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Goal motivation, academic outcomes, and psychological distress of a group of Australian secondary students: Scale refinement and an extension of the Ingledew, Wray, Markland, and Hardy (2005) model.

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B. PE, Dip. Ed., M.Ed. B. Sc (Psych) (Hons)

This thesis is presented in fulfilment of the requirements of Doctor of Philosophy

School of Psychology and Social Science

Faculty of Computing, Health, and Science

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

Abstract

Beliefs held about personal goals are termed goal dimensions. When applied to academic goals, goal dimensions represent a form of academic motivation. The purpose of this research was to examine if a model of goal dimensions developed by Ingledew, Wray, Markland, and Hardy (2005) in a business setting with adults could be applied to explain academic outcomes and psychological distress of two hundred and sixteen Australian final-year secondary students who were striving to gain a place at a university. Structural Regression (S-R) Analysis was used to examine the effect of the goal dimensions on psychological distress at Time 1 (April); psychological distress at Time 3 (September) while accounting for psychological distress at Time 1; and psychological distress at Time 3 as well as overall final academic performance, with consideration given to the effect of sense of goal progress and use of self-regulated learning strategies assessed at Time 2. Although not intended as a major part of the current research, several alternative models were developed for the scales that were used in the present study. Findings from the substantive analysis indicated that supportive beliefs about this personal goal were predictive of fewer symptoms of concurrently measured psychological distress. These findings were most clearly demonstrated when an S-R (of a substantially modified version of the Ingledew et al. model) rather than a Path Analysis was conducted. Supportive goal beliefs were also predictive of subsequent beliefs about goal progress and academic performance. The most supportive goal beliefs were greater expectations of attaining the goal, greater progress towards attaining the goal, as well as greater sense of control and less difficulty associated with goal pursuit. Use of self-regulated learning skills was greater when goal value was greater. Some important differences between males and females were noted for these findings. The

importance of examining measurement models prior to conducting regression analyses was reinforced. The results from this study help to demonstrate the important role that beliefs about educational goals play as a form of student motivation in predicting academic and psychological consequences experienced by adolescents striving to achieve an important educational goal; the role that gender may play in this process; and the effect of analysis type on the results.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;

(ii) contain any material previously published or written by another person except where due reference is made in the text; or

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Craig Harms.

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Chapter 1. Goal motivation, academic outcomes, and psychological distress of a group of Australian secondary students: Scale refinement and an extension of the Ingledew et al. (2005) model.

By the nature of their enrolment, there is one thing that unites a large number of Australian students in their final year of secondary studies. These students are tertiary-bound: they are striving to gain a place at university. While gaining a place at a university can be instrumental in helping these young people begin a career in a chosen field, it is a demanding, challenging, and competitive process. After studying for their final two years at secondary school, between 82% (2004/05) and 92% (2006/07) of students leaving secondary education in Western Australia are offered a place at university (TISC, 2009). Of all secondary students who apply for a place at a university, between 78% (2004/05) and 81% (2008/09) gain a place at university that was the first or second course that they applied for. In order to perform well academically, research has shown that the academic performance of the tertiary-bound secondary students would, in some part at least, depend on their use of self-regulated learning strategies to complement the learning activities directed by their teachers (Duncan & McKeachie, 2005; Pintrich, Smith, Garcia, & McKeachie, 1991; Robbins, Lauver, Davis, Langley, & Carlstrom, 2004).

Research has also found that Australian students report significant levels of psychological distress, such as stress, anxiety and depression, during adolescence (2000 Collaborative Health and Wellbeing Survey, 2001) and specifically during their final years of secondary education (Einstein, Lovibond, & Gaston, 2000; Robinson, Alexander, & Gradisar, 2009; Smith, Sinclair, & Chapman, 2002). Experiencing elevated levels of psychological distress can have lifelong consequences. Judd (1997)

has suggested that major depression is generally a chronic condition, with up to 80% of persons who experience depression experiencing symptoms of major depression an average of four times in their life.

A multitude of factors have been found to be associated with academic performance including personal factors, such as personality type and measures of cognitive ability (Chamooro-Premuzic & Furnham, 2008); previous performance (Andrich & Mercer, 1997); self-efficacy (Bandura, 1997); and goal orientation (Dweck & Leggett, 1988). Socio-environmental factors linked with academic performance include parenting style (Heaven & Ciarrochi**,** 2008), and the student's perception of the classroom environment (Brock, Nishida, Chiong, Grimm, & Rimm-Kaufman, 2008). Similarly, theoretical models have postulated that the interactions of personal and environmental factors are important in the aetiology of depressive (Hyde, Mezulis, & Abramson, 2008) and anxiety disorders (Barlow, 2000).

Extensive research has examined the impact of motivation constructs on academic performance such as personal orientations towards performance or learning goals of young adults studying at college or university (Duda & Nicholls, 1992; Harackiewicz, Baron, Tauer, & Elliot, 2002; Wolters, Yu, & Pintrich, 1996). Researchers have also examined the relationship between motivation constructs and the experience of psychological distress including personal goal orientations (Dykman, 1998) and the personal preferences associated with approaching and avoiding therapeutic goals (Elliot & Church, 2002). In addition, researchers have examined how well intrinsic motivation (Ryan & Deci, 2000) explained the academic performance and self-reported depression of college students (Conti, 2000). An important motivational construct linked with understanding both academic outcomes and psychological experiences is that of personal goals.

Goals have been defined as "internal representations of desired states where states are broadly construed as outcomes, events, or processes" (Austin & Vancouver, 1996, p. 338). Research in the field of psychology is based on the proposition that goals are a motivational construct because goals provide energy and direction to behaviour (Pervin, 1982). Therefore, educational goals of students should provide energy and direction to behaviour associated with the academic outcomes for the students such as academic performance and use of self-regulated learning strategies. An emerging body of research links the experience of depression and anxiety with the context of pursuing personal goals. Karoly (1999) has suggested that symptoms of psychological response can be related to aspects of goal pursuit such as choosing excessively difficult goals.

The purpose of the present research is to investigate the role that one goal construct in particular – goal dimensions – plays in explaining the academic performance, use of self-regulated learning strategies, and the psychological distress of tertiary-bound final year secondary students. Goal dimensions represent perceptions, appraisals, or beliefs that individuals have about their personal goals (Austin & Vancouver, 1996). Examples of goal dimensions include expectations of goal attainment (Success Expectation[1]) and goal value (Value).

In order to achieve this purpose, a model of goal dimensions developed by Ingledew, Wray, Markland, and Hardy (2005) was applied and extended in the present study. In their model, (described here as the Goal Dimensions model, and as shown Figure 1) Success Expectation and Value mediated the effects of most of the other goal dimensions in the model (e.g., Commitment, Specificity, Difficulty, and Support) on the commitment that a group of adult workers felt towards a work goal as well as the their recent experiences of positive and negative affect.

[1.] The names of goal dimensions are often capitalised during the course of this document.

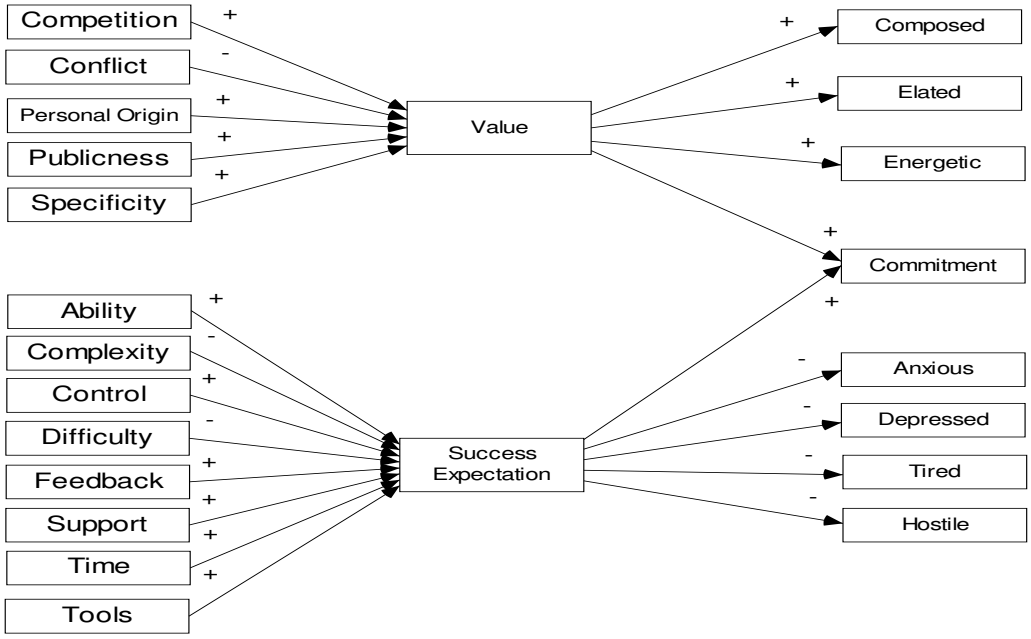

Figure 1. An overview of the model of goal dimensions as originally specified by Ingledew et al. (2005).

Note: Covariances between predictor variables and between residual terms for the outcome variables are not shown in this figure. Manifest variables are represented throughout this paper as rectangles.

The current research progressed in three steps. The Goal Dimensions model (Ingledew et al., 2005) was replicated with the current group of participants to explore the applicability of the model for predicting the commitment that the participants felt towards gaining a place at university as well as the psychological distress they experienced near the start of the academic year.

The Goal Dimensions model was then extended to investigate how well goal dimensions assessed near the beginning of the academic year predicted the development of symptoms of psychological distress over the course of the academic year and how symptoms of psychological distress impacted on overall academic performance. The Goal Dimensions model was also used to test how various goal dimensions assessed at the beginning of the academic year were related to the participant's use of self-regulated learning strategies reported near the mid-point of the academic year, overall academic

performance, and symptoms of psychological distress reported near the end of the academic year. What was also considered in this final analysis was the impact of beliefs about goal progress and use of self-regulated learning strategies completed near the mid-point of the academic year on academic performance and measures of psychological distress later in the academic year. As well as evaluating a theoretical model of goal dimensions developed by Ingledew et al. (2005), understanding the relationship between goal dimensions and academic outcomes and psychological distress for tertiary-bound final year secondary students could provide educators with an early indicator of the future academic outcomes and the psychological state of students under their tutelage.

There were several other aspects to this study. The impact of a participant's gender was examined for each step of the analysis. Ingledew et al. (2005) used Path Analysis in their research, where measurement error was not explicitly modelled. Several researchers (Kline, 2005; MacKinnon, 2008) have pointed to the deleterious effects that not accounting for measurement error may have on the parameters estimated as part of Path Analysis. Therefore, the effect of modelling random measurement error on parameters estimated in the model was also studied by estimating models using Structural Regression (S-R) analysis, and then comparing the results of both Path and S-R analyses.

Following suggestions by Anderson and Gerbing (1988), all of the measures used in the current research – the Goal Perceptions Questionnaire (Ingledew et al., 2005); the 42-item version of the Depression, Anxiety, and Stress scale (Lovibond & Lovibond, 1995); and the self-regulated learning component of the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991) – were subjected to Confirmatory Factor Analysis prior to conducting the S-R Analysis. This

part of the analysis became more substantial than had been anticipated as the results from the present analysis highlighted a number of substantive questions about the model-structure for these scales.

This thesis is presented in four overall sections – a review of the literature, a method section, a results and discussion section, and an overall discussion section. The literature pertinent to the current study is reviewed between Chapters 2 and 5. In Chapter 2, an outline of the study of goal constructs in psychology, with particular focus on goal dimensions, is provided. Chapter 3 summarises research linking goal dimensions with academic outcomes such as academic performance and the use of self-regulated learning strategies and psychological health. Chapter 4 includes a summary of the findings from the Ingledew et al. (2005) study; an overview of each step in the present research; a review of the measures used in the current study; a justification for the impact that the gender of the participants may have on the results of the present research; a justification for the other paths examined in the S-R analysis; and an outline of the Structural Equation Modelling (SEM) approach to testing each step of the current research.

The following issues are covered in the method section (Chapter 5): the characteristics of the participants, a summary of the measurement instruments, and the procedure used to collect the data. Chapter 6 (Results and Discussion) begins with a focus on data preparation before reporting and discussing the findings from the analyses. The final section of the thesis (Chapter 7) focuses on an overall discussion of the research questions and findings; the implications of the findings of the current research for the Ingledew et al. (2005) model of goal dimensions as well as the measurement instruments used in the current study; prior to discussing the limitations, future directions, and general implications associated with the current research.

CHAPTER 2: GOALS AND GOAL DIMENSIONS.

The underlying assumption to this research was that the appraisals, beliefs, or perceptions that individuals have about personal goals (i.e., goal dimensions) have a role in explaining their academic behaviour and psychological distress. This assumption is based on the work of researchers who have investigated the link between personal goals and behaviour as well as the link between personal goals and affect, well-being, or psychological distress (Carver & Scheier, 2000; Emmons, 1986; Locke & Latham, 2002; Pervin, 1982, 1989). Specifically, it is proposed in the current research that goal dimensions associated with the goal of gaining a place at university will explain some of the academic performance, use of learning strategies, and psychological distress experienced by final-year secondary students who, by the nature of their enrolment, were seeking to gain a place at university.

According to Austin and Vancouver (1996), goals are defined according to two essential characteristics: goals are an internal psychological experience; and goals are results that are desired. In general, psychological research assumes that goals provide energy and direction to behaviour (Pervin, 1982). Locke and Latham (2002) have suggested that goals initially energise and later maintain effort; focus attention on activities that are most relevant to the achievement of the goal; and direct behaviour towards seeking the most useful strategies congruent with achieving the goal. According to Emmons (1996), goal theorists assume that goals not only motivate behaviour, goals influence the psycho-emotional reactions to events. For example, Brunstein (1993) stated that "successful pursuit of meaningful goals plays an important role in the development and maintenance of an individual's psychological well-being" (p. 1061).

In their review of goal constructs and goal theories in psychology, Austin and Vancouver identified three broad categories of research conducted on goal constructs – goal content, the process of goal achievement, and goal structures. These broad goal constructs are reviewed next to provide a theoretical framework and motivational context for the current research.

Goal Content

According to Austin and Vancouver (1996) goal content research has focused on categorising goals into the types of results that humans are attempting to achieve when they set goals. Research in this area usually results in some overall list of human goals. Chulef, Read, and Walsh (2001) concluded that three categories of goals had attracted the attention of researchers: family and intimate-relationship goals (including goals associated with sex, marriage, and having a family); goals that related to general aspects of interpersonal relationships (such as developing and maintaining friendships and helping others); and intrapersonal goals (including meeting personal needs, health, and achievement).

The content of personal goals can also be understood in terms of the multiple goals for each developmental phase that individuals pursue in various domains of functioning, including goals across the academic, sporting, family, social, and health domains of living. For example, Schwartz and Drotar (2006) found that adolescents with chronic health conditions set new goals that involved management of the health condition; and that family goals were re-prioritised because of their health condition. According to Massey, Gebhardt, and Garnefski (2008), the goals of adolescents are mostly focused on education, occupation, social connection, and social standing (such as greater money and personal fame).

Sometimes researchers have focused on the purposes associated with goals that are pursued. One example of this approach to research in the educational domain is Achievement Goal or Goal Orientation Theory. Initial research in Achievement Goal Theory (Ames, 1992; Dweck & Leggett, 1988) suggested that students are orientated towards personal purposes or goals when they are studying in classroom situations. The personal purposes for someone with a high mastery orientation are learning, mastery, and developing competence. The personal purposes of someone who has a high performance orientation are to demonstrate their competence or superiority over others.

Similarly, goals have also been thematically categorised in terms of the higher-order reasons associated with goal pursuit. Approach and avoidance motivation have been defined by Higgins (1997) as regulatory focus. In approach motivation, the goal of enhancing personal development is an example of a goal that individuals approach or attracted to. Conversely, a threat to personal security is an example of something that people generally wish to avoid. In self-concordance theory (Sheldon & Elliot, 1999), goals that are pursued for more self-determined reasons (Ryan & Deci, 2000) are defined as self-concordant because the reasons for pursuing the goal are more closely linked to the self rather than being associated with the agenda of others.

Other research has focused on categorising goals into goal themes based on some common purpose that unites a number of goals. Emmons (1986) defined personal strivings as "objectives(s) that you are striving to accomplish or attain" (p. 1060). Emmons reported that looking attractive to others is the possible end goal or personal striving that links the goals of exercising regularly and dressing fashionably.

Goal Processes

According to Austin and Vancouver (1996), goal processes reflect the temporal and dynamic aspect of goal pursuit. They describe research where the overall process of

goal pursuit involves a linear-like cycle of establishing, planning, striving, and revising goals; and suggest that researchers attempt to measure goal constructs as a 'snap-shot' of a constantly developing process of goal pursuit. Action Phases Theory (Gollwitzer & Oettingen, 2000; Heckhausen, 1991) exemplifies the dynamic aspects of goal pursuit. In this theory, goal pursuit is conceptualised in terms of four phases.

In the initial phase of goal pursuit, goal choice is conceptualised as a process whereby people start with general wishes or desires, contemplate how these wishes or desires fit in with other wishes or desires, and then consider the feasibility (an expectation of achievement) and desirability (or value) of the wish or desire. The culmination of the first phase is the experience of some level of commitment to a goal that a person wishes to achieve.

At the end of the second phase of goal pursuit, there is some level of volitional commitment to behaviours that will help in the achievement of the goal. According to this model, an individual is most ready for goal pursuit when he or she experiences a high level of commitment to the goal and a high level of commitment to the behaviours that will help to achieve that goal. In the third phase of this model, behaviour is initiated. In the final phase, goal progress is evaluated, and decisions about future behaviour (continue or discontinue behaviour) are made.

Goal Structure

Part 1: Goal properties and hierarchies.

Austin and Vancouver (1996) outlined three general structural aspects or characteristics of goals: goal properties, goal hierarchies, and goal dimensions. The first two are reviewed in this section. The core issue linked to the properties of goals is discrepancy. That is, there is a difference between the person's current state and his or her future state. The TOTE (Test-Operate-Test-Exit) model by Miller et al. (1960)

represents early thinking on the nature of discrepancy. In this model, cognitive processes within a person occur such that their present state and preferred state (also known as the desired standard) are compared. If there is a difference between the current and preferred states, then operations are performed by the person to bring their current state into line with the preferred state. After some time, the current state is again compared to the preferred state. When there is a match between the current and preferred state, then operations stop, and the person stops or exits the process. The TOTE model (Miller et al., 1960) represents seminal work on the role that discrepancy plays in our understandings about goals. While researchers debate the nature of discrepancy, the motivational properties of goals are closely related to the notion of either reducing (Carver & Scheier, 2000) or creating (Bandura & Locke, 2003) discrepancy.

Many types of goal hierarchies have been articulated. For example, Carver and Scheier (2000), inspired by the work of Powers (1973), proposed that a goal can be understood in terms of a vertical organisation or level of abstraction. Carver and Scheier illustrate this concept by suggesting that the goal of being an honourable person is at a higher level of abstraction (described as a 'Be' or person goal) than the goal of not gossiping at work (termed a 'Do' or action goal). At the lowest level of abstraction, motor control goals (perhaps defined as 'Move' goals) represent the purpose behind specific actions taken by an individual in a situation. So, the same goal is expressed in different ways depending on whether the focus is on higher-order ideas ('Be' goals), ideas about actions in a situation ('Do' goals), or specific actions ('Move' goals).

As well as vertical organisation to goals, other researchers have suggested that goals can have a horizontal aspect. For example, goal systems theory (Kruglanski et al.,

as cited in Fishbach, Friedman, & Kruglanski, 2003) proposes that connections between goals can facilitate or inhibit goal attainment.

Goal constructs (so far) and the current research.

In terms of the current study, the goal constructs examined so far have provided a theoretical framework around the goal that is at the centre of this research – the goal of gaining a place at university. Using the taxonomy outlined by Chulef, Read, and Walsh (2001), this goal could be classified as an intrapersonal goal associated with striving to achieve in the academic domain. Educational goals are developmentally important goals for adolescents (Massey, Gebhardt, & Garnefski, 2008; Nurmi, 1991). The effect of higher-order purposes, such as Achievement Goal Orientation (Ames, 1992; Dweck & Leggett, 1988) and regulatory focus (Higgins, 1997) were not examined in the current study.

From the perspective of goal pursuit, attempting to gain a place at university represents a decision made at the end of the 'establishing' (Austin & Vancouver, 1996) or 'goal choice' (Gollwitzer & Oettingen, 2000; Heckhausen, 1991) phases of goal pursuit. For the participants in the current study, this decision was made approximately twelve months earlier. Thus, the participants were in their second of the two years that they need to complete before sitting the final set of external exams which would permit them to apply for a place at a university.

In terms of goal structure, tertiary-bound secondary students are aware that there is a discrepancy between their current and preferred state as they have not sat their final exams nor received an offer to enrol at a university during the time of the study. The goal of gaining a place at university can be viewed as a less abstract goal of being academically successful. Being academically successful can also be defined in terms of receiving an offer to enrol at university, being offered a place in a specific course at

university, and eventual graduation. Goal achievement could be facilitated if the participants in the current study focused on gaining a place at university rather than focusing on the process of wealth accumulation by starting full-time employment while studying.

Goal Structure

Part 2: Goal dimensions.

Having provided a framework for understanding the goal of gaining a place at university in terms of goal content, process, and some aspects of goal structure (discrepancy and goal hierarchies), the aim of the next part of the review is to examine the nature of goal dimensions. As a subjective experience, goal dimensions represent personal appraisals and perceptions of the personal and situational context of a goal (Austin & Vancouver, 1996). Responses to questions related to the expectancy of goal attainment represent a subjective evaluation of the likelihood that a person will be able to complete a task to a certain standard of achievement. Some other examples of goal dimensions include Value (the value or importance attached to a goal), Commitment (the desire and determination to achieve a goal), and Difficulty (a sense of the challenge and the obstacles that an individual may face in the achievement of a goal). According to Austin and Vancouver (1996) the meaning of goal dimensions can vary between persons and can change over time. There is occasionally some confusion in the literature about the distinctions in goal research outlined by Austin and Vancouver (1996). For example, Massey, Gebhardt, and Garnefski (2008) included literature about the goal importance (a goal dimension) in their review of the research investigating goal content and goal pursuit by adolescents.

Austin and Vancouver (1996) described two general approaches that have been used to explore the relationships between goal dimensions. First, researchers like Locke

and Latham (2002) have focused on the effects of a small number of goal dimensions, such as goal difficulty and specificity, on performance. Other goal dimensions are present in the model proposed by Locke and Latham, such as goal commitment, self-efficacy, feedback, task complexity, and goal importance. Several other goal dimensions have also been considered in the context of goal setting research, including goal stress, the rationale for goal pursuit, goal conflict, and goal clarity (Lee, Bobko, Earley, & Locke, 1991). However, most of the research conducted by Locke and Latham has focused on the beneficial effects on performance of setting specific and difficult goals.

Second, Exploratory Factor Analysis (EFA) has been used to establish higher-order relationships between larger numbers of goal dimensions. For example, Emmons (1986) found that 73% of the variance in 18 single-item goal dimensions was explained by five higher-order factors: Degree of Striving; (past) Success; Ease of Attainment; Instrumentality; and an unnamed factor. McGregor and Little (1998) extracted five factors, labelled as Self-benefit, Efficacy, Fun, Integrity, and Support.

Austin and Vancouver (1996) identified six common goal dimension of the research that had been conducted at the time: how important or valuable as well as how committed an individual is to the goal; level of difficulty for attaining the goal; how specific is the goal; the time frame for the goal; level of conscious access to personal goals; and the connectedness and or complexity of relationships between a goal with various other goals in an individual's life. Austin and Vancouver also noted at the time that a major problem associated with research at the time on the antecedents to and consequences of goal dimensions in psychological research was the lack of research investigating the relationships between goal dimensions. With adequate research on the relationship between goal dimensions, Austin and Vancouver felt that the relationship between goal dimensions and behaviour as well as affect could be better understood.

Many of the goal dimensions outlined by Austin and Vancouver (1996) were present in the model of goal dimensions developed by Ingledew et al. (2005). Ingledew et al. also proposed a set of relationships between goal dimensions.

The review by Austin and Vancouver (1996) provided a framework for the motivational context of the current research where personal goals (such as gaining a place at university) were conceptualised in terms of goal content, phase of goal pursuit, and goal structure. As one aspect of goal structure, goal dimensions reflect the subjective personal and social context that characterise a personal goal. Austin and Vancouver observed that the research that has been conducted on the effects of goal dimensions on performance and affect has taken place within the context of examining relationships between smaller (e.g., Locke & Latham, 2002) or larger (e.g., Emmons, 1996) exploratory sets of goal dimensions. What is reviewed next is research involving the relationships between goal dimensions outlined in the Goal Dimensions model (Ingledew et al., 2005), and between these goal dimensions and academic outcomes, such as academic performance and use of self-regulated learning skills, and psychological distress.

CHAPTER 3. GOAL DIMENSIONS, ACADEMIC PERFORMANCE, SELF-REGULATED LEARNING, AND PSYCHOLOGICAL DISTRESS.

A number of goal dimensions are outlined in the Goal Dimensions model (Ingledew et al., 2005), including: Competition (perceived competition for goal attainment); Conflict (how the goal conflicts with other goals); Personal Origin (personal influence involved in choosing the goal); Publicness (the intention to focus on the goal was known to others); Specificity (the specificity of the goal); Ability (the capacity to achieve the goal); Complexity (the complications associated with goal pursuit); Control (sense of control over the pursued goal); Difficulty (perceived challenge associated with obtaining the goal); Feedback (information from important others about progress towards goal attainment); Support (encouragement from important others); Time (there is sufficient time to achieve the goal); Tools (materials and resources to attain the goal); Success Expectation (expectations of goal attainment); Value (the personal value attached to the goal); and Commitment (the determination to achieve the goal). The purpose of this section is to report on previous research that has involved goal dimensions outlined in the Goal Dimensions model, academic performance, use of self-regulated learning strategies, and psychological distress.

Goal Dimensions and Academic Performance

As is the case with the general assumptions made about the relationship between goals and behaviour (e.g., Locke and Latham, 2002; Pervin, 1982), it is assumed that personal beliefs about educational goals (that is, goal dimensions) provide energy and direction to educational performance and behaviours. The research linking goal dimensions with academic performance is relatively sparse. Robbins et al. (2004) found that there was a non-significant relationship between commitment to goals and

academic performance. However, the authors argued that measurement problems (e.g., small numbers of items on scales) may have obscured the relationship between goal commitment and academic performance. Greater perceived control over academic outcomes has been found to be positively related to academic achievement (Perry, Hladkyj, Pekrun, & Pelletier, 2001; Schmitz & Skinner, 1993).

There are some suggestions about how specific goal dimensions might impact on academic performance from previous research conducted in academic settings. According to Goal Setting Theory (Locke & Latham, 2002), students who set difficult goals should outperform students who do not set goals or set vague goals. Wright (1990) has noted that goal difficulty had been conceptualised in four different ways – as goal level assigned by others; goal level personally assigned; in terms of improvement in performance; and the phenomenological perception that goal attainment is difficult.

According to Wright, goal difficulty is conceptualised as goal level in Goal Setting Theory. In research conducted on the relationship between goal difficulty and academic performance, goal difficulty is often defined in terms of the desired level of academic performance (Chen, Gully, Whiteman, & Kilcullen, 2000; Radosevich, Allyn, & Yun, 2003; Roney & O'Connor, 2008). This type of research has generally found that academic performance was greater when the participants focused on trying to achieve a superior academic grade. Thus, when a more difficult goal was chosen, academic performance was greater. How goal difficulty impacts on academic performance when goal difficulty is defined as phenomenological construct rather than goal level is less clear.

Concepts similar to the goal dimensions outlined in the Goal Dimensions model have been examined in educational research. Marsh, Craven, Hinkley, and Debus (2003) developed a model which included items that related to a competitive orientation

towards academic performance. For example, the authors ask students to respond to statements such as “I learn the most when I try to do better than other students”. The notion that feedback should be linked with better educational performance can be traced back to Thorndike’s (1913) Law of Effect: when applied to the current context, environmental contingencies, such as positive feedback, should increase academic behaviour. While feedback on performance has been viewed as being essential for learning to occur (Mory, 1992), little research has indicated how the quantity of feedback from teachers is perceived by students. The role of personal ability has been examined in the academic domain where personal ability has been defined in terms of previous academic performance (Carroll & Garavalia, 2004; Radosevich, Allyn, & Yun, 2007). Rather than examining the impact on academic performance of personal preferences for competing against other students, feedback from teachers, or previous performance of a measure of ability, of interest in the present research was how academic performance depended on the perceived competitiveness of the academic environment, the experience of receiving feedback from teachers during goal pursuit, and personal perceptions of academic ability.

Findings from research examining the role of academic task perceptions in the academic domain provide some direction about the likely role of perceived ability and value as well as expectations of success on performance in an academic setting. Goals and tasks may be thought of as conceptually related but distinct concepts. According to Locke and Latham (2002), a task represents the activity to be completed while a goal represents a standard of performance. In an educational setting, an upcoming exam is an example of a task, and the score that a participant aspires to achieve is an example of a personal standard of performance or goal. As notions of task and goal are associated in the goal pursuit process, it is suggested that research about task perceptions are

informative about the relationship between goal dimensions and the impact of goal dimensions on academic outcomes.

Eccles and colleagues (Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) have conducted a substantial amount of research examining the antecedents and consequences of personal beliefs about the ability to complete an academic task, the value attached to the task, and expectations of success on the task. Task-related expectancy beliefs were defined as "children's beliefs about how well they will do on upcoming tasks, either in the immediate or longer term future" (p. 70). Ability beliefs were defined as "(an) individual's perception of his current competence at a given activity" (p. 70).

Wigfield and Eccles (2000, p.70) defined task value in three ways – task importance ("For me being good in math is …not at all important …very important"); enjoyment of the process of attaining the goal ("In general, I find working on math assignments …very boring …very interesting") and how goal attainment was linked with future plans ("Compared to most other activities, how useful is what you learn in maths (not at all useful …very useful").

Eccles and colleagues (Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) described a set of structural relationships between task perceptions. They place expectations of task success and task value as the most proximal and positive predictors of academic outcomes, including performance and enrolment intentions. Expectations of task success and task value were proposed to mediate the influence of other task perceptions, such as ability perceptions, on academic outcomes. Wigfield and Eccles (1992) proposed that task-expectancy was more closely related to academic performance than task-value, but task-value was more related to academic choices than task-expectancy.

Researchers have also used Exploratory Factor Analysis (EFA) and latent-variable analysis to determine common factors that might explain the relationship between larger groups of goal dimensions. Webb and Sheeran (2005, study 2) conducted an EFA on responses by mostly female university students to 17 scales on their perceptions of doing well in a Psychology unit at first year level. Items measuring Commitment formed part of a Motivation factor (including items measuring Behavioural Intentions, Positive Attitude, and Lack of Effort [reverse scored]). Items measuring Feedback and Social Support made up a Social Support factor. Items measuring Conflict formed part of a factor the authors defined as Ego-depletion / Conflicting Standards. Greater Motivation and Social Support helped to identify students who were more likely to achieve satisfactory exam performance.

White (2002) found a ten-factor solution after an EFA of a 25 item scale of goal dimensions when surveying 100 university students completing a first-year unit in Psychology. Of the ten factors reported, White found that performance on a research report and overall academic performance was greater when Goal Efficacy was higher. Success Expectation was found to be a positive indicator of Goal Efficacy whereas goal difficulty was a negative influence on Goal Efficacy. Greater support from teachers was not found to influence either research report performance or overall performance.

Salmela-Aro and Nurmi (1997) used a latent variable approach to examine the relationship between goal dimensions for students' educational and occupational goals using Personal Projects Analysis methodology (Little, 1983). They specified a model where seven goal dimensions were indicators of a single latent factor titled Project Appraisals. Of the seven goal dimensions measured, five were relevant to the current study. These goal dimensions were Accomplishment and Capability (both of which appeared to be similar in nature to the scale measuring Success Expectation in the Goal

Dimensions model), Progress, as well as Stress and Difficulty (which appeared to be similar in nature to Difficulty in the Goal Dimensions model). Salmela-Aro and Nurmi found that the 'Project Appraisals' factor higher ratings for Accomplishment, Capability, and Progress, and lower ratings for Stress and Difficulty had a significant and positive impact on both satisfaction with their academic achievements and successful course completions but not expected or received grade.

Goal Dimensions and Self-Regulated Learning Strategies

Of interest in the field of motivation has been the concept of self-regulation. Vohs and Baumeister (2004) defined the essence of self-regulation as self control. They defined self-regulation as "efforts by the human self to alter any of its own inner states or responses" by "regulating thoughts, emotions, impulses, or appetites and task performances (as well as) attentional processes" (p. 2).

Zimmerman (2002) has defined self-regulated learning as the proactive efforts to learn. In contrast, learning activities that are directed by a teacher, such as completing homework tasks, are not examples of self-regulated learning. Pintrich, Smith, Garcia, and McKeachie (1991) defined self-regulated learning strategies as cognitive and metacognitive strategies that students can use to aid their own learning. The strategies included rehearsing and thinking critically about information to be learned, managing their study time, and strategic use of help seeking. This definition of learning strategies fits nicely within the self-regulation framework because Pintrich et al. have focused on assessing strategic use of personal resources to learn educational material.

Very little research has been conducted to examine the relationship between goal dimensions outlined by Ingledew et al. (2005) and the use of self-regulated learning strategies. Van Zile-Tamsen (2001) as well as Pintrich and De Groot (1990) did find that tertiary and secondary students respectively made greater use of self-regulated

learning strategies when they attached greater value on the task of doing well at mathematics. If the effects of task value and goal value are analogous, as suggested earlier, then use of self-regulated learning strategies should increase as goal value increases.

Goals Dimensions and Psychological Distress

Early research on the connection between personal goals and psychological states focused on the relationship between personal goals and well-being and life satisfaction. This body of research was justified using the 'teleonomic' theory of well-being. 'Telos', as the root word for teleonomic, is a Greek word meaning end, purpose, or goal [see http://en.wikipedia.org/wiki/telos_(philosophy)]. There is some disagreement about what defines a teleonomic theory of well-being. For example, Tamir and Deiner (2008) stated that a teleonomic theory of psychological health focuses on the psychological benefits of goal attainment – that well-being is a consequence of achieving a goal. Tamir and Deiner define theories, such as those proposed by Emmons (1986) and Palys and Little (1983), that focus on the effects of goal pursuit on psychological health, as 'activity' theories of well-being. Despite these conceptual differences, the central idea linking goals and well-being is that goal pursuit is a '…necessary but not sufficient condition for happiness and life satisfaction" (Michalak & Grosse Holtforth, 2006, p. 347).

Dimensions about personal goals have been found to impact on psychological health. Emmons (1986) investigated how goal dimensions associated with 'personal strivings' were associated with life satisfaction. According to Emmons, 'personal strivings' "represent what individuals are characteristically aiming to accomplish through their behaviour or the purposes or purposes that a person is trying to carry out …a personal striving is what a person is characteristically trying to do.". Personal

strivings represent super-ordinate goals that provide purpose to sub-ordinate goals. For Emmons, striving to be attractive is a super-ordinate goal that provides purpose to personal goals relating to physical activity and dressing in certain types of clothes.

Initially, Emmons (1986), used an expectancy-value framework as a conceptual starting point, and developed a number of single item measures of goal dimensions. Emmons then factor analysed the appraisals, and proceeded with his analysis using these exploratory factors. Emmons dropped goal commitment from further analysis because goal commitment was found to be highly correlated with goal importance. Overall, Emmons found that expectancy and value appraisals of goals were the goal dimensions that were most associated with daily experiences of positive mood and life satisfaction.

Brunstein and colleagues (Brunstein, 1993; Brunstein, Schultheiss, & Grassman, 1998) took the view that commitment to personal goals was a critical appraisal associated with psychological health without investigating the relationship between goal appraisals such as expectancy for success and value of success. Commitment to goals was conceptualised as the determination, urgency, and willingness to achieve a goal. They found that commitment to goals, in combination with goal attainability and goal progress, was an important factor in predicting subjective well being later in the academic semester (Brunstein, 1993), and, when consistent with higher order motives, for predicting daily experience of subjective well-being and subjective well-being later in the semester (Brunstein et al., 1998).

What has been concluded from the research by Emmons (1986), Brunstein (1993), and Brunstein et al. (1998) is that there is greater life satisfaction and well-being when goals are viewed as valuable as well as attainable and progress is being made on these goals. Klinger and Cox (2004) also make the point that reduced life satisfaction is

associated with greater psychopathology. It is therefore possible that beliefs associated with personal goals may have an indirect relationship on psychopathology via the effect of beliefs associated with personal goals on life satisfaction.

Others have pointed to a direct relationship between goals and psychological distress. Karoly (1999) has suggested that mental health problems can be conceptualised in terms of goal and self-regulation difficulties that may predispose and perpetuate the symptoms of depression and anxiety as part of the general experience of psychological distress. According to Karoly:

> 'The present position is that, whether the real-time expression of psychopathology is recurring and episodic (as in states of mania, depression, anxiety, phobic avoidance, and the like) or is of a protracted duration (as in schizophrenia), the mechanisms of differential susceptibility and extended maintenance will be found in specifiable interactions between environmental or biological triggers-potentiators and one or more of the 14 goal system dimensions ...' (p. 278).

The goal system dimensions identified by Karoly (1999) represent an elaboration of the goal constructs (goal content, goal structure, and goal hierarchies) identified by Austin and Vancouver (1996). Karoly suggests that the pursuit of goals across the lifespan interacts with how individuals self-manage the challenges they face at different times of their life. How individuals negotiate this process has important implications for their psychological well-being. For example, negative life events would be more psychologically distressing if the negative life event was perceived as having substantial negative consequences for important personal goals. Further, exceptionally high standards for achievement, a preference for monitoring the environment for signs of personal failure, and excessive attention to the social competition linked with goal

pursuit represent some goal self-regulatory risk factors for depression. Other goal and self-regulatory risk factors associated with the maintenance of depression include the selection of overly challenging and unengaging goals, and the inability to manage ruminative self-talk linked with goal pursuit.

Some research has been conducted on the relationship between goal dimensions outlined in the Goal Dimensions model and psychological distress. Pomerantz, Saxon, and Oishi (2000) suggested that perceptions of past success mediate the impact of goal investment in their goals (that is, valued goal attainment) on how upset the participants would be if they failed on their personal goals. They found that greater goal investment (as an indicator of the value attached to a goal) was positively related to positive affect when the participant's were more positive about successful goal attainment in the past. However, the expectations that the participant would be more upset if they failed to achieve their personal goal mediated the influence of greater between goal investment and greater worry (as a measure of generalised anxiety).

The relationship between multi-item measures of goal dimensions and psychological distress has been examined. Karoly and Ruehlam (1996) asked a group of participants experiencing chronic pain to complete the Goal Systems Assessment Battery (GSAB: Karoly & Ruehlam, 1995). Of the nine 4-item scales that make up the GSAB, two scales measure goal value (the importance and value attached to a goal) and goal self-efficacy (beliefs about having the skills or tools to achieve a goal). Karoly and Ruehlam found that greater goal self-efficacy was negatively related to symptoms of depression. Karoly et al. (2008) found support for a model where pain-induced fear for a group of participants experiencing long-term lower-back pain mediated the negative influence of greater goal self-efficacy and reduced goal conflict (measured by a single item) on depressive symptoms. Pomaki, ter Doest, and Maes (2006) found that greater

goal self-efficacy (this scale was different to the goal self-efficacy scale developed by Karoly & Ruehlam, 1995, and assessed appraisals of capability to a achieve a work goal) negatively influenced depressive symptoms some two years later while accounting for initial depressive symptoms.

Several studies have factor analysed a number of goal dimensions measured by single items and then investigated the impact of the factors on measures of well-being and psychological distress. Many of these studies have been based on Personal Projects Analysis (PPA) developed by Little (1983). Personal Projects represent the personal pursuits of individuals (Little, 1983). Using PPA participants are requested to list several personal pursuits. Participants are then typically asked to rate several of these pursuits with respect to each of the goal dimensions. A score for each goal dimension is generated by averaging the participant's score for each goal dimension across all of the participant's pursuits.

The number of goal dimensions used in each study has varied from study to study. For example, Ruehlman and Wolchik (1988) and Jackson et al. (2002) used the 17 goal dimensions described by Little (1983) in their studies. On the other hand, McGregor and Little (1998) had the participants in their study rate their goal on 35 goal dimensions. Several studies (Karoly & Lecci, 1993; Lecci et al., 1994; Meyer, Beevers, & Johnson, 2004) asked participants to rate their goals on a subset of goal dimensions used by Cantor et al. (1987).

Table 1 outlines how goal dimensions relevant to the Goal Dimensions model have been grouped as factors after EFA. The goal dimensions reported in Table 1 are grouped according to the goal themes – meaning, structure, community, efficacy, and stress – associated with PPA described in Little and Chambers (2004). Only one study (Christiansen, Blackman, Little, & Nguyen, 1998) has used these goal themes to

examine the relationship between goal dimensions and well-being. However, there was doubt about the validity of grouping the goal dimensions in this way as no form of factor analysis was conducted before grouping the goal dimensions into multi-item scales for the goal themes. A full table of the goal dimensions examined in the studies listed in Table 1 appears in Appendix 1.1.

Many of the goal dimensions listed in Table 1, such as Value, Commitment, and Likelihood of Success, appear to be very similar to the goal dimensions outlined in the Goal Dimensions model such as goal value, goal commitment, and expectations of goal attainment. Several researchers included Initiation as a goal dimension in their analysis. Initiation has been generally defined as the extent to which the goal was initiated by the participant. Conceptually, Initiation appears to be similar to notions of personal control over goal attainment. Similarly, the goal dimension assessing the stress and challenge of goal pursuit is conceptually similar to beliefs about the difficulty of the goal as all three goal dimensions relate to the demands and obstacles associated with goal pursuit.

Table1.

Pattern of Goal Dimensions: Personal Project Analysis and Psychological Health or Distress.

Authors (in bold) and factors found for the study	Meaning		Structure			[a] Com.		Efficacy		Stress			Other				
	Importance	Value congruency	Control	Initiation	Time Adequacy	Visibility	[b] Other's view	Progress	[c] Likelihood	Stress	Difficulty	Challenge	[d] Planning	Skills	Commitment	Support	Conflict
Ruehlman & Wolchik (1988)																	
Mastery			✓		✓			✓	✓								
Strain										✓	✓	✓					
Self-involvement		✓	✓	✓													
Salmela-Aro (1991)																	
Positive meaning	✓	✓						✓				✓					
Accomplishment					✓			✓	✓		✓		✓				
Control			✓	✓		✓											
Negative impact										✓							
Karoly & Lecci (1993)																	
Anxiety-Absorption	*									✓	✓	✓					
Personal responsibility			✓	✓													
Rewardingness					✓				✓								
Lecci et al. (1994)																	
Efficacy / structure			✓						✓				✓	✓			
Social meaning	✓					✓	✓										
Stress Difficulty										✓	✓						

Authors (in bold) and factors found for the study	Meaning		Structure			[a] Com.		Efficacy		Stress			Other				
	Importance	Value congruency	Control	Initiation	Time Adequacy	Visibility	[b] Other's view	Progress	[c] Likelihood	Stress	Difficulty	Challenge	[d] Planning	Skills	Commitment	Support	Conflict
McGregor & Little (1998)																	
Self-benefit																	
Efficacy			✓		✓				✓	✓	✓	✓					
Fun																	
Integrity	✓	✓													✓		
Support						✓										✓	
Pychyl & Little (1998)																	
Personal meaning	✓	✓		✓					✓								
Social meaning					✓	✓	✓	✓									
Stress										✓	✓	✓					
Wallenius (1999)																	
Accomplishment v Stress								✓	✓	✓	✓						
Social support	✓					✓	✓										
Meaning		✓										✓					
Control			✓	✓													
Incompatible					✓												

Authors (in bold) and factors found for the study	Importance	Value congruency	Control	Initiation	Time Adequacy	Visibility	[b] Other's view	Progress	[c] Likelihood	Stress	Difficulty	Challenge	[d] Planning	Skills	Commitment	Support	Conflict
Jackson et al. (2002)																	
Identify fulfilment	✓	✓															
Perceived strain										✓	✓	✓					
Mastery-control			✓	✓	✓			✓	✓								
Social impact						✓	✓										
Meyer, Beevers, & Johnson (2004)																	
Efficacy / structure			✓						✓					✓			
Social meaning	✓					✓	✓										
Stress Difficulty										✓	✓						

Note: ***** Importance not assessed because instructions asked participants to list important goals. [a] Community. [b] Other's view of importance. [c] Likelihood success. [d] Planning & know how.

There is some consistency about how some goal dimensions loaded onto a factor in the factor analyses from previous research using PPA. For example, goal value and goal importance loaded on to the same factor in several studies (Jackson et al., 2002; Lecci et al., 1994; McGregor & Little, 1998; Pychyl & Little, 1998; Salmela-Aro, 1992). Other examples where the items loaded onto the same factor were observed for the perceived control and initiation of goal pursuit (Jackson et al., 2002; Karoly & Lecci, 1993; Ruehlman & Wolchik, 1988; Salmela-Aro, 1992; Wallenius, 1999) and the stress and difficulty associated with goal pursuit (Lecci et al., 1994; Meyer, Beevers, & Johnson, 2004).

There are also several inconsistencies apparent in the summary of results shown in Table 1. For example, goal value was grouped with the sense of control over goal attainment as part of a single factor in the study conducted by Ruehlman and Wolchik (1988). However, goal value and sense of control over goal attainment were part of different factors in the studies conducted by Wallenius (1999) and McGregor and Little (1998). Similarly, items measuring goal difficulty and likelihood for goal attainment sometimes loaded onto the same (Jackson et al., 2002; McGregor & Little, 1998; Salmela-Aro, 1992; Wallenius, 1999) or different factors (Karoly & Lecci, 1993; Lecci et al., 1994; Meyer, Beevers, & Johnson, 2004; Pychyl & Little, 1998; Ruehlman & Wolchik, 1988).

The relationship between factor-analysed groups of goal dimensions on psychological distress has been examined. Karoly and Lecci (1993) found, for a group of female undergraduate students, that symptoms of health-related anxiety (hypochondrias) were greater when anxiety and goal absorption (as measured by perceived goal stress, difficulty, challenge, and personal absorption) was greater and

responsibility linked with personal goals (as measured by beliefs about personal control over and initiation of goal pursuit) was lower.

Lecci, Karoly, Briggs, and Kuhn (1994) found goal dimensions grouped as an Efficacy / Structure factor (including greater control, outcome expectancy, and tools to achieve their goals) were negatively related to symptoms of depression and anxiety. Goal dimensions that were part of a Social Meaning factor (where goal importance was observed to have a minimal impact on this factor) were observed to have a positive effect on symptoms of depression but not anxiety. A perceived Stress/Difficulty factor (goal dimensions measuring Stress and Difficulty) had a positive effect on symptoms of depression and anxiety.

Research Linking Goal Dimensions with Academic Outcomes and Psychological Distress: A Review

The purpose of this section is to highlight previous research linking goal dimensions outlined in the Goal Dimensions model with academic behaviour, use of self-regulated learning strategies, and psychological distress; and to describe the research that has examined the relationship between goal dimensions within the context of this research. The research linking goal dimensions with psychological health was more extensive than the research linking goal dimensions with academic performance, self-regulated learning strategies, and psychological distress.

The academic and psychological consequences of several goal dimensions (or similar constructs), such as goal value, expectations of goal attainment, goal difficulty, sense of control over goal pursuit, and goal commitment have been highlighted. Therefore, while the expected results for this study of the relationship between goal dimensions and academic performance, use of self-regulated learning skills, and measures of psychological distress were guided by the relationships proposed by

Ingledew et al. (2005), there is reasonable evidence from the research reviewed to justify these expected relationships.

This review of more recent research has highlighted the major problem identified by Austin and Vancouver (1996) with research conducted with goal dimensions still remain: that exploratory rather than confirmatory experimental procedures are relied on to establish the relationships between goal dimensions. With the exception of research conducted by Salmela-Aro and Nurmi (1997) and Karoly and colleagues (Karoly et al., 2008; Karoly & Ruehlman, 1996), all of the research examining the relationships between goal dimensions and the role of goal dimension factors for predicting various behavioural and psychological outcomes has been conducted using EFA.

There are several problems with making inferences about the relationships between goal dimensions as well as establishing the relationship between goal dimensions and educational and psychological outcomes of interest. There are doubts about the solution generated by EFAs because EFA is particularly prone to generating solutions due to chance association (Fabrigar et al., 1999). It is also difficult to generalise the effects observed in one study to other contexts and situations because each EFA solution is unique to that study. As a result, the meaning of each goal dimension factor is not always clear. For example, it is unclear whether greater personal control has a unique effect on psychological constructs of interest because the goal dimensions for Control and Likelihood of Success have been part of a common (Jackson et al., 2002) or separate factors (Salmela-Aro, 1992). Overall, the lack of *a priori* modelling has made it very difficult to make clear and confident predictions about the relationship between goal dimensions, as well as the effect of goal dimensions on academic performance, use of self-regulated learning, and psychological distress.

One of reasons for the reliance on EFA to examine the relationship between goal dimensions and psychological health has been overwhelming reliance on measuring goal dimensions with single or at most two items rather than multiple items to represent each goal dimension. Measurement using single items may not permit a full examination of the concept that underlies the ideas of the goal dimension. For example, ideas associated with goal commitment may include notions of determination, dedication, and resolve (Scanlon et al., 1993). Kline (2005) has recommended that scales thought to measure variables such as the goal dimensions described in the current literature should be defined by at least four items.

The Goal Dimensions model by Ingledew et al. (2005) provided an opportunity to examine the concerns established in this review about the relationship between goal dimensions outlined in this review while also answering the questions about the effects of several goal dimensions on the academic performance and psychological distress of final-year tertiary bound secondary students. As well as providing a model of several goal dimensions to be tested against the observed data, all scales that defined each of the goal dimensions Goal Dimensions model were also measured using four items. Although the GSAB (Karoly & Ruehlam, 1995) does measure goal dimensions using multi-item scales, the number of goal dimensions assessed by this questionnaire is relatively small compared to the goal dimensions outlined by Ingledew et al. (2005) and Little (1983) or the themes in goal dimensions described in Little and Chambers (2004). The net result of the approach used by Ingledew et al. to measuring goal dimensions and outlining relationships between goal dimensions was that greater meaning could be attributed to any unique effects observed between goal dimensions and behaviour and psychological outcomes of interest. The development of the Goal Dimensions model (Ingledew et al., 2005) is reviewed next.

Previous research has been conducted examining the link between many of the goal dimensions (or constructs similar to goal dimensions) outlined in the Goal Dimensions model (Ingledew et al., 2005) and academic and psychological phenomena. The research linking goal dimensions with academic outcomes of interest is relatively small. Previous research investigating the association between goal dimensions and well-being has been much larger than the research examining the association between goal dimensions and psychological distress. The Goal Dimensions model provides an approach to clarifying the relationship between goal dimensions while also examining the influence of goal dimensions on academic performance, use of self-regulated learning skills, and psychological distress.

CHAPTER 4. THE INGLEDEW, WRAY, MARKLAND, AND HARDY (2005) MODEL: AN APPLICATION AND EXTENSION.

The purpose of this chapter is to review the theoretical roots of the Ingledew et al. (2005) model of goal dimensions (The Goal Dimensions model), discuss and critically review the key findings from their research, discuss the applicability to the current research, justify the extensions made to this model in the current research, and outline the approach to Structural Equation Modelling (SEM) used in the present study. The intention behind the research by Ingledew et al. (2005) was to explore the relationship between goal dimensions associated with a work goal and the psychological health of adults working in an organisational setting. Ingledew et al. (2005) also developed multi-item scales for each goal dimension. Ingledew et al. based their Goal Dimensions model mainly around the findings of Hollenbeck and Klein (1987). Central to the work of Hollenbeck and Klein was a debate between them and Locke and Latham (2002) about the importance of goal commitment as a predictor of performance. Hollenbeck and Klein expressed the view that early versions of work by Locke and Latham did not adequately acknowledge the impact of goal commitment on the difficulty-performance relationship. Hollenbeck and Klein suggested that goal commitment moderated the effects of goal difficulty on performance. A large amount of research has considered the effect of goal commitment on performance. Klein, Wesson, Hollenbeck, and Alge (1989) found in a meta-analysis of 83 suitable studies that there was a positive relationship between goal commitment and performance, and the performance-commitment relationship was stronger for harder goals than for moderate or easy goals.

In a second part of their model, Hollenbeck and Klein (1987) focused on the possible antecedents to goal commitment. Using Vroom's (1964) expectancy-value theory as a starting point, Hollenbeck and Klein suggested that goal commitment depended on expectancy and attractiveness of goal attainment on performance. Amongst the antecedents to goal commitment in this model are a number of situational and personal factors predicted to impact on the attractiveness and expectancy of goal attainment. Included in these situational and personal predictors of goal attractiveness and expectancy are a number of personality variables as well as goal dimensions.

Ingledew et al. (2005) developed a phenomenological version of the model developed by Hollenbeck and Klein (1987) to examine how goal dimensions underscored the relationship between goal pursuit and well-being in a work environment. For example, Ingledew et al. included measures of goal dimensions such as personal control, competition associated with goal attainment, and the complexity of goal attainment whereas variables such as Reward Structures and Need for Achievement were not included in their model. Ingledew et al. defined the attractiveness of goal attainment as Value, and expectancy of goal attainment was defined as Success Expectation (see Figure 2). Ingledew et al. also included some goal dimensions outlined by Lee, Bobko, Early, and Locke (1991). These goal dimensions were the specificity of the goal and support from others for goal pursuit. Ingledew et al. described the Time and Tools goal dimensions as two dimensions that emerged from their analysis of a Resources dimension outlined by Lee et al..

Of particular note was how Ingledew et al. (2005) specified the impact of goal difficulty in their model. In Goal Setting Theory (Locke & Latham, 2002), goal difficulty has a direct positive effect on performance. According to Hollenbeck and Klein (1987), goal commitment moderated the effect of goal difficulty on Performance.

Goal difficulty in the work of Locke and Latham (2002) as well as Hollenbeck and Klein (1987) has been generally defined in terms of goal level (assigned by others or personally assigned). Wright (1990) noted that goal level and the perception that goal attainment is difficult to attain are two of the ways by which goal difficulty has been conceptualised. Goal difficulty is operationalised in the Ingledew et al. model as a phenomenological variable, where goal difficulty reflects the perceived challenge of the goal rather than any level of achievement. When goal difficulty is defined as the perception that a goal is difficult to obtain, Ingledew et al. suggested that greater goal difficulty was negatively, rather than positively, associated with Success Expectation and academic performance, and positively associated with positive affective states.

Ingledew et al. (2005) described their model as being made up of two parts. In the first part of the model (sub-model 1 – see Figure 2), a number of goal dimensions are specified as predictors of, or antecedents to, goal value (Value) and expectations about goal attainment (Success Expectation). The antecedents to Value were Competition (involving some competition with others); Conflict (that the goal conflicts with other goals); Personal Origin (the goal was personally chosen); Publicness (the intention to focus on this goal has been made public); and Specificity (the specificity of the goal).

The antecedents to Success Expectation were Ability (the capacity to achieve the goal); Complexity (the complications associated with goal pursuit); Control (perceived personal influence associated with the pursued goal); Difficulty (perceived challenge of obtaining the goal); Feedback (information from important others about progress towards goal attainment); Support (encouragement from important others); Time (the goal can be achieved within set deadlines); and Tools (the materials and resources to attain the goal). In this section of the model, Ingledew et al. (2005) represented the

relationship between goal dimensions in structural terms. In suggesting, for example, that Success Expectation mediated the impact of Ability on Commitment, Ingledew et al. proposed that perceptions of the ability to achieve a goal causally impacted on the development of beliefs about successfully achieving a goal.

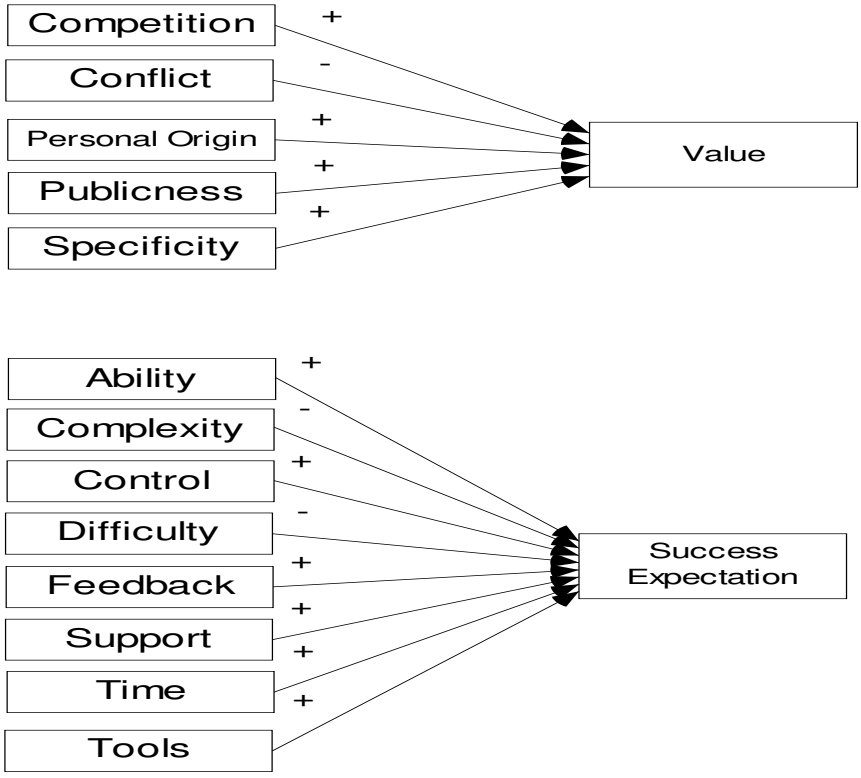

Figure 2. Conceptual diagram and hypothesised associations for sub-model 1. The valance of the antecedents to Value and Success Expectation are in parenthesis.

It is suggested in the second part of the Ingledew et al. study (see Figure 3) that Value was positively associated with positive emotions (feeling elated, energetic, and composed) as well as goal commitment (Commitment). In contrast, Success Expectation was postulated to be negatively associated with negative emotions (such as feeling anxious, depressed, tired, and hostile) as well as having a positive effect on Commitment. As part of this model, Success Expectation and Value were specified as

twin mediators (double mediation model) in the model. For example, it was suggested that the Value mediated the effect of Competition on positive emotions; Success Expectation mediated the effect of Difficulty on negative emotions. At the same time, it was also suggested in the proposed model that Competition had no re relationship with negative emotions, and Difficulty had no relationship with positive emotions.

In the Ingledew et al. (2005) study, 196 adult participants rated a work-related goal on 16 goal dimensions taken from the Goal Perceptions Questionnaire (GPQ). Each goal dimension was assessed using four questions. For example, the following four questions were specified to indicate Success Expectation: "I doubt I will achieve this goal" (reverse scored); "There is a good chance that I will achieve this goal"; "I am sure that I will achieve this goal"; and "It is unlikely that I will achieve this goal" (reverse scored). The scales of the GPQ were developed in an early stage of Ingledew et al.'s research project.

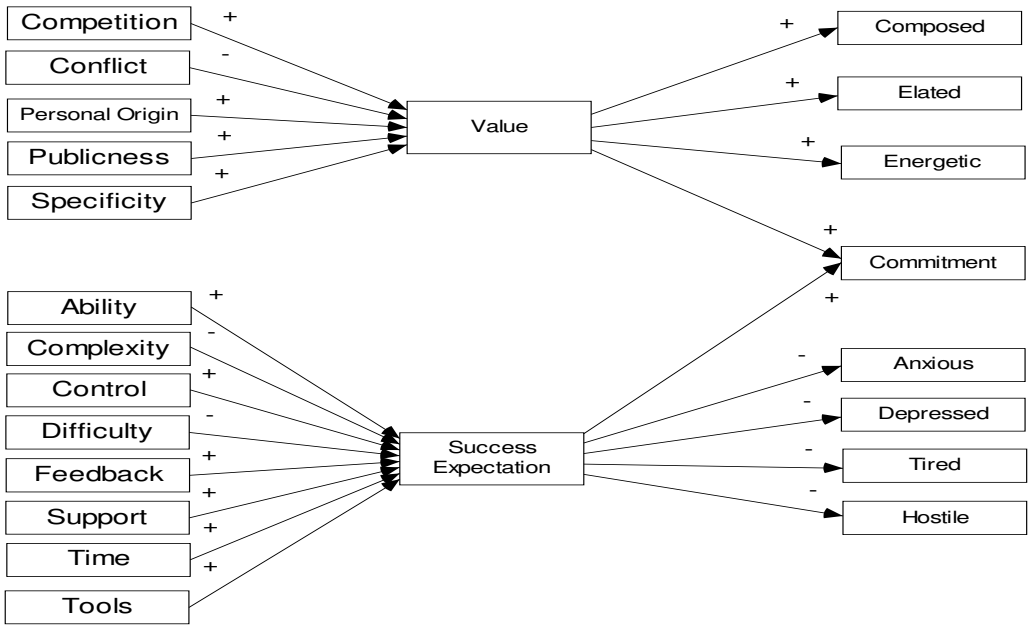

Figure 3. Overall model for the Ingledew et al. (2005) study.

With only a few minor variations, Ingledew et al. (2005) found, using path analysis, that there was reasonable support for their phenomenological version of the model proposed by Hollenbeck and Klein (1987). Ingledew et al. found that Success Expectation was positively associated with Commitment and negatively associated with the scales for negative affect. Further, Value was positively associated with Commitment and the scales that measured positive affect.

Many of the proposed mediated relationships were supported. For example, it was concluded that Success Expectation totally mediated the relationship between Ability and negative emotions because the model was accepted as correctly specified (based on findings for model fit) when the paths between Ability and the negative emotions were fixed at zero (see James, Mulaik, & Brett, 2006).

The total mediation hypothesis was not supported in all cases. Three partial-mediation effects were observed. As well as having a direct effect on Value, Competition was found to have a direct and positive effect on Anxiety; and Specificity was found to have a direct and positive effect on Commitment. Similarly, in addition to the effect of these variables on Success Expectation, Control was found to have a direct and positive effect on self-reported energy levels; and Support was found to have a direct and negative effect with depressive symptoms.

Step 1: An Application of the Goal Dimensions Model (Ingledew et al., 2005).

The Goal Dimensions model was developed to provide some insight into the role goal perceptions might play in explaining the affective well-being experienced by adults in the workplace. The initial purpose of the current research was to investigate if the Goal Dimensions model could be applied in an educational setting to explain the symptoms of psychological distress reported concurrently and near the beginning of the academic year by final-year secondary students striving to gain a place at university. In

order to achieve this goal, the Goal Dimensions model in the present study (see Figure 4) was specified as described by Ingledew et al. except that three measures of psychological distress – Depression, Anxiety, and Stress – were specified as the criterion or outcome variables of interest instead of the measures of affect used by Ingledew et al..

Goal dimensions model (Ingledew et al., 2005).

According to Ingledew et al. (2005), the model shown in Figure 4 consists of two parts. In the first part of the model, a specific set of goal dimensions were specified to have a direct effect on the Value and Success Expectation goal dimensions. It was proposed by Ingledew et al. that Competition (positive effect), Conflict (positive effect), Publicness (positive effect), and Specificity (positive effect) would direct effects on Value; and that Control (positive effect), Lack of Control (negative effect), Difficulty (negative effect), Feedback (positive effect), and Support (positive effect) would have direct effects on Success Expectation.

Some of the previous research is relevant to how aspects of the Goal Dimensions model proposed by Ingledew et al. (2005) are specified. Wigfield and Eccles (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) noted considerable conceptual overlap between notions of ability and self-efficacy. Bandura (1997) defines self-efficacy in terms of self-effectiveness. People with high self-efficacy believe that they can be highly effective in executing a series of actions to perform well in a situation. Research has also demonstrated that self-efficacy is a substantial and positive predictor of academic performance (Bandura, 1997; Pintrich & Schunk, 2002). According to Bandura (2006), the essential characteristics of items that measure self-efficacy are statements that make references to capability (e.g., I can ...), certainty and confidence with regard to domain specific actions rather than outcomes in the context of

challenging domain-specific tasks. Comparing the characteristics of the self-efficacy beliefs described by Bandura (2006), Wigfield and Eccles' measures of ability and expectancy are not related to outcomes like achieving a certain grade or gaining a place at university but instead would refer to beliefs about specific academic actions, such as studying.

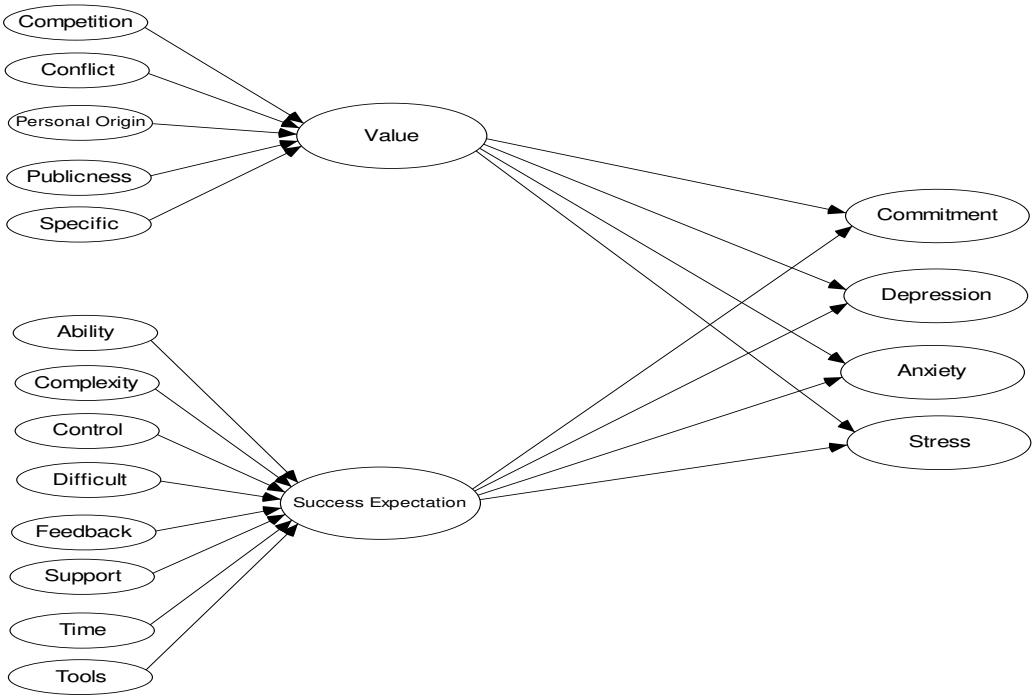

Figure 4. Conceptual for the overall Structural Regression Analysis for part 1 of the current analysis.

Note: The goal dimensions specified to be predictors of Success Expectation and Value were permitted to covary so that the unique effects of these variables on Success Expectation, Value, and other variables could be examined. Latent variables are represented throughout this paper as ellipses.

Self-efficacy (Bandura, 1997) and expectations about goal attainment, as defined by Ingledew et al. (2005), measure related but different constructs. In the context of the current study, self-efficacy beliefs would be framed around specific actions associated with academic performance, including study, using time effectively, and summarising texts. On the other hand, expectations of success refer expectations of goal attainment.

It is suggest that self-efficacy beliefs are most closely represented in the Goal Dimensions model as part of the Tools scale.

For the present study, the items on the Tools scale ask if the participants believed that they had the necessary study skills and resources to achieve the goal of gaining a place at university. It is suggested that, in a generalised sense at least, beliefs about having the study tools to achieve a goal are consistent with ideas of academic self-effectiveness inherent in Bandura's definition of self-efficacy. The approach to modelling the relationships between various goal dimensions proposed by Ingledew et al. (2005) contrasts with some of the previous research conducted in educational settings or in the context of examining the relationship between goal dimensions and psychological health. For example, Ingledew et al. (2005) proposed that Support, Feedback, and Conflict were separate factors and posited unique effects of these goal dimensions on Success Expectation and Value. In contrast, previous research had found that items relating to Support, Feedback, and Conflict (Webb & Sheeran, 2005) as well as Feedback and Support (White, 2002) were part of an overall common factor rather than being specified as separate factors with unique effects on academic outcomes. Ingledew et al. also suggests that Control, Difficulty, and Time were separate factors with unique effects on Success Expectation. However, Jackson et al. (2002) and McGregor and Little (1998) found that items related to Time and Control loaded onto a single factor. Some research has found that expectations of success and goal difficulty were part of the same (McGregor & Little, 1998; Salmela-Aro, 1992; Wallenius, 1999) or different factors (Jackson et al., 2002; Lecci et al., 1994; Pychyl & Little, 1998; Ruehlman & Wolchik, 1988).

Goal dimensions model and concurrently measured psychological distress.

In the second part of the model, it was expected that Success Expectation would have a direct and negative effect on the measures of psychological distress such as anxiety and depression (Ingledew et al., 2005; Karoly et al., 2008; Karoly & Ruehlam, 1996; Lecci, et al., 1994). Unlike the Ingledew et al. study, measures of positive psychological states were not included in the model. Instead, it was postulated that Value would have a direct and positive effect on psychological distress (Karoly, 1999; Pomerantz et al., 2000). It was expected that the perception of greater academic skills or Tools (Karoly & Ruehlam, 1996; Lecci, et al., 1994; Pomerantz, et al., 2000) and more Control (Karoly & Lecci, 1993; Lecci, et al., 1994) would have a negative impact on measures of psychological distress. Symptoms of psychological distress were expected to be greater when the participants reported greater difficulty associated with the achievement of the academic goal (Karoly & Lecci, 1993; Lecci et al., 1994). What was also proposed in the Goal Dimensions model was that the impact of the goal dimensions such as Tools, Control, and Difficulty would be indirect rather than direct. For example, Success Expectation was proposed to be a mediator of the Control – psychological distress relationship.

Step 2: Goal dimensions, Stability of Psychological Distress, and Academic Performance

The key findings of Ingledew et al. (2005) took place within the context of a concurrent research design, where all of the measures in the model were measured at the same time. The general theme for extending the Goal Dimensions model was to investigate the effect of goal beliefs using the goal dimensions model (Ingledew et al., 2005) on academic outcomes, such as use of self-regulated learning skills, and psychological distress over the course of the academic year.

The Goal Dimensions model was initially extended to examine the relationship between goal dimensions and the stability of symptoms of psychological distress across time as well as investigating the effect of symptoms of psychological distress near the beginning of the school year on overall academic performance. In order to reduce the complexity of the models, separate analyses were conducted for each of the measures of depression, anxiety, and stress. A diagram showing a conceptual diagram for one of the proposed analyses is shown in Figure 5.

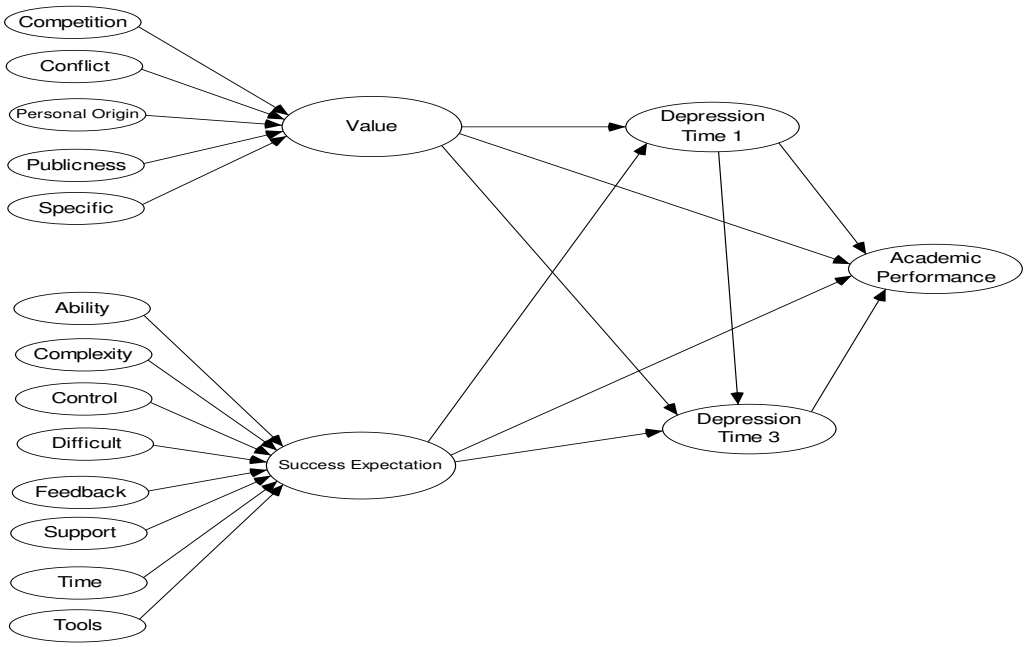

Figure 5. A conceptual diagram showing the model used to examine the effect of goal dimensions, as modelled by Ingledew et al. (2005), on the stability of symptoms of depression between the beginning of the academic year and near the end of the academic year.

If attempting to gain a place at university is an academically demanding and stressful process, then it is possible that levels of psychological distress would increase during the course of the academic year. Further, it is possible goal dimensions measured earlier in the year could explain the self-reported symptoms of depression, anxiety, and stress assessed later in the academic year while accounting for symptoms of depression,

anxiety, and stress near the beginning of the year. For example, students who are highly invested in the goal of gaining a place at university may be more prone to experience worry (see Pomerantz et al., 2000) and therefore experience more psychological distress later in the academic year when the end of the goal pursuit process approaches.

There has been some research linking goal dimensions and the growth of psychological distress symptoms. Pomaki, ter Doest, and Maes (2006) found that psychological distress was lower (after controlling for initial symptoms of psychological distress) two years after the participants rated work goals as being more achievable (as measured by a measure of goal self-efficacy).

It was also expected that the following goal dimensions would be positively related to overall academic performance: Ability and Value (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000), Success Expectation (Eccles & Wigfield, 2002; Salmela-Aro & Nurmi, 1997; White, 2005; Wigfield & Eccles, 2000), and Control (Schmitz & Skinner, 1993; Perry, Hladkyj, Pekrun, & Pelletier, 2001). Perceptions of goal difficulty (and not choice of goal level, as conceptualised by Locke & Latham, 2002) have been found to be negatively related to academic performance (Salmela-Aro & Nurmi, 1997; White, 2002). The perception that the participants were receiving more feedback from teachers was thought to viewed by the students as an indicator of support (Webb & Sheeran, 2005), so that the academic performance of the students was expected to be greater when perceived feedback was greater. In general, the model developed by Eccles and colleagues (Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) in an educational setting is very similar to the Goal Dimensions model in that expectancy and value constructs mediated the effects of other variables on academic performance.

The relationship between measures of psychological distress assessed near the beginning and end of the academic year on overall academic performance was also examined as part of this model. Previous research linking self-reported symptoms of depression and anxiety with academic performance of adolescents has produced a complex set of findings. Frojd et al. (2008) found that depressive symptoms for Finnish high school students (13 to 17 years) over the course of a school term were negatively related to academic performance. Marcotte, Levesque, and Fortin (2006) found no clear relationship between depressive symptoms of French high school students (13 to 16 years) and their academic performance in two school subjects. However, Rapport, Denny, Chung, and Hustace (2001) found that depression and anxiety symptoms (as indicated by an assessment of internalising symptoms) had a direct and negative impact on teacher-rated classroom performance. The effect of depression and anxiety on scholastic achievement was negative but indirect, via cognitive functioning of the student. Despite these mixed findings, it was hypothesised that the measures of psychological distress at Time 1 and Time 3 were negative predictors of overall academic performance.

Step 3: The Goal Dimensions, Academic Outcomes, and Psychological Distress: A Longitudinal Analysis

In the third step of the present research, the Goal Dimensions model (Ingledew et al., 2005) was extended to examine the role that goal dimensions, as outlined in the model, might play in influencing longitudinal educational outcomes, such as academic performance and use of self-regulated learning strategies, and the psychological distress of the participants. A diagram of the model is shown in Figure 6.

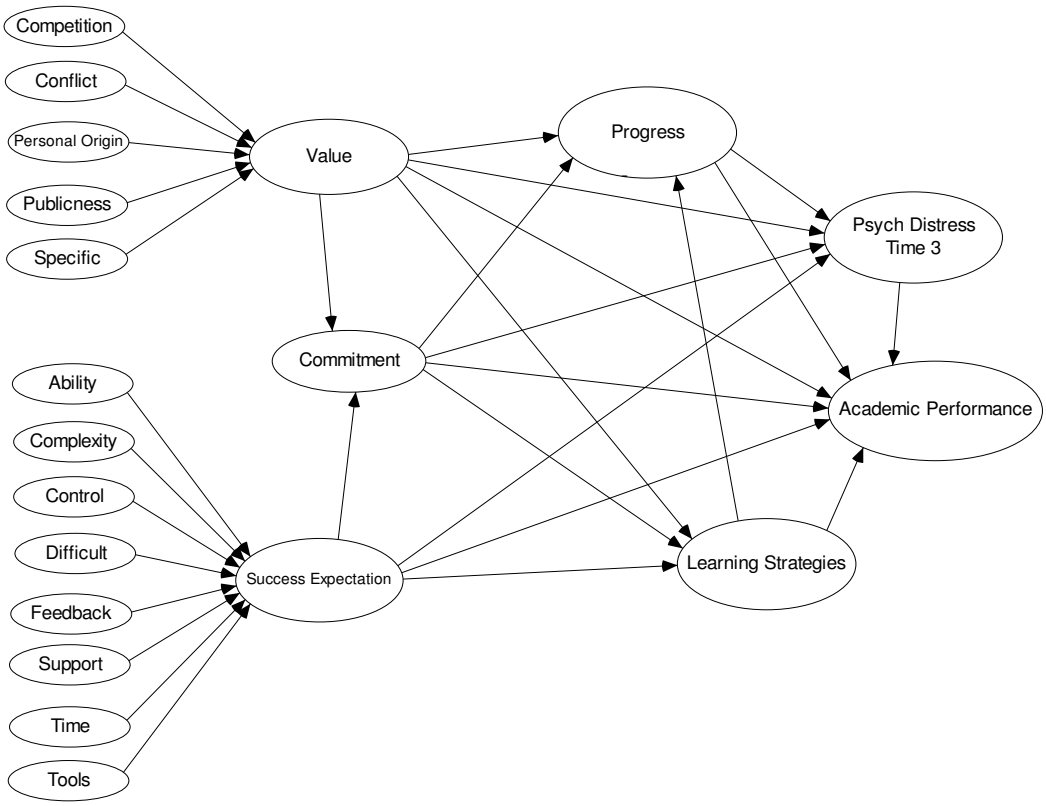

Figure 6. Conceptual model for examining the longitudinal effects of the goal dimensions modelled in the Ingledew et al. (2005) model.

It was expected that the relationships between goal dimensions described in the Goal Dimensions model assessed near the beginning of the academic year (Time 1) and symptoms of psychological distress near the end of the academic year (Time 3) and overall academic performance as well as the effect of symptoms of psychological distress at Time 3 on overall academic performance would be the same as described in Step 2 of the current analysis.

It was decided not to examine the stability of psychological distress over time (that is, include measures of psychological distress assessed near the beginning of the academic year) in this model because the Progress and Learning Strategy variables would have been specified as having a direct effect on measures of psychological distress at Time 1 and Time 3. This specification was not consistent with the temporal

order by which the participants completed the questionnaires. Although this specification meant that the effect of measures of psychological distress at Time 1 on overall academic performance was not investigated as part of this model, the relationship between the two variables was examined as part of Step 2 of the current analysis.

As well as the effect of goal dimensions on educational and psychological outcomes, the scope of the Goal Dimensions model was broadened in the present study to study the relationship between goal dimensions surveyed near the beginning of the academic year and beliefs about goal progress and use of self-regulated learning strategies near the middle of the academic year. What was expected was that greater goal value would be positively related to greater use of self-regulated learning strategies (Pintrich & De Groot, 1990; Van Zile-Tamsen, 2001). In the absence of other supporting or conflicting literature, it was expected that the relationship between goal dimensions and use of self-regulated learning strategies, as well as the relationship between goal dimensions and perception of goal progress, would be partially explained by the Goal Dimensions model. It was also proposed that when participants made greater use of self-regulated learning strategies, they would also report greater goal progress because they may perceive greater personal focus on learning academic content as a sign of progress towards gaining their final goal – gaining a place at university

The additional feature of the Step 3 model was an investigation of longitudinal consequences for perceived goal progress and use of self-regulated learning strategies and overall academic performance and symptoms of psychological distress. Beliefs about goal progress assessed during goal pursuit have been demonstrated to be positively associated with performance in organisation settings (Locke & Latham,

2002). Therefore, it was expected that greater goal progress would have a positive effect on the overall academic performance of the participants in the current study.

The idea that appraisals of goal progress have behavioural and psychological consequences is central to the work of Carver and Scheier (1990, 2000). According to Carver and Scheier, the participants in present study would monitor the environment for signs of goal progress, and that rate of progress on goal attainment generates an affective experience. In addition, beliefs about goal progress have been found to be positively associated with psychological health (Brunstein, 1993; Jackson et al., 2002; Koestner, Lekes, Powers, & Chicoine, 2002; Lecci et al., 1994; Pychyl & Little, 1998, Salmela-Aro, 1992; Wallinius, 1991). It is suggested that perceived positive progress should generate positive affect for the participants in this study, and that positive affect should have a negative impact on the symptoms of psychological distress they report later in the academic year.

Greater use of facilitative self-regulated learning strategies has been associated with better academic performance. Using the self-regulated learning strategy component of the Motivated Strategies for Learning Questionnaire[2] (Pintrich et al., 1991), researchers have found that as self-reported use of supportive self-regulated learning strategies has increased, academic performance of Australian tertiary students (McKenzie, Gow, & Schweitzer, 2004) and North American secondary students (Pintrich & De Groot, 1990; Pokay & Blumenfield, 1990) has increased. Van-Zile and Livingston (1999) also found that high achieving tertiary students reported using more self-regulated learning strategies than low achieving students.

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[2] Described as the MSLQ-SRL at several points in the thesis

Another concept that has much in common with self-regulated learning strategies is that of study skills. In Robbins et al.'s (2004) research, study skills were defined as the personal "tools and abilities to successfully complete task(s), achieve goals, and manage academic demands" (p. 267). In a meta-analysis by Robbins et al., greater use of study skills was positively and moderately associated with academic retention; and greater use of study skills was found to have a positive but small effect on academic performance.

Students may get some comfort from using self-regulated learning strategies while studying. Rather than focusing on the somewhat daunting goal of gaining a place at university, the students in the current study may gain some comfort from focusing on an immediate set of concrete and immediate educational tasks such as focusing on their own study strategies. It is possible then that greater use of self-regulated learning strategies may reduce psychological distress in the same way that problem-focused coping reduces the experience of stress in demanding environments (Valentiner, Holahan, & Moos, 1994).

Gender, Academic Performance, and Psychological Distress

The responses of male and female participants were initially collated together in the present study when calculating composite scores for each of the scales. It was assumed that the S-R models in present study would apply equally well for male and female participants. Important gender differences in predictors of academic performance have been noted in the literature. It has been found that males have a higher perceived expectancy of success in Mathematics (Eccles et al., 1983; Pajares, 1996) and Science (Debacker & Nelson, 2000). Males have been found to place higher value on achievement in Mathematics compared to females (Eccles et al.). Women have been

found to place higher value on achievement in English (Feather, 1988) compared to males.

Crombie, Sinclair, Silverthorn, Byrne, DuBois, & Trinneer (2005) specifically examined gender differences in their development of Eccles and colleagues' model (Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) linking task appraisals (value and competence as a measure of success expectation) with academic outcomes in mathematics. Relatively few gender differences were observed, and all differences involved the relationship between task appraisals and future enrolment intentions. The research on the effect of gender in the educational domain points to the importance of examining gender differences in how goal dimensions might impact on academic outcomes. Therefore, all S-R models were examined for the moderating effects of gender.

Two forms of evidence suggest that the relationship between goal dimensions and symptoms of psychological distress reported by adolescents in the present study may depend on the gender of the participants. Researchers have consistently found the prevalence rates for depression and anxiety depend on the gender of the adolescents. Hankin, Abramson, Moffit, Silva, McGee, & Angell (1998) found that females were generally twice as likely as males to meet the criteria for a major depressive episode or dysthymia in the previous 12 months. Also, researchers have found gender effects when examining the effects of psychosocial variables on psychological distress of young people. Cole (1990) found, when examining the relationship between perceived academic and social competence and symptoms of depression reported by children in year four at school, that ratings by boys of themselves were more similar to ratings by teachers and peers compared to the same ratings by the girls in the sample.

Two-Step Modelling.

The two-step approach to Structural Equation Modelling (SEM) described by Anderson and Gerbing (1988) was used in the current analysis. That is, the assumptions associated with the measurement of each scale used in the present study were tested prior to testing structural relationships (that is, paths in a regression model) between constructs measured by the scales. It was also important to establish the measurement properties of the scales used in the current study because the scales for the questionnaires completed as part of the current study were either totally or partially aggregated as parcels of items; and it has been suggested that unidimensionality should be established before parcelling occurs (Bandalos, 2002; Kishton & Widamen, 1994).

Confirmatory Factor Analysis (CFA) for each scale used in the current research was conducted before the S-R analysis in order to test the assumption of unidimensional measurement (that the items for each scale where unique indicators of a latent factor) and discriminant validity (that the latent factors measured separate constructs). In addition, measurement models for the questionnaire scales were examined using One-factor Congeneric Models (OCMs: (Jöreskog & Sörbom, 1996) to establish convergent validity for each scale (that the items for each scale were good indicators of the latent factor) prior to conducting the CFAs.

Ingledew et al. (2005) used Path Analysis in their research. Path Analysis is an example of analysis of measured variables made up of groups or parcels of items based on the total aggregation approach (Coffman & MacCallum, 2005); and measurement error is not accounted for in the model. According to Kline (2005) and MacKinnon (2008), not considering error in a model has several problematic consequences for the parameters estimated in Path Analysis: the direct effects are likely to be biased; the standardised and unstandardised paths coefficients are more likely to have contrasting

values; and statistical suppression effects are more likely to be observed. Kline (2005) has suggested that these problems noted with Path Analysis can be solved by using S-R analysis of latent or partially latent variables. Therefore, the S-R analyses for Steps 1, 2, and 3 of the present study were conducted by specifying total aggregated parcels of items as a single indicator of a partially latent variable. The partially latent variables were corrected for random error. Path and S-R Analyses were also conducted for Step 1 of the analysis only to examine the impact of modelling random error on the findings associated with the model.

An analysis of the measurement properties for each scale used in the present study was also justified because of substantive issues associated with each of the scales used in the current research. The goal perceptions in this study were measured using the Goal Perceptions Questionnaire (GPQ) developed by Ingledew et al. (2005). The GPQ is a relatively new questionnaire; and concerns about the convergent validity were noted in the reporting of model fit for seven of the 16 scales that were subsequently used in the Path Analysis conducted by Ingledew et al.. The problematic scales were for the following goal dimensions: Competition Control, Publicness, Success Expectation, Time, Tools, and Value. In addition, the measurement properties of the scales were established using a procedure where participants generated a variety of work goals. It is unclear whether rating goal dimensions according to a single goal (as was done in the current study) would impact on the factor structure of these scales. The finding that the goal dimensions outlined by Ingledew et al. (2005) measured separate constructs should also be re-established in the context of the present study.

The DASS-42 was used as the measure of psychological distress in the current study. Lovibond and Lovibond (1995) proposed that the 14 items for each of the Depression, Anxiety, and Stress scales were explained by separate but related factors.

Evidence from several CFAs (see Table 2) have consistently shown that the three-factor model is a better model terms of model fit than the two-factor (the items for the Depression scale are indicators of a Depression factor; and items for the Anxiety and Stress scales are indicators of a single factor titled Tense) or a one-factor (Psychological Distress) model.

Table 2.

Results of Previous Confirmatory Factor Analyses on the Depression Anxiety Stress Scale-42.

Authors (*N*; Method of Estimation)	Models (*df*)	Model fit	Correlations
Lovibond and Lovibond (1995) (717; ML)	1-factor (819)	χ^2=5,413	Scale: D & A = .61; D & S = .62; A & S = .76.
	2-factor (818)	χ^2=3,942	
	3-factor (816)	χ^2=3,559.	
Brown, Chorpita, Korotitsch, & Barlow. (1997). (Study 2; 241; ML)	1-factor	χ^2=3,792.31; RMSEA=.12	Scale: D & A = .45; D & S = .66; A & S = .66
	2-factor	χ^2=2,818.93; RMSEA=.10	
	3-factor	χ^2=2,396.08; RMSEA=.09.	
Crawford and Henry (2003). (1771; RML)	1-factor	χ^2=14,1445.5; S-B χ^2=7,259.3; RMSEA=.10	Scale: D & A=.70; D & S=.72; D & A=.71. *Latent variable: D & A= .75; D & S = .77 A & S = .74
	2-factor	χ^2=10,341.7; S-B χ^2=5,421.9; RMSEA=.08	
	3-factor	χ^2=8,148.0; S-B χ^2=4,298.2; RMSEA=.07.	
Page, Hooke, and Morrison (2007: Study 2) (816; RML)	1-factor	χ^2=16,532.8; S-B χ^2=4,298.2; RMSEA=.15	Not reported
	2-factor	χ^2=7,746.3; S-B χ^2=4,298.2; RMSEA=.10	
	3-factor	χ^2=6,913; S-B χ^2=5,677.7; RMSEA=.09.	

T1 = Time 1 of the study, D=Depression; A=Anxiety; S=Stress. * Crawford and Henry (2003) reported latent-variable correlations based on a model where the error terms were permitted to covary in a pattern suggested by the sub-scale structure of the DASS-42 outlined by Lovibond and Lovibond (1995).

There are two main concerns about the findings of pervious research on the psychometric properties of the DASS-42. None of the models reported from previous research, including the three-factor model which is the preferred model proposed by Lovibond and Lovibond (1995), were a particularly good fit of the data. For example, the lowest value for one accepted indicator of model fit, the Root Mean Square Error (RMSEA) of .07 (Crawford & Henry, 2003). Browne and Cudeck (1992) suggest that an RMSEA value was .07 indicates that reasonable but not a good fit of the data. Another concern with the three-factor model is that the three factors may lack discriminant validity. Scale correlations have been observed to be high in some studies. Lovibond and Lovibond (1995) found that the correlation between Anxiety and Stress was .76. Crawford and Henry (2003) found that the correlation between Depression and Anxiety was .75, between Depression and Stress was .77, and between Anxiety and Stress was .74.

Self-regulated learning strategies were measured in the present study by the learning strategies component of the MSLQ developed by Pintrich, Smith, Garcia, and McKeachie (1993) (and described as the MSLQ-SRL in the current study). There are nine subscales to the MSLQ-SRL: Rehearsal, Elaboration, Organisation, Critical Thinking, Metacognitive Self-Regulation, Time and Study Management, Effort, Peer Learning, and Help Seeking. Concerns about convergent and discriminant validity were apparent after reviewing the findings of Pintrich et al. For example, the factor loadings for the Help Seeking scale were particularly problematic, as loadings for two of the three items that made up the scale were found to equal .20 and .17.

A number of sub-scales of the MSLQ-SRL have been used in research (see Duncan & McKeachie, 2005). Concerns about discriminant validity (separateness between the scales) were noted when the findings reported by Pintrich et al. (1993) were

examined closely. For example, the correlation between the Effort as well as the Time and Study factors was .95. The correlations between several other scales were observed to be greater than .75. A further problem associated with the MSLQ-SRL used in the current study was that many of the items were modified by replacing words such as 'course', 'class'; and 'readings' because they did not reflect the context of secondary students who were the participants for this study. Changing these words may impact on the factor structure for the scales in the MSLQ-SRL.

Finally, all studies involving the GPQ (Ingledew et al., 2005), the DASS-42 (Lovibond & Lovibond, 1995) and the MSLQ-SRL (Pintrich et al., 1993) have been conducted based on the responses of adults who were from the general community, attending clinics for treatment of psychological disorders, or attending college or university. It is unknown if the psychometric properties of these questionnaires would be replicated with Australian adolescents as participants. Thus, one purpose associated with the present study was to establish the convergent validity, unidimensionality, and discriminant validity for each of the scales used in the present study prior to modelling the scales as part of the S-R analyses.

The Current Study: A Summary

The over-riding purpose of this study was to investigate how the perceptions about an important academic goal – gaining a place at university – were related to the overall academic performance, use of self-regulated learning strategies, and psychological distress of a group of Australian students in their final year of secondary education. This goal was achieved by applying and extending the Goal Dimensions model developed by Ingledew et al. (2005). Also, by using the Ingledew et al. (2005) measures of goal dimensions – the Goal Perceptions Questionnaire – it was anticipated that greater meaning could be attributed to the relationship between goal dimensions as

well as the value of goal dimensions for predicting academic and psychological outcomes of interest in this study.

Initially, the Goal Dimensions model was applied to explore the relationship between goal dimensions and symptoms of psychological distress near the beginning of the academic year. The Goal Dimensions model was extended in two ways. In Step 2 of the current research, several effects were examined: the relationship between goal dimensions and symptoms of psychological distress reported by the participants near the end of the academic year was examined while accounting for symptoms of psychological distress reported near the beginning of the academic year; the impact of goal dimensions on overall academic performance; and the effect of symptoms of psychological distress reported near the beginning of the academic year and near the end of the academic year on overall academic performance. In Step 3 of the present study, the Goal Dimensions model was extended to examine how well the goal dimensions explained several outcomes of interest assessed three to six months later: sense of progress and use of self-regulated learning strategies assessed near the mid-point of the academic year; and overall academic performance and symptoms of psychological distress near the end of the academic year. In addition to the main focus of the current study, several other issues were investigated: the impact beliefs about goal progress and the use of self-regulated learning strategies assessed near the middle of the academic year on overall academic performance and symptoms of psychological distress near the end of the academic year; and the relationship between measures of psychological distress measured near the beginning and end of the academic year and overall academic performance.

Some additional analyses were also conducted as part of the current study. The moderating effect of gender on the results of each of the S-R analyses was also

examined. Both Structural Regression (S-R) and Path Analysis were conducted to examine the effect of modelling random error on the magnitude of the parameters estimated Path and S-R versions of Step 1 of the present study. The measurement models for the GPQ (Ingledew et al., 2005), DASS-42 (Lovibond & Lovibond, 1995), and MSLQ-SRL (Pintrich, Smith, Garcia, & McKeachie, 1993) were examined prior to the S-R analysis following the two-step approach to SEM (Anderson & Gerbing, 1988), as part of good practice prior to parcelling items of a S-R or Path Analyses (Bandalos, 2002; Kishton & Widamen, 1994), and because there were substantive concerns about the use of the scales used in the current study.

CHAPTER 5: METHODS.

Participants

The individuals who participated in this study were part of an overall group of Western Australian students who were enrolled in the required number of final-year secondary subjects that would allow them to apply for a place at university in the following year. Of the total number of students enrolled in their final year at secondary school in Western Australia at the time (*N*=20,382), 51.41% were studying the minimum number of subjects to gain a place at university (Curriculum Council, 2006). The participants for the current study attended one of four government-run secondary schools from the western suburbs of Perth, Western Australia. Care was taken to ensure that the majority of students were of a similar socio-economic status. Based on data from the 2006 census, these schools were located in suburbs that scored above the 90th percentile on the Index of Relative Socio-economic Advantage and Disadvantage produced by the Australian Bureau of Statistics (Australian Bureau of Statistics, 2008).

Initially, 278 students (54% female) agreed to participate in the study. This group of participants represented 61.5% (*N* = 452) of the total number of students at these schools who completed the final set of tertiary-entrance exams at the end of 2006. Nearly 90% of the 278 students attended three of the four schools that were approached to participate in the current study: 31.3% of the participants attended one school; 26.6% of the participants attended a second school; 29.1% of the participants attended a third school; and 12.9% of the participants attended the fourth school.

Measures

Goal Perceptions Questionnaire.

Ingledew et al. (2005) developed a questionnaire, the Goal Perceptions Questionnaire (GPQ), to measure the goal dimensions that are central to their model. The authors developed 25 scales, with four items for each scale. The 16 scales of the GPQ used by Ingledew et al. were also used in the present study. These scales were: Ability, Commitment, Competition, Complexity, Conflict, Control, Difficulty, Feedback, Personal Origin, Publicness, Specificity, Success Expectation, Support, Time, Tools, and Value. In addition, the scale for Progress was also used in the present research.

As applied to this research, the participants were asked to rate the items with reference to the goal of gaining a place at university. Each item was rated on a five point Likert-type scale (1 = strongly disagree, 5 = strongly agree). Items were positively and negatively framed. For example, a positively framed item from the Ability scale was "I have the necessary abilities to achieve this goal". A negatively framed item from the same scale was "This goal might exceed my current abilities". As well as appearing in Ingledew et al.'s original paper, the items of the GPQ (and all other scales) appear in Appendix 1.2 and Appendix 1.3. Ingledew et al. (2005) found that Cronbach's alpha for the scales used in the current study ranged from .54 (Time) to .92 (Specificity).

Some of the items for the Feedback and Tools scales were modified so that they were more suitable for the students who participated in the current study. Items in the Feedback scale were modified to include the phrase "from teachers" (e.g., I get feedback 'from teachers' on the progress I am making towards this goal) so that the focus of the question was made clear to the students because secondary students can get feedback on academic progress from teachers, parents, and peers. The focus of the

question was placed on feedback from teachers because teacher feedback was deemed to be the most credible feedback on the academic results and performance for the participants. Questions relating to 'Tools' were modified so that the items referred to study skills because study skills have been shown to be an important predictor of academic performance (Robbins et al., 2004); and 'Tools' was judged by the researcher to be a phrase that the participants would not be familiar with in the academic context.

Depression Anxiety Stress Scale-42 (DASS-42).

The DASS-42 (Lovibond & Lovibond, 1995) is a 42- item questionnaire that is made up of three scales. Each scale contains 14 items designed to measure aspects of Depression (including subscales for Dysphoria, Hopelessness, Devaluation of Life, Self-Depreciation, Lack of Interest, Anhedonia, and Inertia); Anxiety (including subscales for Autonomic Arousal, Skeletal Musculature Effects, Situational Anxiety, and Subjective Experience of Anxious Affect); and Stress (including subscales for Difficulty Relaxing, Nervous Arousal, Easily Upset / Agitated, Irritable / Over-Reactive, and Stress Impatient).

Individuals completing the DASS-42 are asked to respond to statements such as: "I couldn't seem to experience any positive feeling at all" (Depression); "I felt scared without any good reason" (Anxiety); and "I found myself getting upset by quite trivial things" (Stress). A Likert-type response format is used, with anchors of 0 ("Did not apply to me at all" and 3 ("Applied to me very much, or most of the time"). The three scales of the DASS-42 have demonstrated good internal reliability. Cronbach's alpha ranged between .91 (Lovibond & Lovibond) and .96 (Page, Hooke, & Morrison, 2007) for the Depression scale; .81 (Lovibond & Lovibond) to .95 (Crawford & Henry, 2003) for the Anxiety scale; and .89 (Lovibond & Lovibond) to .97 (Crawford & Henry) for the Stress scale.

Motivated Strategies for Learning Questionnaire (MSLQ).

The Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991) is an 81-item questionnaire designed to measure motivation factors that impact on academic performance (31 items) as well as learning strategies (50 items) linked with superior academic performance. Only items relating to learning strategies from the MSLQ were used in the current study. The learning strategies assessed by the 50 items were Rehearsal (4 items), Elaboration (6 items), Organisation (4 items), Critical Thinking (5 items), Metacognitive Self-Regulation (MSR: 12 items), Time and Study Environment (8 items), Effort Regulation (4 items), Peer Learning (3 items), and Help Seeking (4 items).

When completing the Motivated Strategies Learning Questionnaire – Self-Regulated Learning (MSLQ-SRL), participants respond to items relating to each of these scales on a seven point Likert-type scale (1 = not at all true of me: 7 = very true of me). Some example items from the MSLQ-SRL were: "When I study for this course, I go through the readings and my class notes and try to find the most important ideas" (Organisation); and "I make good use of my study time for this course" (Time and Study Environment). The MSLQ-SRL used in the current study was modified to suit the context of the current study. For example, the phrase 'course' was deleted or changed to 'school' or 'class'; and 'readings' was changed to 'text books'. A summary of changes made to the MSLQ-SRL for the present study appears in Appendix 1.4. Pintrich et al. (1991) provided evidence of the internal reliability for the scales of the MSLQ-SRL. Cronbach's alpha for each of the Learning Strategies scales ranged from .52 (Help Seeking) to .80 (Critical Thinking). Similarly, Harris, Edmundson, and Jacobsen (2006) found that Cronbach's alpha ranged between .49 (Effort Regulation) and .82 (MSR).

Academic performance.

Academic performance was measured by the student's Tertiary Entrance Score (TES) and Tertiary Entrance Rank (TER). A score for each subject that a student completed was generated from an algorithm that included contributions from the student's school assessment and from his or her performance in a final set of external exams. Thus, the TES and the TER are indicators of the participant's overall academic performance. The TES for a student represented the average of his or her best four or five tertiary entrance subjects that he or she had completed. The TES for each student was then used to arrive at a percentile rank (Tertiary Entrance Rank: TER) for each student. A TER of 99.95 indicated that the student outperformed 99.95% of the students who participated in the tertiary entrance process.

Age and gender.

Participants were prompted to record his or her date of birth as well as their sex (male or female) on a demographic questionnaire. Age was recorded in years at Time 1.

Procedure

This research was approved by the Human Research Ethics Committee at Edith Cowan University. All documentation relevant to this process appears in Appendix 1.5. The participants completed questionnaires at three points in time during one academic year. They completed the GPQ (other than the Progress scale) and the DASS-42 near the beginning of the school year (March Time 1), the MSLQ-SRL and the Progress scale from the GPQ near the middle of the academic year but after having receiving a mid-year report on their academic progress (June: Time 2) and the DASS-42 for the second occasion two to four weeks prior to the final academic exams (September: Time 3). All testing occurred at the students' school as part of regular classroom activities. The teachers of these students administered the questionnaires. The teachers followed a

common script that included reading a prepared introduction to the participants about the nature of the research, and an explanation about how the students should complete the booklet that contained the questionnaires. Data collection generally took less than 30 minutes on each occasion to complete. The participants' overall academic performance was obtained (with the participant's consent) from the school during the next academic year.

Design and Data Analysis

A correlational research design was used in the current study. Analysis of concurrent and longitudinal data was conducted. The analysis was conducted in two parts: an analysis of the adequacy of the items for each scale as indicators of the latent construct that the scale was intended to measure; and analysis of the structural relations between each of the latent constructs.

Analysis of measurement models.

The aim for this part of the analysis was to examine the measurement models for the questionnaires used in the current study – the Goal Perceptions Questionnaire (GPQ: Ingledew et al., 2005); Depression, Anxiety, and Stress scales (DASS: Lovibond & Lovibond, 1995); and the self-regulated learning component of the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991 – described in the current research as the MSLQ-SRL).

The participants in the current study responded to the items presented to them on scales with a Likert-like response format which is an example of an ordinal or order-categorical measurement scale. The Diagonally Weighted Least Squares (DWLS: also described as Robust Weighted Least Squares in other SEM programs) method was used for estimating the degree of fit between the proposed models and the observed covariance matrix (based on polychoric correlations). Satorra-Bentler Scaled (S-B) χ^2

was reported as the indicator of the degree of fit between the estimated and observed covariance matrices. The Maximum-likelihood estimation method was not considered because the responses of the participants were not measured on continuous or interval scales. Both Weighted Least Squares (WLS) and DWLS were suitable estimation methods for analysing data where the participants responded to items on Likert scales. However, Flora and Curran (2004) found that a number of inadmissible solutions were arrived at when the sample size is close to 200 when the models were relatively small (i.e., five indicators and one latent variable). As the models in the current study were far more complex than those examined by Flora and Curran, the odds of arriving at improper solutions using WLS in the current study were quite high. Flora and Curran also demonstrated that the DWLS method performed well when the data were not normally distributed and across a number of model and sample size conditions.

The analysis of the measurement model for each questionnaire followed the same pattern. First, One-factor Congeneric Models (OCMs: Jöreskog & Sörbom, 1996) were specified to establish the convergent validity for the items that made up each of the individual scales within each questionnaire. This was done for the 16 scales of the GPQ (4 items per scale), the Progress scale, the three scales of the DASS-42 (14 items per scale), and the nine scales of the MSLQ-SRL (each factor is made up of between three and 12 items).

Second, Confirmatory Factor Analysis (CFA) was used to establish unidimensionality for the factors for each scale that comprised the questionnaires. Separate CFAs were specified for the scales of the GPQ, DASS-42 and the MSLQ-SRL. Once it was concluded that the proposed CFA was a correctly specified model, the degree of association between the factors for each CFA was investigated. Where it had been hypothesised by authors that the factors were correlated but distinct (e.g., GPQ and

DASS-42), then procedures described by Fornell and Larcker (1981) were used to establish discriminant validity between the factors. The Average of the Variance Extracted (AVE) reliability for each scale (A) was greater than the shared variance between two factors (B). If it had been hypothesised that the correlations between several lower-order factors were explained by a higher-order model such that the lower-order latent-factors were indicators of a higher-order latent-factor (e.g., one-higher-order-factor models for the DASS-42 and MSLQ-SRL), then Hierarchical CFA was conducted.

The approach to hypothesis testing for all measurement models was confirmatory in nature. In the case of an OCM, it was expected that the items chosen for each scale (e.g., the four items of the Success Expectation scale in the GPQ) were good indicators of the latent variable (e.g., Success Expectation). For each CFA, it was hypothesised that the items chosen (e.g., the four items of the Success Expectation scale) were good indicators of the specified latent variable (e.g., Success Expectation) but were not good indicators of other latent variables (e.g., Ability or Tools).

Conclusions about convergent validity or unidimensionality were not made unless model fit justified the conclusion that the OCM or CFA model was correctly specified. The hypothesis that a model was correctly specified was confirmed if S-B χ^2 was greater than .05 or RMSEA was less than .05. The hypothesis that a model was correctly specified was partially supported when RMSEA was greater than .05 but less than .08 and was rejected when RMSEA was greater than .08. A model was considered to be acceptable if convergent validity was established and standardised factor loadings were observed to be greater than .60 (see Marsh & Hau, 1999). Unstandardised factor loadings, standard errors, and standardised factor loadings were reported as part of the analysis.

If an OCM or CFA was not found to be an acceptable model, then post-hoc modelling was conducted. Possibilities for improvement in model fit were first considered based on statistical grounds such as small factor loadings or large Modification Indices. Once candidates for improvements in model fit were established, model changes were considered if the proposed changes could be theoretically justified. Post-hoc modelling was also conducted if the correlations between factors was sufficiently large that discriminant validity was not established when it was expected that discriminant validity would be demonstrated because the unique effects cannot be attributed to one factor if the same factor is highly correlated with another factor (Farrell, 2009). Farrell (2009) has noted that there are two options available in this situation: either remove or combine the factors. Both options were explored where post-hoc modelling was indicated. After post-hoc modelling, a CFA was conducted to ensure that all factors that remained in the model demonstrated discriminant validity. Where nested models were to be examined, model superiority was established using the S-B $\Delta\chi^2$ test (Satorra & Bentler, 2000).

Different samples were used when investigating the measurement models for each measure. In order to access the largest sample size possible to test the psychometric properties of the scales that made up the GPQ and were tested at Time 1, the CFA for the GPQ was based on the responses from the 278 participants who initially agreed to participate in the current study. As there was some attrition of participants between Time 1 and Time 2, the responses of 230 participants were used for the measurement analysis of the Progress scale of the GPQ as well as the MSLQ-SRL. The analysis of the DASS was conducted on the responses of the 216 participants who completed questionnaires at all points of the research process so that results from the CFA conducted on Time 1 responses could be directly compared to the CFA based on

Time 3 responses. All responses fell within the range of responses possible for the scales used in the current study.

Analysis of structural models.

The latent variables in the S-R analysis were indicated by parcels of items. Parcels were constructed by aggregating a number of individual items from the scales used in the current study. Using guidelines suggested by Coffman and MacCallum, (2005), two types of aggregation were used for the variables in S-R analyses: total and partial aggregation. In total aggregation, the participant's score for that scale was represented by the mean for all of the items on that scale. Total aggregation for a scale was used when the evidence for convergent and discriminant validity as well as unidimensionality had been found during the first part of the current research. The modified Depressed Negativity, Anxiety Physiology and Impatient scales from the DASS-42 (Lovibond & Lovibond, 1995) were examples of scales where the total aggregation method was used.

After total aggregation, the resulting parcels were then specified as the single indicator of a latent variable. An adjustment for random measurement error was made by the specification of a start value for the error term of the latent variable based on model-based reliability. The values for the model-based reliability were calculated following guidelines provided by Fornell and Larker (1981) for all scales on the basis of the results of the final CFAs from part 1 of the current study.

The start value was the product of one minus the model-based reliability and the variance of the items that made up the parcel. For example, the start value for the error term associated with the Success Expectation parcel was (1-.87)*.52, which was .07 (rounded to two decimal points). Model-based reliability (as well as Cronbach's alpha) is reported as part of the descriptive statistics for each S-R analysis. There was no

model-based reliability measure for Academic Performance. A reliability value of .975 was assigned to this variable because the process for arriving at the participant's final score is exhaustive and is carried out in a process that is independent of each school.

Partial disaggregation of a scale was achieved by allocating items from a scale into several groups or parcels of items. The resulting parcels were specified as indicators of a latent variable. Partial disaggregation was used to represent the scales in the S-R analysis where a higher-order CFA was found in the current research to be an acceptable way to model the items of a scale.

The variables specified for the Path Analyses were based on the model of goal dimensions as reported in the Ingledew et al. (2005) study. The participant's score for a variable was determined using the total aggregation method. The number of items for a variable or the number of variables in the model was not influenced by the results of the measurement section of the current research.

The approach to model testing in the S-R analysis was also confirmatory. As suggested by James, Mulaik, and Brett (2006), a full mediation model for the model of goal dimensions proposed by Ingledew et al. (2005) was first examined. James et al. have proposed a different approach to mediation than that outlined by Baron and Kenny (1986). The one key difference between the approaches is that Baron and Kenny recommend that the effect of the independent variable on the dependent variable be examined first (to determine if there is an effect to mediate) before determining the reduction of this effect when the mediator is included in the analysis. However, James et al. have suggested that their approach is a more appropriate test when a full-mediation effect is hypothesised because their approach tests that hypothesis directly. In the current study, the approach to mediation advocated by James et al. was used.

James et al. (2006) recommend that the complete mediation hypotheses should be modelled before the partial mediation model. In the case of the present study, the direct effects of the other goal dimension in the model were initially fixed at zero. Direct effects were estimated in the model if Modification Indices indicated that model fit would improve if the path was estimated in the model, adding the path was justified, and model fit improved significantly with paths added to the model.

Model fit in SEM is evaluated using a number of statistics. These statistics are used in practice as arbitrary cut off points to determine whether a model is correctly specified. The aim at each step of the analysis was to specify a model that was at least a close (RMSEA < .05, *p* close fit > .50) or an exact fit of the data ($\chi^2 > .05$). When model fit is less than this standard, the estimated values of the parameters are likely to be biased (Kline, 2005). Thus, parameter estimates were reported if the hypothesis that a model was correctly specified was confirmed when S-B χ^2 was greater than .05 or RMSEA was less than .05. It was considered that the hypothesis that a model was correctly specified was partially supported when RMSEA was greater than .05 but less than .80; and was rejected when RMSEA was greater than .08.

CHAPTER 6: RESULTS AND DISCUSSION.

Data Preparation

Drop-out of participants.

Of the 278 participants (54% female, *M* age at Time 1= 16.38 years, *S.D.* =.51) who initially agreed to participate in the study at Time 1, 230 participants (53% female; at Time 1, *M* age = 16.38 years, SD=.52) completed the questionnaires at Time 2, and 216 participants (52% female; *M* age at Time 1= 16.37 years, *S.D.* =.51) completed the questionnaires at Time 3. Seven participants did not record their age in the questionnaire booklet at Time 1. Of the original pool of 278 participants, 62 (or 22%) participants dropped out over the 6-month course of the study. There were several reasons for this dropout rate. Some participants changed schools during the course of the study; some participants were no longer enrolled in four or more tertiary-entrance subjects at the time of the final exams; and some participants were absent or had other school commitments during the second and third occasions when data were collected.

Comparisons were made between those participants who dropped out of the study and an equal random sample of participants who completed questionnaires at Time 1 (March), 2 (June), and 3 (September) to determine if there were any systematic differences between those participants who dropped out of the study and those students who remained in the study (see Table 3 for descriptive statistics). The average age of the two groups was almost identical, F (1,100) =.17, p>.05. No substantial differences between the groups were found for self-reported symptoms of Depression, F (1,122) =.30, p>.05, Anxiety, F (1,122) =.74, p>.05, and Stress, F (1,122) =.62, p>.05. Also, Academic Performance – TES, F (1,102) =.06, p>.05, and Academic Performance – TER, F (1,102) =.03, p>.05, were almost identical. On the basis of these findings, it was concluded that there were no substantial differences between the group of

participants who dropped out of the study and those participants who remained in the study.

Table 3.

Drop-out of Participants: Symptoms of Psychological Distress and Academic Performance.

	Drop outs	Random Sample
	M (SD)	*M (SD)*
Age *(N=62)*	16.37 (.49)	16.33 (.48)
Depression *(N=62)*	6.25 (8.44)	5.48 (7.12)
Anxiety *(N=62)*	4.88 (6.10)	4.07 (4.29)
Stress *(N=62)*	6.26 (8.85)	8.16 (6.47)
Academic Performance: TES *(N=52)**	291.87 (62.40)	294.80 (64.03
Academic Performance: TER*(N=52)**	77.84 (13.91)	78.31 (14.35)

*The final academic performance of 10 of the 62 of the participants was not available because they did not complete the final set of the external exams.

Missing values and outliers.

Participants completed almost all of the measures. All participants had fewer than 5% of data points missing at any one time. Overall, the issue of missing values was a relatively minor one. For example, for the data set at Time 1 for the 216 participants who completed all the questionnaires in the overall study, there was a total of 22,896 individual data points (64 items of the GPQ multiplied by 216 participants in addition to 42 items of the DASS-42 multiplied by 216 participants). Only 53 data points of the data set (.25%) were observed to be missing. The results of other missing value analyses indicated that similarly small numbers of values were missing. Missing data points were replaced using the Multiple Imputation function (EM algorithm) in LISREL 8.80 (Jöreskog & Sörbom, 2007). All responses by the participants were retained in the

current analysis as their responses conformed to the possible values associated with each scale that was used in the current study.

Goal Perceptions Questionnaire: One-factor congeneric models (OCMs)

Model specification, estimation of model fit, model re-specification, and re-estimation of model fit.

A pictorial representation of the results for the Success Expectation OCM appears in Figure 7. As described by Ingledew et al. (2005), the four items of this scale were specified as indicators of a latent variable for Success Expectation. It was concluded that the four-item, one-factor model for the Success Expectation scale was an acceptable model because the model was accepted as being correctly specified (so that convergent validity was established) as the *p* value for S-B χ^2 test was greater than .05, S-B $\chi^2 = 3.37$, $df = 2$, $p = .19$; RMSEA = .05, *p* close fit =.39 (CFI = 1.00, SRMR = .03, GFI = 1.00), and all Factor Loadings (FLs) were greater than .60.

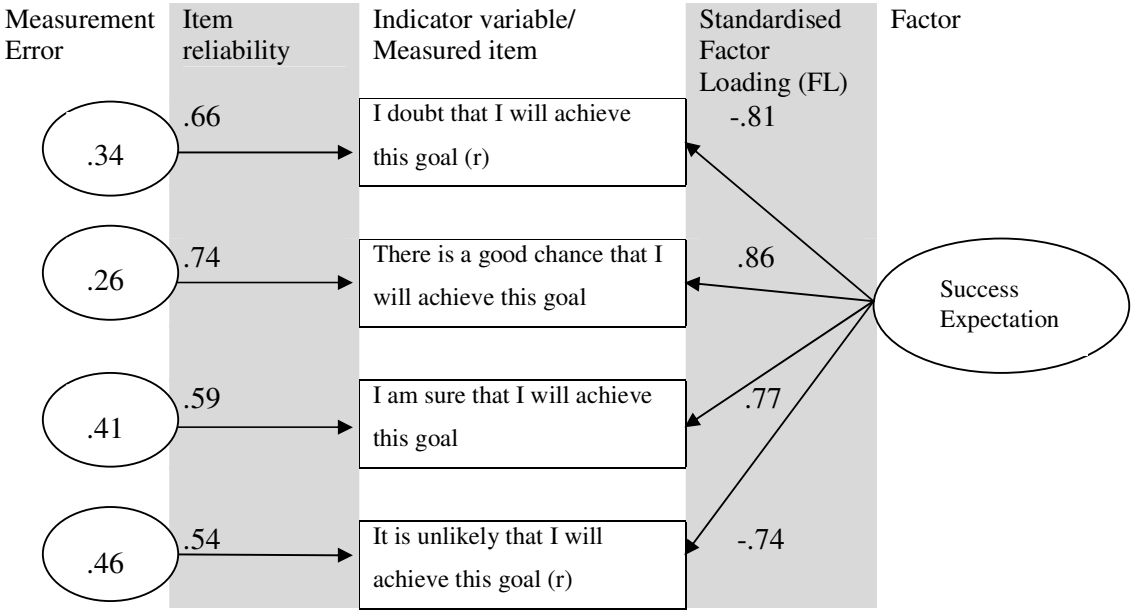

Figure 7. One-factor congeneric model for the Success Expectation scale.

Note: r indicates that the item was reverse-scored when scale scores are calculated. The unstandardised coefficient of the first item was constrained to 1 so that the model could be scaled. This practice was used throughout the current research. Latent variables are represented as ellipses or circles and manifest variables are represented as rectangles.

Separate OCMs were conducted for all scales of the GPQ. Observations regarding model fit and the magnitude of factor loadings reported in Table 4 indicated that the models for the Ability, Commitment, Competition, Complexity, Conflict, Difficulty, Specificity, Success Expectation, and Tools scales were acceptable. Findings regarding model fit did not support the original specification of the models for the Control, Feedback, Publicness, and Value scales. At least one FL in each of the models for Complexity, Personal Origin, Support, and Time scales was observed to be substantially less than .60. Ingledew et al. (2005) also reported that the FL for the same items in the Complexity and Support scales was small. They had also proposed an alternative model for the Time scale because of concerns that the model was not correctly specified. See Table 5 for the post-hoc modelling for the Complexity, Control, Feedback, Personal Origin, Publicness, Support, Time and Value scales.

Revised models for the Complexity, Personal Origin, Support, and Time scales were considered to be acceptable when the items with a FL substantially less than .60 were removed from the model. The items removed from the Personal Origin and Support factors were reverse scored items. Revised models for the Feedback and Value scales were considered to be acceptable when the reverse-scored items for these scales were removed from the model.

Ingledew et al. (2005) had proposed alternative models for the Control and Publicness scales. Ingledew et al. had suggested that the Control scale may be better represented by two factors, where the reverse-scored items were indicators of one factor and the positively scored items were indicators of a second factor. This two-factor model was preferred to the original one-factor model in the current study because the two-factor model was acceptable and the one-factor model was not acceptable, and discriminant validity was demonstrated for the two factors of the two-factor model.

Table 4.

Results of the One-factor Congeneric Models for the Goal Perceptions Questionnaire.

Scale	Correctly specified?	Model fit	FLs < .60?*	Item FLs
Ability	Yes	S-Bχ^2 = 1.90, *p* =.39; RMSEA=.00, *p* close =.60.	No	1(-.53); 2 (92); 3 (89); 4 (.54)..
Commitment	Yes	S-Bχ^2 = 0.37, *p*=.83; RMSEA=.00, *p* close=.91.	No	1 (.77); 2 (.81); 3 (.88); 4 (.96).
Competition	Yes	S-Bχ^2 = 0.55, *p*=.65; RMSEA=.00, *p* close=.00.	No	1 (.70); 2 (.73); 3 (.90); 4 (.90).
Complexity	Yes	S-Bχ^2 = 4.21, *p* =.12; RMSEA=.06, *p* close=.30.	Yes	1 (.24); 2 (-.78); 3 (-.79); 4 (.67).
Conflict	Yes	S-Bχ^2 = 4.10, *p* =.13; RMSEA=.06, *p* close=.31.	No	1 (-.71); 2 (.80); 3 (.85); 4 (.94).
Control	No	S-Bχ^2 = 22.53, *p* =.00; RMSEA=29.48, *p* close =.00.	No	1 (.57); 2 (-.77); 3 (-.67); 4 (.73).
Difficulty	Yes	S-B χ^2 = 0.05, *p* =.98; RMSEA=.00, *p* close=.99.	No	1 (-.72); 2 (.89); 3 (.85); 4 (.93).
Feedback	No	S-Bχ^2 = 11.12, *p* =.00; RMSEA=.13, *p* close=.03.	No	1 (.82); 2 (-.74); 3 (.87); 4 (.90).
Personal Origin	No	S-Bχ^2 = 11.18, *p* =.00; RMSEA=.13, *p* close=.03.	Yes	1 (.79); 2 (-.33); 3 (.85); 4 (.94).
Publicness	No	S-Bχ^2 = 6.82, *p*=.03; RMSEA=.09, *p* close=.13.	No	1 (.79); 2 (.86); 3 (.89); 4 (.86).
Specificity	Yes	S-Bχ^2 = 2.09, *p*=.35; RMSEA=.01, *p* close=.57.	No	1 (.89); 2 (.95); 3 (.92); 4 (.81).
Success Expectation	Yes	S-Bχ^2 = 3.37, *p*=.19; RMSEA=.05, *p* close= .39.	No	1 (-.81); 2 (.86); 3 (.77); 4 (-.74).
Support	No	S-Bχ^2 = 7 .88, *p*=.02; RMSEA=.10, *p* close=.09.	Yes	1 (.76); 2 (-.24); 3 (.70); 4 (.82).
Time	Yes	S-Bχ^2 = 2.47, *p*=.29; RMSEA=.03, *p* close=.51.	Yes	1 (-.55); 2 (.71); 3 (-.70); 4 (-.14).
Tools	Yes	S-Bχ^2 = 1 .24, *p*=.54; RMSEA=.00, *p* close=.72.	No	1 (-.58); 2 (.58); 3 (-.71); 4 (-.81).
Value	No	S-Bχ^2 = 7.14, *p*=.03, RMSEA=.10, *p* close=.00.	No	1 (.89); 2 (-.77); 3 (.81); 4 (.89)..

Note: FLs=standardised factor loading. N = 278. Each latent variable was indicated by four items, and *df*=2. CFIs > .98, except for Control (.94); SRMRs < .05, except for Control (.08); and GFIs > .98. R^2 (i.e., variance explained, which is the square of the FL) is not reported here or in any subsequent table in order to save space.

Table 5.

Post hoc Modelling for Selected Scales of the Goal Perceptions Questionnaire.

Model details	Correctly specified?	Model fit and other observations	FLs < .60?*	Item FLs
Complexity 3 item, one-factor (item 1 removed)	Yes	S-B ÷²=.00, *df*=1, *p*=.98. RMSEA=.00, *p* close=1.00.	No	2** (-.79); 3** (-.79); 4 (.65).
Personal Origin 3 item, one-factor (item 2 removed)	Yes	S-B ÷²=.29, *df*=1, p=.59. RMSEA=.00, *p* close=.70.	No	1** (.82); 3** (.82); 4 (.95).
Support 3 item, one-factor (item 2 removed)	Yes	S-B ÷²=.83, *df*=1, *p*=.36 RMSEA=.00, *p* close=.51.	No	1** (.76); 3 (.76); 3** (.76).
Time 3 item, one-factor (item 4 removed)	Yes	S-B ÷²=.09, *df*=1, *p*=.77. RMSEA=.00, *p* close=.84.	No	1 (-.55); 2** (.70); 3** (.70).
Feedback 3 item, one-factor (item 2 removed)	Yes	S-B ÷²=.00, *df*=1, *p*=.95. RMSEA=.00, *p* close=.96.	No	1 (76); 3** (.91); 4** (.91).
Value 3 item, one-factor (item 2 removed)	Yes	S-B ÷²=1.73, *df*=1, *p*=.19. RMSEA=.05, *p* close=.33.	No	1** (88); 3 (.84); 4** (.88).
Control 4 item, two-factor	Yes	S-B ÷²=.29, *df*=1, *p*=.59. RMSEA=.00, *p* close=.70. Latent r = -.63. Discriminant validity was established, as A (AVE for In Control=.65 and Lack of Control=.59) > B (R^2=.40).	No	In Control: 1 (.89); 4 (.71). Lack of Control: 2 (.60); 3 (.91).
Publicness 4 item, two-factor	Yes	S-B ÷²=.04, *df*=1, *p*=.83. RMSEA=.00, *p* close=.88. Latent r = .89. Discriminant validity was not established as A (AVE for Common Knowledge=.74 and Others Know=.80) > B (R^2=.79).	No	Common Knowledge: 1 (.82); 2 (.90). Others Know: 3 (.92); 4 (.87).

Note: FLs=standardised factor loading. FLs < .60?* = factor loadings were substantially less than .60. *N* = 278. ** The unstandardised factor loading for these items were constrained to be equal so that the model could be over-identified. CFIs > .95, SRMRs< .05, and all GFIs > .98.

It was concluded that the two-factor model for the Publicness scale – a Common Knowledge factor (items 1 and 2 of the original scale) and Others Know factor (items 3 and 4 of the original scale) – was an acceptable model, and was a better model than the one-factor model. However, the two-factor model for the Publicness scale was not retained because discriminant validity was not demonstrated between the Common Knowledge factor and Others Know factors. Given that the one-factor and the two-factor models for Publicness had been ruled out for different reasons, the remaining option was to retain only one of the two factors for the Publicness scale. The items for the Common Knowledge factor was retained because the items for this factor ("It is common knowledge that I have this goal" and "It is widely known that I have this goal") appeared to best encapsulate the key concepts associated with the Publicness scale.

Description of findings

It was concluded after the OCM analyses that the models for nine of the 16 GPQ scales measured at Time 1 – Ability, Commitment, Competition, Complexity, Conflict, Difficulty, Specificity, Success Expectation, and Tools –were acceptable. Ingledew et al. (2005) had proposed an alternative model for the Tools scale because their findings did not indicate that the model for the Tools scale was correctly specified. No such concerns were observed about the model for the Tools in the current study. Problems with the models for the Complexity, Control, Publicness, and Support scales observed in the present study were also apparent in the findings reported by Ingledew et al. (2005). In addition, concerns about model fit were noted about the models for the Feedback, Personal Origin, Time, and Value scales. Reverse-scored items were implicated in the lack of model fit for several of the scales where model fit was observed to be problematic.

The results of the OCM analysis for the factors of the GPQ measured at Time 1 confirmed that the Ability, Commitment, Competition, Conflict, Difficulty, Specificity, Success Expectation, and Tools scales should be retained without change. Modifications were made to other scales from the GPQ. The reverse scored items for the Complexity, Feedback, Personal Origin, Support, Time, and Value were not included in the scale for the present study. The Control scale was re-specified as two scales: 'Lack of Control' and 'In Control'. The two items for the Common Knowledge factor were retained to represent the Publicness scale.

Goal Perceptions Questionnaire Confirmatory Factor Analysis (CFA)

Initial specification, initial estimation of model fit, model re-specification, and re-estimation of model fit.

The results of these CFAs for the GPQ scales used in the present study are highlighted in Table 6. In step 1, the 64 items of the GPQ used in the present study were specified as being unidimensional indicators of the 16 factors (4 items per factor, and one factor per scale) originally proposed by Ingledew et al. (2005). This model did not converge after 1000 iterations. A second CFA was specified (step 2) where the eight items that had been found to be problematic after the OCM analysis for the GPQ were removed from the analysis, and the Control scale was modelled as two scales – In Control and Lack of Control. Therefore, the remaining 56 items were explained by 17 factors. Unidimensionality was again proposed: all of the 56 items were specified as being unique indicators of the 17 latent factors. Based on the results reported in Table 6, it was concluded that the 56 item, 17-factor unidimensional model for the GPQ was correctly specified.

Table 6.

Results of the Confirmatory Factor Analyses for the Goal Perceptions Questionnaire.

Model	Correctly specified?	Model fit and observations
Step 1: 64 items: 16 factors	Na	Model did not converge after 1000 iterations
Step 2: 56 items: 17 factors	Yes	S-B÷² = 2115.81, *df* = 1348, *p*=.00; RMSEA=.05, *p* close = .98; CFI=.99, SMR=.06, GFI=.98.*
Step 3: 35 items: 11 factors	Yes	S-B ÷²=801.84 *df*=574, *p*=.00; RMSEA=.04, *p* close=1.00. CFI=.99; SRMR=.05; GFI=.99.*

Note: *(N*=278*).**The item standardised coefficients for each factor are reported in Appendix 2.3 as these results were almost identical to the item standardised coefficients reported in the previous section.

Inspection of Table 7 (the full latent-variable correlation matrix appears in Appendix 2.1) revealed that two groupings of latent factors failed to meet the Fornell and Larcker (1981) criterion for discriminant validity: the factor models for the Commitment, Personal Origin, and Value scales; and the factor models for the Ability, Complexity, In Control, Lack of Control, Difficulty, Success Expectation, Time, and Tools scales. The finding that these scales lacked discriminant validity when completed by the adolescent students in this current study was problematic for the application of the Ingledew (2005) model to the present study.

Ingledew et al. (2005) had proposed that the scales of the GPQ measured separate constructs. However, the findings from the present study indicated that the correlations between several latent factors were so highly correlated that the items that had been proposed as being indicators of one latent variable (e.g., Ability) could also have been indicators for another latent variable (e.g., Time). Therefore, several scales were redundant as it was no longer possible to attribute a unique effect for the highly correlated scales on the outcomes of interest (e.g., overall student academic performance) in the present study.

Table 7.

Latent-Factor Correlations, Average of the Variance Extracted Reliability (on the diagonal) and Coefficient of Determination (in parentheses) for Selected Factors after the Second Confirmatory Factor Analysis for the Goal Perceptions Questionnaire.

Factor	1	2	3	4	5	6	7	8	9	10	11
1. Ability	.55										
2. Commitment	.63 (.40)	.73									
3. Complexity	-.74 (.55)	-.42 (.18)	.56								
4. In Control	.69 (.48)	.53 (.29)	-.78 (.61)	.54							
5. Lack of Control	.68 (.46)	.60 (.36)	-.40 (.16)	.66 (.44)	.63						
6. Difficulty	-.81 (.66)	-.41 (.17)	.93 (.87)	-.70 (.49)	-.56 (.31)	.73					
7. Personal Origin	.50 (.25)	.91 (.83)	-.30 (.09)	.44 (.19)	.53 (.28)	-.34 (.12)	.75				
8. Success Expectation	.97 (.94)	.67 (.45)	-.69 (.48)	.73 (.53)	.76 (.58)	-.79 (.62)	.59 (.35)	.63			
9. Time	.75 (.56)	.45 (.20)	-.59 (.35)	.79 (.62)	.63 (.40)	-.63 (.40)	.36 (.13)	.74 (.55)	.39		
10. Tools	1.01 (1.02)	.68 (.46)	-.71 (.50)	.82 (.67)	.71 (.50)	-.78 (.61)	.57 (.32)	.90 (.81)	.88 (.77)	.46	
11. Value	.49 (.24)	.99 (.98)	-.23 (.05)	.41 (.17)	.52 (.27)	-.24 (.06)	.92 (.85)	.58 (.34)	.38 (.14)	.53 (.28)	.75

Note: Highlighted areas indicated where discriminant validity was not established between two factors.

Following suggestions made by Farrell (2009), post-hoc modelling focused on choosing between highly correlated scales. Of the Commitment, Personal Origin, and Value scales, the Value scale was retained because goal value was an important mediating variable in the Ingledew et al. (2005) model. Discriminant validity was established for the In Control and Lack of Control, Success Expectation, and Difficulty factors when the Ability, Complexity, Time, and Tools factors were removed.

A third CFA was conducted where the factors for Ability, Commitment, Complexity, Personal Origin, Time, and Tools were removed from the analysis. As shown in Figure 8, it was proposed that the remaining 35 items were explained by 11 unidimensional factors. Based on the results reported in Table 6, it was concluded that

the 35 item, 11-factor unidimensional model for the GPQ was correctly specified (RMSEA criterion). Also, all FLs were greater than .60. Based on the results reported in Table 8, almost all factors met the Fornell and Larcker (1981) criteria for discriminant validity. Discriminant validity was observed between factor models for the Success Expectation and Difficulty scales when the pattern and structural coefficients (Thompson, 1997) were examined (see Appendix 2.2 for details).

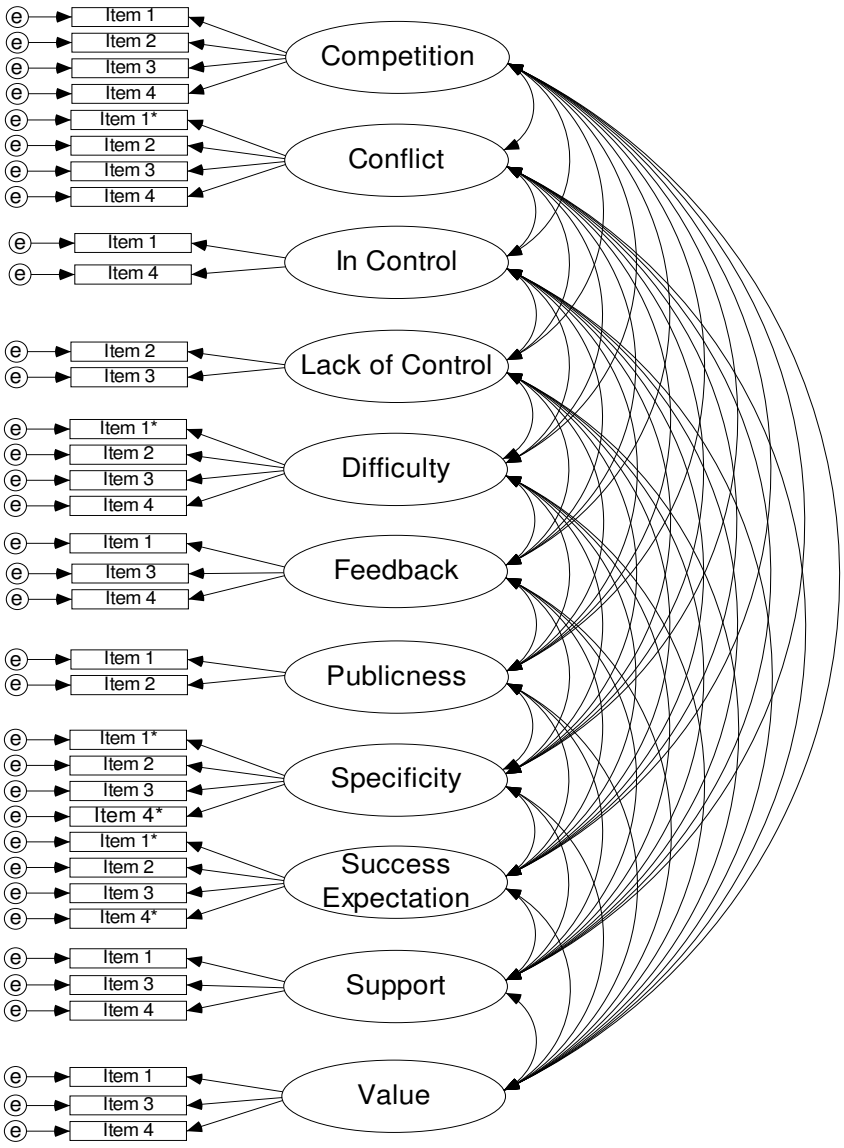

Figure 8. Diagram of the third Confirmatory Factor Analysis for the Goal Perceptions Questionnaire (* indicates reverse scored items. e = error term.

Table 8.

Factor Loadings (FLs), Latent-Factor Correlations, Average of the Variance Extracted Reliability (on the diagonal) and Coefficient of Determination (in parentheses) after the Third Confirmatory Factor Analysis for the Goal Perceptions Questionnaire.

Factor	1	2	3	4	5	6	7	8	9	10	11
1. Competition FLs: 1 (70); 2 (.73); 3 (.92); 4 (.88)	.66										
2. Conflict FLs: 1 (-.90); 2 (.80); 3 (.75); 4 (.84)	-.28 (.08)	.68									
3. In Control FLs: 1 (78); 2 (.69)	.16 (.03)	-.50 (.25)	.54								
4. Lack of Control FLs: 1 (81); 2 (.79)	.18 (.03)	-.49 (.24)	.66 (.44)	.63							
5. Difficulty FLs: 1 (-.77); 2 (.90); 3 (.83); 4 (.90)	-.10 (.01)	.49 (.24)	-.70 (.49)	-.56 (.31)	.73						
6. Feedback FLs: 1 (82); 3 (.86); 4 (.91)	.15 (.02)	-.19 (.04)	.31 (.10)	.26 (.07)	-.23 (.05)	.70					
7. Publicness FLs: 1 (86); 2 (.86)	.35 (.12)	-.62 (.38)	.42 (.18)	.48 (.23)	-.42 (.18)	.18 (.03)	.74				
8. Specificity FLs: 1 (-.85); 2 (.81); 3 (.82); 4 (.-.75)	.07 (.00)	-.42 (.18)	.38 (.14)	.31 (.10)	-.21 (.04)	.06 (.00)	.34 (.12)	.80			
9. Success Expectation FLs: 1 (-.80); 2 (.66); 3 (.66); 4 (.66)	.26 (.07)	-.56 (.31)	.72 (.52)	.76 (.58)	-.80 (.63)	.17 (.03)	.63 (.40)	.32 (.10)	.63		
10. Support FLs: 1 (.81); 3 (.59); 4 (.86)	.27 (.07)	-.32 (.10)	.42 (.18)	.40 (.16)	-.26 (.07)	.56 (.31)	.34 (.12)	.31 (.10)	.37 (.14)	.58	
11. Value FLs: 1 (87); 3 (.83); 4 (.89)	.39 (.15)	-.78 (.61)	.39 (.15)	.54 (.29)	-.23 (.05)	.14 (.02)	.75 (.56)	.50 (.25)	.57 (.32)	.45 (.20)	.71

Note: Highlighted area indicates where discriminant validity was not established between two factors.

Description of findings.

Ingledew et al. (2005) had concluded that the factor models for the16 scales of the GPQ that they used in their path analysis were reasonable, and each factor measured a separate factor. The results from the current study were not totally consistent with these findings. Several of the factor models for the individual scales were not found to be acceptable because model fit was poor or FLs for some of the items were unacceptably low. Most of the items that were found to be problematic were reverse-scored items; and the factor models for several scales (e.g., Support, Complexity, Feedback, and Value) were found to be acceptable items when the reverse-scored items were removed. Not all reverse-scored items were linked with problematic factor models. For example, the factor models for the Success Expectation and Ability scales were observed in the present study to be acceptable even though each scale included two reverse-scored items.

The results of the present study confirmed Ingledew et al.'s (2005) concerns that the factor models for the Control and Publicness scales did not measure single constructs. The items of the Control scale were modelled as two scales (In Control and Lack of Control), and the two items for the Common Knowledge sub-factor from the Publicness scale were retained for the purposes of the current study. Ingledew et al. had noted concerns about factor models for the Competition, Success Expectation, Time, and Tools scales. No such concerns were observed in the current study. However, the items for the Tools scale were modified in the current context to refer to study skills. Referring to specific academic tools, such as use of study skills, may have contributed to the improvement in the Tools scale.

The issue that proved most problematic for the scales of the GPQ was lack of discriminant validity between some of the latent factors for some scales. There were

several examples where items that had specified as indicating a latent factor could have also been indicators of a second latent factor because the correlation between the latent factors was so large. The relationship between goal value and goal commitment is a case in point. Goal value had been specified in the Ingledew et al. (2005) model as an antecedent to goal commitment. Such a specification was not possible because the seven items for both scales essentially measure the same latent factor. Farrell (2009) has observed that researchers can either combine or remove factors when faced with two factors that lack discriminant validity. It was decided in the present research to remove factor models for scales in order to maintain as much similarity as possible with the model specified by Ingledew et al. (2005) where each factor was indicated by a single scale.

The findings from the current study have provided some clarity to the previous research examining the relationship between goal dimensions when goal dimension were measured by single items. For example, previous studies (Emmons, 1986, McGregor & Little, 1998) have also found that items measuring goal value and goal commitment were highly correlated. Whereas Webb and Sheeran (2005) and White (2002) reported that goal conflict and goal feedback were conceptually related and that they would be indicators of on overall construct such as Conflicting Standards (Webb & Sheeran) or Teaching Support (White, 2002), the findings from the present research indicated that goal conflict, goal support, and goal feedback can be considered to be separate factors when measured using multi-item scales.

However, the findings from the present research that goal difficulty and expectations of success were highly correlated has done little to shed light on previous research which has found that goal difficulty and expectations could be considered as part of the same (McGregor & Little, 1998; Samela-Aro, 1991; Wallenius, 1999) or

different factors (Jackson et al., 2002; Karoly & Lecci, 1993; Lecci et al., 1994; Meyer, Beevers, & Johnson, 2004; Pychyl & Little, 1998).

The following unidimensional scales were retained for the S-R analysis (four items per scale unless otherwise stated): Competition, Conflict, In Control (two items), Lack of Control (two items), Difficulty, Feedback (three items), Publicness (two items), Specificity, Success Expectation, Support (three items), and Value (three items). The Ability, Commitment, Complexity, Time, and Tools scales were not retained because the findings from the current analysis did not support the assumption made in the Ingledew et al. (2005) model that these scales measured unique constructs. As a result of the CFA analysis for the GPQ scales at Time 1, 35 of the 64 of the original items and 10 of the original scales (as 11 distinct scales) were retained for the S-R analysis.

The Progress Scale: One-factor Congeneric Model (OCM)

Model specification, estimation of model fit, model re-specification, re-estimation of model fit, and description of findings.

Several models for the four items of the Progress scale were modelled: a one-factor model; a one-factor with an orthogonal common-method variable (CMV) factor for the reverse-scored items; and a two-factor model (two positively-scored items were indicators of an Advancement factor, and the two reverse-scored items were indicators of a Deterioration factor). It was concluded based on the results reported in Table 9 that none of these models were correctly specified.

Ingledew et al. (2005) had also noted concerns about model fit with the factor model for the Progress scale. In the absence of an acceptable model for the Progress

scale based on using the four items of the Progress scale, it was decided to retain the two positively-phrased items as indicators of the Progress factor.

Table 9.

Modelling for the Progress Scale.

Model details	Correctly specified?	Model fit and other observations	FLs < .60?*	Item FLs
one-factor	No	S-B ÷²=40.83, *df*=2, *p*=.00; RMSEA=.29, *p* close=.00.	No	1 (-.78); 2 (-.77); 3 (.82); 4 (.86).
one-factor, and 1 CMV factor	No	S-B ÷²=4.33, *df*=1, *p*=.04; RMSEA=.12, *p* close=.00.	No	1 (-.64/.60[a]); 2 (-.62/60[a]); 3 (.87); 4 (.92).
two-factor	No	S-B ÷²=4.33, *df*=1, *p*=.04. RMSEA=.12, *p* close=.00. FLs: Latent r = -.73.	No	Lack of Progress: 1 (.88); 2 (.85). Progress: 3 (.87); 4 (.92).

Note: FL = standardised factor loading. *N* = 230. FLs < .60?* = factor loadings were substantially less than .60. [a] indicated the standardised factor loadings for the CMV factor. *CFIs* >.95, except for one-factor model (.93); SRMRs < .05, except for the one-factor model for Progress (.08); and GFIs > .98.

Motivated Strategies for Learning Questionnaire – Self-Regulated Learning (MSLQ-SRL): One-factor Congeneric Models (OCMs)

Model specification, estimation of model fit, model re-specification, re-estimation of model fit.

Results reported in Table 10 supported the conclusion that the one-factor models for the Critical, Rehearsal, and Organisation scales from the MSLQ-SRL (Pintrich et al., 1991) were acceptable in terms of model fit and item Factor Loadings (FLs). Concerns about model fit and small FLs were noted for six of the original nine scales of the MSLQ-SRL. Post-hoc modelling was conducted for the model for the Effort Elaboration, and Time and Study Environment (TSE) scales – because the model specification was not supported – as well as the Help Seeking and Metacognitive Self-Regulation (MSR), because the models were not found to be correctly specified and FLs for some items were substantially less than .60. The FLs of the items in the models for

the MSR and Help Seeking scales reported to be less than .60 in the present study were also observed to be substantially less than .60 in the findings reported by Pintrich et al..

Post-hoc modelling was not considered for the model for the Peer Learning scale because the FLs for two of the three items that made up this scale were substantially less than .60. Removing one item from the model would have left only two indicators for a Peer Learning factor, and it is not possible to over-identify an OCM indicated by two items. The final outcomes of the post-hoc modelling are described in Table 11. Details of alternative models are reported in Appendix 2.4.

Reverse-scored items were important in the post-hoc modelling for some of the MSLQ-SRL. An acceptable model for the Help Seeking scale was achieved when the reverse scored item (item 1) was removed from the model. The specification of the Effort scale of two factors – a substantive Effort factor and a separate and orthogonal common method variance (CMV) factor for the two reverse-scored items – was also found to be an acceptable model. A two-factor model for the Time and Study Environment (TSE) scale – a factor (TSE) for the positively scored items, and a factor for the reverse scored items (Lack of TSE) – was preferred to the original one-factor model and a CMV model. An acceptable one-factor model for the MSR scale was achieved after removing the reverse scored items and two items (items 3 and 10) that appeared to be measuring similar content in addition to the MSR factor. Two items were removed from the Elaboration scale because these items appeared to be measuring an additional factor to the overall Elaboration factor.

Table 10.

Results for the One-factor Congeneric Models of the Motivated Strategies for Learning Questionnaire – Self-Regulated Learning.

Model	Correctly specified?	Model fit	FLs < .60?*	Item FLs
Critical	Yes	S-Bχ^2 = 4.41, *df*=5, *p*=.49; RMSEA=.00 *p* close=.75.	No	1 (51), 2(.74), 3 (69.), 4 (.76), 5 (.73).
Elaboration:	No	S-Bχ^2=50.86, *df*=9, *p*=.00; RMSEA=.14, *p* close=.00.	Yes	1(.54), 2(.67), 3(.84), 4(.42), 5(.73), 6(.58).
Rehearsal	Yes	S-Bχ^2=4.43, *df*=2, *p*=.11; RMSEA=.07, *p* close=.25.	No	1(.72), 2(.50), 3(.66), 4(.51).
Organisation	Yes	S-Bχ^2=4.27, *df*=2, *p*=.12; RMSEA=.07, *p* close=.26.	No	1(.81), 2(.55), 3(.68), 4(.79).
Metacognitive Self-Regulation	No	S-Bχ^2=116.40, *df*=54, *p*=.00; RMSEA=.07, *p* close=.03.	Yes	1(.35), 2(.59), 3(.56), 4(.52), 5(.44), 6(.60), 7(.46), 8(.26), 9(.63), 10(.65), 11(.66), 12(.56).
Effort	No	S-Bχ^2=19.91, *df*=2, *p*=.00; RMSEA=.19, *p* close=.01.	No	1(.63), 2(.80), 3(.64), 4(.73).
Help Seeking	No	S-Bχ^2=13.15, *df*=2, *p*=.00; RMSEA=.16, *p* close=.10.	No	1(.07), 2(-.47), 3(-.84), 4(-.64).
Peer Learning	Yes	S-Bχ^2=.02, *df*=1, *p*=.88; RMSEA=.00, *p* close=.91.	Yes	1(.24)**, 2 (1.32), 3(.24)**.
Time and Study Environment	No	S-Bχ^2=50.83, *df*=20, *p*=.00; RMSEA=.08, *p* close=.03.	Yes	1(.61), 2(.65), 3(.47), 4(.54), 5(.67), 6(.52), 7(.54), 8 (.58).

Note: FL = standardised factor loading. *N* = 230. FLs < .60?* = factor loadings were substantially less than .60. CFIs > .95, except for Elaboration (.92); SRMRs < .05, except for Elaboration (.08) and Metacognitive Self-Regulation (.07), Effort (.06), and Time and Study Environment (.08); and GFIs > .95. ** The unstandardised factor loading for these items were constrained to be equal so that the model could be over-identified.

Table 11.

Post hoc modelling for Selected Scales of the Motivated Strategies for Learning Questionnaire – Self-Regulated Learning.

Model details	Correctly specified?	Model fit and other observations	FLs < .60?*	Item FLs
Help 3 item, one-factor (item 1 removed)	Yes	S-B χ^2=2.08, *df*=.1, *p*=.14; RMSEA=.07, *p* close=.26.	No	2**(.55) 3 (.88); 5** (.55)
Effort: 4 item, one-factor, and CMV factor	Yes	S-B χ^2=.48, *df*=1, *p*=.49; RMSEA=.00, *p* close=.60.	Yes	1 (-.52 / .49 [a]); 2 (.87 / .49 [a]); 3 (-.52); 4 (.74).
TSE: 8 items, two-factors	Yes	S-B χ^2=30.03, *df*=19, *p*=.05; RMSEA=.05, *p* close=.46. Latent r = -.68. Discriminant validity was established as A (AVE for Factor 1 = .63 and Factor 2 = .46) > B (R^2=.44).		TSE: 1 (.56); 2 (.70); 5 (.72); 6 (.54). Lack of TSE: 3 (.57); 7 (.65); 8 (.70).
Elaboration: 4 item, one-factor (item2 and 4 removed)	Yes	S-B χ^2=.52, *df*=2, *p*=.78; RMSEA=.00, *p* close=.86.	No	1 (.59); 3 (.71); 5 (.78); 6 (.61).
MSR: 8 item, one-factor (items 1, 3, 8 and 10 removed)	Yes	S-B χ^2=25.02, *df*=20, *p*=.20; RMSEA=.03, *p* close=.74.	Yes	2 (.60); 4 (.54); 5 (.48); 6 (.65); 7 (.54); 9 (.57); 11 (.60); 12 (.49).

Note: FL = standardised factor loading. *N* = 230. FLs < .60?* = factor loadings were substantially less than .60. CFIs ≥ .95, except for Elaboration 6 item model (.92), Help 4 item (.91); SRMRs < .05, except for Elaboration 6 item (.08) and 5 item (06); Effort 4 item (.06); Help 4 item (.07); MSR 12 item (.07), 12 item CMV (.07), 10 item (.06); TSE (.08); and GFIs > .95. N = 230. CMV= Common Method Variable. [a] indicated the standardised factor loadings for the CMV factor. ** The unstandardised factor loading for these items were constrained to be equal so that the model could be over-identified. .

Description of findings.

The results of the OCM analysis for the scales of the MSLQ-SRL confirmed that the models for the Critical, Rehearsal, and Organisation scales should be retained as specified by Pintrich et al. (1991). However, concerns about model fit or small factor loadings were apparent for the Effort, Elaboration, Help, Metacognitive Self Regulation, Peer Learning, and Time and Study Environment scales.

After the results of the OCM analysis for the scales of the MSLQ-SRL, the Critical, Rehearsal, and Organisation scales were retained without change. Modifications were made to the models for the other six scales. The reverse-scored item for the Help scale was removed. The Time and Study Environment scale was modelled as two factors – Time and Study Environment and Lack of Time and Study Environment. The Effort scale was modelled as a single substantive factor and a CMV factor. Four items (items 1, 3, 8, and 10) were removed from the original 12 item Metacognitive Self Regulation scale. Items 2 and 4 were removed from the model for the Elaboration scale. The Peer Learning scale was not included in subsequent analyses. A total of 10 items were removed from the original 50 items for the MSLQ-SRL after the OCM phase of the analysis.

Motivated Strategies for Learning Questionnaire – Self-Regulated Learning (MSLQ-SRL): Confirmatory Factor Analysis (CFA)

Model specification, estimation of model fit, model re-specification, and re-estimation of model fit.

The results of the CFA for the MSLQ-SRL (Pintrich et al., 1991) appear in Table 12. In these models, it was hypothesised that the original 50 items (step 1) or the 40 items retained after taking into account the results of the OCM phase of the analysis

(step 2) were specified as unidimensional indicators of nine factors. The model outlined in the second CFA was retained because the model fit (RMSEA criteria) was superior to the model fit observed for the first CFA.

Table 12.

Results of the Confirmatory Factor Analysis for the Motivated Strategies for Learning Questionnaire – Self-Regulated Learning Scales.

Model	Correctly specified?	Model fit and observations
Step 1: 50 items, nine factors	No	S-B÷²=2254.68, *df*=1139, *p*=.00; RMSEA=.07, *p* close=00; CFI=.94; SRMR=.09; GFI=.93.
Step 2: 40 items, nine factors	Yes	S-B÷²=1065.85, *df*=703, *p*=.00; RMSEA=.05, *p* close=.76; CFI=.97; SRMR=.07; GFI=.96.
Step 3: 39 items, eight factors.	Yes	S-B χ^2 = 965.23, *df* = 674, *p* = .00; RMSEA = .04, *p* close = .96, CFI = .98, SRMR = .07, GFI = .96.

Note: *(N*=230*)*

A third CFA was specified for two reasons. The FL for the first item of the Critical scale was .37, which was substantially less than .60. This item also contributed to five large Modification Indices in the step 2 CFA. Second, the correlation between the modified models for the Effort as well as the Time and Study Environment (TSE) scales approached singularity (r = .98). The details of the correlation matrix for the third CFA for the MSLQ-SRL appear in Appendix 2.5.

Pintrich et al. (1991) also noted that the correlation between the factors for the original TSE and Effort scales was very large (r= .95). Therefore, it was decided to investigate ways of combining these factors because the items of the Effort and TSE scales appeared to examine similar constructs. The Effort scale included references to efforts at self-management in the context of studying and using time effectively. Two new factors were specified: factors for Self, Study, and Time Management (SSTM) and Lack of SSTM. The SSTM factor was indicated by the positively-phrased items from the Effort and TSE scales. On the other hand, the Lack of SSTM factor was indicated by

all of the reverse scored items from the Effort and TSE scales. As reported in Table 13, this two factor model proved to be an acceptable model.

Table 13.

Post-hoc Modelling of the Effort as well as the Time and Study Environment Scales.

Model	Correctly specified?	Model fit and observations	FLs < .60?*	Item FLs
12 item, one-factor model.	No	S-B χ^2=158.32, *df*=54, *p*=.00; RMSEA=.09, *p* close=.00.	Yes	TSE 1 (.62); TSE 2 (.68); TSE 3 (-.48); TSE 4 (.49); TSE 5 (.69); TSE 6 (.51); TSE 7 (-.53); 8 (-.79); Eff 1 (-.64); Eff 2 (.79); Eff 3 (-.63); Eff 4 (.64).
12 item, two-factor	Yes	S-B χ^2=56.88, *df*=53, *p*=.33; RMSEA=.02, *p* close=.97. Latent r =-.68.	No	Self, Study, and Time Management (SSTM): TSE 1 (.64); TSE 2 (.71); TSE 4 (.52); TSE 5 (.72); TSE 6 (.54); Eff 2 (.79); Eff 4 (.76). Lack of SSTM: TSE 3 (.55), TSE 7 (.53); TSE (.64).

Note: Eff=Effort; TSE= Time and Study Environment. CFIs >.95; SRMRs < .05, except for 12 item, one-factor (.08) and GFIs > .98. *N*=230. FLs = standardised factor loadings.

The model outlined in the third CFA for the MSLQ-SRL – 39 items as indicators of eight unidimensional factors – was retained because model fit statistics (RMSEA criterion) supported the conclusion that the model was correctly specified. With the exception of the fifth and seventh items of the MSR scale, all FLs after the third CFA were close to or greater than .60 (all FLs reported in Table 14). However, it was also apparent that many of the eight factors were highly correlated and failed to demonstrate discriminant validity with respect to other factors (see areas highlighted in grey in Table 14). Therefore, it was concluded that the factors of the modified 39 item, eight-factor model for the MSLQ-SRL were unidimensional but highly correlated.

The following eight highly correlated factors were retained after the CFA analysis for the MSLQ-SRL: Critical Thinking, Elaboration, Rehearsal, Organisation, Metacognitive Self-Regulation, Help Seeking, Self, Study, and Time Management (SSTM) and Lack of SSTM. Item 1 from the Critical scale was also removed from the model, leaving 39 of the original 50 items from the MSLQ-SRL.

Table 14.

Factor loadings (FLs), Latent-factor Correlations, Average of the Variance Extracted Reliability (on the diagonal) and Coefficient of Determination (in parentheses) after the Third Confirmatory Factor Analysis for the Motivated Strategies for Learning Questionnaire – Self-Regulated Learning.

Factor	1	2	3	4	5	6	7	8
1. Critical: FLs: 2 (.76); 3 (.75); 4 (.69); 5 (.71).	.53							
2. Elaboration: FLs:1 (.61); 3 (.70); 5 (.80); 6 (.56)	.71 (.50)	.45						
3. Organisation: FLs:1 (.75); 2 (.65); 3 (.64); 4 (.81)	.51 (.26)	.70 (.49)	.51					
4. Rehearsal: FLs:1 (.60); 2 (.57); 3 (.67); 4 (.57)	.60 (.36)	.79 (.62)	.91 (.83)	.36				
5. MSR: FLs 2 (.57); 4 (.58); 5 (.48); 6 (.55); 7 (.46); 9 (.64); 11 (.59); 12 (.68)	.82 (.67)	.77 (.59)	.88 (.77)	.79 (.62)	.32			
6. Help Seeking: FLs:2 (.74); 3 (.58); .4 (.65)	.35 (.12)	.63 (.40)	.45 (.20)	.52 (.27)	.47 (.22)	.44		
7. Self, Study, and Time Management (SSTM): FLs: Eff 2 (.82); .4 (.73). TSE 1 (.66); 2 (.77); 4 (.53); 5 (.70); 6 (.48).	.42 (.18)	.58 (.34)	.67 (.45)	.64 (.41)	.70 (.49)	.56 (.31)	.46	
8. Lack of SSTM: FLs: Eff (.69); 3 (.73). TSE 3 (.50); 7 (.64); 8 (.70)	.36 (.13)	.44 (.19)	.58 (.34)	.46 (.21)	.51 (.26)	.16 (.03)	.69 (.48)	.43

Note: Eff=Effort; TSE= Time and Study Environment. MSR = Metacognitive Self Regulation. Highlighted areas indicated where discriminant validity was not established between two factors.

Two approaches were adopted for modelling the association between the unidimensional factors of the revised eight-factor model for the MSLQ-SRL. The aim of the first approach was to establish if any factors could be identified as being empirically separate from the other factors in the model. If the items for the MSR, Rehearsal, Lack of SSTM, and the Elaboration scales were removed from the model, then the latent-factor correlations for the Critical Thinking, Organisation, SSTM, and Help Seeking scales passed the Fornell and Larcker (1981) test for discriminant validity. When modelled together as an 18 item, four-factor model (see Figure 9), the resulting model was acceptable because the findings for model fit indicated that it was a correctly specified model, S-B χ^2=159.76, *df*=129, *p*=.03; RMSEA=.03, *p* close=.97 (CFI=.99, SRMR=.06, GFI=.98) and the standardised FLs (which are not reported here but were almost identical to the FLs reported in Table 14) were greater than .60.

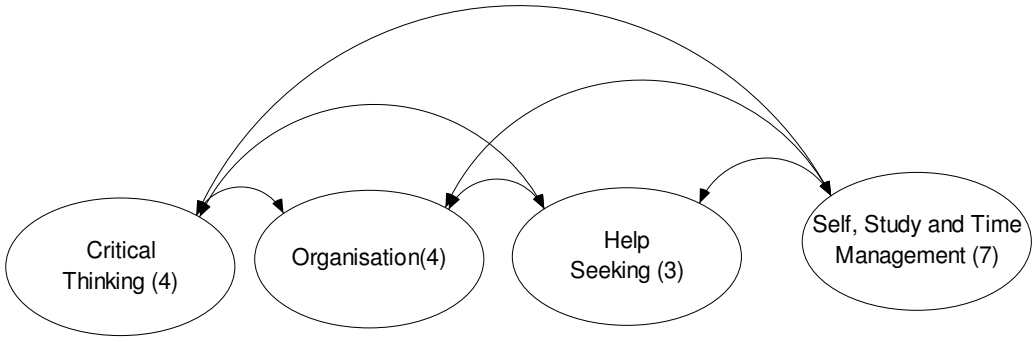

Figure 9. The revised 18 item, four-factor model of the Motivated Strategies for Learning Questionnaire – Self-Regulated Learning (number of items in parentheses).

The second approach used Higher-Order CFA (HCFA) to examine whether a higher-order factor or factors explained the relationship between the eight remaining factors of the MSLQ. Two higher-order models were examined (see Figure 10). In the first HCFA, it was hypothesised that a single higher-order-factor (Self-Regulated Learning Strategies) explained the correlations between the following latent factors –

Critical Thinking, Elaboration, Organisation, Rehearsal, MSR, Help Seeking, SSTM, and Lack of SSTM.

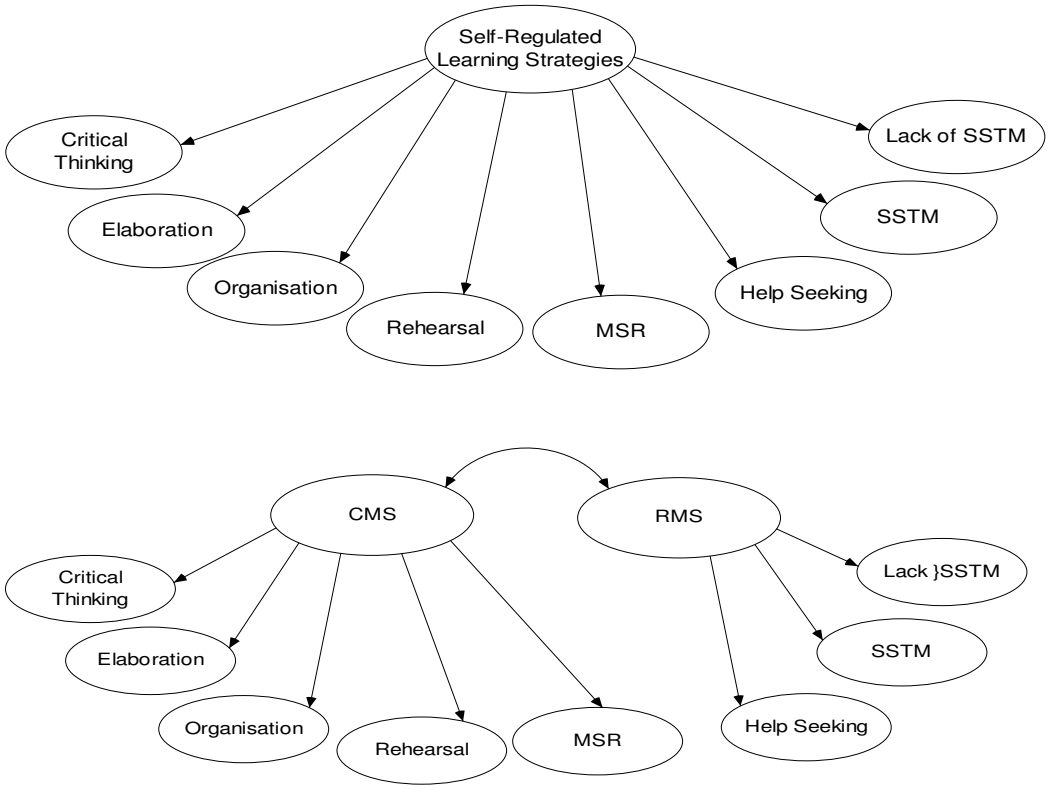

Figure 10. Higher order models for the Motivated Strategies for Learning Questionnaire – Self-Regulated Learning: One-factor (Self-Regulated learning strategies) model (upper); and Two-factor (Cognitive and Metacognitive Strategies – CMS – and Resource Management Strategies – RMS) model (lower).

Note: SSTM = Self, Study, and Time Management MSR= Metacognitive Self Regulation

In the second HCFA, two higher-order-factors that were implicit in the original reporting of the MSLQ-SRL by Pintrich, Smith, Garcia and McKeachie (1991) were modelled. A Cognitive and Metacognitive Strategies factor explained the correlations between the Critical Thinking, Elaboration, Organisation, Rehearsal, MSR factors. The Resources Management Strategies, in turn, explained the correlations between the factors for the SSTM, and Lack of SSTM factors.

An inspection of Table 15 revealed that the model fit for both of the second-order models was similar to the model fit reported for Step 3 of the CFA of the MSLQ-

SRL. This observation was expected because these models represent theoretical explanations of the latent factor correlations observed in the third MSLQ-SRL CFA. The FLs for the first order part of the model were not reported because these FLs were almost the same as those reported for the third CFA of the MSLQ-SRL. The one-higher-order-factor model was retained because the latent variable correlation between the factors of the two-higher-order-factor model was very large.

Table 15.

Results for the Modelling of the Hierarchal Confirmatory Factor Analysis Models for the Motivated Strategies for Learning Questionnaire – Self-Regulated Learning.

Model details	Correctly specified?	Model fit and observations
Study Strategies	Yes	S-B χ^2=1079.68, *df*=694, *p*=.00; RMSEA=.05, *p* close=.58. FLs: Critical (.70); Elaboration (.84); Organisation (.89); Rehearsal (.89); MSR (.95); Help Seeking (.57), SSTM (.76), Lack of SSTM (.62).
CMS and RMS	Yes	S-B χ^2=1061.30, *df*=693, *p*=.00; RMSEA=.05, *p* close=.70. FLs: Factor 1 CMS: Critical (71); Elaboration (.85); Organisation (.91); Rehearsal (.90); MSR (.97) Factor 2 RMS: Help Seeking (.62), SSTM (.90), and Lack of SSTM (.69). Latent r = .79.

Note: CFIs >.95; SRMRs < .05, and GFIs > .98. *N*=230. CMS = Cognitive and Metacognitive Strategies. RMS = Resource Management Strategies. Note: SSTM = Self, Study, and Time Management MSR= Metacognitive Self Regulation

Description of findings.

It was found in the current study was that many items for the MSLQ-SRL (Pintrich et al, 1991) were not good items for a particular scale and some factors were extremely highly correlated. Many with items that were found to be poor indicators of the latent variable were reverse scored items. As a consequence, a number of items were removed from the individual scales of the MSLQ-SRL so that the factor models for these scales were acceptable. Also, a new scale was developed – the Self, Study, and Time Management scale – after combining the positive items of the Effort scale and the Time and Study Environment scale. While many of the items of the MSLQ-SRL were

modified for the present study, problems with items with small FLs and large correlations between factors were apparent in the original report by Pintrich et al. (1991). The correlations between the factor models were found to be satisfactorily explained by a single overall self-regulated learning strategies factor.

Two overall models emerged when the association between the eight factors of the MSLQ-SRL was investigated. An 18 item, four-factor model (Critical Thinking, Organisation, Help Seeking, and Self, Study, and Time Management) was adopted when separateness between factors was the defining criteria for modelling the association between the factors linked with the scales of the MSLQ-SRL. Of the two higher-order CFA models of the 39 item, eight-factor version of the MSLQ-SRL, the one-higher-order-factor model was retained.

Depression Anxiety Stress Scale-42 (DASS-42): One-factor Congeneric Models (OCMs)

Model specification and estimation of model fit.

The details of the OCMs for the separate 14 item scales for Depression, Anxiety, and Stress that made up the DASS-42 (Lovibond & Lovibond, 1995) are outlined in Table 16. The model-fit evidence was not conclusive that the models were correctly specified, as all of the models were reasonable but not a close (RMSEA criteria) or exact (χ^2) fit of the data at Time 1 or Time 3. Almost all FLs for these models described in Table 16 were greater than .60. With no obvious indication that any particular item should not be retained for these OCM models, scale modification was not considered until a CFA was conducted. CFAs can provide a clearer picture of items that might be problematic in a scale.

Depression Anxiety Stress Scale-42 (DASS-42): Confirmatory factor analysis (CFA)

Model specification, estimation of model fit, model re-specification, and re-estimation of model fit.

It can be seen in Table 17 that the one-, two-, or three-factor models for the DASS-42 were a reasonable fit of the data and most of the Factor Loadings (FLs) were close to or greater than .60 at Time 1 and 3. The two- and three-factor models were a better fit of the data (based on RMSEA criteria) than the one-factor model. This finding is consistent with previous research which has demonstrated that the three factor model was a better model than the one-factor model (Brown, Chorpita, Korotitsch, & Barlow, 1997; Crawford & Henry, 2003; Lovibond & Lovibond, 1995; Page, Hooke, & Morrison, 2007).

However, the two- and three-factor models were not considered as suitable models for the scales of the DASS-42 because the correlations between the factors in both models at Time 1 and Time 3 were so large that it was not possible to conclude that the scales measured unique constructs. This finding was contrary to what was expected, as Lovibond and Lovibond (1995) had proposed that the three scales of the DASS-42 did correlated but were separate constructs. It was therefore concluded that the two- and three-factor models for the DASS-42 were not suitable for the current analysis.

Table 16.

Results of the One-factor Congeneric Models for the Scales of the Depression Anxiety Stress Scale-42.

Scale	Time	Correctly specified?	Model fit and observations	FLs < .60>*	Item FLs
Anxiety	1	No	S-Bχ^2=156.84, *df*=77, *p*=.00. RMSEA=.07, *p* close=.00.	Yes	1 (.49); 2 (.62); 3 (.74); 4 (.75); 5 (.49); 6 (.43); 7 (.67); 8 (.61); 9 (.56); 10 (.86); 11 (.69); 12 (.61); 13 (.71); 14 (.54).
	3	No	S-Bχ^2=146.42, *df*=77, *p*=.00. RMSEA=.07, *p* close=.07	No	1 (.67); 2 (.79); 3 (.79); 4 (.69); 5 (.86); 6 (.67); 7 (.83); 8 (.81); 9 (.80); 10 (.86); 11 (.88); 12 (.89); 13 (.84); 14 (.84).
Depression	1	No	S-B χ^2=235.04, *df*=77, *p*=.00. RMSEA=.10, *p* close=.00	No	1 (.71); 2 (.71); 3 (.74); 4 (.78); 5 (.77); 6 (.86); 7 (.81); 8 (.82); 9 (.83); 10 (.76); 11 (.88); 12 (.84); 13 (.90); 14 (.69).
	3	No	S-B χ^2= 163.02 *df*=77 *p*=.00. RMSEA=.07, *p* close=.01.	No	1 (.88); 2 (.73); 3 (.79); 4 (.87); 5 (.89); 6 (.90); 7 (.90); 8 (.93); 9 (.87); 10 (.89); 11 (.92); 12 (.88); 13 (.92) 14 (.73).
Stress	1	No	S-B χ^2=170.59, *df*=77, *p*=.00. RMSEA=.08, *p* close=.00.	Yes	1 (.80); 2 (.80); 3 (.76); 4 (.79); 5 (.75); 6 (.63); 7 (.68); 8 (.76); 9 (.77); 10 (.74); 11 (.72); 12 (.78); 13 (.70); 14 (.81).
	3	No	S-B χ^2= 230.70 *df*=77 *p*=.00. RMSEA=.10, *p* close=.00.	No	1 (.81); 2 (.83); 3 (.81); 4 (.86); 5 (.85); 6 (.71); 7 (.88); 8 (.82); 9 (.90); 10 (.87); 11 (.82); 12 (.84); 13 (.88) 14 (.87).

Note: FLs = standardised factor loadings. *N*=216. CFIs >.95; SRMRs < .05, except for Anxiety (Time 1=.12; Time 3=.06); Depression (Time 1=.09); Stress (Time 1=.08 & Time 2=.06); and GFIs > .98, except for Anxiety 14 items, one-factor (Time 1=.97).

Table 17.

Results of the Confirmatory Factor Analyses of the One-, Two-, and Three-factor Models for Scales of the Depression Anxiety Stress Scale-42.

Model	Time	Correctly Specified?	Model fit and observations
One-factor model: Psychological Distress (42 items).	1	No	S-B χ^2=1791.41, *df*=819, *p*=.00; RMSEA=.07, *p* close=.00. Most FLs >.60*.
	3	No	S-B χ^2=2108.18, *df*=819, *p*=.00; RMSEA=.09, *p* close=.00. All FLs >.60*
Two-factor model: Depression (14 items) and Tense (28 items from the Anxiety and Stress scales).	1	No	S-B χ^2=1314.06, *df*=818, *p*=.00; RMSEA=.05, *p* close=.18. Most FLs >.60*. Discriminant validity was not established: A (AVE for Dep=.65 and Tense=.45) ≤ B (R^2=.64, latent r = .80)
	3	No	S-B χ^2=1567.48, *df*=818, *p*=.00; RMSEA=.07, *p* close=.00. All FLs >.60*. Discriminant validity was not established: A (AVE for Dep=.75 and Tense=.65) ≤ B (R^2=.77, latent r = .88).
Three-factor model: Depression, Anxiety, and Stress factors (14 items per factor).	1	No	S-B χ^2=1291.78, *df*=816, *p*=.00; RMSEA=.05, *p* close=.26. Most FLs >.60*. Discriminant validity was not established for any pair of factors. Dep and Anx – No, as A (AVE for Dep=.63 and Anxiety=.40) ≤ B (R^2=.77, latent r = .80). Dep and Str – No, as A (AVE for Dep=.63 and Str =.56) ≤ B (R^2=.59, latent r = .77). Anx and Str – No, as (AVE for Anxiety=.40 and Str=.56) ≤ B (R^2=.86, latent r = .93).
	3	No	S-B χ^2=1357.13, *df*=816, *p*=.00; RMSEA=.06, *p* close=.04. All FLs >.60* Discriminant validity was not established for any pair of factors Dep and Anx – No, as A (AVE for Dep=.75 and Anxiety=.64) ≤ B (R^2=.77, latent r = .88). Dep and Str – No, as A (AVE for Dep=.75 and Stress =.71) ≤ B (R^2=.59, latent r = .74). Anx and Str – No, as (AVE for Anxiety=.64 and Str=.71) ≤ B (R^2=.86, latent r = .93).

Note: FLs = Factor loadings. *N* = 216. All CFIs >.95 and GFIs > .95. No SRMRs < .05. One-factor, Time 1=.11, Time 3=.08; two-factor, Time 1= .10, Time 3=.07; and three-factor , Time 1=.10, Time 3=.07. Dep=Depression; Anx=Anxiety; Str=Stress; and Ten=Tense. AVE= Average of the Variance Extracted. * All FLs are reported in Appendix 2.6. Problematic items at Time 1 were Anx 1, Anx 2, Anx 5, Anx 6, and Anx 9, and Anx 14 and Str 6.

Having ruled out the two- and three- factor models as being suitable for use in the current analysis, the only model that was viable for use in the current study was the 42 item, one-factor model. However, the one-factor model did not clearly meet the model-fit or factor-loading criteria to be considered as an acceptable model. Therefore, post-hoc modelling was conducted.

The sub-factor structure for the DASS-42 described by Lovibond and Lovibond (1995) was explored to determine options for post-hoc modelling of the DASS-42. A number of modifications were made to the sub-factors as proposed by Lovibond and Lovibond (1995). The details of the final sub-factor models that were retained appear in Table 18. Details of the analysis appear in Appendix 2.7.

Two groups of sub-factors were integrated into combined sub-factors in order to avoid specifying factors with two indicators (see Bollen, as cited in Kline, 2005), and the two sub-factors appeared to measure similar constructs. First, the Skeletal Muscular Effects (2 items) and Autonomic Arousal (5 items) sub-factors were combined as indicators of an Anxiety Physiology sub-factor as an Anxiety Physiology factor. Second, the Nervous Arousal sub-factor (2 items) and Difficulty Relaxing (3 items) factors were combined as indicators of a Stress Physiology factor.

Some of the sub-factors for the Anxiety and the Stress scales were combined because latent variable correlations between the initial sub-factors were very large, the items from these scales shared face validity, and the revised models were acceptable in terms of model fit and the size of the FLs. An Anxiety Emotions factor evolved from the combining of the Situational Anxiety and Subjective Experience of Subjective Affect sub-factors for Anxiety. Similarly, Stress Affect factor evolved from the combination of the Easily Upset and Irritable sub-factors.

The re-specification of the 14 item model for Depression required several steps. Many of the seven sub-factors originally proposed by Lovibond and Lovibond (1995) were observed to be highly correlated (see Appendix 2.7 for details). A meaningful method for combining the sub-factor models for the Depression scale was investigated. A 14 item, two-factor model for Depression emerged from this process. The first sub-factor was titled Depression Affect and Motivation, and was made up of items from the Anhedonia and Dysphoria scales (feelings of sadness and depression as well as being unable to experience positive feelings) and Lack of Interest and Inertia scales (loss of interest, enthusiasm and initiative). It is suggested that these items as a group tapped into the core criteria for a Major Depressive Episode outlined in the Diagnostic and Statistical Manual – 4th Edition – Text Revision (DSM-IV-TR, 2000) – depressed mood (Depressed Affect – Dysphoria factor) and lack of interest (Lost motivation – Lack of Interest and Inertia factors) – as well as loss of positive affect (Depressed Affect – Anhedonia factor) that has been noted in the work on depression by Clark and Watson (1991).

The second factor consisted of items from the original Hopelessness, Devaluation, and Self-Depreciation factors, and was titled Depression Negativity. What these sub-factors had in common was a sense of general negativity about life, in terms of meaning and worth, self-worth, and one's future. This conceptualisation is very similar to Beck's cognitive triad (Beck, 1976; Beck, Rush, Shaw, & Emery, 1979), where three types of negative ideation are associated with Depression: negative thoughts about the self, one's social world, and one's future. The error terms for the Dysphoria were permitted to covary because these items assessed a negative state whereas the other items assessed a loss of a negative state.

Table 18.

Final Post-hoc Sub-factor Models for the Depression Anxiety Stress Scale-42.

One-factor models	Time	Correctly specified?	Model fit and observations	FLs < .60>*	Item FLs
Anxiety Emotions: 7 items.	1	Yes	S-Bχ^2=13.96, *df*=14, *p*=.45. RMSEA=.00, *p* close=.84.	No	4 (.77); 5 (.38); 7 (.71); 10 (.90); 11 (.73); 12 (.63); 13 (.70).
	3	Yes	S-Bχ^2=17.56, *df*=14, *p*=.23. RMSEA=.03, *p* close=.67	Yes	4 (.72); 5 (.80); 7 (.83); 10 (.87); 11 (.88); 12 (.92); 13 (.87).
Anxiety Physiology: 7 items.	1	No	S-Bχ^2=22.35, *df*=14, *p*=.07. RMSEA=.05, *p* close=.41	Yes	1 (.55); 2 (.73); 3 (.81); 6 (.55); 8 (.63); 9 (.61); 14 (.54).
	3	No	S-Bχ^2=24.45, *df*=14, *p*=.04. RMSEA=.06, *p* close=.32.	Yes	1 (.74); 2 (.83); 3 (.82); 6 (.64); 8 (.85); 9 (.80); 14 (.82).
Depression Affect and Motivation: 8 items.	1	No	S-Bχ^2=36.83, *df*=19, *p*=.01. RMSEA=.07, *p* close=.33	Yes	1 (.87); 2 (.74); 4 (.88); 5 (.91); 8 (.94); 9 (.89); 10 (.89); 14 (.76).
	3	No	S-Bχ^2=32.70, *df*=19, *p*=.03. RMSEA=.06, *p* close=.32.	Yes	1 (.87); 2 (.75); 4 (.86); 5 (.91); 8 (.95); 9 (.86); 10 (.89); 14 (.77).
Depression Negativity: 6 items.	1	No	S-Bχ^2=22.14, *df*=9, *p*=.01. RMSEA=.08, *p* close=.10.	Yes	3 (.67); 6 (.89); 7 (.83); 11 (.95); 12 (.85); 13 (.93).
	3	Yes	S-Bχ^2=11.08, *df*=9, *p*=.27. RMSEA=.03, *p* close=.63.	Yes	3 (.74); 6 (.92); 7 (.94); 11 (.95); 12 (.87); 13 (.94).
Stress Emotions: 6 items.	1	No	S-Bχ^2=16.68, *df*=9, *p*=.05. RMSEA=.06, *p* close=.28.	Yes	1 (.85); 2 (.83); 4 (.83); 7 (.71); 9 (.78); 14 (.70).
	3	No	S-Bχ^2=38.54, *df*=9, *p*=.00. RMSEA=.12, *p* close=.00	Yes	FLs: 1 (.85); 2 (.86); 4 (.87); 7 (.89); 9 (.89); 14 (.86).
Stress Physiology: 5 items.	1	No	S-Bχ^2=11.23, *df*=5, *p*=.05. RMSEA=.08, *p* close=.20.	Yes	3 (.78); 5 (.78); 8 (.79); 10 (.73); 12 (.82).
	3	No	S-Bχ^2=16.63, *df*=5, *p*=.00. RMSEA=.10, *p* close=.05	No	FLs: 3 (.87); 5 (.87); 8 (.88); 10 (.88); 12 (.85).
Stress: Impatient 3 items.	1	Yes	S-Bχ^2=.08, *df*=1, *p*=.78. RMSEA=.00, *p* close=.83	No	FLs: 6 (.65); 11 (.84)*; 13 (.84)*.
	3	No	S-Bχ^2=2.71, *df*=1, *p*=.09. RMSEA=.09, *p* close=.20	No	FLs: 6 (.71); 11 (.91)*; 13 (.91)*.

Note: FLs = Factor loadings. *N* = 216. CFIs >.95; and GFIs > .98. SRMR for Time 1 was .09 at Time 1 and .06 at Time 3. * The unstandardised factor loading for these items were constrained to be equal so that the model could be over-identified. The FL for Anx item 5 at Time 1 was substantially less than .60 but greater than .60 at Time 3. Therefore, item 5 was retained.

Seven factors emerged from the post-hoc examination of the sub-factor structure of the DASS-42. There was good evidence to indicate that the revised Anxiety Emotions and Stress Impatient factors were acceptable models. The evidence that the remaining five factors – Anxiety Physiology, Stress Emotions, Depression Affect and Motivation, and Depression Negativity factors were acceptable models was not as clear cut as model fit did not consistently support that these models were correctly specified at Time 1 and Time 3. It was decided to retain these seven factors to develop alternative models of the DASS-42 using the essence of the sub-factor approach proposed by Lovibond and Lovibond (1995).

A CFA was conducted where the 42 items of the DASS were specified as unidimensional indicators of the seven sub-factor models identified in the OCM analysis for the DASS-42. The model fit (RMSEA criteria) statistics reported in Table 19 supported the conclusion that the model was correctly specified. All FLs (as reported in Table 19) were greater than .60 at Time 1 and Time 3. An inspection of Table 20 demonstrated that many of the correlations between the factors of the seven-factor model were sufficiently large that several of the factors failed to demonstrate discriminant validity with respect to other factors in the model (see shaded areas in Table 20).

Table 19.

Results of the Confirmatory Factor Analyses for the Seven- factor Model for the Depression Anxiety Stress Scale-42.

Model	Correctly specified?	Model fit and observations
Time 1	Yes	S-B χ^2=1123.46, *df* =798, *p*=.00; RMSEA=.04, *p* close=.97.
Time 3	Yes	S-B χ^2=1081.86, *df*=798, *p*=.00; RMSEA=.04, *p* close=1.00.

Note: CFIs >.95; and GFIs > .98. SRMR for Time 1 was .09 at Time 1 and .06 at Time 3. *N*=216.

Table 20.

Latent Variable Correlations, Standardised Factor Loadings (FLs), Average of the Variance Extracted (AVE) Reliability (on the diagonal) and Coefficient of Determination (in parentheses) for the Confirmatory Factor Analyses (Time 1 and Time 3) of the Seven-factor Model for the Depression Anxiety Stress Scale-42.

Time 1	1	2	3	4	5	6	7
1. Depressed A and M. FLs: 1 (.75); 2 (.75); 4 (.83); 5 (.75); 8 (.87); 9 (.83); 10 (.74); 14 (.68)	.60						
2. Depression Negativity. FLs: 3 (.78); 6 (.91); 7 (.89); 11 (.86); 12 (.88); 13 (.91)	.85 (.72)	.76					
3. Anxiety Physiology. FLs: 1 (.55); 2 (.70); 3 (.81); 6 (.47); 8 (.79); 9 (.60); 14 (.46)	.68 (.46)	.60 (.36)	.41				
4. Anxiety Emotions. FLs: 4 (.80); 5 (.49); 7 (.77); 10 (.84); 11 (.68); 12 (.65); 13 (.71)	.83 (.69)	.71 (51)	.77 (.59)	.51			
5. Stress Physiology. FLs: 3 (.79); 5 (.79); 8 (.74); 10 (.77); 12 (.81)	.85 (.72)	.66 (.44)	.78 (.61)	1.01 (1.02)	.61		
6. Stress Emotions FLs: 1 (.80); 2 (.81); 4 (.84); 7 (.70); 9 (.78); 14 (.82)	.82 (.67)	.60 (.36)	.73 (.53)	.86 (.74)	.93 (.87)	.63	
7. Stress Impatient. FLs: 6 (.71); 11 (.85); 13 (.77)	.60 (.36)	.41 (.17)	.59 (.35)	.75 (.56)	.80 (.64)	.81 (.66)	.61

Time 3	1	2	3	4	5	6	7
1. Depressed A and M. FLs: 1 (.87); 2 (.76); 4 (.90); 5 (.88); 8 (.95); 9 (.88); 10 (.90); 14 (.77)	.74						
2. Depressed Negativity. FLs: 3 (.82); 6 (.92); 7 (.96); 11 (.93); 12 (.89); 13 (.91)	.93 (.86)	.82					
3. Anxiety Physiology. FLs: 1 (.68); 2 (.81); 3 (.80); 6 (.66); 8 (.80); 9 (.86); 14 (.86)	.81 (.66)	.79(.62)	.69				
4. Anxiety Emotions. FLs: 4 (.76); 5 (.79); 7 (.82); 10 (.89); 11 (.91); 12 (.91); 13 (.82)	.90(.81)	.85(.72)	.94(.88)	.71			
5. Stress Physiology. FLs: 3 (.83); 5 (.88); 8 (.83); 10 (.93); 12 (.89)	.89(.79)	.76(.58)	.83(.69)	.95(.90)	.76		
6. Stress Emotions, FLs: 1 (.84); 2 (.84); 4 (.89); 7 (.89); 9 (.89); 14 (.79)	.88(.77)	.73(.53)	.84(.71)	.93(.86)	.91(.83)	.76	
7. Stress Impatient. FLs: 6 (.75); 11 (.87); 13 (.93)	.79(.62)	.65(.42)	.76(.58)	.85(.72)	.86(.74)	.93 (.86)	.61

Note: Depressed A and M = Depressed Affect and Motivation. Highlighted areas indicated where discriminant validity was not established between two factors

The association between the unidimensional factors for the revised seven-factor model for the DASS-42 was modelled in two ways. The first approach focused on identifying sub-scales that were separate and unique from the other sub-scales. When the Depressed Affect and Motivation, Anxiety Emotions, Stress Physiology, and Stress Emotions factors were removed from the seven-factor model, then the degree of association relative to the size of the FLs for the three remaining factors – Depressed Negativity, Anxiety Physiology, and Stress Impatient – met the criteria for discriminant validity. A CFA for these remaining factors – 16 item, three-factor model (as shown in Figure 11) – was found to be an acceptable model. There was good model-fit evidence to indicate that the sub-components model of psychological distress for the DASS-42 was correctly specified (see Table 21). All FLs were almost identical to those reported in Table 19, and were greater than .60.

Table 21.

Results of the Confirmatory Factor Analyses for the Revised 16 item, Three-factor Model for the Depression Anxiety Stress Scale-42.

Model	Correctly specified?	Model fit and observations
Time 1	Yes	S-B χ^2=131.51, *df*=101, *p*=.02; RMSEA=.04, *p* close=.88.
Time 3	Yes	S-B χ^2=132.02, *df*=101, *p*=.02; RMSEA=.04, *p* close=.97.

Note: CFIs >.95; and GFIs > .98. SRMR for Time 1 was .09 at Time 1 and .06 at Time 3. *N*=216.

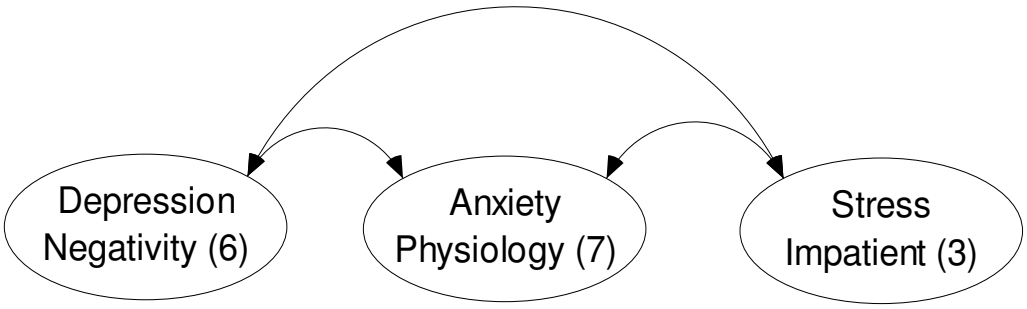

Figure 11. Revised 16 item, three-factor model for the Depression Anxiety Stress Scale-42 (number of items in parentheses).

The purpose of the second approach was to determine whether the commonality between the sub-factors could be explained by a single higher-order-factor. This factor was titled Psychological Distress. The Stress Physiology and Anxiety Emotions factors were observed in Table 20 to exceed or approach unity at Time 1 and Time 3. As there was no conceptual reason for combining these factors, it was decided to remove the items of the Stress Physiology factor from the model because a physiological aspect of a revised Psychological Distress was captured by the items of the Anxiety Physiology factor.

After specifying a CFA for the remaining 37 item, six-factor model for the longer version of the DASS (see Figure 12), a model was specified where a single higher-order-factor (Psychological Distress: see Figure 13) explained the correlations between the 6 factors outlined in the 37 item, six-factor model. As expected the model fit of the hierarchical model was almost identical to the CFA model (see Table 22). Importantly, all FLs were acceptable as they were greater than .60 and less than 1.00 at Time 1 and 3. The results of the analysis supported the hypothesised model which suggested that a single factor, titled Psychological Distress, adequately explained the correlations between the remaining six sub-factors of the original DASS-42.

Both of models that emerged after post-hoc examination of the sub-factors for the DASS-42 compared favourably to the 42 item one-factor model that had been earlier identified as being the best model for the 42 items of the DASS. It was concluded that the 16 item, three-factor model and the 37 item, one higher-order-factor model were correctly specified (based on RMSEA criteria) whereas the findings for model fit did not fully support that the 42 item, one-factor model was correctly specified. Therefore, the 16 item, three-factor and the 37 item, one-higher-order-factor model were preferred to the 42 item, one-factor model for the DASS-42.

Table 22.

Results of the Confirmatory Factor Analysis for Six-factor Model and the One Hierarchal Confirmatory Factor Analysis for the 37 items retained from the Depression Anxiety Stress Scale-42.

Model	Time	Correctly specified?	Model fit and observations
Six-factor	1	Yes	S-B χ^2=908.77, *df*=613, *p*=.00; RMSEA=.05, *p* close=.75.
	3	Yes	S-B χ^2=870.58, *df*=613, *p*=.00; RMSEA=.04, *p* close=.93.
One-higher-order-factor.	1	Yes	S-B χ^2=918.08, *df*=622, *p*=.00; RMSEA=.05, *p* close=.77. Higher-order FLs: Depressed A and M (.93); Depressed Negativity (.79); Anxiety Physiology (.78); Anxiety Emotions (.93); Stress Affect (.90); and Stress Impatient (.75).
	3	Yes	S-B χ^2=925.94, *df*=622, *p*=.00; RMSEA=.05, *p* close=.72. Higher-order FLs: Depressed A and M (.95); Depressed Negativity (.89); Anxiety Physiology (.90); Anxiety Emotions (.98); Stress Affect (.94); and Stress Impatient (.88).

Note: CFIs >.95 and GFIs > .95. SRMRs for the 37 item, six-factor model and the one-higher-order-factor model at Time 1 and .06 at Time 3.

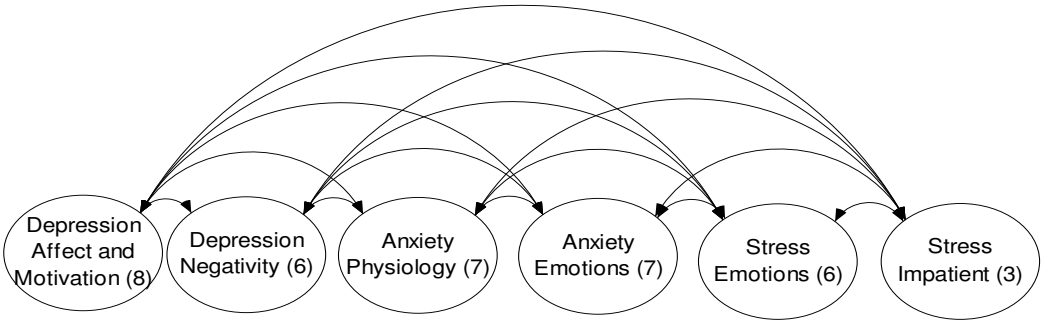

Figure 12. Revised 37 item, six-factor Confirmatory Factor Analysis model for the Depression Anxiety Stress Scale-42 (number of items in parentheses).

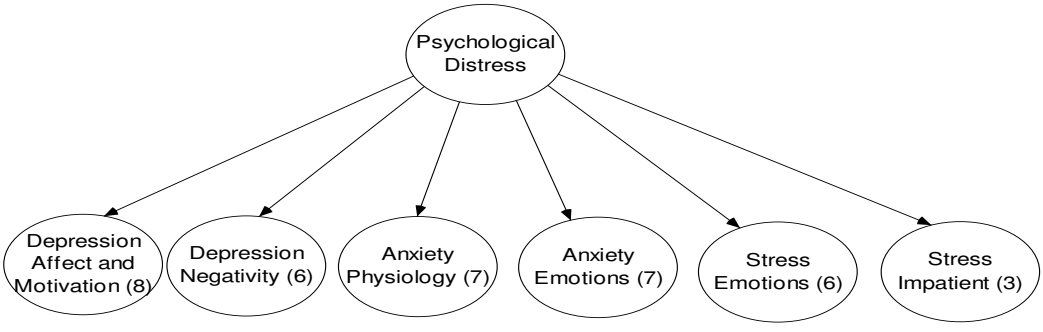

Figure 13. Higher-order-factor model of the revised 37 item version of the Depression Anxiety Stress Scale-42 (number of items in parentheses).

Description of findings.

Previous research on the factor structure of the DASS-42 (Lovibond & Lovibond, 1995) has focused on establishing whether a one-, two-, or three-factor model was the best specified model. It was concluded after the results of the present research that none of these models were satisfactory to model psychological distress for the adolescents who participated in the current study. While the two- and three-factor models were better models than the one-factor model in terms of model fit, the large correlations between the factors in these models meant that the one factor model for the DASS-42 was the "least worst" of the original models. Although the results of the current study were based on the responses of older community-based adolescents, Crawford and Henry (2003) have also reported that the correlations between factors were large for community-based adults. Correlations between scales reported in previous research conducted in mental health settings (Brown et al., 1997; Page et al., 2007) with adult participants have generally been smaller than those reported in the current study. However, these studies reported scale correlations rather than latent-factor correlations and the correlation between scales tends to be an underestimate the correlation between factors (see the results reported by Crawford & Henry, 2003, in Table 2).

A novel approach was adopted in the current research to the post-hoc modelling of the three original factors of the DASS-42. After some refinement, two models emerged from an examination of the sub-factors suggested by Lovibond and Lovibond (1995). The key criterion for developing the 16-item three-factor model was that the factors were reasonably separate from each other. The three factors were Depression Negativity (items from the original Hopelessness, Devaluation, and Self-Depreciation sub-factors), Anxiety Physiology (items from the original Skeletal Muscular Effects and

Autonomic Arousal sub-factors), and Stress Impatient (items from the original Impatient sub-factor).

A model where a single factor for overall psychological distress explained the correlations between the modified sub-factors was found to be correctly specified after the items for the Stress Physiology factor (items from the original Nervous Arousal and Difficulty Relaxing sub-factors) were removed from the model because the Stress Physiology factor was highly correlated with the Anxiety Emotions factor (items for the original Situational Anxiety and Subjective Experience of Subjective Affect sub-factors) on two occasions.

Of the three CFA models for the DASS-42 (the one-, two-, and three-factor models), the one-factor model for the DASS-42 was preferred because the two- and three-factor models were ruled out due to concerns about a lack of discriminant validity between the factors. A number of models based on the sub-factor structure for the DASS-42 were explored. Many of the seven factors that emerged were highly correlated. The degree of association between the factors was modelled by a 16-item, three-factor (factors for Depression Negativity, Anxiety Physiology; and Stress Impatient) model and 37-item, one-higher-order-factor (Psychological Distress) model. The two post-hoc models developed as part of the present research for the DASS-42 were preferred to the 42 item, one-factor model.

Structural Analyses: Preamble

It had been anticipated that the scales to be used in S-R analysis would be relatively unchanged after the analysis of the measurement models for the scales used in the current study. However, the information gained from the first part of the current analysis required that a number of changes be made to the intended S-R analysis. First,

some of the proposed predictors of Value (e.g., Personal Origin and Complexity) and Success Expectation (Ability, Time, and Tools) in the original Goal Dimensions model (Ingledew et al., 2005) were not included in the S-R Analysis because these variables had been so highly correlated with other goal dimension variables that they could not be empirically separated from other goal dimension variables. Also, one of the proposed consequences of Value and Success Expectation – Commitment – was removed from the analysis because the factor model for the Commitment scale was found to be highly correlated with factor models for other scales.

Some of the factor correlations between the scales of the GPQ (Ingledew et al., 2005) that were found to be highly correlated in the second confirmatory factor analysis for the GPQ were also found to be highly correlated in the correlation matrix for the Path Analysis (see Appendix 3.1 for the distribution statistics for the observed variables for the Path Analysis, and Appendix 3.2 for the full correlation matrix between the variables in the Path Analysis). The bivariate correlation between the Value and Commitment scales was .84 when the latent factor correlation reported in Table 7 between these variables approach singularity. The bivariate correlation between the Value and the Personal Origin was .68, whereas the latent variable correlation between these two modified scales was .92. The bivariate correlation between the Success Expectation scale and the Tools scales (.66) was substantially smaller than the latent-variable correlation (.90). Therefore, bivariate correlations of approximately .65 may indicate that the latent-variable correlations are so large that discriminant validity may not be established between conceptually related unidimensional measures.

Second, some of the scales for the Goal Dimensions model retained for the S-R Analysis were also modified. The one item was removed from the Feedback, Support, and Value scales; the original Control variable was specified as two variables (Control

and Lack of Control); and only two positively-phrased items from the Publicness scale were retained.

Third, options for modelling some variables became apparent after the results of the first part of the current analysis. What was found in the current study was that the DASS-42 could be reasonably modelled with this group of participants using a 16 item, three- factor model (factors for Depression Negativity, Anxiety Physiology, and Stress Impatient) and a 37 item, one-higher-order-factor model. Also, it was concluded that the MSLQ-SRL (Pintrich et al., 1991) measure of self-regulated learning could be modelled as a 39 item, one-higher-order-factor model.

The impact of using homogeneous (sub-scale parcels) and domain-representative (sub-scale items balanced across parcels) parcels when modelling the higher-order factor models was investigated prior to conducting the S-R analysis. Coffman and MacCallum (2005) have noted that domain-representative parcels tend to produce models that are a better fit of the data. Therefore, it was important to find the best approach to parcelling to minimise any overall lack of fit in the S-R models that could have been due to the method of parcelling items. Six parcels were specified for both the homogeneous and the domain representative models for the 37 item, one-higher-order-factor model for the DASS (see Figure 14). Four parcels were specified for both the homogeneous and the domain representative models for the 39 item, one-higher-order-factor model for the MSLQ-SRL. The details of how the DASS and MSLQ-SRL items were allocated to the parcels appear in Appendix 3.3 and 3.4.

Inspection of Table 23 revealed that the model fit for the domain-representative parcel models were clearly superior to the model fit of the homogenous parcel for both models. These results are consistent with those reported by Coffman and MacCallum (2005). On the basis of this finding, the domain-representative parcels were used in the

modelling of the 37 item, one-higher-order-factor model for the DASS and the 39 item, one-higher-order-factor model for the MSLQ-SRL.

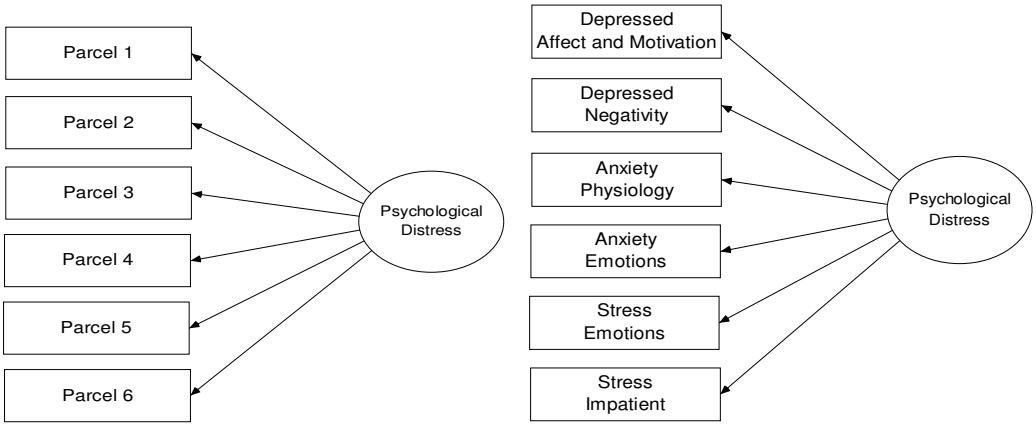

*Figure 14. D*omain-representative (left) and homogeneous parcel models of Psychological Distress.

Table 23.

Results for the Parcelling of the Modified Depression Anxiety Stress Scale (DASS) and the Modified Motivated Strategies for Learning Questionnaire – Self-Regulated Learning (MSLQ-SRL).

Model details		Correctly specified?	Model fit and observations
DASS	Domain-representative Time 1	Yes	S-B χ^2=10.62, *df*=9, *p*=.30; RMSEA=.03, *p* close=.66.
	Domain-representative Time 3	Yes	S-B χ^2=6.93, *df*=9, *p*=.65; RMSEA=.00, *p* close=.89.
	Homogenous Time 1	No	S-B χ^2=37.45, *df*=9, *p*=.00; RMSEA=.12, *p* close=.00.
	Homogenous Time 3	No	S-B χ^2=83.15, *df*=9, *p*=.00; RMSEA=.20, *p* close=.00.
MSLQ -SRL	Domain-representative	Yes	S-B χ^2=4.89, *df*=2, *p*=.09; RMSEA=.08, *p* close=.21
	Homogenous	No	S-B χ^2=67.51, *df*=20, *p*= .00; RMSEA=.11, *p* close=.00.

Note: *N*=216. For the domain-representative parcel models, CFIs >.95; SRMRs < .05; and GFIs > .95. None of the homogenous parcel models met these criteria.

The decision about which scale could be used as the measure for Self-Regulated Learning Strategies (SLRS) in the S-R analysis was made on the basis of the

relationship between these measures and overall academic performance. The results of the two multiple regression analyses to test these issues is reported in Table 24.

Table 24.

Details of the Regression of Academic Performance on the Two Sets of Self-Regulated Learning Strategy (SRLS) Variables.

1. Regression of Academic Performance on SRLS as a latent variable indicated by four domain-representative parcels of items from the modified Motivated Strategies for Learning Questionnaire – Self-Regulated Learning (MSLQ-SRL).

Model Fit: S-B χ^2=5.92, *df*=5, *p*=.32; RMSEA=.03, *p* close=.59. The model was accepted as being correctly specified (χ^2 criteria).

Regression of Academic Performance on SRLS: Unstandardised coefficient 8.62 (SE=5.27$^{ns)}$, Standardised coefficient =.11.

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2. Regression of Academic Performance on the retained MSLQ-SRL factors as separate indicators of SRLS.

	US	SE	US
Critical Thinking	-.28	5.38^{ns}	.00
Organisation	-11.08	5.59*	-.21
Help Seeking	3.08	5.91^{ns}	.05
SSTM	20.02	6.91*	.33

Note: * indicates critical ratio (US/SE) > 1.96, *p*<.05. ns = non-significant.

Correlation matrix.

	1	2	3	4	5
1.Academic Performance	1.00				
2.Critical Thinking	0.03	1.00			
3. Organisation	0.00	0.49	1.00		
4. Help Seeking	0.13	0.25	0.35	1.00	
5. SSTM	0.22	0.39	0.60	0.47	1.00

Note: SSTM = Self, Study, and Time Management.

The measures of Organisation as well as Self, Study, and Time Management (SSTM) were possible indicators of self-regulated learning strategies as the regression of these variables on overall academic performance was statistically significant. The SSTM scale was selected as the sole indicator of self-regulated learning strategies because the direct effect of Organisation on the participants' final academic performance was suppressed most likely due to the large correlation between the Organisation and SSTM variables.

The descriptive statistics for the observed variables used in S-R analyses are presented in Tables 25 and 26. The hypothesis that the variables were normally distributed was accepted when *p* values Skewness, Kurtosis, and Skewness and Kurtosis were observed in Table 25 to be greater than .05.

With the exception of the Success Expectation, Support and Academic Performance variables, the results from the overwhelming majority of χ^2 tests indicated that most of the variables were not normally distributed (see the areas highlighted in grey in Table 25). The Value variable was most affected by lack of normality. Therefore, Robust Maximum Likelihood (RML) method of estimation was used, and the Satorra-Bentler scaled (S-B) χ^2 reported, for the S-R analyses.

The severity rates based on the original DASS-42 (Lovibond & Lovibond, 1995) scales are presented in Table 27. Based on the guidelines for cut-offs suggested by Lovibond and Lovibond (1995), just over 20% of the participants met the criteria for the Mild to Severe severity rating for symptoms of depression, anxiety, and stress at Time 1 and Time 3. A larger number of females rated their stress levels as mild or worse at Time 3 compared to the males at the same Time. The severity rates for all of the measures of psychological distress were relatively similar for males and females at Time 1 and Time 3.

Table 25.

Univariate Statistics for the Observed Variables for the Structural Regression Analyses.

Variable	*M*	*SD.*	MR	α	Skew	Kurtosis	Skew		Kurtosis		Skew & Kurtosis	
							Z-Score	*p*	Z-Score	*p*	χ^2	*p*
Competition	3.96	0.75	.88	.83	-0.54	0.12	-3.14	.00	0.49	.62	10.13	.01
Conflict	2.07	0.82	.89	.86	0.76	0.42	4.20	.00	1.26	.21	19.19	.00
In Control	3.65	0.76	.70	.65	-0.42	0.23	-2.51	.01	0.80	.42	6.94	.03
Lack of Control**	4.03	0.73	.77	.71	-0.45	-0.12	-2.64	.01	-0.26	.80	7.02	.03
Difficulty	2.85	0.92	.91	.89	0.11	-0.61	0.66	.51	-2.52	.01	6.81	.03
Feedback	3.07	0.96	.90	.87	0.07	-0.68	0.41	.68	-3.00	.00	9.18	.01
Publicness**	3.99	0.87	.85	.79	-0.81	0.35	-4.44	.00	1.09	.28	20.86	.00
Specificity	3.65	1.19	.94	.92	-0.69	-0.56	-3.88	.00	-2.23	.03	19.97	.00
Success Expectation	3.72	0.72	.87	.84	-0.24	-0.12	-1.43	.15	-0.26	.80	2.11	.35
Support**	3.73	0.81	.80	.75	-0.39	-0.01	-2.33	.02	0.11	.91	5.44	.07
Value**	4.23	0.73	.90	.86	-1.11	1.30	-5.67	.00	2.78	.01	39.84	.00
Depression Negativity Time 1	1.48	2.54	.95	.84	2.35	6.04	9.18	.00	5.97	.00	119.90	.00
Anxiety Physiology Time 1	1.68	2.16	.82	.66	1.67	2.93	7.52	.00	4.39	.00	75.86	.00
Stress Impatient Time 1	0.70	0.64	.82	.74	0.87	0.39	4.72	.00	1.19	.24	23.64	.00
Depression Negativity Time 3	0.29	0.54	.96	.90	2.58	7.32	9.62	.00	6.38	.00	133.17	.00
Anxiety Physiology Time 3	0.34	0.51	.92	.86	2.52	7.33	9.53	.00	6.38	.00	131.47	.00
Stress Impatient Time 3	0.82	0.83	.89	.83	1.10	0.37	5.62	.00	1.13	.26	32.91	.00
Progress**	3.54	0.82	.88		-0.33	0.33	-1.83	.06	1.05	.29	4.66	.10
Self, Study, and Time Management	5.13	1.03	.88		-0.56	0.18	-3.24	.00	.67	.51	10.92	.00
Academic Performance	306.22	59.37	na	na	-0.04	0.13	-0.03	.98	.54	.59	.29	.86

Note: α = Cronbach's alpha. MR = model-based reliability. ** indicates that GPQ scales that were modified after the results from the measurement model section of the current research. Highlighted areas indicate where the hypothesis that the variable was normally distributed for skewness and / or kurtosis was rejected. na=not applicable.

Table 26.

Correlations Between the Latent Variables for the Structural Regression Analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Competition	1.00																			
2. Conflict	-.19*	1.00																		
3. Lack of Control	-.12*	.33*	1.00																	
4. In Control	.10	-.47*	-.41*	1.00																
5. Difficulty	-.06	.47*	.40*	-.62*	1.00															
6. Feedback**	.12	-.14	-.17*	.32*	-.25*	1.00														
7. Publicness**	.31*	-.57*	-.37*	.39*	-.37*	.14	1.00													
8. Specificity	.01	-.32*	-.18*	.30*	-.10	.08	.34*	1.00												
9. Success Expectation	.24*	-.50*	-.57*	.61*	-.74*	.09	.58*	.25*	1.00											
10. Support*	.18*	-.25*	-.39*	.46*	-.39*	.60*	.35*	.26*	.39*	1.00										
11. Value*	.32*	-.72*	-.39*	.40*	-.21*	.10	.72*	.44*	.55*	.37*	1.00									
12. Depression Negativity Time 1	.01	.11	.23*	-.36*	.25*	-.05	-.04	-.13	-.29*	-.17	-.06	1.00								
13. Stress Impatient Time 1	.08	.08	.06	-.38*	.19*	-.06	.06	-.05	-.10	-.09	.08	.30*	1.00							
14. Anxiety Physiology Time 1	.01	.03	.15	-.26*	.19*	-.18*	-.06	-.02	-.20*	-.25*	-.07	.46*	.50*	1.00						
15. Depression Negativity Time 3	.04	.18	.18*	-.29*	.21*	-.01	-.11*	-.08	-.20*	-.16	-.08	.53*	.21*	.30*	1.00					
16. Stress Impatient Time 3	.17*	.09	-.07	-.23*	.11*	.02	.07	-.05	-.01	.00	.07	.13	.49*	.29*	.54*	1.00				
17. Anxiety Physiology Time 3	.06	.12	.00	-.19*	.15*	.03	.06	.10	-.05	-.03	.09	.26*	.26*	.36*	.71*	.65*	1.00			
18. Progress**	.07	-.27*	-.35*	.53*	-.42*	.21*	.29*	.23*	.52*	.30*	.27*	-.21*	-.18*	-.16*	-.21*	-.14	-.13	1.00		
19. Self, Study, and Time Management	.03	-.30	-.20*	.37*	-.15	.15	.24*	.18*	.23*	.29*	.35*	-.13	-.10	-.07	-.21*	-.20*	-.16	.44*	1.00	
20. Academic Performance	.19*	-.21*	-.30*	.26*	-.35*	-.10	.37*	.03	.57*	.12*	.31*	-.18*	-.01	-.15*	-.11	.05	.03	.57*	.22*	1.00
Psychological Distress	.13	.15	.06	-.29*	.23*	-.01	-.01	-.03	-.15	-.12	.03	na	na	na	na	na	na	-.18*	-.24*	-.03

Note: The results variables 1 to 20 from this table were arrived after a conducting a CFA for the factors (with random error modelled). The results for the Psychological Distress variable were arrived at after a separate CFA. *significant correlation, $p<.05$. ns=not significant. ** indicates that GPQ scales that were modified after the results from the measurement model section of the current research.

Table 27.

Prevalence Rates for the Severity of Depression, Anxiety, and Stress Symptoms Based on Responses to the Depression Anxiety Stress Scale-42 (N = 216).

Scale	Rating	Time 1			Time 3		
		Overall (%)	Males (%)	Females (%)	Overall (%)	Males (%)	Females (%)
Depression	Normal	174 (80.6)	88 (85.4)	86 (76.1)	166 (79.6)	86 (83.5)	80 (70.8)
	Mild	17 (7.9)	7 (6.8)	10 (8.8)	11 (5.1)	4 (3.9)	7 (6.2)
	Moderate	20 (9.3)	7 (6.8)	13 (11.5)	21 (9.7)	8 (7.8)	13 (11.5)
	Severe	2 (.9)	1 (1.0)	1 (.9)	10 (4.6)	2 (1.9)	8 (7.1)
	Extremely Severe	3 (1.4)	0 (0)	3 (12.7)	8 (3.7)	3 (2.9)	5 (4.4)
	Total	216	103	113	216	103	113
Anxiety	Normal	171 (79.2)	88 (85.4)	83 (73.5)	172 (79.6)	87 (84.5)	85 (75.2)
	Mild	15 (6.9)	6 (5.8)	9 (8.0)	15 (6.9)	6 (5.8)	9 (8.0)
	Moderate	23 (10.6)	7 (6.8)	16 (14.2)	17 (7.9)	6 (5.8)	11 (9.7)
	Severe	5 (2.3)	2 (1.9)	3 (2.7%)	7 (3.2)	3 (2.9)	4 (3.5)
	Extremely Severe	2 (.9)	0 (0)	2 (1.8%)	5 (2.3)	1 (1.0)	4 (3.5)
	Total	216	103	113	216	103	113
Stress	Normal	169 (78.2)	88 (85.4)	81 (71.7)	160 (74.1)	88 (85.4)	72 (63.7)
	Mild	26 (12)	11 (10.7)	15 (13.3)	12 (5.6)	4 (3.9)	8 (7.1)
	Moderate	14 (6.5)	4 (3.9)	10 (8.8)	24 (11.1)	7 (6.8)	17 (15.0)
	Severe	6 (2.8)	0 (0)	5.3 (6)	13 (6.0)	3 (2.9)	10 (8.8)
	Extremely Severe	1 (.5)	0 (0)	1 (.9)	7 (3.2)	1 (1.0)	6 (5.3)
	Total	216	103	113	216	103	113

Step 1 of the S-R analysis: Goal Dimensions and Concurrent Psychological Distress

Initial estimation of model fit.

Two S-R models, Model 1a and 1b in Figure 15, were specified to examine the relationship between the Goal Dimensions model developed by Ingledew et al. (2005), and refined after the first part of the current analysis, and measures of psychological distress assessed near the beginning of the academic year. The Goal Dimensions model was identical for Models 1a and 1 b (as highlighted by the rounded rectangles in Figure 15). The latent variables in this part of the model were indicated by a single parcel of items for each of the goal dimensions that had been retained for this part of the analysis. Convergent validity, unidimensionality, and discriminant validity had been established for these scales after the final CFA for the 35 item, 11-factor model for the GPQ (Ingledew et al., 2005).

The major difference between Model 1a and 1b was how psychological distress was modelled. Psychological distress was modelled in Model 1a as three separate factors for Depression Negativity, Anxiety Physiology, and Stress Impatient. This specification was reasonable as it had been concluded that factor models for these three scales were unidimensional and measured separate factors as part of the analysis for the 16 item, three-factor model that evolved from the analysis of the original sub-factors for the DASS-42 (Lovibond & Lovibond, 1995). The relationship between the measures was modelled by permitting the disturbance terms for each parcel to covary. In contrast, psychological distress was modelled in Model 1b as the domain-representative version of the 37 item, one-higher-order-factor model for the longer version of the DASS.

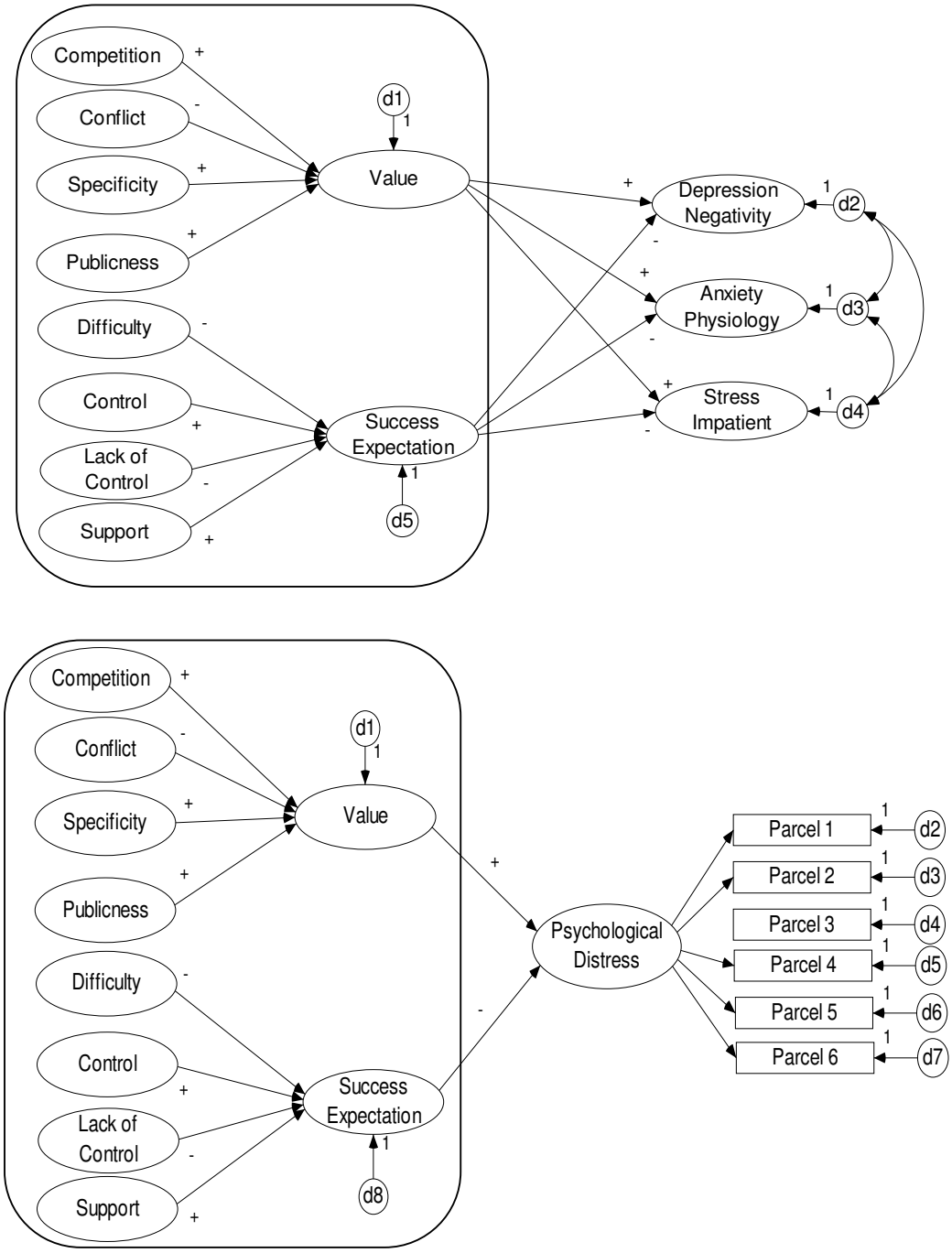

Figure 15. Model 1a (Upper: Goal Dimensions model and concurrently measured Depression, Anxiety, and Stress); and Model 1b (Lower: Goal Dimensions model and concurrently measured Psychological Distress).

Note: Rounded triangle indicated the Goal Dimension model (Ingledew et al, 2005). Single parcel indicators and error terms for and the covariances between the predictor goal dimensions were removed from Figure 15 and all subsequent figures relating to S-R Analyses so that the path diagrams were easier to interpret. A 'd' indicates that a disturbance term was specified for a variable.

Goal dimensions model (Ingledew et al., 2005) for Models 1a / 1b: Initial estimation of model fit, re-specification of the model, and re-estimation of model fit.

The initial specification of this model was rejected as a correctly specified model (see Table 28). Modification indices (MIs) from Model 1a and 1b were examined to determine if paths that were initially not estimated in the model (that is, fixed to zero) should be estimated to improve model fit. Statistically significant MIs indicated that model fit would be improved if the paths from Publicness to Success Expectation, Difficulty to Value, and Success Expectation to Value were estimated. When these paths were estimated in the model (as reported in Table 28), the respecified version for the Goal Dimensions model for Models 1a / 1b was accepted as correctly specified.

Table 28.

Model fit for the Initial and Revised Versions of the Goal Dimensions model for Models 1a /1b.

Model details	Correctly specified?	Model fit and observations
Model 1a & 1b: Initial specification	No	S-B χ^2=42.08, *df*=10, *p*=.00; RMSEA=.12, *p* close=.00.
Model 1a / 1b: After modification	Yes	S-B χ^2=9.51, *df*=7, *p*=.22; RMSEA=.04, *p* close=.53. This model was a significantly better fit of the data than initial version of Model 1, Δdf=3, Δ S-Bχ^2 = 25.51, *p*=.00.

Note: CFIs >.95; SRMRs < .05; and GFIs > .95. *N*=216.

There were substantive reasons to suggest that the addition of Publicness-Success Expectation and Difficulty-Value paths were justified. Previous researchers in the educational domain have proposed that students will adjust their educational goals to protect their self-esteem (Wigfield & Eccles, 2002). What is being suggested is that participants in this study were less likely to publicly disclose that they were

trying to achieve an important education goal if they believed they were unlikely to achieve that goal. It could be that it was problematic for their sense of self if other people knew that they had tried and failed to achieve an important educational goal.

In general, it is suggested that the perceived difficulty and value of a goal should be related. When the difficulty of the goal measures the sense of challenge and the obstacles that an individual perceives that they may face in achievement of an educational goal, it is reasonable to expect that greater goal difficulty would be positively related to goal value because one of the key reasons that the students might decide to pursue a difficult educational goal is because they also highly value that goal.

Previous research had provided little direction on how to specify the relationship between Success Expectation and Value. Ingledew et al. (2005) did not specify a relationship between Success Expectation and Value. Vroom (1964) considered the relationship between Success Expectation and Value as a combined variable where the product of Success Expectation and Value was defined as motivational force. For Eccles et al. (1983), competency beliefs were positively related to the expectancies about successful attainment of educational goals as well as the attractiveness or value of the goal. However, Eccles et al. did not outline how Success Expectation and Value might be related. If, as suggested by Wigfield and Eccles (2002), students adjust their educational goals to protect their self-esteem, then it is suggested that an educational goal will be perceived as being more valuable when there is an expectation that the goal is attainable. That is, as expectations of success increase, the goal becomes more valuable. Valuing goals that are not achievable increases the chance that an individual would experience an event (goal failure) that is likely to have a substantial deleterious impact on self esteem.

Two other pieces of evidence supported the addition of these paths to the Goal Dimensions model for Models 1a / 1b. First, with the addition of the direct effect of Publicness on Success Expectation, Difficulty on Value, and Success Expectation on Value, the resulting model was a significantly better fit of the data than the original model. Second, the unstandardised path coefficients for the paths added to the model (e.g., effect of Publicness on Success Expectation) were observed, as reported in Table 29, to be statistically significant

Table 29.

Parameter Estimates for the Final Versions of the Goal Dimensions model for Models 1a / 1b and as Reported by Ingledew et al. (2005).

Outcome	Predictor	Model 1a / 1b			Ingledew
		UC	SE	SC	SC
Value	Competition	.07	.05^{ns}	.07	.09^{ns}
	Conflict	-.46	.07*	-.51	-.23*
	Publicness	.24	.07*	.28	.17*
	Specificity	.07	.03*	.12	.24*
	Difficulty	.38	.07*	.48	na
	Success Expectation	.47	.11*	.45	na
Success Expectation	Lack of Control	-.10	.03*	-.22	na
	Control	.16	.11^{ns}	.15	.34*
	Difficulty	-.36	.05*	-.48	-.02^{ns}
	Feedback	-.16	.06*	-.22	.11^{ns}
	Support	.11	.09^{ns}	.12	.09^{ns}
	Publicness	.20	.06*	.25	na

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. * = significant effect, such that Critical Ratio (US/SE) > 1.96, p<.05. ns = not significant. Ingledew = Ingledew et al. (2005).

Goal dimensions model (Ingledew et al., 2005) for Models 1a / 1b: Description of findings.

Overall, the predictor goal dimensions in the model explained a large amount of variation in the Success Expectation and Value variables. The perceived

competition to attain the goal, goal conflict, others know about the intention to pursue the goal, goal specificity, goal difficulty, and expectations of goal attainment explained 80% of the variance in goal value. Similarly, perceived control and lack of control about goal pursuit, goal difficulty, feedback from teachers, support from others, and that others know about the intention to pursue the goal explained 75% of the variance in expectations of goal attainment.

After holding the associations between the predictor goal dimensions constant, inspection of the standardised coefficients for Goal Dimensions model of Model 1a / 1b in Table 29 revealed the following findings for the prediction of goal value and expectations of goal attainment. Goal value increased when goal difficulty, others knowing about the pursuit of the goal, goal specificity, and expectations of goal attainment increased; and goal conflict decreased. Goal difficulty, expectations of goal attainment, and goal conflict were the most important predictors of goal value. For example, as the participant's score on the scale for success expectations increased by one point, goal value increased by .47 of a point.

Expectations of goal attainment increased when the participants reported being more public about their intention of trying to gain a place at university. Expectations of goal attainment reduced when goal pursuit was perceived as being less under the control of the participant, the goal was perceived as being more difficult, and the participant reported receiving more feedback from teachers. Goal difficulty was deemed to be the most important predictor of expectations about goal attainment. When the participant's score on the goal difficulty scale increased by one point, their score on the expectations success scale reduced by .36 of a point.

The relationships between the goal dimensions outlined in the final version of Goal Dimensions model for Models 1a / 1b were mostly as outlined in the Goal

Dimensions model, and were generally statistically significant. Other findings were not as expected. The finding that greater feedback from teachers on progress towards goal attainment reduced expectations of goal attainment was opposite in direction to the results outlined by Ingledew et al. (2005). Also, two paths failed to achieve statistical significance: goal value was expected to be lower when competition associated with goal pursuit was higher; and expectations about goal attainment were expected to be higher when support for goal pursuit was greater.

There were several differences between the findings of the present study about the Goal Dimensions model for Models 1a / 1b and the findings reported by Ingledew et al. (2005). First, Ingledew et al. found that goal difficulty influenced expectations of success but not goal value; and that the publicness of goal pursuit influenced goal value but not expectations of goal attainment. What was found in the present study was that goal difficulty and the publicness of goal pursuit influenced both expectations of success and goal value.

Second, the relative size of the standardised regression coefficients for some of the predictors of the Success Expectation and Value variables were observed to be quite different for the present study compared to what was found by Ingledew et al. (2005). For example, goal specificity (positive) was a more important predictor of goal value in the Ingledew et al. study; goal conflict (negative) was a more important predictor of goal conflict present study; perceived control over goal pursuit (positive) was a more important predictor of expectations of goal attainment in the present study; and perceived goal difficulty (negative) was a more important predictor of expectations of goal attainment in the present study.

Three additional paths were estimated in the revised version of the Goal Dimensions model: that others know about the intention to gain a place at university

influenced expectations of successful goal attainment; and goal difficulty and expectations of success impacted on the perceived value of the goal. Goal value increased when (in order of importance) when goal difficulty, others knowing about the pursuit of the goal, goal specificity, and expectations of goal attainment were greater, and goal conflict was lower. Expectations of successful goal attainment increased when the participants reported being more public about their intention of trying to gain a place at university, when the participants experienced less lack of control over goal pursuit, the goal was perceived as less, and the participant reported receiving less feedback from teachers about progress towards goal attainment. The relative importance for several predictors of goal value and expectation of goal attainment observed in the present study were quite different to what was reported by Ingledew et al..

Goal dimensions and concurrent measures of psychological distress: Initial estimation of model fit, re-specification of the model, and re-estimation of model fit.

The relationship between the goal dimensions and self-reported symptoms of psychological distress was examined next using the Goal Dimensions model developed by Ingledew et al. (2005) and adapted in the current study. It found that Model 1a was correctly specified when the path between the Control and Stress Impatient was estimated. Similarly, Model 1b was correctly specified with the addition of a path from Control to Psychological Distress. The detail of the model estimation process appears in Table 30. Diagrams of all final models appear in Figure 16.

Table 30.

Model fit results for Model 1a (Goal dimensions model and concurrently measured Depression, Anxiety, and Stress); and Model 1b (Goal dimensions model and concurrently measured Psychological Distress).

Model details	Correctly specified?	Model fit and observations
Model 1a	Yes	S-B χ^2=46.23, *df*=34, *p*=.08; RMSEA=.04, *p* close=.68. A large MI was observed indicating that model fit would be improved significantly if a path from Control to Stress Impatient was estimated in the model.
Model 1a with the addition of a direct effect from Control to Stress Impatient	Yes	S-B χ^2=35.84, *df*=33, *p*=.34; RMSEA=.01, *p* close=.91. This revised model was a significantly better fit of the data than the initial version of the model, *Δdf*=1, Δ S-Bχ^2 = 5.45, *p*=.02
Model 1b	Yes	S-B χ^2=106.96, *df*=80, *p*=.02; RMSEA=.04, *p* close=.81. A large MI was observed indicating that model fit would improve significantly if a path from Control to Psychological Distress was estimated in the model.
Model 1b with the addition of a direct effect from Control to Psychological Distress	Yes	S-B χ^2=89.64, *df*=79, *p*=.19; RMSEA=.03, *p* close=.97. This model was a correctly specified model according to χ^2 criteria, and was a significantly better fit of the data than Model 4, *Δdf*=1, Δ S-Bχ^2 = 8.77, *p*=.00.

Note: CFIs >.95; SRMRs < .05; and GFIs > .95. *N*=216.

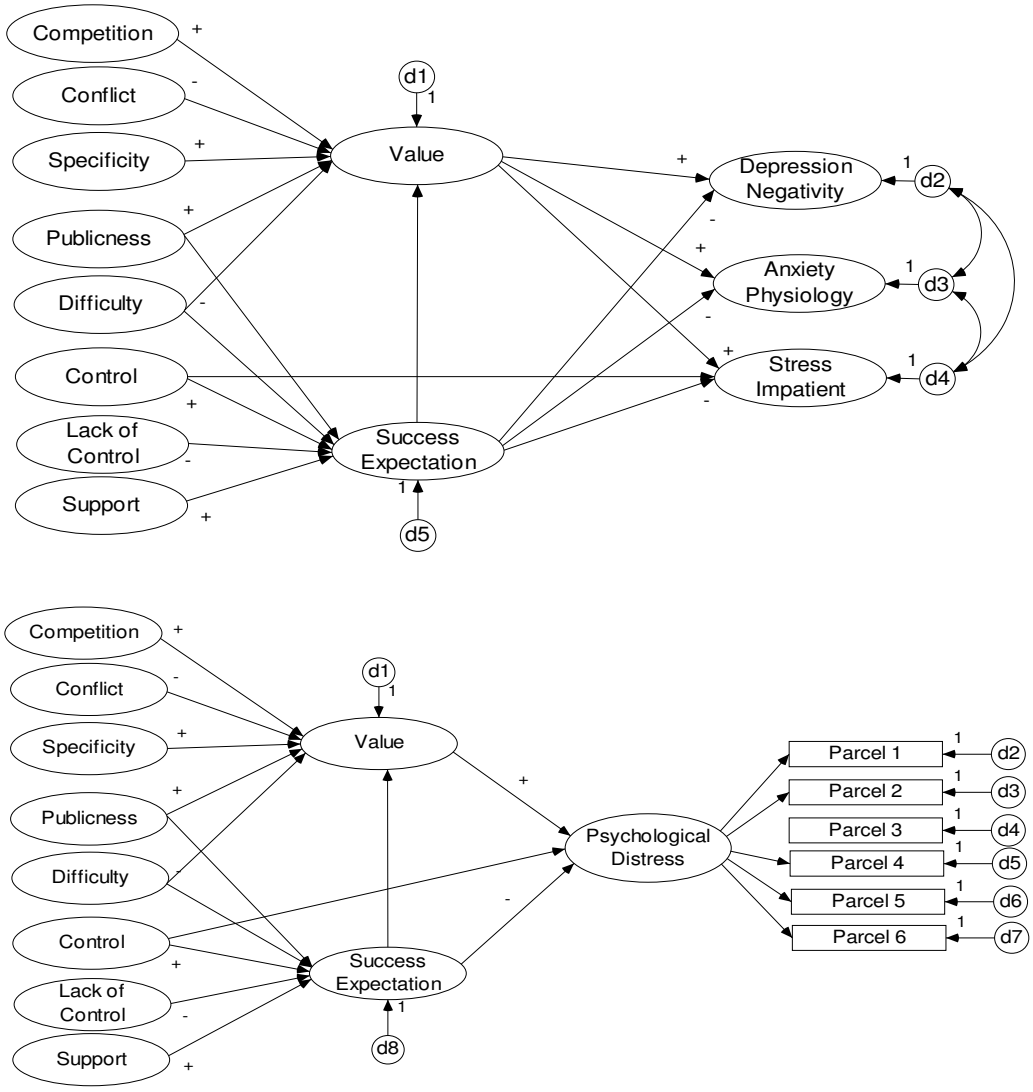

Figure 16. Final versions of Models 1a (Upper: Goal dimensions model and concurrently measured Depression, Anxiety, and Stress); and Model 1b (Lower: Goal dimensions model and concurrently measured Psychological Distress).

Goal dimensions and concurrent measures of psychological distress: Description of findings.

It had been anticipated that Success Expectation would fully mediate the influence of Difficulty, Control, Lack of Control, and Support on the measures of psychological distress. Similarly, it was expected that Value would fully mediate the influence of Competition, Conflict, Specificity, and Publicness on the same measures of psychological distress. These proposed relationships were mostly supported in the

in the final versions of the Models 1a and 1b. For example, it was concluded that the positive relationship observed in the correlation matrix (see Table 26) between Lack of Control and Depression Negativity at Time 1 was fully mediated by Success Expectation because the model was found to be correctly specified with the path between Lack of Control and Depression fixed at zero.

Two examples of partial mediation were observed. Initially, the paths from Control to Stress Impatient (Model 1a) and Control to Psychological Distress (Model 1b) were fixed at zero in the respective models. However, it was found that the same models were correctly specified when these paths (which proved to be statistically significant) were estimated. According to Lazarus and Folkman (1984), the experience of elevated stress levels is due to the perception that one does not have a sense of control over the personal resources to cope with the demands of a situation. Thus, it is reasonable to expect that when the participants perceived that they had less control over goal attainment, they would feel more impatient and more psychologically distressed.

Ingledew et al. (2005) also found that the full mediation model was not totally supported: Control and Support were found to have a direct and negative effect on depressive symptoms, and Competition was found to have a direct and positive effect on Anxiety. None of the additional direct effects reported by Ingledew et al. were observed in the current study.

The amount of variation in psychological distress explained by the models was much smaller in Model 1a compared to Model 1b. The goal dimensions specified explained 11% of the variance in Depressed Negativity, 5% of the variance in Anxiety Physiology, and 16% of the variance in Stress Impatient in Model 1a; and 30% of the variance of Psychological Distress in Model 1b.

Inspection of the path coefficients for the final version of Models 1a and 1b outlined in Table 31 revealed that impatience and psychological distress increased when goal value increased and perceived control over goal pursuit decreased. These findings are consistent with the findings reported by Lecci et al. (1994). Perceived control over goal pursuit was twice as important as goal value for predicting the participant's responses on the measures of impatience and general psychological distress scales. When the participant's score on the scale for Control increased by one point, the participant's score for the average of the three items measuring impatience reduced by .40 of a point.

Table 31.

Path estimates from final versions of Model 1a (Goal dimensions model and concurrently measured Depression, Anxiety, and Stress); and Model 1b (Goal dimensions model and concurrently measured Psychological Distress).

Outcome	Predictor	Models 1a / 1b		
		UC	SE	SC
Depression Negativity (Model 1a)	Value	.09	.05^{ns}	.15
	Success Expectation	-.24	.06*	-.38
Anxiety Physiology (Model 1a)	Value	.04	.04^{ns}	.09
	Success Expectation	-.11	.05*	-.26
Stress Impatient (Model 1a)	Value	.19	.07*	.23
	Success Expectation	.04	.11^{ns}	.05
	Control	-.40	.12*	-.44
Psychological Distress (Model 1b)	Value	.16	.05*	.27
	Success Expectation	-.10	.07^{ns}	-.16
	Control	-.32	.07*	-.50

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. * = significant effect, such that Critical Ratio (US/SE) > 1.96, $p<.05$. ns = not significant.

Further, the participants reported feeling less negative and less physiologically anxious when they had higher expectations of gaining a place at university. For example, when the participant's score on the scale of Success

Expectation increased by one point, their average score for the items measuring Depression Negativity decreased by .24 of a point. Ingledew et al. (2005) and Lecci et al. (1994) also found that positive expectancies of goal attainment were associated with fewer depressive symptoms. Unlike the findings by Pomerantz et al. (2001), greater goal value had little impact on the participant's physiological symptoms of anxiety.

MacKinnon et al. (2002) has suggested that it is essential for the demonstration of statistical mediation that the UC (unstandardised regression coefficient) for the direct effect between mediator variable and outcome be statistically significant. The results from observed in Table 31 indicated that this condition for statistical mediation was not clearly met for Models 1a and 1b. The UCs for the effects of Value on Depressed Negativity, Value on Anxiety Physiology and Success Expectation on Stress Impatient were not statistically significant for Model 1a. Similarly, the UC for the effect of Success Expectation on Psychological Distress in Model 1b was not statistically significant.

The total effect of the goal dimensions on the measures of psychological distress variables were reported in Table 32. Total effects reflected the nature of the direct effect (e.g., the effect of Conflict on Value) as well as any indirect effects observed in the model (e.g., the effect of Conflict on Stress via the effect of Conflict on Value). Success Expectation was the goal dimension that had the largest (and negative) influence on the participant's sense of negativity. Control had twice the influence of Value on participant's sense of impatience.

Table 32.

Standardised Total Effects for the final versions of Model 1a (Goal dimensions model and concurrently measured Depression, Anxiety, and Stress); and Model 1b (Goal dimensions model and concurrently measured Psychological Distress).

	Depression Negativity			Stress Impatient			Anxiety Physiology			Psychological Distress		
	UC	SE	SC	UC	SE	SC	UC	SE	SC	UC	SE	SC
Competition	.01	.01^{ns}	.01	.01	.01^{ns}	.02	.00	.00^{ns}	.01	.01	.01^{ns}	.02
Conflict	-.04	.02^{ns}	-.08	-.09	.03*	-.11	-.02	.02^{ns}	-.08	-.07	.02*	-.14
Publicness	-.02	.02^{ns}	-.03	.07	.03*	.11	-.01	.01^{ns}	-.03	.03	.02^{ns}	.07
Specificity	.01	.00^{ns}	.02	.01	.01^{ns}	.03	.00	.00^{ns}	.02	.01	.01^{ns}	.03
Lack of Control	.02	.01*	.06	-.01	.01^{ns}	-.04	.01	.00^{ns}	.07	.00	.01^{ns}	.01
Control	-.03	.02^{ns}	-.09	-.38	.11*	-.44	-.02	.01^{ns}	-.05	-.32	.07*	-.51
Difficulty	.10	.03*	.22	.03	.05^{ns}	.04	.05	.02*	.15	.07	.03*	.15
Feedback	.03	.01*	.06	-.02	.01^{ns}	-.10	.01	.01^{ns}	.05	.00	.01^{ns}	.01
Support	-.02	.02^{ns}	-.04	-.02	.02^{ns}	.06	-.01	.01^{ns}	-.03	.00	.01^{ns}	.00
Value	.09	.05^{ns}	.15	.19	.07*	.23	.04	.04^{ns}	.09	.46	.11*	.27
Success Expectation	-.19	.05*	-.32	.13	.11^{ns}	.15	-.09	.04*	-.22	-.02	.07^{ns}	-.04ns

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. * = significant effect, such that Critical Ratio (US/SE) > 1.96, $p<.05$. ns = not significant.

.

None of the goal dimensions had a substantial impact on the physiological symptoms of anxiety reported by the participants. Value (positive) and Control (negative) had the largest influence on the overall symptoms of psychological distress that the participants reported. The measures of psychological distress were influenced in a minor way by some of the goal dimensions. As expected, greater goal difficulty played a minor role in explaining more of the participants' general symptoms of psychological distress (Lecci et al., 1994; & Meyer, Beevers, & Johnson, 2004). Unexpectedly, the participants reported feeling less impatient and less generally psychologically distressed at the start of the academic year when they reported greater conflict between the goal of gaining a place at university and other important personal goals. The measures of Competition, Specificity and Support were found to have no significant influence on any of the psychological distress variables.

Most of the expected separate mediation effects proposed in Models 1a and 1b were supported in the final specification for these models. Some examples of partial mediation were observed. The goal dimensions outlined in the revised models for this part of the analysis explained a larger portion of concurrently measured psychological distress compared to the variance explained in the negativity associated with depression, physiological symptoms of anxiety, and impatience. Models 1a and 1b did not clearly meet a necessary condition for the double mediation model proposed by Ingledew et al. (2005) as one mediator – either Value or Success Expectation – did not strongly influence one of the psychological distress variables in Models 1a and 1b. Expectations of goal attainment, goal difficulty, perceived control over goal pursuit, and the value attached to the goal had the greatest influence (direct and total effects) on the concurrently assessed measures of psychological distress.

Gender and step 1 of the present study.

Models 1a and 1b were accepted as correctly specified for males and females. No substantial difference in model fit was observed when paths for the goal dimensions were systematically constrained to be equal for males and females. A summary of these findings are reported in Table 33. A full table of results for this analysis appears in Appendix 3.5. Some differences between males and females were observed. As noted in the highlighted areas of Table 33, the explained variance in Stress Impatient was larger for males (.20) compared to females (.12). The explained variance in Psychological Distress was larger for females compared to males (females = .33, and males = .23), as was the explained variance in Anxiety Physiology (females = .07, and males = .02).

Table 33.

Model fit of the final versions of Model 1a (Goal dimensions model and concurrently measured Depression, Anxiety, and Stress); and Model 1b (Goal dimensions model and concurrently measured Psychological Distress) for Males and Females.

Model	Correctly specified?	Details	*Model fit change after constraints?
Males	Yes	Model 1a: S-Bχ^2=35.96, *df*=33, *p* =.35; RMSEA=.03, *p* close =.69. Variance explained: Depression Negativity = .10, Stress Impatient=.20 and Anxiety Physiology=.02. Model 1b: S-Bχ^2=100.48, *df*=79, *p* =.05; RMSEA=.05, *p* close =.45. Variance Explained in Psychological Distress=.23.	No
Females	Yes	Model 1a: S-Bχ^2=27.06, *df*=33, *p* =.76; RMSEA=.00. *p* close =.95. Variance explained: Depression Negativity = .09, Stress Impatient=.12 and Anxiety Physiology=.07. Model 1b: S-Bχ^2=72.86, *df*=79, *p* =.67; RMSEA=.00, *p* close =.97. Variance Explained in Psychological Distress=33.	No

Note. N=103 for males, and 113 for females. *The question tested: Was there any statistically significant change in model fit after systematically constraining the paths estimated to equal for males and females. Highlighted areas indicated differences between males and females.

The UC for the effect of some of the predictor variables on outcome variables were statistically significant for one gender but not for the other gender. These results are reported in Table 34 (the full table for these results appears in Appendix 3.6). The

following influences were statistically significant for females only: the negative relationship between expectancy of goal attainment and physiological symptoms of anxiety; the negative relationship between lack of control and expectancy of goal success; and the positive relationship between the public commitments about goal pursuit and the personal value attached to the goal. Conversely, the positive influence of several of the measures – Control, Feedback, and Support – on Success Expectation was statistically significant for males only.

Table 34.

Statistically Significant Parameters for One Gender and not for the Other Gender after the final versions of Model 1a (Goal dimensions model and concurrently measured Depression, Anxiety, and Stress); and Model 1b (Goal dimensions model and concurrently measured Psychological Distress).

Outcome	Predictor	Gender	Model Parameters		
			US	SE	SC
Anxiety Physiology	Success Expectation	Males	-.04	.06^{ns}	-.11
		Females	-.13	.06*	-.32
Value	Publicness	Males	.09	.13^{ns}	.11
		Females	.31	.08*	.36
Success Expectation	Lack of Control	Males	-.06	.03^{ns}	-.14
		Females	-.18	.05*	-.35
	Control	Males	.24	.12*	.28
		Females	.07	.18^{ns}	.06
	Feedback	Males	-.25	.09*	-.37
		Females	-.08	.07^{ns}	-.10
	Support	Males	.26	.13*	.29
		Females	.04	.12^{ns}	.04

The variation in the measures for Anxiety Physiology and Stress Impatient for the female participants explained by the models was smaller than what was observed for the male participants. Despite the finding that Models 1a and 1b applied equally well to males and females, some of the antecedents to consequences of goal value and expectations of goal attainment varied substantially between males and females.

Mode of analysis and step 1 of the present study.

The parameters estimated in Models 1a and 1b were of greatest interest as the results of the S-R analysis should produce the least biased estimates for the parameters of the model compared to parameters estimated after a Path Analysis (Kline, 2005). What was also of interest in the current study was a comparison of the parameters estimated in a model where random error was accounted for– S-R analysis – and when random-error was not accounted for – Path Analysis. As no latent variables were specified in a Path Analysis, the results from the Path Analysis were comparable to the S-R analysis for Model 1a but not Model 1b.

The Path Analysis model that had been intended to be examined in the current analysis – Model 2 – is shown in Figure 17. It had been anticipated that the same items and the same scales would be used in the S-R and Path Analyses. However, the results of the OCM analysis for the GPQ indicated that some items were not indicators of the latent variable that the scale was designed to measure. For example, the Support scale was modelled based on the scale score for the four original scale items proposed by Ingledew et al. (2005). In contrast, only three items of the Support scale were used in the S-R analysis because the reverse scored item for this scale was dropped from the scale after the OCM analysis for the Support scale.

To remain consistent with the initial intention associated with this part of the analysis, unadjusted manifest variables were used in the Path Analysis. These variables represented the total scale scores for the variable without adjustment for the results of the OCM analysis for the GPQ. Using the same reasoning, the scores for the original 14 item scales for Depression, Anxiety, and Stress from the DASS-42 were included in Model 2 instead of the scores based on the revised scales for the DASS-42 developed as part of the present study.

It had been anticipated that the same variables would be represented in both the S-R and the Path Analysis. However, the results of the CFA analysis for the GPQ and the DASS-42 scales meant that changes were made for the S-R analysis. Specifically, five variables were removed from the Goal Dimensions model as proposed by Ingledew et al. (2005), and the Control variable was modelled as two variables. Further, the three revised scales – Depression Negativity, Anxiety Physiology, and Stress Impatient – were included as separate measures of psychological distress.

Therefore, two Path Analyses were conducted. Model 2 represented a model where random error was not modelled, and where the findings from the analysis of the measurement models for the scales to be used in a Path Analysis were not implemented. Model 3 (see Figure 18) was specified with the same variables and the same items used in Model 1a in order to examine the impact of not modelling random error in a model where the findings from an analysis of measurement models on the parameters were implemented prior to conducting a Path Analysis. For example, the two-item scales for In Control and Lack of Control were specified in Model 1a and Model 3. However, random measurement error was modelled in the S-R analysis for Model 1a but not in Model 3.

As reported in Table 35, Model 2 (see Figure 17) was not considered to be correctly specified until Modification Indices (MIs) were considered and the paths between Time and Stress and Tools and Depression were also estimated in the model. In addition, two other large MIs were observed between the Complexity and Value variables (which was also noted by Ingledew et al., 2005) and between the Personal Origin and Success Expectation variables. In contrast, Model 3 (see Figure 18) met the χ^2 model-fit criteria to be considered a correctly specified model as originally specified.

However, the model fit statistics for Model 3 were less supportive that the model was correctly specified compared to the model fit statistics reported for Model 1a.

Table 35.

Model fit results for Model 2(Path Analysis: Goal dimensions model, Depression, Anxiety, and Stress) and Model 3 (Path Analysis: Modified Goal dimensions model, Depression, Anxiety, and Stress).

Model details	Correctly specified?	Model fit and observations
Model 2	No	S-B χ^2=81.74, df=49, p=.00; RMSEA=.06, p close=.27. Large MIs were observed indicating that model fit would be improved significantly if the paths from Time to Stress and Tools to Depression were estimated. Additional large MIs indicated that model fit could be improved if the paths between the Complexity and Value (MI=11.56) variables and the Personal Origin and the Success Expectation (MI=18.50) variables were estimated.
Model 2 with addition of the direct effects from Time to Stress and Tools to Depression	Yes	S-B χ^2=63.48, df=47, p=.05; RMSEA=.04, p close=.70. Also, this revised model was a significantly better fit of the data than the initial version of Model 2, Δdf=2, Δ S-Bχ^2 = 14.79, p=.00.
Model 3	Yes	S-B χ^2=45.51, df=33, p=.07; RMSEA=.04, p close=.63. No significant MIs were observed

Note: CFIs >.95; SRMRs < .05; and GFIs > .95. *N*=216.

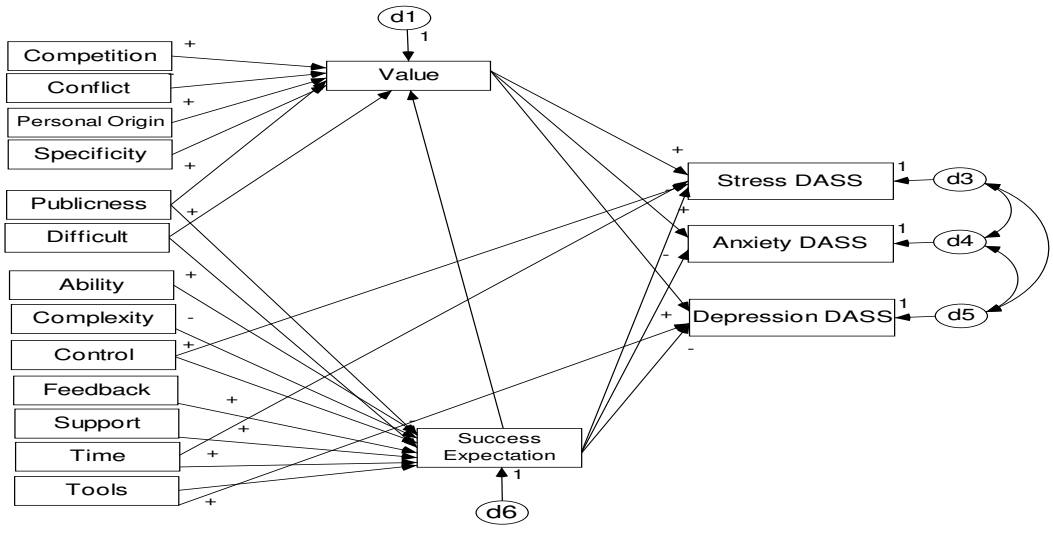

Figure 17. Model 2. (Path Analysis: Goal dimensions model, Depression, Anxiety, and Stress).

Note: A 'd' was used to indicate that a disturbance term was specified for a variable.

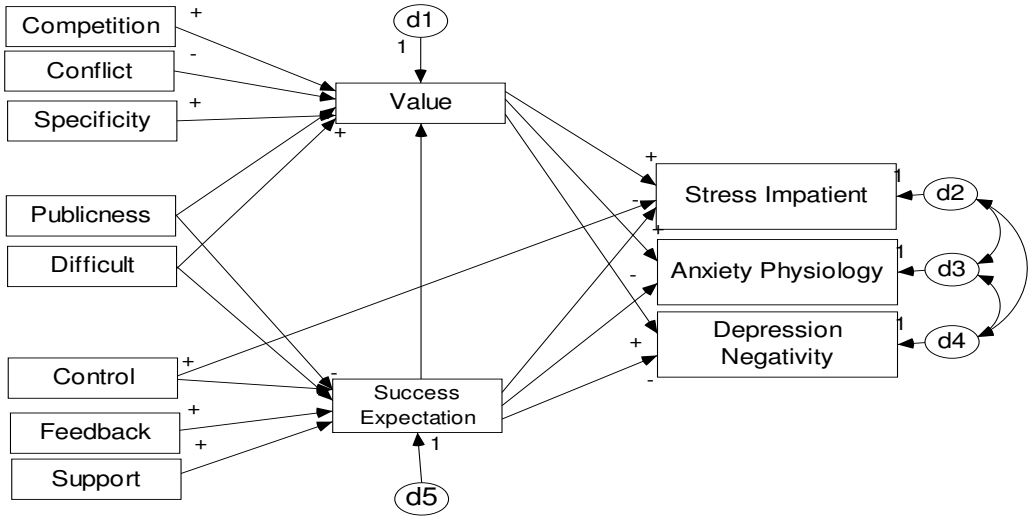

Figure 18. Model 3. (Path Analysis: Modified Goal dimensions model, Depression, Anxiety, and Stress).

The variance of Success Expectation and Value explained by the predictor goal dimensions was larger after Model 1a than after Model 2. The predictor goal dimensions explained 80% of the variance in Value and 75% of the variance in Success Expectation in Model 1a. The goal dimensions specified in Model 2 explained 71% of the variance in Value and 69% of the variance in Success Expectation in Model 2. The variance explained in the Value (65%) and Success Expectation (60%) variables for Model 3 was somewhat smaller than the findings from Model 1a.

The mode of analysis had little impact on the variation in the psychological distress variables explained by the models. Model 1a explained 11% of the variance in Depressed Negativity (6 items), 5% of the variance in Anxiety Physiology (five items), and 16% of the variance in Stress Impatient (three items). Model 2 explained 12% of the variance in Depression (14 item scale), 4% of the variance in Anxiety (14 item scale), and 12% of the variance in Stress (14 item scale). Model 3 explained 7% of the variance in Depression Negativity (6 item scale), 3% of the variance in Anxiety Physiology, and 9% of the variance in Stress Impatient.

Table 36.

Parameter Estimates for the Final Versions of Model 1a (Goal dimensions model and concurrently measured Depression, Anxiety, and Stress), Model 2(Path Analysis: Goal dimensions model, Depression, Anxiety, and Stress) and Model 3 (Path Analysis: Modified Goal dimensions model, Depression, Anxiety, and Stress).

Outcome	Predictor	Model 1a			Model 2			Model 3		
		UC	SE	SC	UC	SE	SC	UC	SE	SC
Value	Competition	.07	.05^{ns}	.07	.05	.04^{ns}	.05	.08	.04^{ns}	.08
	Conflict	-.46	.07*	-.51	-.32	.05*	-.36	-.40	.05*	.45
	Personal Origin	na	na	na	.28	.05*	.29	na	na	na
	Publicness	.24	.07*	.28	.22	.04*	.26	.25	.04*	.30
	Specificity	.07	.03*	.12	.07	.03*	.11	.09	.03*	.15
	Difficulty	.38	.07*	.48	.22	.04*	.28	.25	.04*	.32
	Success Expectation	.47	.11*	.45	.23	.06*	.23	.30	.06*	.30
Success Expectation	Ability	na	na	na	.44	.07*	.42	na	na	na
	Complexity	na	na	na	.00	.05^{ns}	.00	na	na	na
	Lack of Control	-.10	.03*	-.22	na	na	na	-.11	.02*	.23
	Control	.16	.11^{ns}	.15	.17	.07*	.15	.12	.05*	.12
	Difficulty	-.36	.05*	-.48	-.17	.05*	-.21	-.35	.04*	-.45
	Feedback	-.16	.06*	-.22	-.11	.04*	-.14	-.12	.04*	-.16
	Support	.11	.09^{ns}	.12	-.02	.06^{ns}	-.02	.06	.05^{ns}	.06
	Time	na	na	na	.02	.05^{ns}	.02	na	na	na
	Tools	na	na	na	.10	.07^{ns}	.10	na	na	na
	Publicness	.20	.06*	.25	.14	.05*	.17	.20	.04*	.24

Table 36 (continued).

Outcome	Predictor	Model 1a			Model 2			Model 3		
		UC	SE	SC	UC	SE	SC			
Depression variable	Value	.09	.05^{ns}	.15	.06	.04ns	.10	.05	.04ns	.09
	Success Expectation	-.24	.06*	-.38	-.13	.05*	-.21	-.18	.04ns	-.30
	Tools	na	na	na	-.14	.05*	-.23	na	na	na
Anxiety variable	Value	.04	.04^{ns}	.09	.06	.03*	.15	.01	.03ns	.03
	Success Expectation	-.11	.05*	-.26	-.12	.04*	-.29	-.08	.03*	-.18
Stress variable	Value	.19	.07*	.23	.16	.05*	.22	.16	.07*	.18
	Success Expectation	-.04	.11^{ns}	-.05	-.17	.06*	-.23	-.03	.07ns	-.04
	Control	-.40	.12*	-.44	-.05	.04ns	-.05	-.24	.06*	-.28
	Time	na	na	na	-.13	.04*	-.17	na	na	na

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. * = significant effect, such that Critical Ratio (US/SE) > 1.96, $p<.05$. ns = not significant. L Control = Lack of Control. Ingledew = Ingledew et al. (2005).

The relative importance of the direct effects observed in Table 36 between Models 1a, 2, and 3 were quite similar. For example, the Success Expectation and Difficulty variables had approximately twice the effect of other goal dimensions on Value in all three models. The magnitude for most of the other standardised coefficients for Models 1a, 2, and 3 were generally quite similar. However, the size of some of the direct effects of the predictor goal dimensions on Success Expectation and Value for Model 2 were observed in Table 36 to be up to 50% smaller for the same variables in Model 1a. The magnitude of standardised coefficients effects observed in Model 3 was generally smaller than the same effect reported for Model 1a.

Some differences in the standardised path coefficient estimates were observed for the prediction of the Stress variable across the three models. First, the negative influence of Control on Stress was much larger in Model 1a and Model 3 compared to Model 2. Second, the negative influence of Success Expectation on Stress was much smaller in Model 1a and Model 3 compared to Model 2. This finding was mostly attributed to the different measures for the Control variable used in the models. It was found that the participant's sense of control over goal pursuit is associated with fewer symptoms of stress when that sense of control over goal pursuit is assessed using positive-framed items rather than a mixture of positively and negatively framed items.

Overall, most of the parameters (variance explained and the path coefficients) estimated in Model 3 were mostly smaller than the same estimates in the same parameters after Model 1a. Also, the model fit statistics for Model 1a were more supportive of the conclusion that the model was correctly specified. As the only difference between Models 1a and 3 was that random error was accounted for in Model 1a but not in Model 3, it was concluded that modelling random error for Model 1a did

add substantially to the predictive power of the model and the researcher's confidence that the model was correctly specified.

While there were some notable differences, most of the parameters estimated in Model 2 were relatively similar to the same parameters estimated after Model 1a. However, two important benefits were noted for an S-R analysis (Model 1a) over a Path Analysis not adjusted for convergent validity, unidimensionality, and discriminant validity (Model 2). First, the findings from the S-R analysis were obtained with five fewer variables specified in the model and the use of 44 fewer items (20 items from the GPQ and 24 items from the DASS-42.). If the results from S-R analyses are considered to be more trustworthy results (Kline, 2005), then more trustworthy results can be gained more efficiently based on using smaller models and fewer responses by the participants.

Second, two MIs observed after the initial specification of Model 2 were interpreted as indicating measurement rather than a structural relationship between the variables. A large MI was observed indicating that model fit would be improved if a direct effect between the Complexity and Value variables was estimated in the model. However, the latent factors for the Complexity and Value scales were found to be highly correlated after step 2 of the CFA for the Goal Perceptions Questionnaire (GPQ). Also, a large MI indicated that model fit would be improved for Model 2 if the path from Tools to Depression was estimated. The latent factors for the Success Expectation and Tools scales were highly correlated after step 2 of the CFA for the GPQ. Given that the Success Expectation variable was also specified to have a direct effect on the Depression variable, it is suggested that the large MI between the Tools and Depression variables was indicative of the large latent-variable correlation between the Tools and Success Expectation scales.

When random error was modelled in an S-R analysis, almost all of the parameters were larger compared to the same parameters estimated in a Path Analysis where the variables used and the model specification were the same for both models. Two advantages were noted for modelling random error and taking into account findings about convergent validity, unidimensionality, and discriminant validity: the results from the S-R analysis were achieved using fewer variables; and large modification indices observed in a Path Analysis may be indicative of the large latent-variable correlations between the variables.

Step 2: Goal Dimensions, Stability of Psychological Distress, and Academic Performance.

Repeated measures ANOVA indicated that there were no significant differences between the Time 1 and Time 3 scores for Depressed Negativity, $F\ (1,215) = 2.09$, $p > .05$. Compared to what they reported at Time 1, the participants were, at Time 3, more physiologically anxious, $F\ (1,215) = 7.54$, $p < .05$, $\omega^2 = .02$, impatient, $F\ (1,215) = 4.18$, $p < .05$, $\omega^2 = .01$, and generally psychologically distressed, $F\ (1,215) = 8.11$, $p < .05$, $\omega^2 = .02$. The descriptive data are reported in Table 37.

Table 37.

Descriptive Data for the Psychological Distress Variables at Time 1 and Time 3.

	Time 1 (March / April)		Time 3 (September),	
	M	*SD*	*M*	*SD*
Depression Negativity	.26*	.42	.28	.56
Anxiety Physiology	.24	.31	.34	.51
Stress Impatient	.40	.64	.82	.83
Psychological Distress	.43	.37	.53	.52

* The mean score for each scale was calculated by averaging the participant's scores on the items for these scales divided by the number of items in the scale. For example, the score for the Depression Negativity scale was determined by calculating the mean and standard deviation for the participant's responses on the six items for this scale

Despite the statistical significance of these results, the reported effects were relatively small. It had been expected that symptoms of psychological distress would increase during the academic year in response to the academic demands of working towards gaining a place at university. What was found that was that there was little change in any of the measures of psychological distress during the course of the academic year.

Initial specification and model fit.

Separate models were specified for Depressed Negativity (Model 4a), Anxiety Physiology (Model 4b), Stress Impatient (Model 4c) and Psychological Distress (Model 4d) to examine the relationship between the goal dimensions outlined in the revised version of the Goal Dimensions model (Ingledew et al., 2005), the stability of self-reported symptoms of psychological distress between Time 1 and Time 3, and overall academic performance. A diagram for one of these models is shown in Figure 19. All models were accepted as being correctly specified without modification.

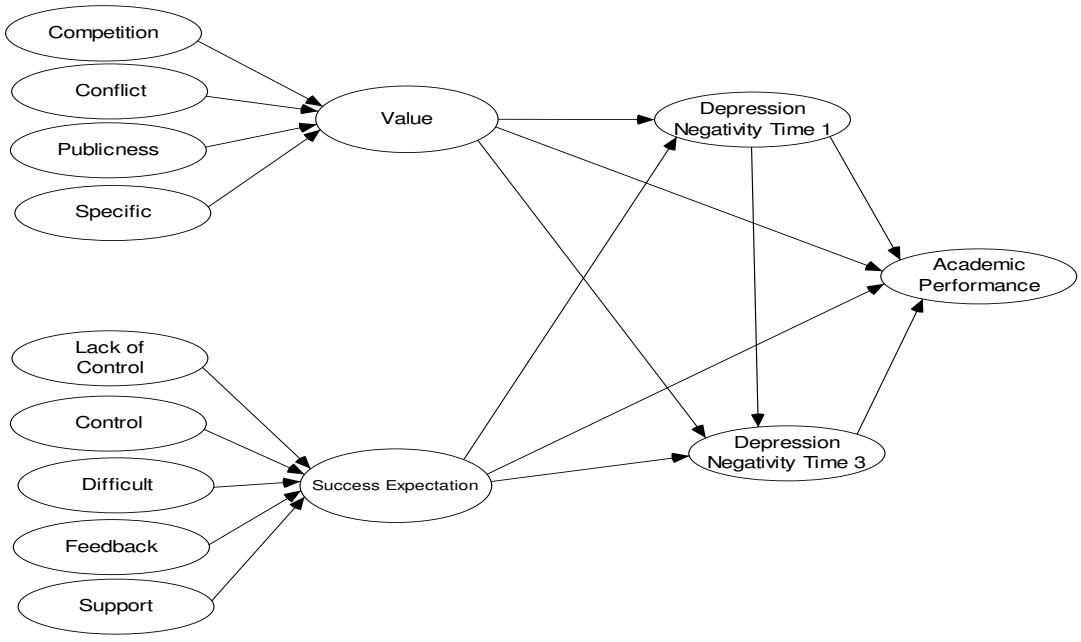

Figure 19. Model 4a: Goal dimensions model, stability of Depression, and Academic Performance.

Table 38.

Path Estimates for the Goal dimensions model, stability of Depression, Anxiety, Stress, and Psychological Distress, as well as Academic Performance.

Model	Correctly Specified?	Model Fit and observations**	Variance explained	Predictor	Model Parameters		
					UC	SE	SC
4a: Depression Negativity Time 3	Yes	S-Bχ^2=38.97, *df*=34, *p*=.26; RMSEA=.03, *p* close=.87.	Depression Negativity Time 3 = .29	Depressed Negativity Time 1	.66	.12*	.51
				Value	-.02	.05^{ns}	-.03
				Success Expectation	-.04	.05^{ns}	-.05
			Academic Performance = .31	Depressed Negativity Time 1	-2.67	10.68^{ns}	-.02
				Depressed Negativity Time 3	2.02	7.90^{ns}	.02
				Value	.06	6.95^{ns}	.00
				Success Expectation	48.55	8.11*	.56
4b: Anxiety Physiology Time 3	Yes	S-Bχ^2=39.23, *df*=33, *p*=.21; RMSEA=.03, *p* close=.84, after the addition of a direct effect from Conflict to Anxiety Physiology Time 3 (UC=.25, SE=.10; SC=.39).	Anxiety Physiology Time 3 = .22	Anxiety Physiology Time 1	.64	.18*	.36
				Value	.29	.09*	.41
				Success Expectation	-.01	.07^{ns}	-.01
			Academic Performance = .32	Anxiety Physiology Time 1	-14.07	14.31^{ns}	-.07
				Anxiety Physiology Time 3	10.82	8.36^{ns}	.09
				Value	-1.05	7.05	-.01
				Success Expectation	48.68	8.32	.56
4c: Stress Impatient Time 3	Yes	S-Bχ^2=35.56, *df*=33, *p*=.35; RMSEA=.02, *p* close=.91, after the addition of a direct effect from Control to Stress Impatient Time 3 (UC=-.50, SE=.13; SC=-.54).	Stress Impatient Time 3 = 24	Stress Impatient Time 1	.67	.13*	.50
				Value	.00	.11^{ns}	.00
				Success Expectation	.05	.10^{ns}	.04
			Academic Performance = .32	Stress Impatient Time 1	3.43	7.41^{ns}	.03
				Stress Impatient Time 3	2.80	5.32^{ns}	.04
				Value	-1.20	7.03^{ns}	-.01
				Success Expectation	49.83	8.07*	.57

Table 38 (continued)

Model	Correctly Specified?	Model Fit and observations	Variance explained	Predictor	Model Parameters		
					UC	SE	SC
4d: Psychological Distress Time 3	Yes	S-Bχ^2=241.37, *df*=200, *p*=.02; RMSEA=.03, *p* close=.99, after the addition of a direct effect from Control to Psychological Distress Time 3 (UC=-.32, SE=.07; SC=-.50).	Psychological Distress Time 3 = .30	Psychological Distress Time 1	.76	.11*	.54
				Value	.03	.06^{ns}	.02
				Success Expectation	-.01	.06^{ns}	-.01
			Academic Performance = .32	Psychological Distress Time 1	3.12	10.34^{ns}	.02
				Psychological Distress Time 3	5.55	7.16^{ns}	.05
				Value	-1.57	7.06^{ns}	-.02
				Success Expectation	51.16	8.36*	.59

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. *N*=216 for all models. * = significant effect, such that Critical Ratio (US/SE) > 1.96, *p*<.05. ns = not significant. ** All models were accepted as correctly specified.

Description of findings.

From the results outlined in Table 38, it can be seen that the variance in the measures of psychological distress completed at Time 3 ranged between 22% and 30%. Further, the best predictor of the various measures of psychological distress at Time 3 was the same measure of psychological distress at Time 1. For example, the best predictor of Depression Negativity at Time 3 was Depression Negativity at Time 1.

In general, the mediator variables in the model – Value and Success Expectation – had little impact on the measures of psychological distress at Time 3 when controlling for the same measures of psychological distress at Time 1. However, the participants who reported greater value attached to the goal of gaining a place at university reported more physiological symptoms of anxiety near the end of the academic year after accounting for the symptoms of anxiety reported by the participants near the beginning of the school year.

No other goal dimension was found to substantially influence any of the psychological distress measures. These findings confirm the findings reported by Pomaski et al. (2006) that goal difficulty had a limited impact on depressive symptoms over time. However, Pomaski et al.'s finding that a construct similar to expectations of success measured in this study (goal capability) had a negative impact on depressive symptoms over time was not matched in the current research.

The amount of variance in overall academic performance explained across all of the models was very consistent – between 31% and 32%. The relationships between the goal dimensions and overall academic performance are outlined in detail in Step 3 of the present analysis when the effects of goal progress and use of self-regulated learning strategies were added to the model.

Overall, the unique influence of the Depression Negativity and Anxiety Physiology, Stress Impatient, and Psychological Distress variables at Time 1 on overall academic performance was relatively minor in the present models. It was observed none of the UCs were statistically significant for the direct effects of the psychological distress variables measured at Time 1 or Time 3 on the participants' final academic performance. It was observed that, although statistically significant negative correlations between the Depression Negativity and Anxiety Physiology variables at Time 1 and overall academic performance were observed in Table 26, the relationships between the measures of Depression Negativity and Anxiety Physiology and overall academic performance were suppressed (that is, the UCs were not statistically significant) when estimated as part of the models described in Table 38. Overall, it was concluded that the results observed in the present study are consistent with previous research which indicated that the relationship between measures of psychological distress and academic achievement was minimal (Marcotte, Levesque, & Fortin, 2006) or, at best, indirect (Rapport et al., 2001).

There was almost no increase in any of the measures of psychological distress between Time 1 and Time 3. The best predictor of a measure of psychological distress at Time 3 was the same measure of psychological distress at Time 1. The Goal Dimensions model explained little of the variation in the measures of psychological distress near the end of the academic year after accounting for an assessment for the same measures of psychological distress completed near the beginning of the academic year. None of the measures of distress at Time 1 or Time 3 had a significant influence on overall academic performance.

Gender and step 2 of the present study.

As can be seen in Table 39, model fit statistics were similar to the overall results when the analyses were conducted for males and females separately. No systematic differences in model fit was observed when the structural paths for Models 4a, 4b, 4c, and 4d were systematically constrained to be equal for males and females (see Appendix 3.7 for details of this analysis).

Table 39.

Findings for the Revised Versions of Models 4a (Depression Negativity), 4b (Anxiety Physiology), 4c (Stress Impatient), and 4d (Psychological Distress) for Males and Females.

Model	Correctly specified?	Details	*Model fit change after constraints?
Males: 4a	Yes	S-Bχ^2=43.17, *df*=34, *p*=.13; RMSEA=.05, *p* close=.45. Variance explained: Depression Negativity at Time 3 = .29. Academic Performance = .31	No
Females: 4a	Yes	S-Bχ^2=33.50, *df*=34, *p*=.49; RMSEA=.00, *p* close=.84. Variance explained: Depression Negativity at Time 3 = .28. Academic Performance = .31	No
Males: 4b	Yes	S-Bχ^2=32.77, *df*=34, *p*=.52; RMSEA=.00, *p* close=.84. Variance explained: Anxiety Physiology at Time 3 = .08. Academic Performance = .34	No
Females: 4b	Yes	S-Bχ^2=39.45, *df*=34, *p*=.24; RMSEA=.04, *p* close=.63. Variance explained: Anxiety Physiology at Time 3 = .14. Academic Performance = .32	No
Males: 4c	Yes	S-Bχ^2=34.67, *df*=33, *p*=.39; RMSEA=.02, *p* close=.74. Variance explained: Stress Impatient at Time 3 = .30. Academic Performance = .34	No
Females: 4c	Yes	S-Bχ^2=30.19, *df*=33, *p*=.67; RMSEA=.00, *p* close=.89. Variance explained: Stress Impatient at Time 3 = .23. Academic Performance = .31	No
Males: 4d	Yes	S-Bχ^2=211.51, *df*=200, *p*=.27; RMSEA=.03, *p* close=.95. Variance explained: Psychological Distress at Time 3 = .15. Academic Performance = .34	No
Females: 4d	Yes	S-Bχ^2=229.14, *df*=200, *p*=.08; RMSEA=.04, *p* close=.86. Variance explained: Psychological Distress at Time 3 = .35. Academic Performance = .31	No

Note. N=103 for males, and 113 for females. * Was there a statistically significant change in model fit after systematically constraining the paths in each model to be equivalent for males and females. Noteworthy differences between males and females highlighted in grey.

Some minor differences in the parameters estimated in these models were observed. As noted in Table 39, the variance in the physiological symptoms of anxiety (.08) and general psychological distress (.15) at Time 3 for males was much smaller than what was observed in the overall model for anxiety (.22) and overall psychological distress (.30) at Time 3. The magnitude of the SCs (standardised coefficients) for most of the effects in each of Models 4a, 4b, 4c, and 4d were very similar for males and females (see Appendix 3.8 for full details). Unexpectedly, as expectations of goal attainment increased at Time 1, males reported feeling more impatient at Time 3 while controlling for impatience reported at Time 1. This effect was not observed in females (see Table 40 for details.).

Table 40.

Model Parameters Where Parameters were Statistically Significant for One Gender and not for the Other Gender in Models 4a (Depression Negativity), 4b (Anxiety Physiology), 4c (Stress Impatient), and 4d (Psychological Distress).

Model	Outcome	Predictor	Gender	Model Parameters		
				US	SE	SC
4c	Stress Impatient Time 3	Success Expectation	Male	.29	.14*	.24
			Female	-.04	.13ns	-.04

The pattern of results for Models 4a, 4b, 4c, and 4d were very similar for males and females. Some minor differences between males and females were noted in the variance explained by the models for the measures of Anxiety Physiology and Psychological Distress. As expectations of success increased for the male participants (but not the female participants), they reported feeling more impatient towards the end of the academic year compared to how they felt at the beginning of the academic year.

Step 3: Longitudinal Consequences of Goal Dimensions: Goal Progress, Self-Regulated Learning, Psychological Distress and Academic Performance

Model specification, estimation of model fit, model re-specification, and re-estimation of model fit.

The purpose of this part of the S-R analysis was to examine the relationship between goal dimensions outlined in the revised Goal Dimension model (Ingledew et al., 2005) assessed near the beginning of the academic year and the symptoms of psychological distress reported near the end of the academic year as well as the participants' overall academic performance. The results from two versions of this S-R analysis were analysed depending on how psychological distress, as measured by the DASS-42 (Lovibond & Lovibond, 1995), was specified. In Model 5, psychological distress was specified as the 16 item, three-factor model. In Model 6, psychological distress was specified as the 37 item, one-higher-order-factor model.

Models 5 and 6 can be understood as a series of mediation models. In Model 5 for example, it had been anticipated that the direct effect of the predictor goal dimensions (e.g., Competition) on Depression Negativity would be zero, and the effect of the predictor goal dimensions on Depression Negativity would be fully explained (that is, indirect) by the effect of the predictor goal dimensions on the mediator goal dimensions (e.g., Value) and the effect of the mediator goal dimensions on Depression Negativity. Similar mediation effects were specified for the effect of the predictor goal dimensions on Anxiety Physiology, Stress Impatient, Progress, the measure of self-regulated learning strategies (Self, Study, and Time Management: SSTM) and Academic Performance.

The Progress factor was modelled using the two-item scale that remained after the results from the measurement section of the current analysis. The Progress factor was modelled as homogeneous parcels adjusted for random error. Self-regulated learning was represented in the model by the revised Self, Study, and Time Management (SSTM) scale, which included the positively-phrased items from the Effort as well as the Time and Study Environment scales from the MSLQ-SRL (Pintrich et al., 1991).

The measures for Progress and SSTM were specified as intermediate variables completed near the mid-point of the academic year. The Progress and SSTM variables were expected to have a unique effect on Academic Performance and the various measures of psychological distress. It was for this reason that the mediator variables in the goal dimensions model – Success Expectation and Value – were specified as having a direct effect on Progress and SSTM as well as having a direct effect on the psychological distress variables and Academic Performance. The paths between the psychological distress variables measured at Time 3 and overall academic performance was also estimated in Models 5 and 6.

The final versions of Model 5 and Model 6 – models 5c and 6c (see Figure 20) – were found to be correctly specified when the paths from Feedback and Specificity to Academic Performance and from Control to SSTM were estimated in Models 5c and 6c; and when the path from Conflict to Psychological Distress was estimated in Model 6c. The process for arriving at these models is described in Table 41. All path estimates are presented in Table 42.

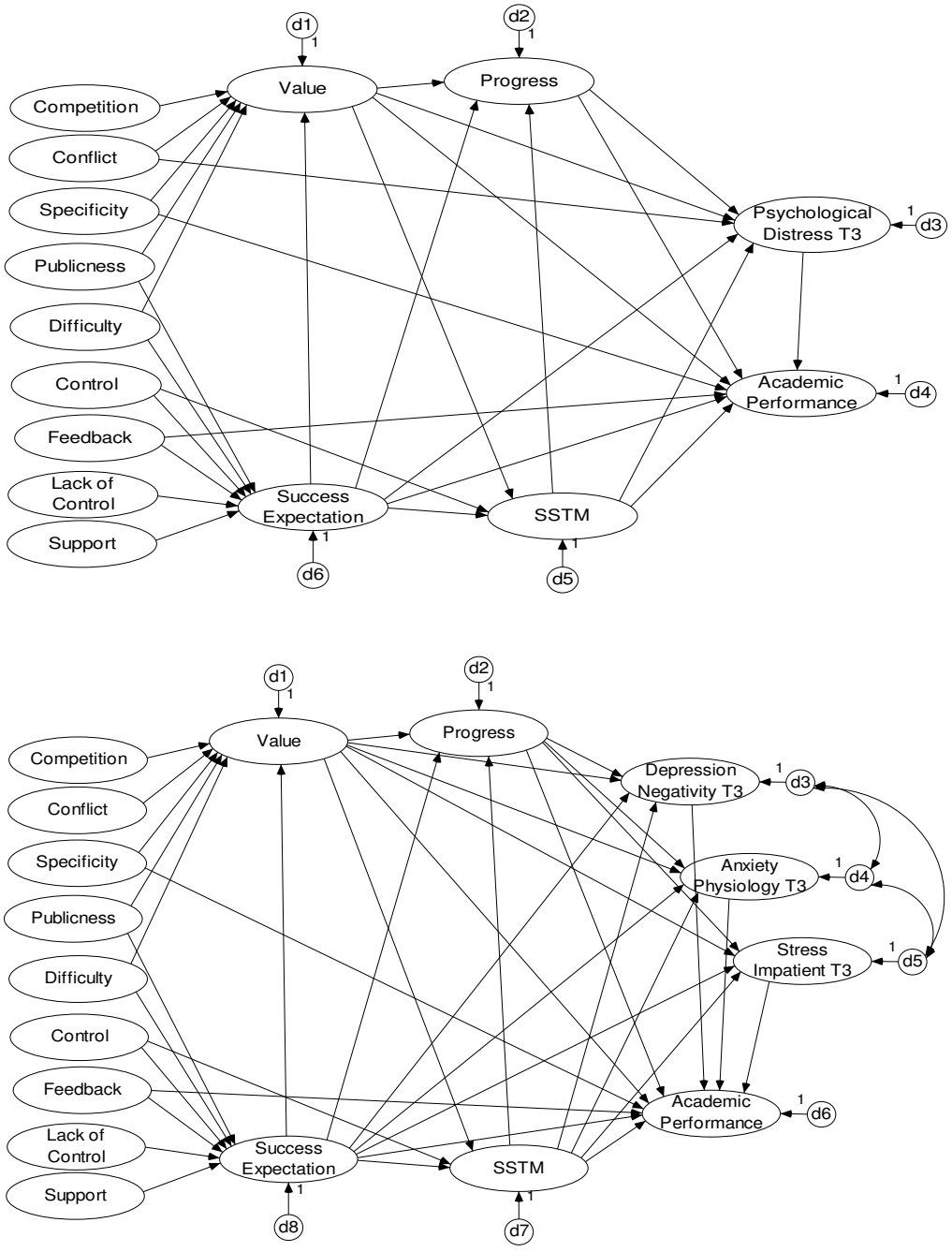

Figure 20. Model 5c (Upper: Goal Dimensions model; Progress; Self, Study, and Time Management – SSTM; Depression Negativity; Anxiety Physiology; Stress Impatient; and Academic Performance) and Model 6c (Lower: Goal Dimensions model; Progress; SSTM; Psychological Distress; and Academic Performance).

Table 41.

Model fit results for the Initial and Final Versions of Model 5 (Goal Dimensions model; Progress; Self, Study, and Time Management; Depression Negativity; Anxiety Physiology; Stress Impatient; and Academic Performance) and Model 6 (Goal Dimensions model; Progress; Self, Study, and Time Management; Psychological Distress; and Academic Performance).

Model	Correctly specified?	Model fit and observations
Model 5	Yes	S-B χ^2=88.69, *df*=61, *p*=.01; RMSEA=.05, *p* close=.61. Statistically significant Modification Indices (MIs) indicated that model fit could be improved when the effect of Specificity, Control, Difficulty, Feedback and Support on Academic Performance and the effect of Control to SSTM were estimated. With these effects added the model, the model fit was superior. These paths were added to the model as Model 6a.
Model 5b	Yes	S-B χ^2=57.27, *df*=55, *p*=.01; RMSEA=.05, *p* close=.63. The unstandardised coefficients (UCs) for the effect of Specificity on Academic Performance (-8.82, S.E. =3.20) and Control on SSTM (.58, S.E. =.18) were statistically significant. The UC for Feedback on Academic Performance approached statistical significance (-10.69, S.E. =5.89). The effects of Control, Difficulty, and Support on Academic Performance were not statistically significant. Therefore, the effects of Specificity and Feedback on Academic Performance and Control on SSTM were retained in Model 6b.
Model 5c	Yes	S-B χ^2=57.18, *df*=58, *p*=.47; RMSEA=.00, *p* close=.99. The effect of Feedback on Academic Performance in this model was statistically significant (see Table 42). Model 6a was a significantly better fit of the data than Model 5, *Δdf*=4, Δ S-Bχ^2 = 35.14, *p*=.00; and was not a worse fit of the data than model 5b, *Δdf*=3, Δ S-Bχ^2 = 2.54, *p*=.47.
Model 6	Yes	S-B χ^2=162.54, *df*=122, *p*=.01; RMSEA=.04, *p* close=.87. Statistically MIs were observed indicating that model fit would be improved significantly if paths from Conflict to Psychological Distress, Specificity, Control, Difficulty, Feedback and Support to Academic Performance, and Control to SSTM were estimated. These paths were added as Model 6a.
Model 6b	Yes	S-B χ^2=129.80, *df*=115, *p*=.16; RMSEA=.02, *p* close=.99. The effect of Conflict on Psychological Distress approached statistical significance, US = .23, S.E. = .12. The pattern of the effects of Specificity, Control, Difficulty, Feedback and Support to Academic Performance, and Control to SSTM observed in Model 5. Therefore, the effects of Conflict on Psychological Distress, Specificity and Feedback on Academic Performance and Control on SSTM were added to the model as Model 6b.
Model 6c	Yes	S-B χ^2=129.07, *df*=118, *p*=.23; RMSEA=.02, *p* close=1.00. The effect of Conflict on Psychological Distress, Specificity and Feedback on Academic Performance and Control on SSTM were statistically significant (see Table 42). Model 6b was a significantly better fit of the data than Model 6, *Δdf*=4, Δ S-Bχ^2 = 38.90, *p*=.00, and was not a worse fit of the data than Model 6a, *Δdf*=3, Δ S-Bχ^2 = 1.35, *p*=.72.

Note: SE= standard error. CFIs >.95; SRMRs < .05; and GFIs > .95. *N*=216. SSTM = Self, Study, and Time Management.

Table 42.

Path Estimates after Model 5c (Goal Dimensions model; Progress; Self, Study, and Time Management; Depression Negativity; Anxiety Physiology; Stress Impatient; and Academic Performance) and Model 6c (Goal Dimensions model; Progress; Self, Study, and Time Management; Psychological Distress; and Academic Performance).

Outcome	Predictor	Overall		
		UC	SE	SC
Depression Negativity Time 3 (Model 5c)	Value	.08	.08^{ns}	.10
	Success Expectation	-.16	.09^{ns}	-.21
	Self, Study, and Time Management	-.10	.05^{ns}	-.18
	Progress	-.03	.07^{ns}	-.05
Anxiety Physiology Time3 (Model 5c)	Value	.16	.06*	.23
	Success Expectation	-.10	.09^{ns}	-.14
	Self, Study, and Time Management	-.10	.05*	-.20
	Progress	-.02	.07^{ns}	-.03
Stress Impatient Time 3 (Model 5c)	Value	.20	.13^{ns}	.17
	Success Expectation	-.03	.13^{ns}	-.02
	Self, Study, and Time Management	-.18	.08*	-.20
	Progress	-.07	.10^{ns}	-.07
Psychological Distress Time 3 (Model 6c)	Value	.37	.11*	.45
	Success Expectation	-.17	.10^{ns}	-.20
	Conflict	.23	.11*	.31
	Progress	-.01	.07^{ns}	-.01
	Self, Study, and Time Management	-.15	.06*	-.26

Table 42 (continued).

Outcome	Predictor	Overall		
		UC	SE	SC
Self, Study, and Time Management [a]	Value	.42	.14*	.30
	Success Expectation	-.25	.18[ns]	-.17
	Control	.57	.18*	.38
Progress [a]	Value	-.17	.09[ns]	-.15
	Success Expectation	.62**	.10*	.52
	Self, Study, and Time Management	.34	.07*	.37
Academic Performance [a]	Value	6.75	6.82[ns]	.08
	Success Expectation	30.80	7.66*	.35
	Progress	34.24	5.91*	.46
	Self, Study, and Time Management	1.68	4.87[ns]	.03
	Specificity	-10.10	3.25*	-.19
	Feedback	-14.16	3.51*	-.21
	Depressed Negativity	4.31	6.29[ns]	.04
	Anxiety Physiology	15.06	6.54*	.12
	Stress Impatient	7.72	4.46[ns]	.10
	Psychological Distress	10.18	6.07[ns]	.10

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. * = significant effect, such that Critical Ratio (US/SE) > 1.96, $p<.05$. ns = not significant. [a] indicates that the results from Model 5 are reported because the results from Model 5c and 6c were almost identical.

** The direct relationship between the Success Expectation and Progress variables was large. This relationship was attributed to a structural rather than a measurement relationship because the latent variable correlation between the two factors was sufficiently small that discriminant validity was demonstrated, S-B χ^2=13.99, *df*=8, p=.08; RMSEA=.06, p close=.99, N =216; latent r = -.63; discriminant validity was established, as A (AVE for Success Expectation =.66 and for Progress =.69) > B (R^2=.31).

Description of findings.

Most of the anticipated separate mediated relationships were observed for the impact of the other goal dimensions outlined in the revised Goal Dimensions model on overall academic performance, use of self, study, and time management strategies, beliefs about goal progress, and the measures of psychological distress. For example, it observed that Value fully mediated the effect of Conflict on Academic Performance. It was concluded that the statistically negative correlation between goal conflict and overall academic performance reported in Table 26 was fully accounted for by the proposed Conflict-Value-Academic Performance mediation model because models 5c and 6c were found to be correctly specified with the path between goal conflict and overall academic performance fixed at zero.

Partial mediation was observed for some predictor goal dimensions in the results for the Goal Dimensions model at this point of the analysis. It was found that Models 5c and 6c were correctly specified with the following paths were estimated as part of these models: Specificity and Feedback to Academic Performance; Conflict to Psychological Distress; and Control to Self, Study, and Time Management (SSTM). These paths were retained in Models 5c and 6c because model fit improved when this path was estimated, and the UC for the added path was statistically significant. The substantive reasons for allowing these paths to be estimated in the models will be discussed in the context of the overall findings for each model.

The amount of variance explained in the measures of psychological distress by the variables in the model was much smaller for Model 5c compared to Model 6c. The variables in Model 5c explained 8% of the variance in Depression Negativity, 7% of the variance in Stress Impatient, and 7% of the variance in Anxiety Physiology

at Time 3. The variables in Model 6c explained 16% of the variance in Psychological Distress at Time 3. The variances explained in the other outcome variables in the model were much larger than the variance explained in the psychological distress variables. In the case of Models 5c and 6c, the variables explained 39% of the variance in Progress, 21% of the variance in Self, Study, and Time Management (SSTM), and 53% (Model 5c) and 51% (Model 6c) of the variance in Academic Performance.

The path coefficients for the final versions of Model 5c and 6c are reported in Table 42. Symptoms of negativity at the end of the school year were relatively unaffected by any of the goal dimensions measured near the start of the school year. In line with findings of Pomerantz, Saxon, and Oishi (2000) and the predictions of Karoly (1999), it was observed that physiological symptoms of anxiety and general psychological distress at the end of the academic year were higher when goal value was higher near the start of the academic year. The participants were less physiologically anxious, impatient, and psychologically distressed when the participants made greater use of self-regulated learning strategies (as measured by the items for the revised Self, Study, and Time management scale) reported near the middle of the year.

Psychological distress was greater at the end of the year when goal conflict was higher at the start of the year, and use of self-regulated learning strategies was lower when assessed near the middle of the school year. As the correlation between Conflict and Psychological Distress (.15) was not statistically significant in Table 26, it was observed that the unique relationship between goal conflict and general psychological distress in the S-R analysis was suppressed in the correlation matrix.

The expected negative relationship between greater goal progress and symptoms of psychological distress (Brunstein, 1993; Carver & Scheier, 1990, 2000; Koestner et al., 2002; Jackson et al., 2002; Lecci et al., 1994; Pychyl & Little, 1998; Samela-Aro, 1991; Wallinius, 1991) that was observed in Table 26 was suppressed in Models 5c and 6c. That is, greater beliefs about goal progress were found not to have a substantial unique effect any of the measures of psychological distress in context of how goal progress was modelled in the present study. Beliefs about goal progress have generally been assessed concurrently with other goal dimensions in previous studies. Therefore, it is possible that the perceived progress assessed during the process of goal pursuit may not have any additional and unique influence on psychological distress near to the end of goal pursuit.

In addition to the relationship between goal dimensions and measures of psychological distress, the goal dimensions outlined in Models 5c and 6c were also expected to influence other outcomes in these models. As expectations of goal attainment increased, beliefs about goal progress reported some two months later were greater. When self, study, and time management strategies were reported to be higher near the middle of the academic year, goal value near the start of the year was also higher. An increase of one point on the goal value scale was associated with an increase of .42 of a point on the average score for the SSTM scale. These findings are consistent with previous research (Pintrich & De Groot, 1990; Van Zile-Tamsen, 2001).

The most important predictor of overall academic performance was beliefs about goal progress. For every one point increase in perceived progress, overall academic performance increased by 34.24 marks. As suggested by Locke and Latham (2002), greater perceived goal progress was observed in this study to have a

positive impact on overall academic performance. It was concluded that the addition of the Progress variable made the greatest contribution to the improvement in academic performance explained by the models at Step 3 of the present study. The variance in academic performance explained at Step 3 of the current analysis was at least 19% greater compared to the results at Step 2 of the present study, and the relative impact of the other variable added at Step 3 of the present analysis – use of self, study, and time management strategies – was relatively minor.

Academic performance was also substantially higher when expectations of goal attainment were higher. This observation was consistent with the findings of White (2005) and the interpretation of Wigfield and Eccles (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) work outlined in the present study. As the participants' expectations of gaining a place at university increased by an average of one point on the four items of the scale, academic performance was 30.80 marks greater.

As teacher feedback on progress towards goal attainment and goal specificity increased by an average of one point for each scale, academic performance declined by 14 and 10 marks respectively. It was observed that the unique influence of Specificity and Feedback variables on overall academic performance was suppressed in the correlation matrix reported in Table 26. The direct effects of the Specificity and Feedback variables on overall academic performance in the present S-R analyses were substantial and negative when the correlations between Specificity ($r = .03$) as well as Feedback ($r = -10$) and Academic Performance were not statistically significant.

The findings from the current study that goal specificity had a negative impact on overall academic performance was negative was not consistent with

research outlined by Locke and Latham (2002) who have consistently found that performance will increase on tasks when the participant sets or chooses a specific goal. The observation that academic performance decreased when the participants perceived that they were receiving greater amounts of feedback from teachers indicates that, while feedback may be essential for learning (Mory, 1992), it was found in the current study that the perception that a person is receiving a large amount of feedback from teachers had a detrimental impact on overall academic performance.

Use of self, study, and time management strategies increased when goal value and perceived control over goal pursuit were greater. As noted earlier, the work of Wigfield and Eccles (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) was interpreted as indicating that greater goal value would have a positive influence on academic behaviours. Other researchers have observed that greater personal involvement in the process of academic achievement has been linked with better academic outcomes (Perry et al., 2001; Schmidt & Skinner, 1993).

While the effect of Value on psychological distress at Time 3 was noted earlier as not being positive and statistically significant, greater goal value had an indirect and negative effect on physiological symptoms of anxiety and generalised psychological distress at Time 3. Greater goal value was linked with greater use of self, study, and time management strategies, and greater use of self, study, and time management strategies was associated with the participants feeling less impatient and feeling less psychologically distressed. The participants who reported greater effort at managing themselves, their study environment, and their time also reported making greater progress on their goal of gaining a place at university at the mid-point of the academic year.

The effect of one of the mediators in the Goal Dimensions model – Success Expectation and Value – was found not to be significantly related to at least one of the outcomes examined in Models 5c and 6c. For example, the influence of goal value on overall psychological distress was statistically significant. However, the impact of expectations of success measured at the start of the year was not statistically significant for any of the measures of psychological distress later in the year. This pattern was repeated for the prediction of Depression Negativity, Stress Impatient, Anxiety Physiology, Progress, self-regulated learning strategies, and academic performance. Therefore, one of MacKinnon et al.'s (2002) statistical conditions for the double mediation model proposed by Ingledew et al. (2005) for this step of the analysis was not met.

Three reasons are offered to explain why the proposed double mediation effect was not observed in the Steps 1 and 3 of the present study. Using the results from Step 3 of the present study as an example, the relationships between the mediator variables and the outcomes measured were suppressed in Models 5c and 6c. The negative correlation between the Value and Academic Performance variable at Time 3 was statistically significant (see Table 26) whereas the relationship between these variables was not statistically significant when estimated as part of the current models described in Table 42. What can be seen from an inspection of Table 26 was that the magnitude of the correlation between the Value scale and the Academic Performance variable (.31) was smaller than the correlations between the Success Expectation (.57), Publicness (.37), and Progress (.57) scales and the Academic Performance variable. It is suggested that the influence of goal value on academic performance was suppressed in the model because the unique effect of goal value on academic performance was accounted for by the much larger impact of the Success

Expectation, Progress, and Publicness variables in the Models 5c and 6c. Similar findings were observed for the relationship between expectations of goal attainment and self, study, and time management strategies as well as goal value and beliefs about goal progress.

A second reason why the impact of goal value on academic performance was found to be relatively small in the present study was that the data for this scale were highly skewed. Of the entire group of goal dimensions assessed in this study, goal value was most affected by a lack of normality – most of the participants reported that they place great value on gaining a place at university. A third reason that might explain why goal value had a limited impact on the findings across Steps 1 and 3 of the present study related to the outcomes of interest in the present study. Eccles and colleagues (Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) have maintained that task value was a more substantial predictor of enrolment intentions than academic performance.

The findings from the present study that the influence of goal value on academic performance was relatively minor compare to the influence of other goal beliefs on academic performance is entirely consistent with the suggestion made by Eccles and colleagues. Also, the research linking goal value and symptoms of psychological distress has not been consistent. Pomerantz et al. (2000) found that the impact of greater goal value on a measure of psychological distress was in-direct rather than direct. Ingledew et al. (2005) did not specify a relationship between goal value and negative affective states. Instead, Ingledew et al. found that goal value had a substantial influence on positive affect.

Variables other than the goal dimensions in Models 5c and 6c were specified to impact on overall academic performance and symptoms of psychological distress.

Only one of the psychological distress variables – physiological symptoms of anxiety – reported near the end of the academic year had any substantial impact on overall academic performance. Unlike the findings for Australian tertiary students (McKenzie, Gow, & Schwitzer, 2004), and previous research conducted with North American young secondary students (Pintrich & De Groot, 1990; Pokay & Blumenfield, 1990), greater use of self-regulated learning strategies had little unique effect on overall academic performance in this model. The relationship between the self-regulated learning strategy use and overall academic performance was suppressed in the present study as the correlation between these variables (see Table 26) was positive and statistically significant.

The total effects are reported in Table 43. Overall, Success Expectation, Value, Control, Difficulty, and Conflict were the goal dimensions that had the largest impact on all of the outcome variables assessed in the middle of the academic year and near the end of the academic year. Specifically, Success Expectation (negative) was the best predictor of Depression Negativity. Control (negative) was the only goal dimension to have a substantial impact on Stress Impatient. Value (positive) was found to have the largest influence on Anxiety Physiology. Difficulty (positive) and Value (positive) were the largest predictors of overall psychological distress. Success Expectation (positive) and Control (positive) had the most substantial influence on beliefs about goal progress. Value (positive) and Control (positive) were the best predictors of self-reported use self, study, and time management strategies. The goal dimensions for Success Expectation (positive), Feedback (negative), and Difficulty (negative) were the best predictors of overall academic performance.

Table 43.

Standardised Total effects for Model 5 (Goal Dimensions model; Progress; Self, Study, and Time Management; Depression Negativity; Anxiety Physiology; Stress Impatient; and Academic Performance) and Model 6 (Goal Dimensions model; Progress; Self, Study, and Time Management; Psychological Distress; and Academic Performance).

	Depression Negativity			Stress Impatient			Anxiety Physiology			Psychological Distress		
	UC	SE	SC	UC	SE	SC	UC	SE	SC	UC	SE	SC
Competition	.00	.00^{ns}	.00	.01	.01^{ns}	.01	.01	.01^{ns}	.01	.08	.05^{ns}	.03
Conflict	-.02	.03^{ns}	-.03	-.06	.05^{ns}	-.05	-.06	.02*	-.09	.08	.09^{ns}	.11
Publicness	-.02	.02^{ns}	-.03	.04	.03^{ns}	.04	.02	.02^{ns}	.04	.08	.04^{ns}	.11
Specificity	.00	.00^{ns}	.01	.01	.01^{ns}	.01	.01	.00^{ns}	.02	.02	.01^{ns}	.04
Lack of Control	.01	.01^{ns}	.04	.00	.01^{ns}	-.01	.00	.01^{ns}	.01	.00	.01^{ns}	.00
Control	-.08	.04*	-.10	-.11	.05*	-.09	-.07	.03^{ns}	-.09	-.09	.05^{ns}	-.10
Difficulty	.06	.03*	.11	.03	.06^{ns}	.04	.06	.03^{ns}	.10	.12	.04*	.18
Feedback	.02	.01^{ns}	.04	-.01	.01^{ns}	-.01	.00	.01^{ns}	.01	.00	.02^{ns}	.00
Support	-.02	.01^{ns}	-.02	.00	.01^{ns}	.00	.00	.01^{ns}	.00	.00	.01^{ns}	.00
Success Expectation	-.14	.06*	-.18	.04	.09^{ns}	.03	-.03	.06^{ns}	-.04	.01	.01^{ns}	.01
Value	.04	.06^{ns}	.05	.12	.12^{ns}	.11	.12	.05*	.18	.31	.11*	.38

Table 43 (continued).

	Progress [a]			Self, Study, and Time Management. [a]			Academic Performance [a]		
	UC	SE	SC	UC	SE	SC	UC	SE	SC
Competition	.00	.01[ns]	.00	.03	.02[ns]	.02	.63	.70[ns]	.01
Conflict	.02	.04[ns]	.02	-.19	.07*	-.15	-4.00	3.68[ns]	-.05
Publicness	.10	.04[ns]	.10	.09	.05[ns]	.07	12.81	3.27*	.18
Specificity	.00	.01[ns]	.00	.03	.02[ns]	.04	-9.47	3.02*	-.18
Lack of Control	-.05	.02*	-.10	.01	.02[ns]	.01	-5.32	1.62*	-.13
Control	.26	.10*	.21	.57	.16*	.37	13.43	6.47*	.14
Difficulty	-.20	.06*	-.22	.18	.08*	.16	-14.86	4.61*	-.22
Feedback	-.08	.03*	-.09	.01	.03[ns]	.01	-22.06	4.68*	-.33
Support	.03	.05[ns]	.05	-.01	.02[ns]	.00	5.67	4.69[ns]	.07
Success Expectation	.52	.10*	.44	-.05	.16[ns]	-.04	50.94	5.97*	.57
Value	-.05	.09[ns]	-.04	.42	.14*	.30	8.83	7.89[ns]	.10

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. * = significant effect, such that Critical Ratio (US/SE) > 1.96, $p<.05$. ns = not significant. [a] indicates that the values from Model 5c as the values after Model 6c were almost identical to these values.

Goal value and expectations of success variables mediated the influence of most of the other goal dimensions in the revised Goal Dimensions model (Ingledew et al., 2005) on many of the measures of psychological distress, goal progress, use of self-regulated learning skills (as measured by the revised Self, Study, and Time Management scale), and academic performance. Some examples of partial mediation were noted. The revised Goal Dimensions model explained more variation goal progress, use of self-regulated learning skills (when measured by the revised Self, Study, and Time Management scale), and final academic performance than was explained for all of the psychological distress variables. However, the double mediation model specified by Ingledew et al. was not fully supported because the effect of one of the proposed mediator variables – expectations of goal attainment and goal value – was not significantly related to one or more of outcome variables in the correctly specified versions of Models 5 and 6. Psychological distress near the end of the academic year was generally greater when goal value and goal conflict were greater near the beginning of the year. Conversely, fewer symptoms of psychological distress were reported near the end of the academic year when the participants reported making better use of self, study, and time management skills near the middle of the academic year.

The most important predictor of overall academic performance was beliefs about goal progress assessed near the middle of the academic year. With the addition of a variable measuring progress beliefs, more variance in academic performance was explained at Step 3 of the current analysis compared to Step 2. Academic performance was also greater when expectations of goal attainment were higher, the participants perceived that they were receiving less feedback from teachers about progress towards goal attainment, and the participants were less specific in their

thinking about the goal of gaining a place at university. Greater use of self, study, and time management strategies had relatively little influence on overall academic performance. Most of the measures of psychological distress assessed near the end of the academic year had little impact on overall academic performance.

Gender and step 3 of the present study.

It was concluded from the results described in Table 44 that Models 5c and 6c were correctly specified for males and females separately and when the covariance and structural relationships between the variables for these separate models were systematically constrained to be equal. The full details of this analysis appear in Appendix 3.9.

Some gender differences for Models 5c and 6c were observed. The amount of variance in the psychological distress variables, beliefs about goal progress and use of self, study, and time management strategies explained by Models 5c and 6c for females reported in Table 44 was twice that observed for males. Other gender differences are noted in Table 45. The full details of this analysis appear in Appendix 3.10. That SSTM had a negative impact on Stress Impatient and Psychological Distress was statistically significant for females but not males. What was not expected was the observation that a negative relationship was found between greater Success Expectation and use of self, study, and time management strategies for females and not for males. The earlier overall finding that greater specificity of goal pursuit was negatively related to overall academic performance was found to apply to females only.

Table 44.

Model fit statistics of Model5c (Goal Dimensions model; Progress; Self, Study, and Time Management; Depression Negativity; Anxiety Physiology; Stress Impatient; and Academic Performance) and Model 6c (Goal Dimensions model; Progress; Self, Study, and Time Management; Psychological Distress; and Academic Performance) for Males and Females.

Model	Correctly specified?	Details	*Model fit change after constraints?
Males	Yes	Model 5c: S-Bχ^2=54.63, *df*=58, *p* =.60; RMSEA=.00, *p* close =.93. Variance explained: Depression Negativity = .04, Stress Impatient= .05 and Anxiety Physiology= .04, Progress=.34; SSTM=.19; and Academic Performance = .52. Model 6c: S-Bχ^2=133.11, *df*=118, *p* =.12; RMSEA=.04, *p* close =.78. Variance explained: Psychological Distress = .12, Progress=.34; SSTM=.19; and Academic Performance = .51.	No
Females	Yes	Model 5c: S-Bχ^2=64.41, *df*=58, *p* =.26; RMSEA=.03, *p* close =.76. Variance explained: Depression Negativity = .17, Stress Impatient=.22 and Anxiety Physiology=.13, Progress=.47; SSTM=.31; and Academic Performance = .57. Model 6c: S-Bχ^2=144.04, *df*=118, *p* =.05; RMSEA=.04, *p* close =.63. This model was accepted as correctly specified (RMSEA criteria). Variance explained: Psychological Distress = .30, Progress=.47; SSTM=.30; and Academic Performance = .54.	No

Note. *N*=103 for males, and 113 for females. *The question tested: Was there any statistically significant change in model fit after systematically constraining the paths estimated to equal for males and females. SSTM = Self, Study, and Time Management. Substantial differences between males and females highlighted in grey.

Table 45.

Differences between males and females for Model5c (Goal Dimensions model; Progress; Self, Study, and Time Management; Depression Negativity; Anxiety Physiology; Stress Impatient; and Academic Performance) and Model 6c (Goal Dimensions model; Progress; Self, Study, and Time Management; Psychological Distress; and Academic Performance).

Outcome	Predictor	Male			Female		
		UC	SE	SC	UC	SE	SC
Stress Impatient Time 3 (Model 5c)	Self, Study, and Time Management	-.01	.08ns	-.02	-.37	.11*	-.43
Psychological Distress Time 3 (Model 6c)	Self, Study, and Time Management	-.09	.06ns	-.17	-.22	.08*	-.35
Self, Study, and Time Management [a]	Success Expectation	.06	.31[ns]	.04	-.50	.24*	-.37
Academic Performance [a]	Specificity	-8.57	5.84[ns]	-.14	-11.42	3.66*	-.25

Three important gender differences were observed. The models explained less variance in all of the psychological distress variables, beliefs about goal progress and use of self, study, and time management strategies. Greater expectations about goal attainment near the start of the academic year was found for females only to be negatively related to use of self, study, and time management strategies assessed near the middle of the academic year. Only the female participants were less impatient towards the end of the academic year if they reported greater use of self, study, and time management strategies near the middle of the academic year

CHAPTER 7. GENERAL DISCUSSION.

The aim of this present study was to apply and extend the Goal Dimensions model developed by Ingledew et al. (2005) to examine how beliefs about a personal goal (gaining a place at university) explained the symptoms of psychological distress, use of self-regulated learning strategies, and academic performance of tertiary-bound secondary students in their final year of secondary education. The beliefs associated with this personal goal were defined in the present study as goal dimensions (Austin & Vancouver, 1996).

Several refinements were made to the Goal Dimensions model for the present study. Based on a phenomenological version of the Hollenbeck and Klein's (1987) model for the predictors of goal commitment, Goal Dimensions model proposes that a number of goal dimensions were antecedents to expectations of goal attainment and goal value. As a result of examining convergent, unidimensionality, and discriminant validity of the scales of the Goal Perceptions Questionnaire (GPQ), almost all reverse-scored items were removed from the scales; and post-hoc changes were made to the scales for Control (two scales – In Control and Lack of Control), Publicness (two items instead of four items), and Progress (two items instead of four items).

Five scales – Ability, Complexity, Personal Origin, Time, and Tools – were not included in the version of the Goal Dimensions model that was used in the present study. These variables were redundant because the latent factors for these scales were highly correlated with the latent factors for other scales of the GPQ. The part of the Goal Dimensions model dealing with the prediction of goal value was largely unaffected by these results. However, of the five variables removed from the

Goal Dimensions model for the present study, four of those had been originally proposed by Ingledew et al. (2005) as factors that directly influenced expectations of goal attainment.

Ingledew et al. (2005) had also proposed that each of the predictors of goal value and expectations of goal attainment uniquely influenced expectations of goal attainment and goal value. What was found for the participants in the current study was that public intentions about pursuing a goal shaped expectations of goal attainment as well as the value attached to the goal; the perceived difficulty of the goal influenced the value attached to a goal as well as expectations of goal attainment; and expectations about goal attainment influenced the value attached to the goal.

The goal dimensions that were retained for the current analysis explained at least three quarters of the variation in the participants' scores on the scales for goal value and expectations of goal attainment. Greater value was attached to the goal of gaining a place at university when this academic goal conflicted less with other goals that the participants were pursing, the goal was perceived as being more difficult but also attainable, the participants were more specific in the academic goal that they were chasing (particularly for males), and the participants were more public about their intentions to achieve the goal.

The participants in this study believed that they were more likely to be successful at gaining a place at university if they were more public about their intentions to achieve the goal, the goal was perceived as being less difficult, the participants reported less lack of control of goal pursuit (particularly for females), and perceived that they had received less feedback from teachers about progress towards goal attainment (particularly for males).

In both the current study and in the findings reported by Ingledew et al. (2005), perceived competition to gain a place at university had little influence on the value that the participants attached to this academic goal. Also the influence of support from others for goal pursuit on expectations of goal attainment was minimal. However, it was found in the present study that expectations of gaining a place at university were higher when the males perceived that they had greater social support for pursing this goal.

The relative effects of the predictor goal dimensions on the expectations of goal attainment and goal value were substantially different in this study compared to the results reported by Ingledew et al. (2005). For the older adolescents in the current study, greater goal value was much more dependent on less conflict with other goals than what was observed for the adults in the Ingledew et al. study. Greater feedback from teachers reduced the expectations of the students that they would gain a place at university whereas greater feedback from supervisors enhanced expectations of goal attainment for the adult workers in the study by Ingledew et al.. Beliefs about personal control had little impact in the present study on the students' expectations that they would gain a place at university whereas control beliefs were a very important predictor of expectations for successful goal attainment for participants in the Ingledew et al. study.

These differences between the findings of the present study and the findings reported by Ingledew et al. on the relative importance of the factors described as predictors of goal value and expectations about goal pursuit may reflect the differing ways in which adolescents and adults think about achieving goals in educational and work settings. For example, the value that adolescents attach to an educational goal may depend more on the conflict that the educational goal has with other personal

goals than what is typically observed when adults pursue work goals. Similarly, students may interpret that they are getting a large amount of feedback from teachers as an indicator that they need substantial help in completing their studies and that they may not achieve their goal of gaining a place at university.

Model fit is a second reason that may explain the differences between the findings from the current research and the results reported by Ingledew et al. (2005). Ingledew et al. reported their findings after the model fit was observed to be reasonable (using RMSEA criteria). However, several paths were added to the model developed in the present study until the model was observed to be an exact fit of the data (using χ^2 criteria) or a close fit of the data (using RMSEA criteria). These additional paths were only retained after possible paths were identified from Modification Indices, substantive reasons for permitting the path to be estimated were considered, the magnitude of the paths were substantial, and the addition of the paths was associated with a significant improvement in model fit. If model fit had been improved by estimating additional paths for the Ingledew et al study, fewer discrepancies may have been observed between the findings from the current study and the results reported by Ingledew et al..

The remainder of the study concerned how well the Goal Dimensions model explained several psychological and educational outcomes for the participants in the present study. It had been intended that the relationship between the Goal Dimensions model and goal commitment would be examined as part of the present study. However, Confirmatory Factor Analysis for the GPQ revealed that the latent factors for the goal value and goal commitment scales were so highly correlated that one of the scales was redundant. Previous research had also found that goal value and goal commitment were highly related (Emmons, 1986, McGregor & Little,

1998). Goal value was retained for the remainder of the study as goal value had been specified as an important mediator in the Ingledew et al. (2005) model. Removing the goal commitment from the analysis meant that the relationship between the goal value and goal commitment could not be investigated.

The most likely explanation for the large correlation between the latent factors for the goal value and goal commitment scales of the GPQ observed in the present study was that, for the participants in the present study at least, goal value and goal commitment were interchangeable rather than separate constructs. If this finding is replicated with adults, the conclusion that goal value and goal commitment were highly related constructs rather than being separate but related constructs has important implications for the Hollenbeck and Klein (1987) model. Hollenbeck and Klein propose that goal commitment operates as a moderator of the goal difficulty and performance relationship, and that goal value (defined as goal attractiveness) is an antecedent to goal commitment. The findings from the current study indicate that it will be necessary to establish that goal value and goal commitment measure separate constructs before examining the influence of goal value on goal commitment and between goal commitment and other constructs like goal difficulty.

The prevalence rates based on the original items for the Depression Anxiety Stress Scale-42 (DASS-42: Lovibond & Lovibond, 1995) indicated that about one student in five who participated in the present study experienced mild to severe symptoms of depression, anxiety, and stress at either the beginning or the end of the academic year. There was good evidence to indicate that the Goal Dimensions model played an important role in predicting concurrently assessed measures of psychological distress. When measured together near the beginning of the school year, the Goal Dimensions model explained nearly a third of the variation in

symptoms of overall psychological distress but less variation in the participants' symptoms of negativity associated with depression, physiological symptoms of anxiety, and impatience. These findings were particularly pertinent for the female participants. The Goal Dimensions model was less effective at explaining symptoms of psychological distress over time, explaining about half of the variation in the participants' symptoms of psychological distress when the measures of psychological distress were completed approximately six months after the same measures were initially completed.

The Goal Dimension model explained little of the participants' reported symptoms of negativity associated with depression, physiological symptoms of anxiety, and impatience later in the academic year. It is likely that the Goal Dimensions model did not explain much of the growth of psychological distress between the beginning of the academic year and the end of the academic year because the participant's symptoms of psychological distress were highly stable across the course of the academic year. What was found in the present study was that the best predictor of psychological distress near the end of the academic year was psychological distress reported near the beginning of the academic year. While the final year of study for tertiary-bound secondary students places substantial demands on the students, it was unexpectedly observed that there was no substantial growth in psychological distress over the course of the year.

When measured concurrently, symptoms of depression were lower when expectations of goal attainment were higher, which was consistent with the findings of Lecci et al. (1994), Karoly and Ruehlam (1996), Ingledew et al. (2005), and Karoly et al. (2008). That greater goal value had a positive influence on how impatient, physiologically anxious, and generally distressed the participants felt is

consistent with the writings of Karoly (1999) and the findings of Pomerantz, Saxon, and Oishi (2000). The participants did report feeling less psychologically distressed when they felt more in control over goal pursuit. Similar findings were also reported by Karoly and Lecci (1993) and Lecci et al. (1994).

The finding that beliefs about goal progress did not have a unique effect on subsequent negative psychological states was not expected. Previous researchers in this area (Brunstein, 1993; Jackson et al., 2002; Lecci et al., 1994, Pychyl & Little, 1998, Salmela-Aro, 1991; Wallinius, 1991) have generally measured beliefs about goal progress concurrently with other goal dimensions. That approach is in contrast to the approach used in the current study where beliefs about goal progress were assessed during the process of goal pursuit. Therefore, when beliefs assessed may impact on the psychological consequences of beliefs about goal progress.

Overall, it was concluded that beliefs about academic goals play some role in explaining the level of psychological distress experienced by Australian adolescents focused on gaining a place at university, particularly when the measures of goal dimensions and a measures of general psychological distress are completed at the same time. This finding was especially apparent for the female participants in the present study.

However, substantial amounts of variation in the measures of psychological distress remained unexplained by beliefs associated with gaining a place at university. Therefore, other personal and environmental factors which have been outlined as important factors in the aetiology of depression (Hyde, Mezulis, & Abramson, 2008) and anxiety disorders (Barlow, 2000) are likely to be highly influential in explaining the psychological distress experienced by these young people, and particularly when psychological distress is measured using scales that

assess relatively unique aspects of psychological distress (such as depressed negativity and physiological symptoms of anxiety) and as the psychological distress develops over time.

The goal dimensions measured near the beginning of the academic year had a substantial influence on the academic outcomes examined in this study, explaining nearly half of the variation in scores for overall academic performance and approximately one-fifth of the variation in scores for use of self, study, and time management strategies (as a measure of self-regulated learning) measured near the middle of the academic year.

The participants' belief assessed near the middle of the academic year that they were making progress in achieving their educational goal was deemed to be the most important goal belief for predicting final academic performance. The amount of academic performance explained in the present study increased by nearly one-fifth when beliefs about goal progress were added to the final model. The other variable that was added at that point in the analysis – use of self, study, and time management strategies – had little unique impact on the academic performance of the participants. The findings of the present study that greater perceived progress towards the attainment of an educational goal had a positive impact on educational outcomes like academic performance is consistent with the writings of Carver and Scheier (1990; 2000) and Locke and Latham (2002).

Academic performance was greater when the participants expressed the opinion near the start of the academic year that the goal of gaining a place at university was more attainable. The participants made greater use of self, study, and time management strategies near the middle of the academic year when they reported greater value associated with gaining a place at university as well as feeling more in

control about the pursuit of this goal. The findings from the present research that greater expectancy of goal attainment and goal value would play an important role in explaining academic performance and self, study, and time management strategies are generally in line with the writings of Eccles and colleagues (Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000), Salmela-Aro and Nurmi (1997), and White (2002).

Several important effects associated with the goal dimensions in the Ingledew et al. (2005) model were noted for the prediction of academic performance. Greater goal difficulty near the beginning of the academic year impacted positively on self-reported educational behaviour, such as use of self-regulated learning strategies. In contrast to previous researchers who have found that academic performance was greater when students chose a higher level of standard of performance (Chen, Gully, Whiteman, & Kilcullen, 2000; Radosevich, Allyn, & Yun, 2003; Roney & O'Connor, 2008), it was concluded here that the effect of greater perceived goal difficulty on educational performance was negative. What was observed in the present study was that greater goal difficulty was associated with an increase in academic behaviour, which is consistent with the work of Locke and Latham (2002), but a decrease in academic performance. In addition to supporting Wright's (1990) observation that the relationship between goal difficulty and behaviour depends on how goal difficulty is defined, the findings from the present study indicate that the perception of goal difficulty may differentially influence academic behaviour and performance.

It was observed in the current study that the academic performance of the secondary students in this study declined when they believed that they were receiving substantial feedback from teachers and they reported having a very specific

goal in mind when they thought about gaining a place at university. The teachers of the students who participated in this study may have given some students more feedback at the start of the academic year because the teachers believed that giving extra feedback to these students may help them perform better in the long run. Therefore, greater feedback at the start of the academic year from teachers may have been a warning sign that the student was at risk of not performing well at the end of the academic year. Feedback from teachers may be important for academic learning (Mory, 1992), and positive feedback should enhance academic performance (Thorndike, 1913). However, the findings of the present study indicated that greater feedback from teachers may not have perceived by the students as being supportive of goal attainment as the expectations of successful goal attainment and long-term academic performance declined when the secondary students perceive that they are receiving substantial amounts of feedback from teachers.

The relationship between greater perceived specificity of the educational goal being pursued and the observed reduction in educational performance may depend on the difficulty or level (Locke & Latham, 2002) of the chosen goal. The relationship between greater perceived specificity of the educational goal being pursued and the observed reduction in educational performance may depend on the difficulty or level (Locke & Latham, 2002) of the chosen goal. For example, a student in the present study may have had a very specific course at university in mind while they were studying. If they had chosen to pursue a course where the level of performance needed to achieve entry into that course was not as high as the level of performance that was needed by another student to gain entry into the specific university course, then the participant who had chosen the less difficult goal (in

terms of level of performance to gain entry into the course) may not have worked as hard at their studies compared to students who had chosen the more difficult goal.

Greater goal conflict is generally described as a negative factor for goal achievement (Locke & Latham, 2002) and the psychological consequences of goal pursuit (Karoly et al., 2008). What was found in the current study was that adolescent secondary students who reported greater goal conflict were less impatient and less psychologically distressed near the beginning of the academic year but more psychologically distressed near the end of the academic year. While greater goal conflict was found to be linked with a reduction in use of self, study, and time management strategies, greater goal conflict was unrelated to academic performance. Therefore, it was concluded that, while greater goal conflict may have had a negative influence on use of self-regulated educational behaviour for the participants in this study, and led to greater psychological distress towards the end of the academic year, any problematic academic consequences associated with greater goal conflict were minimal.

Beliefs associated with academic goals played a substantial part in explaining the academic performance of the participants. Beliefs about eventual goal attainment assessed near the beginning of the academic year and beliefs about progress towards goal attainment assessed during the academic year were particularly influential. Many personal factors have been found to be associated with academic performance, such as personality type and measures of cognitive ability (Chamooro-Premuzic & Furnham, 2008); previous performance (Andrich & Mercer, 1997); self-efficacy (Bandura, 1997); and goal orientation (Dweck & Leggett, 1988). Many socio-environmental factors have also been associated with academic performance including parenting style (Heaven & Ciarrochi**,** 2008), and the students' perception

of the classroom environment (Brock, Nishida, Chiong, Grimm, & Rimm-Kaufman, 2008). Based on the findings from the present study, it is suggested that personal beliefs about educational goals, and particularly beliefs linked with expectations of goal attainment and progress on goal attainment, add substantially to our understanding of how student motivation can impact on academic performance.

The findings from the present study have highlighted that the relationship between goal dimensions as goal beliefs and the outcomes examined in this study may be quite different to what was expected from Goal Setting theory (Locke & Latham, 2002). For example, academic performance declined and behaviour (as measured by use of self, study, and time management strategies) increased in the present study when the goal of gaining a place at university was perceived as being a more difficult goal. These findings both contradict and support the contentions of Goal Setting theory (Locke & Latham, 2002) which proposes that effort and performance should be greater when students set or choose difficult goals.

The current study also did not consider the impact of personal preferences for avoiding or approaching the achievement of personal achievement goals (Higgins, 1997), as well as personal orientations towards demonstrating personal mastery with respect to the educational context or performance superiority over others (Ames, 1992; Dweck & Leggett, 1988; Elliot & McGregor, 2001). Researchers have examined the relationship between goal setting characteristics and personal goal orientations (Radoesvich et al., 2007). Researchers may examine how beliefs about beliefs, goal setting characteristics, personal goal preferences, and goal orientations are related.

The Goal Dimensions model (Ingledew et al., 2005) can be described as a double mediator model. Although some direct paths between the predictor goal

dimensions and the outcomes of interest in the present study were substantial (that is, partial mediation was observed), most of the separate full mediation hypotheses were supported. For example, expectations of goal attainment and goal value separately mediated the effects for the other seven predictor goal dimensions on concurrently measured symptoms of negativity associated with depression, physiological symptoms of anxiety, levels of impatience, as well as symptoms of general psychological distress.

It was concluded that the double mediation model of goal dimensions proposed by Ingledew et al. (2005) was not the optimal way of modelling the relationship between the goal dimensions in the current study. None of the models met the criterion for statistical mediation proposed by MacKinnon et al. (2002) that both mediator variables should have a statistically significant effect on the outcome of interest. What was observed in all of the models was that one of the proposed mediators was not statistically related to the outcome of interest. For example, expectations of success were found to have a significant and positive effect on academic performance, whereas the effects of goal value on academic performance in the same model was not statistically significant. The impact of goal dimensions on longitudinal measures of psychological distress was less supportive of the Ingledew et al. (2005) mediation model because the proposed mediators – Value and Success Expectation – were often not found to have significant impact on the outcomes of interest in the present study.

Three explanations were offered about the lack of support for the double mediation model of goal dimensions proposed by Ingledew et al. (2005). First, the relationship between goal value and several of the outcomes in the present study was suppressed in the models. For example, the correlation between goal value and

academic performance was relatively small compared to the correlation between other goal dimensions and academic performance. Second, the impact of goal value variable on the outcomes of interest in the present study may have been reduced because goal value was highly negatively skewed. That is, the vast majority of participants rated the goal of gaining a place university as being highly valuable. This observation is hardly surprising given that the final year of secondary education for tertiary-bound secondary students is a culmination of two years of sustained effort in order to achieve a tertiary score that could lead to being offered a place at university. Therefore, a more reasonable test of the Ingledew et al. model of goal dimensions may require that the goal dimensions be assessed at a time when goal value is more normally distributed. Third, goal value may have relatively little impact on academic performance and psychological distress. Goal value may have a stronger relationship with enrolment intentions (see Eccles et al., 1983; Eccles & Wigfield, 2002; Wigfield & Eccles, 2000) and positive affect (Ingledew et al., 2004). Therefore, the double mediation model proposed in the Goal Dimensions model may be demonstrated in other contexts where goal value may be greater and where other measures of psychological health are assessed.

There were several other substantive issues examined in the current study. Use of self, study, and time management strategies was greater near the middle of the academic year when more value was attached to the goal of gaining a place at university and the students felt more in control with goal pursuit at the beginning of the academic year. Progress towards gaining a place at university near the middle of the academic year was perceived as being greater when the students had greater expectations that they would achieve this education goal at the beginning of the academic year.

The relationship between self, study, and time management strategies (as a measure of self-regulated learning) and academic performance was suppressed in Step 3 of the present study. This finding was consistent with the conclusion by Robbins et al. (2004) that the relationship between self-regulated learning with study on academic performance was relatively small. Of particular concern was the finding that female participants who reported greater expectations of goal attainment were less likely to use self, study, and time management strategies later in the academic year.

While there is little doubt that a well-structured and systematic program of teaching knowledge, attitudes, and skills (Bloom, 1956) can make a major contribution to the educational performance of students, researchers have pointed to the substantial benefits of a self-directed approach to learning in an educational setting (Pintrich et al., 1991; Robbins et al., 2004; Van Zile-Tamsen, 2001; Zimmerman, 2002). What was apparent from the findings of the current study was that greater self, study, and time management had little unique impact on academic performance. Much would be gained if more effective methods of encouraging and rewarding the use of self-regulated learning strategies could be developed so that actions taken by students to foster their own educational performance are encouraged.

Greater use of self-regulated learning skills did have some benefits for the participants in the present study. Greater use of self, study, and time management strategies was an indicator of greater goal progress. Those female students who did report using more self, study, and time management strategies near the middle of the academic year reported feeling less psychologically distressed near the end of the academic year. Thus, self, study, and time management strategies may reduce

psychological distress for females in the same way that greater use of problem-focused coping has been associated with a reduction in the experience of stress in demanding environments (Valentiner, Holahan, & Moos, 1994).

Elevated symptoms of psychological distress were observed to have little influence on academic performance. Marcotte, Levesque, and Fortin (2006) also found the impact on measures of psychological distress on academic performance and achievement are indirect rather than direct in nature. So, while about one in five of the students who participated in this research experienced mild to severe symptoms of depression, anxiety, and stress at various times of the academic year, these symptoms, on average, had minimal impact on the academic performance of the participants in the present study.

Important gender differences were noted in the modelling of the antecedents to and consequences of Success Expectation and Value. The models were much better at predicting variation for almost all of the outcome measures for females, including the psychological distress variables completed by the participants near the beginning and near the end of the academic year, beliefs about goal progress, and use of self, study, and time management strategies completed in the middle of the academic year. The females who reported making greater use of self, study, and time management strategies in the middle of the academic year also reported feeling less impatient near the end of the academic year. These findings confirmed that differences between males and females on the effects of interest were worthy of investigation in the educational domain (Debacker & Nelson, 2000; Eccles et al., 1983; Feather, 1988; Pajares, 1996)

One potential limitation of the findings in the present research regarding the impact of the goal dimensions outlined in the Ingledew et al. (2005) model,

academic outcomes, and psychological distress was that many of the scales used in the analyses were modified (and some substantially) before the structural analyses were conducted. Using the two-step approach to modelling (Anderson & Gerbing, 1988) can help to enhance the trustworthiness of the findings because the findings are based on good measures of the constructs of interest (Kline, 2005). However, using the two-step approach in the present study could limit the generalisability of the findings from the present study because the findings are based on scales that have not been specifically used in this way in previous research.

For example, the scale that was used to measure self-regulated learning in the current research – the Self, Study, and Time Management scale, which was developed from the positively-framed items from the original Effort as well as the Time and Study Environment scales of the MSLQ (Pintrich et al., 1991) – is unique to this present research. However, almost all of the modifications to the original scales were relatively minor or easily reproducible. Most of the items that were removed from the scales were reverse-scored items (GPQ and MSLQ-SRL) or were sub-factors of the original scales (DASS-42). Many of the revisions to the scales were based on sub-factors of the original scales (DASS-42 and the MSLQ-SRL). The relative ease of reproducing these scales in future research should enhance the ability of future researchers to replicate the major aspects of the present study.

Several issues around the analysis of the models were examined across the three steps of the present research. Bivariate correlations as low as .66 between conceptually-related scales in the correlation matrix of the Path Analysis indicated that latent-factor correlation between two scales were so highly correlated that procedures for combining or removing variables were implemented (see Farrell, 2009). The findings regarding mode of analysis indicated that the parameters

estimated from a Structural Regression (S-R) model where random error was modelled were generally larger compared to the parameters estimated from a Path Analysis version of the same model. Therefore, not accounting for random error in structural analysis is likely to mean that the parameters estimated from such a model may be underestimated (Kline, 2005; McKinnon, 2008).

Also, 44 fewer items were required for the S-R model for Step 1 of the present study compared to a Path Analysis where the results of findings for the measurement models for the scales to be used in the Path Analysis had not been taken into account. The model parameters estimated from the smaller S-R model were mostly superior to the parameter estimates from the Path Analysis. In terms of explaining the outcomes of interest in the present study, the S-R models "did more with less" than the equivalent unmodified Path Analysis. These findings confirm the value of the two-step approach to modelling (Anderson & Gebing, 1988) and before parcelling scales (Bandalos, 2000; Kishton & Widamen, 1994).

Also, researchers should consider doing more to improve the convergent, unidimensionality, and discriminant validity of scales as part of the scale development process if similar findings are replicated in future research. It is likely that scales developed with greater attention to the measurement aspects of the scales would result in smaller scales, as was observed in the current study. Smaller scales with better psychometric properties would reduce the demands placed on the participants' time to complete questionnaires when they participated in psychological research as well as enhancing the trustworthiness of the findings associated the same research.

Of interest was the finding that some of the modification indices observed for a Path Analysis that had not been modified based on an analysis of the measurement

models for the scales to be used in the Path Analysis were better explained by large correlations between the latent factors for the GPQ scales. A domain-representative approach to parcelling items was found to produce better findings for model fit than the homogenous parcel models, which is consistent with the findings of Coffman and MacCallum (2005).

Each of the scales used in this current study – the GPQ (Ingledew et al., 2005), the self-regulated leaning strategy component of the MSLQ (Pintrich et al., 1991), and the DASS-42 (Lovibond & Lovibond, 1995) – were subjected to tests of convergent validity, unidimensionality, and discriminant validity. While this step of the analysis was not the principal focus of the current research, the findings from the current study have highlighted previous concerns about these scales and have led to the development of alternative models for these scales that could be examined in future research.

There were some concerns that were common to the GPQ and the MSLQ. Some of the individual scales lacked convergent validity. There were a number of items from the individual scales of the GPQ and the MSLQ that were found to be poor indicators of those scales. Some scales of the GPQ and the MSLQ were re-modelled because the models of the original scales could not be justified based on the responses of the participants in the present study. Many (but not all) of the reversed-scored items were central to concerns about the convergent validity of the Complexity, Control, Personal Origin, Progress, Support, Time, and Value scales of the GPQ, and the Effort, Metacognitive Self-Regulation (S-R), Time and Study Environment, and Help scales of the MSLQ. It is suggested that future users of the GPQ and MSLQ consider not using the reverse-scored items when examining the predictors or antecedent to the variables measured by these scales. Instead, the

reverse-scored items for these scales could serve as 'filler' or distracter items to minimise social desirability bias.

An issue that was found with the GPQ, MSLQ, and DASS-42 scales was that many of the factors for the separate scales were highly correlated and did not meet the Fornell and Larcker (1981) criteria for discriminant validity. As noted earlier, for example, several scales of the GPQ were redundant with respect to the Goal Dimensions model outlined for the present study because of the large latent-factor correlations between these scales and other scales of the GPQ.

Of particular interest for the scales of the GPQ was the finding that ability to achieve a goal, the perceived difficulty of the goal, the time and tools needed to achieve a goal, and expectations of goal attainment were very similar concepts for the participants in the current study. If , as was suggested in the present study, that the Tools scale was a general measure of educational self-efficacy (Bandura, 1997), the finding from the current study that the Tools and Ability scales were highly correlated lends support to the suggestion by Wigfield and Eccles (2002) that ability beliefs and self-efficacy beliefs may be highly related for adolescents at least. What was also found in the current study was that the factor models for the Success Expectation, Difficulty, Ability, and Tools scales were highly related. Results from EFAs are suggestive that these goal beliefs may be related. White (2002) found that single items for goal difficulty and expectancy of success were part of the Goal Efficacy factor. Samela-Aro (1991) and Wallenius (1999) found that the likelihood of goal success and goal difficulty were part of an Accomplishment factor. Similar results were reported by McGregor and Little (1998).

What the findings from the present study indicate is that researchers should consider establishing that scales proposing to measure expectations of goal

attainment, ability beliefs about goal attainment, perceived goal difficulty, and self-efficacy do measure separate constructs before attributing unique effects to these constructs. Alternatively, researchers may consider explaining the degree of association between the factor models for multi-item scales for Ability, Difficulty, Success Expectation, and Tools as indicators of an overall variable.

The findings from the current research indicated that the pattern of goal dimensions observed in the present study, where goal dimensions were measured using multi-item scales, was generally consistent with the proposed overall Personal Project Analysis (PPA) themes described by Little and Chambers (2004), where goal dimensions were measured by single-item scales. For example, Little and Chambers grouped goal value and goal importance (Meaning), beliefs about control over goal attainment (Structure), and the visibility or publicness of goal pursuit (Community) as part of separate goal themes. The factor models for the Value, Control, Lack of Control, and Publicness scales were found to be separate factors in the current study. Unlike the results reported by Webb and Sheeran (2005) and White (2002), goal conflict and goal feedback were found to be separate constructs in the present study.

However, the finding that the Difficulty and Success Expectation variables in the current study were highly correlated has not provided much direction in clarifying whether goal difficulty and expectations of goal attainment should be considered as part of the same (McGregor & Little, 1998; Samela-Aro, 1991; Wallenius, 1999) or separate factors (Jackson et al., 2002; Karoly & Lecci, 1993; Lecci et al., 1994; Meyer, Beevers, & Johnson, 2004; Pychyl & Little, 1998).

The Goal Perceptions Questionnaire (GPQ) that was developed by Ingledew et al. (2005) was used to measure goal dimensions in the current study. Researchers have several options when considering how to examine the relationship between goal

dimensions and academic outcomes (such as academic performance and use of self-regulated learning strategies) or between goal dimensions and psychological health (such as psychological distress or well-being). A second option is to use Personal Project Analysis (PPA) developed by Little (1983). A third option is to use the Goal Systems Assessment Battery (GSAB) developed by Karoly and Ruehlam (1995). While PPA and the GSAB are well developed scales for measuring goal dimensions, the GPQ offers researchers some advantages over PPA and the GSAB.

The main advantage for the PPA is that it can be used to measure a large number of goal dimensions that may be of interest to researchers. However, the goal dimensions are assessed using single items to assess the goal dimensions; and goal dimensions are usually grouped in a post-hoc manner using the results of an Exploratory Factor Analysis. On the other hand, the GSAB uses multi-item scales to assess the goal dimensions – using multi-item scales can provide a better measure of a latent variable (Kline, 2005) such as a goal dimension. However, the GSAB assesses a much smaller number of goal dimensions that are similar to the goal dimensions measured by the PPA. The GPQ combines the advantages of PPA and the GSAB with the disadvantages of either scale. The version of the GPQ that was used in the present study measured 11 goal dimensions that are likely to be of interest to researchers; it has been demonstrated in the present research that the same goal dimension scales are empirically separate after Confirmatory Factor Analysis; and each of the GPQ scales are made up of between two and four items.

For the DASS-42 (Lovibond & Lovibond, 1995), lack of discriminant validity between the original three-factor model meant that, for the adolescents in this study at least, the only viable option was to retain a one-factor model for the DASS-42, even though model fit for the one-factor model was found to be

unsatisfactory in present study. An examination of a modified sub-factor version of the DASS-42 produced two post-hoc models. The first model, the 16 item, three-factor model (Depressed Negativity, Anxiety Physiology, and Stress Impatient) was the result of establishing that the three factors measured separate but related constructs. The second model, the 37 item, one-higher-order-factor model explained the association between the six sub-factors that were retained after removing the Stress Physiology sub-factor. The addition of the two post-hoc models developed in the current study provides users of the DASS-42 with some alternative ways for modelling the DASS-42 specifically for adolescents and adults.

The findings from the present research do not support the assumption that the original scales of the MSLQ-SRL (Pintrich et al., 1991) measure separate constructs because many of the factor models for the modified scales for the MSLQ-SRL were highly correlated in the current study. As a result, there is some doubt about the specific effects attributed to the Elaboration, Rehearsal, Metacognitive Self-Regulation (MSR), Effort, and Time and Study Environment scales reported by Duncan and McKeachie (2005) if the findings of the current study are replicated. For example, Jain and Dowson (2009) examined the effect of Rehearsal, Elaboration, and Organisation on MSR as part of their research on the effect of self-regulated learning strategies and anxiety about mathematics of young secondary students. If the findings from the current study can be generalised, then the unique effect of the Rehearsal variable on the MSR variable is unclear because the Organisation and Rehearsal scales are so highly correlated that they may be indicators of a common factor.

The only scales of the MSLQ-SRL that were found to measure separate factors were the scales for Critical Thinking, Organisation, the revised Self, Study,

and Time Management, and Help Seeking. More work is needed on the other scales of the MSLQ-SRL before unique effects can be reliably attributed to those scales. The results from the present study support two approaches to modelling the MSLQ-SRL: the 18 item, four factor model, and the 39 item, one-higher-order-factor model.

The scales that were retained for the S-R analyses in the current study were arrived at after close scrutiny of the measures used before parcelling the items and considering the impact of random error. Despite the conceptual and methodological rigour of testing for convergent validity, unidimensionality, and discriminant validity, the findings regarding the GPQ, MSLQ-SRL, and DASS-42 used in the present study need to be replicated with other adolescent and adult populations. Also, many of the items for the scale of the MSLQ-SRL were modified so that item content was more suitable for the participants in the present study. Therefore, further research on the modifications made to the scales of the MSLQ in the present study will need to be replicated with other participants completing the original items developed by Pintrich et al. (1991). One benefit of the revised models developed in the present study for the GPQ, MSLQ-SRL, and DASS-42 is that researchers can use these models as planned alternative models when conducting their own analyses.

In summary, it is apparent from the findings of the current research that the goal dimensions outlined in the Ingledew et al. (2005) model were particularly influential for explaining concurrently measured psychological distress, academic performance, beliefs about goal progress, and the use of self, study, and time management strategies for adolescent students in their final year of secondary school who were attempting to gain a place at university. The multi-item scales for each goal dimension developed by Ingledew et al. helped to clarify the relationship between goal dimensions in *a priori* manner before investigating the influence of

goal dimensions on psychological distress, academic performance, and use of self-regulated study skills by the participants in the present study. The Ingledew et al. model of goal dimensions continues to offer a set of theoretically-driven relationships between goal dimensions that remains to be tested under other conditions.

However, the findings of the present study are limited to investigating the relationship between goal beliefs or dimensions and academic and mental health outcomes for tertiary-bound students in their final year of secondary education. Therefore, the findings cannot be extended to students in their final year of secondary education who have chosen not to pursue a tertiary education. As can be seen when comparing the results of the present study to the results reported by Ingledew et al. (2005), how goal beliefs impact on the psychological state and performance will need to be replicated in future research. It was noted by Austin and Vancouver (1996) that goal dimensions will mean different things to different groups of people.

All of the participants in the present study were living in suburbs that scored above the 90th percentile on the Index of Relative Socio-economic Advantage and Disadvantage produced by the Australian Bureau of Statistics (Australian Bureau of Statistics, 2008) and attended government-run schools. Future research should consider the impact of socio-economic background and school type on the relationship between beliefs about goals, psychological state and academic outcomes for students. Finally, that sample size for some of the analyses (particularly those for the moderating effect of gender on the results) were somewhat low. For example, Kline (2005) has recommended that the number of participants to free parameters estimated in the model should be at least 10 to 1. There were 58 free parameters

estimated in Model 5c of the present study, which would require, using Kline's suggestions, the model be estimated based on the responses of 580 participants whereas the responses of 216 participants were analysed for Model 5c. Therefore, the sample size for the majority of the analyses in the current study was generally quite small; and results of the present study should be replicated with a larger sample of tertiary-bound secondary students.

There are a number of practical implications for researchers and practitioners interested in the relationship between goal motivation, academic outcomes, such as academic achievement and use of self-regulated learning skills, and the experience of psychological distress for older adolescents and adults. Beliefs about important educational goals were particularly informative as to the extent of psychological distress being experienced by adolescent students at the time when the when the measures of psychological distress and goal dimensions were completed at the same time as well as being substantially predictive of academic performance. Questionnaires assessing goal dimensions about important educational goals can provide teachers and school administrators with an indicator of the current psychological state and future academic performance of adolescents studying towards gaining a place at university.

Assessment of beliefs about personal goals is an important part of motivational counselling for individuals experiencing problems with alcohol and other drugs. The assessment of the current concerns helps to provide a motivational context to understand the reasons why individuals continue with problematic patterns of behaviour and experience difficulties adopting self-sustaining behaviours (Cox & Klinger, 2004). Assessment of beliefs about personal goals may help to provide insight and directions for help when students are experiencing problematic

educational behaviour, such as chronic truancy, procrastination, lack of self-regulated learning, and poor academic performance. As noted by Michalak, Heindenrich, and Hoyer (2004), assessment of beliefs about important personal goals help psychotherapists to identify personal factors that may have contributed to the reasons why a client may be seeking help from a mental health professional as well as the identifying conflicts between psychotherapeutic goals and the client's own current concerns.

The model of goal dimensions developed by Ingledew et al. (2005) also provides teachers, school administrators, and psychologists working in schools with some directions for promoting expectations of success and goal value. Given that most of the participants in this study placed great value on gaining a place at university, perhaps the issue of greatest focus is that of expectancy of goal attainment. Using Ingledew's model as a guide, increasing expectations of success can be improved by helping students manage the difficulty associated with gaining a place at university, encouraging an optimistic approach to goal pursuit, as well as reducing any lack of control over pursuit. Teachers may need to consider how much feedback is necessary at a specific time in the development of the students' capacities given that greater feedback from teachers had a negative effect on expectations of goal attainment when greater expectations of goal attainment was such a strong predictor of academic performance. Teachers and school administrators may also encourage greater goal options to reduce the deleterious impact of goal specificity on academic performance.

It was Austin and Vancouver (1996) who pointed out that goal dimensions represent a characteristic of a goal that individuals can reflect on that is distinct from other goal constructs, such as the nature of the discrepancy between the current and

desired states of the goal, how the goal is linked to other goals, the phase of goal pursuit, and the general content of the goal. Researchers have found that goal dimensions are related to psychological health such as well-being (Brunstein, 1993; Brunstein, Schultheiss, & Grassman, 1998; Emmons, 1986, 1992). What was demonstrated in the current study was that beliefs about personal goals (defined as goal dimensions) were particularly predictive of psychological distress, such as symptoms of depression, anxiety, and stress. A number of supportive beliefs about goal attainment, such as expectancy of and sense of control about goal attainment were found to be associated with a reduction in psychological distress. It was also found that while goal dimensions are relatively good predictors of psychological distress when goal dimensions and measures of psychological distress are measured at the same time, the same goal dimensions are less predictive of measures of psychological distress six months later. In contrast, goal dimensions were strong predictors of the subsequent academic performance (e.g., goal progress and expectations of goal attainment) and use of self-regulated learning strategies (e.g., control over and value attached to goal pursuit).

There were several other findings that emerged as part of the present study: greater use of self-regulated learning strategies had a positive influence on perceptions of goal progress and a negative impact on psychological distress later in the academic year; the unique effects of measures of psychological distress and use of self, time, and study strategies on academic performance were minimal; the overall findings were generally more substantial for females than males; several alternative ways for modelling for the scales used in the present study (GPQ, MSLQ-SLR, and DASS-42) were established; and the value of accounting for random

measurement error and the findings for the measurement models of scales before conducting an S-R analysis based on those scales was reinforced..

The findings from the current study supported the use of the Goal Perceptions Questionnaire (GPQ: Ingledew et al., 2005) as an effective method for assessing goal dimensions. Although the Goal Dimensions model offered by Ingledew et al. (2005) was not fully supported by the findings of the present study, there are reasons for being optimistic that the model may be supported in other settings.

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Appendix 1: Appendices for Chapters 1 to 5.

1. Full table of goal dimensions examined in studies using Person Project Appraisals (Little, 1983) reviewed in the present study.
2. All items of the Goal Perceptions Questionnaire.
3. Version of the Goal Perceptions Questionnaire used in the present study.
4. Summary of changes made to the Motivated Strategies for Learning Questionnaire – Self Regulated Learning for the present study.
5. Documentation relevant to the Ethics approval process at Edith Cowan University.

Appendix 1.1: Full table of goal dimensions examined in studies using Person Project Appraisals (Little, 1983) reviewed in the present study.

Authors (in bold) and factors found for the study	Meaning						Structure					[a] Com.		Efficacy		Stress					Other								
	Importance	Enjoyment	Value	Self-identity	Absorption		Control	Initiation	Time Adequacy	Positive impact	Negative Impact	Visibility	[b] Other's view	Progress	[c] Likelihood	Stress	Difficulty	Challenge	Positive affect	Negative affect	[d] Planning	Skills	Commitment	Support	Accomplishment	Share objectives	Conflict	Investment
Ruelman & Wolchik (1988)																												
Mastery		✓			✓		✓		✓					✓	✓													
Strain					✓											✓	✓	✓										
Self-involvement			✓	✓			✓	✓																				
Salmela-Aro (1991)																												
Positive meaning	✓	✓	✓		✓					✓				✓				✓										
Accomplishment									✓					✓	✓		✓				✓				✓			
Control							✓	✓				✓																
Negative impact																✓				✓								
Karoly & Lecci (1993)																												
Anxiety-Absoprtion	*				✓											✓	✓	✓										
Personal responsibility							✓	✓																				
Rewardingness		✓							✓						✓													
Lecci et al (1994)																												
Efficacy / structure							✓								✓						✓	✓						
Social meaning	✓	✓										✓	✓															
Stress Difficulty																✓	✓											

Author & Theme	Meaning					Structure					[a] Com.		Efficacy		Stress					Other								
	Importance	Enjoyment	Value congruency	Self-identity	Absorption	Control	Initiation	Time Adequacy	Positive impact	Negative Impact	Visibility	[b] Other's view	Progress	[c] Likelihood	Stress	Difficulty	Challenge	Positive affect	Negative affect	[d] Planning	Skills	Commitment	Support	Accomplishment	Share objectives	Conflict	Investment
McGregor & Little (1998)																											
Self-benefit																		[e]✓									
Efficacy						✓		✓						✓	✓	✓	✓										
Fun		✓																[f]✓									
Integrity	✓		✓	✓																		✓					
Support											✓							✓					✓				
Pychyl & Little (1998)																											
Personal meaning	✓		✓	✓			✓							✓													
Social meaning		✓						✓	✓		✓	✓	✓														
Stress															✓	✓	✓										
Wallenius (1999)																											
Accomplishment v Stress													✓	✓	✓	✓								✓			
Social support	✓										✓	✓															
Meaning			✓		✓				✓								✓										
Control						✓	✓																		✓		
Incompatible								✓		✓																	
Lecci et al. (2001)																											
Distress															✓	✓										✓	
Support											✓	✓															
Self-efficacy													✓	✓													✓
Meaningfulness	✓		✓																✓								

Author & Theme	Meaning					Structure					[a] Com.		Efficacy		Stress					Other								
	Importance	Enjoyment	Value	Self-identity	Absorption	Control	Initiation	Time Adequacy	Positive impact	Negative Impact	Visibility	[b] Other's view	Progress	[c] Likelihood	Stress	Difficulty	Challenge	Positive affect	Negative affect	[d] Planning	Skills	Commitment	Support	Accomplishment [e]	Share objectives	Conflict	Investment
Jackson et al (2002)																											
Identify fulfilment	✓	✓	✓	✓	✓				✓																		
Perceived strain															✓	✓	✓										
Mastery-control						✓	✓	✓					✓	✓													
Social impact										✓	✓	✓															
Meyer, Beevers, & Johnson (2004)																											
Efficacy / structure						✓								✓							✓						
Social meaning	✓										✓	✓															
Stress Difficulty															✓	✓											

Note: ***** Importance not assessed because instructions asked participants to list important goals. [a] Community. [b] Other's view of importance. [c] Likelihood success. [d] Planning & know how. [e] Six items. [f] Three items.

Appendix 1.2: All items of the Goal Perceptions Questionnaire.

GOAL PERCEPTIONS QUESTIONNAIRE

Often we find ourselves with particular goals or targets to achieve at work. Goals are often set as part of an appraisal process or in response to a particular team, departmental or company project or initiative. Please think of a goal that you currently have which is to do with your work. This questionnaire contains various statements which you might use to describe a goal or target. Read each statement carefully and circle the number which seems to best represent how you see the goal. There are no right or wrong answers and no trick questions. It is your views that interest us. Please be assured that this is a confidential questionnaire.

1 = Strongly disagree
2 = Disagree
3 = Neither agree nor disagree
4 = Agree
5 = Strongly agree

Please state your goal.....

.....

.....

What is the date by which this goal should be achieved?.....

How long will it have taken altogether (from start to finish)?
.....

		Strongly agree				Strongly disagree
1.	This goal can be altered.	1	2	3	4	5
2.	The fact that I have this goal is common knowledge.	1	2	3	4	5
3.	This goal might exceed my current abilities.	1	2	3	4	5
4.	The deadline for completing this goal is unrealistic.	1	2	3	4	5
5.	I am inhibited by lack of materials to complete this goal.	1	2	3	4	5
6.	It is widely known that I have this goal.	1	2	3	4	5

		Strongly agree				Strongly disagree
7.	I will need to strive hard to achieve this goal.	1	2	3	4	5
8.	I have enough time in which to complete this goal.	1	2	3	4	5
9.	I chose to have this goal.	1	2	3	4	5
10.	So far, progress on this goal has been slow.	1	2	3	4	5
11.	There are a number of different paths to achieving this goal.	1	2	3	4	5
12.	There is insufficient time in which to achieve this goal.	1	2	3	4	5
13.	I need others to do their bit so that I can attain this goal.	1	2	3	4	5
14.	It is hard to know what stage I am at with this goal.	1	2	3	4	5
15.	I doubt that I will achieve this goal.	1	2	3	4	5
16.	Other people think this goal is trivial.	1	2	3	4	5
17.	I have the necessary abilities to achieve this goal.	1	2	3	4	5
18.	This goal can be divided into smaller parts.	1	2	3	4	5
19.	This goal requires detailed planning.	1	2	3	4	5
20.	This goal is ambiguous.	1	2	3	4	5
21.	I enjoy working towards this goal.	1	2	3	4	5
22.	This goal can be simplified by splitting it up.	1	2	3	4	5
23.	This is an uncomplicated goal.	1	2	3	4	5
24.	This goal was set for me.	1	2	3	4	5
25.	I get a lot of satisfaction out of pursuing this goal.	1	2	3	4	5
26.	I get feedback on the progress I am making towards this goal.	1	2	3	4	5
27.	This goal is simple.	1	2	3	4	5
28.	As regards this goal, I feel in command of the situation.	1	2	3	4	5
29.	I can break this goal down into sub-goals.	1	2	3	4	5
30.	This goal is easy.	1	2	3	4	5
31.	My achieving this goal relies on others fulfilling their role.	1	2	3	4	5
32.	I set this goal for myself.	1	2	3	4	5
33.	This goal is important to me.	1	2	3	4	5
34.	This goal is specific.	1	2	3	4	5

		Strongly agree				Strongly disagree
35.	It is difficult to know how far I have progressed towards this goal.	1	2	3	4	5
36.	People fail to tell me how I am progressing in relation to this goal.	1	2	3	4	5
37.	I get a lot of support in pursuit of this goal.	1	2	3	4	5
38.	This goal is difficult.	1	2	3	4	5
39.	I mean to achieve this goal.	1	2	3	4	5
40.	I have the skills needed to attain this goal.	1	2	3	4	5
41.	It is a public fact that I have this goal.	1	2	3	4	5
42.	This is a tough goal.	1	2	3	4	5
43.	This goal is clearly defined.	1	2	3	4	5
44.	This goal means little to me.	1	2	3	4	5
45.	I can see more than one method of achieving this goal.	1	2	3	4	5
46.	There is a good chance that I will achieve this goal.	1	2	3	4	5
47.	Many people know that I have this goal.	1	2	3	4	5
48.	Other people undermine my efforts to achieve this goal.	1	2	3	4	5
49.	This is a hard goal.	1	2	3	4	5
50.	This is a worthwhile goal for me	1	2	3	4	5
51.	Other people think this goal is of little consequence.	1	2	3	4	5
52.	This is a complex goal.	1	2	3	4	5
53.	To achieve this goal, I have to compete with others.	1	2	3	4	5
54.	I have the necessary tools to achieve this goal	1	2	3	4	5
55.	I am powerless in relation to this goal.	1	2	3	4	5
56.	I am sure that I will achieve this goal.	1	2	3	4	5
57.	To achieve this goal my performance has to be superior to others.	1	2	3	4	5
58.	I will need to stretch myself to achieve this goal.	1	2	3	4	5
59.	It is difficult to know how well I am doing in relation to this goal.	1	2	3	4	5
60.	I have enough resources to achieve this goal.	1	2	3	4	5
61.	There are various possible approaches to achieving this goal.	1	2	3	4	5

		Strongly agree				Strongly disagree
62.	So far, I seem to be getting nowhere with this goal.	1	2	3	4	5
63.	I can measure, step by step, my progress towards this goal.	1	2	3	4	5
64.	This goal fits in well with my other goals.	1	2	3	4	5
65.	Other people are unconcerned whether I achieve this goal.	1	2	3	4	5
66.	I am really committed to achieving this goal.	1	2	3	4	5
67.	I dislike having to work towards this goal.	1	2	3	4	5
68.	I find it hard to see how this goal could be broken down.	1	2	3	4	5
69.	It matters to other people that I achieve this goal.	1	2	3	4	5
70.	I will be pushed for time to achieve this goal.	1	2	3	4	5
71.	I rely on others to do their part so that I can achieve this goal.	1	2	3	4	5
72.	This goal can be adjusted.	1	2	3	4	5
73.	This goal can be achieved in a number of ways.	1	2	3	4	5
74.	I will have to exert myself to achieve this goal.	1	2	3	4	5
75.	To reach this goal I must do better than others.	1	2	3	4	5
76.	I have a shortage of tools in respect to this goal.	1	2	3	4	5
77.	So far, I have made a lot of progress towards achieving this goal.	1	2	3	4	5
78.	I will have to push myself to achieve this goal.	1	2	3	4	5
79.	This goal can be changed.	1	2	3	4	5
80.	I have people to turn to for advice about this goal.	1	2	3	4	5
81.	So far, I am on course to achieving this goal.	1	2	3	4	5
82.	I fully intend to achieve this goal.	1	2	3	4	5
83.	I selected this goal.	1	2	3	4	5
84.	This goal requires teamwork.	1	2	3	4	5
85.	I am kept informed about my progress towards this goal.	1	2	3	4	5
86.	This goal can be amended.	1	2	3	4	5
87.	This goal seems to contradict the purpose of my other goals.	1	2	3	4	5
88.	I have to outperform others to achieve this goal.	1	2	3	4	5

		Strongly agree				Strongly disagree
89.	Pursuing this goal gives me a lot of pleasure.	1	2	3	4	5
90.	I have people to encourage me with this goal.	1	2	3	4	5
91.	I am kept in the picture about my progress towards this goal.	1	2	3	4	5
92.	I am helpless in relation to this goal.	1	2	3	4	5
93.	I have the necessary expertise to achieve this goal.	1	2	3	4	5
94.	It is unlikely that I will achieve this goal.	1	2	3	4	5
95.	This goal is vague.	1	2	3	4	5
96.	This goal conflicts with some of my other goals.	1	2	3	4	5
97.	I am determined to reach this goal.	1	2	3	4	5
98.	I value this goal.	1	2	3	4	5
99.	This goal clashes with my other goals.	1	2	3	4	5
100.	I am in control of this goal.	1	2	3	4	5

Scales and Items of the Goal Perceptions Questionnaire

Ability
This goal might exceed my current abilities. (R)
I have the necessary abilities to achieve this goal.
I have the skills needed to attain this goal.
I have the necessary expertise to achieve this goal.

Commitment
I mean to achieve this goal.
I am really committed to achieving this goal.
I fully intend to achieve this goal.
I am determined to reach this goal.

Competition
To achieve this goal, I have to compete with others.
To achieve this goal my performance has to be superior to others.
To reach this goal I must do better than others.
I have to outperform others to achieve this goal.

Complexity
This goal requires detailed planning.
This is an uncomplicated goal. (R)
This goal is simple. (R)
This is a complex goal.

Conflict
This goal fits in well with my other goals. (R)
This goal seems to contradict the purpose of my other goals.
This goal conflicts with some of my other goals.
This goal clashes with my other goals.

Control
As regards this goal, I feel in command of the situation.
I am powerless in relation to this goal. (R)
I am helpless in relation to this goal. (R)
I am in control of this goal.

Difficulty
This goal is easy. (R)
This goal is difficult.
This is a tough goal.
This is a hard goal.

Divisibility
This goal can be divided into smaller parts.
This goal can be simplified by splitting it up.
I can break this goal down into sub-goals.
I find it hard to see how this goal could be broken down. (R)

Effort
I will need to strive hard to achieve this goal.
I will need to stretch myself to achieve this goal.
I will have to exert myself to achieve this goal.
I will have to push myself to achieve this goal.

Enjoyment
I enjoy working towards this goal.
I get a lot of satisfaction out of pursuing this goal.
I dislike having to work towards this goal. (R)
Pursuing this goal gives me a lot of pleasure.

Feedback
I get feedback on the progress I am making towards this goal.
People fail to tell me how I am progressing in relation to this goal. (R)
I am kept informed about my progress towards this goal.
I am kept in the picture about my progress towards this goal.

Importance to Others
Other people think this goal is trivial. (R)
Other people think this goal is of little consequence. (R)
Other people are unconcerned whether I achieve this goal. (R)
It matters to other people that I achieve this goal.

Measurability
It is hard to know what stage I am at with this goal. (R)
It is difficult to know how far I have progressed towards this goal. (R)
It is difficult to know how well I am doing in relation to this goal. (R)
I can measure, step by step, my progress towards this goal.

Modifiability
This goal can be altered.
This goal can be adjusted.
This goal can be changed.
This goal can be amended.

Options
There are a number of different paths to achieving this goal.
I can see more than one method of achieving this goal.
There are various possible approaches to achieving this goal.
This goal can be achieved in a number of ways.

Personal Origin
I chose to have this goal.
This goal was set for me. (R)
I set this goal for myself.
I selected this goal.

Progress
So far, progress on this goal has been slow. (R)
So far, I seem to be getting nowhere with this goal. (R)
So far, I have made a lot of progress towards achieving this goal.
So far, I am on course to achieving this goal.

Publicness
The fact that I have this goal is common knowledge.
It is widely known that I have this goal.
It is a public fact that I have this goal.
Many people know that I have this goal.

Specificity
This goal is ambiguous. (R)
This goal is specific.
This goal is clearly defined.
This goal is vague. (R)

Success Expectation
I doubt that I will achieve this goal. (R)
There is a good chance that I will achieve this goal.
I am sure that I will achieve this goal.
It is unlikely that I will achieve this goal. (R)

Support
I get a lot of support in pursuit of this goal.
Other people undermine my efforts to achieve this goal. (R)
I have people to turn to for advice about this goal.
I have people to encourage me with this goal.

Teamwork
I need others to do their bit so that I can attain this goal.
My achieving this goal relies on others fulfilling their role.
I rely on others to do their part so that I can achieve this goal.
This goal requires teamwork.

Time
The deadline for completing this goal is unrealistic. (R)
I have enough time in which to complete this goal.
There is insufficient time in which to achieve this goal. (R)
I will be pushed for time to achieve this goal. (R)

Tools
I am inhibited by lack of materials to complete this goal. (R)
I have the necessary tools to achieve this goal.
I have enough resources to achieve this goal.
I have a shortage of tools in respect to this goal. (R)

Value
This goal is important to me.
This goal means little to me. (R)
This is a worthwhile goal for me.
I value this goal.

Note. R = reverse scored item.

Appendix 1.3: Version of the Goal Perceptions Questionnaire used in the present study.

GOAL PERCEPTIONS QUESTIONNAIRE

We often find ourselves with particular goals or targets to achieve. You have chosen subjects that permit you to apply for a place at university at the end of this school year. Please think about this as a goal.

Read each statement carefully and circle the number which seems to best represent how you are currently thinking about the goal of gaining a place at university.

There are no right or wrong answers and no trick questions. It is your views that interest us. Please be assured that this is a confidential questionnaire.

1 = Strongly disagree
2 = Disagree
3 = Neither agree nor disagree
4 = Agree
5 = Strongly agree

		Strongly agree				Strongly disagree
1.	The fact that I have this goal is common knowledge.	1	2	3	4	5
2.	This goal might exceed my current abilities.	1	2	3	4	5
3.	The deadline for completing this goal is unrealistic.	1	2	3	4	5
4.	I am inhibited by lack of materials to complete this goal.	1	2	3	4	5
5.	It is widely known that I have this goal.	1	2	3	4	5
6.	I have enough time in which to complete this goal.	1	2	3	4	5
7.	I chose to have this goal.	1	2	3	4	5
8.	There is insufficient time in which to achieve this goal.	1	2	3	4	5
9.	I doubt that I will achieve this goal.	1	2	3	4	5
10.	I have the necessary abilities to achieve this goal.	1	2	3	4	5
11.	This goal requires detailed planning.	1	2	3	4	5
12.	This goal is ambiguous.	1	2	3	4	5
13.	This is an uncomplicated goal.	1	2	3	4	5
14.	This goal was set for me.	1	2	3	4	5

		Strongly agree				Strongly disagree
15.	I get feedback on the progress I am making towards this goal.	1	2	3	4	5
16.	This goal is simple.	1	2	3	4	5
17.	As regards this goal, I feel in command of the situation.	1	2	3	4	5
18.	This goal is easy.	1	2	3	4	5
19.	I set this goal for myself.	1	2	3	4	5
20.	This goal is important to me.	1	2	3	4	5
21.	This goal is specific.	1	2	3	4	5
22.	People fail to tell me how I am progressing in relation to this goal.	1	2	3	4	5
23.	I get a lot of support in pursuit of this goal.	1	2	3	4	5
24.	This goal is difficult.	1	2	3	4	5
25.	I mean to achieve this goal.	1	2	3	4	5
26.	I have the skills needed to attain this goal.	1	2	3	4	5
27.	It is a public fact that I have this goal.	1	2	3	4	5
28.	This is a tough goal.	1	2	3	4	5
29.	This goal is clearly defined.	1	2	3	4	5
30.	This goal means little to me.	1	2	3	4	5
31.	There is a good chance that I will achieve this goal.	1	2	3	4	5
32.	Many people know that I have this goal.	1	2	3	4	5
33.	Other people undermine my efforts to achieve this goal.	1	2	3	4	5
34.	This is a hard goal.	1	2	3	4	5
35.	This is a worthwhile goal for me	1	2	3	4	5
36.	This is a complex goal.	1	2	3	4	5
37.	To achieve this goal, I have to compete with others.	1	2	3	4	5
38.	I have the necessary tools to achieve this goal	1	2	3	4	5
39.	I am powerless in relation to this goal.	1	2	3	4	5
40.	I am sure that I will achieve this goal.	1	2	3	4	5
41.	To achieve this goal my performance has to be superior to others.	1	2	3	4	5
42.	I have enough resources to achieve this goal.	1	2	3	4	5

		Strongly agree				Strongly disagree
43.	This goal fits in well with my other goals.	1	2	3	4	5
44.	I am really committed to achieving this goal.	1	2	3	4	5
45.	I will be pushed for time to achieve this goal.	1	2	3	4	5
46.	To reach this goal I must do better than others.	1	2	3	4	5
47.	I have a shortage of tools in respect to this goal.	1	2	3	4	5
48.	I have people to turn to for advice about this goal.	1	2	3	4	5
49.	I fully intend to achieve this goal.	1	2	3	4	5
50.	I selected this goal.	1	2	3	4	5
51.	I am kept informed about my progress towards this goal.	1	2	3	4	5
52.	This goal seems to contradict the purpose of my other goals.	1	2	3	4	5
53.	I have to outperform others to achieve this goal.	1	2	3	4	5
54.	I have people to encourage me with this goal.	1	2	3	4	5
55.	I am kept in the picture about my progress towards this goal.	1	2	3	4	5
56.	I am helpless in relation to this goal.	1	2	3	4	5
57.	I have the necessary expertise to achieve this goal.	1	2	3	4	5
58.	It is unlikely that I will achieve this goal.	1	2	3	4	5
59.	This goal is vague.	1	2	3	4	5
60.	This goal conflicts with some of my other goals.	1	2	3	4	5
61.	I am determined to reach this goal.	1	2	3	4	5
62.	I value this goal.	1	2	3	4	5
63.	This goal clashes with my other goals.	1	2	3	4	5
64.	I am in control of this goal.	1	2	3	4	5

Appendix 1.4: Summary of changes made to the Motivated Strategies for Learning Questionnaire – Self Regulated Learning for the present study.

Question (MSLQ question)	Wording in the original MSLQ-SRL	Change made for the present study and reason for change.
1 (32)	Readings	Text books, because (Australian) secondary students study text books rather than readings.
	Course	Subjects at school, because the nature of questions are deliberately framed with reference to general self-regulatory educational behaviour, reflecting the overall purpose of the revised questionnaire.
2 (33)	Unchanged	
3 (34)	Course	Subjects at school (see question 1 (32) for reason)
4 (35)	Course	School (see question 1 (32) for reason)
5 (36)	Course	School subjects (see question 1 (32) for reason)
6 (37)	For this course	Phrase deleted (see question 1 (32) for reason)
7 (38)	In this course	At school (see question 1 (32) for reason)
8 (39)	For this class	Phrase deleted (see question 1 (32) for reason)
9 (40)	This class	My subjects at school (see question 1 (32) for reason)
10 (41)	This class	School (see question 1 (32) for reason)
11 (42)	This course	School (see question 1 (32) for reason)
12 (43)	This course	School (see question 1 (32) for reason)
13 (44)	Course readings	Text books (see question 1 (32) for reason)
14 (45)	This class	School (see question 1 (32) for reason)
	The course	Phrase deleted (see question 1 (32) for reason)
15 (46)	This course	For school (see question 1 (32) for reason)
	Course readings	Text books (see question 1 (32) for reason)
16 (47)	Readings	Text book (see question 1 (32) for reason)
17 (48)	This class	At school (see question 1 (32) for reason)
18 (49)	Course	Class (see question 1 (32) for reason). Class is sufficiently general in this context to be an appropriate adaptation, and the use of school would be inappropriate
19 (50)	Course	My subjects at school (see question 1 (32) for reason)
	Course (second mention)	Class (see question 1 (32) for reason)
	The class	School (see question 1 (32) for reason)
20 (51)	Course material	Class work (see question 1 (32) for reason)
21 (52)	Unchanged	
22 (53)	This class	School (see question 1 (32) for reason)
	Lectures	Class notes (see question 1 (32) for reason)
	Readings	Text books
23 (54)	Course	Deleted (see question 1 (32) for reason)
24 (55)	In this class	At school (see question 1 (32) for reason)
25 (56)	Course	Class (see question 1 (32) for reason)
	Instructor's	Teacher's style of teaching (see question 1 (32) for reason, secondary students are familiar with the phrase 'teacher' rather than 'instructor', and because the change is grammatically reasonable)

26 (57)	This class	Subjects at school (see question 1 (32) for reason)
27 (58)	Instructor	Teacher (see question 26 (56) for reason)

Appendix 1.4 (continued)

28 (59)	This	Deleted (see 18 (49) for reason)
29 (60)	Course	Class (see question 1 (32) for reason)
30 (61)	For this course	Delete phrase (see question 1 (32) for reason)
31 (62)	This	One (see question 1 (32) for reason)
	Courses	Subjects
32 (63)	For this course	Deleted (see question 1 (32) for reason)
33 (64)	Reading for this class	A subject at school (see question 1 (32) for reason)
34 (65)	Unchanged	
35 (66)	This course	A subject (see question 1 (32) for reason)
36 (67)	This course	A subject (see question 1 (32) for reason)
37 (68)	This course	A subject (see question 1 (32) for reason)
	This class	Deleted (see question 1 (32) for reason)
38 (69)	This class	Subject (see question 1 (32) for reason)
	Readings	Text book (see question 1 (32) for reason)
	From the lectures	Covered in the classroom
39 (70)	Weekly readings	Reading the text book (see question 1 (32) for reason)
	This course	Each subject
40 (71)	Assertion	Deleted, to focus the participants reading of the word conclusion in the question, making the question more simple to understand
41 (72)	This course	Each subject (see question 1 (32) for reason)
42 (73)	Class	School, because secondary students would find it easier to relate to attending school as a generalised concept
43 (74)	Course	Class (see question 1 (32) for reason)
44 (75)	This	Each (see question 1 (32) for reason)
45 (76)	This course	Phrase deleted (see question 1 (32) for reason)
46 (77)	This course	Studying (see question 1 (32) for reason)
47 (78)	For this class	Phrase deleted (see question 1 (32) for reason)
48 (79)	Unchanged	
49 (80)	Readings	Text books (see question 1 (32) for reason)
50 (81)	Course readings	Text books

Appendix 1.5: Documentation relevant to the Ethics approval process at Edith Cowan University.

Information document: Parents of participants

Edith Cowan University
100 Joondalup Drive
JOONDALUP WA 6027
Phone: 6304 2170
Phone: 13 43 28
Fax: +61 (08) 9300 1257

Dear Parent (s) / Guardian,

My name is Craig Harms, and I am a PhD student from Edith Cowan University. High levels of academic performance are needed to gain a place at university. Studying in Year 12 can also be very stressful and distressing. The purpose of this research to investigate how the motivation gained from striving to gain a place at university might influence use of study skills, academic performance and the psychological distress sometimes experienced by Year 12 students.

Your son or daughter has been asked to participate in this research because they are studying four or more TEE subjects. By being involved in this project, your son or daughter will be able to examine their own motivation toward gaining a place at university. Findings from this research will allow teachers, members of the school's student services team, and parents to better help students cope with the rigours of year 12.

I am seeking your permission for your son or daughter to complete some questionnaires on three occasions: near the beginning of Term 1; at the beginning of term 3; and towards the end of Term 3. These questionnaires will be completed during class time. The testing itself should take between 15 and 45 minutes to complete on each occasion. I am also seeking your permission to access your son or daughter's TER from the school administration early in 2007. If your son or daughter experience discomfort while completing the questionnaires, they will be encouraged to contact members of the school's student services team.

A number of steps will be taken to ensure that all responses will be confidential: no individual results and only averaged results will be reported in the thesis, at conferences, or in publications; only the researchers listed below will have access to individual information; all references to your son or daughter's name will be removed from the questionnaires; and all questionnaires will be destroyed at the end of the project. However, it should be noted that there are legal limits to

confidentiality. A summary of the findings from this research will be available on request from first researcher. The Human Research Ethics Committee at Edith Cowan University has approved this study.

Participation in this research is purely voluntary. No explanation or justification is needed if your son or daughter chooses not to participate. Your son or daughter may are free to withdraw their consent to further involvement in the research project at any time, and this will not affect their standing at the school.

If you have any questions or require any information about the research project, please contact:

Researcher:Mr Craig Harms	Telephone	6304 5551
SupervisorAssociate Professor Craig Speelman	Telephone	6304 5551
Supervisor Professor Alison Garton	Telephone	6304 5551

If you have any concerns or complaints about the research project and wish to talk to an independent person, you may contact: Research Ethics Officer, Human Research Ethics Committee, Edith Cowan University, 100 Joondalup Drive, JOONDALUP WA 6027. Phone: (08) 6304 2170; Email: research.ethics@ecu.edu.au

If you agree for your son or daughter to participate in this study, can you please sign the consent form that is attached to this sheet, and return it to the school

Mr Craig Harms

PhD Candidate, Edith Cowan University.

Information sheet: Participants.

Edith Cowan University
100 Joondalup Drive
JOONDALUP WA 6027
Phone: 6304 2170
Phone: 13 43 28
Fax: +61 (08) 9300 1257

Dear Student,

My name is Craig Harms, and I am a PhD student at Edith Cowan University. High levels of academic performance are needed to gain a place at university. Studying in Year 12 can also be very stressful and distressing. The purpose of this research to investigate how the motivation gained from striving to gain a place at university might influence use of study skills, academic performance and the psychological distress sometimes experienced by Year 12 students.

You have been asked to participate in this research because you are studying four or more TEE subjects. By being involved in this project, you will be able to examine your own motivation towards gaining a place at university. Findings from this research will help teachers, members of the school's student services team, and parents to better help students cope with the rigours of year 12.

You will be asked to complete some questionnaires on three occasions: near the beginning of Term 1; at the beginning of term 3; and towards the end of Term 3. These questionnaires will be completed during class time. The testing itself should take between 15 and 45 minutes to complete on each occasion. I am also seeking your permission to access your TER from the school administration early in 2007. If you experience discomfort while completing these questionnaires, you can contact members of the school's student services team.

A number of steps will be taken to ensure that all responses will be confidential: no individual results and only averaged results will be reported in the thesis, at conferences, or in publications; only the researchers listed below will have access to individual information; all references to your name will be removed from the questionnaires; and all questionnaires will be destroyed at the end of the project. However, it should be noted that there are legal limits to confidentiality. A summary of the findings from this research will be available on request from first researcher. The Human Research Ethics Committee at Edith Cowan University has approved this study.

PTO

Participation in this research is purely voluntary. No explanation or justification is needed if you choose not to participate. You are also free to withdraw your consent to further involvement in the research project at any time, and this will not affect your standing at the school.

If you have any questions or require any information about the research project, please contact:

Researcher:	Mr Craig Harms	Telephone 6304 5555
Supervisor:	Associate Professor Craig Speelman	Telephone 6304 5551
Supervisor	Professor Alison Garton	Telephone 6304 5551

If you have any concerns or complaints about the research project and wish to talk to an independent person, you may contact: Research Ethics Officer, Human Research Ethics Committee, Edith Cowan University, 100 Joondalup Drive, JOONDALUP WA 6027. Phone:(08) 6304 2170; Email: research.ethics@ecu.edu.au.

If you agree to participate in this study, can you please sign the consent form that is attached to the front of the questionnaire booklet.

Mr Craig Harms

PhD Candidate, Edith Cowan University.

Information sheet: Teachers.

Edith Cowan University
100 Joondalup Drive
JOONDALUP WA 6027
Phone: 6304 2170
Phone: 13 43 28
Fax: +61 (08) 9300 1257

Dear Teacher,

My name is Craig Harms, and I am a PhD student from Edith Cowan University. High levels of academic performance are needed to gain a place at university. Studying in Year 12 can also be very stressful and distressing. The purpose of this research to investigate how the motivation gained from striving to gain a place at university might influence use of study skills, academic performance and the psychological distress sometimes experienced by Year 12 students.

Only students who are studying four or more TEE subjects have been asked to participate in this research. By being involved in this project, the students will be able to examine their own motivation towards gaining a place at university. Findings from this research will allow teachers, members of the school's student services team, and parents to better help students cope with the rigours of year 12.

As a staff member, you may be asked to help in the conduct of this research by having students who are in your class and participating in this research to complete some questionnaires. The students will be asked to complete some questionnaires on three occasions: near the beginning of Term 1; at the beginning of term 3; and towards the end of Term 3. These questionnaires will be completed during class time. The testing itself should take between 15 and 45 minutes to complete on each occasion. If a student experience discomfort while completing these questionnaires, they can be encouraged to contact members of the school's student services team.

A number of steps have been taken to ensure that all responses will be confidential: no individual results and only averaged results will be reported in the thesis, at conferences, or in publications; only the researchers listed below will have access to individual information; all references to the student's name will be removed from the questionnaires; and all questionnaires will be destroyed at the end of the project. However, it should be noted that there are legal limits to confidentiality. A summary of the findings from this research will be available on request from first researcher. The Human Research Ethics Committee at Edith Cowan University has approved this study.

PTO

Participation in this research is purely voluntary. No explanation or justification is needed if the student chooses not to participate. Each student is free to withdraw their consent to further involvement in the research project at any time, and this will not affect their standing at the school.

Please do not hesitate to contact the first researcher if you have any questions or concerns about this project.

Researcher: Mr Craig Harms	Telephone	6304 5551
Supervisor Associate Professor Craig Speelman	Telephone	6304 5551
Supervisor Professor Alison Garton	Telephone	6304 5551

If you have any concerns or complaints about the research project and wish to talk to an independent person, you may contact: Research Ethics Officer, Human Research Ethics Committee, Edith Cowan University, 100 Joondalup Drive, JOONDALUP WA 6027. Phone: (08) 6304 2170; Email: research.ethics@ecu.edu.au.

Mr Craig Harms

PhD Candidate, Edith Cowan University.

Research Participation Form – Parents

Research:

Goal Striving, Study Skills, Academic Performance, and the Psychological Distress of University-Bound Secondary Students

I _____ (the parent / guardian) confirm that

1. I have read the information provided with the consent form.
2. I agree allow to my child _____ to participate in the activities associated with this research and understand that I can withdraw consent at any time.
3. I give permission for the school to release the TER results for my son or daughter to the first researcher (Mr C. Harms).
4. I agree that the research data gathered in this study may be published providing my child is not identified in any way.

Signed_____ (signature of parent)

Date: _____

Research Participation Form – Students

Research:

Goal Striving, Study Skills, Academic Performance, and the Psychological Distress of University-Bound Secondary Students

I _____ (name of student) confirm that

1. I have read the information provided with this consent form.
2. I voluntarily sign this document to participate in the activities associated with this research and understand that I can withdraw consent at any time.
3. I give permission for the school to release my TER results to the first researcher (Mr C. Harms).
4. I agree that the research data gathered in this study may be published providing I am not identified in any way.

Signed_____ (signature of student)

Date_____

Appendix 2: Results & measurement models

1. Latent-factor correlations, average of the Variance Extracted Reliability (on the diagonal) and Coefficient of Determination (in parentheses) after the second Confirmatory Factor Analysis for the Goal Perceptions Questionnaire.
2. Pattern and structural coefficients for the Success Expectation and Difficulty factors.
3. Standardised factor loadings for the items of the Goal Perceptions Questionnaire for the current study and reported by Ingledew et al. (2005).
4. Steps in the post-hoc modelling for scales of the Motivated Strategies for Learning Questionnaire – Self Regulated Learning.
5. Latent variable correlations for the scales of the Motivated Strategies for Learning Questionnaire – Self Regulated Learning at Step 2 of the CFA analysis.
6. Factor loadings for the one-, two-, and three- factor models for the Anxiety, Depression, and Stress scales of the DASS-42.
7. Steps in the post-hoc modelling for Anxiety, Depression, and Stress scales of the DASS-42.

Appendix 2.1: Full table of the latent-factor correlations, average of the Variance Extracted Reliability (on the diagonal) and Coefficient of Determination (in parentheses) after the second Confirmatory Factor Analysis for the Goal Perceptions Questionnaire.

Factor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Ability	.55																
2. Commitment	.63 (.40)	.73															
3. Competition	.23 (.05)	.44 (.19)	.62														
4. Complexity	-.74 (.55)	-.42 (.18)	-.10 (.01)	.56													
5. Conflict	-.51 (.26)	-.81 (.66)	-.28 (.02)	.45 (.20)	.68												
6. In Control	.69 (.48)	.53 (.29)	.16 (.03)	-.78 (.61)	-.50 (.25)	.54											
7. Lack of Control	.68 (.46)	.60 (.36)	.18 (.03)	-.40 (.16)	-.49 (.24)	.66 (.44)	.63										
8. Difficulty	-.81 (.66)	-.41 (.17)	-.10 (.01)	.93 (.87)	.49 (.24)	-.70 (.49)	-.56 (.31)	.73									
9. Feedback	.28 (.08)	.16 (.03)	.15 (.02)	-.28 (.08)	-.18 (.03)	.33 (.11)	.25 (.06)	-.22 (.05)	.75								
10. Personal Origin	.50 (.25)	.91 (.83)	.27 (.07)	-.30 (.09)	-.72 (.52)	.44 (.19)	.53 (.28)	-.34 (.12)	.14 (.02)	.75							
11. Publicness	.58 (.34)	.83 (.69)	.35 (.12)	-.38 (.14)	-.62 (.38)	.42 (.18)	.48 (.23)	-.42 (.18)	.19 (.04)	.78 (.61)	.74						
12. Specificity	.33 (.11)	.56 (.31)	.07 (.00)	-.16 (.03)	-.42 (.18)	.38 (.14)	.31 (.10)	-.21 (.04)	.07 (.00)	.51 (.26)	.35 (.12)	.79					
13. Success Expectation	.97 (.94)	.67 (.45)	.26 (.07)	-.69 (.48)	-.56 (.31)	.73 (.53)	.76 (.58)	-.79 (.62)	.16 (.03)	.59 (.35)	.63 (.40)	.33 (.11)	.63				
14. Support	.50 (.25)	.48 (.23)	.27 (.07)	-.26 (.07)	-.33 (.11)	.42 (.18)	.40 (.16)	-.26 (.07)	.60 (.36)	.42 (.18)	.34 (.12)	.32 (.10)	.37 (.14)	.58			
15. Time	.75 (.56)	.45 (.20)	.13 (.02)	-.59 (.35)	-.45 (.20)	.79 (.62)	.63 (.40)	-.63 (.40)	.47 (.22)	.36 (.13)	.32 (.10)	.31 (.10)	.74 (.55)	.50 (.25)	.39		
16. Tools	1.01 (1.02)	.68 (.46)	.23 (.05)	-.71 (.50)	-.56 (.31)	.82 (.67)	.71 (.50)	-.78 (.61)	.32 (.10)	.57 (.32)	.51 (.26)	.36 (.13)	.90 (.81)	.52 (.27)	.88 (.77)	.46	
17. Value	.49 (.24)	.99 (.98)	.41 (.17)	-.23 (.05)	-.77 (.59)	.41 (.17)	.52 (.27)	-.24 (.06)	.14 (.02)	.92 (.85)	.75 (.56)	.49 (.25)	.58 (.34)	.47 (.22)	.38 (.14)	.53 (.28)	.75

Note: Highlighted areas indicated where discriminant validity was not established between two factors.

Appendix 2.2: Pattern and structural coefficients for the Success Expectation and Difficulty factors.

	Difficulty		Success Expectation	
Item	Pattern Coefficient	Structural Coefficient	Pattern Coefficient	Structural Coefficient
Difficulty(1)	.77	-	0	-.62
Difficulty (2)	.90	-	0	-.72
Difficulty (3)	.84	-	0	-.67
Difficulty (4)	.90	-	0	-.72
Success (1)	0	-.65	.81	-
Success (2)	0	-.65	.81	-
Success (3)	0	-.66	.82	-
Success (4)	0	-.60	.75	-

The relationship between the pattern and structural coefficients (Thompson, 1997) was used to further scrutinise the relationship between for factor models for the Success Expectation and Difficulty scales. In this approach, determining discriminant validity is demonstrated when structural coefficients are smaller than pattern coefficients. As can be seen above, the pattern coefficient (standardised factor loading) for the first item of the Difficulty factor was .77. The structural coefficient for this item is the product of the pattern coefficient for an item and the correlation between the two factors (-.80), which is -.62. It was concluded from the results above that there was a reasonable degree of empirical separateness between the Success Expectation and Difficulty factors because, in each case, the pattern coefficients for each item were greater than the equivalent structural coefficient for the same item.

Appendix 2.3: Standardised factor loadings for the items of the Goal Perceptions Questionnaire for the current study and reported by Ingledew et al. (2005).

Latent factor (item)		Model parameters			
		OCM	CFA Step 2	CFA Step 3	Ingledew et al. (2005)
Ability	(1)	-.53	-.62	-	-.44
	(2)	.92	.79.	-	.59
	(3)	.89	.81	-	.92
	(4)	.54	.72	-	.79
Commitment	(1)	.77	.76	-	.80
	(2)	.81	.86	-	.67
	(3)	.88	.87	-	.95
	(4)	.96	.92	-	.86
Competition	(1)	.70	.70	.70	.62
	(2)	.73	.75	.74	.89
	(3)	.90	.95	.93	.91
	(4)	.90	.85	.87	.90
Complexity	(1)	.24	-	-	.35
	(2)	-.78	-.71	-	-.62
	(3)	-.79	-.85	-	-.90
	(4)	.67	.68	-	.48
Conflict	(1)	-.71	-.94	-.90	-.42
	(2)	.80	.79	.80	.62
	(3)	.85	.73	.75	.88
	(4)	.94	.83	.85	.84
Control	(1)	.57	.78**	.78**	.78
*Lack of Control	(2)	-.77	.79*	.80*	-.51
**In Control	(3)	-.67	.80*	.79*	-.43
	(4)	.73	.69**	.69**	.79
Difficulty	(1)	-.72	-.83	-.77	-.68
	(2)	.89	.89	.90	.77
	(3)	.85	.82	.83	.91
	(4)	.93	.88	.90	.88

Appendix 2.3 (continued)

Latent factor (item)		Model parameters			
		OCM	CFA Step 2	CFA Step 3	Ingledew et al. (2005)
Feedback	(1)	.82	.84	.83	.73
	(2)	-.74	-	-.	-.51
	(3)	.87	.85	.86	.93
	(4)	.90	.90	.90	.87
Personal Origin	(1)	.79	.88	-	.80
	(2)	-.33	-	-	-.54
	(3)	.85	.80	-	.83
	(4)	.94	.92	-	.93
Publicness	(1)	.79	.87	.86	.86
	(2)	.86	.85	.86	.89
	(3)	.89	-	-	.73
	(4)	.86	-	-	.78
Specificity	(1)	-.89	-.84	-.86	-.46
	(2)	.95	.95	.94	.70
	(3)	.92	.97	.96	.72
	(4)	-.81	-.78	-.80	-.69
Success Expectation	(1)	-.81	-.81	-.80	-.79
	(2)	.86	.82	.81	.80
	(3)	.77	.81	.82	.80
	(4)	-.74	-.74	-.75	-.82
Support	(1)	.76	.84	.82	.65
	(2)	-.24	-	-	-.22
	(3)	.70	.57	.58	.56
	(4)	.82	.85	.86	.86q
Time	(1)	-.55	-.75	-	-.56
	(2)	.71	.67	-	.74
	(3)	-.70	-.41	-	-.62
	(4)	-.14	-	-	-.56

Appendix 2.3 (continued)

Latent factor (item)		Model parameters			
		OCM	CFA Step 2	CFA Step 3	Ingledew et al. (2005)
Tools	(1)	-.58	-.55	-	-.62
	(2)	.58	.73	-	.73
	(3)	.71	.65	-	.67
	(4)	-.81	-.75	-	-.74
Value	(1)	.89	.86	.87	.89
	(2)	-.77	-	-	-.73
	(3)	.81	.83	.83	.76
	(4)	.89	.90	.89	.81

Appendix 2.4: Steps in the post-hoc modelling for scales of the Motivated Strategies for Learning Questionnaire – Self Regulated Learning.

Scale	Model details	Correctly Specified	Model fit and observations	FLa<.60?	Item FLs
Elaboration	6 item, 1-factor	No	S-B χ^2=50.86, *df*=9, *p*=.00; RMSEA=.14, *p* close=.00. The factor loading (FL) for item 4 ("When I study for school, I go through my text books and my class notes to find the most important ideas.") was substantially less than .60. Three significant Modification Indices (MIs) were also observed between item 4 and three other items. Item 4 was removed from the model on the basis of evidence from observation of the FL and MIs associated with item.	No	1 (.54); 2 (.67); 3 (.84); 4 (.42); 5 (.73); 6 (.58).
	5 item, 1-factor	No	S-B χ^2= 21.44, *df*=5, *p*=.00; RMSEA=.12, *p* close=.00. Although the 5 item, 1 factor model was better fit of the data than the 6 item, 1 factor model, the 5 item, 1 factor model was also a poor fit of the data. The FL for item 1 was less than .60. A significant MI was observed between item 2 ("I try to relate ideas in one subject to those learned in other subjects whenever possible.") and item 3 ("When studying for a subject at school, I try to relate the material to what I already know). Both of these items refer to 'relating to the material', which may explain the relationship between these items. Item 2 was removed from the model – the large MI between item 2 and 3 indicated that these two items were measuring an additional factor to the overall Elaboration factor such that convergent validity and model fit could be improved if item 2 or 3 was removed from the model. Item 2 was removed as the FL for this item was smaller than the FL for item 3.	No	1 (.52); 2 (.70); 3 (.84); 5 (.70); 6 (.61).
	4 item, 1-factor	Yes	S-B χ^2=.5, *df*=2, *p*=.78; RMSEA=.00, *p* close=.86.	Ok	1 (.59); 3 (.71); 5 (.78); 6 (.61).

Appendix 2.4 (continued)

Scale	Model details	Correctly Specified	Model fit and observations	FLa<.60?	Item FLs
Effort	4 item, 1-factor	No	S-B χ^2=18.91, *df*=2, *p*=.00; RMSEA=.19, *p* close=.00.	Yes	1 (-.63); 2 (.80); 3 (-.64); 4 (.73).
	4 item, 1-factor, and 1 CMV factor	Yes	S-B χ^2=.48, *df*=1, *p*=.49; RMSEA=.00, *p* close=.60.	No	1 (-.52 / .49 [a]); 2 (.87 / .49 [a]); 3 (-.52); 4 (.74).
	4 item, 2-factor	Yes	S-B χ^2=.48, *df*=1, *p*=.49; RMSEA=.00, *p* close=.60. Latent r = .73. Discriminant validity was not established, as A (AVE for Effort=.65 and Poor Effort=.52) ≤ B (R^2=.53).	Yes	Factor 1 Effort – 2 (.87); 4 (.74). Factor 2 Lack of Effort – 1 (.72); 3 (.72).
Time and Study Environment (TSE)	8 items, 1-factor	No	S-B χ^2=50.83, *df*=20, *p*=.00; RMSEA=.08, *p* close=.03. CFI=.95.	No	1 (.61); 2 (.65); 3 (-.47); 4 (.54); 5 (.67); 6 (.52); 7 (-.54); 8 (-.58).
	8 items, 1-factor, and 1 CMV factor	Yes	S-B χ^2=29.46, *df*=19, *p*=.06; RMSEA=.05, *p* close=.48.	No	1 (.64); 2 (.68); 3 (-.35 / .49 [a]); 4 (.56); 5 (.70); 6 (.55); 7 (-.42 / 49 [a]); 8 (-.48 / 49 [a]).
	8 items, 2-factor		S-B χ^2=30.03, *df*=19, *p*=.05; RMSEA=.05, *p* close=.46. Latent r = -.68. Discriminant validity was established as A (AVE for Factor 1 = .63 and Factor 2 = .46) > B (R^2=.44).	Ok	Factor 1 TSE – 1 (.56); 2 (.70); 5 (.72); 6 (.54). Factor 2 Lack of TSE – 3 (.57); 7 (.65); 8 (.70).

Appendix 2.4 (continued)

Scale	Model details	Correctly Specified	Model fit and observations	FLa<.60?	Item FLs
Metacognitive Self Regulation (MSR)	12 item, 1-factor	No	S-B χ^2=116.40, *df*=54, *p*=.00; RMSEA=.07; *p* close=.03. FL's for two reverse scored items were particularly small.	No	1 (-.35); 2 (.59); 3 (.56); 4 (.52); 5 (.44); 6 (.60); 7 (.46); 8 (-.26); 9 (.63); 10 (.65); 11 (.66); 12 (.56).
	12 item, 1-factor and 1 CMV factor	No	S-B χ^2=108.55, *df*=53, *p*=.00; RMSEA=.07, *p* close=.06 Model fit was marginally improved compared to the 12 item, 1 factor model. FLs for the reversed scored items (.33 and .23) as indicators of the MSR factor remained substantially less than .60, indicating that, if modelled with a method factor, the reverse scored items were not good indicators of an overall MSR factor.	No	1 (-.33 / .46 [a]); 2 (.59); 3 (.56); 4 (.52); 5 (.44); 6 (.61); 7 (.46); 8 (-.23 / .46 [a]); 9 (.63); 10 (.65); 11 (.66); 12 (.56).
	12 item, 2-factor model	No	S-B χ^2=108.55, *df*=53, *p*=.00; RMSEA=.07, *p* close=.06. Latent r = -.52. Several FLs were observed to be substantially less than .60. The items for Factor 2 were removed from the model because the low latent variable between Factors 1 and 2 indicated that Factor 2 was a substantially different construct than Factor 1. Further modelling was based on the remaining 10 items of the MSR Factor	No	Factor 1 MSR – 2 (.59); 3 (.56); 4 (.52); 5 (.44); 6 (.61); 7 (.46); 9 (.63); 10 (.65); 11 (.66); 12 (.56). Factor 2 Lack of MSR – 1 (.64); 8 (.45).

Appendix 2.4 (continued)

Scale	Model details	Correctly Specified	Model fit and observations	FLa<.60?	Item FLs
	10 item, 1-factor model	No	S-B χ^2=81.65, *df*=35, *p*=.01; RMSEA=.08, *p* close=.02. A large MI was observed between items 10 ("When studying, I try to determine which concepts I don't understand well") and 11 ("When I study, I set goals for myself in order to direct my activities in each study period"). Both items related to setting academic goals. A large MI was also observed between item 10 and item 2. As item 10 was at the centre of two large MIs, it was decided to remove item 10 from the model.	No	2 (.59); 3 (.54); 4 (.52); 5 (.44); 6 (.61); 7 (.48); 9 (.63); 10 (.65); 11 (.66); 12 (.56)
MSR (cont)	9 item, 1-factor (item 10 removed)	No	S-B χ^2=46.02, *df*=27, *p*=.01; RMSEA=.06, *p* close=.34. A large MI was observed between items 3 ("When I become confused about something I'm reading, I go back and try to figure it out") and 12 ("If I get confused taking notes in class, I make sure I sort it out afterwards"). Both of these items relate to taking action to alleviate confusion about class work. A large MI was also observed between item 3 and item 9 ("I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying"). As item 3 was central to both large MIs, and the FL of item 3 was relatively low (.50), it was decided to delete item 3 and re-run the model.	No	2 (.63); 3 (.50); 4 (.54); 5 (.46); 6 (.63); 7 (.61); 9 (.61); 11 (.61); 12 (.54).
MSR (cont)	8 item, 1-factor	Yes	S-B χ^2=25.02, *df*=20, *p*=.20; RMSEA=.03, *p* close=.74. Several FLs continued to be less than .60. The 8 item, 1-factor model was retained because this model was an exact fit of the data whereas the previous models were not an exact fit of the data. However, several FLs were close to .50.	No	2 (.60); 4 (.54); 5 (.48); 6 (.65); 7 (.54); 9 (.57); 11 (.60); 12 (.49).

Note: FLs = standardised factor loadings. FLs < .60?* = factor loadings were substantially less than .60. *N =230.* CMV= Common Method Variable. [a] indicates that the standardised factor loadings for the CMV factor. * The unstandardised factor loading for these items were constrained to be equal so that the model could be over-identified. For all models in Appendix 2.4, CFIs ≥ .95, except for Elaboration 6 item model (.92); SRMR's < .05, except for Elaboration 6 item (.08) and 5 item (06); Effort 4 item (.06); MSR 12 item (.07), 12 item CMV (.07), 10 item (.06); TSE (.08); and GFIs > .95.

Appendix 2.5: Latent variable correlations and Factor Loadings (FLs) for the scales of the Motivated Strategies for Learning Questionnaire – Self Regulated Learning at Step 2 of the CFA analysis.

	1	2	3	4	5	6	7	8	9
1. Critical: FLs: 1 (.37); 2(.79); 3 (.76); 4 (.71); 5 (.73)	1.00								
2. Elaboration: FLs: 1 (.61); 2 (.70); 3 (.80); 4 (.57).	.72	1.00							
3. Organisation: FLs: 1 (.75); 2 (.65); 3 (.64); 4 (.81).	.48	.70	1.00						
4. Rehearsal: FLs: 1 (.60); 2 (.57); 3 (.67); 4 (.57).	.58	.79	.91	1.00					
5. MSR: FLs 4 (.58); 5 (.48); 6 (.55); 7 (.46); 9 (.64); 11 (.59); 12 (.67).	.80	.77	.88	.79	1.00				
6. Help Seeking: FLs: 2 (.75); 3 (.58); 4 (.64).	.34	.63	.45	.52	.47	1.00			
7. Effort: FLs: 1 (.83); 2 (.74); 3 (.55); 4 (.59).	.37	.55	.65	.58	.68	.49	1.00		
8. Time and Study Environment: FLs: 1 (.65); 2 (.76); 4 (.52); 5 (.69); 6 (.47).	.42	.59	.69	.66	.71	.53	.98	1.00	
9. Lack of Time and Study Environment: FLs: 3 (.50); 7 (.66); 8 (.74).	.30	.46	.60	.48	.48	.13	.80	.66	1.00

Note: FLs = standardised factor loadings. MSR = Metacognitive Self Regulation. Highlighted area indicated where discriminant validity was not established between two factors.

Appendix 2.6: Factor loadings for the one-, two-, and three- factor models for the Anxiety, Depression, and Stress scales of the DASS-42.

Model		FLs>.60	FLs
One-factor model: Psychological Distress (42 items).	Time 1	Most	Psychological Distress Time 1: Str1 = .74; Anx1 = .45; Dep1 = .70; Anx2 = .56; Dep2 = .70; Str2 = .75; Anx3 = .65; Str3 = .76; Anx4 = .77; Dep3 = .65; Str4 = .78; Str5 = .76; Dep4 = .78; Str6 = .55; Anx5 = .47; Dep5 = .70; Dep6 = .78; Str7 = .65; Anx6 = .37; Anx7 = .73; Dep7 = .76; Str8 = .71; Anx8 = .64; Dep8 = .81; Anx9 = .48; Dep9 = .79; Str9 = .72; Anx10 = .80; Str10 = .75; Anx11 = .64; Dep10 = .69; Str11 = .66; Str12 = .79; Dep11 = .76; Str13 = .60; Anx12 = .62; Dep12 = .75; Dep13 = .81; Str14 = .76; Anx13 = .68; Anx14 = .36; Dep14 = .63.
	Time 3	Yes	Psychological Distress Time 3: Str1 = .80; Anx1 = .62; Dep1 = .84; Anx2 = .73; Dep2 = .73; Str2 = .80; Anx3 = .73; Str3 = .80; Anx4 = .74; Dep3 = .73; Str4 = .85; Str5 = .84; Dep4 = .87; Str6 = .67; Anx5 = .77; Dep5 = .85; Dep6 = .85; Str7 = .85; Anx6 = .60; Anx7 = .80; Dep7 = .88; Str8 = .79; Anx8 = .73; Dep8 = .91; Anx9 = .78; Dep9 = .85; Str9 = .85; Anx10 = .87; Str10 = .88; Anx11 = .89; Dep10 = .87; Str11 = .77; Str12 = .84; Dep11 = .87; Str13 = .83; Anx12 = .88; Dep12 = .82; Dep13 = .86; Str14 = .84; Anx13 = .80; Anx14 = .78; Dep14 = .74
Two-factor model: Depression (14 items) and Tense (28 items from the Anxiety and Stress scales).	Time 1	Dep: Yes Tense: Most	Depression: Dep1 = .76; Dep2 = .76; Dep3 = .70; Dep4 = .85; Dep5 = .76; Dep6 = .83; Dep7 = .81; Dep8 = .88; Dep9 = .85; Dep10 = .75; Dep11 = .80; Dep12 = .80; Dep13 = .85; Dep14 = .68 Tense: Anx1 = .46; Anx2 = .58; Anx3 = .67; Anx4 = .79; Anx5 = .48; Anx6 = .39; Anx7 = .75; Anx8 = .65; Anx9 = .49; Anx10 = .82; Anx11 = .66; Anx12 = .64; Anx13 = .70; Anx14 = .38; Str1 = .77; Str2 = .77; Str3 = .79; Str4 = .80; Str5 = .79; Str6 = .57; Str7 = .67; Str8 = .73; Str9 = .75; Str10 = .77; Str11 = .68; Str12 = .81; Str13 = .62; Str14 = .78.
	Time 3	No	Depression: Dep1 = .87; Dep2 = .77; Dep3 = .77; Dep4 = .91; Dep5 = .89; Dep6 = .88; Dep7 = .91; Dep8 = .94; Dep9 = .89; Dep10 = .90; Dep11 = .89; Dep12 = .84; Dep13 = .88; Dep14 = .78 Tense: Anx1 = .63; Anx2 = .75; Anx3 = .74; Anx4 = .75; Anx5 = .78; Anx6 = .61; Anx7 = .81; Anx8 = .74; Anx9 = .79; Anx10 = .88; Anx11 = .90; Anx12 = .90; Anx13 = .81; Anx14 = .80; Str1 = .82; Str2 = .82; Str3 = .81; Str4 = .86; Str5 = .85; Str6 = .68; Str7 = .86; Str8 = .80; Str9 = .86; Str10 = .90; Str11 = .78; Str12 = .86; Str13= .84; Str14 = .85.

Appendix 2.6 (continued).

Model		FLs>.60	FLs
Three-factor model: Depression, Anxiety, and Stress factors (14 items per factor).	Time 1	Dep: Yes Anx: No Str: Yes	Depression Dep1 = .76; Dep2 = .76; Dep3 = .70; Dep4 = .85; Dep5 = .76; Dep6 = .83; Dep7 = .81; Dep8 = .88; Dep9 = .85; Dep10 = .75; Dep11 = .80; Dep12 = .80; Dep13 = .85; Dep14 = .68. Anxiety Anx1 = .47; Anx2 = .59; Anx3 = .68; Anx4 = .81; Anx5 = .49; Anx6 = .39; Anx7 = .77; Anx8 = .67; Anx9 = .51; Anx10 = .84; Anx11 = .68; Anx12 = .65; Anx13 = .71; Anx14 = .39. Stress Str1 = .78; Str2 = .78; Str3 = .80; Str4 = .81; Str5 = .80; Str6 = .58; Str7 = .68; Str8 = .74; Str9= .76; Str10 = .78; Str11 = .69; Str12 = .82; Str13 = .63; Str14 = .79.
	Time 3	Dep: Yes Anx: Yes	Depression Dep1= .87; Dep2 = .77; Dep3 = .77; Dep4 = .91; Dep5 = .89; Dep6 = .88; Dep7 = .91; Dep8 = .94; Dep9 = .89; Dep10 = .90; Dep11 = .89; Dep12 = .84; Dep13 = .88; Dep14 = .78. Anxiety Anx1 = .64; Anx2 = .76; Anx3 = .76; Anx4 = .77; Anx5 = .79; v19Anx6 = .62; Anx7 = .83; Anx8 = .76; Anx9 = .81; Anx10 = .90; Anx11 = .92; Anx12 = .92; Anx13 = .83; Anx14 = .81. Stress Str1 = .83; Str2 = .83; Str3 = .82; Str4 = .88; Str5 = .86; Str6 = .69; Str7 = .87; Str8 = .81; Str9 = .87; Str10 = .91; Str11 = .79; Str12 = .87; Str13 = .85; Str14 = .86.

FLs = standardised factor loadings. FLs < .60?* = factor loadings were substantially less than .60. *N* = 216. Dep = Depression. Anx = Anxiety. Str = Stress.

Appendix 2.7: Steps in the post-hoc modelling for Anxiety, Depression, and Stress scales of the DASS-42.

Scale	Model details	Correctly Specified	Model fit and observations	FLa<.60?	Item FLs
Anxiety	14 items, 3-factor	Ok	Time 1: S-Bχ^2=133.24, *df*=74, *p*=.00. RMSEA=.06, *p* close=.13. CFI=.98, SRMR=.11, GFI=.97. Latent variable correlations (Latent r) between Factors 1 and 2 = .76; 1 and 3 = .77; 2 and 3 = .96. Time 3: S-Bχ^2=121.27, *df*=74, *p*=.03. RMSEA=.06, *p* close=.32. CFI=.99, SRMR=.06, GFI=.99. Latent r between Factors 1 and 2 = .89; 1 and 3 = .96; 2 and 3 = .97. Latent r between Factors 2 and 3 approached 1 at Time 1 and 3. A combined model for these factors was investigated for convergent validity.	Time 1: No Time 3: Yes	Time 1: Factor 1 Anxiety Physiology – 1 (.62); 2 (.49); 3 (.54); 4 (.69); 5 (.67); 6 (.82); 7 (.58). Factor 2 Situational Anxiety – 1 (.74); 2 (.78); 3 (.72). Factor 3: Subjective Experience of Subjective Affect (SESA) – 1 (.89); 2 (.63); 3 (.70); 4 (.50). Time 3:Factor 1 Anxiety Physiology – 1 (.82); 2 (.69); 3 (.69); 4 (.81); 5 (.83); 6 (.81); 7 (.86). Factor 2 Situational Anxiety – 1 (.87); 2 (.72); 3 (.91). Factor 3: Subjective Experience of Subjective Affect – 1 (.86); 2 (.89); 3 (.83); 4 (.87).
Stress	14 items, 4-factor	Ok	Time 1: S-Bχ^2=124.92, *df*=71, *p*=.00. RMSEA=.06, *p* close=.18. CFI=.99, SRMR=.06, GFI=.99. Latent r between factors 1 and 2 = .95; 1 and 3 = .93; 1 and 4 = .80. 2 and 3 = 1.05; 2 and 4 = .84. 3 and 4 = .82. Time 3: S-Bχ^2=148.60, *df*=71, *p*=.00. RMSEA=.07, *p* close=.02. CFI=.99, SRMR=.04, GFI=1.00. Latent r between factors 1 and 2 = .93; 1 and 3 = .91; 1 and 4 = .86. 2 and 3 = 1.03; 2 and 4 = .92. 3 and 4 = .95. Although other large latent variable correlations were observerd, the degree of association between conceptually similar factors –Factors 3 and 4 – approached 1. The model fit for a combined model for these factors was investigated.	Yes	Time 1: Factor 1 Stress Physiology– 1 (.78); 2 (.77); 3 (.78); 4 (.78); 5 (.80). Factor 2 Easily Upset / Agitated– 1 (.79); 2 (.80); 3 (.81). Factor 3 Irritable / Over-Reactive – 1 (.81); 2 (.69); 3 (.78). Factor 4 Impatient – 1 (.72); 2 (.83); 3 (.79). Time 3: Factor 1 Stress Physiology – 1 (.85); 2 (.91); 3 (.84); 4 (.88); 5 (.88). Easily Upset / Agitated – 1 (.86); 2 (.81); 3 (.88). Factor 3 Irritable / Over-Reactive – 1 (.84); 2 (.90); 3 (.88). Factor 4 Impatient – 1 (.75); 2 (.87); 3 (.93).

Appendix 2.7 (continued).

Scale	Model details	Correctly Specified	Model fit and observations	FLa<.60?	Item FLs
Depression	14 items, 7-factor	Ok	Time 1: S-Bχ^2=94.96, *df*=56, *p*=.00. RMSEA=.06, *p* close=.27. CFI=.99, SRMR=.06, GFI=.99	Yes	Time 1: Factor 1 Lack of Interest – 1 (.85); 2 (.84); Factor 2 Inertia– 1 (.80); 2 (.77); Factor 3 Anhedonia – 1 (.86); 2 (.75); Factor 4 Dysphoria – 1 (.85); 2 (.91); Factor 5 Hopelessness – 1 (.83); 2 (.70); Factor 6 Devaluation – 1 (.81); 2 (.83); Factor 7 Self Depreciation – 1 (.94); 2 (.95).

Factor	1	2	3	4	5	6	7
1. Lack of Interest	1.00						
2. Inertia	.86	1.00					
3. Anhedonia	.97	.87	1.00				
4. Dysphoria	.75	.76	.93	1.00			
5. Hopelessness	.98	.89	.84	.96	1.00		
6. Devaluation	.79	.95	.86	.89	1.17	1.00	
7. Self Depreciation	.65	.63	.74	.79	1.04	.96	1.00

Time 3: S-Bχ^2=45.76, *df*=56, *p*=.83. RMSEA=.00, *p* close=1.00. CFI=1.00, SRMR=.03, GFI=1.00.

	1	2	3	4	5	6	7
1. Lack of Interest							
2. Inertia	1.01						
3. Anhedonia	1.03	.87					
4. Dysphoria	.94	.89	.96				
5. Hopelessness	1.04	.90	1.05	1.01			
6. Devaluation	1.00	.89	1.01	.96	1.18		
7. Self Depreciation	.96	.85	.87	.90	1.10	1.08	

Many large latent variable correlations observed at Time 1 and Time 3.

Time 3: Factor 1 Lack of Interest – 1 (.89); 2 (.88); Factor 2 Inertia – 1 (.80); 2 (.79); Factor 3 Anhedonia – 1 (.94); 2 (.89); Factor 4 Dysphoria – 1 (.91); 2 (.91); Factor 5 Hopelessness – 1 (.85); 2 (.74); Factor 6 Devaluation – 1 (.86); 2 (.85); Factor 7 Self Depreciation – 1 (.94); 2 (.92)..

Note: FLs=standardised factor loading. FLs < .60?* = factor loadings were substantially less than .60. *N* = 216.

Appendix 3: Results.

1. Univariate and distribution statistics for the observed variables for the path analysis.
2. Correlations between the variables in the path analysis.
3. Parcels for the items of the 37 item version of the Depression, Anxiety, and Stress scale.
4. Parcels for the remaining 39 items of the Motivated Strategies for Learning Questionnaire – Self Regulated Learning.
5. Model fit statistics for analysis of gender differences (Δ) for the revised versions of Model 1a and 1b. (Highlighted areas indicated differences between males and females).
6. Full output for the revised versions of Models 1a and 1b applied to males and females separately.
7. Model fit statistics for the analysis of gender differences for the revised versions of Models 4a (Depression Negativity), 4b (Anxiety Physiology), 4c (Stress Impatient), and 4d (Psychological Distress).
8. Full output for the revised versions of Models 4a (Depression Negativity), 4b (Anxiety Physiology), 4c (Stress Impatient), and 4d (Psychological Distress) applied to males and females separately.
9. Full table of the model fit statistics for analysis of gender differences for the revised versions of Models5c and 6c.
10. Path estimates from the model shown for the final versions of the final versions of Models 5 and 6.

Appendix 3.1: Univariate and distribution statistics for the observed variables for the path analysis.

Variable	*M*		*SD*		Cronbach's alpha		Skewness				Kurtosis			Skewness & Kurtosis	
	This study	Ingle-dew	This study	Ingle-dew	This study	Ingle-dew	This study	Z-Score	*p*	Ingle-dew	This study	Z-Score	*p*	χ^2	*p*
Ability	3.73	4.11	0.69	0.68	.74	.71	-0.35	-2.11	.04	-0.46	0.00	0.16	.88	4.49	.12
Commit	4.09	4.41	0.77	0.67	.88	.89	-1.09	-5.59	.00	-1.70	1.57	3.12	.00	40.98	.00
Competition	3.96	2.77	0.75	1.11	.82	.89	-0.54	-3.14	.00	0.08	0.12	0.49	.62	10.13	.01
Complexity	3.26	3.43	0.75	0.84	.69	.67	-0.19	-1.14	.25	-0.53	0.04	0.16	.88	1.33	.51
Conflict	2.07	1.99	0.82	0.71	.87	.77	0.76	4.20	.00	0.70	0.42	1.26	.21	19.19	.00
Control	3.84	3.71	0.61	0.80	.67	.73	-0.21	-1.29	.20	-0.48	0.01	0.19	.85	1.70	.43
Difficulty	2.85	3.55	0.92	0.95	.89	.88	0.19	0.67	.51	-0.62	-0.67	-2.52	.01	6.81	.03
Feedback	3.12	3.10	0.92	0.88	.88	.84	0.05	0.32	.75	-0.14	-0.58	-2.34	.02	5.57	.06
Personal	4.02	3.34	0.73	1.16	.71	.85	-0.69	-3.87	.00	-0.35	0.45	1.32	.19	16.67	.00
Publicness	3.99	3.48	0.87	1.03	.88	.89	-0.89	-4.44	.00	-0.21	0.35	1.09	.28	20.86	.00
Specificity	3.65	4.01	1.19	0.76	.92	.73	-0.69	-3.87	.00	-0.69	-0.56	-2.23	.03	19.97	.00
Success Expectation	3.72	4.01	0.72	0.82	.84	.87	-0.24	-1.43	.15	-0.79	-0.12	-0.26	.78	2.11	.35
Support	3.72	3.54	0.73	0.75	.71	.64	-0.33	-1.98	.05	-0.64	-0.18	-0.48	.63	4.15	.13
Time	3.41	3.48	0.67	0.88	.54	.74	-0.32	-1.93	.05	-0.60	0.29	0.95	.34	4.64	.10
Tools	3.64	3.77	0.70	0.77	.74	.77	-0.48	-2.80	.01	-0.47	0.24	0.81	.42	8.48	.01
Value	4.24	4.35	0.72	0.71	.86	.87	-1.15	-5.82	.00	-1.38	1.54	3.09	.00	43.40	.00
Depression	0.40	na	0.44	na	.91	na	1.69	7.57	.00	na	3.47	4.76	.00	79.94	.00
Anxiety	0.31	na	0.31	Na	.80	na	1.32	6.42	.00	na	1.62	3.19	.00	51.40	.00
Stress	0.62	na	0.52	Na	.92	na	0.87	4.69	.00	na	0.43	1.29	.20	23.64	.00

Note: Highlighted areas indicate where the hypothesis that the variable was normally distributed for skewness and / or kurtosis was rejected. na = not applicable

Appendix 3.2: Correlations between the variables in the path analysis.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1.Ability	1.00																		
2.Commitment	.45*	1.00																	
3.Competition	.15*	.34*	1.00																
4.Complexity	-.51*	-.21*	-.05	1.00															
5.Conflict	-.38*	-.67*	-.17*	.33*	1.00														
6.Control	.60*	.48*	.12	-.40*	-.41*	1.00													
7.Difficulty	-.67*	-.31*	-.05	.71*	.42*	-.53*	1.00												
8.Feedback	.23*	.08	.10	-.17*	-.12	.25*	-.22*	1.00											
9.Personal	.33*	.69*	.16*	-.08	-.48*	.39*	-.21*	.09	1.00										
10.Public	.46*	.74*	.28*	-.19*	-.51*	.39*	-.33*	.10	.52*	1.00									
11.Specific	.20*	.47*	.01	-.06	-.29*	.26*	-.09	.07	.37*	.31*	1.00								
12. Success Expectation	.77*	.53*	.21*	-.48*	-.44*	.61*	-.66*	.08	.40*	.50*	.23*	1.00							
13.Support	.45*	.34*	.11	-.21*	-.22*	.41*	-.36*	.44*	.31*	.29*	.20*	.35*	1.00						
14.Time	.40*	.19*	-.02	-.32*	-.29*	.44*	-.36*	.28*	.09	.10	.17*	.35*	.29*	1.00					
15.Tools	.73*	.42*	.13	-.44*	-.35*	.62*	-.60*	.26*	.32*	.36*	.21*	.66*	.46*	.50*	1.00				
16.Value	.34*	.84*	.26*	-.07	-.65*	.43*	-.18*	.08	.68*	.66*	.43*	.48*	.26*	.13	.32*	1.00			
17.Depression 14 Time 1	-.39*	-.17*	.04	.30*	.13*	-.36*	.29*	-.14*	-.24*	-.08	-.18*	-.31*	-.27*	-.36*	-.41*	-.08	1.00		
18.Anxiety 14 Time 1	-.28*	-.07	.03	.27*	.04	-.29*	.22*	-.14*	-.19*	-.05	-.06	-.22*	-.23*	-.23*	-.27*	.01	.70*	1.00	
19.Stress 14 Time 1	-.27*	-.02	.05	.32*	.07	-.31*	.26*	-.14*	-.10	.03	-.07	-.21*	-.18*	-.37*	-.29*	.07	.70*	.79*	1.00

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

Appendix 3.3 Parcels for the items of the 37 item version of the Depression, Anxiety, and Stress scale.

Scale	Sub-Factor	Parcel 1 (7)	Parcel 2 (6)	Parcel 3 (6)	Parcel 4 (6)	Parcel 5 (6)	Parcel 6 (6)
Depression	A & M	LI: 16Dep 5 DY: 26Dep 9	LI: 31 Dep 10 DY: 13Dep 4	AN: 24 Dep 8	AN: 3 Dep 1	IN: 5 Dep 2	IN: 42 Dep 14
	Negativity	DE: 21 Dep 7	DE: 38 Dep 12	SD: 17 Dep 6	SD: 34 Dep 11	HO: 37 Dep 13	HO: 10 Dep 3
Anxiety	Physiology	AA: 2 Anx 1	AA: 4Anx 2	AA: 19 Anx 6 SME: 41 Anx 14	AA: 23 Anx 8	AA: 25 Anx 9	SME: 7 Anx 3
	Affect	SA: 40 Anx 13	SA 30 Anx 11	SESA: 15 Anx 5	SA: 9 Anx 4 SESA: 28 Anx 10	SESA: 20 Anx 7	SESA: 36 Anx12
Stress	Affect	EU: 1 Str 1	EU: 11 Str 4	EU: 39 Str 14	IR: 6 Str 2	IR: 18 St r7	IR: 27 Str 9
	Impatient	IM: 32 Str 11	-	-	-	IM: 35 Str 13	IM: 14 Str 6

Note: Number of items per parcel in parenthesis. LI 16 Dep 5 = Lack of Interest, item 16 of 42, 5th Depression item. Dep=Depression; LI = Lack of Interest, AN = Anhedonia, IN=Inert, DY=Dyshporia, Negativity: DE=Devaluation, SD =Self Depreciation, HO=Hope, Physiology: AA=Autonomic Arousal (5); SME=Skeletal Muscular Effects (2); SA=Situational Anxiety (3); SESA= Subjective Experience of Subjective Affect (4), EU=Easily Upset; IR=Irritable / Over-reactive; IM=Impatient

Appendix 3.4: Parcels for the remaining 39 items of the Motivated Strategies for Learning Questionnaire – Self Regulated Learning.

Parcel	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
1 (9)	Crit 2	Elab 4	Org 3	Reh 2	SR 2	SR 7	Stu 4	Eff 2	Stu 8r	
2 (10)	Crit 3	Elab 1	Org 4	Reh 3	SR 4	SR 9	Stu 5	Eff 4	Stu 7r	Help 2
3 (10)	Crit 4	Elab 2	Org 1	Reh 4	SR 5	SR 11	Stu 1	Stu 3r	Eff 3r	Help 3
4 (10)	Crit 5	Elab 3	Org 2	Reh 1	SR 6	SR 12	Stu 2	Stu 6	Eff 1r	Help 4

Note: Number of parenthesis = number of the items in the parcel. Crit 2 = 2nd item of the Critical Thinking Scale. Elab = Elaboration; Org=Organisation; Reh=Rehearsal; SR= Self Regulated Learning; Stu=Study and Time Management; Eff=Effort; and Help=Help Seeking.

Appendix 3.5 Model fit statistics for analysis of gender differences (Δ) for the revised versions of Model 1a and 1b. (Highlighted areas indicated differences between males and females).

Model	Δ**	Model fit and Observations
Model A: Males*	na	Model 1a: S-Bχ^2=35.96, *df*=33, *p* =.35; RMSEA=.03, *p* close =.69. Variance explained: Depression Negativity = .10, Stress Impatient=.20 and Anxiety Physiology=.02. Model 1b: S-Bχ^2=100.48, *df*=79, *p* =.05; RMSEA=.05, *p* close =.45. Variance Explained in Psychological Distress=.23.
Model B: Females*	na	Model 1a: S-Bχ^2=27.06, *df*=33, *p* =.76; RMSEA=.00. *p* close =.95. Variance explained: Depression Negativity = .09, Stress Impatient=.12 and Anxiety Physiology=.07. Model 1b: S-Bχ^2=72.86, *df*=79, *p* =.67; RMSEA=.00, *p* close =.97. Variance Explained in Psychological Distress=33.
Model C: Males and Females simultaneously*	na	Model 1a: S-Bχ^2=63.15, *df*=66, *p* =.57; RMSEA=.00. *p* close =.94. Model 1b: S-Bχ^2=173.64, *df*=158, *p* =.19; RMSEA=.03, *p* close =.89.
Model D: Covariance between exogenous goal dimensions equalised*	No	Model 1a: S-Bχ^2=112.96, *df*=111, *p* =.43; RMSEA=.01, *p* close =.94. ÄS-Bχ^2=49.83, Δdf=45, *p*=.29 Model 1b: S-Bχ^2=228.92, *df*=203, *p* =.10; RMSEA=.04, *p* close =.87. ÄS-Bχ^2=55.22, Δdf=45, *p*=.14
Model E: Structural relations between goal dimensions and Success Expectation-Value relationship equalised*	No	Model1a: S-Bχ^2=126.25, *df*=124, *p* =.43; RMSEA=.01, *p* close =.95. ÄS-Bχ^2=62.07, Δdf=58, *p*=.30. Model 4: S-Bχ^2=239.75, *df*=216, *p* =.47; RMSEA=.03, *p* close =.91. ÄS-Bχ^2=66.07, Δdf=58, *p*=.22
Model F: Structural relations between goal dimensions and psychological distress variables equalised*	No	Model 1b: S-Bχ^2=128.56, *df*=130, *p* =.52; RMSEA=.00, *p* close =.97. ÄS-Bχ^2=65.42, Δdf=64, *p*=.43. Model 4: S-Bχ^2=241.68, *df*=218, *p* =.13; RMSEA=.03, *p* close =.91. ÄS-Bχ^2=68.02, Δdf=60, *p*=.22.

Note. *N*=103 for males, and 113 for females. * It was concluded that the model was correctly specified. ** A test of the increase in ÄS-Bχ^2 relative to the increase in *df*. It was concluded that the magnitude parameters in the model were relatively similar for both males and females when the parameters for the male and female models were constrained to be equal, and the resulting increase in ÄS-Bχ^2 relative to the gain in *df* (that is, a ÄS-Bχ^2) was not statistically significant (that is, $p < .05$).

Appendix 3.6: Full output for the revised versions of Models 1a and 1b applied to males and females separately.

Endogenous Variable	Exogenous Variable	Gender	Model Parameters		
			US	SE	SC
Depression Negativity	Value	Males	.07	.07^{ns}	.14
		Females	.09	.08^{ns}	.13
	Success Expectation	Males	-.22	.09*	-.38
		Females	-.23	.08*	-.36
Stress Impatient	Value	Males	.18	.09^{ns}	.25
		Females	.15	.11^{ns}	.16
	Success Expectation	Males	.07	.17^{ns}	.08
		Females	.04	.14^{ns}	.05
	Control	Males	-.36	.16*	-.48
		Females	.42	.16*	-.41
Anxiety Physiology	Value	Males	-.02	.04^{ns}	-.05
		Females	.06	.06^{ns}	.14
	Success Expectation	Males	-.04	.06^{ns}	-.11
		Females	-.13	.06*	-.32
Psychological Distress	Value	Males	.11	.05*	.22
		Females	.16	.09ns	.25
	Success Expectation	Males	-.09	.13ns	-.15
		Females	-.08	.08ns	-.13
	Control	Males	-.22	.08*	-.42
		Females	-.41	.12*	-.57
Value	Competition	Males	.05	.08^{ns}	.05
		Females	.11	.06^{ns}	.11
	Conflict	Males	-.57	.11*	-.60
		Females	-.41	.08*	-.49
	Publicness	Males	.09	.13^{ns}	.11
		Females	.31	.08*	.36
	Specificity	Males	.11	.06^{ns}	.16
		Females	.05	.04^{ns}	.08

Appendix 3.6 (continued)

Endogenous Variable	Exogenous Variable	Gender	Model Parameters		
			US	SE	SC
Value (continued)	Difficulty	Males	.35	.11*	.43
		Females	.39	.10*	.52
	Success Expectation	Males	.48	.22*	.41
		Females	.45	.13*	.48
Success Expectation	Lack of Control	Males	-.06	.03^{ns}	-.14
		Females	-.18	.05*	-.35
	Control	Males	.24	.12*	.28
		Females	.07	.18^{ns}	.06
	Difficulty	Males	-.28	.08*	-.40
		Females	-.38	.08*	-.46
	Feedback	Males	-.25	.09*	-.37
		Females	-.08	.07^{ns}	-.10
	Support	Males	.26	.13*	.29
		Females	.04	.12^{ns}	.04
	Publicness	Males	.19	.07*	.26
		Females	.25	.08*	.27

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. * = significant effect, such that Critical Ratio (US/SE) > 1.96, $p<.05$. ns = not significant

Appendix 3.7 Model fit statistics for the analysis of gender differences for the revised versions of Models 4a (Depression Negativity), 4b (Anxiety Physiology), 4c (Stress Impatient), and 4d (Psychological Distress).

Model	Δ**		Model fit and Observations
Model A: Males*	na	4a	S-Bχ^2=43.17, *df*=34, *p*=.13; RMSEA=.05, *p* close=.45. Variance explained: Depression Negativity at Time 3 = .29. Academic Performance = .31
		4b	S-Bχ^2=32.77, *df*=34, *p*=.52; RMSEA=.00, *p* close=.84. Variance explained: Anxiety Physiology at Time 3 = .08. Academic Performance = .34
		4c	S-Bχ^2=34.67, *df*=33, *p*=.39; RMSEA=.02, *p* close=.74. Variance explained: Stress Impatient at Time 3 = .30. Academic Performance = .34
		4d	S-Bχ^2=211.51, *df*=200, *p*=.27; RMSEA=.03, *p* close=.95. Variance explained: Psychological Distress at Time 3 = .15. Academic Performance = .34
Model B: Females*	na	4a	S-Bχ^2=33.50, *df*=34, *p*=.49; RMSEA=.00, *p* close=.84. Variance explained: Depression Negativity at Time 3 = .28. Academic Performance = .31
		4b	S-Bχ^2=39.45, *df*=34, *p*=.24; RMSEA=.04, *p* close=.63. Variance explained: Anxiety Physiology at Time 3 = .14. Academic Performance = .32
		4c	S-Bχ^2=30.19, *df*=33, *p*=.67; RMSEA=.00, *p* close=.89. Variance explained: Stress Impatient at Time 3 = .23. Academic Performance = .31
		4d	S-Bχ^2=229.14, *df*=200, *p*=.08; RMSEA=.04, *p* close=.86. Variance explained: Psychological Distress at Time 3 = .35. Academic Performance = .31
Model C: Males and Females simultaneously*	na	4a	S-Bχ^2= 73.43, *df* = 68, *p* = .30; RMSEA= .03. *p* close = .81.
		4b	S-Bχ^2= 73.27, *df* = 68, *p* = .31; RMSEA= .03. *p* close = .81.
		4c	S-Bχ^2= 64.91, *df*= 66, *p* = .51; RMSEA= .00. *p* close = .91.
		4d	S-Bχ^2= 441.63, *df*= 400, *p* = 07; RMSEA= .03, *p* close = 97.
Model D: Covariance between exogenous goal dimensions equalised*	No	4a	S-Bχ^2 = 128.40, *df* = 113, *p* = .15; RMSEA = .04, *p* close = .78. ÄS-Bχ^2 = 55.54, Δ*df* = 45, *p* = .13.
	No	4b	S-Bχ^2 = 123.85, *df* = 113, *p* = .23; RMSEA = .03, *p* close = .85. ÄS-Bχ^2 = 50.68, Δ*df* = 45, *p* = .26.
	No	4c	S-Bχ^2 = 123.35, *df* = 111, *p* = .33; RMSEA = .02, *p* close = .91. ÄS-Bχ^2 = 51.59; Δ*df* = 45, *p* = .23.
	No	4d	S-Bχ^2 = 498.55, *df* = 445, *p* = .04; RMSEA = .03, *p* close = .97; ÄS-Bχ^2 = 56.95, Δ*df* = 45, *p* = .11.

Appendix 3.7 (continued).

Model	Δ**		Model fit and Observations
Model E: Structural relations between goal dimensions and Success Expectation-Value relationship equalised*	No	4a	S-Bχ^2 = 141.73, *df*= 125, *p* = .15; RMSEA= .04, *p* close = .80. ÄS-Bχ^2= 68.75, Δ*df*= 57, *p*= .14
	No	4b	S-Bχ^2 = 137.20, *df*= 125, *p* = .21; RMSEA= .30, *p* close = .86. ÄS-Bχ^2= 63.94, Δ*df*= 57, *p*= .25.
	No	4c	S-Bχ^2 = 129.04, *df*= 123, *p* = .34; RMSEA= .02, *p* close = .92. ÄS-Bχ^2= 63.69, Δ*df*= 57, *p*= .25.
	No	4d	S-Bχ^2 = 511.45, *df*= 457, *p* = .04; RMSEA= .03, *p* close = .97. ÄS-Bχ^2= 69.85, Δ*df*= 57, *p*= .12.
Model F: Structural relations between goal dimensions and psychological distress variables equalised*	No	4a	S-Bχ^2= 148.95, *df*= 134, *p* = .18; RMSEA= .03, *p* close = .85. ÄS-Bχ^2= 75.79, Δ*df*= 66, *p*= .19.
	No	4b	S-Bχ^2= 143.57, *df*= 134, *p* = .27; RMSEA= .03, *p* close = .91. ÄS-Bχ^2= 70.29, Δ*df*= 66, *p*= .33.
	No	4c	S-Bχ^2= 135.20, *df*= 133, *p* = .43; RMSEA= .01, *p* close = .96. ÄS-Bχ^2= 70.10, Δ*df*= 67, *p*= .37.
	No	4d	S-Bχ^2= 519.23, *df*= 467, *p* = .05; RMSEA= .03, *p* close = .98. ÄS-Bχ^2= 77.62, Δ*df*= 67, *p*= .18.

Note. *N*=103 for males, and 113 for females. * It was concluded that the model was correctly specified. ** A test of the increase in ÄS-Bχ^2 relative to the increase in *df*. It was concluded that the magnitude parameters in the model were relatively similar for both males and females when the parameters for the male and female models were constrained to be equal, and the resulting increase in ÄS-Bχ^2 relative to the gain in *df* (that is, a ÄS-Bχ^2) was not statistically significant (that is, $p < .05$).

Appendix 3.8: Full output for the revised versions of Models 4a (Depression Negativity), 4b (Anxiety Physiology), 4c (Stress Impatient), and 4d (Psychological Distress) applied to males and females separately.

	Endogenous Variable	Exogenous Variable	Gender	Model Parameters		
				US	SE	SC
Model 4a	Depression Negativity Time 3	Value	Male	.01	.06^{ns}	02
			Female	-.10	.08^{ns}	-.12
		Success Expectation	Male	.06	.06^{ns}	.08
			Female	-.07	.07^{ns}	-.09
		Depression Negativity Time 1	Male	.79	.16*	.60
			Female	.59	.15*	.46
	Academic Performance	Depression Negativity Time 1	Male	-12.77	19.34^{ns}	-.07
			Female	2.66	12.75^{ns}	.02
Model 4b	Anxiety Physiology Time 3	Value	Male	.09	.06^{ns}	.17
			Female	.05	.07^{ns}	.07
		Success Expectation	Male	.00	.06^{ns}	.00
			Female	-.06	.09^{ns}	-.08
		Anxiety Physiology Time 1	Male	.36	.16*	.24
			Female	.62	.23*	.35
	Academic Performance	Anxiety Physiology Time 1	Male	17.41	9.08^{ns}	.11
			Female	5.84	10.00^{ns}	-.10
Model 4c	Stress Impatient Time 3	Value	Male	-.01	.11^{ns}	-.01
			Female	-.09	.15^{ns}	-.08
		Success Expectation	Male	.29	.14*	.24
			Female	-.04	.13^{ns}	-.04
		Stress Impatient Time 1	Male	.70	.15*	.51
			Female	.61	.17*	.46
	Academic Performance	Stress Impatient Time 1	Male	4.55	9.44^{ns}	.05
			Female	-1.11	5.96^{ns}	-.02

Appendix 3.8 (continued).

	Endogenous Variable	Exogenous Variable	Gender	Model Parameters		
				US	SE	SC
Model 4d	Psychological Distress Time 3	Value	Male	.07	.06^{ns}	.11
			Female	-.04	.08^{ns}	-.05
		Success Expectation	Male	.03	.44^{ns}	.04
			Female	-.01	.08^{ns}	-.02
		Psychological Distress 1	Male	.51	.13*	.37
			Female	.81	.15*	.58
	Academic Performance	Psychological Distress Time 1	Male	-.35	16.43^{ns}	.00
			Female	-3.52	9.64^{ns}	.07

Note: UC = unstandardised regression coefficients. SE = standard error. SC = standardised regression coefficients. * = significant effect, such that Critical Ratio (US/SE) > 1.96, $p<.05$. ns = not significant

Appendix 3.9 Full table of the model fit statistics for analysis of gender differences for the revised versions of Models5c and 6c.

Model	Model fit and Observations
Model A: Males:	Model 6: S-Bχ^2=54.63, *df*=58, *p* =.60; RMSEA=.00, *p* close =.93. Variance explained: Depression Negativity = .04, Stress Impatient= .05 and Anxiety Physiology= .04, Progress=.34; ETS=.19; and Academic Performance = .52.
	Model 7: S-Bχ^2=133.11, *df*=118, *p* =.12; RMSEA=.04, *p* close =.78. Variance explained: Psychological Distress = .12, Progress=.34; ETS=.19; and Academic Performance = .51.
Model B: Females:	Model 6: S-Bχ^2=64.41, *df*=58, *p* =.26; RMSEA=.03, *p* close =.76. Variance explained: Depression Negativity = .17, Stress Impatient=.22 and Anxiety Physiology=.13, Progress=.47; ETS=.31; and Academic Performance = .57.
	Model 7: S-Bχ^2=144.04, *df*=118, *p* =.05; RMSEA=.04, *p* close =.63. This model was accepted as correctly specified (RMSEA criteria). Variance explained: Psychological Distress = .30, Progress=.47; ETS=.30; and Academic Performance = .54.
Model C: Males and Females simultaneously	Model 6: S-Bχ^2=119.34, *df*=146, *p* =.40; RMSEA=.02. *p* close =.94.
	Model 7: S-Bχ^2=276.37, *df*=236, *p* =.04; RMSEA=.04, *p* close =.80. This model was accepted as correctly specified (RMSEA criteria).
Model D: Covariances between predictor goal dimensions equalised:	Model 6: S-Bχ^2=172.73, *df*=161, *p* =.25; RMSEA=.03, *p* close =.93. This model was not a worse fit of the data compared to Model C, ÄS-Bχ^2=53.39, Δdf=45, p=.18.
	Model 7: S-Bχ^2=329.32, *df*=281, *p* =.03; RMSEA=.04, *p* close =.82. This model was not a worse fit of the data compared to Model C, ÄS-Bχ^2=2.96, Δdf=45, p=.19.
Model E: Structural relations between goal dimensions and Success Expectation-Value relationship equalised.	Model6: S-Bχ^2=188.85, *df*=176, *p* =.24; RMSEA=.03, *p* close =.94. This model was not a worse fit of the data compared to Model C, ÄS-Bχ^2=69.45, Δdf=59, p=.17.
	Model 7: S-Bχ^2=344.25, *df*=297, *p* =.03; RMSEA=.04, *p* close =.86. This model was not a worse fit of the data compared to Model C, ÄS-Bχ^2=67.87, Δdf=61, p=.26
Model F: Structural relations between goal dimensions and psychological distress variables equalised:	Model 6: S-Bχ^2=211.58, *df*=200, *p* =.27; RMSEA=.02, *p* close =.96. This model was not a worse fit of the data compared to Model C, ÄS-Bχ^2=92.20, Δdf=84, p=.25.
	Model 7: S-Bχ^2=359.91, *df*=311, *p* =.13; RMSEA=.04, *p* close =.87. This model was not a worse fit of the data compared to Model C, ÄS-Bχ^2=88.54, Δdf=75, p=.23.

Note. *N*=103 for males, and 113 for females

Appendix 3.10: Path estimates from the model shown for the final versions of the final versions of Models 5 and 6.

Endogenous Variable	Exogenous Variable	Male			Female		
		UC	SE	SC	UC	SE	SC
Depression Negativity Time 3 (Model 5c)	Value	.11	.09ns	.17	-.01	.10ns	-.01
	Success Expectation	-.14	.12ns	-.18	-.11	.13ns	-.14
	Self, Study, and Time Management	-.09	.06ns	-.19	-.10	.08ns	-.17
	Progress	.07	.09ns	.12	-.16	.11ns	-.21
Anxiety Physiology Time3 (Model 5c)	Value	.11	.06ns	.21	.16	.09ns	.19
	Success Expectation	-.04	.09ns	-.06	-.09	.13ns	-.12
	Self, Study, and Time Management	-.05	.05ns	-.14	-.15	.08ns	-.26
	Progress	.05	.08ns	.12	-.10	.12ns	-.14
Stress Impatient Time 3 (Model 5c)	Value	.15	.06ns	.14	.12	.17ns	.10
	Success Expectation	-.04	.09ns	.14	-.11	.16ns	-.09
	Self, Study, and Time Management	-.01	.08ns	-.02	-.37	.11*	-.43
	Progress	.05	.08ns	-.06	.07	.14ns	-.06
Psychological Distress Time 3 (Model 6c)	Value	.37	.13*	.55	.31	.13*	.34
	Success Expectation	-.05	.14ns	-.06	-.15	.12ns	-.18
	Conflict	.27	.17ns	.42	.23	.13ns	.30
	Progress	.09	.06ns	.13	-.10	.10ns	-.12
	Self, Study, and Time Management	-.09	.06ns	-.17	-.22	.08*	-.35
Self, Study, and Time Management[a]	Value	.40	.21ns	.30	.29	.18ns	.20
	Success Expectation	.06	.31[ns]	.04	-.50	.24*	-.37
Progress[a]	Value	-.23	.14[ns]	-.20	-.14	.11[ns]	-.12
	Success Expectation	.72	.20*	.52	.58	.12*	.54
	Self, Study, and Time Management	.26	.10*	.29	.34	.09*	.44

Appendix 3.10 (continued).

Endogenous Variable	Exogenous Variable	Male			Female		
		UC	SE	SC	UC	SE	SC
Academic Performance [a]	Value	4.25	11.19[ns]	.05	10.14	7.92[ns]	.12
	Success Expectation	39.31	13.59*	.37	20.93	9.32*	.27
	Progress	28.43	8.06*	.37	41.55	8.87*	.58
	Self, Study, and Time Management	4.85	6.99[ns]	.07	-2.77	6.75[ns]	-.05
	Specificity	-8.57	5.84[ns]	-.14	-11.42	3.66*	-.25
	Feedback	-15.80	5.49*	-.22	-13.69	4.40*	-.22
	Depressed Negativity	5.34	10.08[ns]	.04	3.54	7.06[ns]	.04
	Anxiety Physiology	18.00	10.19[ns]	.11	14.10	7.33[ns]	.14
	Stress Impatient	11.35	7.50[ns]	.13	3.77	5.71[ns]	.06
	Psychological Distress	13.86	8.18[ns]	.10	7.85	7.57[ns]	.09

UC = unstandardised regression coefficient; SE = standard error; SC = standardised regression coefficient. *Critical ratio (US/SE) > 1.96, $p < .05$. ns=not significant. [a] indicates that the results from Model 5c are reported because the results from Model 5c and 6c were almost identical.