational processes affecting learning. *American Psychologist, 41*(10), 1040–1048.
- Dweck, C. (1999). *Self-theories: Their role in motivation, personality, and development*. Philadelphia: Taylor & Francis.
- Dweck, C., & Leggett, E. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256–273.
- Earley, P. C., Northcroft, G. B., Lee, C., & Lituchy, T. R. (1990). Impact of process and outcome feedback on the relation of goal setting to task performance. *Academy of Management Journal, 33*(1), 87–105.
- Elliot, A. J. (1997). Integrating the "classic" and "contemporary" approaches to achievement motivation: A hierarchical model of approach and avoidance achievement motivation In M. Maehr & P. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 143–179). Greenwich, CT: JAI Press.
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*(3), 169–189.
- Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 52–72). New York, NY: Guilford.
- Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*(1), 218–232.
- Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70*(3), 461–475.
- Elliot, A. J., & McGregor, H. A. (2001). A 2 x 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*(3), 501–519.

- 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.
- Erez, M. (1977). Feedback: A necessary condition for the goal-setting performance relationship. *Journal of Applied Psychology, 62*, 624–627.
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Journal of Psychological Methods, 4*(3), 272–299.
- Fan, X., & Chen, M. (1997). Gender differences in mathematics achievement: Findings from the National Education Longitudinal Study. *Journal of Experimental Education, 65*, 229–242.
- Freeman, T. M., & Anderman, L. H. (2005). Changes in mastery goals in urban and rural middle school students. *Journal of Research in Rural Education, 20*, 1.
- Frost, P., & Mahoney, T. (1976). Goal setting and task process: An interactive influence on individual performance. *Organizational Behavior and Human Performance, 17*, 328–350.
- Gaa, J. P., & Schunk, D. (1981). Goal-setting influence on learning and self-evaluation. *Journal of Classroom Interaction, 16*(2), 38–44.
- George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference 11.0 update* (4th ed.). Boston, MA: Allyn & Bacon.
- Glass, G. V. (1976). Primary, secondary, and meta-analysis of research. *Educational Researcher, 5*(10), 3–8.
- Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (Vol. 2, pp. 53–92). New York, NY: Guilford Press.
- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology, 38*, 69–119.
- Good, T. L., & Brophy, J. E. (2000). *Teacher Expectations. In Looking in classrooms* (8th ed.). New York, NY: Addison-Wesley Educational Publishers.
- Hadwin, A. F., & Winne, P. H. (1998). CoNoteS: A software tool for promoting self-regulated learning in networked collaborative learning environment. In C. Rust (Ed.), *Improving students as learners* (pp. 539-549). Oxford: Oxford Centre for Staff Learning and Development.
- Hambleton, R. K., Swaminathan, H., & Rogers, H. J. (1991). *Fundamentals of item response theory*. Newbury Park, CA: Sage Publications.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. London, UK: Routledge.
- Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. London, UK: Routledge.
- Hattie, J., Brown, G. T. L., Keegan, P. J., MacKay, A. J., Irving, S. E., Patel, P., & Sussex, D. (2005). *Assessment tools for teaching and learning (asTTle) version, 4*. Wellington, New Zealand: University of Auckland, Ministry of Education, Learning Media.

- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81–112.
- Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st Century. *Review of Educational Research, 70*(2), 151–179.
- Howell, D. C. (2007). The analysis of missing data In W. Outhwaite & S. Turner (Eds.), *Handbook of social science methodology*. London, UK: Sage.
- Hoyle, R., & Panter, A. T. (1995). Writing about structural equation models. In H. R.H (Ed.), *Structural equation modeling: Concepts issues, and applications* (pp. 158–176). Thousand Oaks, CA: Sage.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.
- Janssen, O., & Van Yperen, N. W. (2004). Employees' goal orientations, the quality of leader-member exchange, and the outcomes of job performance and job satisfaction. *Academy of Management Journal, 47*, 368–384.
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*, 141–151.
- Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19*, 141–184.
- Karabenick, S. (2003). Seeking help in large college classes: A person-centred approach. *Contemporary Educational Psychology, 28*(1), 37–58.
- Kenny-Benson, G. A., Pomerantz, E. M., Ryan, A. M., & Patrick, I. I. (2006). Sex differences in math performance: The role of children's approach to schoolwork. *Developmental Psychology, 73*, 1284–1295.
- Kianian, A. M. (1996). Gender and mathematics achievement parity: Evidence from post-secondary education. *Education, 116*, 586–591.
- Klein, H., Wesson, M. J., Hollenbeck, J. R., & Alge, B. J. (1999). Goal commitment and the goal-setting process: Conceptual clarification and empirical synthesis. *Journal of Applied Psychology, 84*(6), 885–896.
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: Guilford Press.
- Latham, G. P., & Locke, E. A. (2006). Enhancing the benefits and overcoming the pitfalls of goal setting. *Organizational Dynamics, 35*(4), 332–340.
- Latham, G. P., & Locke, E. A. (2007). New developments and directions for goal-setting research. *European Psychologist, 12*(4), 290–300.
- Latham, G. P., & Yukl, G. A. (1975). A review of research on the application of goal setting in organizations. *Academy of Management Journal, 18*, 824–845.
- Leung, K., Su, S., & Morris, M. W. (2001). When is criticism not constructive? The roles of fairness perceptions and dispositional attributions in employee acceptance of critical supervisory feedback. *Human Relations, 54*, 1155–1187.
- Lewin, K., Dembo, T., Festinger, L., & Sears, R. (1994). Level of aspiration. In J. M. Hunt (Ed.), *Personality and the behavioural disorders* (pp. 333–378). New York, NY: Ronald Press.

- Licht, B., Stader, S., & Swenson, C. (1989). Children's achievement-related beliefs: Effects of academic area, sex, and achievement level. In C. J. Foote (Ed.), *Attribution feedback in the elementary classroom* (Vol. Doctoral dissertation): Syracuse University.
- Little, R. J. A., & Rubin, D. B. (2002). *Statistical Analysis with Missing Data* (2nd ed.). New York, NY: John Wiley.
- Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Journal of Human Performance*, 3, 157–189.
- Locke, E. A. (1969). Goals, probability of success (expectancy), and anticipated effects as determinants of performance level. In E. A. Locke, N. Cartledge, C. S. Knerr & J. F. Bryan (Eds.), *The motivational effects of knowledge of results*, (Report no. R69-2).
- Locke, E. A. (1996). Motivation through conscious goal setting. *Applied and Preventive Psychology*, 5(9), 117–124.
- Locke, E. A., Frederick, E., Lee, C., & Bobko, P. (1984). Effect of self-efficacy, goals, and task strategies on task performance. *Journal of Applied Psychology*, 69, 241–251.
- Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and performance*. Englewood Cliffs, NJ: Prentice Hall.
- Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, 57(9), 705–717.
- Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969-1980. *Psychological Bulletin*, 90, 125–152.
- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, 1, 130-149.
- Marsh, H. W., Balla, C. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*(103), 391-410.
- Marsh, H. W., & Yeung, A. A. (1998). Longitudinal structural equation models of academic self-concept and achievement: Gender differences in the development of math and English constructs. *American Educational Research Journal*, 35, 705–738.
- Martin, A. J. (2006). Personal bests (PBs): A proposed multidimensional model and empirical analysis. *British Journal of Educational Psychology*, 76, 803–825.
- Martin, A. J. (2007). Examining a multidimensional model of student motivation and engagement using a construct validation approach. *British Journal of Educational Psychology*, 77, 413-440.
- McInerney, D., & Ali, J. (2006). Multidimensional and hierarchical assessment of school motivation: Cross-cultural validation. *Educational Psychology*, 26(6), 717–734.
- Meece, J. L. (1991). *The classroom context and students' motivational goals* (Vol. 7). Greenwich, CT: JAI Press.
- Meece, J. L. (1994). The role of motivation in self-regulated learning. In D. Schunk & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 25-44). Hillsdale, NJ: Erlbaum.

- Meece, J. L., Blumenfeld, P. C., & Hoyle, R. H. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology*, 80(4), 582–590.
- Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology*, 85(4), 582–590.
- Mento, A., Locke, E., & Klein, H. (1992). Relationship of goal level to valence and instrumentality. *Journal of Applied Psychology*, 77, 395–405.
- Mento, A., Steel, R. P., & Karren, R. J. (1987). A meta-analytic study of the effects of goal setting on task performance. *Organisational Behaviour and Human Decision Processes*, 39(1), 52–83.
- Messick, S. (1989). Validity. In R. L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 13–103). New York, NY: Macmillan.
- Middleton, M. J., & Midgley, C. (1997). Avoiding the demonstration of lack of ability: An underexplored aspect of goal theory. *Journal of Educational Psychology*, 89, 710–718.
- Midgley, C., Anderman, E., & Hicks, L. (1995). Differences between elementary and middle school teachers and students: A goal theory approach. *Journal of Early Adolescence*, 15(1), 90–113.
- Midgley, C., Arunkumar, R., & Urdan, T. (1996). "If I don't do well tomorrow, there's a reason": Predictors of adolescents' use of academic self-handicapping strategies. *Journal of Educational Psychology*, 88(3), 423–434.
- Midgley, C., Kaplan, A., & Middleton, M. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, and at what cost? *Journal of Educational Psychology*, 93(1), 77–86.
- Midgley, C., Maehr, M., Huda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., . . . Urdan, T. (2000). *Manual for the Patterns of Adaptive Learning Scales*. Michigan: University of Michigan.
- Midgley, C., & Urdan, T. (1995). Predictors of middle school students' use of self-handicapping strategies. *Journal of Early Adolescence*, 15, 389–441.
- Ministry of Education. (1993). *The New Zealand curriculum framework*. Wellington, New Zealand: Learning Media.
- Mitzel, H. C., Lewis, D. M., Patz, R. J., & Green, D. R. (2000). The bookmark procedure: Cognitive perspectives on standard setting. In G. J. Cizek (Ed.), *Setting performance standards: Concepts, methods, and perspectives*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Musket, S., & Thompson, T. (2005). Does priming for mastery goals improve the performance of students with an entity view of ability? *British Journal of Educational Psychology*, 75(3), 391–409.
- Nicholls, J. G. (1984). Achievement motivation: Conception of ability, subjective experience, task choice, and performance. *Psychological Review*, 91, 328–346.
- Nicholls, J. G. (1992). Students as educational theorists. In D. Schunk & J. L. Meece (Eds.), *Student perceptions in the classroom* (pp. 267–286). Hillsdale, NJ: Lawrence Erlbaum Associates.

- Nicholls, J. G., Patashnick, M., & Nolen, S. B. (1985). Adolescents' theories of education. *Journal of Educational Psychology, 77*(6), 683–692.
- Nolen, S. B. (1988). Reasons for studying: Motivational orientations and study strategies. *Cognition and Instruction, 5*, 269–287.
- O'Connell, C. (1991a). Great expectations. *News, Notes, and Quotes (Phi Delta Kappa Newsletter), 35*(1).
- O'Connell, C. (1991b). Great expectations. News, Notes, and Quotes. *Phi Delta Kappa Newsletter, 35*(1).
- Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*(4), 543–578.
- Paris, S. G., & Paris, A. H. (2001). Classroom applications of research on self-regulated learning. *Educational Psychologist, 36*(2), 89–101.
- Patrick, H., Ryan, A. M., & Pintrich, P. R. (1999). The differential impact of extrinsic and mastery goal orientations on males' and females' self-regulated learning. *Learning and Individual Differences, 11*(2), 153–171.
- Payne, S. C., Youngcourt, S. S., & Beaubien, J. M. (2007). A meta-analytic examination of the goal orientation nomological net. *Journal of Applied Psychology, 92*, 128–150.
- Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*(3), 544–555.
- Pintrich, P. R., & DeGroot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*(1), 33–40.
- Pintrich, P. R., & Schunk, D. (1996). *Motivation in education: Theory, research, and applications*. Englewood Cliffs, NJ: Prentice Hall.
- Pintrich, P. R., & Zusho, A. (2002). The development of academic self-regulation: The role of cognitive and motivational factors. In A. Wigfield & J. Eccles (Eds.), *Development of academic motivation* (pp. 250–284). San Diego, CA: Academic Press.
- Pokay, P., & Blumenfeld, P. C. (1990). Predicting achievement early and late in the semester: The role of motivation and use of learning strategies. *Journal of Educational Psychology, 82*, 41–50.
- Polivy, J., & Herman, C. P. (2002). If at first you don't succeed: False hopes of self-change. *American Psychologist, 57*, 677–689.
- Poortvliet, P. M., Janssen, O., Van Yperen, N. W., & Van de Vliert, E. (2007). Achievement goals and interpersonal behavior: How mastery and performance goals shape information exchange. *Personality and Social Psychology Bulletin, 33*, 1435–1447.
- Regner, L., Escribe, C., & Dupeyrat, C. (2007). Evidence of social comparison in mastery goals in natural academic settings. *Journal of Educational Psychology, 99*, 575–583.
- Robertson, Q. M., & Stewart, M. M. (2006). Understanding the motivational effects of procedural and informational justice in feedback processes. *British Journal of Educational Psychology, 89*, 281–298.

- Roeser, R., Midgley, C., & Urdan, T. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioural functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology, 88*(3), 408–422
- Rosenthal, R. (1974). On the social psychology of self-fulfilling prophecy: Further evidence for Pygmalion effects and their mediating mechanisms. *MSS Modular Publications, 53*, 1–28.
- Rosenthal, R. (1991). Teacher expectancy effects: A brief update 25 years after the Pygmalion experiment. *Journal of Research in Education, 1*(1), 3–12.
- Rubie-Davies, C. (2003). *Expecting the best: Instructional practices, teacher beliefs and student outcomes*. (Unpublished doctoral thesis), University of Auckland, New Zealand.
- Rubie-Davies, C., & Hattie, J. (2012). The dangers of extreme positive responses in Likert scales administered to young children. *The International Journal of Educational and Psychological Assessment, 11*, 75-89.
- Rubie-Davies, C., Hattie, J., & Hamilton, R. (2006). Expecting the best for students: Teacher expectations and academic outcomes. *British Journal of Educational Psychology, 76*, 429–444.
- Ryan, A. M., Hicks, L., & Midgley, C. (1997). Social goals, academic goals, and avoiding seeking help in the classroom. *Journal of Early Adolescence, 17*, 152–171.
- Ryan, A. M., & Pintrich, P. R. (1997). "Should I ask for help?" The role of motivation and attitudes in adolescents' help seeking in math class. *Journal of Educational Psychology, 89*, 329–341.
- Sadler, R. (1989). Formative assessment and the design of instructional systems. *Instructional Science, 18*(2), 119–144.
- Schunk, D. (1981). Modeling and attributional effects on children's achievement: A self-efficacy analysis. *Journal of Educational Psychology, 73*, 93–105.
- Schunk, D. (1983). Goal difficulty and attainment information: Effects on children's achievement behaviours. *Human Learning, 2*, 107–117.
- Schunk, D. (1987). Peer models and children's behavioral change. *Review of Educational Research, 57*, 149–174.
- Schunk, D. (1990). Goal setting and self-efficacy during self-regulated learning. *Educational Psychologist, 25*(1), 71–76.
- Schunk, D. (2003). Self-efficacy for reading and writing: Influence of modeling, goal setting, and self-evaluation. *Reading and Writing Quarterly, 19*, 159–172.
- Schunk, D., & Lilly, M. W. (1984). Sex differences in self-efficacy and attributions: Influences of performance feedback. *Journal of Early Adolescence, 4*, 203–213.
- Schunk, D., & Pajares, F. (2002). The development of academic self-efficacy. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 15–31). San Diego, CA: Academic Press.
- Schunk, D., & Zimmerman, B. J. (2001). *Self-regulated learning and academic achievement*. Mahwah, NJ: Lawrence Erlbaum Associates.

- Schunk, D., & Zimmerman, B. J. (2007). Influencing children's self-efficacy and self-regulation of reading and writing through modeling. *Reading and Writing Quarterly*, 23(1), 7–25.
- Shehni Yailagh, M., Lloyd, J., & Walsh, J. (2009). The causal relationships between attribution styles, mathematics self-efficacy beliefs, gender differences, goal setting, and math achievement of school children. *Journal of Education & Psychology*, 3(2), 1-12.
- 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, 91–100.
- Skinner, E., & Edge, K. (2002). Parenting, motivation, and the development of children's coping. In L. J. Crockett (Ed.), *Agency, motivation, and the life course: The Nebraska symposium on motivation* (Vol. 48, pp. 77–143). Lincoln, NE: University of Nebraska Press.
- Steiger, J. H., & Lind, J. M. (1980). *Statistically based tests for the number of common factors* Paper presented at the Annual meeting of the Psychometric Society, Iowa City, IA.
- Stipek, D., & Gralinski, J. H. (1996). Children's beliefs about intelligence and school performance. *Journal of Educational Psychology*, 88, 397–407.
- Stone, N. J. (2000). Exploring the relationship between calibration and self-regulated learning. *Educational Psychology Review*, 12(4), 437–475.
- Thompson, T., & Dinnel, D. L. (2003). Construction and initial validation of the self-worth protection scale. *British Journal of Educational Psychology*, 73, 89–97.
- Timperley, H., & Parr, J. (2009). What is this lesson about?: Instructional processes and student understandings in writing classrooms. *Curriculum Journal*, 20(1), 43-60.
- Timperley, H., & Phillips, G. (2003). Changing and sustaining teachers' expectations through professional development in literacy. *Teaching and Teacher Education*, 19(6), 627–641.
- Tubbs, M. E. (1986). Goal setting: A meta-analytic examination of the empirical evidence. *Journal of Applied Psychology*, 71, 474–483.
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1-10.
- Urdan, T. (1997). Achievement goal theory: Past results, future directions. In M. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 229–243). Greenwich, CT: JAI.
- Van Yperen, N. (2006). A novel approach to assessing achievement goals in the context of the 2x2 framework: Identifying distinct profiles of individuals with different dominant achievement goals. *Personality and Social Psychology Bulletin*, 32, 1432–1445.
- Van Yperen, N., Elliot, A., & Anseel, F. (2009). The influence of mastery-avoidance goals on performance improvement. *European Journal of Social Psychology*, 39, 923–943.

- Van Yperen, N., & Renkema, L. J. (2008). Performing great and the purpose of performing better than others: On the recursiveness of the achievement goal adoption process. *European Journal of Social Psychology, 38*, 260–271.
- Vandewalle, D. (1997). Development and validation of a work domain goal orientation instrument. *Educational and Psychological Measurement, 57*, 995–1015.
- Volet, S. E., & Lawrence, J. A. (1989). Goals in the adaptive learning of university students. In H. Mandl, E. de Corte, N. Bennett & H. F. Friedrich (Eds.), *Learning and instruction: European research in an international context: Vols. II & III* (pp. 497–516). Oxford, UK: Pergamon.
- Vygotsky, L. S. (Ed.). (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Weaver-Hightower, M. (2003). The “boy-turn” in research on gender and education. *Review of Educational Research, 73*, 471–499.
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92*, 548–573.
- Wigfield, A., & Eccles, J. S. (1992). The development of achievement task values: A Theoretical analysis. *Developmental Review, 12*, 265–310.
- Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 91–100). San Diego, CA: Academic Press.
- Wigfield, A., Eccles, J. S., & Pintrich, P. R. (1996). Development between the ages of 11 and 25. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 148–185). New York: Simon & Schuster Macmillan.
- Willett, J. B. (1997). Measuring change: What individual growth buys you. In E. Amsel & K. A. Reninger (Eds.), *Change and development* (pp. 213–243). Mahwah, NJ: Lawrence Erlbaum Associates.
- Williams, R. H., & Zimmerman, D. W. (1996). Are simple gain scores obsolete? *Applied Psychological Measurement, 20*, 59–69.
- Winne, P. H. (1995). Inherent details in self-regulated learning. *Educational Psychologist, 30*(4), 173–187.
- Winne, P. H., & Butler, D. L. (1994). Student cognition in learning from teaching. In T. Husen & T. Postlewaite (Eds.), *International encyclopaedia of education* (2nd ed., pp. 5738–5745). Oxford, England: Pergamon.
- Wood, R. E., Mento, A., & Locke, E. A. (1987). Task complexity as a moderator of goal effects: A meta-analysis. *Journal of Applied Psychology, 72*(3), 416–425.
- Wright, P. M. (1992). An examination of the relationships among monetary incentives, goal level, goal commitment and performance. *Journal of Management, 18*(4), 677–693.
- Yailagh, M. S., Lloyd, J., & Walsh, J. (2009). The causal relationships between attribution styles, mathematics self-efficacy beliefs, gender differences, goal setting, and math achievement of school children. *Journal of Education & Psychology 3*(2), 95–114.
- Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25*(1), 82–91.

- Zimmerman, B. J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B. Zimmerman & D. Schunk (Eds.), *Self-regulated learning and academic achievement* (pp. 1–38). Mahway, NJ: Lawrence Erlbaum Associates.
- Zimmerman, B. J. (2002). Achieving academic excellence: A self-regulatory perspective. In M. Ferrari (Ed.), *The pursuit of excellence through education* (pp. 85-112). Mahwah, NJ: Lawrence Erlbaum Associates.
- Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology*, 82, 51–59.
- Zimmerman, B. J., & Risemberg, R. (1997). Self-regulatory dimensions of academic learning and motivation. In G. D. Phye (Ed.), *Handbook of academic learning: Construction of knowledge* (pp. 106–127). San Diego, CA: Academic Press.