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SITUATIONAL AND DISPOSITIONAL INFLUENCES
ON STUDENT LEARNING

by

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Submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

Deakin University
December, 2005
I certify that the thesis entitled

Situational and Dispositional Influences on Student Learning

submitted for the degree of

Doctor of Philosophy

is the result of my own work and that where reference is made to the work
of others, due acknowledgment is given.

I also certify that any material in the thesis which has been accepted for
a degree or diploma by any university or institution is identified in the text.

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Date: 5 August, 2006
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# Table of Contents

Candidate Declaration ............................................................... ii  
Acknowledgements ...................................................................... iii  
Table of Contents ...................................................................... iv  
Table of Tables .......................................................................... viii  
List of Figures ........................................................................... x  
Thesis Overview ......................................................................... xi  

## Chapter One: Past Research on Student Learning ...................... 1
1.1 Overview .............................................................................. 1  
1.2 Historical Overview of Research on Learning ....................... 1  
1.3 Typologies of Research on Student Learning ....................... 4  
  1.3.1 Cognitive/Personality/Personal Style Model .................... 5  
  1.3.2 Information-Processing Model ........................................ 9  
  1.3.3 Phenomenological Model .............................................. 11  
  1.3.4 System Model ................................................................ 13  
1.4 Clarification of the term “Learning Approach” ....................... 14  
1.5 3P Model of Student Learning ............................................ 16  

## Chapter Two: The Study Process Questionnaire ......................... 26
2.1 The Study Process Questionnaire (SPQ) and its Psychometric Properties .............................................................. 26  
2.2 Generality of the SPQ across Cultures ................................. 29  
2.3 Motive-Strategy Congruency and Non-Congruency ............... 30  

## Chapter Three: Study One: Influences of Situational Factors on Student Learning ......................................................... 32
3.1 Overview .............................................................................. 32  
3.2 Distinguishing Learning Motives from Learning Strategies ........ 33  
3.3 Assessment .......................................................................... 35  
  3.3.1 Assessment Type (Essay vs. Multiple-Choice) ................. 36  
  3.3.2 Research Findings for Effects of Assessment Type on Student Learning ................................................. 39  
  3.3.3 Learning Strategies in Multiple-Choice Examinations ....... 43  
  3.3.4 Student perceptions of multiple-choice and learning strategies adopted .............................................. 45  
3.4 Assessment Weighting .......................................................... 48  
3.5 Effects of Discipline on Student Learning .............................. 49  
  3.5.1 Conceptualisation of Differences between Disciplines ...... 51  
  3.5.2 Extending Becher’s (1994) Model .................................... 54  
3.6 Effects of Gender on Student Learning .................................. 56  
3.7 Summary ............................................................................. 60  
3.8 Proposed Hypotheses ........................................................... 61  
Method ....................................................................................... 62  
3.9 Participants ......................................................................... 62  
3.10 Materials ............................................................................ 62  
3.11 Procedure .......................................................................... 63  
3.12 Design .............................................................................. 64  
Results ....................................................................................... 64  
3.13 Overview ............................................................................ 65  
3.14 Screening for Multivariate Analyses .................................... 65
3.15 Addressing assumptions that were violated ........................................... 66
3.15.1 Preliminary MANOVA (Stage 1) ...................................................... 66
3.16 Descriptive Statistics ........................................................................... 68
3.17 Main MANOVA (Stage 2) ....................................................................... 69
3.18 Adjustment to Alpha Values .................................................................. 69
3.19 Main effects ............................................................................................ 71
3.20 Interaction Effects (Stage 3) .................................................................... 72
3.20.1 Interaction Effect on Achieving Strategy ........................................... 74
3.20.2 Interaction Effects on Surface Strategy ............................................. 76
3.21 Overall Summary .................................................................................... 77
Discussion ..................................................................................................... 77
3.22.1 Multiple Choice Exam did not promote Surface Strategy in Learning ..... 80
3.22.2 Essay did not promote Deep Strategy ................................................ 81
3.23 Effects of Assessment Weighting on Learning ....................................... 83
3.23.1 Assessment Weighting x Discipline x Gender Interaction Effects ...... 84
3.23.2 A Comparison between Female and Male Business students for Effects of Assessment Weighting on Surface Strategy ........................................... 85
3.23.3 A Comparison between Female Business and Female Psychology Students on Effects of Assessment Weighting for Surface Strategy ........ 86
3.24 Effects of Discipline on Learning ............................................................ 87
3.24.1 A Comparison between Psychology and Business students on Deep and Surface Strategies ................................................................................. 87
3.24.2 A Comparison between Psychology and Business Students on Deep and Surface Learning Motives ........................................................ 89
3.25 Effect of Gender on Achieving Strategy .................................................. 90
3.25.1 Gender x Discipline Interaction Effect on Achieving Strategy .......... 91
3.26 Implications of the Present Research ...................................................... 92
3.27 Limitations of Present Research and Further Research ......................... 94
3.28 Conclusion .............................................................................................. 95

Chapter Four: Study Two: Influences of Dispositional Factors on Student Learning ....................................................................................................................... 97
4.1 Overview .................................................................................................. 97
4.2 Test Anxiety and Approaches to Learning ............................................. 98
4.3 Life values and Approaches to Learning ............................................... 101
4.3.1 Achievement life value and Learning ................................................. 103
4.3.2 Power and Learning .......................................................................... 104
4.3.3 Self-Directed life value and Learning ............................................... 105
4.3.4 Conformity life value and Learning ................................................. 107
4.4 Demographic Characteristics (Culture, Age, Discipline Type, and Gender) and Learning Approaches ................................................................. 108
4.4.1 Culture and Learning Approaches ..................................................... 109
4.4.2 Culture and SPQ Deep Approach in Learning .................................. 109
4.4.3 Culture and SPQ Achieving Approach in Learning ......................... 112
4.4.4 Power Mediating Cultural Influence on Achieving Motive ............... 114
4.5 Age and Learning Approaches .............................................................. 116
4.6 Effects of Discipline Type and Gender on Learning ............................... 117
4.7 Summary ................................................................................................ 118
4.8 Summary of Proposed Hypotheses to be Tested .................................... 119
Method ......................................................................................................... 118
4.9 Participants ............................................................................................ 120
4.10 Materials ............................................................................................... 121
4.10.1 Test Anxiety Inventory - TAI (Spielberger, 1980) ............................ 121
Chapter Five: Influences of Situational and Dispositional Factors on Student Learning ........................................ 184

5.1 Overview .......................................................................................................................... 184
5.2 Relative Importance of Dispositional and Situational Variables on Student Learning ...................... 184
5.3 Dispositional Effects on Student Learning .............................................................................. 186
5.4 Test Anxiety mediates the Effect of Assessment Weighting ..................................................... 187
5.5 Interaction of Discipline Type x Gender x Assessment Weighting on Surface Strategy ............... 187
5.6 Robustness of Student Life Values .......................................................................................... 188

Method ...................................................................................................................................... 186

5.7 Participants .......................................................................................................................... 190
5.8 Materials .............................................................................................................................. 191
5.9 Student Life Value Scales ..................................................................................................... 192
5.10 Procedure ............................................................................................................................ 192

Results ....................................................................................................................................... 193

5.11 Overview ............................................................................................................................ 193
5.12 Descriptive Statistics .......................................................................................................... 194
5.13 Hierarchical Multiple Regression ......................................................................................... 195
5.13.1 Factors predicting Learning Motives and Learning Strategies .................. 197
5.14 Test Anxiety as a Mediator of Assessment Weighting ............................. 204
5.15 Three-way interaction effect of Weighting x Gender x Discipline Type on Surface Strategy ................................................................. 205

Discussion .................................................................................................. 203
5.16 Relative Influence of Dispositional and Situational Variables on Student Learning ................................................................. 207
5.17 Dispositional Effects on Student Learning .............................................. 209
5.18 Test Anxiety as a Mediator of Assessment Weighting ......................... 213
5.19 Three-Way Interaction Effect (Assessment Weighting x Discipline Type x Gender) on Surface Strategy ...................................................... 214
5.20 Reliabilities of Student Life Values (Self-Directed, Achievement, and Power) ................................................................. 216
5.21 Effects of Age, Discipline Type, and Gender on Learning ...................... 217
5.22 Overall Summary .............................................................................. 218
5.23 Strengths, Limitations, and Future Research ....................................... 218

Chapter Six: Overall Discussion and Implications ..................................... 221
6.1 Consistent Findings from the Research ............................................... 221
6.1.1 Situational Influence on Student Learning ...................................... 222
6.1.2 Dispositional Influences on Student Learning ............................... 224
6.1.3 Age and Gender Influences on Student Learning ...................... 225
6.2 Implications for Teaching Practices .................................................. 229
6.3 Implications for Future Research ...................................................... 232

References ............................................................................................. 229

Appendices .............................................................................................. 255
Table of Tables

Table 1.1. Typologies of Student Learning Processes ..........................................5
Table 3.1. Frequency of participants under each Assessment Condition .............64
Table 3.2. Preliminary Analysis: Summary of results for influence of
Discipline on students' learning motives and strategies: Multivariate and
Univariate Analyses of Variance .................................................................67
Table 3.3. Means, Standard Deviations and Reliability coefficients for the SPQ
scales ...........................................................................................................68
Table 3.4. Summary of results for influence of Assessment Type, Assessment
Weighting, Discipline and Gender on students’ learning motives and
strategies: Multivariate and Univariate analyses of variance .....................70
Table 4.1. Frequency distribution of participants classified by Culture,
Discipline and Gender ..............................................................................121
Table 4.2. Cronbach reliability alpha coefficients of the SPQ scales for
Australian and Chinese university students .............................................124
Table 4.3. Means and standard deviations for Australian and Chinese student
samples and reliabilities of scales ...............................................................127
Table 4.4. Averaged factor loadings for items that loaded substantively and
significantly onto factors shared by Australian and Chinese students ........130
Table 4.5. Means, standard deviations and reliabilities for the Student Life
Value scales ..................................................................................................131
Table 4.6. Intercorrelations between variables used in the Multiple Regression
Analyses ......................................................................................................133
Table 4.7. Summary of hierarchical regression analysis to predict SPQ Surface
Motive ..........................................................................................................134
Table 4.8. Summary of hierarchical regression analysis to predict SPQ Surface
Strategy ......................................................................................................136
Table 4.9. Summary of hierarchical regression analysis to predict SPQ Deep
Motive ..........................................................................................................137
Table 4.10. Summary of hierarchical regression analysis to predict SPQ Deep
Strategy .......................................................................................................139
Table 4.11. Summary of hierarchical regression analysis for variables
predicting SPQ Achieving Motive ...............................................................140
Table 4.12. Summary of hierarchical regression analysis to predict SPQ
Achieving Strategy .......................................................................................142
Table 5.1. Frequency distribution of participants classified by Gender and
Discipline ....................................................................................................191
Table 5.2. Mean, standard deviations, and reliabilities of scales .......................194
Table 5.3. Inter-correlations between variables used in the Multiple Regression Analyses. ................................................................. 196

Table 5.4. Summary of hierarchical regression analysis for variables to predict SPQ Surface Motive. ...................................................... 197

Table 5.5. Summary of hierarchical regression analysis for variables to predict SPQ Surface Strategy. .................................................... 198

Table 5.6. Summary of hierarchical regression analysis for variables to predict SPQ Deep Motive. .......................................................... 199

Table 5.7. Summary of hierarchical regression analysis for variables to predict SPQ Deep Strategy. ....................................................... 201

Table 5.8. Summary of hierarchical regression analysis for variables to predict SPQ Achieving Motive. .................................................... 202

Table 5.9. Summary of hierarchical regression analysis for variables to predict SPQ Achieving Strategy. ................................................. 203

Table 5.10. Means and standard deviations of SPQ Surface Strategy for student groups by Gender, Discipline, and Assessment Weighting. ......... 205
List of Figures

Figure 1.1. The 3P model of student learning .................................................. 16

Figures 3.1. (a) – 3.1 (c). Elaborations of Becher's (1994) model representing the location of specific Psychology, Economics and Computing subjects in a two-dimensional space ................................................................. 55

Figure 3.2. Assessment Type x Discipline x Gender on Achieving Strategy ........ 72

Figure 3.3. Assessment Weighting x Discipline x Gender on Surface Strategy ... 73

Figure 3.4. Assessment Type x Gender on Achieving Strategy for Psychology students ............................................................................................................. 75

Figure 3.5. Assessment Weighting x Gender on Surface Strategy for Business students ................................................................. 76

Figure 3.6. Assessment Weighting x Discipline on Surface Strategy for female students ............................................................................................................. 77

Figure 4.1. Direct and indirect effects of independent variables on Surface Motive. .................................................................................................................. 145

Figure 4.2. Direct and indirect effects of independent variables on Surface Strategy ............................................................................................................. 147

Figure 4.3. Direct and indirect effects of independent variables on Deep Motive. .................................................................................................................. 149

Figure 4.4. Direct and indirect effects of independent variables on Deep Strategy .................................................................................................................. 150

Figure 4.5. Direct and indirect effects of independent variables on Achieving Motive ............................................................................................................. 152

Figure 4.6. Direct and indirect effects of independent variables on Achieving Strategy ............................................................................................................. 153

Figure 6.1(a). Factors influencing Surface Approach in learning ....................... 227

Figure 6.1(c). Factors influencing Achieving Approach in learning .................. 227
Thesis Overview

The need to understand student approaches to learning at university level has become increasingly important as society places more emphasis on knowledge and skills, and as education practices become modified with changes in technology and expectations. In addition, competition that now exists among higher education institutions places pressure on them to excel in quality teaching and in fostering outstanding student performance (Coaldrake & Stedman, 1998). Yet never has the student clientele been so diverse (in terms of age, gender, abilities, experiences, values, and cultural background). Thus a greater understanding of how students go about their learning appears imperative to achieve quality teaching and satisfactory student outcomes.

Empirical support is provided for the influence on students’ learning approaches from situational factors such as curriculum, teaching expertise, and assessment type (Newble & Clarke, 1985; Ramsden & Entwistle, 1981: Scouller, 1998). Support is also evident for the influence on learning approaches from dispositional variables such as conceptions of learning, ethnicity, ability, and gender (Marton, Dall’Alba, Beatty, 1993; Ramsden, Beswick, & Bowden, 1986; Van Rossum & Schenk, 1984). However, a literature search did not reveal any study that explored the relative importance of situational or dispositional factors on students’ learning motives and strategies. Moreover, no study appeared to have determined the relative influence of situational versus dispositional factors on learning nor explored interactions between situational and dispositional variables that influenced specific learning motives or strategies.
The present research seeks to systematically determine the degree to which specific situational and dispositional factors influence learning motives and strategies. Interactions between particular situational and dispositional factors are also investigated. Biggs' (1987) Study Process Questionnaire (SPQ) is used to determine the learning motives and strategies that students adopt when they study and his 3P model of student learning (1990) forms the theoretical framework of the thesis. The 1990 model is a refinement of Biggs' original 1987 model of student learning proposed when the SPQ was developed.

Chapter One provides an historical overview of research on learning from which specific research on student learning evolved as an area of study in its own right. Three different typologies of student learning process are explored. The term "learning approach" is defined and a description provided of Biggs' (1990) 3P model of student learning. A detailed account of the SPQ learning motives and strategies is also given in the chapter.

Chapter Two traces the development of the SPQ (Biggs, 1987) and identifies the assumptions underlying the instrument. The psychometric properties of the SPQ instrument and its applicability across different cultures are reviewed. Support for the reliability (internal consistency), validity (construct and convergent), and generality across cultures of the SPQ instrument is provided. Research evidence that supports a congruence between the SPQ motive and strategy, particularly for deep and surface learning approaches, is also discussed.

Chapter Three introduces the first study of the thesis. Study One investigates the effects and relative importance of the situational factors of Assessment Type
(Essay vs. Multiple-choice exam) and Assessment Weighting (30% vs. 70% value exam) on learning motives and strategies. A sample of 248 Australian undergraduates is involved in the study. Students reported how they went about their study under a hypothetical scenario of studying for an exam of a specific type and weighting. The data are analysed using MANOVA and ANOVA procedures. The results show a significant main effect of Assessment Weighting on Surface Strategy and significant three-way interaction effects: Assessment Type x Discipline x Gender for Achieving Strategy and Assessment Weighting x Discipline x Gender for Surface Strategy. Discussion of the results is carried out with respect to past findings and to Becher's (1994) conceptualization of “hard” and “soft” disciplines. Implications of the findings, limitations of the study and suggestions for further research are considered.

Chapter Four introduces the second study of the thesis. Study Two investigates the effects and relative importance of the dispositional factors of Test Anxiety, and Student Life Values on students' learning motives and strategies. Effects of demographic variables on learning are also considered. A total sample of 467 Australian and Chinese undergraduates is involved in this study. Australian and Chinese student groups are included in the study to provide a cross-cultural comparison of the effects from Student Life Values on learning motives and strategies. Test Anxiety is measured by the Test Anxiety Inventory (Spielberger, 1990) and Student Life Values are derived from the Life Value Scale (Schwartz, 1994). Student Life Values shared by the two student groups are identified through factor analysis. The reliability and validity of the above two instruments, together with further evidence of the suitability of the SPQ for cross-cultural study, are
discussed. Effects on learning from the dispositional and demographic factors are
determined by multiple regressions analyses. Unique contributions by the
independent variables on specific learning motives and strategies are reported. As
well, path diagrams are presented to illustrate direct and indirect effects on
learning. A summary of the relative overall influences of dispositional and
demographic factors on each learning motive and strategy is also presented. The
discussion relates the results to past findings and explanations to account for the
results are also presented. The chapter concludes by considering limitations of the
study, implication of the findings and future research directions.

Chapter Five introduces the third study of the thesis. Study Three brings
together the situational and dispositional factors that significantly influenced
student learning in the first two studies. The study investigates the relative
influence on learning from these two types of factors as well as certain interactions
between them. A sample of 183 Australian undergraduates is involved in this
study. The data are analysed using multiple regression analyses. The results of
Study Three replicate those of Study Two but differ from those of Study One. A
non-significant interaction effect between situational and dispositional factors is
noted and explanations offered. The chapter concludes with a discussion of the
strengths and limitations of the study and possible future research

The final chapter of the thesis, Chapter Six, summarises the consistent
findings from Studies One, Two, and Three. From this evidence, three models are
derived that represent extensions of the Presage and Process phases of Biggs’
(1990) 3P model of student learning. These models are briefly discussed. Finally,
implications for teaching practices and for future research are considered.
Chapter One
Past Research on Student Learning

1.1 Overview

This chapter provides an historical overview of research on human learning, from which specific research on student learning evolved and developed as an area of study in its own right. Three different typologies of research on student learning, as proposed by past researchers (Curry, 1983; Biggs, 1994; Sadler-Smith, 1997) are explored here as well as an examination of the relationships between Bigg’s 3P (1987,1990) system model of student learning and other models. The term “learning approach”, as defined by Biggs (1987), and a detailed account of his 3P system model are also given.

1.2 Historical Overview of Research on Learning

Research into human learning was originally based on laboratory experiments such as those carried out by Ebbinghaus (1913) and Gates (1917) who studied human learning of verbal materials (e.g., lists of nonsense trigrams and paired-associate words, etc.) that were developed by the experimenter. The focus of this sort of research was to establish general “laws of association” between stimuli and responses. For example, repetition/rehearsal of a task strengthens the association between the presented letters/words and memory of them. This attempt at establishing such principles of learning was also the focus of other research carried out on the learning of perceptual-motor tasks by human subjects (e.g., Gagne, Foster & Crowley, 1948; Miles, 1921; Perrin, 1914) and studies on
acquisition of habit and skill by animal subjects (e.g., Guthrie, 1935; Hull, 1933; Pavlov, 1927; Skinner, 1956).

As cognitive psychology emerged in the 1960s, there was a shift in emphasis from association learning to the study of human information processing. Within the information processing perspective, the learner is viewed as a highly sophisticated information processor rather than a "reflex-like mechanism" as portrayed by the behaviourists (Estes, 1988, p.90). A different methodology in research on learning emerged with the focus being placed mainly on questions relating to what, how and why particular information was selected by the learner for attention, storage and retrieval (e.g., Gagne, 1965; Neisser, 1967; Sperling, 1960). The works of these three researchers had a profound effect on the development of the study of cognition and human information processing. Gagne applied the emerging theories of cognition to education, while Neisser drew together a wide range of research findings in human information processing to develop a comprehensive cognitive approach to the psychological processes involved in human perception, memory, and learning. Sperling's contribution was to identify different features and levels of processing information that occur in three separate types of memory system (sensory, short term and long term memory). From these, there was an increasing interest in how individuals vary in their information processing characteristics such as attending to encoding, processing, storing and retrieving information.

Following the seminal work of Marton and Säljö (1976), there has been an increasing focus in research on student learning as an area of study that has developed with its own concepts, problems, and methodologies. Earlier studies on
student learning were restricted essentially to the prediction of academic performance by student characteristics alone, such as intelligence, personality, learning orientation, socio-economic status, and prior knowledge (Cooper & Foy, 1969; Entwistle & Brennan, 1971; Field & Poole, 1970). In more recent years, researchers have widened their views of student learning by extending their investigation of student characteristics to other aspects of student learning, such as the context in which students learn (e.g., the curriculum, teaching procedures and climate, assessment procedure, etc.), and student perceptions of the teaching context. In addition to this, student learning outcomes such as the grades achieved (quantitative measure), and the level of understanding and personal satisfaction attained in learning (qualitative measure) have also been considered (Entwistle & Entwistle, 1991; Gow & Kember, 1993; Harper & Kember, 1989; Meyer, 1991; Meyer & Muller, 1990; Meyer & Parsons, 1989; Ramsden, 1979; Ramsden & Entwistle, 1981; Trigwell & Prosser 1991; Thomas, Bol, & Warkentin, 1991; Watkins, 1982; Watkins & Hattie, 1981). Consequent to this vigorous and extensive research, student learning is now considered in a wider perspective to include many factors and the interactions between these factors.

Biggs’ (1987) original 3P model of learning represents an attempt to capture the complex and dynamic notion of student learning implied in recent research. The 3P model is a modified version of Dunkin and Biddle’s (1974) model of classroom teaching. The model is based on consideration of the characteristics of students engaged in learning and the context in which they learn (Presage Phase), the approaches they bring to the task of learning (Process Phase), and the outcomes of learning (Product Phase). The model can be considered an example of
Estes' (1988) claim of a “large-scale, formal theory construction” of learning, developed through the course of continuous research on learning over the last century.

1.3 Typologies of Research on Student Learning

As research interest into student learning has escalated, an outcome has been the development of numerous models of student learning. These models have been associated with a wide range of instruments designed to measure their constructs, and different conceptualisations of the learning process. Over the years, different researchers (e.g., Biggs, 1987; Entwistle & Ramsden, 1983; Honey & Mumford, 1992; Kolb, 1984; Marton & Säljö, 1976; Riding, 1991; Witkin, 1976) have employed different research paradigms and methodologies, and have asked different questions, to pursue further understanding of how students go about their learning. Different attempts to frame the different paradigms and methodologies were carried out by Curry (1983), Biggs (1994), and Sadler-Smith (1997). These authors developed the following typologies as indicated in Table 1.1.
Table 1.1. Typologies of Student Learning Processes

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Cognitive/Personality style model</td>
<td>Personal Style model</td>
<td>Cognitive/personality</td>
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<tr>
<td>Information Processing model</td>
<td>Information Processing model</td>
<td>Information Processing model</td>
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<tr>
<td>Phenomenological model</td>
<td>Approaches to studying model</td>
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<td>Instructional preference model</td>
<td>Instructional preference model</td>
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<td>Systems model</td>
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1.3.1 Cognitive/Personality/Personal Style Model

The cognitive/personality/personal style model relates to cognitive style or learning style that is considered to influence learning outcomes. Pask (1976) postulated two types of learners; holist and serialist. A holist learner is described as one who forms inter-relationships between concepts to derive a global thematic overview of the subject matter. The learner is "hypothesis-led", focuses on several aspects of a topic at the same time and can work simultaneously at different levels of thinking. Features such as flexibility, and broad conceptual orientation characterise an holistic way of learning. A serialist learner, on the other hand, is "data-led" and tackles learning in a cautious and critical step-by-step fashion. Features such as defined focus, detail orientation, and high discrimination skills characterise a serialist way of learning. It may be
considered that an holistic style of learning is more common to Arts students, a serialist learning style more common to Science students. Pask (1988) argued that the holist and serialist styles of learning reflect stable differences in the way individuals perceive problems. The notion of variability, however, was implied when Pask defined a versatile learner as an individual who is able to employ both holist and serialist strategies according to demands of the learning situation. The notions of stability and variability are, therefore, at odds with each other in Pask’s theory of learning.

Kolb (1976), on the other hand, identified two main bipolar dimensions to describe student learning. One dimension relates to perception (concrete/abstract thinking) and the other to information processing (active/reflective). The two dimensions intersect to form four types of learners; the converger (abstract-reflective), the assimilator (abstract-active), the accommodator (concrete-active), and the diverger (concrete-reflective). Both converger and assimilator learners perceive information conceptually and symbolically, but process information differently. A converger processes information reflectively and prefers to be involved in a detailed and sequential type of thinking activity. An assimilator on the other hand, processes information actively and prefers to be involved in a pragmatic problem-solving type of activity. Both accommodator and divergent learners perceive information in a concrete fashion through the kinesthetic qualities of the immediate experience, but differ from each other in the way they process information. The accommodator prefers to be involved in an active and experimental type of learning activity where flexibility is a feature. The
divergent learner processes information through reflection and prefers to be personally involved in the learning activity.

Learning style, as described by Kolb (1976), is construed in terms of a person’s preferred method of learning with experiential learning forming the conceptual context of his theory. Kolb’s theory of learning embraces the notion of an individual progressing through different stages of “human growth” during which a synthesis of style-based learning is eventually refined. His model of the four learner types presupposes a combination of stability and variability in an individual’s learning style with the less stable aspects changing over time and under different learning situations. Kolb has argued that a person may prefer one style in one situation, and another style in another situation, meaning that the position a person occupies in the two-dimensional plane can vary with the learning tasks. However he also argued that, in the same learning context, the learning style adopted on each occasion is likely to remain stable. Although Kolb’s proposition has attracted much attention, his Learning Style Inventory (1976) is criticised for its poor internal consistency, reliability and construct validity (Atkinson, 1988; Newstead, 1992). Replication of his research findings is difficult and his propositions subject to much speculation.

Generally, from the numerous studies carried out with the cognitive/personality/personal style model (Allison and Hayes, 1996; Gregorc, 1982; Guilford, 1967; Klein, 1954; Kolb, 1976; Paivio, 1971; Pask, 1976; Riding & Calvey, 1981; Witkin, 1964), Biggs (1994) noted that at least twenty cognitive and learning styles were identified. Riding and Cheema (1991) integrated the many conceptualisations of style generated from past research by summarising
them into a two dimensional model of cognitive styles to represent typical methods of organising new information.

In their model, one dimension is conceptualised as wholist-analytic which includes the concepts of field-dependence/independence, reflection-impulsivity, leveling-sharpening, and holist-serialist. Fundamentally, the wholist-analytic dimension measures whether a learner tends to organise information into wholes and process them simultaneously (wholist) or break it down into parts and process it sequentially (analytics). Sadler-Smith and Riding (1999) maintained that wholists tend to show a stronger preference than analytics for non-print media forms of instruction, and informal types of assessment.

The other dimension that Riding and Cheema identified is the verbaliser-imager. This dimension measures whether a learner is inclined to represent information by thinking verbally (verbaliser) or in mental images (imager). It can be expected that a verbaliser may be more adept and comfortable than an imager in dealing with courses of study relating to Arts, Law and Social Sciences. An imager on the other hand, may be more adept in dealing with courses relating to Architecture, Engineering and Medicine.

Riding and Rayner (1998) commented that the two style dimensions (organisation and representation of information) commonly interact with each other to produce four possible types of cognitive styles, namely, wholistic verbaliser, wholistic imager, analytic verbaliser, and analytic imager. Generally, the cognitive/personality/personal style model of student learning
encompasses notions of learning as being static, context free and relatively unmodifiable.

1.3.2 Information-Processing Model

The information processing model, derived from cognitive psychology, is focused on the cognitive strategies used by learners to organise information that can be best represented and retained by the learners’ cognitive schema. Unlike the Cognitive/Personality/Personal Styles model, the emphasis here is “less on unchanging characteristics as upon the on-line cognitive strategies that students use when handling tasks” (Biggs, 1994, p.319). The information-processing model is similar to the learning style model, in that information-processing strategies (such as elaboration, imaging and rehearsal) are perceived to remain similar across learning contexts, for example, learning for an examination or for a laboratory experiment (Biggs, 1994). However, the model differs from the learning style model in that the strategies are considered to be more changeable or modifiable than are personal styles. Weinstein and Mayer (1986) argue that students can be trained in the use of effective information-processing strategies and that such strategies can be transferred from one learning context to the next. This view, however, is likely to be challenged by phenomenologists and system theorists who would argue that any intervention attempt should be made within the particular teaching-learning context rather than outside it.

Examples of past researchers who embraced the information-processing perspective include Craik and Lockhart (1972), Schmeck, Ribich and Ramanaiah (1977), Moreno and DiVesta (1991), and Weinstein and Mayer,
(1986). Schmeck et al. (1977), influenced by Craik and Lockhart's work on depth of information processing, developed the Inventory of Learning Processes (ILP; 1977) consisting of four learning dimensions: synthesis-analysis, elaborative processing, fact retention and study methods. A further development of the ILP instrument by Schmeck, Geisler-Brenstein and Cercy (1991) resulted in an identification of two main forms of information processing, namely, reflective processing and agentic processing.

Reflective processing involves deep and elaborative processing whereby the learner forms a large number of conceptual associations between information and existing items in the memory creating different levels of meaning. Each associative link serves as a potential retrieval pathway in recall. A range of processes is involved, whereby the learner actively relates with the text by, for example, switching among strategies such as classifying, comparing, contrasting, analysing and synthesising information (De Bello, 1985b). The notions of elaborative thinking, learner adaptability, and active construction of information are therefore implied in reflective processing. A deep, rich and meaningful learning can be expected to result. Agentic processing, on the other hand, is less free-associative, less elaborative, but more directed, purposeful and restricted. In addition, it is considered to be more responsive to external contingencies such as demands of the learning task, task content and teaching style (Schmeck et al., 1991). Hence a factual retention of information rather than an active construction of the text that leads to meaningful understanding is likely to occur.

In comparison with the Cognitive/Personality/Personal Style model of student learning, the information-processing model may be considered to be
more dynamic, relatively changing and modifiable. It may also be considered as context free, although this notion is challenged by Biggs' (1990) 3P system model, to be discussed later in the chapter. It would appear that Schmeck, Geisler-Breinstein and Cercy's (1991) reflective and agentic forms of information processing are similar to Marton and Säljö's (1976) notions of Deep and Surface information processing, identified in their phenomenological research on student learning.

1.3.3 Phenomenological Model

In phenomenological research, students are given a piece of text to study and then asked to report on what they have learned, how they went about their learning, and also to answer questions about the studied text. The phenomenological model is based on how students relate to and comprehend a text in a specific learning situation. Marton and Säljö (1976) posited that students' attention during learning can be either on the text per se or on the intentional content or underlying message of the discourse. The emphasis placed by the model is on students' conception of the text content, believed to be inherent in the answers given to questions about the studied text. Students' responses to the questions are interpreted, classified into separate categories, and then identified in terms of qualitative differences in learning outcomes. In their seminal and highly influential phenomenological studies, Marton and Säljö identified, through student interviews and written responses to questions, two main levels of information processing. These levels, identified as deep and surface, later became known as learning approaches.
In a Deep Approach, students attend to the themes, and main ideas of the content, thereby dealing with abstract and high-level accounts of the text. The intention of the learner here is to understand the author's intended meaning conveyed by the text. Consequently the attention is focused on the broad overview of the essential information conveyed by the text in order to derive the underlying message. This sort of learning is therefore, relatively holistic, and context free.

In a Surface Approach, students attend mainly to the words and sentences instead, thereby dealing with simple factual information and overlooking inter-connections between aspects of the passage that can reveal the author's intended meaning. Here, the intention of the learner is to memorise details as accurately as possible for later recall rather than on conceptual understanding of the given text. In comparison with deep learners therefore, surface learners may be considered to be more detail-focused and less constructive in their learning approach.

In a second study, Marton and Säljö (1976) noted that student approaches in learning can be context dependent and modifiable. It was shown that students modified their approaches to learning according to task demands. When task demands are vague or unknown to the learner, Marton and Säljö noted that students then adopt an approach determined by their own expectations of what is required of them. In the phenomenological perspective on student learning, an approach is "intricately bound up to the task, its context and the nature of the outcome" (Biggs, 1994, p.320). Biggs considered this perspective of student learning to be limiting, in that it does not consider the impact from relatively stable characteristics of the learner (conceptions of learning, culture,
values, gender, abilities, motivations for learning, habitual orientations in learning) on how students approach their learning tasks. In the next model of student learning to be discussed (system model), Biggs (1987, 1990, 1992b) incorporated the view that stable individual characteristics interact with the student’s perceptions of the learning context. The 3P system model provides a comprehensive theoretical framework by including the Cognitive/Personality/Personal style model, the Information Processing model and the Phenomenological model. Biggs' 3P (1990) system model forms the main theoretical basis of the present research.

1.3.4 System Model

The system model differs from the Information–Processing model by incorporating variables such as student motives in learning and the teaching-learning context that are not considered in the Information-Processing model. In the latter model the focus is solely on the cognitive aspect of the learner. The system model also differs from the Phenomenological model. In the former, approaches refer both to student learning motives and preferred ways in learning (also referred to as learner's orientation towards learning) and to the on-line cognitive strategies that students use in tackling a specific task. In the phenomenological model, only on-line cognitive strategies are considered. Generally, the system model can be considered as more comprehensive and informative than any of the previously presented models. The model is clear and systematically takes into account the many different variables considered to be influential in student learning (see Figure 1.1). The model is inclusive of other
models and acknowledges the complex and dynamic nature of learners as they engage in learning tasks. Essentially, the focus is on the learners themselves and on how they relate to the task of learning. Biggs’ (1987, 1990, 1992b) 3P model of student learning is a system model.

In his system model of student learning, Biggs (1990) incorporated the personal characteristics of the learner (e.g., conception of learning and abilities), the teaching-learning context (e.g., curriculum, and assessment), the learning approaches adopted in specific tasks (surface, deep, and achieving approaches), and the learning outcomes (qualitative and quantitative). All of the above are considered as important factors that interact with each other in an open-ended and recursive system of learning.

1.4 Clarification of the term “Learning Approach”

Misko (1994), in her review of research on learning styles, defined learning style as “an individual’s characteristic approach to learning” (p.2). This definition, which conveys the notion of a stable individual difference in learning behaviour is at odds with the views of Kolb (1984), Marton and Säljö (1976), Laurillard (1979), and Entwistle (1996), who argued that the learning style of an individual can vary with context and content. The term “approach” that Misko used in defining learning style can also be confusing. Biggs (1990, 1994) used the term “approach” quite separately from the concept of learning style when he defined “approach to task” as a learning approach that students would adopt when tackling a specific learning task. The notion of variability in accordance with the nature of
the task at hand is thus implied in the definition. Curry (1983), on the other hand, would refer to this concept of variable learning as a “learning strategy”.

To further add to the confusion, Biggs also referred to the word “approach” when he defined orientation to learning as a learning approach that students would characteristically adopt in their learning. In this case, learning approach embodies the notion of stability instead, seeing that it is a feature characteristic of the learner. In Sadler-Smith’s (1997) nomenclature, Biggs’ reference to orientation to learning is termed “learning style”. According to Biggs (1990) the term “approaches” has two meanings. The first meaning refers to a habitual predisposition (“orientation to learning”) of the learner, considered to be stable; while the second refers to a situationally specific learning behaviour, considered to be variable according to the task on hand.

Owing to the different perspectives that past researchers adopted as they carried out their research, different terms (e.g., approach to learning, orientation to learning, learning style, learning strategy and preference,) have been used to describe different aspects of student learning. Unfortunately, confusion can arise when an identical term is used to refer to different concepts or when different terms are used to refer to similar notions about student learning.

In this thesis, the term “learning approach”, conceptualised by Biggs as a habitual predisposition in his Studying Process Questionnaire (SPQ) will be used. In cases where different instruments and terms have been used to measure students’ habitual predisposition in learning, the term “approach” will be used. In studies by Entwistle, Hanley and Hounsell (1979), Entwistle (1991), and Entwistle
and Ramsden (1983) who used the Approaches to Studying Inventory (ASI) instrument, use of the term “orientation” closely corresponds with the term “approach” used by Biggs to describe student learning. Both the ASI and SPQ instruments were developed from qualitative analyses of students’ reports of their own study processes using a phenomenological methodology (Biggs, 1993).

1.5 3P Model of Student Learning

The 3P model of student learning was developed by Biggs originally in 1987 following several years of research. Since then, the model has been revised many times to include more variables that influence student learning and to illustrate the recursive interaction among the various components of the system. A later version of Biggs’ (1990) 3P model is shown in Figure 1.1.

![Figure 1.1. The 3P model of student learning](image-url)
The 3P model consists of three phases of student learning. Phase 1 (Presage stage) includes those variables that characterise individuals prior to their engagement in learning, that will influence student learning. Phase 2 (Process stage) refers to the learning motives and processing strategies that occur as students study a particular text, while Phase 3 (Product stage) refers to the outcomes that eventuate from learning.

There are two kinds of presage variables. One concerns the students’ personal characteristics (e.g., prior knowledge, abilities, conception of learning), and the other concerns the teaching context (e.g., curriculum, teaching method, assessment). Both type of presage variable can directly and indirectly influence the way students learn. In addition, interactions between student characteristics and teaching context can also influence the way students approach their tasks. For example, teachers’ perceptions of students’ motives or abilities can influence their teaching styles, which may then influence the way students approach their tasks. Similarly, students’ perceptions of the teaching context such as curriculum and assessment format can in turn affect their learning motive and strategy and consequently the sort of learning approach they adopt when presented with the text.

The effect of personal presage variables on the way students approach their learning implies a consistency of learning approach since characteristics such as ability, personality, beliefs and values are regarded as relatively stable predispositions. The teaching presage variables (such as nature of the task, curriculum, teaching method, classroom climate, and assessment type) are more situationally specific. Consequently, the effect that presage variables may have on
the way students go about their learning can vary depending on whether the relatively stable student characteristics or the more variant teaching variables exert a greater influence on how students tackle their learning tasks. In addition and as stated previously, interactions between student personal characteristics and teaching characteristics can also influence the way students approach their tasks.

The second phase (Process) of Biggs' (1990) model refers to the particular study approach (Deep Approach, Surface Approach or Achieving Approach) that students adopt when presented with a particular learning task at a particular time. Biggs maintained that the approach that students adopt depends on their motive in tackling the task and the strategies that best match that motive. In other words, how we study is a function of why we study. On a particular learning occasion, our intention in tackling the task may reflect our overall motive for learning, or alternatively, it may be related specifically to the situation or the task at hand. For example, a student who is intrinsically motivated in learning Psychology may approach all tasks in a deep and meaningful way. On the other hand, the same student who is intrinsically motivated in the subject matter, may be surface motivated (has pass-only aspirations) on a specific task in the subject.

Motive for learning, therefore, can be either relatively stable (i.e., at the Presage Phase) or can vary according to the situation on hand (at the Process Phase). The motivational mix and consequent strategy adopted may vary from subject to subject and from time to time (Biggs, 1987). Biggs (1990) considered motivation to be a starting point for learning and commented that how the student is motivated determines how much effort the student will invest in learning, how the task is approached and the learning outcomes attained. In his Expectancy-
Value model of motivation, Biggs explained that the value students place on the process and outcome of learning, and the expectation that students have regarding success or failure would influence the way they approach their learning tasks.

Three approaches to learning a task (Deep, Surface and Achieving Approaches) were identified by Biggs (1987) as a result of an extensive study carried out on three different student samples. A Surface Approach to learning is based on extrinsic motives such as praise, recognition and material reward. The reason for learning is predominantly pragmatic; the intention is to provide accurate and detailed recall of given factual information in order to make the grade. The learner learns to meet the basic requirements of the task, hence he or she would expend minimal time and effort in learning with a view to “corner-cutting” where possible (Biggs, 1993). Another learning motive that accompanies a surface approach to learning is one of avoiding failure or punishment for not performing the task. This affective motive is more immediate in nature, but nevertheless is closely related to the pragmatic reason for studying. A Surface Approach seems to mirror “operant learning” whereby a motive to either attain a reward or to avoid fear of failure is considered to be instrumental in adoption of the Surface Approach.

Rote learning is a commonly adopted strategy in a surface learning approach. Students try to memorise and reproduce what is learnt with little attempt at understanding the meaning and implications of what is learnt. This often results in an inability to see interconnections among ideas that often is necessary for a meaningful understanding of the learned text. Generally, the adopted strategies are focused and restricted in nature, as the outcome of learning relates specifically to
the content of the task or prescribed syllabus. Biggs (1992b) noted that students high in surface learning often showed little insight into the how and why of their learning activities, demonstrating little evidence of metalearning in the learning process. Metalearning can be defined as "students' awareness of and control over their own learning processes" (Biggs, 1987, p.5)

A Deep Approach to learning is based on the learner's personal interest and curiosity in the subject matter and enjoyment in the process of learning itself (intrinsic motivation). Here, the intention in learning is to maximise understanding. The type of strategy that students adopt has them operating at a high or abstract level of conceptualisation. In such learning, students actively engage with the context of the task by relating the new material with previously acquired information and experiences. In addition, the learner would pose questions, read widely beyond the confines of the syllabus, and critically evaluate the text, in order to maximise understanding (Biggs & Moore, 1993). A high level of generality is therefore involved so that the main ideas, themes, and principles, rather than unsupported specifics are obtained from the text. A deep learner may be considered to be a reflective learner who is aware of and can exercise control over his or her own learning processes. Therefore, metalearning can be said to occur in deep learning (Biggs, 1987).

The third approach in learning (Achieving Approach) is based on a motive to enhance one's ego and self-esteem through academic excellence. Although the motive is extrinsic in nature like the Surface Motive, it is based on competition and ego-enhancement. Students are highly competitive and will strive to attain top grades regardless of whether the learning material is interesting or not. The
learning strategies that students adopt would involve actions such as: planning carefully their study time according to task importance, ensuring that relevant references are available, using cue-seeking techniques to predict examination questions and systematically making effective notes and revising work. Organisation of study time and learning resources, application of self-discipline in learning and "cost-effective use of time and effort" are the main essence of this type of learning strategy (Biggs, 1993, p.314). For these actions to be executed effectively and efficiently, it is necessary that students be aware of their learning needs, their capability for the task, the learning environment they are placed in, and the demands and complexity of the task. Here, students are aware of their motives and exercise control over their strategy selection and deployment. In other words, metalearning is involved. Control over the learning processes (metalearning) is also exercised so that high grades can be attained. However, the focus of the Achieving Approach is on the outcome rather than on the task itself.

The three learning approaches differ from each other in terms of how students are motivated towards the task, the strategies adopted, the type of learning outcome obtained, and lastly, the level of metalearning manifested. Biggs (1987) differentiated Surface and Deep Approaches from Achieving Approach in terms of the type of learning strategy that students adopt. Biggs commented that both Surface and Deep strategies involve students engaging themselves with task content in a cognitive fashion. For example, a surface learner deals with the text by memorising factual information presented in the text, while a deep learner deals with it by relating newly presented information to past knowledge, critically evaluating information presented in the task and comprehending the message
underlying the text. In an Achieving Approach, however, the Achieving Strategy that a student adopts is more concerned with the temporal spatial context of the task. That is, the student focuses on certain behavioural actions such as proper organisation of time, learning space and learning resources, priority listing of tasks in accordance to importance and seeking cues to predict examination questions.

The learning outcome that is associated with a Surface Approach is one of accurate and unintegrated recall of details, while that associated with a Deep Approach is a meaningful understanding of the text and a positive personal feeling. In an Achieving Approach, the outcomes involve obtaining whatever goals (high marks, good understanding, etc.) students perceive to be important to academic excellence, a personal sense of satisfaction, and a good academic self-concept. Biggs (1987) maintained that the level of meta-learning is lowest in a Surface Approach, relatively higher in an Achieving Approach, and highest in a Deep Approach.

A third and final phase (Product) of the 3P model relates to learning outcomes that may be described either quantitatively or qualitatively. Quantitatively, learning outcomes are evaluated (commonly by a short-answer or multiple-choice form of assessment) in terms of how much knowledge is learned through correct recall or recognition by students. Qualitatively, learning outcomes are evaluated (commonly by means of essay-type questions) in terms of how the acquired knowledge is applied by students (e.g., through interpretation, integration, critical evaluation, etc). Typically, both types of learning outcome are assessed at the institutional level and are represented in a composite form by the
grades awarded. Student learning outcomes can also be construed at an affective level, in terms of how students feel about their learning experiences.

Apart from a direct line of influence whereby Presage variables (such as personal characteristics and some aspects of the teaching context) affect the learning processes, which in turn affect learning outcomes, a complex interaction among the three phases can occur. Students’ learning outcomes, for example, can affect their beliefs about their own learning ability which in turn can feedback to learners the efficacy (or lack of) of their orientation to learning. The particular study approach shown to be effective is likely to be perpetuated. Learning outcomes can also provide feedback to teachers about their own teaching procedures, which may or may not be changed to influence a change in students’ approach to learning.

In summary, personal traits (or dispositional factors), contextual factors (or situational factors), approach to task (surface, deep, and achieving approaches), and learning outcome, together form “an open-ended recursive system, in which individuals adjust their intentions in learning and processing strategies to their view of the task demands” (Biggs, 1994, p.320).

Biggs (1994) stated that when students commence their course, they bring with them certain goals (e.g., to achieve good grades with minimal effort) and certain stable characteristics (e.g., abilities, cognitive styles, and attribution style) to the learning environment. Depending on the structure of the teaching context (e.g., curriculum and assessment type) together with student perception of task demands, students then adjust their approach to learning as a “relatively stable way
of handling a particular set of teaching demands” (Biggs, 1994, p.320). Approach to the task as described by Biggs is considered to be fairly consistent, but an adjustment in the learning approach can occur when the context (such as teaching demands) varies.

Several questions can be posed. First, what are the roles that situational and dispositional factors play in determining students’ approaches to learning? Different researchers have expressed different views. Some researchers maintain that learning approach is determined more by students’ perception of the task (the demands of the task, how the task is presented and the pressures imposed) than by their predisposition to learn in particular ways (Laurillard, 1979; Marton, 1975, 1983; Ramsden, 1979). Other researchers contend that generally students are predisposed to adopt a particular approach regardless of the specific learning situation (Entwistle, 1981; Schmeck, 1983). Biggs (1987) commented that these seemingly opposing views address different questions. For example, Marton and his supporters are interested in how students approach a specific learning task and how that approach relates to the learning outcome. The question addressed by Entwistle and Schmeck, on the other hand, relates to a persisting trait characteristic and the process-outcome relationship is less clear as there is no certainty that a student will adopt a “usual way of studying” when learning a specific task. The next question concerns how students will approach their learning given a particular hypothetical learning scenario such as studying for a particular exam.

Study One was carried out to investigate the consistency in learning approaches by examining the influence of two situational variables (Assessment
Type and Assessment Weighting) on students’ approaches to learning, given the hypothetical scenario that they are studying in preparation for an exam. Before reporting on Study One, a critical evaluation of Biggs’ (1987) Study Process Questionnaire (the main instrument used to determine student learning approaches) is provided in the next chapter. The present research adopts Biggs’ system model, and uses the Studying Process Questionnaire (SPQ) that Biggs (1987) developed to measure student learning. The Studying Process Questionnaire measures three main learning constructs, namely surface, deep, and achieving approaches. A review of past studies based on Biggs’ 3P model and competing models will be considered in Chapter Three and Chapter Four.
Chapter Two

The Study Process Questionnaire

This chapter explores the Study Process Questionnaire (SPQ) in some detail. The psychometric properties and the cross-cultural applicability of the instrument are considered. A congruency between learning motive and its corresponding learning strategy for each learning approach is also considered in the chapter.

2.1 The Study Process Questionnaire (SPQ) and its Psychometric Properties

Biggs began his work on student learning as early as 1966 to predict student academic performance at university. During this period, when cognitive psychology was prominent, Biggs developed his first instrument the Study Behaviour Questionnaire (SBQ) to test the hypothesis that students learn in a way that mediates between their cognitive style and academic performance. Test items concerning personality (e.g., introversion-extroversion and tolerance of ambiguity), complex cognitive processing (e.g., relating what is learned in one subject to another), and study behaviour (e.g., organising a study schedule) were included in the questionnaire. The questionnaire was administered to 300 first-year Australian university students who also completed a battery of personality and reading performance tests. Students’ academic performance at the end of their first year at the university was also obtained. Findings indicated that students’ study behaviours were indicative of certain personality traits. The hypothesis that study behaviour mediates between cognitive style and academic performance was supported. Biggs (1970) developed the Study Behaviour Questionnaire (SBQ)
after the first series of his studies. The instrument was considered to be theoretically and empirically sound, however it was later revised because of its length and diversity. A second-order factor analysis of the SBQ subscales was subsequently carried out and a shorter version of the instrument, with fewer subscales, was produced in 1987.

The revised instrument was called the Study Process Questionnaire (SPQ; Biggs, 1987). The SPQ consists of three main scales (Surface, Deep, and Achieving Approaches) representing the three main, stable and independent dimensions of students’ habitual orientation to learning. Each scale is further divided into two subscales representing the learning motive and strategy. The instrument, therefore, consists of six subscales. Each subscale is measured by 7 items, providing a total of 42 items. The subscales are referred to as Surface Motive, Surface Strategy, Deep Motive, Deep Strategy, Achieving Motive, and Achieving Strategy.

The assumptions underlying the SPQ are as follows. First, there are three common and salient motives for learning in a formal setting. The motives are: to obtain a formal qualification with minimal effort (Surface Motive), to realise personal interest in learning (Deep Motive) and to achieve some form of academic excellence (Achieving Motive). Second, students may subscribe to one or more of the motives. Third, the three different learning strategies are likely to lead to three different learning outcomes. A Surface Strategy will lead to accurate but unintegrated recall of detailed information, a Deep Strategy to an understanding of the message behind the text, and an Achieving Strategy to attainment of academic excellence. Fourth, the particular strategy that a student adopts is predominantly
driven by the matching learning motive. For example, Surface Strategy is assumed to arise from a Surface Motive. Fifth, the mix of learning motive and consequent strategy may vary from time to time in the same person.

Generally, the SPQ has good internal reliability and validity (Biggs, 1987, 1993; Burnett & Dart, 2000; Foz, McManus & Winder, 2001; O’Neil & Child, 1984). Results of most studies showed internal consistencies for the three learning approaches to range from the low .70s to the low .80s (Biggs, 1987; Burnett & Dart, 2000; O’Neil & Child, 1984). Moderate to good reliabilities, therefore, have been obtained for the three learning approaches with subscales yielding alpha coefficient values ranging from the high .50s to mid .70s (Biggs, 1987; Hattie & Watkins, 1981; O’Neil & Child, 1984) In more recent years, some researchers (Biggs, Kember & Leung, 2001; Kember, Wong, & Leung, 1999; Zeegers, 2002) have suggested that the SPQ may best consist of only Deep Approach and Surface Approach, indicating that the 42 items tend not to confirm the intended scale structure. Nevertheless, the Achieving Approach is also explored in the current research for a more complete understanding of the factors that can influence learning approaches.

Support is also provided for the validity of the SPQ scales by many researchers using exploratory and confirmatory factor analyses (Bolen, Wurm, & Hall, 1994; Burnett & Dart, 2000; Kember & Gow, 1990; Volet, Renshaw & Tietzel, 1994). For example, Bolen et al. noted that the three learning approaches accounted for 69% of the total variance in scores. Additionally, convergent validity was obtained by Wilson, Smart and Watson (1996) when they obtained significant correlations between the SPQ and the Approaches to Studying
Inventory (ASI: Entwistle & Ramsden, 1983). The SPQ can thus be considered as a reliable and valid instrument for assessing learning approaches. The factorial structure of this instrument holds for both Western and Chinese university students (Zhang & Sternberg, 2000).

2.2 Generality of the SPQ across Cultures

The validity of the SPQ across cultures, especially among non-Western cultures, has been investigated by many researchers (Biggs, 1987, 1993; Kember, 1996; Volet, Renshaw & Tietzel, 1994; Watkins, 1998; Watkins & Biggs, 1996). In a recent study, Watkins investigated the cross-cultural relevance of the SPQ for use with students from ten countries by drawing together the findings from different researchers (Albaili, 1995; Biggs, 1987, 1993; Watkins & Murphy, 1994; Watkins & Regmi, 1992; 1995). Watkins concluded from his meta-analysis that the SPQ is a reliable and valid instrument for research within many cultures although its suitability for students from Nepal, Phillipines, Indonesia, and Sweden was questionable.

Watkin’s (1998) conclusion concurs with that drawn by other researchers in their studies with students from countries such as Australia, America, Britain, Hong Kong, China, Kenya, South Africa, and the Arab Emirates (Balla, Stokes, & Stafford, 1991; Kember, & Leung, 2001; O’Neil & Child, 1984; Watkins, 1998; Zhang, 2000). Using American, Hong Kong, and Nanjing Chinese students, Zhang noted that generally the internal consistencies for the SPQ subscales were very
similar across the three cultures. These alpha coefficient values were also very similar to those obtained by Biggs (1987).

2.3 Motive-Strategy Congruency and Non-Congruency

Learning approach, as described by Biggs (1987), consists of motive and strategy. Student behaviour in learning is said to be driven by the motive for learning (Surface, Deep, or Achieving) which then determines the type of strategy for attaining a specific outcome. Thus a match or congruency between motive and strategy is assumed in Biggs’ Study Process Questionnaire.

Biggs’ (1987) assumption of a motive-strategy congruency for a learning approach was tested by O’Neil and Child (1984) in their study with British students. Intercorrelations between students’ scores on the six subscales provided highly significant associations between students’ professed motives and their corresponding strategies in learning. The correlation between Surface Motive and Surface Strategy was .49 and that between Deep Motive and Deep Strategy was .50. The correlation between Achieving Motive and Achieving-Strategy was lowest at .41. Overall, the evidence appears supportive of a motive-strategy congruence. Had the inter-correlations been too high, separate constructs for motive and strategy would have become questionable.

Biggs (1987) also suggested that an Achieving Motive may combine with either Deep Strategy or Surface Strategy to form a Deep Achieving Approach or a Surface Achieving Approach. O’Neil and Child (1984) found that Achieving Motive was moderately associated with Surface Strategy (r = .36), and to a lesser
degree with Deep Strategy ($r = .21$). In these two particular learning approaches, a non-congruency between learning motive and strategy can be said to occur. It would appear that an Achieving Motive is not as restricted in the strategy that it drives.

The concepts of Deep Achieving and Surface Achieving approaches to learning are elaborated by Watkins (1998). Watkins proposed that students, who thought the assessment system best rewarded their understanding on content, would probably adopt Deep Strategy and Achieving Motive. On the other hand, students, who thought the assessment system best rewarded a reproduction of factual information, would probably adopt Surface Strategy and Achieving Motive. In both Deep Achieving and Surface Achieving approaches, the motive in learning is a drive for high academic success.

To summarise, empirical evidence was obtained to support Biggs' suggestion of an association between motive for learning and strategy adopted in learning. The association between the two constructs can occur either in a congruent fashion (i.e., Surface Motive - Surface Strategy, Deep Motive - Deep Strategy, Achieving Motive - Achieving Strategy) or in a non-congruent fashion (i.e., Achieving Motive - Deep Strategy, Achieving Motive - Surface Strategy).
Chapter Three

Study One: Influences of Situational Factors on Student Learning

3.1 Overview

Assessment plays a prominent role in student learning and is considered by researchers to be one of the most salient situational factors that can influence student choices of learning approaches (Crooks, 1988; Hartley, 1998; Marton & Säljö, 1976; Newble & Jaeger, 1983; Ramsden, 1992; Rogers, 1993; Scouller, 1998; Thomas & Bain, 1984, 1982). A number of research studies on the effects of Assessment Type (such as essay assignment, essay exam, short-answer exam, and multiple-choice exam) on student learning have been carried out (Bennett, 1993; Birenbaum & Tatsuoka, 1987; Hadwin, Winne, Stockley, 1997; Ramsden, 1988; Scouller, 1998; Scouller & Prosser, 1994; Thomas & Bain, 1984; 1982; Traub, 1993; Watkins, 1982).

A comprehensive search of past literature (using database ERIC, Current Contents, Ebsco, Expanded Academic, PsychLit) has not revealed any study that has investigated the effect of Assessment Weighting on student learning. How this aspect of assessment might influence the way students go about their learning is, therefore, unclear. This omission is surprising given that every assessment carries with it a percentage of the total assessment of a subject. One would expect that the combined effect of Assessment Type and Assessment Weighting would have some influence on how students approach their learning.
The present study strikes new ground on three aspects. First, the study seeks to investigate the relative influences of both Assessment Type (essay vs. multiple-choice under examination conditions) and Assessment Weighting (30% vs. 70%). Second, it investigates the conjoint effect of Assessment Type and Assessment Weighting on student learning. Third, it investigates the influence of these two situational factors on students’ separate learning motives and learning strategies, the two components of each learning approach. The sample in this study consists of university students drawn from different courses (Psychology, Economics and Computing) with male and female students represented in each course group. In the light of possible influences on student learning by Course and Gender, the effects of these two factors will also be considered in this study.

3.2 Distinguishing Learning Motives from Learning Strategies

Biggs’ (1987) assumed a congruency between a particular learning motive (e.g., Surface Motive) and its corresponding learning strategy (e.g., Surface Strategy). The combined motive and strategy were considered to form a learning approach (e.g., Surface Approach). Such a congruency is not assumed in this study. Therefore, in this study, students’ learning will not be expressed in terms of the type of learning approach (second-order level of structure) but rather in terms of their learning motives and strategies (first-order level of structure). Throughout the thesis, Biggs’ six learning motives and strategies will be referred to as scales rather than subscales.

A close examination of the SPQ (the instrument used in the present study) was carried out by the current researcher to provide a more complete
understanding of the scale and the terms associated with it. From this, it would appear that underlying the constructs of Deep, Surface and Achieving Motives is the influence of an on-going or "long term" goal that provides students with the reason for seeking formal learning. In Surface Motive, the "long term" goal is the eventual attainment of a job (Extrinsic), and the intention in learning is to pass. In Deep Motive, the on-going goal is to experience a sense of personal satisfaction from learning itself (Intrinsic), and the intention in learning is to understand the meaning of what is learned. In Achieving Motive, the "long term" goal is to obtain status and prestige by striving for the best possible career, and the intention in learning is to aim for the best grade across as many subjects as possible. The notion of stability seems to characterise students' on-going and long-term goals in learning. Surface, Deep and Achieving Motives, therefore, may be considered to prevail from one learning situation to the next. Accordingly, Surface, Deep and Achieving Motives are not likely to be influenced by either Assessment Type (i.e., Essay and Multiple-Choice examinations) or Assessment Weighting (i.e., 30% and 70%).

Learning strategies, on the other hand, might be affected by Assessment Type and Assessment Weighting. To reiterate from Chapter One, a surface learning strategy is considered to be focused and pragmatic as students confine their learning mainly to factual information, set guidelines, and what is expected of them by the teacher. A low level of cognitive processing that predominantly involves the memorization of facts and details also occurs. A deep learning strategy, on the other hand, operates at a relatively higher level of cognitive processing as students seek to understand the text by relating, synthesizing,
elaborating, and extending the ideas that are provided. The activities involved in both surface and deep strategies are associated with the task at hand. It can be expected, therefore, that both surface and deep strategies will vary according to situational factors such as Assessment Type and Assessment Weighting.

In Achieving Strategy, the learner is involved in regular note-taking, early completion of assignments, and maintaining a regular and consistent effort in studying. Personal characteristics such as good organizational skills, conscientiousness, and self-discipline are implied. Such characteristics are considered by Costa and McCrae (1992) to be personality traits and relatively stable/permanent. Contrary to surface and deep strategies, it is unlikely that Achieving Strategy will be affected by the situational factors of Assessment Type or Assessment Weighting.

To sum up, it is argued that learning motives will be less likely influenced by the situational factors of Assessment Type and Assessment Weighting. By contrast, apart from Achieving Strategy, both Surface Strategy and Deep Strategy are likely to be influenced by Assessment Type and Assessment Weighting.

3.3 Assessment

Assessment forms a crucial part of the learning and teaching process and it provides feedback to both learners and teachers about the quantitative and qualitative outcomes of student learning. Assessment of student learning can be either formative or summative. In a formative assessment, marks or grades are
normally not given on students’ work while in a summative assessment, marks and grades form crucial parts of the feedback to students.

Biggs (1993) maintained that assessments may address student learning at different cognitive levels; the lower cognitive level, the higher cognitive level or the level at which transfer of learning (i.e., applying knowledge or skills to solve new problems) is achieved. Biggs argued that when addressing the lower cognitive level, assessment is designed to check students’ amount of knowledge, and recall and recognition of a range of topics taught. When addressing the higher cognitive level in learning, Biggs argued that the role of assessment is to determine students’ conceptual knowledge, elegance and originality of their thinking, their ability to synthesize and integrate ideas, and to apply knowledge and understanding to new situations. When addressing transfer of learning, Biggs contended that assessment is used to determine “how far the student can competently move from the content and context originally taught, and have the procedural and conditional knowledge to know when and under what conditions transfer is possible” (p. 412). Assessment of student learning at each of lower and higher cognitive levels and in transfer, therefore, plays a function in narrowing and directing students’ focus to examinable topics and can shape students’ learning approaches. The type and amount of information and the format expected of students for presenting the information are normally contained in the assessment questions.

3.3.1 Assessment Type (Essay vs. Multiple-Choice)

Biggs (1973) and Claxton and Murrell (1987) maintained that in an objective test (e.g., multiple-choice or short answer), students are examined on
relatively specific information that is predominantly knowledge-based. The learner is asked to give a specific answer or to select the correct response from alternatives provided. Although multiple-choice questions can demand higher-order thinking skills where conceptual understanding is involved (Green, 1981; Swanson, 1987) it is widely acknowledged that generally, objective tests tend to test knowledge (Ramsden, 1988). According to Biggs’ (1993) classification, a multiple-choice exam can be seen as assessing the lower cognitive level of student learning. Here, students are encouraged to adopt a convergent type of learning strategy whereby factual information and details are focused upon. Students are also encouraged to rote-learn (with minimal emphasis on understanding) in order to maximise accurate recognition of the information learned. Ramsden (1988) stated that objective tests tend to encourage memorisation and subsequent counting of “how many things are remembered” (p. 103). Entwistle (1996) argued that multiple-choice assessment leads to surface learning in preference to deep learning.

In an essay type of assessment, students are more likely required to know the information content and to have a conceptual understanding of various terms and issues so that a logical, systematic and clear argument can be presented. Clarity and originality in thinking, ability in critically evaluating the given information, and in synthesising ideas, are all crucial in good essay writing. An essay assessment, in Biggs’ (1993) terms addresses the higher cognitive level of student learning. Ramsden (1988) stated that objective tests tend to encourage memorisation, whereas essay tests tend to encourage more thinking, self-expression and judgment.
Hounsell (1997), in two sets of semi-structured interviews with History and Psychology students, found that students generally held three qualitatively distinct conceptions of the nature of an essay. First, an essay was seen as a written “argument” that involved an explicit focus on interpreting the essay material, a delivery of a particular viewpoint on a problem with supporting evidence to either substantiate or refute the point of view, and the presentation of this position in a coherent and logical fashion. A second conception entailed seeing an essay as a “viewpoint”. Here an essay was defined as an ordered presentation of a point of view. However the use of supporting evidence to either substantiate or refute the taken position was of little concern to students. Unlike the close interplay between interpretation and supporting evidence in an essay perceived as an “argument”, the association between these two aspects is more superficial in an essay perceived as a “viewpoint”. It can be suggested that both conceptions of an essay involve a deep learning strategy although the presentation of an “argument” imposes greater demand for a Deep Strategy than presentation of a “viewpoint”. The third conception entailed seeing an essay as an unorganized collection of unrelated facts and ideas in accordance with the assigned topic. Emphasis was placed more on describing a large amount of material than on quality of the subject matter. It is suggested that this conception of an essay, where an understanding of subject matter is not clearly manifested, involves more of a Surface Strategy than Deep Strategy. Overall, it appears that an essay type of assessment may be more likely to prompt Deep strategy rather than Surface Strategy.
An additional feature on which multiple-choice and essay tests can be differentiated is the breadth and depth of knowledge expected from the learner. In the case of multiple-choice tests, the focus is more on the breadth of knowledge whereas in essay tests, depth of knowledge is more crucial. A surface approach to learning can be considered largely appropriate in objective tests whereas, in essay tests, a deep approach to learning is considered essential for producing quality work.

3.3.2 Research Findings for Effects of Assessment Type on Student Learning

A review of past studies on the effects of Assessment Type for student learning is appropriate here. A distinct difference in learning behaviour according to Assessment Type was observed by researchers such as Watkins (1982), Ramsden (1988), and Scouller (1998). For example, Scouller in a within-subject design study using 206 second-year Australian Education students at tertiary level, noted that students perceived an essay assignment as assessing high levels of cognitive processing and were more inclined to employ both deep strategies and motives when preparing for their essay than when preparing for their multiple-choice examination. By contrast, students perceived a multiple-choice examination as assessing the ability to recall factual information (lower level of cognitive processing) and were more inclined to employ surface strategies and motives when preparing for such an examination.

In Scouller's (1998) study, described above, more than one variable can be identified in her comparison between the two Assessment Types. Essay
assignments and multiple-choice tests differed not only in terms of type of assessment, but also in the conditions under which the assessment was delivered. Scouller’s findings cannot, therefore, be considered conclusive as effects of Assessment Type alone. Examinations and assignments differ on many aspects. In an assignment, students know the question and topic, it is less threatening, and students can seek assistance and guidance when preparing their work. Examinations, on the other hand, can pose more of a threat to learners because students usually do not know the questions in advance. Students can be expected to experience more stress and anxiety when preparing for an examination than when preparing for an assignment.

Examinations and assignments also differ on a temporal aspect in that an assignment is an event executed over time with some student control over when they do the assignment and how they pace their work. By contrast, an examination is an event carried out at a nominated time and over a specific period beyond student control. Considering these differences between examination and assignments, it can be argued that examination conditions permit less time for reflective thinking and critical evaluation of work than do assignments such that the learning approach may differ under these two different forms of assessment condition.

In their study using Australian Psychology students, Thomas and Bain (1984) noted that for an essay assignment (performed in an open-ended context) students reported a higher tendency to engage in “transformational learning” and used strategies such as elaborating, relating of terms, concepts and ideas, and reflecting and internalizing the meaning of the text. The authors noted,
on the other hand, that when preparing for the short-answer examination (performed in a closed context) students reported a more “reproductive learning” whereby they selected basic information and ideas from the text for the purpose of memorising. Transformational learning can be considered to be equivalent to Biggs’ (1987) notion of deep learning, and, “reproductive learning” equivalent to Biggs’ notion of surface learning. Therefore, in Biggs’ terminology the conclusion was that students were inclined to adopt a deep learning strategy when preparing for an open-ended assessment context and a surface learning strategy when preparing for a closed context assessment. This proposition cannot, however, be considered as conclusive owing to the confounding variables of assessment condition (exam vs. assignment) and Assessment Type (short-answer vs. essay) in their study.

Tang (1992) in his study using Hong Kong physiotherapy students, explained students’ adoption of a particular learning strategy in terms of their perception of the demands of the assessment tasks. From interviews, Tang showed that students were inclined to perceive tests as mainly involving a surface type of learning characterised by mechanical memorization. Assignments were perceived to mainly involve deep learning, reflecting demands for an understanding of the question and content. This notion of coherence between perception of task demands and strategy type adopted was not, however, fully supported by Scouller and Prosser (1994) in their study using Australian Nursing and Physiology students. Scouller and Prosser did not obtain any association between students’ surface perception of multiple-choice exam and their reported Surface Strategy.
It would seem from the studies reviewed above that the effect of Assessment Type on student learning is not sufficiently clear and that multiple variables can influence how students go about their learning. To some degree, Entwistle and Entwistle’s (1997) study has resolved the issue of possible confounds by investigating how examination specifically can influence the forms of understanding students seek when preparing for an essay exam. From the verbal and written feedback provided by Psychology and History students, Entwistle and Entwistle noted that some students “distinguished sharply between the understanding they initially sought in their studying and the learning they had to do afterwards to cope with the examination” (p. 154). Students reported that the restricted time period associated with an examination put pressure on them to quickly remember what they knew and understood of the examination question and to quickly write down their answers. Students reported a series of stages in their learning when preparing for an exam. Initially, they sought to understand their notes, then repeatedly read and summarized their notes, rehearsed their understanding and sought clues from past exam questions on how best to present their answers. Finally, students rote learned the detailed information to support their explanations in the exam.

According to Biggs’ (1987) SPQ, making sense of one’s notes reflects a deep learning strategy. Repeated reading and summarizing of notes, and seeking cues from past exam questions, all reflect an achieving learning strategy. Finally, repeated rehearsal for accurate recall and rote learning, reflect a surface learning strategy. It would appear, therefore, that the students in Entwistle and Entwistle’s (1997) study adopted multiple learning strategies at different stages in
their preparation and that the deep learning strategy that they initially adopted was ultimately moderated. This moderation might have occurred in order to accommodate the constraints associated with an exam. Entwistle and Entwistle thus demonstrated that learning is a complex and dynamic learning process whereby more than one type of learning strategy can occur even under a specific assessment context such as an essay exam.

3.3.3 Learning Strategies in Multiple-Choice Examinations

Scouller and Prosser (1994) carried out an extensive study into the relationships between students’ orientation in learning, their perception of task demands of a multiple-choice exam and intended learning strategy, as they prepared for an exam. The authors found no consistent relationship between surface learning strategy and multiple-choice exam. This finding was inconsistent with those obtained by Watkins (1982), Ramsden (1988a), and Scouller (1998) who noted that students reported an intended surface learning strategy when studying for a multiple-choice exam. The sample in Scouller and Prosser’s study was rather heterogeneous in terms of student academic ability, maturity and discipline of study. The sample consisted of three relatively distinct groups. Group A consisted of 69 second-year Science students, representing a narrow range of high ability based on their successful performances in their first year of study. Groups B and C together consisted of 121 predominantly female Nursing students representing a wider range of ability. The initial entry criteria for these students were significantly lower than that for Group A. Group B differed from Group C in that the former group consisted entirely of mature-aged students who were
upgrading their Diplomas to Bachelor degrees. Group C was more heterogenous in terms of age and ability.

In their study, Scouller and Prosser (1994) found that the Group A Science students (of high ability) reported an intention to adopt a Deep Strategy when preparing for a multiple-choice examination. The Group B mature-aged Nursing students reported an intention not to use a Surface Strategy. No clear result was obtained, however, for the C group of Nursing students who varied widely in terms of ability; they did not report any specific study strategy when preparing for a multiple-choice examination. It is possible, therefore, that personal characteristics such as ability and maturity may override situational factors in determining learning approach.

Watkins (1982), Ramsden (1988), and Scouller (1998) did not report student ability and maturity in their research samples. So their samples may have consisted of neither high ability nor mature-age students. It can be speculated that the conflict in findings between by the above-mentioned researchers and those of Scouller and Prosser (1994) might result from a moderating influence of such personal characteristics on learning strategy.

Scouller and Prosser (1994) noted that the Science students, who were all highly able academically, were assessed to be deeply oriented in learning and perceived multiple-choice as assessing deep learning rather than surface learning. In turn, those students reported an intended deep learning strategy when preparing for a multiple-choice exam. Scouller and Prosser’s findings were consistent with that obtained by Entwistle and Tait (1990). The latter authors
noted that students who were deeply oriented continued to rely on Deep Strategy when preparing for their multiple-choice exam, even when that exam required a shift towards a surface learning strategy. A notion of consistency in learning orientation regardless of assessment demands is implicated, especially among students who are deeply oriented in their learning. This notion is further supported by Thomas and Bain (1982) and Biggs (1987) who maintained that essentially deep learners are less sensitive to change in task demands (situational influences) than are surface learners.

3.3.4 Student perceptions of multiple-choice and learning strategies adopted

Whilst an association between perception of multiple-choice exam and intended strategy was obtained by Scouller and Prosser (1994) for deep perception and Deep Strategy, the authors did not obtain an association between a surface perception of multiple-choice exam and intended Surface Strategy. Watkins (1982), Ramsden (1988) and Scouller (1998), however, all obtained from their studies an association between a surface perception of multiple-choice exam and an intended Surface Strategy. It would appear, therefore, that the Scouller and Prosser research lends only partial support to Tang’s (1992) finding that students adopted “perception-appropriate” strategies in their learning. Likewise, there is partial support for Biggs’ (1979) and Ramsden’s (1992) comments that student perceptions of task demands filter and shape their responses.

It is difficult to explain the differences in the above-mentioned findings. It is not possible to make a direct comparison across samples as different
researchers provided different forms of information. In Scouller and Prosser's (1994) study, the sample consisted of Science students of whom most had high ability. In Scouller's (1998) study, the sample consisted of second-year education students whose ability levels were not mentioned and in Watkins' (1982) study, the sample consisted of first year students whose ability levels were also not mentioned. Therefore, one can only speculate that the differences in findings might be attributed to a sample difference in terms of course of study undertaken and/or to academic ability, or even perhaps to some other unidentified influence.

Several conclusions can be drawn from the above discussion. First, multiple-choice exam per se does not necessarily lead to a Surface Strategy in learning. It is possible that student ability and maturity may outweigh the situational task demands in determining learning approach. Second, there is some uncertainty as to whether a learner's perception of the task demands of a multiple-choice exam might consistently influence the particular study strategy adopted. Watkins (1982), Ramsden (1988) and Scouller (1998) provided evidence of "perception-appropriate" strategies for both surface and deep learning. Scouller and Prosser (1994) obtained a "perception appropriate strategy" only for deep learning and not for surface learning. Third, Scouller's evidence of the seemingly "neat" associations between multiple-choice test and Surface Approach (consisting of Surface Motive and Surface Strategy) and between essay assignment and Deep Approach (consisting of Deep Motive and Deep Strategy) cannot be considered to be conclusive. It would appear that such associations can be modified by students' level of academic abilities or maturity. Further research
is needed to cast more light on whether learning approaches are closely associated with particular Assessment Type.

Finally, past studies on student learning and assessment seem to differ from each other on many aspects. Studies differ in terms of the student sample tested, student abilities, intended vs. adopted learning strategy, and particular type of assessment investigated. In addition, some studies investigated both learning motives and strategies (e.g., Ramsden, 1988; Scouller, 1998; Scouller & Prosser, 1994; Watkins, 1982) whereas other studies investigated only learning strategies (e.g., Scouller, 1998; Thomas & Bain, 1982). Further, many studies confounded assessment context and assessment type. It would thus seem that a final position concerning the effect of Assessment Type on student learning is unclear.

The present study, therefore, seeks to clarify the effects of Assessment Type on student learning by controlling some of the variables (i.e. ability, maturity and assessment condition) that might have “muddied” past findings. Under investigation will be the learning motives and learning strategies of a heterogeneous sample of university students who vary widely in terms of academic ability and maturity. Students will report their learning motives and learning strategies when preparing for an essay and multiple-choice type of exam.

If high ability learners are unlikely to discriminate different task demands (Biggs, 1987; Thomas & Bain, 1982), it can be expected that a heterogeneous student group (in terms of ability) will be more discriminating. Biggs (1973), Ramsden (1988), and Entwistle (1996) have argued that objective
tests tend to assess knowledge-based learning, whereas essay tests tend to assess conceptual understanding. Based on the above two arguments, together with the consistent empirical findings from Watkins, (1982), Ramsden, (1988), and Scouller (1998), one can expect students to discriminate the different task demands of an essay vs. multiple-choice exam by adopting a deep vs. surface learning strategy, respectively. However, with respect to learning motives, an argument to consider learning motives as relatively stable attributes of a learner was proposed in Section 3.1. Accordingly, it might be expected that Assessment Type will not influence Surface, Deep, and Achieving learning motives.

3.4 Assessment Weighting

As indicated in the overview, little research has been carried out on the effects that Assessment Weighting might have on student learning. A search of various databases (e.g., Ebsco, Academic Search Elite, Ovid, Current Contents, Eric, PsychInfo, Webspirs) revealed that no work has been carried out, specifically on the effects that Assessment Weighting may have on students’ approaches to learning. Whether students vary their study approach according to the relative worth of the assessment is, therefore, unclear.

The lack of research on the effect of Assessment Weighting on students’ learning strategies provides no basis for predictions in the present study. An attempt based on logical reasoning, therefore, will be made to generate a hypothesis. This will be done by considering how students might react to a difference in the weighting of an examination (30% vs. 70%).
Becker, Geer and Hughes (1968), from their interviews with students, believed that the grading system has a powerful influence on learning in that students tend to adopt strategies that would enable them to earn high grades at the cost of understanding the material. It can be argued that a 70% value exam represents a higher stake because of a higher probability in failing the subject, should students perform poorly in the exam. It can be expected, therefore, that a 70% value exam is more likely than a 30% value exam to induce among students some anxiety owing to fear of failing. Past evidence (as indicated in the Introduction) has consistently shown a close association between students’ fear of failure and an adopted Surface Strategy (Biggs, 1987; Entwistle, 1988; Fransson, 1977; Smith, Miller & Crassini, 1998). It is hypothesised, therefore, that students will adopt a higher level of Surface Strategy when an exam is worth 70% than when it is worth 30%. It is difficult, however, to speculate how Assessment Weighting might affect students’ deep and achieving strategies. Therefore, no expectation can be posed.

This study will also investigate the effects of Assessment Type and Assessment Weighting on the study approaches of students enrolled in different disciplines: Psychology, Economics, and Computing. A review of past literature on the effects of discipline of study on student learning thus follows.

3.5 Effects of Discipline on Student Learning

The influence of discipline of study on students’ approaches to learning has been acknowledged by many researchers (Biggs, 1987; Becher, 1994; Entwistle & Ramsden, 1983; Hayes & Richardson, 1995; Lonka & Lindlom-Ylane, 1996;
Neumann, 2001; Ramsden, 1991, 1992, 1997; Ramsden & Entwistle, 1981; Slaats, Lodewijks & Van der Sanden, 1999; Watkins, 1982). Yet the research has varied in terms of its methodology (quantitative vs. qualitative); research design (between vs. within subject design); the level of enquiry into student learning (global learning approach vs. specific learning strategies); and student sample (university vs. vocational students). Despite the variability among past studies, a consistent pattern of findings has emerged that students from different disciplines differ from each other in their approach to their learning. The difference in learning approach might be due to students adapting their learning approach to the learning environment. Alternatively, the difference may arise from a bias for students to enrol in a particular discipline that best suits their predisposed learning style.

Several authors have observed that Science students, more than Arts students, were inclined to adopt a Surface Approach in learning; Arts students, more than Science students, were inclined to adopt a Deep Approach in learning (Entwistle & Ramsden, 1983; Ramsden & Entwistle, 1981; Watkins, 1982). The Approaches to Studying Inventory (ASI: Entwistle & Ramsden, 1983) was used in the three studies. Entwistle and Ramsden investigated the learning approaches of British students and Watkins investigated the learning approaches of Australian university students. This difference in study approach according to discipline is further supported in later research carried out by Lonka and Lindblom-Ylanne (1996). These researchers found that Psychology students were less inclined towards a reproducing/surface learning approach than were their Science counterparts. Psychology students were also noted to be less externally motivated in their learning than were Science students.
3.5.1 Conceptualisation of Differences between Disciplines

The concept of "hard" vs. "soft" discipline was introduced by Biglan (1973) with the distinction made on the basis of whether a subject is paradigm based or not. According to Biglan, a subject belongs to a "hard" discipline where there is consensus among educators about the appropriate content and method of study and the subject is considered to be paradigmatic. Where a discipline is non-paradigmatic, since the content and method of study is idiosyncratic, Biglan considered it to be "soft". This approach was considered by Becher (1989) to be simplistic. Becher's (1987, 1989, 1994) theoretical concepts of "hard" vs. "soft" and "pure" vs. "applied" disciplines are adopted instead to interpret the discipline effect on learning approaches. Becher (1994) considered that the subject content of a discipline might be considered as the main feature that distinguishes a "hard" discipline from one that is "soft". In the case of "hard" disciplines (such as Physics and Chemistry), Becher contended that the subject content deals mainly with universals involving facts and principles; quantities involving numbers; and simplification where relationships between ideas are represented in terms of equations and formulae. In addition, the emphasis on learning is focused on the discovery of ideas and an explanation of existing knowledge. On the other hand, Becher maintained that the subject content in "soft" disciplines (such as History and Anthropology) deals mainly with particulars where value is judged in terms of quality rather than quantity, and with complications that involve the complexity of relationships among constructs or different aspects of human behaviour. The emphasis on learning by students of "soft" disciplines is focused on the understanding and interpreting of ideas, and on establishing coherence of ideas when presenting an argument.
Becher's (1994) proposed distinctions between "hard" and "soft" disciplines are consistent with the distinctions noted by other researchers from their studies. Braxton (1995) found that in "hard" disciplines, teachers emphasised the learning of specific facts, principles and concepts, while in "soft" disciplines, teachers emphasised the learning of broad general knowledge and the use of critical thinking. Smart and Ethington (1995) observed that students who studied "hard" subjects were required to memorise and apply the course material in their learning while students studying "soft" disciplines were often required to analyse and synthesise the course content.

On the basis of these distinctions between "hard" and "soft" disciplines, it is understandable why Arts students were more inclined to engage in deep learning than were Science students (Entwistle & Ramsden, 1983; Ramsden & Entwistle, 1981; Watkins, 1982). In comparison to the Science students in "hard" studies, more demand is placed on Arts student in "soft" studies to understand and interpret a given piece of information in order to develop a coherent argument for choosing between competing ideas or theories. Such learning strategies describe a deep learning strategy.

Becher's (1994) model also addressed the distinction between "pure" and "applied". Becher argued that "pure" disciplines (e.g., Mathematics and Philosophy) deal mainly with knowledge and principles in their own right whereas "applied" disciplines (e.g., Computing and Engineering) involve putting knowledge and principles into effect. Therefore, the emphasis for "pure" disciplines is on the learning process whereas that for "applied" disciplines is on the learning outcome. It can thus be argued that the "pure" type of discipline with
its emphasis on the learning process is likely to promote a deep learning approach that involves understanding, relating, integrating and logical thinking. On the other hand, it can be argued that the “applied” type of discipline with an emphasis on the learning outcome is likely to promote either a surface or achieving learning approach. In both surface and achieving motives, students learn for pragmatic reasons; that being to obtain some sort of qualification that will ultimately enable them to obtain a job. To surface learners, the outcome of a pass in their course of study is acceptable; however, to achieving learners, the learning outcome is aimed at one of academic excellence so that students will have the option of choosing the particular career they desire.

Although Becher’s concepts of the “hard” vs. “soft” and “pure” vs. “applied” categories are useful to differentiate disciplines, his categorisation is artificial and inflexible to the extent that the model does not appear to take into account the possibility each discipline can vary through a continuum according to the specific subject within that discipline. A discipline can be represented as occupying an area of a two-dimensional space, rather than as a single point within Becher’s four-category model.

In addition, the model does not accommodate the variation that occurs within each discipline. Vermetten, Lodewijks and Vermunt (1999) have noted in their research that Law students varied their learning strategies according to the specific law subject they were studying. The researchers attributed such variation within the discipline to differences in teaching style and subject content among the individual law subjects studied by the students.
To accommodate the variability in students’ learning strategies within a discipline, as well as the proposal to represent a discipline as occupying a space, it is therefore necessary to reconceptualise Becher’s (1994) model such that his theoretical concepts of “hard” vs. “soft” and “pure” vs. “applied” are further extended. An adapted and elaborated model is proposed below, with specific reference to the disciplines from which students from the present study will be drawn.

3.5.2 Extending Becher’s (1994) Model

For each of the figures shown below, the mapping of specific subjects within each of three courses (Psychology, Economic, Computing) against Becher’s two dimensions of hard/soft and pure/applied was carried out in consultation with relevant members of the teaching staff from the three disciplines. Teachers described the subject content of the unit(s) taught according to the main features used by Becher to distinguish between “hard” and “soft” disciplines. In other words, teachers described whether their teaching of a specific unit mainly dealt with either facts, principles, numbers, equations, formulae, and explanations of existing knowledge (“hard”), or with interpretation of ideas, presenting a cogent argument and complexity of relationships among constructs (“soft”). The emphasis placed by teachers on students’ learning outcomes differs from Biglan’s methodology where subjects are described, instead, in terms of methods of study. Teachers also considered whether the unit mainly emphasized either the process of learning (“pure”) or applying knowledge and principles in practice (“applied”). The specific Psychology subjects that students in the present
study undertake can be represented as occupying two-dimensional space [Figure 3.1(a)] rather than as a single point within Becher’s four-category model. Both Economics and Computing subjects, on the other hand, are represented as occupying a space in the “hard applied” quadrants [Figures 3.1(b) and 3.1(c)].

Note. a = Introduction to psychology, b = Developmental psychology, c = Social psychology, d = Health psychology, e = Abnormal psychology, f = Psychological testing & measurement, g = Statistical psychology, h = Economic principles, i = National economic policy, j = The global economy, k = Competition & industry, l = International industry policy, m = Labour economics, n = Data structure & algorithms, o = Basic programming concepts, p = System analysis & design, q = Concepts & practices for software engineering, r = Introduction to information & technology, s = Introduction to software development, t = Database & information retrieval, u = Operation system, • Predominant position.


For the sake of simplicity and clarity, when discussing the effects of a discipline on student learning, the characteristics of that discipline as represented by its predominant position in the two-dimensional model will be implied. The predominant position is the average (or resulting “balance”) of all
points occupied by the individual subjects that students have studied within the
discipline, and determine whether the discipline will be considered as
predominantly "hard" or "soft" and "pure" or "applied". In Figure 3.1(a),
Psychology is considered as a discipline that is predominantly "soft" and slightly
more "pure" than "applied" in nature. In Figures 3.1(b) and 3.1(c), Economics is
considered as a discipline that is predominantly "hard" and "applied" and
Computing as a discipline that is "more hard" and "applied". Becher (1994)
likewise has classified Computing as a "hard applied" discipline and maintained
that Economics may be argued to be a "hard" discipline. Biglan (1973), on the
other hand, considered Economics as a "soft" discipline, and expressed no view
on Computing.

Taking into account the empirical evidence for student variation in
learning approaches across disciplines and Becher's theoretical notions of
disciplinary types together, one can expect Discipline to have an effect on student
learning in such a way that Psychology ("soft pure") students will be higher than
Computing ("hard applied") and Economics ("hard applied") students on Deep
Motive and Deep Strategy in learning. On the other hand, one can also expect
Psychology students to score lower on Surface Motive and Surface Strategy than
Computing and Economics students.

3.6 Effects of Gender on Student Learning

A literature review of the research on gender difference on learning did not
reveal a consistent pattern of gender difference among students for surface and
deep learning strategies. Empirical evidence for a consistent gender difference on
achieving learning strategy, however, has been shown by Heikkinen, Pettigrew, and Zakraysek (1985), Meyer, Dunne and Richardson (1994), and Meyer (1995). Good organisation in learning and regular monitoring of one's learning are considered to be salient features of female learning. In addition, female students were found to show a stronger preference than did male students for a learning context that is well-organised. It is expected, therefore, in the present study, that female students will be higher than their male cohorts on Achieving Strategy in learning.

With respect to surface and deep learning strategies, some researchers have found gender differences in student learning (e.g., Miller, Finley & Mckinley, 1990; Murphy, 1982; Sadler-Smith, 1996; Speth & Brown, 1990; Watkins, 1982) whereas other researchers have not (e.g., Hayes & Richardson, 1995; Richardson, 1993; Richardson & King, 1991). The lack of consistent evidence of gender difference in learning may have arisen from methodological differences among studies. Some aspects relate to variation in: sample size, type of statistical analysis employed; student characteristics (e.g., discipline of study, year of study, being a minority/majority group within the class), and type of instrument used to measure learning behaviour.

In two separate studies, Richardson (1993) investigated the learning approaches of first-year British university students who were enrolled in Social Sciences and Humanities. Using a short and a long version of the original ASI, Richardson noted that male and female students did not differ significantly from each other in their Meaning and Reproducing orientations in learning. Also, male and female students did not differ on Deep Approach or Surface Approach.
Although Richardson (1993) did not obtain any evidence to indicate gender difference in learning, it is noted that some of his samples were as small as 27 students and may have lacked power.

By contrast, gender difference in learning behaviours was observed by Sadler-Smith (1996) in his study of 245 British Business students (115 females, 130 males). The Revised Approaches to Studying Inventory (RASI: Entwistle & Tait 1994) was used. Gender effects on mean scores for each of the five orientations (Deep Approach, Surface Approach, Strategic Approach, Lack of Direction in Learning, and Academic Self-confidence), and for the individual subscales comprising them, were investigated. However, in Sadler-Smith’s (1996) multiple-comparisons of the various mean scores, there is no evidence that alpha levels had been adjusted to overcome the possibility of Type 1 error. In making such an adjustment (using the Bonferroni method), Sadler-Smith’s analyses were reinterpreted and the following findings noted. Male Business students adopted a deeper learning approach whereas female Business students adopted a more surface learning approach. On Academic Self-Confidence, male students showed greater self-confidence in their academic ability than did female students. For both Strategic Orientation and Lack of Direction in learning, no significant gender difference was obtained.

Although different conclusions were drawn by Richardson (1993) and Sadler-Smith (1996) regarding gender difference in student learning, it is difficult to determine whether Richardson’s findings are really inconsistent with those obtained by Sadler-Smith. The student samples tested in each of the studies were quite different. Richardson’s sample consisted of first-year university students
drawn from Social Sciences and Humanities whereas Sadler-Smith’s sample consisted of Business students who were at different levels of their university programmes. As discussed earlier in this chapter, students from different disciplines can vary in the way they approach their learning (Becher, 1994; Braxton, 1995; Entwistle & Ramsden, 1983; Lonka & Lindblom-Ylanne, 1996; Ramsden & Entwistle, 1981; Smart & Ethington, 1995; Watkins, 1982). The possibility that gender difference in learning behaviour might occur in some disciplines while not in others is still open to speculation.

Another possible explanation for the inconsistency between Richardson’s (1993) findings (for Social Science and Humanities students), and those of Sadler-Smith’s (1996) (for Business students), may be explained in terms of Thomas’s (1988, 1990) notion of gender differences in emotional reactions to being a minority gender group in the class. According to Thomas, male Humanities students reported that they felt “special” in a class that was predominantly female. By contrast, female Science students reported feeling that their personal identity and self-confidence were being challenged, and that they were not accepted by their cohorts into the mainstream. It may be expected therefore, that female Science students will be anxious and concerned about their ability to perform well in the course. Evidence is provided by Clarke (1986) and Sadler-Smith (1997), who both noted in their studies that their minority group of female medical students and female Business students, respectively, reported higher levels of anxiety about their study and were more concerned about coping than were their male cohorts. It can be argued from here that such an emotion can in turn influence the type of learning strategy students will adopt.
Entwistle (1996) and Meyer (1995) noted in their research that students (especially female students) who lacked confidence and who were highly anxious about failure, tended to adopt a surface learning strategy whereby their thinking was narrow and restricted, and heavy emphasis was placed on the memorization of details and procedures. The close association between fear of failure and Surface Strategy was also obtained by the present author and her colleagues (Smith, Miller & Crassini, 1998) in their study of Australian and Overseas Chinese university students. It can be argued, therefore, that when females form a minority group within a discipline, they will be prone to more anxiety and hence adopt greater Surface Strategy. By contrast, minority males will not display the same tendency.

In the present study, the effects of Assessment Type and Assessment Weighting on the learning of male and female students from the disciplines of Psychology, Economics, and Computing will be investigated. It can be argued that an interaction effect between Gender, Discipline, and Assessment Weighting may occur. In the situation where a 70% value exam is likely to pose greater risk in failing a subject than a 30% value exam (as discussed earlier in the Introduction), it can be hypothesised that female Business students will adopt an even higher Surface Strategy level when studying for a 70% value exam than when studying for a 30% value exam compared with male Business students when studying for a 70% vs. 30% exam.

3.7 Summary

From a review of past work it has been argued that Assessment Type (Essay vs. Multiple-choice exam) will influence students' Surface Strategy and Deep
Strategy in learning. It was also argued that Assessment Weighting will influence students’ Surface Strategy since a higher stake is associated with a 70% than a 30% value exam. Evidence has consistently indicated that Discipline Type promotes different learning approaches, such that it can be expected that students from Psychology will differ from students in Economic and Computing in Surface Motive, Surface Strategy, Deep Motive, and Deep Strategy. Finally, it was argued that Gender will influence Achieving Strategy in learning. A summary of the proposed hypotheses follows.

3.8 Proposed Hypotheses

The hypotheses that were proposed in the present study can be summarized as follows:

1. Assessment Type will influence learning in that students’ Surface Strategy will be higher for a multiple-choice exam than for an essay exam.

2. Assessment Type will influence learning in that students’ Deep Strategy will be higher for an essay exam than for a multiple-choice exam.

3. Assessment Weighting will influence learning in that students’ Surface Strategy will be higher for an exam that is worth 70% than when it is worth 30% of the total subject studied.

4. Discipline will influence learning in that students who were enrolled in Psychology ("soft-pure") will be higher on Deep Motive and Deep Strategy than will Computing and Economics students.
5. Discipline will influence learning in that students who were enrolled in Computing and Economics ("hard-applied") will be higher on Surface Motive and Surface Strategy than will Psychology students.

6. Gender will influence learning in that female students will be higher on Achieving Strategy than will male students.

7. Female Business students will adopt a higher Surface Strategy level when studying for a 70% value exam than when studying for a 30% value exam compared with male Business students when studying for a 70% vs. 30% exam.

Method

3.9 Participants

Two hundred and forty-eight Australian undergraduate students from Deakin University in the State of Victoria volunteered as unpaid participants in the study. The sample consisted of 137 males and 111 females drawn from Psychology (N = 93), Computing (N = 99), and Economics (N = 56). Students' ages ranged from 18 to 50 years. Voluntary participants were recruited on the basis that English is their first language and that they had recent experience in doing a multiple-choice and an essay type of examination in their course of study.

3.10 Materials

The materials used in this study consisted of the Studying Process Questionnaire -SPQ (Biggs, 1987) and a demographic questionnaire. The SPQ
(see Appendix B1) consisted of 42 statements with seven statements measuring each of the six scales (Deep Motive, Deep Strategy, Surface Motive, Surface Strategy, Achieving Motive, Achieving Strategy). A five-point Likert scale with values ranging from 1 (rarely true) to 5 (almost always true) was used by participants to rate the statements on the way they approached their studies, as they prepared for a particular hypothetical exam (essay or multiple-choice) that was worth either 70% or 30% of the total mark for the subject studied.

The SPQ has acceptable internal consistency for research purposes. Biggs (1987) reported alpha reliability coefficients (for university samples) for the subscales as: 0.61 (Surface Motive), 0.66 (Surface Strategy), 0.65 (Deep Motive), 0.72 (Deep Strategy), 0.70 (Achieving Motive), and 0.77 (Achieving Strategy). Further evidence to substantiate psychometric properties was presented in Chapter Two. The demographic questionnaire requested information from students regarding their age, gender, discipline and academic level.

3.11 Procedure

Written permission (Appendix A) to carry out this study was sought from Deakin University Ethics Committee. Upon approval, permission to approach students for volunteers to participate in this study was obtained from individual staff members in the faculties of Science and Computing, Commerce and Health and Behavioural Sciences. Arrangements were made with staff members for testing to be carried out either at the beginning or at the end of lectures.
At a prearranged class time, students were approached and invited to participate in answering the questionnaire. First, the plain language statements (Appendix B1) were distributed to the participants. The questionnaires were then distributed randomly to participants who took approximately 10 to 20 minutes to complete. Participants were treated in accordance with the ethical standards of the National Statement on Ethical Conduct in Research involving Humans (1999).

3.12 Design

A 2 (essay vs. multiple-choice) x 2 (30% vs. 70% weighting) mixed factorial design with four hypothetical assessment conditions (a 30% multiple-choice exam, a 70% multiple-choice exam, a 30% essay exam and a 70% essay exam) was used. Participants responded to the Study Process Questionnaire as if they were studying for a particular hypothetical examination that was randomly allocated to them. The number of participants under each condition is shown in the table below.

Table 3.1. Frequency of participants under each Assessment Condition

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Assessment Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30%</td>
</tr>
<tr>
<td>Essay</td>
<td>71</td>
</tr>
<tr>
<td>Multiple Choice</td>
<td>50</td>
</tr>
</tbody>
</table>
Results

3.13 Overview

Between-subject comparisons were carried out on the data collected from 248 participants using the Statistical Package for Social Sciences (SPSS for Windows, Version 11). Analyses were carried out in three stages.

First, a preliminary one-way MANOVA was carried out to determine whether the two subgroups (Economics and Computing) could be collapsed to form a larger group. Post hoc analyses (Tukey method) were then carried out to determine univariate significant differences. Results of the analyses enabled Economics and Computing students to be combined together to form a larger single group referred to a Business students. Second, a single 2x2x2x2 MANOVA was carried out with Assessment Type (Essay vs. Multiple-choice), Assessment Weighting (30% vs. 70%), Discipline (Psychology vs. Business) and Gender (males vs. females) as independent variables, and the six SPQ scales as dependent variables. Some significant main effects were obtained and post-hoc analyses (Tukey method) were carried out. Third, interaction effects from the MANOVA were then systematically explored.

3.14 Screening for Multivariate Analyses

The data collected from 248 participants were screened for missing values and the various assumptions underlying the use of MANOVA and ANOVA were evaluated for possible violations. Assumptions of univariate and multivariate normality, linearity, homogeneity of regression, homogeneity of covariance
matrices, multi-collinearity and singularity were not violated. Three assumptions underlying the use of MANOVA, however, were violated. They were: (1) equality of error variance of dependent variables across groups, (2) an appropriate ratio of 1:1.5 between the smallest and largest cells, and (3) an acceptable cell size (number of cases > number of dependent variables).

3.15 Addressing assumptions that were violated

To address violation of assumption (1), the alpha level for the particular variable, whose error variance was significantly different from other variables, was adjusted at 0.025 instead of 0.05 (as recommended by Tabachnick & Fidell, 2001). In all univariate analyses, Bonferroni adjustments to alpha values of significance for the six dependent variables were carried out in order to reduce the probability of occurrence of Type 1 error owing to multiple comparisons. To remedy violations of assumptions (2) and (3), a preliminary MANOVA was carried out to determine whether Computing and Economics students could be combined together to form a large single group.

3.15.1 Preliminary MANOVA (Stage 1)

Levene’s test indicated unequal error variances across groups for the learning measure, Deep Motive. The alpha value for this measure was therefore adjusted to .025 (Tabachnick & Fidell, 2001). After applying the Bonferroni adjustment to reduce Type 1 error, a final level of .004 was set for Deep Motive when determining its significance in the univariate F test. Results of
the preliminary one-way MANOVA and the subsequent univariate analyses are summarized in Table 3.2.

Table 3.2. Preliminary Analysis: Summary of results for influence of Discipline on students’ learning motives and strategies: Multivariate and Univariate Analyses of Variance.

<table>
<thead>
<tr>
<th>IV</th>
<th>DV</th>
<th>Multivariate F-Ratio</th>
<th>Univariate F-Ratio</th>
<th>df</th>
<th>Partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st one-way MANOVA</td>
<td></td>
<td></td>
<td></td>
<td>1:232</td>
<td>.17</td>
</tr>
<tr>
<td>Discipline (Psychology vs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computing vs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Economics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surface Motive</td>
<td>13.42*</td>
<td></td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surface Strategy</td>
<td>16.31*</td>
<td></td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep Motive</td>
<td>14.79*</td>
<td></td>
<td>.11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep Strategy</td>
<td>4.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Achieving Motive</td>
<td>4.85</td>
<td></td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Achieving Strategy</td>
<td>13.52*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * Significant after Bonferroni adjustment. Partial $\eta^2$ = partial eta squared

Discipline had a significant main effect on student learning. Univariate F values indicated significant effects for students’ Surface Motive, Surface Strategy, Deep Motive and Achieving Strategy. Psychology students reported a significantly lower score for Surface Motive ($M = 3.16, SD = .62$) than did Computing students ($M = 3.57, SD = .65$) and Economics students ($M = 3.61, SD = .60$), and also a significantly lower score for Surface Strategy ($M = 2.77, SD = .55$) than did Computing students ($M = 3.22, SD = .60$) and Economics students ($M = 3.15, SD = .50$). Conversely, Psychology students reported a significantly higher score for Deep Motive ($M = 3.28, SD = .77$) than did Computing students.
(M = 2.75, SD = .66) and Economics students (M = 2.94, SD = .56), and also a significantly higher score for Achieving Strategy (M = 3.08, SD = .89) than did Computing students (M = 2.55, SD = .73) and Economics students (M = 2.52, SD = .72). Overall, results indicated that Psychology students studied in a way that was distinctly different from Economic and Computing students who were similar in their learning approaches. It was therefore deemed acceptable to combine these two groups of students into one larger discipline group, subsequently referred to in the thesis as the Business group. The assumptions concerning an appropriate ratio between the smallest and largest cells and an acceptable cell size were no longer violated.

3.16 Descriptive Statistics

The means, standard deviations, and reliabilities for each SPQ scale are shown in Table 3.3.

Table 3.3. Means, Standard Deviations and Reliability coefficients for the SPQ scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Scale Range</th>
<th>M</th>
<th>SD</th>
<th>Cronbach's coefficient alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Motive</td>
<td>7-35</td>
<td>23.97 (21.52)</td>
<td>4.59 (4.88)</td>
<td>.60 (.61)</td>
</tr>
<tr>
<td>Surface Strategy</td>
<td>7-35</td>
<td>21.24 (20.54)</td>
<td>4.16 (4.44)</td>
<td>.56 (.66)</td>
</tr>
<tr>
<td>Deep Motive</td>
<td>7-35</td>
<td>20.93 (24.91)</td>
<td>5.05 (4.59)</td>
<td>.71 (.65)</td>
</tr>
<tr>
<td>Deep Strategy</td>
<td>7-35</td>
<td>22.05 (22.42)</td>
<td>4.21 (4.44)</td>
<td>.70 (.72)</td>
</tr>
<tr>
<td>Achieving Motive</td>
<td>7-35</td>
<td>22.61 (20.03)</td>
<td>4.66 (5.14)</td>
<td>.67 (.70)</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>7-35</td>
<td>19.18 (21.20)</td>
<td>5.82 (5.49)</td>
<td>.78 (.77)</td>
</tr>
</tbody>
</table>

Note. N = 248. Figures in brackets are values reported by Biggs (1987) in his study.
Overall, the means and standard deviations of the SPQ scales are comparable to those obtained by Biggs (1987). Apart for Surface Strategy (with alpha coefficient of .56), the reliabilities of the remaining SPQ scales are also comparable to those obtained by Biggs.

3.17 Main MANOVA (Stage 2)

Next a 2x2x2x2 MANOVA between-subject design was carried out on student ratings for the six SPQ scales. The four independent variables were Assessment Type (essay vs. multiple-choice), Assessment Weighting (30% vs. 70%), Discipline (Psychology vs. Business), and Gender (males vs. females). The six dependent measures were Deep Motive, Deep Strategy, Surface Motive, Surface Strategy, Achieving Motive, and Achieving Strategy.

3.18 Adjustment to Alpha Values

Levene's test indicated unequal error variances across groups for Surface Motive. The alpha value for this measure was, therefore, adjusted to .025 (Tabachnick & Fidell, 2001). After applying the Bonferroni adjustment to reduce Type 1 error, a final alpha level of .004 was set for determining significance of the univariate F test for Surface Motive. Final alpha values of .008 (after Bonferroni adjustments) were set for the remaining five measures. Results of the MANOVA and subsequent univariate analyses are summarized in Table 3.4.
Table 3.4. Summary of results for influence of Assessment Type, Assessment Weighting, Discipline and Gender on students’ learning motives and strategies:
Multivariate and Univariate analyses of variance.

<table>
<thead>
<tr>
<th>IV</th>
<th>IV</th>
<th>Multivariate F-Ratio</th>
<th>Univariate F-Ratio</th>
<th>df</th>
<th>Partial η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Type</td>
<td></td>
<td>.97</td>
<td></td>
<td>1: 227</td>
<td>.03</td>
</tr>
<tr>
<td>M/C vs. Essay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface Motive</td>
<td>.89</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Surface Strategy</td>
<td>.34</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Deep Motive</td>
<td>1.24</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.01</td>
</tr>
<tr>
<td>Deep Strategy</td>
<td>.68</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Achieving Motive</td>
<td>.35</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>.46</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Assessment Weighting</td>
<td>2.72*</td>
<td></td>
<td></td>
<td>1: 227</td>
<td>.07</td>
</tr>
<tr>
<td>30% vs. 70%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface Motive</td>
<td>.34</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Surface Strategy</td>
<td>12.75*</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.05</td>
</tr>
<tr>
<td>Deep Motive</td>
<td>.13</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Deep Strategy</td>
<td>.00</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Achieving Motive</td>
<td>.20</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>.04</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Discipline</td>
<td>11.49*</td>
<td></td>
<td></td>
<td>1: 227</td>
<td>.23</td>
</tr>
<tr>
<td>Psychology vs. Business</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface Motive</td>
<td>18.11*</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.07</td>
</tr>
<tr>
<td>Surface Strategy</td>
<td>19.43*</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.08</td>
</tr>
<tr>
<td>Deep Motive</td>
<td>29.62*</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.11</td>
</tr>
<tr>
<td>Deep Strategy</td>
<td>13.93*</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.06</td>
</tr>
<tr>
<td>Achieving Motive</td>
<td>4.78</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.02</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>7.56*</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.03</td>
</tr>
<tr>
<td>Gender</td>
<td>5.07*</td>
<td></td>
<td></td>
<td>1: 227</td>
<td>.12</td>
</tr>
<tr>
<td>Male vs. Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface Motive</td>
<td>.60</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Surface Strategy</td>
<td>.52</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Deep Motive</td>
<td>.27</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Deep Strategy</td>
<td>3.05</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.01</td>
</tr>
<tr>
<td>Achieving Motive</td>
<td>.03</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.00</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>11.94*</td>
<td></td>
<td></td>
<td>1: 232</td>
<td>.05</td>
</tr>
</tbody>
</table>

Note. * Significant after Bonferroni adjustment. Partial η² = partial eta squared
3.19 Main effects

Assessment Type (multiple-choice vs. essay) did not have a significant main effect. Assessment Weighting (30% vs. 70%) had a significant main effect on student learning. Univariate F values indicated that students reported a higher score for Surface Strategy when an assessment was worth 70% (M = 3.11, SD = .59) than when it was worth 30% (M = 2.96, SD = .59). This increase in Surface Strategy, had a moderate effect size of 5%. An effect with eta-squared value of .05 is considered moderate (Cohen, 1988). In this case, the partial $\eta^2$ has the same value (.05) as $\eta^2$.

Discipline (Psychology vs. Business) also had a significant main effect on student learning. Univariate F values indicated Discipline to have significant main effects on Surface Motive, Surface Strategy, Deep Motive, and Deep Strategy. Psychology students reported a significantly lower score for Surface Motive (M = 3.16, SD = .62) than did Business students (M = 3.58, SD = .63) and also, a significantly lower score for Surface Strategy (M = 2.77, SD = .55) than did Business students (M = 3.19, SD = .57). Conversely, Psychology students reported a significantly higher score for Deep Motive (M = 3.28, SD = .77) than did Business students (M = 2.82, SD = .63) and also, a significantly higher score for Deep Strategy (M = 3.29, SD = .61) than did Business students (M = 3.06, SD = .58). Psychology students also reported a significantly higher score for Achieving Strategy (M = 3.08, SD = .89) than did Business students (M = 2.54, SD = .73).

Finally, Gender had a significant main effect on student learning. Univariate F values indicated Gender to have a significant main effect on Achieving Strategy.
with female students reporting a significantly higher score ($M = 3.04$, $SD = .83$) than did male students ($M = 2.49$, $SD = .75$).

3.20 Interaction Effects (Stage 3)

Two 3-way interactions were obtained. One three-way interaction was Assessment Type x Discipline x Gender for Achieving Strategy, $F(1, 232) = 8.99$, $p < .008$ with an effect size of 4.4%. The other interaction was Assessment Weighting x Discipline x Gender for Surface Strategy, $F(1, 232) = 13.32$, $p < .008$ with an effect size of 5% (See Figures 3.2 and 3.3 below).

![Graph showing Interaction Effects](image)

**Figure 3.2** Assessment Type x Discipline x Gender on Achieving Strategy
Figure 3.3 Assessment Weighting x Discipline x Gender on Surface Strategy

To better understand a 3-way interaction, various permutations of two-way interactions can to be explored (Maxwell & Delaney, 1990). The aim of this study was to examine effects of Assessment Type (essay vs. multiple-choice) and Assessment Weighting (30% vs. 70%) on student learning. Hence, four comparisons of 2-way interactions on Achieving Strategy and Surface Strategy, respectively, were carried out using univariate analyses of variance.

With respect to Achieving Strategy, the four comparisons were Assessment Type x Gender (Psychology students), Assessment Type x Gender (Business students), Assessment Type x Course (Male students), and Assessment Type x Course (Female students). With respect to Surface Strategy, the four comparisons were Assessment Weighting x Gender (Psychology students), Assessment Weighting x Gender (Business students), Assessment Weighting x Course (male students), and Assessment Weighting x Course (female students). Further adjustments to alpha values for Achieving Strategy and Surface Strategy were
carried out to reduce the probability of occurrence of Type I error owing to multiple comparisons. A final alpha value of .002 was set for both Achieving and Surface Strategy.

3.20.1 Interaction Effect on Achieving Strategy

Of the four 2-way comparisons carried out, only one significant interaction effect (Assessment Type x Gender) on Achieving Strategy was obtained. This effect was obtained for Psychology students (Figure 3.4). The change in Achieving Strategy scores for male Psychology students when studying for an essay versus a multiple-choice examination differed significantly from the change in Achievement Strategy scores for female Psychology students when studying for an essay versus a multiple-choice examination, $F(1, 240) = 10.384$, $p < .002$. The Achieving Strategy scores for male students decreased when they studied for multiple-choice as opposed to essay examination whereas the reverse was obtained for female students. Assessment Type, therefore, influenced Achieving Strategy differently for Psychology students according to gender. It appears, therefore, that the significance of the 3-way interaction (Assessment Type x Gender x Subject Studied) on Achieving Strategy can be attributed to the significant interaction effect (Assessment Type x Gender) on Achieving Strategy for Psychology students alone.
Figure 3.4  Assessment Type x Gender on Achieving Strategy for Psychology students
3.20.2 Interaction Effects on Surface Strategy

Of the four 2-way comparisons carried out, two significant interaction effects on Surface Strategy were obtained, namely Assessment Weighting x Gender and Assessment Weighting x Discipline. The interaction of Assessment Weighting x Gender on Surface Strategy scores was significant for Business students, $F(1, 240) = 9.571$, $p < .002$. Surface Strategy scores for male Business students remained unchanged by Assessment Weighting whereas scores for female Business students increased when Assessment Weighting changed from 30% to 70%. Assessment Weighting, therefore, influenced the Surface Strategy scores of Business students differently, according to Gender (Figure 3.5).

![Graph showing interaction effects on Surface Strategy](image)

Figure 3.5. Assessment Weighting x Gender on Surface Strategy for Business students

For females alone, the interaction effect of Assessment Weighting x Discipline on Surface Strategy was also significant, $F(1, 240) = 10.467$, $p < .002$ (See Figure 3.6). The Surface Strategy scores for female Psychology students remained unchanged by Assessment Weighting whereas the Surface Strategy scores for female Business students increased as Assessment Weighting increased.
from 30% to 70%. Assessment Weighting, therefore, influenced the Surface Strategy of female students differently, according to discipline studied (effect size of 6.1%). In conclusion, it appears that the significance of the three-way interaction (Assessment Weighting x Gender x Discipline) on Surface Strategy scores can be attributed to the significant interaction effect (Assessment Weighting x Gender) on Surface Strategy for female Business students alone.

![Graph showing Surface Strategy vs Assessment Weighting](image)

Figure 3.6 Assessment Weighting x Discipline on Surface Strategy for female students

3.21 Overall Summary

With respect to main effects, Assessment Type did not have a main effect on student learning, whereas Assessment Weighting had an effect on students’ Surface Strategy. Students adopted a higher level of Surface Strategy when assessment was worth 70% than when assessment was worth 30%. Gender had an effect on students’ Achieving Strategy with female students adopting a higher level than did male students. Discipline had a main effect on student learning with
Psychology students adopting a higher level for Achieving Strategy, Deep Motive and Deep Strategy than did Business students, and a lower level for Surface Motive and Surface Strategy than did Business students.

With respect to interaction effects, Assessment Type, Discipline, and Gender interacted with each other to produce a significant effect on students’ Achieving Strategy. The significance of this three-way interaction was attributed to a significant difference in levels of Achieving Strategy between male and female Psychology students when preparing for an essay as opposed to a multiple-choice examination. Assessment Weighting, Discipline, and Gender, on the other hand, interacted with each other to produce a significant effect on students’ Surface Strategy. The significance of this interaction was attributed to a significant difference in levels of Surface Strategy; firstly between male and female Business students and secondly, between female Psychology and female Business students.

Discussion

The main aim of Study 1 was to investigate the degree of influence of the situational variables (Assessment Type and Assessment Weighting) on students’ learning motives and strategies. Overall, the hypotheses that Assessment Type will influence students’ surface and deep strategies in learning were not supported. However, the hypothesis that Assessment Weighting will influence students’
Surface Strategy in learning was supported. At a secondary level, the hypotheses that Discipline will influence students' surface and deep strategies in learning and that Gender will influence students' Achieving Strategy in learning were all supported.

Main effects for each of the factors (Assessment Type, Assessment Weighting, Discipline and Gender) will be discussed in terms of how they compare with past findings and possible explanations will be proposed to account for the results obtained in the study. Significant interaction effects will also be discussed. Limitations of the present study, implications and future research will be considered before a conclusion to the study is made.

3.22 Effects of Assessment Type on Learning

Assessment Type was proposed to increase students' Surface Strategy for a multiple-choice exam compared with an essay exam. Further, Assessment Type was proposed to increase students' Deep Strategy for an essay exam compared with a multiple-choice exam. Neither hypothesis was supported. Surface Strategy and Deep Strategy levels remained relatively similar regardless of whether students were preparing for an essay or a multiple-choice exam. The results do not seem to support the researcher's arguments that multiple-choice exam assesses the learning of facts and details and will thus promote a Surface Strategy in learning or that essay exam assesses conceptual understanding, logic, integration and synthesis of ideas and will thus promote a Deep Strategy in learning (Ramsden, 1988; Entwistle, 1996; Biggs, 1973; Claxton & Murrell, 1987). It is possible that while answering the questionnaire in the hypothetical context demanded by the
research methodology, students were not distinguishing strongly between the demands of an essay and those of a multiple-choice exam.

3.22.1 Multiple Choice Exam did not promote Surface Strategy in Learning

A non-significant main effect of multiple-choice on students’ surface learning strategy is consistent with Scouller and Prosser’s (1994) finding. It is inconsistent, however, with the findings obtained by Watkins (1982), Ramsden (1988a) and Scouller (1998), all of whom found that students reported an intended surface learning strategy when studying for a multiple-choice exam. Similar to Scouller and Prosser’s research, the students in the current study formed a very heterogeneous group where it is likely that students differed considerably in terms of academic ability and maturity. Students in this study varied in terms of age, year level of study (second or third year level), mode of study (on-campus or off-campus), and discipline of study (Psychology, Computing, or Economics). Scouller and Prosser proposed that student ability and maturity may moderate the effects of multiple-choice assessment on students’ Surface Strategy. Taking into account the similarity of student sample used in both the present study and Scouller and Prosser’s study, it is possible that in the current research, variability in students’ ability and maturity might have also moderated the influence of multiple-choice exam on surface learning strategy to bring about a non-significant effect. The students investigated by Ramsden, by Scouller, and by Watkins were first and second year university students. Those students may, therefore, be considered to be relatively homogenous in ability and maturity, with fewer years
of study at a tertiary institution compared with the students investigated in the present study and in Scouller and Prosser’s study.

An alternative explanation is that in the heterogeneous sample, one can expect some number of students to be consistently deep learners. Scouller and Prosser (1994) noted that deep learners tend to perceive multiple-choice as assessing deep learning. Biggs (1987), Thomas and Bain (1982), and Entwistle and Tait (1990) all maintained that deep learners are less sensitive to change in task demands than are surface learners and are likely to continue with a deep learning approach under different learning situations such as multiple-choice versus essay exams. It is possible, therefore, that the lack of a significant main effect for multiple-choice on surface learning strategy in the current study may be due to the deep learners continuing with a deep approach even when a multiple-choice exam might have demanded a surface type of learning strategy.

Finally, it may be that the context for assessment, held constant as an exam condition in this study, is the factor that influences learning strategy. As noted in the Introduction of this study, findings of an Assessment Type effect have generally confounded it with assessment condition.

3.22.2 Essay did not promote Deep Strategy

A non-significant main effect of essay on students’ deep learning strategy indicates that an essay type of exam does not promote a deep learning strategy in students. There are three possible explanations for this finding.
First, even though deep learners are likely to continue adopting a deep learning strategy regardless of situational influence (Entwistle & Tait, 1994), it has to be acknowledged that other environmental variables associated with an exam context (e.g., pressure and time constraints) may have some effect on how students study. For many students, examinations induce some anxiety as they are expected to quickly understand the exam question, to formulate the structure of the essay and to write and substantiate their work, all within a given time constraint. Entwistle and Entwistle (1997) found that although students might initially seek to adopt a Deep Strategy in their preparation for an essay exam, the type of strategy they ultimately adopted in their revision appeared to reflect parts of deep, surface and achieving learning strategies. It may be that the deep learners in the present study were also aware of the constraints and pressures of an examination and that they were not able to maintain their intended Deep Strategy but instead ultimately adopted surface and achieving strategies as suggested by Entwistle and Entwistle.

Second, it is possible that students have different notions of what is required by an essay. Hounsell (1997) has shown that some students consider the essay requirement is to present a coherent and persuasive argument with supporting evidence to substantiate a point of view. Others hold a superficial notion that the requirement is simply to describe the subject matter. The first notion of an essay involves a deep learning strategy while the second notion involves a surface learning strategy. If students in the present study indeed held different notions of what is required by an essay, the variability in learning
strategy reported might have averaged out to a non-significant effect of an essay exam on students’ Deep Strategy.

A third explanation again resides in the possibility that the hypothetical nature of the task set for students who participated in this study has not provided a situation where the demands of different Assessment Types can be starkly contrasted. It must be acknowledged, however, predicted effects were obtained for other aspects of the “hypothetical exercise”.

It is also noted that no significant main effect of Assessment Type was obtained for any of the learning motives (Deep Motive, Surface Motive and Achieving Motive). It was argued in the Introduction that learning motives are relatively stable and can be considered as personal traits that are relatively resilient to situational influences. This argument appears consistent with the results.

3.23 Effects of Assessment Weighting on Learning

Assessment Weighting was expected to increase students’ Surface Strategy for an examination that was worth more. This hypothesis was supported. This finding supports the argument that students will consider a higher risk of failure for an exam that is worth 70% than for an exam that is worth 30%. When stakes are high, one can expect that students will be more anxious about their performance for fear of failing in the subject. Students in this study indicated a tendency to be more rule-governed and strategic in their learning behaviour when preparing for a 70% value exam than for a 30% value exam. Students reported to have studied closely according to set learning guidelines and objectives. They also
adhered to the prescribed learning material, focused predominantly on factual information and studied in order to pass. It can be argued that this definite and factual type of learning will provide, especially to anxious students, a sense of security in relation to the quantity and type of information they have while preparing for the exam. A tendency towards a rule-governed and strategic learning behaviour may be considered as another way of minimising their anxiousness about the high risk of failing in the 70% value exam. Fransson (1977), Biggs (1987), Entwistle (1988), and Smith, Miller and Crassini (1998) have each argued for a close association between students' fear of failure and an adopted surface learning strategy. It would appear that the present result has therefore provided further support for their arguments.

3.23.1 Assessment Weighting x Discipline x Gender Interaction Effects

Although Assessment Weighting had an effect on the Surface Strategy of students overall, the extent of this effect varied according to the discipline students were enrolled in and their gender. Two significant 2-way interactions were obtained from the analyses. Discussions of significant differences in surface learning strategy according to Assessment Weighting between female and male Business students, and between female Business and female Psychology students will be addressed.
3.23.2 A Comparison between Female and Male Business students for Effects of Assessment Weighting on Surface Strategy.

Female Business students who responded under a 70% value exam scenario had a significantly higher Surface Strategy than did female Business students who responded for a 30% value exam. By contrast, male Business students showed no difference in Surface Strategy for a 30% vs. 70% exam. The significantly higher Surface Strategy reported by female Business students for a 70% value exam might be explained both in terms of their emotional reactions associated with fear of failing in the exam and with being a minority group in a discipline where Business studies are favoured more by male students. The number of male and female Business students enrolled in that year was 324 and 151, respectively. In the Introduction, it was argued that anxiousness owing to fear of failure is likely to be accentuated when the stakes are high, as in a 70% weighted exam. It can be further argued that such an effect will be experienced particularly by female students, representing the minority group in Business-related studies.

Thomas (1988, 1990) noted that in a predominantly male learning environment, female students felt uncomfortable and lacked confidence in their ability to cope. Such feelings might be due to the female students’ perceived need to identify and adapt to the social and cognitive expectations of a predominantly male environment. If indeed this was the case one can expect female Business students to adopt a high Surface Strategy as they study for a 70% value exam. A Surface Strategy provides students with a clear structure for learning because the content, guidelines and objectives for learning are clearly defined. This type of
learning strategy can be reassuring especially to students who are under-confident and anxious about their ability to pass the exam. The present result can be said to support the findings by Sadler-Smith (1996) and Meyer (1995) that female students, when a minority group, report a higher Surface Strategy than do their male counterparts.

3.23.3 A Comparison between Female Business and Female Psychology Students on Effects of Assessment Weighting for Surface Strategy

A significant difference in Surface Strategy according to Assessment Weighting between female Business and female Psychology students was also obtained. As previously discussed, female Business students who responded for a 70% exam has a significantly higher Surface Strategy than did Business females who responded for a 30% exam. By contrast, female Psychology students, like male Business students, showed no difference in their Surface Strategy according to Assessment Weighting.

It can be argued that female Psychology students share similar experiences with male Business students in that both represent the majority subgroups in their enrolled discipline. In the year the study was carried out, females represented 72% and males represented 68.2% of the total enrollment of Psychology and Business students, respectively. With their self-identity and confidence not likely to be under threat (Thomas, 1988, 1990), probably both student subgroups were reasonably comfortable in their discipline and felt no necessity to increase their Surface Strategy to ensure success when preparing for a
70% value exam. Hence, their Surface Strategy in learning was not affected by Assessment Weighting.

3.24 Effects of Discipline on Learning

It was hypothesized that Discipline would affect students’ learning strategies such that Psychology students would be higher on Deep Strategy and lower on Surface Strategy than would Business students. Both hypotheses were supported. The hypotheses that Psychology students would be higher on Deep Motive and lower on Surface Motive than would Business students were also supported.

3.24.1 A Comparison between Psychology and Business students on Deep and Surface Strategies

The present findings regarding significant differences in learning strategies between Psychology and Business students are consistent with the findings obtained by Braxton (1995) and Smart and Ethington (1995). Braxton noted that “hard” disciplines (to which Business students in present research are assigned) emphasised the learning of specific facts, principles and concepts (surface learning). By contrast, “soft” disciplines (to which Psychology students in present research are assigned) emphasised the learning of broad general knowledge and the use of critical thinking (deep learning). Smart and Ethington noted that “hard” disciplines emphasised memorisation (an aspect of surface learning) and “soft” disciplines emphasised analysis and synthesis of course content (deep learning).
The findings may be explained with reference to the present author’s elaborated version of Becher’s model of disciplinary types and to Becher’s (1994) characterisation of “soft” and “hard” disciplines. In the elaborated models proposed [Figures 3.1(a), 3.1(b), and 3.1(c)], it was argued that Psychology can be described as a predominantly “soft” discipline, and both Computing and Economics (i.e., Business studies) can be described as predominantly “hard” disciplines. Becher’s (1994) characterisation of “soft” and “hard” disciplines offers an argument for why Psychology students were high on Deep Strategy whereas Business students were high on Surface Strategy.

In Becher’s (1994) categorization of a “soft” discipline, a deep learning strategy is implied for successful study as the subject content deals predominantly with understanding and interpreting of ideas, the complexity of relationship among constructs and the presentation of a coherent argument. As indicated in the Introduction, deep learning involves applying strategies such as relating new ideas to already acquired knowledge and experience, elaborating on ideas with further information, reflecting and critically evaluating the given information, and seeking to understand the meaning behind the words. All of those strategies are important if ideas are to be readily understood and interpreted, complex relations among constructs are to be grasped, and coherent arguments presented.

In Becher’s (1994) categorization of a “hard” discipline, more of a surface learning strategy is implied for successful study, as the subject content here deals predominantly with universals involving facts and principles and quantities involving numbers. Learning is focused on explaining existing
knowledge using factual information and formulae that illustrate relationships between ideas. Surface learning as described earlier in the Introduction involves the learning of predominantly factual information with an emphasis more on accurate recall of the information rather than on conceptual understanding. It can be suggested, therefore, that this type of subject content can encourage students to adopt more of a surface than a Deep Strategy since the demands, as suggested by Becher (1994), are commensurate with those of surface strategies.

3.24.2 A Comparison between Psychology and Business Students on Deep and Surface Learning Motives

In addition to a main effect on learning strategies, Discipline also had a main effect on students' learning motives. Psychology students reported a significantly higher Deep Motive compared with Business students, while Business students reported a significantly higher Surface Motive compared with Psychology students.

The results are consistent with Becher's (1994) suggested associations between discipline type and motives for learning. His model would suggest that the Psychology students, working within a 'pure-soft' discipline, would exhibit a higher degree of Deep Motive than would the Business students, who came from what Becher would classify as a 'hard-applied' discipline. Interpreting the current results in Becher's (1994) conceptualisation of student learning in a "hard applied" and "soft pure" type of disciplines, the motive in learning is outcome-driven in the case of the Business students, while more process-driven in the case of the Psychology students.
Compared with the Business students, the responses made by Psychology students indicate that they are more internally driven in their learning by a personal satisfaction associated with the process of learning. It has been discussed in the previous section that these students also were inclined towards adopting a deep learning strategy. Biggs (1987) had proposed a congruency between learning motive and its corresponding learning strategy. The report by Psychology students of significantly high levels in both Deep Strategy and Deep Motive, therefore, provides support to Biggs' assumption of a congruency between strategy and motive in student learning.

Further support to Biggs' (1987) assumption is also provided by the responses made by Business students, which indicated they were high on Surface Motive. Students' responses indicate that they are more externally driven in their learning than the Psychology students. Since the Surface Motive scale measures motivation towards external rewards such as gaining a formal qualification, the result may indicate that gaining a formal qualification is a stronger driver for learning than is the case with Psychology students. It has also been discussed in the previous section that Business students were inclined towards adopting a Surface Strategy. For both student subgroups, therefore, students' learning strategies appear to correspond to their learning motives.

3.25 Effect of Gender on Achieving Strategy

A gender difference for Achieving Strategy was proposed and supported in the present research. Generally, female students reported themselves to be more organised than male students in note-taking and in assignment preparation. This
finding substantiates past finding that female students preferred more than male students a learning context that is well organized (Heikkinen, Pettigrew & Zakrjsek, 1985; Meyer, 1995; Meyer, Dunne & Richardson, 1994). In addition to being organised, female students reported themselves as more consistent and regular in their study habits than did their male counterparts. Thus, female students appeared to be the more conscientious and disciplined in their study. Being organised, conscientious and disciplined was considered by Costa and McCrae (1992) to be personality traits.

3.25.1 Gender x Discipline Interaction Effect on Achieving Strategy

Apart from a main Gender effect for Achieving Strategy, a significant interaction effect (Gender x Discipline) was also obtained. Female Psychology students reported higher Achieving Strategy for multi-choice than essay exam whereas male Psychology students reported the reverse. This difference in Achieving Strategy was evident specifically for a multiple-choice exam. The finding may be explained with reference to the findings obtained by Murphy (1982) and Speth and Brown (1990). Murphy noted that generally, female students performed more poorly on multiple-choice exams. Speth and Brown noted that females reported encountering more trouble in selecting what to study and how to prioritize material for a multiple-choice exam. Thus, one can infer that female students are less comfortable and confident than are male students with multiple-choice exams. In this study, female Psychology students reported themselves as the more organised, regular and disciplined in preparing for a multiple-choice exam. They may explicitly adopt these study behaviours because
they are less comfortable and confident in dealing with multiple-choice exam. Their overt plans to organise their work and to engage in regular and disciplined study may best alleviate their discomfort.

Although the above explanation might seem plausible, caution has to exercised with the finding. The sample sizes for female (N= 26) and male Psychology students (N=10) who responded to the questionnaire under a hypothetical multiple-choice exam condition are small. Further evidence is required to support the present finding and substantiate such explanation.

3.26 Implications of the Present Research

Several implications arise from the results of the present study. First, a high weighting for assessment promotes Surface Strategy, a finding that has potentially important implications for assessment policies and practices. Should the instructor prefers students to adopt deep strategies in preparing for an assessment, it may be preferable to evaluate their learning through several pieces of assessment, each contributing a small and relatively equal amount of marks to the overall grade in a subject. If Surface Strategy arises through student anxiety about a poor grade, setting many small stake assessments may reduce that anxiety.

Next, female Business students adopted a significantly higher Surface Strategy than did other student subgroups when preparing for the 70% examination. This result was attributed to minority status in the course and consequent anxiety. Under such a circumstance, definite and proactive steps can be implemented to develop an inclusive group culture that may help reduce
students’ anxiousness. This can involve students working in pairs or in groups of mixed gender as much as possible. Also teaching staff particularly male instructors can interact in a way that is inclusive of female students in a male-dominated discipline. Inclusiveness is possibly an important and influential issue to students who feel that they are the minority in the group.

Third, it was speculated in the Discussion that an absence of marked deep learning strategy when preparing for an essay examination might be due to students moderating their strategy to accommodate the pressure and time constraints associated with examinations. If indeed this was the case, there are important implications concerning the conditions under which students are assessed. It is commonly acknowledged that an essay assignment is a less threatening form of assessment than an essay examination. Moreover, past studies have found students to employ a deep learning strategy when preparing for an essay assignment (Ramsden, 1988; Scouller, 1998; Watkins, 1982). Essay assignments instead of essay examinations can, therefore, be implemented to encourage and promote deep learning. However, should an examination format be favoured more by the teacher or institutional policy for assessment, then the conditions under which an examination is conducted may have to be carefully considered. For example, in the examination, time constraints may be removed and word limits introduced to encourage students to think and plan their work carefully without the pressure of having to sacrifice quality for quantity in their work. Adequate choice in the questions to be answered or an open-book examination format (used in some disciplines) can further reduce the pressure and anxiety often associated with examinations.
An alternative explanation was also supplied for the absence of marked Deep Strategy as students prepared for an essay examination. Teachers may assume that students share with them the notion that an essay requires a demonstration of understanding and the ability to communicate clearly, coherently, and persuasively. If indeed the students in the present research are similar to those in Hounsell’s (1997) study, in that students differed from teachers on what is required by an essay, a range of teaching and assessment implications may result. Several strategies could address any mismatch. That may involve demonstrating to students what a good and bad essay entail, developing students’ essay writing skills, providing assistance in essay writing and providing constructive feedback on their work. Opportunity should also be given to students, if possible, to demonstrate their learning through a second piece of work after feedback. Where students complete only a single essay assessment in a subject, there is no opportunity to improve their essay writing skills nor any incentive for them to do so. It is acknowledged that some strategies may be limited by the available resources for teaching.

3.27 Limitations of Present Research and Further Research

Although the present research has produced some interesting and potentially useful findings, there are some limitations in methodology and research design. Further research to extend and explore current findings might include the following considerations. First, a more even representation by Gender and Discipline for each of the four assessment conditions would form a useful extension to the current study. Second, students from other universities could be
investigated to generalise the present findings beyond the instructional and assessment policies and practices of one institution.

Third, the study can be further extended to investigate the situational effects by a within-group design rather than the between-group design of this study. In other word, the same student sample could report on its learning behaviour for each scenario of assessment type and weighting. Fourth, students could report on their actual learning behaviours either near the conclusion of their preparation for a particular type of exam or immediately after completing the exam. It is a common practice in research to use self-report inventories under hypothetical conditions; however, the limitation of that procedure is that neither actual learning behaviours nor actual assessment conditions are assessed directly. Finally, in addition to the quantitative approach used by this study, a qualitative approach could well provide further information on student learning that might not otherwise be available. The additional information could also be used to validate the conclusions drawn from the study.

3.28 Conclusion

To conclude, the present research indicates that the situational factors Assessment Type and Assessment Weighting have little overall effect on student learning for this group of Deakin Psychology and Business students. Assessment Weighting did exert significant influences on learning strategies, particularly for specific student subgroups according to Gender and Discipline. It appears that assessment condition not type is responsible for the findings of other researchers who confounded the two variables. Secondary to the main focus of the research on
Assessment Type and Weighting, Discipline and Gender also influenced student learning motives and strategies. The next study turns to the influences of dispositional factors on student learning.
Chapter Four

Study Two: Influences of Dispositional Factors on Student Learning

4.1 Overview

In his model of student learning, Biggs (1990) proposed that both situational and dispositional variables can influence student learning. In the current research, the effects and relative importance of two situational factors (Assessment Type and Assessment Weighting) on learning motives and learning strategies were investigated in Study One. Now Study Two will investigate the effects and relative importance of two dispositional factors (Test Anxiety and Life values) on student learning. As with the variables selected for Study One, students’ Test Anxiety and life values have general relevance for students who are studying to have their knowledge and understanding assessed.

Across cultures, test anxiety is likely to exert similar effects on learning; however, life values may differ between cultures and be evidenced as a cultural influence on student learning. Two different cultural groups, Australian and mainland Chinese university students, will be included in the study to provide a between-group comparison of the effects that life values might have on learning motives and strategies. The possible influences of other demographic variables on learning, such as Discipline Type, Age, and Gender, will also be considered to enable a more thorough interpretation of results.
4.2 Test Anxiety and Approaches to Learning

Test anxiety may be defined as a relatively stable personality characteristic that causes an individual to react to a test situation with psychological, physiological and behavioural responses (Sarason, 1975; Schwarzer & Jerusalem, 1989; Spielberger, 1972; Trent & Maxwell, 1980). Examples of such responses in Spielberger's (1972) Test Attitude Inventory are: "Thoughts of doing poorly interfere with my concentration on tests", "During important exams I am so tense that my stomach gets upset", and "I freeze up on final exams". Although some researchers identify two main components of test anxiety in the inventory - Worry and Emotionality (Hodapp & Benson, 1997; Leibert & Morris, 1967; Sarason, 1978; Spielberger, 1980), past studies have consistently noted that the two components are oblique factors suggesting, therefore, some reasonable association between them (Benson & Tippets, 1990; Everson, Millsap, & Rodriguez, 1991; Gierl & Rogers, 1996). On this basis, test anxiety will be treated as a single higher order construct in the following sections.

There is an abundance of research on effects of test anxiety on student performance, memory, information processing ability, cognitive interference, study skills and self-concept in learning (e.g., Hancock, 2001; Sarason, 1984, 1986; Wine, 1971, 1980). There have also been a number of studies investigating the effects of test anxiety on learning behaviour (Fiedler, Pampe, & Scherf, 1986; Pekrun, 1992; Schwarz & Bless, 1991). However, according to a search of available databases (e.g., Current Contents, Ebsco, InfoTrac, Ovid, and Pschlit), no known studies appear to have specifically investigated the effects of test anxiety on students' learning motives and strategies as assessed by the SPQ
(Biggs, 1987). Therefore, a case will be argued for a possible effect of test anxiety on specific SPQ dimensions.

Researchers have noted that under test situations, students with high test anxiety performed more poorly than did students with low or medium test anxiety (Morris & Liebert, 1970; Sarason, 1972; Wine, 1971, 1980). The adverse effect of anxiety on test performance was explained differently by different researchers. Wine (1971) attributed poor test performance by highly anxious students to reduced attention and concentration for the task, hence a reduction in working memory capacity. Sarason (1972) attributed the poor performance to students’ inappropriate interpretation of the informational cues that were available to them, while Covington (1984) suggested that the intrusive worries of anxious students would “inhibit all but the simplest, autonomic responses” (p. 39).

Regardless of the actual processes that might be involved for test-anxious students, it can be argued that past experience of performing poorly or failing a test is likely to consolidate a continuing preoccupation with thoughts of inadequacy and of possible failure while preparing for future tests. If indeed test anxiety reduces attention, concentration and working memory capacity (Wine, 1971), it can be argued that the remaining working memory may be channeled into a narrowly focused and selected subset of the information to be processed. Such a focused learning strategy is arguably similar to Biggs’ (1987) restricted Surface Strategy whereby students’ attention and concentration are confined to the prescribed syllabus and contents and to factual information.
It was argued in Study One that a surface strategy provides students with a clear structure for learning. Thus, a high surface strategy can be reassuring for students who lack confidence in their ability to pass a test. In Study One, the weighting of an exam had a main effect on students' SPQ Surface Strategy scores in that students, primarily female Business students, adopted a higher level of surface learning strategy when the exam was worth 70% of the total subject than when the exam was worth 30%. Interpretation of the result drew upon Thomas (1988, 1990) who noted that in a predominantly male learning environment, female students felt uncomfortable and lacked confidence in their ability. It was thus argued that the accentuated feelings of anxiousness experienced by female business students had increased their Surface Strategy in learning. The suggestion that SPQ Surface Strategy is predicated by test anxiety will be tested in the present study.

Test anxiety may also influence the motive for learning. Pekrun (1992) maintained that test anxiety will motivate students to avoid negative outcomes (e.g., failure, shame, embarrassment, etc.) by either not participating in the test or choosing an alternative form of assessment, if available. Generally, tests and exams are unavoidable for students. In these circumstances, Pekrun proposed that anxious students will react by investing their efforts in studying to pass. This goal for a pass mark is represented by the SPQ Surface Motive scale. That scale measures learning in order to pass (alternatively to avoid failure) and the task of learning is perceived as necessary in order to achieve that. Overall, it is reasoned that test-anxious students will display higher levels of both SPQ Surface Motive and of Surface Strategy when compared with less anxious students.
4.3 Life values and Approaches to Learning

The term ‘value’ requires some exploration here to achieve clarity of meaning. Schwartz and Bilsky (1987) proposed a comprehensive definition of the term ‘value’ that incorporated the features identified by previous researchers (e.g., Allport, 1961; Maslow, 1959; Rokeach, 1973; Williams, 1968). According to Schwartz and Bilsky, values can be defined as “concepts or beliefs about desirable end states or behaviours that transcend specific situations, guide selection or evaluation of behaviour and events, and are ordered by relative importance” (p. 551). The authors argued that when a person’s value is activated, the individual experiences certain feelings and will act in a particular way that is consistent with the value embraced.

Schwartz (1994) considered that a value embraced by an individual is likely to be expressed in that person’s life-tasks or life domains, (e.g., at work, school, home or in interpersonal relations). This view is shared by Ames (1992) and by Pintrich, Marz and Boyle (1993), who suggested that the goals students have under different situations are salient in guiding their behaviour, cognition and affect in their academic work. For example, if a learner values self-directedness highly, that individual is likely to display initiative in his/her learning, perhaps by setting specific learning goals to be used as standards to direct, guide, evaluate and maintain the learning behaviour. Values, therefore, can be considered as important sources of influence for learning.

Numerous empirical studies have been carried out investigating the learning approaches of students with different cultural backgrounds (e.g., Biggs, 1990,
1992(a), 1992(b), 1994; Marton, Dall'Alba & Tse, 1996; Smith, Miller & Crassini, 1998; Volet, Renshaw & Tietsel, 1994). In most of these studies, however, differences in socio-cultural variables (e.g., child-rearing practices, educational system or language of instruction), rather than life values, were invoked to explain observed differences in student learning. Moreover, although socio-cultural variables were suggested to influence students' learning approaches, the possible confounds with life values were not considered. No known research has been carried out to specifically determine the effects of life values on learning motives and strategies. It would be informative, therefore, to disentangle the effects of life values from the effects of cultural background upon student learning. In addition understanding will be enhanced by considering the relative impact of life values compared with test anxiety on learning motives and strategies.

Schwartz (1994) argued that there are ten universal types of life values that people consider meaningful as guiding principles in their lives. The ten value types are Achievement, Power, Self-Direction, Conformity, Hedonism, Universalism, Tradition, Security, Stimulation and Benevolence. Of the ten life values, four (Achievement, Power, Self-Direction, and Conformity) were selected for investigation in the present study owing to their theoretical relevance to student learning. A discussion of these four life values and their relevance to students' learning motives and strategies follows.
4.3.1 Achievement life value and Learning

According to Schwartz (1992, 1994), the motivational goal underlying Achievement as a life value is to pursue personal success and ego-enhancement which can be achieved by demonstrating competence according to certain social standards. In Schwartz’s Life value Inventory, Achievement is measured by constructs such as success, capability, ambitiousness and influence. Schwartz’s concept of Achievement as a life value corresponds very closely to Biggs’ (1987) SPQ Achieving Motive scale. The SPQ Achieving Motive assesses the desire by students to excel in their studies and to obtain the best mark or grade that they believe will enable them to select the most desirable career available when they graduate. Best mark or grade represents social and institutional recognition of students’ academic capability and excellence. Students who score highly on SPQ Achieving Motive are competitive and ambitious, and view the attainment and award of academic excellence as an ego enhancement. It can be expected that strong endorsement of the life value Achievement will be positively related to SPQ Achieving Motive in student learning.

Various researchers on student learning (e.g., Covington, 2000; Dweck & Leggett, 1988; Dowson & McInerney, 1997; Graham & Golan, 1991; McInerney & McInerney, 1998) have distinguished two types of achievement, namely mastery goal-related achievement and performance or ego goal-related achievement. Performance goal-related achievement involves outperforming others as a means of establishing a sense of academic ability, self-worth and status. Thus students’ motivation for learning is extrinsic (e.g., a good mark or grade) because achievement is referenced against the performance of others.
Therefore, the notions of competition, success, competence, ego-enhancement, ambitiousness and the meeting of set external standards are the common features that seem to underline all three of the constructs: SPQ Achieving Motive, Schwartz’s life value of Achievement and performance goal-related achievement.

4.3.2 Power and Learning

Schwartz (1992) defined Power in terms of the motivational goals and needs that are associated with the “attainment of social status, prestige, recognition, and control or dominance over people and resources” (p. 9). According to Schwartz’s Life value Inventory, Power is measured by constructs such as authority, wealth, social power, preserving one’s public image, and social recognition. Schwartz (1992, 1994) regarded the life values of Power and Achievement as closely related, but also distinctive. Both values focus on social superiority, self-esteem, and self-enhancement. However, in Achievement these outcomes are attained by demonstrating competence, whereas in Power, these outcomes are attained through social status and prestige in the social structure of society (e.g., wealth, authority, public image, and social recognition). Power is further distinguished from Achievement in that Power alone concerns control or dominance either over people or resources.

According to Raven (1992), some of the bases of Power are associated with expertise and information. Expertise or information-related power can accompany careers that are socially highly regarded, valued or considered unique. Such careers can boost the public image of the person and the chance of exercising control or dominance over other people is highly probable. It can be
expected that students who endorse the value of Power may be motivated to strive for academic excellence in the course of their study, so that when they graduate they can select a career where they can exercise some form of power or authority over others. In other words, the life value Power will be positively related to SPQ Achieving Motive in student learning.

In summary, both the life values of Achievement and Power can be considered to influence scores for SPQ Achieving Motive. The driving force underlying the Achievement life value is to seek superiority through competence, whereas that underlying the Power life value is to seek superiority for exercise of dominance.

4.3.3 Self-Directed life value and Learning

According to Schwartz (1992), the motivational goal underlying the life value of Self-Directed concerns independent thought and action. In his Life value Inventory, Self-Directed is measured by constructs such as creativity, freedom, curiosity, independence, and choosing own goal. The notions of being independent in thought and action are likewise included in conceptualisations of self-directed academic learning.

Self-direction in learning has drawn the attention of many researchers (e.g., Brockett & Hiemstra, 1993; Brookfield, 1985; Garrison, 1997; Knowles, 1975; Weinstein & Mayer, 1986). Knowles defined self-directed learning as “that process in which the individual takes initiative, with or without the help of others, in diagnosing their own learning needs, formulating learning
goals, identifying human and material resources for learning, choosing and implementing learning strategies, and evaluating learning outcomes” (p.37). In being independent in both thought and action, as well as being proactive, self-directed learners are characterised by taking a personal responsibility for their own learning goals and experiences in the learning process. These concepts of exercising freedom to choose, independence, and personal goal-setting are included in Schwartz’s (1992) life value of Self-Directed.

In his comprehensive model of self-directed learning, Garrison (1997) attributed learner self-directedness to cognitive and motivational characteristics. For learning strategy, Garrison ascribed self-directed students with cognitive strategies such as critical reflection, relating of ideas, critical evaluation, integration of ideas and concepts, and regular testing of their comprehension as they construct a personal meaning for what is learned. Such learning strategies are included in Biggs’ (1987) SPQ Deep Strategy. In adopting a Deep Strategy, the learner often relates new information to personal experiences and past knowledge, takes initiative in gathering new information to further one’s understanding, and critically evaluates any given information. Thus, students with high levels of the Self-Directed life value are likely to score highly on SPQ Deep Strategy.

In his discussion of the motivational aspects, Garrison (1997) suggested that self-directed learning can be characterised by: intrinsic motivation, taking responsibility in learning, experiencing a sense of commitment, and persistence in the effort to learn. For Biggs’ (1987) SPQ Deep Learning Motive, the learner is intrinsically driven to learn and experience personal satisfaction and enjoyment at having understood the meaning of what is learned. Personal
responsibility and personal involvement in the learning process and a sense of value and commitment are also implied. It would appear, therefore, that the life value Self-Directed is positively associated with SPQ Deep Motive in student learning.

Empirical evidence for an association between self-directed learning and SPQ Deep Approach (consisting of motive and strategy) is provided by Choy and Delahaye (2000). The researchers reported that tertiary students who scored high on self-directed learning also scored high on SPQ Deep Approach. Based both on argument and Choy and Delahaye's finding, it can be argued that, via the notion of self-direction in learning, the Self-Directed life value will be positively associated with SPQ Deep Motive and SPQ Deep Strategy.

4.3.4 Conformity life value and Learning

Schwartz (1992) proposed that the defining motivational goal of Conformity is a restraint of actions, inclination and impulses that might upset the harmony of a group or violate the social norms or expectations of the society. According to Schwartz's Life Inventory, Conformity is measured by constructs such as obedience, self-discipline, politeness, and honouring of parents and elders. At an individual level, Conformity can be considered as compliance or subordination to another person's view or behaviour in the course of interpersonal interaction. Hence, conformity is likely to occur when another person is in authority or power, e.g., parent, teacher, or boss.
It can be argued that in a learning situation, students who are highly conforming will comply with the demands and expectations of the teacher and will adhere to the curriculum and guidelines set by the teacher. Students are then dependent on the teacher's direction for what is to be learned and the teacher can be considered as the external instructor, guide and regulator in students' learning. In addition, to maintain harmony and compliance, students would be reluctant to question, challenge, or critically evaluate the information given by the teacher. The SPQ Surface Strategy reflects a narrow and focused form of learning whereby students prefer factual rather than theoretical information and are externally directed in their learning by the set syllabus and teacher expectations. It is thus argued that students who highly endorse the Conformity life value will tend to have high scores for SPQ Surface Strategy.

4.4 Demographic Characteristics (Culture, Age, Discipline Type, and Gender) and Learning Approaches

Socio-cultural influences such as beliefs, attitudes, expectations, norms, and ways of processing information, can influence student learning (Hau & Salili, 1991; Hofstede, 2001; Mishra, 2001; Salili, 1996; Tang & Biggs, 1996). These characteristics may vary across cultures, age, discipline type, and gender. The literature review for Study One focused in some detail on the influences on student learning from discipline type and gender. Consequently, the review that follows will focus largely on the influences of culture and age upon learning approaches.
4.4.1 *Culture and Learning Approaches*

Apart from life values that can influence student learning, other socio-cultural variables (e.g., conception and attitude towards learning, and belief about the teacher-student role) can also affect student learning. Using a cognitive perspective, Hofstede (1986) referred to culture as a set of "mental programming" consisting of patterns of thinking, feeling, and acting that are shared by the members of a society or ethnic group. Those patterns of thinking, feeling and acting are determined by the beliefs, attitudes, and norms of behaviour that are instilled in members of a particular society. Various researchers (e.g., Hill, 2000; Hofstede, 1986, 2001; Li, 2002) contend that as long as people are socialized in their own cultural contexts, the schemas they develop will reflect their culture and influence their thinking, feeling, behaviour and outcomes of learning. In other words, culture, separate from life values, may influence academic learning. By investigating Australian and Chinese students in the present study, there is an opportunity to determine whether culture might influence learning motives and strategies.

4.4.2 *Culture and SPQ Deep Approach in Learning*

Researchers have observed that the Confucian heritage continues to exert considerable influence on Chinese student learning within the modern Chinese schooling context (Biggs, 1991; Cleverly, 1991; Tweed & Lehman, 2002). For some writers (Biggs, 1991; Li, 2002) this means that deep learning is encouraged, while for others (Ho, Peng, & Chan, 2001(a), 2001(b),, Samuelowicz, 1987) this means learning is rather more surface with an emphasis on rote
learning. A similar divergence of opinion occurs with the form of instruction in China, with some writers reporting it as constructivist (Biggs, 1991; Li, 2002), and others as teacher-directed (Ho, Peng & Chan, 2001(a), 2001(b)).

Although there are these differences of view expressed, there is evidence that the rote learning observed is a strategy used to develop understanding and is, therefore, a process of learning rather than an outcome (Biggs, 1996; Kember, 2000; Watkins, 2000). In that context, it is also arguable that a teacher-directed instructional strategy can be a part of a broader constructivist strategy, as rote learning moves through to construction of meaning, and thus beyond surface learning.

According to Confucian tradition, education is intrinsically important as it promotes personal development. Students are encouraged to learn through studying extensively, and through enquiry, reflection, selecting and practising. In his study, Li noted that Chinese university students perceived learning as an interactive process whereby the mind acquired knowledge by contemplation, deductive/inductive reasoning, relating ideas and challenging assumptions. Students regarded learning as a means towards self-perfection in terms of scholarship and moral character; knowledge was considered to be indispensable and essential as it created meaning for their lives. An intrinsic drive for learning is clearly reflected in students’ use of the phrase “heart and mind for wanting to learn” (Li, 2002, p. 250). This type of learning conception clearly reflects an emphasis upon SPQ Deep Motive and SPQ Deep Strategy.
By contrast with the global and comprehensive learning outlook held by Chinese students, Li (2002) found a more specific and narrow learning outlook for Western (US) students. The US notion of learning addressed questions of what is to be known, what knowledge is reliable, and how the mind knows it. For US students, according to Li, knowledge exists as a fairly neutral entity embodied by the subject content. Li’s findings do not enable firm predictions about cultural differences in the learning motives and strategies of students. Li’s model does, however, provide a conceptual framework that will assist in understanding the Chinese and the Western influence upon students’ approaches to learning.

Several researchers have characterised university teaching in mainland China as constructivist in nature; teachers consider themselves as mentors with the responsibility of nurturing the intellectual and personal aspects of their students (e.g., Biggs, 1994, 1996; O’Connor, 1991; Stigler & Stevenson, 1991). Teachers were noted to promote high levels of cognitive thought processes and reflection by constantly engaging their students in problem solving, and by posing provocative questions. Additionally, in teaching they displayed a warm attitude and respect towards students. Students, on the other hand, considered that their responsibility was to construct their own meaning in what they learned and to work hard and consistently. Biggs (1996) has suggested that all of the above characteristics are likely precursors to a deep learning approach.

By contrast, Hau and Salili (1991) noted that Western students invested relatively less effort and persistence in their learning than did Chinese students. According to Stevenson and Stigler (1992), Western teachers did not
consider nurturing the personal character of students to be their role and interacted less with their students on a one-to-one basis in and out of class hours. Also, organised study and discussion groups between students and teachers and among students themselves were less frequently carried out for Western students in student residence settings. Accordingly, there is considerable evidence to support findings by Biggs (1990, 1991, 1992a, 1992b) and Kember and Gow (1990) that Chinese students score higher than Western students (e.g., Australian students) on SPQ Deep Motive and SPQ Deep Strategy.

4.4.3 Culture and SPQ Achieving Approach in Learning

In two studies, Biggs (1990, 1992a) found that Chinese students scored higher than Australian students on Achieving Motive and Achieving Strategy. He explained the difference in terms of a cultural difference in attribution style. Western students tended to attribute success primarily to ability, whereas Chinese students attributed success primarily to effort and endurance, a finding consistent with that obtained by Hau and Salili (1991). This attribution of success to personal effort was considered by Biggs to provide Chinese students with a driving force to achieve (as expressed in Achieving Motive). Interestingly enough, in a more recent study, Stevenson and Lee (1996) remarked that high achievement motivation “may be weakening in mainland China as opportunities are on an increase for achieving social and economic status through entrepreneurial activities rather than through (academic) scholarship” (p. 133).

The literature also suggests some defining characteristics among younger Australian university students who belong to what has become known as
Generation X, born between 1961 and 1981 (Barnard, 1996). Several writers have suggested that Generation X are less achievement-oriented than their parents, not strongly motivated towards money, status or material gain, and more interested in personal fulfilment (Coupland, 1991; Howe & Strauss, 1993). However, this view is not shared by other writers who suggested Generation X to be practical and interested in career outcomes (Barnard, 1996; Burke, 1994; Tulgan, 1995). Taken together, the evidence for current Australian and Chinese students on Achieving Motive is somewhat contradictory. However, on balance the more convincing arguments provided by past researchers (e.g., Biggs, 1990, 1992a; Hau & Salili, 1991; Burns, 1991), suggest that Chinese students will score higher than Australian students of Generation X on SPQ Achieving Motive.

From the 1960s to 1990s, many researchers have observed, on Achieving Strategy, that Chinese students are predominantly strategic and pragmatic in their attitude towards learning (e.g., Biggs, 1990, 1992b; Kember & Gow, 1990; Nakamura, 1964; Smith, Miller & Crassini, 1998). Biggs noted that Chinese students, whose education system is dominated by exams, are particularly good at seeking cues that will assist them to pass with good grades, while Nakamura noted that Chinese think in ways that are strongly related to utilitarian goals. Further support for these findings was provided by the present author and her colleagues (Smith, Miller & Crassini, 1998) when they identified an ‘Efficiency Orientation’ factor for their sample of Chinese students. The factor entails seeking out cues for possible exam questions, securing important references, establishing a conducive learning environment, and meeting the learning objectives set by the instructor. No such similar factor was obtained for
the Australian students who participated in that research. These aspects of strategy and pragmatism in learning are captured by Biggs (1987) in his SPQ Achieving Strategy scale. The scale measures persistence in following up on suggested readings, regular monitoring of understanding of what is learned, being organised in tasks such as note-taking and completing assignments on time, pacing study behaviour, and maintaining consistent and regular efforts in studying. On the basis of past and consistent empirical evidence, it is postulated that Chinese students will score higher than Australian students on SPQ Achieving Strategy.

4.4.4 Power Mediating Cultural Influence on Achieving Motive

Past evidence indicates that Chinese students score higher than Australian students on the SPQ Achieving Motive. Biggs (1990, 1992a) attributed the high Achieving Motive to the Chinese belief that success comes from hard work rather than ability. By contrast, Stevenson and Lee (1996) explained the difference as the Chinese students’ desire to achieve social and economic status from academic performance. Previously, it was argued that the valuing of Power and of Achievement will increase SPQ Achieving Motive. In particular, the Life value of Power concerns the attainment of superiority through wealth, prestige and authority, all of which are in accordance with Stevenson and Lee’s notion of achieving social and economic status. Thus, a cultural difference for Achieving Motive may be mediated by Chinese students’ strong endorsement of the life value, Power.

Power arising from a person’s position within the hierarchical structure of a society (Schwartz, 1994) is evident in many life aspects of the
Chinese people (Bond, 1996; Hofstede, 2001; Redding, 1990; Wu, 1995; Yao, 2002). In the family, parents are accorded power and influence. In schools, teachers are accorded authority, and in the workplace the owner/manager can expect some degree of deference from subordinates (Bond, 1996; Hofstede, 2001; Redding, 1990). Hierarchical structures with uneven power distributions (Confucian concept of wu lun) are commonplace in Chinese social structures and hence it is likely that Chinese students will value Power strongly. By contrast, it is widely recognised that, in a more egalitarian society such as Australia (Kapferer & Morris, 2003) the notions of social recognition of power, authority, and dominance that are associated with hierarchical social structures are not as strongly evident. Accordingly, a cultural influence upon SPQ Achieving Motive may be primarily mediated by a cultural difference in the valuing of Power.
4.5 Age and Learning Approaches

Research has demonstrated consistently that older students are more likely than younger students to be deep learners and less likely to be surface learners (Biggs, 1985, 1987; Gow & Kember, 1990; Harper & Kember, 1986; Richardson, 1995; Sadler-Smith, 1996; Watkins, 1982; Watkins & Hattie, 1981; Zeegers, 2001). The findings hold true for different countries (e.g., Australia, Britain, Hong Kong), different disciplines (e.g., Sciences, Business, Arts, Psychology, Education, Accountancy), and different measures of learning - SPQ (Biggs, 1987); Inventory of Learning Process (Schmeck, Ribich, & Ramanaiah, 1977); Approaches to Studying Inventory: Original and Shortened Versions (Entwistle & Ramsden, 1983).

In Richardson’s (1995) study, older students included those who were of 23 years and above, while in Zeeger’s (2001) study, older students included those who were 20 years and above in their first year of study. Despite the age difference for “older“ students, a shared characteristic was that these students did not progress directly from secondary schooling to tertiary education. They had acquired considerable experience of living and possibly working in the community before resuming their education, an experience lacking in younger students.

Harper and Kember (1986) argued that the life experiences acquired by older students can raise their level of self-reliance and overall maturity in their approach to study. In addition, the pool of resources, knowledge and experiences that these students have acquired can assist them in their learning, particularly in
evaluating new information and in inter-relating ideas. These qualities and learning behaviours correspond closely to SPQ Deep Strategy.

Harper and Kember (1986) also maintained that, compared with younger students, older and more mature students are more intrinsically motivated in learning by personal goals (e.g., personal interest, pleasure, and curiosity). A sense of personal satisfaction with the actual task of learning is, therefore, likely to ensue. Moreover, it may be further argued that older students may be self-selected for high intrinsic motivation to learn because it prompts them to return to study. The intrinsic motivation to learn corresponds closely to SPQ Deep Motive. To summarise, it can be expected that older students, compared to their younger cohorts, are more likely to adopt a Deep Motive and Deep Strategy in learning.

4.6 Effects of Discipline Type and Gender on Learning

Effects of Discipline Type on learning approaches were reviewed in Study One. It was argued that students from Science-related or "hard" disciplines will be more inclined to adopt a Surface Motive and Surface Strategy in learning whereas students from Arts-related or "soft" disciplines will be more inclined to adopt a Deep Motive and Deep Strategy in learning. Results from Study One in this thesis supported those findings. Although the effect of Discipline Type on learning is not the main focus of Study Two, similar results can be expected again.

Effects of Gender on learning approaches were also reviewed in Study One. Empirical evidence for a consistent gender difference on Achieving Strategy has been shown by past researchers (Heikkinen, Pettigrew, & Zakrajsek, 1985; Meyer,
1995; Meyer, Dunne & Richardson, 1994). Past findings together with the results from Study One indicate that female students, by comparison with male students, are more organised in their learning and more regularly monitor their understanding of what is learned. A similar result can, therefore, be expected in this study.

4.7 Summary

In summary, it has been argued that the dispositional qualities of students (Test Anxiety and life values) will influence their learning motives and strategies. Four of Schwartz’s (1992) specific life values (Achievement, Power, Self-Directed, and Conformity) were identified as having theoretical relevance to student learning. It was argued that test anxiety will influence students’ Surface Motive and Surface Strategy in learning. With regards to life values, it was argued that both Achievement and Power will influence students’ Achieving Motive in learning, Self-directed will influence students’ Deep Motive and Deep Strategy in learning, and Conformity will influence students’ Surface Strategy in learning.

In addition to the dispositional variables, the effects of demographic variables (i.e., Culture, Age, Discipline Type, and Gender) on students’ learning motives and strategies, will also be considered. The construct Culture was distinguished from life value and it was argued that Culture will influence students’ Deep Motive, Deep Strategy, Achieving Motive and Achieving Strategy in learning. It was argued that Age will affect students’ Deep Motive and Deep Strategy in learning, and Discipline Type will influence Surface Motive, Surface
Strategy, Deep Motive and Deep Strategy in student learning. Finally, it was suggested that Gender will affect students’ Achieving Strategy in learning.

In addition to determining which variables will influence student learning, the relative impact of both dispositional and demographic variables on student learning will also be investigated. A summary of the proposed hypotheses follows.

4.8 Summary of Proposed Hypotheses to be Tested

The hypotheses that are proposed in this study can be summarized as follows:

1. Anxiety will influence learning in that students’ Surface Motive and Surface Strategy will increase as Test Anxiety increases.

2. The life values Achievement and Power both will influence learning in that students’ Achieving Motive will increase with stronger endorsement of those life values.

3. The life value Self-Directed will influence learning in that students’ Deep Motive and Deep Strategy will increase with stronger endorsement of this life value.


5. Age will influence learning with older students scoring higher than will younger students on Deep Motive and Deep Strategy.
6. Discipline Type will influence learning: Students from "hard" disciplines will score higher on Surface Motive and Surface Strategy whereas students from "soft" disciplines will score higher on Deep Motive and Deep Strategy.

7. Gender will influence learning with female students scoring higher than will male students on Achieving Strategy.

Method

4.9 Participants

A sample of 467 second and third year university students (mean age = 21.9, SD = 4.4) participated voluntarily in this study. Two students (significant outliers) were removed from the study leaving a final sample of 465 students. The final sample consisted of 260 Australian students from Deakin University in the State of Victoria and 205 Chinese students from a university in Beijing (PRC). Second and third-year Chinese students were chosen to ensure that they were sufficiently fluent in written English such that they clearly understood the questionnaire.

To represent the "hard" disciplines, Australian and Chinese students were drawn from the disciplines of Computing and Economics, and Engineering, respectively. To represent the "soft" disciplines, Australian and Chinese students were drawn from the disciplines of Social Sciences and Education, and Languages, respectively. A frequency distribution of the sample classified
according to Culture, Discipline Type, and Gender is shown in Table 4.1. In the main, males were over-represented in “hard” disciplines as were females for “soft” disciplines. This was true for both nationalities.

Table 4.1. Frequency distribution of participants classified by Culture, Discipline and Gender.

<table>
<thead>
<tr>
<th>Culture</th>
<th>Discipline</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Australian</td>
<td>“Hard” (Computing, Computing)</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>“Soft” (Social Sciences, Education)</td>
<td>31</td>
</tr>
<tr>
<td>Chinese</td>
<td>“Hard” (Engineering)</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>“Soft” (Languages)</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>172</td>
</tr>
</tbody>
</table>

4.10 Materials

The materials used in this study consisted of a demographic questionnaire, the Test Anxiety Inventory (Spielberger, 1980), the Life value Scale (Schwartz, 1992), and the Study Process Questionnaire (Biggs, 1987). A description of each of the inventories follows.

4.10.1 Test Anxiety Inventory - TAI (Spielberger, 1980)
The Test Anxiety Inventory (TAI) assesses overall test anxiety and is used widely in many different countries such as Australia, Germany, and Korea. (Araki, Iwawaki, & Spielberger, 1993; Hagtvet, 1984; Hancock, 2001; Schwarzer & Kim, 1984; van der Pleog, 1982). The inventory consists of 20 items designed to measure “individual differences in test anxiety as a situation-specific personality trait” (Spielberger, 1980, p. 5). Items include emotional aspects such as “During tests I feel very tense”, and worry aspects such as “Thinking about my grade in a course interferes with my work on tests”. Respondents’ total score on all 20 items indicate their overall propensity towards test anxiety. A four-point Likert scale with values ranging from 1 (Almost Never) to 4 (Almost Always) was used by participants to describe their feelings or thoughts before, during and after examinations.

The TAI has high internal consistency reliabilities with alpha values of .94 for US male college undergraduates and .95 for US female college undergraduates (Spielberger, 1980). The inventory has high concurrent validities with Sarason’s (1978) Test Anxiety Scale, yielding correlation values of .82 for males and .83 for females. Good test-retest reliability was also obtained with a value of .80 for a time period of three weeks (Wood, 1979).

4.10.2 Life Values Scale (Schwartz, 1992)

For the purposes of this study, four life values (Power, Self-Directed, Achievement, and Conformity) were selected from a pool of ten life values in Schwartz’s (1992) Life Value Inventory. These four life values were considered to have some theoretical relevance to student learning. Schwartz’s life
values are considered to be universal, and were established from at least 20
different countries (e.g., Australia, US, China, etc.) where samples of teachers and
students were tested. Schwartz together with Schwartz and Savig (1995) claimed
that all values have high consistency in meanings across cultures (metric
equivalence). The selected four value types, namely, Power, Achievement, Self-
Directed, and Conformity, are represented by 20 items. A seven-point Likert scale
with values ranging from 1 (Opposed to my values) to 7 (Supreme Importance)
was used by participants to indicate the importance of each value “As a guiding
principle in my life”. Further psychometric evidence is not presented because the
selected items will be reanalysed to form structurally equivalent scales for the two
cultures used in this study.

4.10.3 Study Process Questionnaire-SPQ (Biggs, 1987)

The SPQ used in the present study was similar to the SPQ
described in Study One. The only variation to the questionnaire used in this study
was that students had to indicate how they generally go about their study when
preparing for an exam. Unlike Study One, the type or weighting of the exam was
not indicated. Evidence for the reliability and validity of the instrument was also
presented for Study One. The SPQ has been widely used by researchers to
investigate the learning approaches of university students from both Western and
Asian countries (Kember & Gow, 1990; Kember & Leung, 1998; Niles, 1995;
Watkins & Akande, 1994; Watkins & Dahlin, 1997; Watkins & Murphy, 1994;
Zhang, 2000).
Table 4.2 presents the Cronbach alpha reliability coefficients of SPQ scales for Australian and Chinese student samples. Apart from Deep Motive, a comparison between the values obtained by Biggs (1987) for his Australian university sample, and those obtained by Zhang (2000) for his Chinese university samples, shows the reliability values to be similar across the two cultures. It is noted that some of the reliabilities are somewhat below the criteria for a research instrument, thus results should be considered cautiously.

Table 4.2. Cronbach reliability alpha coefficients of the SPQ scales for Australian and Chinese university students.

<table>
<thead>
<tr>
<th>SPQ Scales</th>
<th>Australian (N = 860)</th>
<th>Chinese (Nanjing) (N = 193)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Motive</td>
<td>.61</td>
<td>.63</td>
</tr>
<tr>
<td>Surface Strategy</td>
<td>.66</td>
<td>.66</td>
</tr>
<tr>
<td>Deep Motive</td>
<td>.65</td>
<td>.46</td>
</tr>
<tr>
<td>Deep Strategy</td>
<td>.72</td>
<td>.73</td>
</tr>
<tr>
<td>Achieving Motive</td>
<td>.70</td>
<td>.61</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>.77</td>
<td>.77</td>
</tr>
</tbody>
</table>

*Note.* The Australian sample was reported by Biggs (1987). The Chinese sample was reported by Zhang (2000).

In addition to its reliability, the SPQ is also considered to be a valid instrument for assessing learning by non-Western students. Zhang (2000) demonstrated good construct validity when he obtained similar factor structures in learning approaches for his American and Chinese student samples. The SPQ can,
therefore, be considered an acceptable instrument to measure learning by students from different cultures.

4.11 Procedure

Written permission to carry out this study was sought from Deakin University Ethics Committee. Upon approval (Appendix A2), permission to approach Australian students for volunteers to participate in this study was obtained from individual staff members in the faculties of Science and Computing, Commerce, Arts, and Education. Permission to approach Chinese students for participation was also sought from staff members in the faculties of Engineering and Languages at the University of Beijing, mainland China.

Arrangements were made with staff members for testing to be carried out either at the beginning or the end of lectures. At a prearranged time, Australian students were approached and invited to participate in answering the questionnaire. First the plain language statements (Appendix C2) were distributed to the participants. The questionnaires were then distributed to the participants who took approximately 20-25 minutes to complete them. Upon completion, the questionnaires were collected and debriefing statements were given to the participants. The same procedure was repeated for Chinese students but not collected by the author for practical reasons. Instead, a contact Chinese academic staff member at Beijing University administered the questionnaires. All participants were treated in accordance with the ethical standards of the National Statement on Ethical Conduct in Research Involving Humans (1999).
Results

4.12 Overview

The data collected from the 465 participants were analysed using the Statistical Package for Social Science (SPSS for Windows, Version 11). The following procedures were carried out. Data screening was conducted for missing values, out of range data, and possible violation of assumptions underlying each type of statistical analysis. A series of factor analyses using different extraction methods and rotations was then carried out to determine a set of common value types for Australian and Chinese students. Next, six separate hierarchical multiple regression analyses were conducted to predict each of the student learning motives and strategies from the independent variables of Anxiety, and life values (Self-Directed, Power, and Achievement) after controlling the influence of the demographic variables.

The next set of analyses was conducted for path diagrams to illustrate the direct and indirect effects of independent variables on each of the student learning motives and strategies. Four separate standard multiple regressions were carried out to determine the predictiveness of the dispositional variables (Test Anxiety, Power, Self-Directed, and Achievement) from the demographic variables (Culture, Age, Gender, and Discipline Type). Further, a standard multiple regression was also carried out to determine the predictiveness of Discipline Type from Age and Gender. From these analyses, path diagrams were produced.
4.13 Descriptive Statistics

The means, standard deviations, and reliabilities for each scale were computed from unweighted scores and are shown in Table 4.3 below.

Table 4.3. Means and standard deviations for Australian and Chinese student samples and reliabilities of scales.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Scale Range</th>
<th>Australian (N = 260)</th>
<th>Chinese (N = 260)</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Anxiety</td>
<td>20-80</td>
<td>41.39</td>
<td>13.16</td>
<td>38.86</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>5-35</td>
<td>25.88</td>
<td>4.01</td>
<td>24.76</td>
</tr>
<tr>
<td>Achievement</td>
<td>6-42</td>
<td>30.64</td>
<td>4.68</td>
<td>28.82</td>
</tr>
<tr>
<td>Power</td>
<td>5-35</td>
<td>17.85</td>
<td>4.11</td>
<td>19.70</td>
</tr>
<tr>
<td>Conformity</td>
<td>4-28</td>
<td>18.36</td>
<td>3.72</td>
<td>17.49</td>
</tr>
<tr>
<td>Surface Motive</td>
<td>7-35</td>
<td>22.37</td>
<td>5.04</td>
<td>20.29</td>
</tr>
<tr>
<td>Surface Strategy</td>
<td>7-35</td>
<td>19.96</td>
<td>4.49</td>
<td>19.03</td>
</tr>
<tr>
<td>Deep Motive</td>
<td>7-35</td>
<td>19.22</td>
<td>5.04</td>
<td>21.28</td>
</tr>
<tr>
<td>Deep Strategy</td>
<td>7-35</td>
<td>19.69</td>
<td>4.76</td>
<td>21.46</td>
</tr>
<tr>
<td>Achieving Motive</td>
<td>7-35</td>
<td>16.93</td>
<td>4.62</td>
<td>18.10</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>7-35</td>
<td>16.40</td>
<td>5.14</td>
<td>20.38</td>
</tr>
</tbody>
</table>

Note: Total sample size = 465. A^a = Australian; C^b = Chinese

The two student samples obtained similar means and standard deviations for each scale. In addition, the obtained scores are comparable to the norms established by Spielberger (1980) and Biggs (1987) for test anxiety, and for
learning motives and strategies, respectively. Norms for the life values (Self-Directed, Achievement, Power and Conformity) have not been published. Reliability values obtained for the Test Anxiety scale and the six SPQ scales are comparable to those obtained by Spielberger (alpha coefficient of .92) and by Biggs (alpha coefficients ranging from .61 for Surface Motive to .77 for Achieving Strategy).

4.14 Factor Analyses of life values

A series of factor analyses was carried out on the data from the Australian and Chinese samples to determine whether the life values selected from Schwartz's instrument were common to both student samples. The data obtained from an Australian sample of 260 and Chinese sample of 205 university students, represents a case to variable ratio of 13.0 and 10.4 respectively. These ratios are in excess of the minimum of five cases per variable as recommended by Tabachnick and Fidell (2001) for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for factor analysis was 0.8 for both Australian and Chinese samples. This value exceeds the recommended minimum value of 0.6 for a good factor analysis according to Tabachnick and Fidell.

4.14.1 Factor Structure of life Values

For each sample, combinations of different extraction methods (Principal Components and Maximum Likelihood) and rotations (Varimax and Oblique) were employed in the analyses to derive a robust internal structure of Life Values. Thompson and Daniel (1996) recommended that solutions derived from different extraction methods should be examined so that trivial and
redundant factors can be identified. Substantive and distinctive factor loadings for each item were averaged to derive a central factor structure of life values that is shared by Australian and Chinese students. For each cultural group, Principal Component analyses with Varimax and Oblique rotations produced factor structures that were very similar to each other in terms of number and type of factors. The specific items loading onto each factor varied somewhat between groups. However, there was a sufficient number of the same items that loaded substantively and distinctively on three factors common to Australian and Chinese students. All factors have eigen values greater than 1, and at least three items load distinctively and substantively on each. Substantive loadings were values equal to or greater than 0.30 and distinctive loading were instances where an item’s highest loading was at least .20 higher than its loadings for other factors (Arrindell, Emmelkamp, Brilman, & Monsma, 1983).

The three factors reflected three of Schwartz’s (1992) life values, namely, Self-Directed, Achievement and Power. An averaged factor loading was calculated for each salient item within each factor. These values were derived from Principal Components and Maximum Likelihood extraction methods with varimax rotation for the separate samples of Australian and Chinese students. Thus four factor loadings: were used to obtain each averaged loading (See Table 4.4 below).
Table 4.4. Averaged factor loadings for items that loaded substantively and significantly onto factors shared by Australian and Chinese students.

<table>
<thead>
<tr>
<th>Life value Items</th>
<th>Self-Directed</th>
<th>Achievement</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Choosing own goals</td>
<td>.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Freedom</td>
<td>.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Capable</td>
<td>.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Independent</td>
<td>.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Success</td>
<td></td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>6. Wealth</td>
<td></td>
<td>.58</td>
<td></td>
</tr>
<tr>
<td>7. Influential</td>
<td></td>
<td>.57</td>
<td></td>
</tr>
<tr>
<td>8. Ambition</td>
<td></td>
<td>.56</td>
<td></td>
</tr>
<tr>
<td>9. Public Image</td>
<td></td>
<td></td>
<td>.61</td>
</tr>
<tr>
<td>10. Social Recognition</td>
<td></td>
<td></td>
<td>.58</td>
</tr>
<tr>
<td>11. Social Power</td>
<td></td>
<td></td>
<td>.50</td>
</tr>
</tbody>
</table>

*Note: N = 465*

It can be noted from the table that all of the loadings are moderate to high for each factor. These averaged factor loadings for the items were used to compute factor weighted scores for the Self-Directed, Achievement, and Power scales which were employed in subsequent analyses. No factor for Conformity was extracted from the analyses. Although a factor was formed from four items for the Australian sample, only two items (Honouring Elders and Politeness) loaded above .30 for the Chinese sample. It was concluded that the factor was insufficiently robust across samples.
For ease of interpretation the means, standard deviations, and reliabilities for the three new scales were calculated as unweighted scores and are presented in Table 4.5 below. The three new scales will be referred to as Student Life Values from now onwards in the thesis. The mean and standard deviation of each Student Life Value scale are similar for Australian and Chinese student samples. The reliability coefficient for each Student Life Value scale is considered to be adequate for research purposes.

Table 4.5. Means, standard deviations and reliabilities for the Student Life Value scales

<table>
<thead>
<tr>
<th>Student Life Values</th>
<th>Scale Range</th>
<th>Australian (N = 260)</th>
<th>Chinese (N = 205)</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>4-28</td>
<td>22.03</td>
<td>3.26</td>
<td>20.98</td>
</tr>
<tr>
<td>Achievement</td>
<td>4-28</td>
<td>18.23</td>
<td>3.75</td>
<td>17.43</td>
</tr>
<tr>
<td>Power</td>
<td>3-21</td>
<td>10.43</td>
<td>2.76</td>
<td>11.85</td>
</tr>
</tbody>
</table>

*Note.* Total sample size = 465.

### 4.15 Hierarchical Multiple Regressions

Six hierarchical multiple regressions were conducted to predict each SPQ scale. Before the analyses, initial steps were taken to prepare the data. Tests of the various assumptions underlying the use of multiple regression analysis ensured that the assumptions were not violated (Tabachnick & Fidell, 2001). Two cases of multivariate outliers that exceeded the critical value of \(X^2 (8) = 26.13\), \(p < .001\) were removed from further analyses as recommended by Tabachnick and Fidell.
Four cases of outliers for age were recoded back to 3 standard deviations from the mean. Data from the remaining 465 participants were used without alteration in the subsequent analyses. Table 4.6 presents the inter-correlations between the variables used in the multiple regression analyses.

The moderate inter-correlations between Achievement, Self-Directed, and Power, suggest an underlying commonality shared by these three constructs. However, the inter-correlations are only moderate; hence, Self-Directed, Achievement, and Power, can also be considered as separate constructs in their own right.
Table 4.6. Intercorrelations between variables used in the Multiple Regression Analyses.

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Gender</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Discipline Type</td>
<td></td>
<td>.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Ethnicity</td>
<td></td>
<td></td>
<td>-.21</td>
<td></td>
<td>-.11</td>
<td></td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Surface Motive</td>
<td></td>
<td></td>
<td></td>
<td>-.08</td>
<td>.09</td>
<td>-.07</td>
<td>-.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Deep Motive</td>
<td></td>
<td></td>
<td></td>
<td>.23</td>
<td></td>
<td></td>
<td></td>
<td>.21</td>
<td></td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Achieving Motive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Surface Strategy</td>
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<td>-.17</td>
<td></td>
<td>-.10</td>
<td>.51</td>
<td></td>
<td>.02</td>
<td></td>
<td>.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Deep Strategy</td>
<td></td>
<td>.22</td>
<td></td>
<td>-.08</td>
<td>-.04</td>
<td></td>
<td>-.19</td>
<td></td>
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<td></td>
<td>.64</td>
<td></td>
<td>.40</td>
<td>-.02</td>
</tr>
<tr>
<td>10. Achieving</td>
<td></td>
<td></td>
<td>.07</td>
<td></td>
<td>.08</td>
<td>-.05</td>
<td>.38</td>
<td></td>
<td>.08</td>
<td></td>
<td>.46</td>
<td></td>
<td>.46</td>
<td>.10</td>
</tr>
<tr>
<td>Anxiety</td>
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<td>.07</td>
<td></td>
<td>.06</td>
<td></td>
<td>-.01</td>
<td>-.11</td>
<td>.49</td>
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<td>.00</td>
<td></td>
<td>.08</td>
<td></td>
<td>.22</td>
</tr>
<tr>
<td>Achievement</td>
<td></td>
<td>-.14</td>
<td></td>
<td>-.02</td>
<td></td>
<td>-.24</td>
<td>-.11</td>
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<td></td>
<td>.40</td>
<td></td>
<td>.21</td>
<td>.03</td>
</tr>
<tr>
<td>Self-Directed</td>
<td></td>
<td>.13</td>
<td></td>
<td>.27</td>
<td></td>
<td>.19</td>
<td>-.15</td>
<td>.12</td>
<td>.17</td>
<td>.18</td>
<td>-.03</td>
<td>.16</td>
<td>.08</td>
<td>-.01</td>
</tr>
<tr>
<td>Power</td>
<td></td>
<td>-.18</td>
<td></td>
<td>-.11</td>
<td></td>
<td>-.13</td>
<td>.26</td>
<td>.10</td>
<td>.12</td>
<td>.34</td>
<td>.10</td>
<td>.10</td>
<td>.16</td>
<td>.03</td>
</tr>
</tbody>
</table>

Note. N = 465
* p < .05, ** p < .01, *** p < .001
4.15.1 Factors predicting Learning Motives and Learning Strategies

Six hierarchical multiple regressions were conducted, each with the demographic variables (Culture, Gender, Age, and Discipline Type) entered at Step 1 to control for their effects and TAI Anxiety and the three Student Life Value scales (Achievement, Self-Directed, and Power) entered at Step 2. The dependent variables for the multiple regressions were the six SPQ scales. Results of the six separate hierarchical multiple regressions are summarised and described below.

Table 4.7. Summary of hierarchical regression analysis to predict SPQ Surface Motive.

<table>
<thead>
<tr>
<th>Variable</th>
<th>r²</th>
<th>Beta</th>
<th>Sr²</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture&lt;sup&gt;d&lt;/sup&gt;</td>
<td>-.22</td>
<td>-.24</td>
<td>.05</td>
<td>26.12&lt;sup&gt;***&lt;/sup&gt;</td>
<td>1,460</td>
</tr>
<tr>
<td>Gender&lt;sup&gt;e&lt;/sup&gt;</td>
<td>.09</td>
<td>.11</td>
<td>.01</td>
<td>5.14&lt;sup&gt;*&lt;/sup&gt;</td>
<td>1,460</td>
</tr>
<tr>
<td>Age</td>
<td>-.07</td>
<td>-.10</td>
<td>.01</td>
<td>4.99&lt;sup&gt;*&lt;/sup&gt;</td>
<td>1,460</td>
</tr>
<tr>
<td>Discipline Type&lt;sup&gt;f&lt;/sup&gt;</td>
<td>-.07</td>
<td>-.13</td>
<td>.01</td>
<td>6.55&lt;sup&gt;**&lt;/sup&gt;</td>
<td>1,460</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.49</td>
<td>.46</td>
<td>.21</td>
<td>140.97&lt;sup&gt;***&lt;/sup&gt;</td>
<td>1,456</td>
</tr>
<tr>
<td>Achievement</td>
<td>.27</td>
<td>.14</td>
<td>.01</td>
<td>9.10&lt;sup&gt;**&lt;/sup&gt;</td>
<td>1,456</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.12</td>
<td>.06</td>
<td>.00</td>
<td>1.88</td>
<td>1,456</td>
</tr>
<tr>
<td>Power</td>
<td>.10</td>
<td>.05</td>
<td>.00</td>
<td>1.12</td>
<td>1,456</td>
</tr>
</tbody>
</table>

Note. TAI = Trait Anxiety Inventory.
<sup>a</sup> Zero-order correlation between measure and Surface Motive score.
<sup>b</sup> Standardised regression co-efficient.
<sup>c</sup> Unique variance contributed to the prediction of Surface Motive at point of entry.
<sup>d</sup> 1 = Australian, 2 = Chinese.
<sup>e</sup> 1 = males, 2 = females.
<sup>f</sup> 1 = "hard" discipline, 2 = "soft" discipline.
<sup>*</sup> p < .05; <sup>**</sup> p < .01; <sup>***</sup> p < .001.
For Surface Motive, the variables Culture, Gender, Age, and Discipline Type entered at Step 1 significantly explained 7.7% of the variance in the scores: $R^2 = .077$, $F(4, 460) = 9.598$, $p < .001$. Culture, Gender, Age, and Discipline Type were significant unique predictors: higher Surface Motive scores were associated with Australian students, females, younger students, and with “hard” discipline.

Entry of the Anxiety and Student Life Value variables at Step 2 significantly increased the amount of explained variance in Surface Motive scores by 26%: $R^2$ change $= .257$, $F(4, 456) = 43.875$, $p < .001$. Anxiety and Achievement were significant unique predictors: greater levels of Anxiety and Achievement were related to higher scores for Surface Motive. Overall, 33% of the variance in Surface Motive scores was explained by this linear regression model and the entire model was significant: $R^2 = .334$, $F(8, 456) = 28.525$, $p < .001$. 
Table 4.8. Summary of hierarchical regression analysis to predict SPQ Surface Strategy.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r^a$</th>
<th>Beta$^b$</th>
<th>$S_r^c$</th>
<th>$F$</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture$^d$</td>
<td>-.10</td>
<td>-.13</td>
<td>.02</td>
<td>7.78**</td>
<td>1,460</td>
</tr>
<tr>
<td>Gender$^e$</td>
<td>-.04</td>
<td>.02</td>
<td>.00</td>
<td>0.23</td>
<td>1,460</td>
</tr>
<tr>
<td>Age</td>
<td>-.10</td>
<td>-.10</td>
<td>.01</td>
<td>4.92*</td>
<td>1,460</td>
</tr>
<tr>
<td>Discipline Type$^f$</td>
<td>-.17</td>
<td>-.18</td>
<td>.03</td>
<td>12.65***</td>
<td>1,460</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.22</td>
<td>.20</td>
<td>.04</td>
<td>19.77***</td>
<td>1,456</td>
</tr>
<tr>
<td>Achievement</td>
<td>.21</td>
<td>.13</td>
<td>.01</td>
<td>5.97**</td>
<td>1,456</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>-.03</td>
<td>-.06</td>
<td>.00</td>
<td>1.57</td>
<td>1,456</td>
</tr>
<tr>
<td>Power</td>
<td>.10</td>
<td>.06</td>
<td>.00</td>
<td>1.20</td>
<td>1,456</td>
</tr>
</tbody>
</table>

*Note.* TAI = Trait Anxiety Inventory.

$^a$ Zero-order correlation between measure and Surface Strategy score.

$^b$ Standardised regression coefficient.

$^c$ Unique variance contributed to the prediction of Surface Strategy at point of entry.

$^d$ 1 = Australian, 2 = Chinese.

$^e$ 1 = males, 2 = females.

$^f$ 1 = “hard” discipline, 2 = “soft” discipline.

*p < .05; **p < .01; ***p < .001.

For Surface Strategy, the variables Culture, Gender, Age, and Discipline Type entered at Step 1 significantly explained 5.3% of the variance in the scores: $R^2 = .053$, $F(4, 460) = 6.381$, $p < .001$. Culture, Age, and Discipline Type were significant unique predictors: higher Surface Strategy scores were associated with Australian students, younger students, and with “hard” discipline.
Entry of the Anxiety and Student Life Value variables at Step 2 significantly increased the amount of explained variance in Surface Strategy scores by 7%: $R^2$ change = .066, $F(4, 456) = 8.497$, $p < .001$. Anxiety and Achievement were significant unique predictors: greater levels of Anxiety and Achievement were related to higher scores for Surface Strategy. Overall, 12% of the variance in Surface Strategy scores was explained by this linear regression model and the entire model was significant: $R^2 = .118$, $F(8, 456) = 7.647$, $p < .001$.

Table 4.9. Summary of hierarchical regression analysis to predict SPQ Deep Motive.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r^a$</th>
<th>Beta$^b$</th>
<th>$S_r^c$</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture$^d$</td>
<td>.21</td>
<td>.26</td>
<td>.06</td>
<td>34.27***</td>
<td>1, 460</td>
</tr>
<tr>
<td>Gender$^e$</td>
<td>-.11</td>
<td>-.02</td>
<td>.00</td>
<td>0.24</td>
<td>1, 460</td>
</tr>
<tr>
<td>Age</td>
<td>.23</td>
<td>.30</td>
<td>.08</td>
<td>44.49***</td>
<td>1, 460</td>
</tr>
<tr>
<td>Discipline Type$^f$</td>
<td>.12</td>
<td>.12</td>
<td>.01</td>
<td>6.10**</td>
<td>1, 460</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.00</td>
<td>.02</td>
<td>.00</td>
<td>0.17</td>
<td>1, 456</td>
</tr>
<tr>
<td>Achievement</td>
<td>.05</td>
<td>.01</td>
<td>.00</td>
<td>0.01</td>
<td>1, 456</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.17</td>
<td>.21</td>
<td>.03</td>
<td>18.81***</td>
<td>1, 456</td>
</tr>
<tr>
<td>Power</td>
<td>.12</td>
<td>.04</td>
<td>.00</td>
<td>0.60</td>
<td>1, 456</td>
</tr>
</tbody>
</table>

Note. TAI = Trait Anxiety Inventory.

$^a$ Zero-order correlation between measure and Deep Motive score.

$^b$ Standardised regression co-efficient.

$^c$ Unique variance contributed to the prediction of Deep Motive at point of entry.

$^d$ 1 = Australian, 2 = Chinese.

$^e$ 1 = males, 2 = females.

$^f$ 1 = "hard" discipline, 2 = "soft" discipline.

*p < .05; **p < .01; ***p < .001.
For Deep Motive, the variables Culture, Gender, Age, and Discipline Type entered at Step 1 significantly explained 14.0% of the variance in the scores: $R^2 = .140, F(4, 460) = 18.727, p < .001$. Culture, Age, and Discipline Type were significant unique predictors: higher Deep Motive scores were associated with Chinese students, older students, and with “soft” discipline.

Entry of the Anxiety and Student Life Value variables at Step 2 significantly increased the amount of explained variance in Deep Motive scores by 5%: $R^2$ change = .046, $F(4, 456) = 6.516, p < .001$. Self-Directed scores were a significant unique predictor at this step: higher Self-Directed scores were related to higher scores for Deep Motive. Overall, 19% of the variance in Deep Motive scores was explained by this linear regression model and the entire model was significant: $R^2 = .187, F(8, 456) = 13.071, p < .001$. 
Table 4.10. Summary of hierarchical regression analysis to predict SPQ Deep Strategy.

<table>
<thead>
<tr>
<th>Variable</th>
<th>r&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Beta&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Sr&lt;sup&gt;c&lt;/sup&gt;</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.19</td>
<td>.24</td>
<td>.06</td>
<td>28.25***</td>
<td>1, 460</td>
</tr>
<tr>
<td>Gender&lt;sup&gt;e&lt;/sup&gt;</td>
<td>-.08</td>
<td>-.045</td>
<td>.00</td>
<td>0.52</td>
<td>1, 460</td>
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<tr>
<td>Age</td>
<td>.22</td>
<td>.27</td>
<td>.07</td>
<td>35.26***</td>
<td>1, 460</td>
</tr>
<tr>
<td>Discipline Type&lt;sup&gt;f&lt;/sup&gt;</td>
<td>-.04</td>
<td>-.03</td>
<td>.00</td>
<td>0.40</td>
<td>1, 460</td>
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<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>-.04</td>
<td>-.03</td>
<td>.00</td>
<td>0.50</td>
<td>1, 456</td>
</tr>
<tr>
<td>Achievement</td>
<td>.03</td>
<td>.01</td>
<td>.00</td>
<td>0.05</td>
<td>1, 456</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.16</td>
<td>.18</td>
<td>.03</td>
<td>13.25***</td>
<td>1, 456</td>
</tr>
<tr>
<td>Power</td>
<td>.10</td>
<td>.04</td>
<td>.00</td>
<td>0.59</td>
<td>1, 456</td>
</tr>
</tbody>
</table>

Note. TAI = Trait Anxiety Inventory.

<sup>a</sup> Zero-order correlation between measure and Deep Strategy score.

<sup>b</sup> Standardised regression co-efficient.

<sup>c</sup> Unique variance contributed to the prediction of Deep Strategy at point of entry.

<sup>d</sup> 1 = Australian, 2 = Chinese.

<sup>e</sup> 1 = males, 2 = females.

<sup>f</sup> 1 = "hard" discipline, 2 = "soft" discipline.

*p < .05; **p < .01; ***p < .001.

For Deep Strategy, the variables Culture, Gender, Age, and Discipline Type entered at Step 1 significantly explained 10.9 % of the variance in the scores: R^2 = .109, F(4, 460) = 14.008, p < .001. Culture and Age were significant unique predictors: higher Deep Strategy scores were associated with being Chinese and with older students.

Entry of the Anxiety and Student Life Value variables at Step 2 significantly increased the amount of explained variance in Deep Strategy scores.
by 4%: $R^2$ change = .037, $F(4, 456) = 5.001$, $p < .001$. Self-Directed was a significant unique predictor: greater levels of Self-Directed were related to higher scores for Deep Strategy. Overall, 15% of the variance in Deep Strategy scores was explained by this linear regression model and the entire model was significant: $R^2 = .146$, $F(8, 456) = 9.749$, $p < .001$.

Table 4.11. Summary of hierarchical regression analysis for variables predicting SPQ Achieving Motive.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r^a$</th>
<th>Beta$^b$</th>
<th>Sr$^c$</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture$^d$</td>
<td>.14</td>
<td>.13</td>
<td>.02</td>
<td>7.57**</td>
<td>1, 460</td>
</tr>
<tr>
<td>Gender$^e$</td>
<td>-.07</td>
<td>.07</td>
<td>.00</td>
<td>2.21</td>
<td>1, 460</td>
</tr>
<tr>
<td>Age</td>
<td>-.02</td>
<td>.04</td>
<td>.00</td>
<td>.81</td>
<td>1, 460</td>
</tr>
<tr>
<td>Discipline Type$^f$</td>
<td>-.27</td>
<td>-.29</td>
<td>.07</td>
<td>35.38***</td>
<td>1, 460</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.08</td>
<td>.06</td>
<td>.00</td>
<td>1.90</td>
<td>1, 456</td>
</tr>
<tr>
<td>Achievement</td>
<td>.40</td>
<td>.28</td>
<td>.05</td>
<td>32.24***</td>
<td>1, 456</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.18</td>
<td>.11</td>
<td>.01</td>
<td>5.35*</td>
<td>1, 456</td>
</tr>
<tr>
<td>Power</td>
<td>.34</td>
<td>.17</td>
<td>.02</td>
<td>12.64***</td>
<td>1, 456</td>
</tr>
</tbody>
</table>

*Note. TAI = Trait Anxiety Inventory.

$^a$ Zero-order correlation between measure and Achieving Motive score.

$^b$ Standardised regression co-efficient.

$^c$ Unique variance contributed to the prediction of Achieving Motive at point of entry.

$^d$ 1 = Australian, 2 = Chinese.

$^e$ 1 = males, 2 = females.

$^f$ 1 = “hard" discipline, 2 = “soft" discipline.

*p < .05; **p < .01; ***p < .001.

For Achieving Motive, the variables Culture, Gender, Age, and Discipline Type entered at Step 1 significantly explained 9.1% of the variance in
the scores: $R^2 = .091$, $F(4, 460) = 11.470$, $p < .001$. Culture and Discipline Type were significant unique predictors: higher Achieving Motive scores were associated with being Chinese and with "hard" discipline.

Entry of the Anxiety and Student Life Value variables at Step 2 significantly increased the amount of explained variance in Achieving Motive scores by 17%: $R^2$ change $= .173$, $F(4, 456) = 26.750$, $p < .001$. Anxiety, Self-Directed and Power were significant unique predictors: greater levels of Achievement, Self-Directed, and Power were related to higher scores for Achieving Motive. Overall, 26% of the variance in Achieving Motive scores was explained by this linear regression model and the entire model was significant: $R^2 = .264$, $F(8, 456) = 20.394$, $p < .001$. 
Table 4.12. Summary of hierarchical regression analysis to predict SPQ Achieving Strategy.

<table>
<thead>
<tr>
<th>Variable</th>
<th>r</th>
<th>Beta</th>
<th>Sr</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture d</td>
<td>.38</td>
<td>.42</td>
<td>.17</td>
<td>93.43 ***</td>
<td>1, 460</td>
</tr>
<tr>
<td>Gender e</td>
<td>.08</td>
<td>.17</td>
<td>.02</td>
<td>13.37 ***</td>
<td>1, 460</td>
</tr>
<tr>
<td>Age</td>
<td>.07</td>
<td>.17</td>
<td>.03</td>
<td>14.63 ***</td>
<td>1, 460</td>
</tr>
<tr>
<td>Discipline Type f</td>
<td>-.05</td>
<td>-.11</td>
<td>.01</td>
<td>4.99 *</td>
<td>1, 460</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.07</td>
<td>.09</td>
<td>.01</td>
<td>4.94 *</td>
<td>1, 456</td>
</tr>
<tr>
<td>Achievement</td>
<td>.02</td>
<td>-.01</td>
<td>.00</td>
<td>0.02</td>
<td>1, 456</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.09</td>
<td>.09</td>
<td>.01</td>
<td>3.76</td>
<td>1, 456</td>
</tr>
<tr>
<td>Power</td>
<td>.14</td>
<td>.06</td>
<td>.00</td>
<td>1.80</td>
<td>1, 456</td>
</tr>
</tbody>
</table>

*Note. TAI = Trait Anxiety Inventory.

a Zero-order correlation between measure and Achieving Strategy score.

b Standardised regression co-efficient.

c Unique variance contributed to the prediction of Achieving Strategy at point of entry.

d 1 = Australian, 2 = Chinese.

e 1 = males, 2 = females.

f 1 = "hard" discipline, 2 = "soft" discipline.

*p < .05; **p < .01; ***p < .001.

For Achieving Strategy, the variables Culture, Gender, Age, and Discipline Type entered at Step 1 significantly explained 18.6 % of the variance in the scores: $R^2 = .186$, $F(4, 460) = 26.312$, $p < .001$. Culture, Gender, Age, and Discipline Type were significant unique predictors: higher Achieving Strategy scores were associated with being Chinese, female, older students, and with "hard" discipline.
Entry of the Anxiety and Student Life Value variables at Step 2 significantly increased the amount of explained variance in Achieving Strategy scores by 2%: $R^2$ change = .022, $F(4, 456) = 3.328$, $p < .05$. Anxiety was the only significant unique predictor: greater level of Anxiety was related to higher scores for Achieving Strategy. Overall, 21% of the variance in Achieving Strategy scores was explained by this linear regression model and the entire model was significant: $R^2 = .209$, $F(4, 456) = 15.031$, $p < .001$.

4.16 Path Diagram

The contribution of an independent variable to predictiveness is partly reflected by the unique relationship of that variable with the dependent variable, as reported in the previous section. A more complete understanding of the independent variables however, requires consideration of the relationships between them (Tabachnick & Fidell, 2001). Accordingly, a model of the relationships was evaluated whereby the demographic variables, Age, Culture, Gender, and Discipline Type influenced the dispositional variables of Test Anxiety and the Student Life Values of Power, Self-Directed, and Achievement. In turn amongst the demographic variables, Age and Gender influenced Discipline Type. A culture effect on Discipline Type was ruled out because the sampling method had ensured roughly equal proportions of each culture for Discipline Type.

For evaluation of the model, four standard regressions were carried out to determine the predictiveness of the demographic variables for each of the four dispositional variables. A fifth standard regression was then conducted which treated the demographic variables of Age and Gender as predictors of Discipline
Type. The standardised regression coefficients from these analyses were used in
six path diagrams to illustrate the relative impact through direct and indirect
effects of the independent variables upon the six SPQ scales.

In each of these path diagrams, the demographic variables (Age, Culture,
Gender and Discipline Type) are modeled as causal antecedents to the
dispositional variables. The demographic variables also have direct causal flows to
the SPQ scales. Thus, the demographic variables have both direct effects upon a
SPQ scale and indirect effects via any of the intervening dispositional variables.

To determine the overall influence of each independent variable on a
particular SPQ scale, the sum of its direct and indirect effects was calculated
(Bryman & Crammer, 1997). This value is termed the affect coefficient of the
independent variable concerned. In calculating the affect coefficients, the path
coefficients reported in the path diagrams were used. An indirect effect was
obtained by multiplying the coefficient for each pathway from an independent
variable to a particular SPQ scale. Where there is an odd number of negative links
between variables, the ultimate indirect effect of the independent variable on the
SPQ scale is negative. A negative relationship between the independent and
dependent variable can also be obtained for a direct effect. If a pair of independent
and dependent variables has both positive and negative signs among its direct and
indirect effect(s), the system is considered inconsistent (Davis, 1985). In an
inconsistent system, the effects (direct and indirect) oppose or suppress each other
hence reducing the size of the overall influence of that independent variable on the
particular SPQ scale. Thus, the value of the affect coefficient for the independent
variable may be less that its single direct effect on the SPQ scale. On the other
hand, where both direct and indirect effects are either positive or negative, the
system is considered consistent) with both direct and indirect effects reinforcing
each other (Davis). The overall influence of the independent variable concerned is,
therefore, greater than its single direct effect on the SPQ scale.

To avoid unnecessary complexities, only significant path coefficients are
shown in the path diagrams. In the diagrams, the arrows depict causal relationships
between predictor variables and dependent variables. The direction of paths is
guided by theoretical considerations.

Independent Variables
Demographics

Dependent Variables
Dispositional Characteristics

Culture
Age
Discipline Type
Gender
Anxiety
Power
Self-Directed
Achievement
Surface
Motive

Note. *p < .05; ** p < .01, *** p < .001.

Figure 4.1. Direct and indirect effects of independent variables on Surface
Motive.
For Surface Motive, the demographic variables Age and Culture and the dispositional characteristics Anxiety and Achievement exerted significant direct effects on Surface Motive. Anxiety was the only variable that exerted a very substantial direct effect. No substantial indirect effect on Surface Motive was obtained.

In terms of overall influence on Surface Motive, Anxiety had the greatest affect coefficient (.46), followed by Culture (-.20), and then Age (-.12). Other values are included in Appendix D. The Culture effect on Surface Motive was primarily due to a direct and significant effect. In addition, Culture exerted an indirect and significant effect on Surface Motive via the value Achievement. The system of effects that Culture had on Surface Motive is consistent with its direct and indirect effects reinforcing each other. The Age effect on Surface Motive was also primarily due to a direct and significant negative effect. In addition, Age exerted indirect and significant effects on Surface Motive via two separate pathways. A consistent system of effects was also obtained for Age with both direct and indirect effects reinforcing each other.
Figure 4.2. Direct and indirect effects of independent variables on Surface Strategy.

For Surface Strategy, the demographic variables Culture and Discipline Type and the dispositional characteristics Anxiety and Achievement exerted direct significant effects on Surface Strategy. Anxiety was the only variable that had a substantial direct effect on Surface Strategy. No substantial indirect effect was obtained.

In terms of overall influence on Surface Strategy, the variable Anxiety had the greatest affect coefficient (.20), followed by Discipline Type (.17), and then Culture (-.15). Other values are included in Appendix D. The Discipline Type effect on Surface Strategy was primarily due to a direct and significant effect. In
addition, Discipline Type exerted an indirect and significant effect on Surface Strategy via the value Achievement. A consistent system of effects on Surface Strategy was obtained for Discipline Type with both direct and indirect effects reinforcing each other. The Culture effect on Surface Strategy was also primarily due to a direct and significant effect. Culture also exerted indirect and significant effects on Surface Strategy via the value Achievement, albeit the effect was relatively small. A consistent system of effects was also obtained for Culture with both direct and indirect effects working together in a negative direction.

Summarising the results for Surface Motive and Surface Strategy together, the dispositional characteristic Anxiety and the demographic variable Culture were the two variables that directly predicted both Surface Motive and Surface Strategy in student learning. Anxiety and Culture both had a relatively higher impact on Surface Motive than on Surface Strategy.
For Deep Motive, the demographic variables of Age, Culture and Discipline Type and the dispositional characteristic of Self-Directed all exerted significant direct effects. No substantial indirect effect on Deep Motive was obtained.

In terms of overall influence on Deep Motive, the variable Age had the greatest affect coefficient (.33), followed by Culture (.26) and then Self-Directed (.21). Other values are included in Appendix D. The overall influence of Age on Deep Motive was reinforced by the combination of a positive direct relationship and positive indirect relationships via two separate pathways; hence a coefficient greater than that for its single direct effect was obtained. The affect coefficient for Culture on Deep Motive, on the other hand, was less than that for its single direct
effect on Deep Motive. The variable Self-Directed acted as a suppressor variable: its negative path with Culture suppressed the positive direct effect of Culture on Deep Motive. The effects of Age on Deep Motive were represented by a consistent system whereas the effects of Culture on Deep Motive were represented by an inconsistent system.

![Diagram of the relationship between variables]

**Independent Variables**
- Demographics
- Dispositional Characteristics

**Dependent Variables**
- Demographics

Note. *p < .05; **p < .01, ***p < .001

**Figure 4.4.** Direct and indirect effects of independent variables on Deep Strategy.

For Deep Strategy, the demographic variables of Age and Culture and the dispositional characteristic Self-Directed exerted significant direct effects. No substantial indirect effect on Deep Strategy was obtained.

In terms of overall influence on Deep Strategy, the variable Age had the greatest affect coefficient (.28) followed by Culture (.23), and then Self-Directed
(.18). Other values are included in Appendix D. The overall influence of Age on Deep Strategy was reinforced by the combination of positive direct and positive indirect relationships via Self-Directed hence a coefficient greater than its single direct effect was obtained. The affect coefficient for Culture on Deep Strategy, on the other hand, was less than for its direct effect, due again to the variable Self-Directed acting as a suppressor variable.

To summarise the results for Deep Motive and Deep Strategy together, the variables Age, Culture, and Self-Directed had significant direct influence on both Deep Motive and Deep Strategy. In addition, Age and Culture indirectly influenced both Deep Motive and Deep Strategy via Self-Directed. This similarity in patterns of influence on Deep Motive and Deep Strategy demonstrated a congruency between Deep Motive and Deep Strategy for their antecedent influences.
Independent Variables

Demographics

Dispositional Characteristics

Dependent Variables

Demographics

Culture → Anxiety
Age → Power
Discipline Type → Self-Directed
Gender → Achievement

Achieving
Motive

Note. *p < .05; **p < .01, ***p < .001

Figure 4.5. Direct and indirect effects of independent variables on Achieving Motive

For Achieving Motive, significant direct effects were obtained for the demographic variables, Culture and Discipline Type and for the dispositional characteristics, Power, Self-Directed and Achievement. In addition to its direct effect, Discipline Type exerted a moderate indirect effect on Achieving Motive via Achievement.

In terms of overall influence on Achieving Motive, the variables Discipline Type had the greatest affect coefficient (.29) followed by Achievement (.28), and then Power (.17). Other values are included in Appendix D. The overall influence of Discipline Type on Achieving Motive was reinforced in a consistent system, by
the combination of positive direct and positive indirect relationships via the value Achievement; hence a coefficient greater than its direct effect was obtained. The overall influences of the variables, Achievement and Power on Achieving Motive were primarily due to their direct effects.

![Diagram showing relationships between variables](image)

**Note.** *p < .05; **p < .01, ***p < .001*

Figure 4.6. Direct and indirect effects of independent variables on Achieving Strategy

For Achieving Strategy, significant direct effects were obtained for all of the demographic variables (Age, Culture, Gender, and Discipline Type) and the dispositional characteristic of Anxiety. Culture exerted a very substantial direct effect on Achieving Strategy relative to the other variables. No marked indirect effects were evident.
In terms of overall influence on Achieving Strategy, the variable Culture had the greatest affect coefficient (.42), followed by Age (.17) and then Gender (.11). Other values are included in Appendix D. The overall influences of the variables Culture and Age on Achieving Strategy were primarily due to their direct effects. The overall influence of Gender on Achieving Strategy was less than its direct effect owing to the intervening variable Discipline Type that acted as a suppressor in an inconsistent system.

To summarise the results for Achieving Motive and Achieving Strategy, a difference in pattern of influence on the two SPQ scales was obtained. Achieving Motive was directly influenced by the variables, Discipline Type, Achievement and Power with Discipline Type and Achievement having the strongest direct effects on Achieving Motive. By contrast, Achieving Strategy was directly influenced by a different set of variables, Culture, Age and Gender with Culture having the strongest direct effect on Achieving Strategy.

4.17 Relationships among Independent Variables

The pattern of relationships among the independent variables is worth noting in its own right for the purpose of subsequent interpretation of results. Culture was significantly associated with Power. Chinese valued Power more than did Australian students. Gender was significantly associated with Self-Directed and Discipline Type. Female students scored higher on Self-Directed than did males, and more often had a "soft" discipline type. Discipline Type, in turn, was associated with Achievement: students in "hard" disciplines (predominantly
males) valued Achievement more than did students in "soft" disciplines (predominantly females).

Discussion

The main aim of Study Two was to investigate the relative influence of the dispositional variables (Test Anxiety and Student Life Values) on students' learning motives and strategies, while taking into consideration the influence of Culture, Discipline Type, Gender, and Age on student learning. The proposed influences of the dispositional variables were supported: Test Anxiety significantly affected Surface Motive and Surface Strategy in learning, Achievement and Power Life Values both significantly influenced Achieving Motive, and the value of Self-Directed significantly affected both Deep Motive and Deep Strategy in learning. As an exception, an influence from the value Conformity could not be tested because a cross-culturally robust factor could not be identified.

Proposed influences from the demographic variables were likewise largely supported. Culture influenced Deep Motive, Deep Strategy, Achieving Motive and Achieving Strategy. Age affected Deep Motive and Deep Strategy. The influence of Discipline Type was partially supported: it influenced Surface Strategy and Deep Motive, but not Surface Motive and Deep Strategy. Finally, Gender affected Achieving Strategy.
Significant effects for each of the variables will be discussed in terms of how they compare with past findings and possible explanations will be proposed to account for the results. Limitations of the present study, implications of the findings and future research directions will be considered before a conclusion to the study is made.

4.18 Test Anxiety promotes Surface Motive and Surface Strategy

The hypothesis that Test Anxiety will promote students’ Surface Motive in learning was supported. For highly test anxious students, their intention for learning was to focus attention on those tasks that enabled them to avoid failing in a test. The result supports Pekrun’s (1992) argument that test anxiety triggers a motivation to avoid failure so that the learner studies only to pass or to avoid failing the exam. It is possible that, lacking confidence in their academic ability, students seek to allay their worries and discomfort by aiming for a pass instead of a higher grade in the exam, thereby adjusting their expectation for level of success.

Results also indicated that the more test anxious students scored higher on SPQ Surface Strategy, as predicted. Highly test anxious students tended to prepare for assessment by learning in a restricted and narrowly focused way. They concentrated more on memorising detailed facts and information and mainly confined their learning to the prescribed syllabus and the teacher’s expectations.

Wine (1971) commented that highly anxious students often perform poorly in a test, attributing this performance to the reduced attention, concentration, and limited working memory capacity resulting from anxiety. It was argued in the
Introduction that students’ past exam failures may develop in them a sense of inadequacy regarding their future performance that promotes anxiety during their study for exams. The adoption of a narrow and restricted form of learning, focused on factual information and the prescribed curriculum, may provide some sense of clarity and security for anxious learners. That restricted strategy may also enable an anxious learner to channel their limited attention, concentration, and working memory specifically to the learning task. Thus, channeling may ameliorate the impairing effects suggested by Wine to be associated with a high level of anxiousness.

It is noted that although Test Anxiety significantly influenced both Surface Motive and Surface Strategy, the impact was greater on students’ Surface Motive. Highly anxious students were more inclined to perceive learning as a necessary task to pass the exam (and ultimately to become employed) than to adopt a surface learning strategy. The students in this study were second and third year students who could be considered as experienced learners. Some may have learned to adopt other forms of learning strategy (e.g., the strategic organisation reflected by Achieving Strategy) that enabled them to pass previous exams. The present study did indicate that Test Anxiety had a significant but small positive effect on Achieving Strategy.

In Study One, it was suggested that the high Surface Strategy score for female Business students might be attributed to a high anxiety level due in part to their minority group status in the class. Results in the present study do not seem to support this speculation. In this study, the mean Surface Strategy score for female students from “hard” disciplines (M = 20.84, SD = 4.27) did not differ
significantly from that for the entire sample ($M = 19.52$, $SD = 4.31$). Likewise, the mean Anxiety score for female students from "hard" disciplines ($M = 41.73$, $SD = 12.77$) did not differ significantly from that for the entire sample ($M = 40.32$, $SD = 11.71$). The next study will specifically explore this issue further.

4.19 Student Life Values promote Learning Motives and Strategies

In this study, it was found that the Student Life Values, Achievement, Power, and Self-Directed, significantly influenced students' motives and strategies as they studied for an exam. The results support the arguments made by past researchers who suggested that the life goals held by students are salient in guiding their cognition, affect and behaviour in their academic work (Ames, 1992; Pintrich, Marz & Boyle, 1993; Schwartz, 1994, Schwartz & Bilsky, 1987). According to Schwartz and Bilsky, values are beliefs about desirable end states (goals) that motivate and guide the selection of specific behaviours. A discussion of the significant impact of each of the Student Life Value (Achievement, Power, and Self-Directed) on learning motives and strategies follows.

4.19.1 Achievement value promotes Achieving Motive

Results indicated that the Student Life Value of Achievement promoted Achieving Motive in learning. Students who endorsed the value of Achievement in their everyday lives considered themselves to be ambitious in their learning, competed for the highest grade, measured their success in terms of academic excellence, and had a long-term goal to attain the best career available. These factors can all be considered as strong motivators that will drive students to
study diligently. Students indicated that they were “prepared to sacrifice immediate popularity” (SPQ item 21) with their fellow students for success in their studies and subsequent career. In the Introduction to this thesis, the Achievement value was identified as a performance or ego-related type of achievement. According to some researchers (e.g., Covington, 2000; Dweck & Leggett, 1988; Dowson & McInerney, 1997; Graham & Golan, 1991; McInerney & McInerney, 1998), performance-related achievement involves outperforming others and the highest grade obtained in class is a way of establishing a sense of academic ability, self-worth, status, and prestige.

Success and Wealth were the most defining aspects of the Achievement value developed in this study. These two aspects can be readily identified in SPQ Achieving Motive where striving for academic success and a good career are emphasised in six of the seven test items in that scale. Academic success and a good career are often closely associated with one another. It is conceivable that students would construe a good career in terms of a good salary from which wealth can readily be accrued. It can be argued that the extrinsic motivators of success and wealth that defined the Achievement value, and that appear implicit in SPQ Achieving Motive, can account for the highly significant influence of Achievement as a value upon Achieving Motive in learning.

4.19.2 Power value promotes Achieving Motive in Learning

The hypothesis that the value of Power will promote students’ Achieving Motive in learning was supported by the results of the present study. The result was highly significant but the size effect was moderate. Students who
endorsed the value of Power reported that they were motivated to learn in order to achieve top grades, academic excellence, success in competition and the eventual goal of being “able to select from among the best positions available when they graduate” (SPQ items 3, 9, 27, 6, 39). In this study, Power was primarily defined by public image, social recognition, and social power. An effect of Power on Achieving Motive may indicate students’ perception that top grades will secure a good public image and social recognition.

Another interpretation might relate to social power, the other defining feature of the value. Students who strongly endorsed Power might perceive that academic success among their peers represents power over other students, or some form of dominance/influence over other people in the job they eventually attain. Raven (1992) had proposed that Power can be associated with expertise and information. Therefore, it is possible that for students who scored high on Achieving Motive, the “best positions” (SPQ item 3) might represent a career where some degree of influence/power can be exercised. This explanation, although plausible, is probably less likely than the previous interpretation in this section given that social power is the least defining feature of the Power value.

Results also indicate that an endorsement of Power varied for students as a function of Culture and Age. Culture has a strong effect on Power (beta value of .23, p < .001) while Age has a smaller effect (beta value of -.13, p < .001). Chinese and younger students endorsed the value of Power more highly than did Australian and older students. This finding for Chinese students supports previous research on the importance of hierarchical structures in the Chinese social system (Bond, 1996; Hofstede, 2001; Redding, 1990). In the Chinese
society, it is publicly acknowledged and socially recognised that people in higher positions (e.g., parents, teachers and owner/manager of a workplace) are accorded with authority, influence, and dominance over other people lower in the hierarchy. By contrast, Australian students are subject to a more egalitarian society (Kapferer & Morris, 2003) which may explain why they valued Power less.

With respect to age, younger students (young twenties) ascribed more highly to public image, social recognition and social power than did students in their mid-thirties or older. It is possible that younger students are more concerned with how they appear to others as part of establishing their position within the community. At their age, the future holds a much broader potential than for older students who generally have more defined career paths.

4.19.3 Self-Directed Life value promotes Deep Motive and Deep Strategy in Learning

The hypotheses that the value Self-Directed would influence Deep Motive and Deep Strategy in student learning were both supported. Thus students who highly valued Self-Directed scored higher on SPQ Deep Motive and Deep Strategy. This result supports the empirical finding by Choy and Delahaye (2000) who found a close association between self-directed learning and the SPQ Deep Approach.

Self-Directed in the present study was best defined by the terms of choosing one's own goals and freedom. This emphasis upon independence of thought and action concurs with Schwartz' (1992) notion of Self-Directed and may be considered to be driven internally by the individual. A likewise intrinsic
motivation is also evident in SPQ Deep Motive whereby students felt motivated to
discover the truth, their personal philosophy, and belief system (SPQ items 8 and
32). The finding concurs with Garrison (1997) who suggested that, in self-directed
learning, students are intrinsically motivated, take personal responsibility and are
committed in their pursuit of knowledge and understanding. It can be further
argued that intrinsic motivation also underlines personal responsibility and
commitment. It would appear that the Student Life Value of Self-Directed, self-
directed learning, and Deep Motive in learning share many similar features.

Results also indicated that a valuing of Self-Directed promoted
students’ Deep Strategy in learning. The effect from the value of Self-Directed
upon SPQ Deep Strategy may be explained in terms of personal involvement.
Creativity, freedom, curiosity, independence, and choosing one’s own goal
(constructs used by Schwartz to measure Self-Directed) involve personal
involvement and independence of action. Similarly, such features are implied
when students adopt a Deep Strategy. Students reported that when they studied
they actively related new information to real life experiences, past knowledge, as
well as to another subject to create a personal meaning of what they have learnt
(SPQ items 5, 11, 23, 41). In addition, they put in extra time and effort in learning
through interest in the topic and to form a personal point of view (SPQ items 17,
29, 35). These characteristics can be argued to imply personal involvement and
independence of action.

Those students who strongly endorsed the value of Self-Directed
and scored high on both Deep Motive and Deep Strategy appeared to display the
self-directed learning postulated by Knowles (1975) and Garrison (1997). These
authors maintained that self-directed learners are intrinsically motivated and will engage in cognitive and meta-cognitive processes that involve critical reflection, evaluating, relating, and integration of ideas and concepts. In addition, the learner will construct personal meaning of what is learned in order to enhance understanding.

4.20 Culture and Learning Approaches

Investigating the effect of Culture on learning was a secondary aim of the present study. Nevertheless, results showed Culture to have significant and direct effects upon all six SPQ scales. The hypotheses that Chinese students will score significantly higher than will Australian students on Deep Motive, Deep Strategy, Achieving Motive, and Achieving Strategy were supported. Culture, unexpectedly, was also significantly associated with Surface Motive and Surface Strategy. Thus, support was obtained for the proposal that Culture, separate to life values, can influence learning. The result also substantiates the views of past researchers that the patterns of thinking, feeling and acting of people who are socialized in their own cultural context are likely to be influenced by the beliefs, attitudes, and norms of behaviour acquired within that culture (Hill, 2000; Hofstede, 1986, 2001; Li, 2002). A discussion of cultural effect on learning follows in terms of the differences between the two groups on the SPQ scales. While there was a statistically significant difference between the two groups on every SPQ scale, it is also interesting to note that within each of the two groups, there was little difference between the mean values of each of the scales. It would appear that, for both groups, no one motive or strategy is favoured above any other.
4.20.1 *Culture and SPQ Deep Motive and Deep Strategy.*

Chinese students scored higher than did Australian students on Deep Motive as predicted. Chinese students reported greater personal satisfaction, absorption and excitement with the task of learning than did Australian students, a finding consistent with those obtained by Biggs (1990, 1991, 1992b) and Kember and Gow (1990). The results also indicate that Chinese students were more intrinsically motivated in their learning than their Australian counterparts, resonant with Li’s (2002) observations that Chinese students often used the phrase “heart and mind for wanting to learn” (p.250). Chinese students also regarded learning as a means toward self-perfection of scholarship and moral character, as well as the creation of meaning in their lives. Past researchers (e.g., Biggs, 1996; Cleverly, 1991; Tweed & Lehman, 2002) have commented that this Confucian conception on learning exerts considerable influence on students in China, possibly explaining the effect of Culture on Deep Motive.

A second explanation might relate to the type of teaching approach adopted by Chinese teachers and their expectations of their students. According to Biggs (1994, 1996), O’Connor (1991) and Stigler and Stevenson (1991), teachers in China tend to adopt a mentoring role with a close one-to one relationship with students to develop their intellectual and personal attributes. It can be argued that this environment encourages students towards understanding the meaning of what is learnt, in turn enhancing a sense of personal satisfaction and absorption with learning itself. By contrast, Western teachers played more of an instructive role
with less emphasis placed on a personal and mentoring relationship with students (Stevenson & Stigler, 1992).

Although both groups moderately endorsed Deep Strategy in learning, Chinese students scored higher than did Australian students on the SPQ Deep Strategy, as predicted. Chinese students reported an active relating of new information to real life experiences and past knowledge, seeking out new and further information, and constructing a personal meaning of what is learnt. This finding is consistent with the observations made of Chinese learners by past researchers (Biggs, 1991, 1994, 1996; Cleverly, 1991; Li, 2002, Tweed & Lehman, 2002). These authors maintained that Chinese student learning is much influenced by the Confucian teaching and that students are encouraged to study extensively, inter-relate ideas, and be enquiring and reflective. Similarly, Biggs (1994, 1996), O’Connor (1991), and Stigler and Stevenson (1991), all noted that Chinese students engaged in high levels of reflection, active construction of personal meaning for what is learned, and other high levels of cognitive thought processes. Those learning strategies were attributed to the Chinese teachers’ use of problem-solving exercises and provocative questioning in their teaching.

Although the feature of personal independence can also be associated with Deep Strategy (Biggs, 1987; 1993), it is more likely that the Deep Strategy of Chinese students arose from other sources than a valuing of independence. A minor but significant finding obtained in the study indicated that Chinese students were slightly less likely to value Self-Directed, which in turn directly influences Deep Strategy. Thus the reason for Chinese students scoring high on Deep Strategy appears to be more related to their educational experiences.
4.20.2 Culture and SPQ Achieving Motive and Achieving Strategy

Chinese students scored higher than did Australian students on Achieving Motive as predicted. Thus Chinese students reported themselves to be ambitious and competitive as well as strongly driven towards attaining top grades in all their studies and a good employment when they graduate (SPQ items, 3, 9, 15, 27, and 33). This result concurs with past findings that Chinese students reported higher Achieving Motive than did Australian students (Biggs, 1990, 1992a; Burns, 1991; Hau & Salili, 1991; Nakamura, 1964).

An explanation for Chinese students scoring higher than did Australian students on Achieving Motive was offered by Biggs (1990, 1992a). Biggs noted that Chinese students appeared more inclined than Western students to attribute academic success to personal effort rather than to ability, (Biggs, 1990, 1992b; Hau & Salili, 1991). He thus argued that this internal and controllable style of attributing success may provide Chinese students with a driving force to strive and compete for the top grade that they believe can be achieved through hard work.

A second explanation may be related to the Power value, which was more valued by Chinese students. As indicated previously, Power is defined in terms of public image and social recognition. As Chinese students more strongly endorsed Power, it can be argued that their strong drive to compete against others for the top grade is due to their greater valuing of public image and social recognition. As discussed earlier, top grades represent a form of social recognition of academic excellence, and good public image is perceived to follow
as an outcome. It is not likely that a desire for success, wealth or independence influenced the Chinese students’ Achieving Motive. Results indicate that Chinese students were somewhat less likely to value success and wealth (defining features of Achievement) and independence (a feature emphasised by Self-Directed) than did Australian students.

Although the influence of Culture on Achieving Motive between the two culturally different student groups was significant, this difference was relatively small (beta value of .11, p < .05). There may be substance in Stevenson and Lee’s (1996) remark that students’ high achievement motivation for learning “may be weakening in mainland China as opportunities are on an increase for attaining social recognition and public image through entrepreneurial activities rather than through (academic) scholarship” (p. 133). If indeed the present sample of Chinese students can gain social and economic status through business instead of through academic excellence, it can be expected that motivation to strive for academic excellence will be reduced. The small significant difference in Achieving Motive between Chinese and Australian students may be a consequence of a weakening of the Achieving Motive level among Chinese students. A comparison of the Achieving Motive for Chinese students reveals a higher mean value of 22.60 for the Chinese students investigated by Biggs in 1982 than that obtained for the sample of Chinese students investigated in this study (mean value of 18.10).

Chinese students scored higher than did Australian students on Achieving Strategy as predicted. This difference between the two cultures was particularly strong. The finding is consistent with those obtained by many past
researchers who found that Chinese students typically adopt a pragmatic and strategic approach to learning, with a strong focus on the practical outcomes of success in learning (Biggs, 1990, 1992b; Kember & Gow, 1990; Nakamura, 1964; Smith, Miller & Crassini, 1998). In the present study, Chinese students reported themselves to be: organised in tasks such as note-taking and assignments, conscientious in terms of expending consistent, regular efforts in studying and testing their understanding, and vigilant in seeking out suggested readings that go with the lectures (SPQ items 12, 18, 24, 30, 36, 42). Such learning strategies can clearly be considered to be pragmatic and strategic as described by past researchers.

The effect of Culture on Achieving Strategy may be explained in terms of the difference between education systems for Chinese and Australian students. By contrast to Australia, schooling in China is heavily dominated by public examinations and students are commonly exposed to exams as early as their primary years (Biggs, 1990; Kember & Gow, 1990; Tang & Biggs, 1996). These researchers all considered that the cue-seeking learning behaviour of Chinese students is an adaptive and pragmatic strategy to pass exams with good grades and is a "carry-over" effect (Thomas, Bol, and Warkentin, 1991) as they progress from one level of schooling to another. Taking into account that Achieving Strategy was not influenced by any of the Life values, the Chinese students’ high Achieving Strategy scores might be attributed to an intrinsic motivation for efficiency. An aspect of efficiency is reflected by the strategic, pragmatic, and organised nature of the SPQ Achieving Strategy.
4.21 Effect of Age on Deep Motive and Deep Strategy

Older students (mid-thirties and above) scored significantly higher than did younger students (low twenties) on Deep Motive and Deep Strategy as predicted. These two findings are consistent with those obtained by past researchers (Biggs, 1985, 1987; Gow & Kember, 1990; Harper & Kember, 1986; Richardson, 1995; Sadler-Smith, 1996; Watkins, 1982; Watkins & Hattie, 1981; Zeegers, 2001). Support is provided for Harper and Kember's argument that the greater life experiences of older students can raise their level of self-reliance and overall maturity in their approach to study. The result showed that older students were personally involved and interested in the task of learning as well as proactive in their search for knowledge and understanding. This drive for learning may be associated with maturity that develops with age and experience. The result also supported Harper and Kember's argument that older students are more able to draw upon their life experiences, accumulated knowledge and resources to assist them in evaluating new information and in inter-relating ideas. The higher Deep Strategy score obtained by older students indicate that these students were inclined to relate new material to real life experiences, past knowledge and other subject matter in order to develop personal meaningfulness and to promote understanding of what is learned.

4.22 Effect of Discipline Type on Surface Motive and Surface Strategy

Students from "hard" disciplines scored significantly higher than did students from "soft" disciplines on Surface Motive and Surface Strategy as predicted. These two findings are consistent with those obtained in Study One, and
with findings obtained by past researchers (e.g., Braxton, 1995; Entwistle & Ramsden, 1983, Ramsden & Entwistle, 1981; Smart & Ethington, 1995; Watkins, 1982; Biggs 1987). The effects of Discipline on Surface Motive and Surface Strategy are apparently robust. Although the effects of Discipline were highly significant, they were relatively small. Discipline influenced Surface Motive indirectly and Surface Strategy, both directly and indirectly.

Discipline indirectly affected Surface Motive via the Achievement Life value. Students from “hard” disciplines were more inclined to value the success and wealth of Achievement which in turn promoted higher Surface Motive scores. According to Becher’s (1994) classification, the “hard” disciplines in this study can also be categorised as “applied” while the “soft” disciplines mainly represent Becher’s “pure” disciplines. Becher reasoned that students from “applied” disciplines tend to focus on the learning outcome whereas students from “pure” disciplines focus on the learning process itself. The SPQ Surface Motive represents a desire to gain qualifications and ultimate employment (external motivators). It may be argued, therefore, that the higher Surface Motive scores of students from “hard” or “applied” disciplines reflect a perception that gaining a qualification and employment are means of attaining success and wealth. Hence, a higher regard for the Achievement Student Life Value drives students from “applied” disciplines towards a Surface Motive in learning.

For Surface Strategy, Discipline exerted both a direct and indirect effect (via the Achievement value). Results showed that students from “hard” disciplines tended to focus their learning mainly on the memorisation of facts and information and to adhere closely to the prescribed syllabus and set guidelines (Surface
Strategy). This finding supports Becher’s (1994) implied association between discipline type and learning strategy. Becher characterised “hard” discipline as subjects involving the learning of facts, principles and quantities with a focus on explaining existing knowledge using factual information. The subject content and learning objective in such a discipline are considered to be highly focused and restricted. The SPQ Surface Strategy also reflects focused and restricted learning. It may be considered, therefore, that both the subject content and learning objectives encouraged students from “hard” disciplines to adopt more of a surface learning strategy compared with students from “soft” disciplines. This interpretation fits the direct effect of Discipline on students’ Surface Strategy in learning.

Discipline also indirectly influenced Surface Strategy via the life value Achievement. A higher valuing of success and wealth by students from “hard” disciplines thus boosted their Surface Strategy scores. It is possible that these students regard a restricted and focused learning strategy as the way of ensuring success and wealth through passing the exam, graduating and gaining appropriate employment. This finding further adds to previous findings regarding Discipline and Surface Strategy by identifying the mediating role of the Achievement life value in explaining part of the effect.

4.23 Effect of Discipline Type on Deep Motive and Deep Strategy

Students from “soft” disciplines scored significantly higher than did students from “hard” disciplines on Deep Motive, as predicted. That result replicates those obtained by past researchers (e.g., Biggs 1987; Braxton, 1995; Entwistle &
Ramsden, 1983, Ramsden & Entwistle, 1981; Smart & Ethington, 1995; Watkins, 1982). The effect of Discipline on Deep Motive is thus robust. Support is also given to Becher's (1994) suggestion that "soft" disciplines are more conducive than "hard" disciplines in encouraging students to be deeply motivated in their learning.

Students from "soft" disciplines were shown to be intrinsically motivated in learning. The SPQ Deep Motive represents an intention to understand what is learned as well as personal satisfaction and interest in the task of learning (internal motivators). Becher (1994) suggested that in "soft" disciplines, students are encouraged and expected to understand and interpret a given piece of information in order to develop a coherent argument for choosing between competing ideas or theories. Following understanding and being able to present a coherent argument can be intrinsically satisfying and interesting. It can be argued, therefore, that the subject content and learning objectives associated with "soft" disciplines promote Deep Motive in learning.

Discipline Type, however, did not influence Deep Strategy, so the proposed hypothesis was not supported. This finding contrasts with outcomes from Study One and those reported by past researchers (e.g., Biggs 1987; Braxton, 1995; Entwistle & Ramsden, 1983, Ramsden & Entwistle, 1981; Smart & Ethington, 1995; Watkins, 1982). Thus, students from "hard" and "soft" disciplines did not differ in their degree of cognitive engagement involving inter-relating of ideas, reflections, and critical evaluations to promote an understanding of the text.
It is possible that the combination of Australian and Chinese students into a single sample attenuated the Discipline effect on Deep Strategy. A further analysis of the data indicated a significant correlation between Discipline and Deep Strategy for Australian students \( (r = .15, p < .05) \) but not for Chinese students \( (r = .01, p > .05) \). Hence, it is likely that attenuation of the Discipline effect resulted from the culturally different student groups and from the favouring of Deep Strategy by Chinese students in general, irrespective of Discipline Type. This outcome attests to the possible educational differences between China and Australia, suggesting that Becher’s (1994) reasoning for different learning strategies may be partly restricted to Western cultures.

4.24 Gender Effect on SPQ scales

Female students scored significantly higher than did males on Achieving Strategy as predicted. The result replicates that obtained in Study One and is consistent with findings obtained by past researchers (e.g., Heikkinen, Pettigrew, & Zakrajsek, 1985; Meyer, 1995; Meyer, Dunne & Richardson, 1994). Female students are more likely to take regular notes, complete assignments on time, and maintain a regular and consistent effort in studying and seeking out necessary readings to promote understanding. In other words, the female students can typically be described as well-organised, conscientious and self-disciplined in their study efforts.

A further but indirect effect of Gender on Achieving Strategy via Discipline Type indicates that females are more likely to be in soft disciplines. In turn, “soft” disciplines score lower on Achieving Strategy. This effect, although significant, is
relatively small. It is likely then, that the high Achieving Strategy scores for females may come predominantly from female students in "hard" disciplines rather than from females per se. As indicated in Chapter Three, Thomas (1988, 1990) noted that minority female groups in "hard" disciplines often lacked confidence in their learning ability and were uncomfortable in a male-dominated learning environment. It is possible, therefore, that female students from "hard" disciplines consider it necessary to be conscientious, well-organised, and self-disciplined in their learning efforts to ensure success in their study.

Gender also indirectly affected Deep Motive, Deep Strategy, Surface Motive, Surface Strategy, and Achieving Motive through multiple pathways. The indirect Gender effects on student learning by means of multiple pathways are significant but small. However, they may help explain the inconsistent past findings of gender effects on student learning (Miller, Finley & Mckinley, 1990; Murphy, 1982; Sadler-Smith, 1996; Speth & Brown, 1990; Hayes & Richardson, 1995; Richardson, 1993; Richardson & King, 1991). That inconsistency was discussed in some detail in Study One (Chapter Three). Because Gender is not one of the main factors investigated in the present study, no further discussion of the findings will be pursued.

4.25 Congruency between Learning Motives and Strategies

In the main, results from the present study support Biggs' (1987) notion of a congruency between motive and strategy for each learning approach. This congruency is evidenced particularly for Deep and Surface learning approaches whereby the motive and its corresponding strategy are largely affected by the same
factors. For example, Surface Motive and Surface Strategy were both most strongly influenced by Anxiety. Likewise, Deep Motive and Deep Strategy were both most strongly influenced by Culture and Age. Moreover, the high zero-order correlation between Surface Motive and Surface Strategy (.51) provides evidence for a higher order construct, namely Surface Approach. Likewise, the high zero-order correlation between Deep Motive and Deep Strategy (.64) provides evidence for the higher order construct of Deep Approach.

Less congruent were Achieving Motive and Achieving Strategy as these two SPQ scales were influenced by many different factors. Achieving Motive was directly influenced mostly by Achievement, Discipline Type, and Power. It could be argued that dispositional variables exercised the most influence. Achieving Strategy, on the other hand, was directly influenced mostly by Culture, Age, and Gender such that demographic variables appeared to exercise the greatest influence. In addition to this difference, Achieving Motive displayed many indirect influences via the three Student Life Values, whereas Achieving Strategy displayed direct effects from factors other than the life values. This evidence contrasts with Biggs’ (1987) suggestion of a congruency between Achieving Motive and Achieving Strategy. Nevertheless, a considerable zero-order correlation (.46) between the motive and strategy does suggest the higher-order construct of Achieving Approach. The relatively weak congruence between Achieving Motive and Achieving Strategy had been noted in Chapter Two.
4.26 Replication of Schwartz’s Life values

Schwartz’s (1992) life values of Achievement, Power and Self-Directed were replicated in the study for both Australian and Chinese student samples and their relationships with learning motives and strategies have been discussed. The replication of these three life values testifies to the robustness and cross-cultural validity of these constructs.

Although a clear separation of life value items for Power and Achievement reflects the distinctiveness of the two constructs, the moderate inter-correlation between these constructs ($r = .38$, $p < .001$) demonstrates some relatedness between them. The results therefore, support Schwartz’ (1994) comment that Power and Achievement life values are related but distinct from each other. Another moderate inter-correlation between Achievement and Self-Directed ($r = .32$, $p < .001$) also demonstrates some common aspects between these two life value constructs.

Schwartz’s (1994) life value of Conformity, on the other hand, was not replicated for both Australian and Chinese students. This factor was obtained for Australian students only, hence demonstrating a lack of cross-cultural invariance. Consequently, the impact of Conformity upon SPQ Surface Strategy could not be evaluated for the whole sample. However, the correlation between the weighted Conformity scale scores for the Australian sample and their Surface Strategy scores show a small but significant relationship between the two variables ($r = .14$, $p < .05$). Thus, Australian students who valued Conformity more, tended to report a slightly higher Surface Strategy.
Schwartz’s life value of Conformity was not replicated for Chinese students. The life value items of Honouring Elders and Politeness were not associated with the Conformity items of Obedience and Self-Discipline. Honouring Elders and Politeness loaded onto the Self-Directed factor for Chinese students. It may be argued that Honouring Elders and Politeness are values that have been deeply embedded within the culture and adopted by choice; a defining feature of the Self-Directed factor. The other two items, Obedience and Self-Discipline were not related to each other or to a factor relevant to life values.

4.27 Relative Importance of Dispositional Variables on Student Learning

The relative importance of the dispositional factors (Test Anxiety and Student Life Values) on student learning can be determined in terms of the magnitude and frequency of their effects on the SPQ learning scales. Multiple regression analyses established that the dispositional variables always added significant predictiveness to each SPQ scale. However, no single dispositional variable significantly improved predictiveness for all six SPQ scales. Anxiety, Achievement, and Self-Directed values influenced the greatest number of the SPQ scales with a magnitude of impact on any single scale in the same order as above. In addition, the dispositional variables exert different effects on the different SPQ scales.

4.28 Implications of the Study

Several implications arise from the results of the present study, most particularly in relation to the personal development of the learner and teaching
procedures. The results indicate that the learning strategy of test anxious students, particularly from soft disciplines, contrasts with Becher’s (1994) account of the demands of “soft” disciplines. The test anxious students were higher on Surface Motive, Surface Strategy, and Achieving Strategy. “Soft” disciplines tend to require a Deep Approach that focuses on understanding, interpreting, and presenting a coherent argument, while “hard” disciplines are more typically associated with Achieving Strategy and Surface Strategy. Hence, the mismatch between the learning strategies prompted by Test Anxiety and the demands of the discipline is less of an issue for students from “hard” disciplines than it is for students from “soft” disciplines. Difficulty will, therefore, arise for those “soft” discipline-related students who through their anxiety are inclined to adopt a surface learning strategy that focuses more on factual rather than conceptual information.

Attempting to establish a Deep Strategy in learning among test anxious students from “soft” disciplines can be challenging. However, another effective and possibly more achievable course of intervention is to boost students’ Achieving Strategy in order to attain good grades in their course of study. It is noted that Achieving Strategy is more likely for test anxious students. Effective study skills programs that teach efficient note taking, appropriate pacing of study behaviours and strategic cue-seeking, would help these “soft” discipline-related students become more organised, pragmatic and strategic in their learning.

Several implications can be drawn from the findings that the life value Self-Directed and Culture both influenced a deep learning approach. While personal involvement in task performance was considered to be responsible for the
association between Self-Directed and deep learning, the constructivist and mentoring teaching style experienced by the Chinese students was considered to largely explain these students' higher scores for deep learning. Results for Chinese students suggest therefore, that a constructivist and mentoring teaching style for Australian students will enhance deep strategy development. Students' learning can be closely monitored by means of regular consultation, guidance, and discussion as well as continuous assessment and feedback of their work. In addition, encouraging and assisting students to express their own views can create a non-threatening and supportive learning environment. Under such an interactive and supportive teaching-learning environment, students may feel more assured of their academic ability and prepared to adopt a deep learning strategy, when the learning task demands it, or when students wish to.

It is further suggested that students be permitted some freedom in choosing the topic or type of project through which their achievement of the learning outcomes can be pursued. By choosing their own topic or even the contents with which they wish to deal, students are able to connect their learning with their personal experiences and past knowledge. In this way, personal relevance and meaningfulness of their learning may be enhanced, thereby promoting Deep Motive among students who may otherwise be inclined towards surface learning.

Freedom in deciding on the topic and learning goals and close mentoring from the teacher are features commonly associated with post-graduate students and are not typical for undergraduates, owing to limited teaching resources. Nevertheless, the suggested teaching style warrants serious consideration especially where small classes occur.
4.29 Limitations of the Study and Further Research

Although the present research has produced some interesting and potentially useful findings, the effect of life values on student learning is limited to the student samples that were employed in the study and to Biggs’ conceptualisation of learning motives and strategies. No known past research has specifically investigated the relationships between life values and learning. Accordingly, future similar research will have to be carried out before the findings can be generalised to a wider population. In addition, despite the adequacy of the reliability coefficients for the three new Student Life Values, the reliabilities for Achievement and Power Life values in particular could be boosted to provide stronger measures of these constructs.

On balance, despite the above limitations, this study has further extended the findings of many past researchers (Biggs, 1987, 1990, 1992a, 1992b; Braxton, 1995; Choy & Delahaye, 2000; Hayes & Richardson, 1995; Kember & Gow, 1990; Li, 2002; Smith, Miller & Crassini, 1998) by demonstrating the direct as well as indirect influences of different independent variables on SPQ learning motives and strategies. The research has, therefore provided a richer understanding of the influences of dispositional and demographic variables on student learning.

4.30 Future Research Directions

The finding of substantial Culture effects on student learning provides scope for future research. While the socio-cultural variables of attribution style and teacher-student relations were offered as possible explanations for cultural effects
on Achieving Motive and Deep learning, future research to specifically investigate such relationships can be carried out to further substantiate those propositions. Attribution style and teacher-student relations can be measured quantitatively and their predictiveness for any of the SPQ learning motives and strategies can be evaluated. In addition, the finding that Schwartz's (1994) concept of conformity was identified only among Australian students, but not among Chinese students, suggests that further research can be carried out with a view to establishing a common set of attributes that will define the construct Conformity across these cultures.

Biggs (1987) identified specific learning behaviours that he considered to be indicative of surface, deep, or achieving learning strategy. However, those behaviours he identified are by no means exhaustive. It would be interesting, therefore, to further explore other specific learning behaviours that are not captured in the SPQ. Additional use of other measures such as the Learning Style Profile (Keefe, 1990) and Inventory of Learning Processes (Schmeck, Geisler-Brenstein & Cercy, 1991) provide an additional range of cognitive strategies (e.g., critical, evaluative and logical thinking, and long-term memory). These measures would provide a richer and more comprehensive understanding of how specific variables like Test Anxiety and Student Life Values affect student learning.

It was suggested earlier in the discussion that the exam-focused learning environment typical for Chinese students might explain their high scores on Achieving Strategy. Achieving Strategy (as defined by the SPQ) involves students being pragmatic and strategic by organising their study tasks and regulating and monitoring their understanding of the material learnt. It would be interesting to
explore other pragmatic and strategic learning behaviours that students might display, especially in an educational context where assessment is less heavily emphasised. This could be done through qualitative research.

4.3.1 Summary and Conclusions

In summary, Study Two indicates that the dispositional factors Test Anxiety and Student Life Values (Achievement, Power, and Self-Directed) do influence student learning. The most influential factors on student learning, in terms of effect size are: Test Anxiety, Culture, Age, Discipline Type, Achievement, Self-Directed, Power and Gender, in that order. However, in terms of the number of SPQ scales affected, the most influential factors are: Culture, Age, Discipline Type, Self-Directed, Test Anxiety, Achievement, Gender, and Power in that descending order.

Support for Biggs’ (1987) assumption of a motive-strategy congruence applies to Surface and Deep Approaches in learning, but not Achieving Approach. Secondary to the main aim of the research, the demographic variables Age, Culture, Discipline Type and Gender, influence student learning. These variables act as antecedents to the Student Life Values but not Test Anxiety. Culture has a notable effect on Power whereas Discipline Type notably influences Achievement.

To conclude, the multiple direct and indirect pathways by which different variables are associated with learning motives and strategies, demonstrate a complex and multi-factorial phenomenon of student learning. The same conclusion was drawn from the findings obtained in Study One. The next study
(Study Three) seeks to explore possible interactions between specific situational and dispositional variables on student learning.
Chapter Five

Influences of Situational and Dispositional Factors on Student Learning

5.1 Overview

In the Presage phase of his 3P model on student learning, Biggs (1987) proposed that both situational and dispositional variables can influence student learning. He did not, however, indicate the relative influence of these two variable types on learning. Additionally, no indication was given regarding the relative effects amongst situational variables or amongst dispositional variables on student learning. Furthermore, although interactions between situational and dispositional variables were illustrated in the 3P model, Biggs did not specify which situational and dispositional variables might interact to influence learning. Study Three seeks to further clarify the Presage phase of Biggs’ 3P model on student learning. Study Three will bring together the situational and dispositional variables that significantly influenced students’ learning in the previous studies reported in the thesis.

5.2 Relative Importance of Dispositional and Situational Variables on Student Learning

Study One found that, of the situational variables Assessment Type (Essay vs. Multiple-Choice) and Assessment Weighting (30% vs. 70%), only Assessment Weighting had a main effect on learning (effect size of .07). Students reported
higher Surface Strategy for a 70% exam than one worth 30% of the total mark for the subject. Study Two found that, of the dispositional variables Test Anxiety and three Student Life Values (Achievement, Power, and Self-Directed), Test Anxiety had the greatest impact on student learning, followed in order by the life values Achievement, Self-Directed, and Power.

Apart from the findings obtained in Study One and Study Two in the thesis, according to a search of available databases (e.g., Ebsco, Academic Search Elite, Ovid, InfoTrac, Current Contents, Eric, PsychInfo, Webspirs) no known studies appear to have ever investigated the effects of either Assessment Weighting (situational), Test Anxiety or life values (dispositional) on student’s learning motives and strategies. Predictions regarding the relative importance of situational and dispositional variable on student learning, therefore, will be based solely on the findings obtained thus far in this research.

The relative importance of situational vs. dispositional variables on student learning can be evaluated on the basis of only one SPQ scale (Surface Strategy). The reason is that only this scale displayed an effect from a situational variable. One way to estimate the relative impact of different variables on student learning is by their effect sizes. These are indexed for the dispositional variables Test Anxiety and Achievement life value by $sr^2$, whereas a partial eta squared value for Assessment Weighting provides the same information. The partial eta squared value indicated that Assessment Weighting accounted for only 5% of the variance in Surface Strategy scores. By contrast, the dispositional variables Test Anxiety and Achievement life value accounted for 20% and 13% of the variance in Surface Strategy scores, respectively. These dispositional variables can, therefore, be
expected to have greater influences on Surface Strategy in student learning than the situational variable. No other SPQ scale was affected by Assessment Weighting.

5.3 Dispositional Effects on Student Learning

In Study Two, Test Anxiety and the Student Life Values of Self-Directed, Achievement, and Power affected many aspects of student learning. The \( r^2 \) values indicated that Test Anxiety significantly influenced three SPQ scales, namely Surface Motive, Surface Strategy, and Achieving Strategy in that descending order of importance. Test Anxiety exerted a particularly strong impact on Surface Motive (21%). The Student Life Values of Self-Directed and Achievement also each significantly influenced three SPQ scales. Self-Directed affected Deep Motive, Deep Strategy and Achieving Motive, exerting an impact of 3% on the first two scales. The Student Life Value of Achievement significantly influenced Achieving Motive, Surface Motive, and Surface Strategy in that descending order of importance and had its strongest impact on Achieving Motive (5%). Finally, the Student Life Value of Power significantly influenced one SPQ scale, namely Achieving Motive, with an impact of 2% for that scale. Amongst all of the dispositional variables studied, Test Anxiety exerted the greatest influence on student learning, and then in turn the Student Life Values of Self-Directed, Achievement and Power. Study Three will also investigate whether the same order of relative influence by the dispositional variables on the relevant SPQ scales will be replicated.
5.4 Test Anxiety mediates the Effect of Assessment Weighting

In Study One, it was argued that students' higher Surface Strategy for a 70% exam may be attributable to greater test anxiety. A 70% value exam poses a higher risk of failing the complete subject than a 30% value exam, should students perform poorly. Thus, a 70% exam should accentuate test anxiety. Study Two findings showed that highly test anxious students scored high on Surface Strategy. It can be suggested, therefore, that Test Anxiety acted as a mediator for Assessment Weighting when the latter influenced SPQ Surface Strategy. This suggestion will be tested in the present study. Students preparing for a 70% exam (as opposed to a 30% exam) should report greater Test Anxiety and score higher on the Surface Strategy scale.

5.5 Interaction of Discipline Type x Gender x Assessment Weighting on Surface Strategy

Another finding of relevance from Study One was a three-way interaction (Assessment Weighting x Discipline Type x Gender) on Surface Strategy (effect size of 6.1%). The Surface Strategy scores for female Business students increased significantly as Assessment Weighting increased from 30% to 70%, unlike the Surface Strategy scores for the other three student groups (male Business, female Psychology, and male Psychology students).

The effect of discipline type on student learning derived from Studies One and Two indicated that students from "hard" disciplines (e.g., Business, Engineering) scored higher on Surface Strategy than did students from "soft" disciplines (e.g., Psychology, Education, Social Science and Languages). These
findings match those obtained by many past researchers (Biggs, 1987; Becher, 1994; Entwistle & Ramsden, 1983; Hayes & Richardson, 1995; Neumann, 2001; Ramsden, 1992, 1997; Watkins, 1982). The evidence also supports Becher’s (1994) argument that in “hard” disciplines, the subject content and teaching objectives of the discipline encourage students to adopt a surface learning strategy.

Thomas (1988, 1990) noted that where females represent a minority of students in a ‘hard’ discipline, they felt threatened and less confident of their ability to cope. Moreover, there is evidence that under-confident students who fear failure will adopt a Surface Strategy that limits learning to the content and objectives set by the syllabus or instructor (Biggs, 1987; Entwistle, 1988; Fransson, 1977; Smith, Miller, & Crassini, 1998). Confining one’s learning in this way can result in greater clarity and confidence for students than would otherwise be the case. Accordingly, it can be argued that female students preparing for a 70% exam in a hard discipline (in which they are a minority) are likely to experience high test anxiety, and are most likely to adopt a Surface Strategy. Study Three seeks to replicate the three-way interaction effect on Surface Strategy with a different sample.

5.6 Robustness of Student Life Values

Three psychometrically adequate Student Life Values (Self-Directed, Achievement, and Power) were obtained in Study Two. These values were derived from Schwartz’s (1994) original general life values and represent common life values held by two culturally different student groups (Australian and Chinese university students). Given that these life values are modifications of Schwartz’s
general life values and have not been identified in previous research, it is necessary to determine the robustness of the scales. Study Three will determine the reliabilities of the three scales using a new student sample that consists only of Australian university students.

The aims of the study, therefore, are as follows. The first aim is to evaluate the relative importance on Surface Strategy exerted by the situational variable Assessment Weighting, and the dispositional variables Test Anxiety and the Student Life Value Achievement. The second aim is to examine the order of relative influence amongst the dispositional variables on the SPQ scales that manifested effects in Study Two. The third aim is to investigate whether the Assessment Weighting effect on Surface Strategy is mediated by Test Anxiety. The fourth aim is to investigate the interaction effect on Surface Strategy of Assessment Weighting x Discipline Type x Gender. The final aim is to investigate the invariance of psychometric properties of the three Student Life Value scales.

The hypotheses for Study Three are as follows:

1. The dispositional variables of Test Anxiety and the Student Life Value of Achievement will both exert greater influences on SPQ Surface Strategy than will the situational variable of Assessment Weighting.

2. In a descending order of importance for student learning, Test Anxiety and Student Life Values of Self-Directed, Achievement, and Power will influence the following SPQ scales. Test Anxiety will influence Surface Motive, Surface Strategy, and Achieving Strategy; Self-Directed will influence Deep Motive, Deep Strategy and Achieving Motive; Achievement will influence Achieving
Motive, Surface Motive, and Surface Strategy; and finally, Power will
influence Achieving Motive.

3. Test Anxiety will mediate an Assessment Weighting effect on SPQ Surface
Strategy.

4. Female students from “hard” disciplines when studying for a 70% value exam
will score higher on Surface Strategy than other student groups studying for a
70% value exam or 30% value exam.

5. The reliabilities of the Student Life Values (Achievement, Power, and Self-
Directed) will yield acceptable values for research scales, greater than .60.

Method

5.7 Participants

A sample consisting of 183 second and third year Australian students (mean
age = 23.10, SD = 5.11) from Deakin University in the State of Victoria,
participated voluntarily in this study. To represent the “hard” disciplines, 65
students were drawn from the schools of Economics, Computing and Accounting.
It is acknowledged that Biglan (1973) classified Accounting as a “soft” discipline.
In this thesis, though, Becher’s (1994) classification system has been used, where
Accounting is classified as “hard”. To represent the “soft” disciplines, 118
students were drawn from the schools of Education and Psychology. A frequency
distribution of the sample by Gender and Discipline is shown in Table 5.1.
Table 5.1. Frequency distribution of participants classified by Gender and Discipline.

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Gender</th>
<th>Sub-total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>&quot;Hard&quot; (Accounting</td>
<td>49</td>
<td>16</td>
</tr>
<tr>
<td>Computing Economics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Soft&quot; (Education</td>
<td>23</td>
<td>95</td>
</tr>
<tr>
<td>Psychology)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>111</td>
</tr>
</tbody>
</table>

5.8 Materials

The materials used in this study consisted of a demographic questionnaire, Spielberger’s (1980) Test Anxiety Inventory (TAI), Biggs’ (1987) Study Process Questionnaire (SPQ), and the Student Life Value scale (Self-Directed, Achievement, and Power) derived from Schwartz’s (1992) Life Value Scale. Apart from a slight variation in instructions for the SPQ, this questionnaire together with the TAI are identical to those used and described in Studies One and Two, respectively. In the present study, participants responded to the SPQ in terms of how they approached their studies as they prepared for a hypothetical exam that was worth either 70% or 30% of the total mark for the subject studied. The type of exam was not mentioned. A description of the Student Life Value scales that were established in Study Two follows.
5.9 Student Life Value Scales

The Student Life Value scales Self-Directed, Achievement and Power were derived from combinations of different extraction methods (Principal Components and Maximum Likelihood) and rotations (Varimax and Oblique) on the data from both Australian and Chinese students, and are represented by factor weighted scores. The data was collected in Study Two and consisted of student ratings (on a five-point Likert scale), on the importance of 20 specific life values (Schwartz, 1994) as guiding principles in their everyday lives. Factorial validity for the three Student Life Value remained invariant across the two cultures (see Appendix E). The Self-Directed scale (reliability coefficient of .72) is measured by items associated with choosing one’s own goals, freedom, capability and independence. The Achievement scale (reliability coefficient of .59) is measured by items associated with success, wealth, influence and ambition. The Power scale (reliability coefficient of .63) is measured by items associated with public image, social recognition and power. A total of 11 items are contained the Student Life Value scale.

5.10 Procedure

Written permission to carry out this study was sought from Deakin University Ethics Committee. Upon approval (Appendix A3), permission to approach students for volunteers to participate in this study was obtained from individual staff members in the faculties of Science and Computing, Commerce and Accounting, Education and Health and Behavioural Sciences. Arrangements
were made with staff members for testing to be carried out either at the beginning or at the end of lectures.

At a prearranged time, students were approached and invited to participate in answering the questionnaire. First the plain language statements (Appendix C3) were distributed to the participants. The questionnaires were then distributed to the participants who took approximately 20-25 minutes to complete them. Upon completion, the questionnaires were collected and debriefing statements given to participants. Participants were treated in accordance with the ethical standards of the National Statement on Ethical Conduct in Research Involving Humans (1999).

Results

5.11 Overview

The data collected from 183 participants were analysed using the Statistical Package for Social Science (SPSS for Windows, Version 11). The following procedures were carried out. Data screening was conducted for missing values, out of range data, and possible violation of assumptions underlying multiple regression (Tabachnick & Fidell, 2001). Six separate hierarchical multiple regression analyses were conducted to predict each of the student learning motives and strategies from the independent situational variable of Assessment Weighting (30% vs. 70%), and the independent dispositional variables of Test Anxiety, and Student Life Values (Self-Directed, Achievement, and Power). In addition, a
further hierarchical multiple regression analysis was conducted to investigate a Weighting x Discipline x Gender interaction for Surface Strategy. Finally, a hierarchical multiple regression analysis was conducted to investigate Test Anxiety as a mediator of an Assessment Weighting effect on Surface Strategy.

5.12 Descriptive Statistics

The means, standard deviations, and reliabilities for each scale computed from unweighted scores are shown in Table 5.2 below.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Scale Range</th>
<th>M</th>
<th>SD</th>
<th>Reliability coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Anxiety</td>
<td>20-80</td>
<td>41.97</td>
<td>13.55</td>
<td>.95</td>
</tr>
<tr>
<td>Student Life Values</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Directed</td>
<td>4-28</td>
<td>22.19</td>
<td>3.74</td>
<td>.78</td>
</tr>
<tr>
<td>Achievement</td>
<td>4-28</td>
<td>13.23</td>
<td>2.65</td>
<td>.52</td>
</tr>
<tr>
<td>Power</td>
<td>3-21</td>
<td>11.56</td>
<td>2.89</td>
<td>.59</td>
</tr>
<tr>
<td>SPQ scales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface Motive</td>
<td>7-35</td>
<td>22.31</td>
<td>5.11</td>
<td>.62</td>
</tr>
<tr>
<td>Surface Strategy</td>
<td>7-35</td>
<td>19.33</td>
<td>3.88</td>
<td>.49</td>
</tr>
<tr>
<td>Deep Motive</td>
<td>7-35</td>
<td>19.40</td>
<td>4.93</td>
<td>.75</td>
</tr>
<tr>
<td>Deep Strategy</td>
<td>7-35</td>
<td>19.67</td>
<td>4.52</td>
<td>.75</td>
</tr>
<tr>
<td>Achieving Motive</td>
<td>7-35</td>
<td>19.83</td>
<td>5.38</td>
<td>.76</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>7-35</td>
<td>16.25</td>
<td>5.42</td>
<td>.78</td>
</tr>
</tbody>
</table>

*Note: N = 183.*

Overall, the means and standard deviations of the Anxiety scale are comparable to those obtained for the same scale in Study Two and those reported by Spielberger (1970) as cited in Study Two. Apart for Achievement, the means and standard deviations of the unweighted Student Life Value scales of Self-
Directed and Power are comparable to those reported in Study Two. The mean for Achievement life value is substantially lower and the scores less variable in Study Three than those reported in Study Two (Mean = 18.23; SD = 3.75). Finally, the summary values for the SPQ scales are comparable to those reported in Studies One and Two, and reported by Biggs (1987).

The reliability for the Student Life Value Achievement, although considered fair (Corcoran & Fischer, 1987) is somewhat lower than desirable and lower than that reported in Study Two (alpha coefficient of .59). Also, the reliability of Surface Strategy is relatively low in comparison to that obtained for the combined Australian and Chinese student sample in Study Two (alpha coefficient of .62), the Australian sample in Study One (alpha coefficient of .56), and Biggs’ Australian sample (alpha coefficient value of .66).

5.13 Hierarchical Multiple Regression

Six hierarchical multiple regressions were conducted to predict each SPQ scale. Tests of the various assumptions underlying the use of multiple regression analysis ensured that the assumptions were not violated (Tabachnick & Fidell, 2001). Data from all 183 participants were used without alteration in the analyses. Table 5.3. presents the inter-correlations between the variables used in the analyses. Similar to Study Two, moderate inter-correlations between Achievement, Power, and Self-Directed are reported in the present study; however the three Student Life Values can be considered as separate constructs.
Table 5.3. Inter-correlations between variables used in the Multiple Regression Analyses.

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
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<td></td>
</tr>
<tr>
<td>2. Gender</td>
<td>.17*</td>
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<td></td>
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</tr>
<tr>
<td>3. Discipline Type</td>
<td>.19**</td>
<td>.55***</td>
<td>--</td>
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<tr>
<td>4. Anxiety</td>
<td>.08</td>
<td>.11</td>
<td>.02</td>
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<tr>
<td>5. Surface Motive</td>
<td>-.05</td>
<td>.05</td>
<td>-.05</td>
<td>.42***</td>
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<td></td>
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<tr>
<td>6. Deep Motive</td>
<td>.18*</td>
<td>.01</td>
<td>-.12</td>
<td>.00</td>
<td>.04</td>
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<tr>
<td>7. Achieving Motive</td>
<td>-.08</td>
<td>-.17*</td>
<td>-.41***</td>
<td>.03</td>
<td>.28***</td>
<td>.35***</td>
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<tr>
<td>8. Surface Strategy</td>
<td>-.11</td>
<td>.00</td>
<td>-.12</td>
<td>.22**</td>
<td>.39***</td>
<td>.01</td>
<td>.28***</td>
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<td></td>
</tr>
<tr>
<td>9. Deep Strategy</td>
<td>.23**</td>
<td>.04</td>
<td>-.02</td>
<td>.05</td>
<td>.10</td>
<td>.68***</td>
<td>.35***</td>
<td>.01</td>
<td>--</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10. Achieving Strategy</td>
<td>.10</td>
<td>.04</td>
<td>-.16*</td>
<td>.13</td>
<td>.19**</td>
<td>.41***</td>
<td>.44***</td>
<td>.16*</td>
<td>.52***</td>
<td>--</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>11. Self-Directed</td>
<td>.07</td>
<td>.12</td>
<td>-.06</td>
<td>-.02</td>
<td>.13</td>
<td>.29***</td>
<td>.13</td>
<td>.01</td>
<td>.23**</td>
<td>.12</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Achievement</td>
<td>-.15*</td>
<td>-.08</td>
<td>-.29**</td>
<td>.04</td>
<td>.15*</td>
<td>.11</td>
<td>.39***</td>
<td>.22**</td>
<td>-.02</td>
<td>.15*</td>
<td>.38***</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>13. Power</td>
<td>-.16*</td>
<td>.04</td>
<td>-.11</td>
<td>.05</td>
<td>.23**</td>
<td>-.01</td>
<td>.25***</td>
<td>.24**</td>
<td>-.01</td>
<td>.06</td>
<td>.28***</td>
<td>.581***</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>14. Weighting</td>
<td>.01</td>
<td>.08</td>
<td>.03</td>
<td>.01</td>
<td>.11</td>
<td>.01</td>
<td>.03</td>
<td>.07</td>
<td>.08</td>
<td>.04</td>
<td>.04</td>
<td>.08</td>
<td>.09</td>
<td>--</td>
</tr>
</tbody>
</table>

*Note. N = 183, * p < .05, ** p < .01, *** p < .001
5.13.1 Factors predicting Learning Motives and Learning Strategies.

Six hierarchical multiple regressions were conducted, each with the demographic variables (Gender, Age, and Discipline Type) entered at Step 1 to control for their effects. Assessment Weighting, TAI Anxiety, and the three Student Life Value scales (Achievement, Self-Directed, and Power) were entered in Step 2. Following Study Two, the factor weighted scores for the Student Life Value scales were used in the analyses. The dependent variables for the multiple regressions were the six SPQ scales. Results of the six separate hierarchical multiple regressions are summarised and described below.

Table 5.4. Summary of hierarchical regression analysis for variables to predict SPQ Surface Motive.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r^a$</th>
<th>Beta$^b$</th>
<th>SR$^c$</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender$^d$</td>
<td>.05</td>
<td>.12</td>
<td>.01</td>
<td>1.82</td>
<td>1,179</td>
</tr>
<tr>
<td>Age</td>
<td>-.05</td>
<td>-.04</td>
<td>.00</td>
<td>.34</td>
<td>1,179</td>
</tr>
<tr>
<td>DiscType$^e$</td>
<td>-.05</td>
<td>-.11</td>
<td>.01</td>
<td>1.49</td>
<td>1,179</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighting</td>
<td>.11</td>
<td>.09</td>
<td>.01</td>
<td>1.86</td>
<td>1,174</td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.42</td>
<td>.41</td>
<td>.17</td>
<td>37.77**</td>
<td>1,174</td>
</tr>
<tr>
<td>Achievement</td>
<td>.15</td>
<td>-.04</td>
<td>.00</td>
<td>.16</td>
<td>1,174</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.13</td>
<td>.09</td>
<td>.01</td>
<td>1.65</td>
<td>1,174</td>
</tr>
<tr>
<td>Power</td>
<td>.23</td>
<td>.18</td>
<td>.02</td>
<td>4.76*</td>
<td>1,174</td>
</tr>
</tbody>
</table>

*Note. TAI - Trait Anxiety Inventory
$^a$ Zero-order correlation between measure and Surface Motive score.
$^b$ Standardised regression co-efficient
$^c$ Unique variance contributed to the prediction of Surface Motive at point of entry.
$^d$ 1 = males, 2 = females
$^e$ 1 = "hard" discipline, 2 = "soft" discipline.
*$p < .05; **p < .01; ***p < .001.$
For Surface Motive, the variables Gender, Age and Discipline Type entered at Step 1 were not significant predictors: $R^2 = .014$, $F(3, 174) = .844$, $p > .05$. Entry of Assessment Weighting, Anxiety, and the Student Life Value scales at Step 2 significantly increased the amount of explained variance in Surface Motive scores by 22%: $R^2$ change = .222, $F(5, 174) = 10.092$, $p < .001$. Anxiety and Power were significant unique predictors: greater levels of Anxiety and Power were related to higher scores for Surface Motive. Overall, 24% of the variance in Surface Motive scores was explained by this linear regression model and the entire model was significant: $R^2 = .236$, $F(8, 174) = 6.704$, $p < .001$.

Table 5.5. Summary of hierarchical regression analysis for variables to predict SPQ Surface Strategy.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r^a$</th>
<th>Beta$^b$</th>
<th>Sr$^c$</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender$^d$</td>
<td>.00</td>
<td>.10</td>
<td>.01</td>
<td>1.38</td>
<td>1, 179</td>
</tr>
<tr>
<td>Age</td>
<td>-.11</td>
<td>-.09</td>
<td>.01</td>
<td>1.52</td>
<td>1, 179</td>
</tr>
<tr>
<td>DiscType$^e$</td>
<td>-.12</td>
<td>-.16</td>
<td>.02</td>
<td>3.05</td>
<td>1, 179</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighting</td>
<td>.07</td>
<td>.05</td>
<td>.00</td>
<td>.39</td>
<td>1, 174</td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.22</td>
<td>.20</td>
<td>.04</td>
<td>7.96**</td>
<td>1, 174</td>
</tr>
<tr>
<td>Achievement</td>
<td>.22</td>
<td>.12</td>
<td>.01</td>
<td>1.63</td>
<td>1, 174</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.01</td>
<td>-.08</td>
<td>.01</td>
<td>1.06</td>
<td>1, 174</td>
</tr>
<tr>
<td>Power</td>
<td>.24</td>
<td>.15</td>
<td>.02</td>
<td>2.89</td>
<td>1, 174</td>
</tr>
</tbody>
</table>

*Note*. TAI - Trait Anxiety Inventory

$^a$ Zero-order correlation between measure and Surface Strategy score.

$^b$ Standardised regression co-efficient

$^c$ Unique variance contributed to the prediction of Surface Strategy at point of entry.

$^d$ 1 = males, 2 = females

$^e$ 1 = "hard" discipline, 2 = "soft" discipline.

*p < .05; **p < .01; ***p < .001.
For Surface Strategy, the variables Gender, Age, and Discipline Type entered at Step 1 were not significant predictors. $R^2 = .028$, $F(3, 179) = 1.720$, $p > .05$. Entry of Assessment Weighting, Anxiety, and the Student Life Value scales at Step 2 significantly increased the amount of explained variance in Surface Strategy scores by 9.7%: $R^2$ change = .097, $F(5, 174) = 3.864$, $p < .01$. Anxiety was a significant unique predictor with greater Anxiety being related to a higher score for Surface Strategy. Overall, 13% of the variance in Surface Strategy scores was explained by this linear regression model and the entire model was significant: $R^2 = .125$, $F(8, 174) = 3.112$, $p < .01$.

Table 5.6. Summary of hierarchical regression analysis for variables to predict SPQ Deep Motive.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r^2$</th>
<th>Beta$^b$</th>
<th>Sr$^c$</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender$^d$</td>
<td>.01</td>
<td>.09</td>
<td>.01</td>
<td>.98</td>
<td>1, 179</td>
</tr>
<tr>
<td>Age</td>
<td>.18</td>
<td>.20</td>
<td>.04</td>
<td>7.39**</td>
<td>1, 179</td>
</tr>
<tr>
<td>DiscType$^e$</td>
<td>-.12</td>
<td>.21</td>
<td>.03</td>
<td>5.77*</td>
<td>1, 179</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighting</td>
<td>.01</td>
<td>.01</td>
<td>.00</td>
<td>.01</td>
<td>1, 174</td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.00</td>
<td>-.00</td>
<td>.00</td>
<td>.00</td>
<td>1, 174</td>
</tr>
<tr>
<td>Achievement</td>
<td>.11</td>
<td>.05</td>
<td>.00</td>
<td>.24</td>
<td>1, 174</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.29</td>
<td>.27</td>
<td>.06</td>
<td>11.99***</td>
<td>1, 174</td>
</tr>
<tr>
<td>Power</td>
<td>-.01</td>
<td>-.11</td>
<td>.01</td>
<td>1.44</td>
<td>1, 174</td>
</tr>
</tbody>
</table>

Note. TAI - Trait Anxiety Inventory

$^a$ Zero-order correlation between measure and Deep Motive score.

$^b$ Standardised regression co-efficient

$^c$ Unique variance contributed to the prediction of Deep Motive at point of entry.

$^d$ 1 = males, 2 = females

$^e$ 1 = "hard" discipline, 2 = "soft" discipline.

*p < .05; **p < .01; ***p < .001.
For Deep Motive, the variables Gender, Age, and Discipline Type entered at Step 1 significantly explained 6.2% of the variance in Deep Motive scores: $R^2 = .062$, $F(3, 179) = 3.921$, $p < .01$. Age and Discipline Type were significant unique predictors: older students and those from “soft” disciplines had higher Deep Motive scores. Entry of Assessment Weighting, Anxiety, and the Student Life Value scales at Step 2 significantly increased the amount of explained variance in Deep Motive scores by 7.2%: $R^2$ change $= .072$, $F(5, 174) = 2.897$, $p < .05$. Self-Directed was a significant unique predictor with higher Self-Directed scores being related to higher scores for Deep Motive. Overall, 13% of the variance in Deep Motive scores was explained by this linear regression model and the entire model was significant: $R^2 = .134$, $F(8, 174) = 3.359$, $p < .001$. 
Table 5.7. Summary of hierarchical regression analysis for variables to predict SPQ Deep Strategy.

<table>
<thead>
<tr>
<th>Variable</th>
<th>r^a</th>
<th>Beta^b</th>
<th>Sr^c</th>
<th>F</th>
<th>df^d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender^d</td>
<td>.04</td>
<td>.05</td>
<td>.00</td>
<td>.30</td>
<td>1, 179</td>
</tr>
<tr>
<td>Age</td>
<td>.23</td>
<td>.24</td>
<td>.05</td>
<td>10.19**</td>
<td>1, 179</td>
</tr>
<tr>
<td>DiscType^e</td>
<td>-.02</td>
<td>.09</td>
<td>.01</td>
<td>1.14</td>
<td>1, 179</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighting</td>
<td>.08</td>
<td>.08</td>
<td>.01</td>
<td>1.29</td>
<td>1, 174</td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.05</td>
<td>.04</td>
<td>.00</td>
<td>.34</td>
<td>1, 174</td>
</tr>
<tr>
<td>Achievement</td>
<td>-.06</td>
<td>-.11</td>
<td>.01</td>
<td>1.31</td>
<td>1, 174</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.23</td>
<td>.26</td>
<td>.05</td>
<td>10.36**</td>
<td>1, 174</td>
</tr>
<tr>
<td>Power</td>
<td>-.01</td>
<td>-.01</td>
<td>.00</td>
<td>.00</td>
<td>1, 174</td>
</tr>
</tbody>
</table>

Note. TAI - Trait Anxiety Inventory

^a Zero-order correlation between measure and Deep Strategy score.

^b Standardised regression co-efficient

^c Unique variance contributed to the prediction of Deep Strategy at point of entry.

^d 1 = males, 2 = females

^e 1 = "hard" discipline, 2 = "soft" discipline.

*p < .05; **p < .01; ***p < .001.

For Deep Strategy, the variables Gender, Age, and Discipline Type entered at Step 1 significantly explained 5.8% of the variance in Deep Strategy scores: $R^2 = .058$, $F(3, 179) = 3.648$, $p < .01$. Age was a significant unique predictor: Older students had higher Deep Strategy scores. Entry of Assessment Weighting, Anxiety, and the Student Life Value scales at Step 2 significantly increased the amount of explained variance in Deep Strategy scores by 6.0%: $R^2$ change = .060, $F(5, 174) = 2.358$, $p < .05$. Self-Directed was a significant unique predictor with higher Self-Directed scores being related to higher scores for Deep Strategy. Overall, 12 % of the variance in Deep Strategy scores was explained by
this linear regression model and the entire model was significant: $R^2 = .117$, $F(8, 174) = 2.894$, $p < .01$.

Table 5.8. Summary of hierarchical regression analysis for variables to predict SPQ Achieving Motive.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r^a$</th>
<th>Beta$b$</th>
<th>Sr$c$</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender$d$</td>
<td>-.17</td>
<td>.08</td>
<td>.00</td>
<td>.88</td>
<td>1, 179</td>
</tr>
<tr>
<td>Age</td>
<td>-.08</td>
<td>-.00</td>
<td>.00</td>
<td>.00</td>
<td>1, 179</td>
</tr>
<tr>
<td>DiscType$e$</td>
<td>-.41</td>
<td>-.45</td>
<td>.14</td>
<td>30.55$^{***}$</td>
<td>1, 179</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighting</td>
<td>.03</td>
<td>.01</td>
<td>.00</td>
<td>.03</td>
<td>1, 174</td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.03</td>
<td>.01</td>
<td>.00</td>
<td>.03</td>
<td>1, 174</td>
</tr>
<tr>
<td>Achievement</td>
<td>.39</td>
<td>.27</td>
<td>.04</td>
<td>9.18$^{**}$</td>
<td>1, 174</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.13</td>
<td>-.01</td>
<td>.00</td>
<td>.03</td>
<td>1, 174</td>
</tr>
<tr>
<td>Power</td>
<td>.25</td>
<td>.07</td>
<td>.00</td>
<td>.65</td>
<td>1, 174</td>
</tr>
</tbody>
</table>

*Note. TAI - Trait Anxiety Inventory*

- $a$ Zero-order correlation between measure and Achieving Motive score.
- $b$ Standardised regression co-efficient
- $c$ Unique variance contributed to the prediction of Achieving Motive at point of entry.
- $d$ 1 = males, 2 = females
- $e$ 1 = "hard" discipline, 2 = "soft" discipline.
- $^{*}p < .05; ^{**}p < .01; ^{***}p < .001.$

For Achieving Motive, the variables Gender, Age, and Discipline Type entered at Step 1 significantly explained 17.3% of the variance in Achieving Motive scores: $R^2 = .173$, $F(3, 179) = 12.449$, $p < .001$. Discipline Type was a significant unique predictor with students in "hard" disciplines scoring higher on Achieving Motive. Entry of Assessment Weighting, Anxiety, and the Student Life Value scales at Step 2 significantly increased the amount of explained variance in
Achieving Motive scores by 8.3%: $R^2$ change = .083, $F(5, 174) = 3.904$, $p < .01$. The Student Life Value of Achievement was a significant unique predictor with higher Achievement scores being associated with higher scores for Achieving Motive. Overall, 26% of the variance in Achieving Motive scores was explained by this linear regression model and the entire model was significant: $R^2 = .256$, $F(8, 174) = 7.487$, $p < .001$.

Table 5.9. Summary of hierarchical regression analysis for variables to predict SPQ Achieving Strategy.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r^a$</th>
<th>Beta$^b$</th>
<th>$R^2c$</th>
<th>F</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender$^d$</td>
<td>.02</td>
<td>.16</td>
<td>.02</td>
<td>3.53</td>
<td>1, 179</td>
</tr>
<tr>
<td>Age</td>
<td>.01</td>
<td>.12</td>
<td>.01</td>
<td>2.61</td>
<td>1, 179</td>
</tr>
<tr>
<td>DiscType$^e$</td>
<td>.05</td>
<td>-.27</td>
<td>.05</td>
<td>9.81**</td>
<td>1, 179</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weighting</td>
<td>.00</td>
<td>.03</td>
<td>.00</td>
<td>.16</td>
<td>1, 174</td>
</tr>
<tr>
<td>TAI Anxiety</td>
<td>.01</td>
<td>.11</td>
<td>.01</td>
<td>2.11</td>
<td>1, 174</td>
</tr>
<tr>
<td>Achievement</td>
<td>.01</td>
<td>.10</td>
<td>.01</td>
<td>1.16</td>
<td>1, 174</td>
</tr>
<tr>
<td>Self-Directed</td>
<td>.00</td>
<td>.05</td>
<td>.00</td>
<td>.43</td>
<td>1, 174</td>
</tr>
<tr>
<td>Power</td>
<td>.00</td>
<td>-.03</td>
<td>.00</td>
<td>.13</td>
<td>1, 174</td>
</tr>
</tbody>
</table>

Note. TAI - Trait Anxiety Inventory

$^a$ Zero-order correlation between measure and Achieving Strategy score.

$^b$ Standardised regression co-efficient

$^c$ Unique variance contributed to the prediction of Achieving Strategy at point of entry.

$^d$ 1 = males, 2 = females

$^e$ 1 = "hard" discipline, 2 = "soft" discipline.

*p < .05; **p < .01; ***p < .001.

For Achieving Strategy, the variables Gender, Age, and Discipline Type entered at Step 1 significantly explained 6.1% of the variance in Achieving
Strategy scores: $R^2 = .061$, $F(3, 179) = 3.866$, $p < .01$. Discipline Type was a significant unique predictor with students in "hard" disciplines scoring higher on Achieving Strategy. Entry of Assessment Weighting, Anxiety, and Student Life Value scales at Step 2 were not significant predictors for Achieving Strategy: $R^2$ change $= .025$, $F(5, 174) = .962$, $p > .05$. Overall, 9% of the variance in Achieving Strategy scores was explained by this linear regression model and the entire model was significant: $R^2 = .086$, $F(8, 174) = 2.049$, $p < .05$.

5.14 Test Anxiety a Mediator of Assessment Weighting

According to Baron and Kenny (1986), in order to establish mediation the independent variable (Assessment Weighting) must have significant effects on both the mediator (Test Anxiety) and the dependent variable (Surface Strategy). The mediator (Test Anxiety) must also significantly influence the dependent variable Surface Strategy. The independent variable (Assessment Weighting) did not significantly influence Surface Strategy in this study whereas the mediator did. Although the necessary conditions to establish mediation were already lacking, the relationship between independent variable and mediator was assessed for the sake of completeness.

A standard multiple regression was carried out with all independent variables entered at Step 1 to predict Test Anxiety. Assessment Weighting did not significantly and uniquely predict Test Anxiety. Overall, only 2.7% of the variance in Text Anxiety scores was explained by this linear regression model and the entire model was not significant: $R^2 = .027$, $F (7, 182) = .690$, $p > .05$. 
5.15 Three-way interaction effect of Weighting x Gender x Discipline Type on Surface Strategy

The interaction effect of Assessment Weighting (30% vs 70%) x Gender x Discipline Type on SPQ Surface Strategy was next evaluated. The mean and standard deviation scores on SPQ Surface Strategy for each student subgroup are shown below in Table 5.10. The table permits a comparison of values across student groups.

Table 5.10. Means and standard deviations of SPQ Surface Strategy for student groups by Gender, Discipline, and Assessment Weighting.

<table>
<thead>
<tr>
<th>Student subgroup</th>
<th>Assessment Weighting</th>
<th>N</th>
<th>Scale Range</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>FH</td>
<td>70%</td>
<td>10</td>
<td>7-35</td>
<td>20.70</td>
<td>3.95</td>
</tr>
<tr>
<td>FH</td>
<td>30%</td>
<td>6</td>
<td>7-35</td>
<td>21.33</td>
<td>3.61</td>
</tr>
<tr>
<td>MH</td>
<td>70%</td>
<td>19</td>
<td>7-35</td>
<td>20.00</td>
<td>3.87</td>
</tr>
<tr>
<td>MH</td>
<td>30%</td>
<td>30</td>
<td>7-35</td>
<td>19.37</td>
<td>3.75</td>
</tr>
<tr>
<td>FS</td>
<td>70%</td>
<td>45</td>
<td>7-35</td>
<td>19.20</td>
<td>4.07</td>
</tr>
<tr>
<td>FS</td>
<td>30%</td>
<td>50</td>
<td>7-35</td>
<td>18.96</td>
<td>3.78</td>
</tr>
<tr>
<td>MS</td>
<td>70%</td>
<td>11</td>
<td>7-35</td>
<td>19.64</td>
<td>4.43</td>
</tr>
<tr>
<td>MS</td>
<td>30%</td>
<td>12</td>
<td>7-35</td>
<td>17.83</td>
<td>3.69</td>
</tr>
</tbody>
</table>

*Note.* FH = females in “hard” disciplines, MH = males in “hard” disciplines, FS = females in “soft” disciplines, MS = males in “soft” disciplines.

Overall, the means and standard deviations for Surface Strategy for the different students groups are comparable to each other. Group size, however, varies greatly from only six participants (FH 30%) to as many as 50 participants (FS 30%).
Given that all three variables in the interaction were dichotomous, the analysis was conducted by multiple regression using a set of dummy-coded variables to represent each possible combination of Gender, Discipline Type, and Assessment Weighting conditions. The analysis is essentially identical to the 3-way ANOVA conducted in Study 1 (Cohen & Cohen, 1975) and is used because the student group that differed in Study One, (i.e., FH 70%) can directly be evaluated against other student groups. Eight new dummy variables were created to represent membership of each mutually exclusive category formed by a combination of the three independent variables. One example is females from ‘hard’ disciplines who received a 70% Assessment Weighting scenario (FH 70%) for reporting their learning approach on the SPQ. This category was selected as the contrast group against which other categories were compared because the group differed significantly from other groups on Surface Strategy in Study One. The variables Gender, Age, and Discipline Type entered at Step 1 were not significant predictors of the SPQ Surface Strategy: \( R^2 = .028, F(3, 174) = 1.720, p > .05 \). Entry of the dummy variables at Step 2, were not significant: \( R^2 \) change = .012, \( F(5, 174) = .450, p > .05 \). No significant differences in Surface Strategy scores were obtained between the contrast category and any other categories. Overall, only 4% of the variance in Surface Strategy scores was explained by this linear regression model and the entire model was not significant: \( R^2 = .040, F(8, 174) = .917, p > .05 \).
Discussion

Overall, results indicated that dispositional variables exerted a stronger effect on student learning than did situational variables, as expected. The order of relative influence exerted by the dispositional variables was replicated from Study Two. Likewise the significant and strong effects exerted by Test Anxiety and Student Life Values of Self-Directed and Achievement on various learning motives and strategies were replicated from Study Two. However the significant but weaker effects in Study Two exerted by Test Anxiety and Student Life Values on learning motives and strategies were not replicated. The hypothesis that Test Anxiety would mediate the effect of Assessment Weighting on Surface Strategy was not supported. Also not supported was the hypothesis for an interaction effect of Assessment Weighting x Discipline Type x Gender on Surface Strategy. Finally, the reliability coefficients for the Student Life Values of Self-Directed, Achievement, and Power yielded acceptable values, demonstrating reasonable robustness for these scales.

5.16 Relative Influence of Dispositional and Situational Variables on Student Learning.

In this study, the situational variable Assessment Weighting did not significantly influence Surface Strategy in learning, but the dispositional variable of Test Anxiety exerted a significant effect. A main effect of Assessment Weighting on Surface Strategy (obtained in Study One) was not replicated, indicating that the effect may be tenuous. It is noted that the effect size of Assessment Weighting obtained in Study One was small (partial eta squared 5%).
As previously mentioned, no other studies appear to have investigated the effects of Assessment Weighting on student learning. Hence the evidence remains uncertain on whether Assessment Weighting would generally exert a small effect on Surface Strategy.

Another possibility for the inconsistent results between Study One and Study Three might be a difference in sample composition between the two studies. In Study One, students from "hard" disciplines comprised Computing and Economics students whereas in Study Three, students from "hard" disciplines comprised Computing, Economics, and Accounting students. To explore this possibility, further investigation into the effects of Assessment Weighting on Surface Strategy for students from "hard" and "soft" disciplines in Studies One and Three was carried out. The groups of students from "hard" and "soft" disciplines were evaluated separately for an Assessment Weighting effect, first for Study One and then for Study Three. Thus four separate t-tests were conducted.

Results showed a significant effect of Assessment Weighting on Surface Strategy for "hard" discipline students in Study One (effect size of 6.1%) but not for Study Three. No effect from Assessment Weighting was evident for "soft" discipline students in either study. Given that "hard" discipline students included Accounting students only in Study Three, the failure to replicate the Study One finding might be attributed to sample differences. Teaching staff in Financial Accounting, from which the Accounting students were drawn, stated that predominantly the subject deals with rules and procedures which students need to memorise and apply to solving problems. Staff reported that, although students were encouraged to reflect and consider the theoretical aspects of the unit, students
tended to focus on memorising the rules and procedures. It was thought that students’ awareness of having their subsequent professional work audited generated the emphasis on memorising the rules and procedures. It can be argued that the nature of the subject might represent a situational influence, promoting students to adopt consistently high surface learning strategy regardless of the relative value of any exam for which they study. Thus the nature of Accounting may have cancelled out the Assessment Weighting effect on Surface Strategy that was obtained for Computing and Economics students in Study One. Further research would be needed to test the plausibility of this suggestion.

With respect to a non-significant effect of Assessment Weighting on the Surface Strategy of “soft” discipline students, it may be argued that Surface Strategy is not their predominant learning strategy. It has been widely acknowledged by past researchers and further substantiated in this research that students from “soft” disciplines are more deep than surface oriented in their approach to learning (Biggs, 1987; Becher, 1994; Entwistle & Ramsden, 1983; Ramsden & Entwistle, 1981; Lonka & Lindlom-Ylane, 1996; Watkins, 1982). Therefore, regardless of whether an exam is worth 30% or 70% of the total mark, these students are not likely to alter their Surface Strategy.

5.17 Dispositional Effects on Student Learning

In this study, Test Anxiety and every Student Life Value (Self-Directed, Achievement, and Power) exerted a broad impact on learning as evidenced by their influence on specific SPQ scales. Test Anxiety had a powerful and pervasive influence on learning, particularly on Surface Motive. A replication of the
relatively strong and significant effects of Self-Directed and Achievement values on Deep Motive, Deep Strategy and Achieving Motive again supported the view that life values are likely to be expressed in the individual’s academic work (Ames, 1992; Pintrich, Marz & Boyle, 1993; Schwartz, 1994).

However, not every effect obtained by the dispositional variables in Study Two was replicated. The present study did not obtain significant effects for: Test Anxiety on Achieving Strategy, the Self-Directed value on Achieving Motive, and the Achievement value on both Surface Motive and Strategy. However, these effects in Study Two were minimal, with each independent variable accounting for only 1% of the variance in the relevant SPQ score. These small effects may arise from chance fluctuations in the particular sample of students investigated. Lack of replication would thus indicate that the effects cannot be regarded as veridical.

In the main, the results attest to congruence between motive and strategy for both surface and deep learning. In Study Two and the present study, Test Anxiety influenced both Surface Motive and Surface Strategy, while the Self-Directed value influenced both Deep Motive and Deep Strategy. This common influence upon motive and strategy for Surface Approach and Deep Approach supports Biggs’ (1987) notion of motive-strategy congruence in student learning. The results also demonstrate the robustness and distinctiveness of these two learning approaches that were obtained by Marton and Säljö (1976) in their original work on student learning.

On the other hand, congruence between Achieving Motive and Achieving Strategy to form Achieving Approach is not evident in either Study Two or Three.
In both studies, the Achievement value influenced Achieving Motive but not Achieving Strategy. The results suggest that a higher order construct of Achieving Approach is less compelling than the higher order constructs of Surface Approach and Deep Approach. This finding is consistent with other researchers who were unable to establish clearly an Achieving Approach in student learning (Biggs, Kember & Leung, 2001; Kember & Leung, 1998; Kember, Wong & Leung, 1999). The item content from the two relevant SPQ scales might help explain the seeming lack of congruence between Achieving Motive and Achieving Strategy. According to Biggs (1987), Achieving Strategy concerns the regulation of one’s study effort and understanding of what is learned, and also organisation of the study tasks (e.g., note-taking and assignment writing). Self-discipline and good organisational skills are implied when students score high on Achieving Strategy. By contrast, Achieving Motive concerns competitiveness, ambition, and a desire to learn that is driven by a need to excel academically. Being well organised, self-disciplined, and well paced are not necessarily signs of competitiveness and may not lead to top grades. Hence, Achieving Motive may not be as closely associated with Achieving Strategy as Biggs suggested in his early work.

Study Two also showed that the Power value significantly influenced Achieving Motive in learning. Study Three failed to replicate this finding. Although the effect in Study Two is small (2%), an explanation for the inconsistent finding will be offered because a significant and substantial zero-order correlation of .58 between Power and Achievement values was indicated. Thus Power and Achievement had a shared variance of 34%. This relatively high
conceptual overlap between the two constructs may have reduced the unique impact exerted by Power.

To determine the shared variance in Achieving Motive scores contributed by Achievement and Power life values, another hierarchical multiple regression analysis was carried out. The $R^2$ change value showed that Achievement and Power life values, together, significantly contributed towards 7.1% of the variance in Achieving Motive scores. Achievement life value uniquely predicted 3.9% of the variance in Achieving Motive and thus Power life value would have helped predict another 3.2% of the variance in Achieving Motive. This variance in Achieving Motive that is predicted by Power life value is larger than its negligible unique effect obtained in the original multiple regression analysis. It can be concluded that the high conceptual overlap between Achievement and Power life values did mask the significant influence that Power exerted on students’ Achieving Motive in learning.

With respect to the order of relative influence on student learning by the dispositional variables, the present study replicated the results for Study Two. In both studies, none of the investigated dispositional variables affected all six of the learning motives and strategies. However, Test Anxiety exerted a stronger effect on student learning than did any Student Life Value. The greater influence exerted by Test Anxiety may be explained in terms of the nature of the variables. Test Anxiety is immediate and acutely felt when compared to Student Life Values which can be considered to be constant, subtle, and pervasive. It can be argued that the features of immediacy and intensity are partly responsible for Test Anxiety being more influential on students’ learning than are Student Life values.
Next, in their order of importance, are the Student Life Values of Self-Directed, Achievement and Power. The Self-Directed value can be seen as an intrinsic motivator where valuing of independence is reflected by the test items (e.g., Choosing one’s own goals and Freedom) that measured the construct. The Achievement and Power values, on the other hand, can be considered as extrinsic motivators. The items, Success and Wealth measured the Achievement value whereas Public Image and Social Recognition measured the Power value. An intrinsic drive for independence that is internally sourced from within the learner can be considered as relatively reliable and stable. By contrast, motivators (such as Success, Wealth, Public Recognition and Social Recognition) that are controlled by external sources (e.g., the institution, and the community) can be considered to be less reliable and predictable. It can be argued that the intrinsic drive associated with Self-Directed value may partly explain its stronger influence on student learning compared with the Achievement and Power values that were driven by external motivators. Alternatively, the Self-Directed value might be more influential on student learning because of its greater conceptual distinctiveness compared to the less distinctive Achievement and Power life values which intercorrelated to a substantial degree.

5.18 Test Anxiety as a Mediator of Assessment Weighting

The hypothesis that Test Anxiety will mediate the effect of Assessment Weighting on SPQ Surface Strategy was not supported. It had been reasoned that, as the risk of failing increases (higher Assessment Weighting) then Test Anxiety is
also likely to increase. Additionally, Test Anxiety was shown to promote a Surface Strategy in learning. Accordingly, Test Anxiety was likely to mediate an Assessment Weighting effect on Surface Strategy. In this study two conditions for mediation were not met. Assessment Weighting did not significantly influence either Surface Strategy or Test Anxiety. Assessment Weighting appears to have a weak and inconsistent influence on student learning; thus a possible mediation by Test Anxiety could not be properly evaluated. The inconsistent Assessment Weighting effect may result from the scenario methodology whereby students had to imagine they were studying for an exam as they responded to the questionnaire.

5.19 Three-Way Interaction Effect (Assessment Weighting x Discipline Type x Gender) on Surface Strategy

The proposal that female students from “hard” disciplines studying for a 70% value exam (FH70%) will score higher on Surface Strategy than other student groups studying for either a 30% value or 70% value exam, was not supported. Results from Studies One and Two supported many past findings that “hard” disciplines tend to promote Surface Strategy more than do “soft” disciplines (Biggs, 1987; Becher, 1994; Entwistle & Ramsden, 1983; Hayes & Richardson, 1995; Neumann, 2001; Ramsden, 1992; 1997; Watkins, 1982). Thomas (1988, 1990) noted that where females are a minority in a “hard” discipline (as was the case in this study), they feel threatened and less confident of their ability to cope academically. As indicated earlier in the thesis, Surface Strategy can be reassuring particularly to less confident students as it provides a clear structure for learning. Thus it was argued that female Business students are likely to experience high test
anxiety particularly for a 70% value exam (where the stakes are high) and are most likely to adopt a Surface Strategy.

Study Three, however, failed to replicate the effect shown in Study One. This failure may be due to the disproportionate numbers of students represented in the dummy variables that were created to represent the different student groups in the study. The sizes of the groups varied widely, ranging from six participants for the smallest group (FH30% that represents female “hard” discipline students studying for a 30% value exam) to 50 participants for the largest group (FS 30% that represents female “soft” discipline students studying for a 30% value exam). According to Cohen and Cohen (1975), the relative size of a group in the total sample will affect the magnitude of the correlation between that group and the dependent variable. In the present study, 5% of the total sample represented the group of female “hard” discipline students studying for a 70% value exam (i.e., FH 70% group). In Study One, 8% of the total sample represented the FH 70% group. These two proportions are fairly similar thus group size cannot plausibly explain the difference in result between Study One and Study Three. Apart from the scale being relatively low on reliability (coefficient value of .49), it is unclear why in this study the female students from “hard” disciplines studying for a 70% value exam did not score significantly higher on Surface Strategy than did other student groups.
5.20 Reliabilities of Student Life Values (Self-Directed, Achievement, and Power)

The hypothesis that Student Life Values will yield acceptable reliability values of at least .60 was partially supported. The reliability coefficients for Student Life Values of Self-Directed and Power were acceptable whereas the value for Achievement was not acceptable at .52. The reliabilities for the three Student Life Values in the present study are very similar to those obtained in Study 2. In both studies, the Self-Directed scale is most reliable, followed by the Power scale and then the Achievement scale. The weaker internal consistency of the Achievement value might be attributed to different interpretations of the measure. Achievement can be defined as either a mastery goal-related achievement or an ego-related achievement (Covington, 2000; Dweck & Leggett, 1988; Dowson & McInernery, 1997; Graham & Golan, 1991; McInernery & McInerney, 1998). It is possible, therefore, that some students in the studies perceived Achievement items as mastery goal-related rather than as ego-related. It was argued in Chapter Four that the Achievement value (measured by Success, Wealth, Influence and Ambition) corresponded most closely to ego-related achievement.

Overall, although the reliabilities of the three scales are moderate, their internal consistency values in both studies reflect a degree of robustness. The scales for Achievement and Power values can be further improved and this will be discussed later under Section 5.23 “Strengths, Limitations, and Future Research”.
5.21 Effects of Age, Discipline Type, and Gender on Learning

Age and Discipline Type affected student learning in ways that are very similar to the results obtained in Studies One and Two. The effects of Age and Discipline Type on student learning were replicated with older students scoring higher on both Deep Motive and Deep Strategy than did younger students; and students from “soft” disciplines scoring higher on Deep Motive and lower on Achieving Strategy than did students from “hard” disciplines. Although students from “soft” disciplines also scored low on Achieving Motive, hence replicating the result for Study Two, this finding was not obtained in Study One. However, from the consistent findings across the three studies, one can confidently conclude that Age influenced Deep Motive and Deep Strategy in students’ learning while Discipline Type influenced Deep Motive and Achieving Strategy in students’ learning. A discussion of how Age and Discipline Type might influence those aspects of learning was given in Chapter Four and accordingly, will not be repeated.

Gender exerted no significant effect on student learning in Study Three, contrary to the results obtained in Studies One and Two. This discrepancy is not surprising as past researchers have been unable to demonstrate a consistent and convincing pattern of gender effect on student learning (Hayes & Richardson, 1995; Miller, Finley & McKinley, 1990; Murphy, 1982; Sadler-Smith, 1996; Speth & Brown, 1990; Richardson, 1993; Richardson & King, 1991). In this study, Gender displayed a significant zero-order correlation of -.17 with Achieving Motive (males scored higher than did females). However, Gender also showed substantial shared variance of 30% with Discipline Type thus reducing the
capacity of Gender to attain significance as a unique predictor in the multiple regression for Achieving Motive.

5.22 Overall Summary

To summarise, this study brought together the situational and dispositional variables that significantly influenced students’ learning in Studies One and Two, and replicated some of the results. Hence, the following conclusions regarding the relative effects of specific situational and dispositional variables can be made with reasonable confidence. First, dispositional variables exerted more effect on student learning than did the situational variables. Second, the dispositional variable Test Anxiety exerted the strongest effect on student learning, followed by the Student Life Values of Self-Directed, Achievement and Power in descending order. Finally, the overall similarity in reliability values yielded by the three Student Life Values between this study and Study Two demonstrated a degree of robustness for these scales.

5.23 Strengths, Limitations, and Future Research

This study is unique in being the first to compare dispositional and situational variables for their impact on student learning and to explore certain interactive effects. Although Biggs (1987) maintained that both dispositional and situational variables can influence students’ learning, he did not indicate which variable type is likely to exert greater influence.
A limitation of the study was the disproportionate number of students from the three different courses that represented the "hard" disciplines. It was proposed that an effect of Assessment Weighting on Surface Strategy obtained in Study One but not replicated in this study might be attributed to the inclusion of Accounting students in this study. Future research using sizeable samples of Computing, Economics, and Accounting students might clarify the effects of Assessment Weighting on different student groups from the "hard" disciplines. It may be that students from specific courses also share certain learning characteristics unique to that course. On the other hand, the effect size of Assessment Weighting on Surface Strategy is small (5%). It is possible therefore, that the influence exerted by Assessment Weighting on Surface Strategy obtained in Study One is weak at best.

With respect to Student Life Values, more research is warranted. First, the inconsistent findings between this study and Study Two concerning the effect of Power on learning will have to be further explored. Second, the evidence indicated a high conceptual overlap between Power and Achievement. These two constructs can be made more distinctive from each other and their reliability values further increased by including additional test items that are specific to either construct. For example, terms such as Control, Domination, and Strength can be added to the existing items of Public Image, Social Recognition and Social Power to define the value Power. On the other hand, terms such as Fulfilment, Gain, and Effort can be added to the existing items of Success, Wealth, Influential, and Ambition to define the value of Achievement. Third, the effects exerted by Student Life Values of Self-Directed, Achievement, and Power on various aspects of student learning can
be investigated with other cultures to determine the universality of the influences that these values exert on student learning.
Chapter Six

Overall Discussion and Implications

The discussion considers the consistent findings from Studies One, Two and Three of the direct influences exerted by the investigated situational and dispositional variables. The consistency of demographic influences on students' learning will also be considered. The three studies have provided sufficient evidence about specific situational and dispositional effects on student learning to enable three proposed models that extend the Presage and Process phases of Biggs' (1990) 3P model on student learning. These extended models provide further insight into how specific factors influence the motives and strategies that comprise the three learning approaches identified by Biggs. Next, implications for educational policy and practices are considered, followed by suggestions for future directions in research.

6.1 Consistent Findings from the Research

Where a finding was replicated across studies that finding is considered sufficiently robust to be represented in the proposed models. Where an independent variable exerted a significant effect on learning only once, the effect is considered inconclusive and will be discussed within the context of future research directions.
6.1.1 Situational Influence on Student Learning

This research did not establish a consistent effect upon student learning from either Assessment Type or Assessment Weighting. Past studies have indicated that assessment by essay tended to promote Deep Approach in learning whereas assessment by multiple-choice exam promoted a Surface Approach (Biggs, 1993; Entwistle, 1996; Ramsden, 1988; Scouller, 1998; Thomas & Bain, 1984; Watkins, 1982). It was suggested in Chapter Three that such findings may be due to a confound between assessment context (exam vs. assignment) and assessment type (essay vs. multiple-choice). The current research stipulated both assessment types within the exam context to avoid a confound and obtained no significant effect of Assessment Type on learning approach. Thus it appears more likely that assessment context rather than Assessment Type influences learning. Assessment Weighting only influenced students’ Surface Strategy in learning in Study One and to a moderate degree. This effect was not replicated in Study Three and therefore is not represented in the extended models proposed later in this chapter.

Another factor construed as situational was the variable Discipline Type which consistently influenced student learning (namely, Surface Motive, Surface Strategy, Deep Motive, Achieving Motive, and Achieving Strategy). Discipline primarily functions as a situational variable because of its basis in the curriculum and the learning emphasis, both of which are determined externally by the instructors and the institution. Becher’s (1994) categorisation of different disciplines into “hard” vs. “soft” was adopted in this research to explain the different effects that discipline exerted on students’ learning. “Hard” and “soft”
disciplines types were differentiated on the basis of the subject content that is externally determined by the institution and the instructors. The effects of Discipline Type on Surface Motive, Surface Strategy, and Deep Motive have been discussed to considerable depth in Chapters Three and Four.

Given that an effect of Discipline Type on Achieving Approach was neither hypothesised nor discussed in any study, a brief discussion of that effect is appropriate here. Students from “hard” disciplines (drawn from Computing, Economics, Engineering, and Accounting) scored higher on Achieving Approach than did students from “soft” disciplines (drawn from Psychology, Social Sciences, and Languages). Although more males represented the “hard” disciplines and more females the “soft” disciplines within the samples (correlations of .42 and .55 for studies Two and Three, respectively), the Discipline effect does not appear due to Gender. Gender exerted little effect on Achieving Motive (correlations of -.07 and -.17 for studies Two and Three respectively) or Achieving Strategy (correlations of .08 and .04 for studies Two and Three respectively).

Discipline effects are more pronounced for Achieving Motive (correlations of -.27 and -.41 for studies Two and Three, respectively) than for Achieving Strategy (correlations of -.05 and -.16 for studies Two and Three, respectively). Given that Achieving Motive is best defined by a “long term” goal to obtain status and prestige by striving for the best possible career (See Chapter Three), it can be argued that the “hard” disciplines sampled in the two studies did indeed offer better career prospects, and higher pay/status than the “soft” disciplines. Thus, the students attracted to the disciplines with better career
prospects also reported being motivated to study by status and prestige of future career.

6.1.2 Dispositional Influences on Student Learning

All investigated dispositional variables (Test Anxiety and the Student Life Values of Self-Directed, Power and Achievement) consistently influenced different aspects of the learning approaches. Test Anxiety and the Self-Directed value consistently influenced surface and deep approaches in learning respectively. Power and Achievement values, on the other hand, consistently influenced only the motive aspect of surface and achieving approaches, respectively.

Researchers argue that a value embraced by an individual is likely to be expressed in that person’s life tasks (Ames, 1992; Pintrich, Marz, & Boyle, 1993; Schwartz, 1994). They further propose that the motivational goals students hold for different life-domains (e.g., family, relationship, and work) are salient in guiding their affect, cognition and behaviours in academic work. It would seem that the motivational goals associated with the Self-Directed value are salient in influencing students’ affect, expressed by their pleasure in learning (Deep Motive) as well as their cognitions and behaviours, such as relating new materials to past experiences and knowledge, and evaluating what is learned (Deep Strategy).

By contrast, the motivational goals associated with Power and Achievement life values only influence learning motives. Students who highly endorsed the value of Power (measured by Public Image and Social Recognition)
were motivated towards learning by a desire to pass the exam in order to gain employment (Surface Motive), while students who highly endorsed the value of Achievement (measured by Success and Wealth) were motivated towards learning by a desire to compete and gain top grades (Achieving Motive). The Power and Achievement values, however, did not influence study strategies. These Student Life Values compared to the Self-Directed value, are relatively broad concepts. It may be that the motivational life goals of attaining good public image or success and wealth do not transfer as readily to learning behaviours or strategies as does Self-Directed value.

Test Anxiety, which involves emotions and cognitions about taking a test (Hodapp & Benson, 1997; Leibert & Morris, 1967; Sarason, 1978; Spielberger, 1980), permeates the study phase as well. It has been discussed in some detail (Chapter Four) that test anxious students are preoccupied with thoughts of inadequacy and of possible failure while studying for an exam. It is understandable, therefore, why their motive for learning is to avoid failure (Surface Motive). It has also been argued that Surface Strategy can assist students who lack confidence in their ability to pass a test because it provides a clear and reassuring structure for learning, framed by the set syllabus and teacher expectations.

6.1.3 Age and Gender Influences on Student Learning

Age consistently influenced Deep Motive and Deep Strategy; older students scored higher than did younger students on both. This finding is consistent with the large pool of empirical evidence provided by past researchers
(Biggs, 1985, 1987; Gow & Kember, 1990; Harper & Kember, 1986; Richardson, 1995; Sadler-Smith, 1996; Watkins, 1982; Watkins & Hattie, 1981; Zeegers, 2001). Chapter Four discussed these effects in some detail, drawing upon Harper and Kember's argument that older students would be more inclined than younger students towards a Deep Approach in learning, due to their greater life experiences and maturity.

Gender also consistently affected Achieving Strategy; female students were shown to be more diligent and organised in their study habits than were male students. This finding, discussed previously in Chapter Three, is consistent with findings obtained by past researchers (e.g., Heikkinen, Pettigrew, & Zakrjsek, 1985; Meyer, 1995; Meyer, Dunne & Richardson, 1994).

Different factors, therefore, influenced each learning approach apart from Discipline Type which influenced motives and strategies of all three learning approaches. Each dispositional factor influenced only one particular learning approach. To capture the effects of the various factors on student learning, three separate models are, therefore, proposed. These models introduce greater specificity to the Presage and Process phases of Biggs' (1990) 3P model on student learning.
Figure 6.1(a). Factors influencing Surface Approach in learning

Figure 6.1(b). Factors influencing Deep Approach in learning

Figure 6.1(c). Factors influencing Achieving Approach in learning
The three models represent only the direct influences on learning approaches exerted by different dispositional and situational factors and depict the three learning approaches as operating independently of each other. Learners have a mix of the three approaches and the learning approach adopted at a given time will depend on the prominence of an influencing factor. For example, an older student with high Self-Directed value might be most prone to a Deep Approach but with strong test anxiety and a valuing of Power may end up taking more of a Surface Approach. As Biggs and Moore (1993) indicated, every learner brings certain personal characteristics to the learning context, which will influence the learning motive and the strategy adopted.

In the three models, it noted that the dispositional variables of Test Anxiety, Self-Directed, and Age, and the situational variable of Discipline Type, all influenced a motive and its corresponding strategy within a particular learning approach. Figure 6.1(a) shows that Test Anxiety and Discipline Type influence Surface Approach independently of each other. (The correlations between Test Anxiety and Discipline Type were negligible with values of -.01 and .02 from Studies Two and Three, respectively). In Figure 6.1(b), Self-Directed value and Age also operate independently in their effects on Deep Approach. (Again, the correlations between the two factors are small with values of .13 and .07 from Studies Two and Three respectively). Figure 6.1(c) indicates that Achieving Approach is influenced by only the single variable Discipline Type. Therefore, the question of whether different variables independently influenced Achieving Approach is not an issue. It would seem there is no interaction between the independent variables in their effects on learning.
Discipline Type alone exerted a common impact across all learning approaches but for Deep Motive in Deep Approach. Many past researchers (Biggs, 1987; Becher, 1994; Hayes & Richardson, 1995; Lonka & Lindlom-Ylane, 1996; Neumann, 2001; Ramsden, 1997; Slaats, Lodewijks & Van der Sanden, 1999) have reported the influence of study discipline on students' learning. This research extends those findings by establishing the breadth of its influence across learning approaches relative to other dispositional and situational factors.

6.2 Implications for Teaching Practices

Implications for effective teaching practices can be derived from the findings of this research. First, all students as individuals bring with them to the classroom, many personal attributes that can influence different learning approaches when they study. Highly test anxious students who tend to a surface learning approach might also be capable of learning in a deep, and meaningful way especially if they are self-directed, or/and have broad knowledge and life experiences by nature of their age. Teachers, therefore, can facilitate effective learning by guiding these students to draw upon their life knowledge and life experiences to construct personal understanding of the subject matter learnt. Understanding what is learnt can be personally satisfying which in turn can be reassuring and confidence boosting to highly anxious learners who lack confidence in their own abilities. Teachers, therefore, can play a dual role of mentoring and instructing through a person/student centred teaching approach.

For highly test anxious students, especially those who also value Power more than Self-Directed, engagement in Deep Approach may prove difficult.
Under this circumstance, teachers can accommodate the students preferred Surface Approach by creating a highly structured and defined learning environment with clear learning guidelines and expectations of the learning outcomes. It has been argued throughout the thesis that such a structured and clearly defined learning environment can enable the highly anxious students to focus their memory and attention capacity on the prescribed content to be learned. Studying for an exam, therefore, might become less anxiety-provoking and more effective. Further, the learning that is promoted may persuade test anxious students to construe tests as a way of enabling learning rather than as a way of judging their level of achievement. It is thought that the majority of students share the latter perception (Biggs & Moore, 1993; McClellan, 2001). Hence, apart from the usual step that teachers may take by recommending highly anxious students to seek personal counseling, teachers can also directly assist these students in their learning.

A second implication from the findings concerns the selection of the most appropriate approach for the learning task at hand. Educators generally seem to treat Deep Approach as more effective and superior to a Surface Approach (Kember & Leung, 1998). This view can be contested. It is arguable that the most effective learning approach can depend on the student’s learning intentions at a given time. If students desire only to pass an exam with minimal effort, then a Surface Approach may be the most effective way to learn. Additionally, if the course content deals mainly with facts, information, and principles that students have to know and be able to apply, then a Surface Strategy may be an effective way in securing high marks. It is part of a teacher’s responsibility to encourage students to develop a range of different learning approaches and to assist them to
strategically deploy them. Cleverley (1994) echoes this view when he suggests that students become equipped learners through exposure to a variety of teaching styles. A single learning approach, therefore, may not be the most desirable at all times and for all content areas (Cleverley, 1994; Gregorc, 1979). With a range of different learning approaches and an ability to strategically deploy an appropriate learning approach, students will become flexible learners where they can take advantage of the many and varied types of curricula offered by the institution.

The findings for Discipline Type effects on student learning has different implications for teaching and learning development depending on whether Discipline Type is regarded as a situational or a dispositional factor. From a situational perspective (a view held in the thesis), students’ learning approaches are considered to result from the curriculum, teaching style and teaching objectives to which they have been exposed. Thus learning approaches are viewed as malleable to external determinants. From a dispositional perspective, students’ learning approaches are considered as their stable preference that attracted them to either a “hard” or “soft” discipline type. In this case, students’ preferred learning approach might be less malleable to change by the curriculum and teaching style of the teacher.

To summarise, as teachers receive the students in their class, these students bring with them different characteristics that will exert different impacts on different learning approaches. Teachers can work with students as mentors and educators to maximise their learning whether it be a Surface, Deep or Achieving Approach. There is no one learning approach that is superior to another, however, teachers can assist students to develop a range of different learning approaches so
that they are flexible in learning. In this way, students are better able to cope with different types of curricula and assessment practices.

6.3 Implications for Future Research

Possibilities for further research have been discussed in Chapters Three, Four and Five. However, additional implications for future research result from the above discussion. For the first time, an investigation on the relationship between Student Life Values and student learning has been carried out. Significant relationships were obtained with Self-Directed, Power, and Achievement values exerting different impacts on student learning. These findings open up an important area of research that has not been explored before. Future research should be carried out to identify other life values that may influence how students go about their learning. This evidence, together with a consideration of the relative impact from those values, will provide a more detailed and comprehensive understanding of the relationship between life values and student learning beyond that established by this research. Studies Two and Three, however, can be considered as the catalyst for further research on life values and learning.

The relationship between Student Life Values and learning approaches can also be extended by comparing students from different cultural backgrounds. The importance of Culture on student learning is clearly demonstrated in Study Two in which Culture influenced all three learning approaches. Yet no study has systematically investigated the effects from a set of common constructs (such as Student Life Values) on the learning approaches of culturally different student groups. In Study Two, the effect on learning approaches from the Student Life Values was investigated for Australian and Chinese students. Further studies can
be carried out to replicate the findings and to explore culturally different student groups (e.g., from US, Britain, India, and Singapore). These studies would broaden the understanding of Culture effects on student learning.

Within the confines of the specific factors identified for investigation in this research, dispositional factors are considered to be more influential than situational factors. Other situational factors (e.g., teaching style and curriculum) may well cast a different light on the relative importance of situational and dispositional factors on student learning. Therefore, numerous studies will have to be carried out to provide an understanding of the relative significance of the roles played by situational and dispositional factors on learning. It can be concluded, however, that this research has contributed towards a further understanding of the complexity of the learning phenomenon and has provided some clarity on the relative significance of specific situational and dispositional factors on students' learning approaches.


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Construction versus Choice in Cognitive Measurement, (pp. 29-44), Hillsdale, NJ: Erlbaum.,


APPENDICES
APPENDICES A

UNIVERSITY ETHICS APPROVALS
APPENDIX A1

DEAKIN UNIVERSITY ETHICS APPROVAL (Study One)

Research Services
Office of the Pro Vice-Chancellor (Research) (Burwood Campus)

MEMORANDUM

TO: Ms Swee Smith
Psychology
Geelong

FROM: Secretary, Deakin University Ethics Committee (DUEC)

DATE: 2 June 1999

SUBJECT: PROJECT: EC 63-99
(Please quote this project number in future communication.)
AN EVALUATION OF CONSISTENCY IN STUDENT APPROACHES TO LEARNING

The above human research project was considered at DUEC Meeting 3/99 held on 31 May 1999. The decision of the Committee reads as follows:

THAT APPROVAL BE GIVEN FOR MS SWEE SMITH, UNDER THE SUPERVISION OF DR ROBYN MILLER, PSYCHOLOGY, TO UNDERTAKE THIS PROJECT FROM 1 JULY 1999 TO 30 NOVEMBER 1999.

Standard ethical clearance has been given for the above project, the (revised) conditions for which are listed on the accompanying page.

Please do not hesitate to contact me if you have any queries on (03) 9251 7123 (x17123). The project number should be quoted in any communication.

Signature Redacted by Library

Keith Wilkins
Secretary, DUEC
Email: keithwil@deakin.edu.au
APPENDIX A2

DEAKIN UNIVERSITY ETHICS APPROVAL (Study Two)

Research Services
Office of the Deputy Vice-Chancellor (Research) (Melbourne Campus)

MEMORANDUM

TO: Ms Swee Smith
Psychology

FROM: Secretary, Deakin University Human Research Ethics Committee (DUHREC)

DATE: 27 March 2002

SUBJECT: PROJECT: EC 265-2001 (Please quote this project number in future communication.)

INFLUENCES OF CULTURAL VALUES AND EXAMINATION ANXIETY ON STUDENT LEARNING APPROACHES

This application was considered at the DU-HREC meeting of 25 February 2002.

APPROVAL HAS BEEN GIVEN FOR MS SWE SMITH, UNDER THE SUPERVISION OF DR ROBYN MILLER, PSYCHOLOGY, TO UNDERTAKE THIS PROJECT FROM 1 MAY 2002 TO 31 DECEMBER 2002.

Approval of this project has been confirmed for research at Deakin University. Research at any other university is subject to the provision of authorisation by the appropriate officers of that university.

The approval given by the Deakin University Human Research Ethics Committee is given only for the project and for the period as stated in the application and approval. It is your responsibility to contact the Secretary immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time.
- Any events which might affect the continuing ethical acceptability of the project.
- The project is discontinued before the expected date of completion.

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

Signature Redacted by Library

Victoria Emery
Secretary, DU-HREC
(03) 9251 7123
vemery@deakin.edu.au
APPENDIX A3

DEAKIN UNIVERSITY ETHICS APPROVAL (Study Three)

Research Services
Office of the Deputy Vice-Chancellor (Research) (Melbourne Campus)

MEMORANDUM

TO: Ms Swee Smith
Psychology
Geelong

FROM: Secretary, Deakin University Human Research Ethics Committee (DU-HREC)

DATE: 12 August 2004

SUBJECT: PROJECT: EC 127-2004 (Please quote this project number in future communication)
EFFECTS OF DISPOSITIONAL AND SITUATIONAL FACTORS ON STUDENT LEARNING APPROACHES

This application was considered at the DU-HREC meeting held on 23 June 2004.

APPROVAL HAS BEEN GIVEN FOR MS SWEE SMITH, UNDER THE SUPERVISION OF DR ROBYN MILLER, SCHOOL OF PSYCHOLOGY, TO UNDERTAKE THIS PROJECT FROM 12 AUGUST 2004 TO 31 DECEMBER 2004.

The approval given by the Deakin University Human Research Ethics Committee is given only for the project and for the period as stated in the application and approval. It is your responsibility to contact the Secretary immediately should any of the following occur:
- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time.
- Any events which might affect the continuing ethical acceptability of the project.
- The project is discontinued before the expected date of completion.

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

Signature Redacted by Library

Victoria Emery
Secretary, DU-HREC
(03) 9251 7123
APPENDIX B1 (Study One)

STUDENT APPROACHES TO LEARNING

QUESTIONNAIRE

This is an anonymous questionnaire. Please ensure that you do not write your name, or any other comments that will make you identifiable, on the attached questionnaire. By completing the questionnaire you are consenting to take part in this research. As such you should first read the enclosed Plain Language statement carefully as it explains fully the intention of this project.
Section A

Please complete the following information.

1. Current Academic Level............(e.g., 1st, 2nd, 3rd etc., year of tertiary education).

2. Faculty .........................(e.g., Arts or Science).

3. Age: (please circle)  
   - 20 or less
   - 20 – 29
   - 30 and above

4. Sex (please circle)  
   - Female
   - Male
Section B

Study Process Questionnaire

Students learn in different ways and in this section we are interested in how you go about your learning. Imagine you are preparing for a multiple-choice exam that is worth 30% of the marks in the subject you are currently studying. Indicate how true each of these statements are for you personally by circling the number that best describes the way you would go about your study when preparing for this exam. There are no right or wrong answers.

<table>
<thead>
<tr>
<th>Rarely True</th>
<th>Sometimes True</th>
<th>Moderately True</th>
<th>Often True</th>
<th>Almost Always True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Examples:

(a) "I tend to study only what's set. I usually don't do anything extra." .........................
You believe the statement is sometimes true for you, so response number 2 is circled.

(b) "I find studying some topics can be really exciting." ............... 
You believe this statement to be moderately true for you, so response number 3 is circled.
Now please respond to **ALL** of the following statements as truthfully as you can by circling the number that best describes the way you approach your study.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Moderately</th>
<th>Often</th>
<th>Almost Always</th>
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</thead>
<tbody>
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<td></td>
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<td>True</td>
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<td>3</td>
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<td>1</td>
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<td>8</td>
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<td>9</td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>2</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td>Rarely True</td>
<td>Sometimes True</td>
<td>Moderately True</td>
<td>Often True</td>
<td>Almost Always True</td>
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</tr>
<tr>
<td>15</td>
<td>I would see myself basically as an ambitious person and want to get to the top, whatever I do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>I tend to choose subjects with a lot of factual content rather than theoretical kinds of subjects.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>I find that I have to do enough work on a topic so that I can form my own point of view before I am satisfied.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>I try to do all my assignments as soon as possible after they are given out.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>Even when I have studied hard for a test, I worry that I may not be able to do well in it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>I find that studying academic topics can at times be as exciting as a good novel or movie.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>If it came to the point, I would be prepared to sacrifice immediate popularity with my fellow students for success in my studies and subsequent career.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22</td>
<td>I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>23</td>
<td>I try to relate what I have learned in one subject to that in another.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>24</td>
<td>After a lecture or lab I re-read my notes to make sure that they are legible and that I understand them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>Lecturers shouldn’t expect students to spend significant amounts of time studying material everyone knows won’t be examined.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>26</td>
<td>I usually become increasingly absorbed in my work the more I do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>27</td>
<td>One of the most important considerations in choosing a course is whether or not I will be able to get top marks in it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>28</td>
<td>I learn best from lecturers who work from carefully prepared notes and outline major points on the blackboard.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Rarely True</td>
<td>Sometimes True</td>
<td>Moderately True</td>
<td>Often True</td>
<td>Almost Always True</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>29. I find most new topics interesting and often spend extra time trying to obtain more information about them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>30. I test myself on important topics until I understand them completely.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>31. I almost resent having to spend a further three or four years studying after leaving school, but feel that the end results will make it worthwhile.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>32. I believe strongly that my main aim in life is to discover my own philosophy and belief system and to act strictly in accordance with it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>33. I see getting high grades as a kind of competitive game, and I play to win.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>34. I find it best to accept the statements and ideas of my lecturers and question them only under special circumstances.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>35. I spend a lot of my free time finding out more about interesting topics, which have been discussed, in different classes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>36. I make a point of looking at most of the suggested readings that go with the lectures.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>37. I am at university mainly because I feel that I will be able to obtain a better job if I have a tertiary qualification.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>38. My studies have changed my views about such things as politics, my religion, and my philosophy of life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>39. I believe that society is based on competition and schools and universities should reflect this.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>40. I am very aware that lecturers know a lot more than I do and so I concentrate on what they say is important rather than rely on my own judgement.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>41. I try to relate new material, as I am reading it, to what I already know on that topic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>42. I keep neat, well-organised notes for most subjects.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

APPENDIX B2 (Study Two)

TEST ATTITUDE, LIFE VALUES

AND

STUDY APPROACHES

This questionnaire is anonymous, therefore, do not write your name, or any other comments that will make you identifiable. Your completion and return of the questionnaire signifies your consent to participate in the research. As such you should first read the enclosed Plain Language Statement as it explains fully the intention of this research.

There are four sections to the questionnaire, which will take approximately 20-30 minutes. Please make sure that you complete all sections and thank you once again for your participation.
Section A.

Please answer all questions.

1. Major Subject of Study: Accounting  Computing
   (Please circle)  Commerce  Economics
   Management
   Other (please indicate) ________________________

2. Age (Please specify)  ____________ years

3. Sex (Please circle)  Female  Male

4. Country of Birth:  ________________ (e.g., Australia, Canada, France, India,
   (Please specify)  China, Hong Kong, etc.)

8. (a) Which country are you living in at present?  ________________

   (b) If your answer to above is Australia, how long have you been living in the
country?  ____________ years

9. Is English your native tongue? (Please circle)  Yes  No

   (b) If your answer to above is "No", then what is your native language?


10. What is your ethnic background?  ________________________
    (e.g., Greek, Italian, Swedish, Chinese, Indonesian etc.)
Section B

Test Attitude Inventory

A number of statements which people have used to describe how they feel about taking tests are shown below. Read each statement carefully, and then circle a number (from 1-4) to indicate how you generally feel.

The number 1 will indicate that the statement is not characteristic of you, and the number 4 will indicate that you almost always feel that way. Use any number from 1-4 to indicate how well the statement describes you.

1 = Almost Never
2 = Sometimes
3 = Often
4 = Almost Always

There are no right or wrong answers to such questions, so do not spend too much time on any one statement. Just enter the number that indicates best how that statement generally describes you.

Examples

<table>
<thead>
<tr>
<th></th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>I worry throughout the semester if there is an exam.......................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

You believe that you almost always do this, therefore, the number 4 is circled.

<table>
<thead>
<tr>
<th></th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don’t feel confident about doing well in an exam..........................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

You believe this statement describes your feelings only sometimes, therefore the number 2 is circled.
Kind permission to use the Test Anxiety Inventory in this research was provided by its author, Professor Charles D. Spielberger. This inventory is available from the publisher Mind Garden (USA).

Website: http://www.mindgarden.com
Section C

Life Values Inventory

You will be given a list of 20 cultural values and be required to do two tasks.

**Task 1.** Mark with a tick (✓) the value that you identify as most important to you, and mark with a cross (X) the value you identify to be least important to you.

**Task 2.** From the list rate the importance of each value "AS A GUIDING PRINCIPLE IN MY LIFE" using the six-point scale of:

1 = Opposed to my values  
2 = Not Important  
3 = Neutral  
4 = Important  
5 = More than Important  
6 = Very Important  
7 = Of Supreme Importance

**EXAMPLES:**

Task 1: One ✓ (most important)  
One X (least important)  
for all values 1 to 20

Task 2: Rate importance of value "AS A GUIDING PRINCIPLE IN MY LIFE"

<table>
<thead>
<tr>
<th>Values</th>
<th>✓ and X</th>
<th>Opposed to my values</th>
<th>Not Important</th>
<th>Neutral</th>
<th>Important</th>
<th>More than Important</th>
<th>Very Important</th>
<th>Supreme Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Enjoying life</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>B. Honest</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>C. Respect for tradition</td>
<td>✓</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>D. Daring</td>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>E. Wealth</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>F. Accepting my portion in life</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

**Task 1.** Among the six values above, the student identified the value “Respect for tradition” to be the most important value and being “Daring” to be the least important value to him.

**Task 2.** “AS A GUIDING PRINCIPLE IN MY LIFE” the student rated “Enjoying Life” to be Slightly Important to him (4), being “Honest” to be Very Important to him (6), “Respect for Tradition” to be of Supreme Importance to him (7), both “Daring” and “Wealth” to be Not Important values to him (2) and “Accepting my portion in life” to be Opposed his own values (1).
Using the list of 20 cultural values below, please complete the following two tasks:

**Task 1.** Mark with a tick (✓) the value that you identify as most important to you, and mark with a cross (X) the value you identify to be least important to you.

**Task 2.** From the list rate the importance of each value to you "AS A GUIDING PRINCIPLE IN MY LIFE" using the six-point scale of:

- 1 = Opposed to my values
- 2 = Not Important
- 3 = Neutral
- 4 = Important
- 5 = More than Important
- 6 = Very Important
- 7 = Of Supreme Importance

---

### Task 1: One ✓ (most important)  
One X (least important)
for all values 1 to 20

<table>
<thead>
<tr>
<th>Values</th>
<th>✓</th>
<th>X</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Social Power</td>
<td>1</td>
<td></td>
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<tr>
<td>2. Freedom</td>
<td>1</td>
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</tr>
<tr>
<td>3. Politeness</td>
<td>1</td>
<td></td>
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<tr>
<td>4. Wealth</td>
<td>1</td>
<td></td>
<td>1</td>
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</tr>
<tr>
<td>5. Self-respect</td>
<td>1</td>
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<td>3</td>
<td>4</td>
<td>5</td>
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<td>7</td>
</tr>
<tr>
<td>6. Creativity</td>
<td>1</td>
<td></td>
<td>1</td>
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<td>3</td>
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<td>5</td>
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</tr>
<tr>
<td>7. Self-discipline</td>
<td>1</td>
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<td>4</td>
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<td>7</td>
</tr>
<tr>
<td>8. Social Recognition</td>
<td>1</td>
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<td>4</td>
<td>5</td>
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<td>7</td>
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<tr>
<td>9. Authority</td>
<td>1</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>7</td>
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<tr>
<td>10. Independent</td>
<td>1</td>
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<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<td>7</td>
</tr>
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<td>11. Ambitious</td>
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<td>5</td>
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</tr>
</tbody>
</table>
| Task 1: One \( \checkmark \) (most important) | Task 2: Rate importance of value "AS A GUIDING IN MY LIFE"
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Values</strong></td>
<td><strong>Opposed to my values</strong></td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>12. Influential</td>
<td>1</td>
</tr>
<tr>
<td>13. Honouring of parents and elders</td>
<td>1</td>
</tr>
<tr>
<td>14. Choosing own goals</td>
<td>1</td>
</tr>
<tr>
<td>15. Capable</td>
<td>1</td>
</tr>
<tr>
<td>16. Preserving my public image</td>
<td>1</td>
</tr>
<tr>
<td>17. Obedient</td>
<td>1</td>
</tr>
<tr>
<td>18. Intelligent</td>
<td>1</td>
</tr>
<tr>
<td>19. Curious</td>
<td>1</td>
</tr>
<tr>
<td>20. Successful</td>
<td>1</td>
</tr>
</tbody>
</table>

Section D

STUDY PROCESS QUESTIONNAIRE

Students learn in different ways and in this section we are interested in how you go about your learning. Indicate how true each of these statements are for you personally by circling the number that best describes the way you would generally go about your study. There are no right or wrong answers.

Examples:

(a) "I tend to study only what’s set. I usually don’t do anything extra." .........................

   Rarely True  Sometimes True  Moderately True  Often True  Almost Always True
   1          2              3          4          5

You believe the statement is sometimes true for you, so response number 2 is circled.

(b) "I find studying some topics can be really exciting." ..............

   Rarely True  Sometimes True  Moderately True  Often True  Almost Always True
   1          2              3          4          5

You believe this statement to be moderately true for you, so response number 3 is circled.
Now please respond to **ALL** of the following statements as truthfully as you can by circling the number that **best describes** the way you approach your study.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Rarely True</th>
<th>Sometimes True</th>
<th>Moderately True</th>
<th>Often True</th>
<th>Almost Always True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I chose my present courses largely with a view to the job situation when I graduate rather than out of their intrinsic interest to me..............</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>I find that at times studying gives me a feeling of deep personal satisfaction. .......................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>I want top grades in most or all of my courses so that I will be able to select from among the best positions available when I graduate......</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>I think browsing around is a waste of time, so I only study seriously what’s given out in class or in the course outlines. .....................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>While I am studying, I often think of real life situations to which the material that I am learning would be useful. ......................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6.</td>
<td>I summarise suggested readings and include these as part of my notes on a topic. ..............</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7.</td>
<td>I am discouraged by a poor mark on a test and worry about how I will do on the next test. ...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8.</td>
<td>While I realise that truth is forever changing as knowledge is increasing, I feel compelled to discover what appears to me to be the truth at this time. ..................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9.</td>
<td>I have a strong desire to excel in all my studies. ........................................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10.</td>
<td>I learn some things by rote, going over and over them until I know them by heart. ..........</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11.</td>
<td>In reading new material I often find that I’m continually reminded of material I already know and see the latter in a new light. ...............</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tr>
<tr>
<td>12.</td>
<td>I try to work consistently throughout the term and review regularly when the exams are close. ........................................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13.</td>
<td>Whether I like it or not, I can see that further education is for me a good way to get a well-paid or secure job. ..................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tr>
<tr>
<td>14.</td>
<td>I feel that virtually any topic can be highly interesting once I get into it. .................</td>
<td>1</td>
<td>2</td>
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<td>5</td>
</tr>
<tr>
<td>15.</td>
<td>I would see myself basically as an ambitious person and want to get to the top, whatever I do. ..................</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
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<tr>
<td></td>
<td></td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Moderately</td>
<td>Often</td>
<td>Almost Always</td>
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</tr>
<tr>
<td>16.</td>
<td>I tend to choose subjects with a lot of factual content rather than theoretical kinds of subjects.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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</tr>
<tr>
<td>17.</td>
<td>I find that I have to do enough work on a topic so that I can form my own point of view before I am satisfied.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tr>
<tr>
<td>18.</td>
<td>I try to do all my assignments as soon as possible after they are given out.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
</tr>
<tr>
<td>19.</td>
<td>Even when I have studied hard for a test, I worry that I may not be able to do well in it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20.</td>
<td>I find that studying academic topics can at times be as exciting as a good novel or movie.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21.</td>
<td>If it came to the point, I would be prepared to sacrifice immediate popularity with my fellow students for success in my studies and subsequent career.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22.</td>
<td>I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>23.</td>
<td>I try to relate what I have learned in one subject to that in another.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>24.</td>
<td>After a lecture or lab I re-read my notes to make sure that they are legible and that I understand them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tr>
<tr>
<td>25.</td>
<td>Lecturers shouldn't expect students to spend significant amounts of time studying material everyone knows won't be examined.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
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<tr>
<td>26.</td>
<td>I usually become increasingly absorbed in my work the more I do.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
</tr>
<tr>
<td>27.</td>
<td>One of the most important considerations in choosing a course is whether or not I will be able to get top marks in it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>28.</td>
<td>I learn best from lecturers who work from carefully prepared notes and outline major points on the blackboard.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tr>
<tr>
<td>29.</td>
<td>I find most new topics interesting and often spend extra time trying to obtain more information about them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>30.</td>
<td>I test myself on important topics until I understand them completely.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
</tr>
<tr>
<td></td>
<td>I almost resent having to spend a further three or four years studying after leaving school, but feel that the end results will make it worthwhile.</td>
<td>1</td>
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<tr>
<td>32.</td>
<td>I believe strongly that my main aim in life is to discover my own philosophy and belief system and to act strictly in accordance with it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>33.</td>
<td>I see getting high grades as a kind of competitive game, and I play to win.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>34.</td>
<td>I find it best to accept the statements and ideas of my lecturers and question them only under special circumstances.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>35.</td>
<td>I spend a lot of my free time finding out more about interesting topics, which have been discussed, in different classes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>36.</td>
<td>I make a point of looking at most of the suggested readings that go with the lectures...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>37.</td>
<td>I am at university mainly because I feel that I will be able to obtain a better job if I have a tertiary qualification.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>38.</td>
<td>My studies have changed my views about such things as politics, my religion, and my philosophy of life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>39.</td>
<td>I believe that society is based on competition and schools and universities should reflect this.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>40.</td>
<td>I am very aware that lecturers know a lot more than I do and so I concentrate on what they say is important rather than rely on my own judgement.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>41.</td>
<td>I try to relate new material, as I am reading it, to what I already know on that topic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>42.</td>
<td>I keep neat, well-organised notes for most subjects.</td>
<td>1</td>
<td>2</td>
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</tbody>
</table>

Thank you for your participation.

APPENDIX B3 (Study Three)

TEST ATTITUDE,

STUDENT LIFE VALUES,

AND

STUDY APPROACHES

This questionnaire is anonymous; therefore, do not write your name, or any other comments that will make you identifiable. Your completion and return of the questionnaire signifies your consent to participate in the research. As such you should first read the enclosed Plain Language Statement as it explains fully the intention of this research.

There are four sections to the questionnaire, which will take approximately 25 minutes to complete. Please make sure that you complete all sections. Thank you once again for your participation.
Section A.

Please answer all questions.

1. Major Subject of Study: 
   (Please circle) 
   Accounting  Computing
   Commerce  Economics
   Management
   Other (please indicate) ____________

2. Age (Please specify) 
   ____________ years

3. Sex (Please circle) 
   Female  Male

4. Country of Birth: 
   (Please specify) 
   (e.g., Australia, Canada, France, India, China, Hong Kong, etc.)
Section B

Test Attitude Inventory

A number of statements which people have used to describe how they feel about taking tests are shown below. Read each statement carefully, and then circle a number (from 1-4) to indicate how you generally feel.

The number 1 will indicate that the statement is not characteristic of you, and the number 4 will indicate that you almost always feel that way. Use any number from 1-4 to indicate how well the statement describes you.

1 = Almost Never  
2 = Sometimes  
3 = Often  
4 = Almost Always

There are no right or wrong answers to such questions, so do not spend too much time on any one statement. Just enter the number that indicates best how that statement generally describes you.

Examples

<table>
<thead>
<tr>
<th></th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. I worry throughout the semester if there is an exam .................. 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>You believe that you almost always do this; therefore, the number 4 is circled.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. I don’t feel confident about doing well in an exam ..................... 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>You believe this statement describes your feelings only sometimes, therefore the number 2 is circled.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Kind permission to use the Test Anxiety Inventory in this research was provided by its author, Professor Charles D. Spielberger. This inventory is available from the publisher Mind Garden (USA).

Website: http://www.mindgarden.com
Section C

Student Life Values

You are given a list of 11 Student Life Values and are required to rate the importance of each value "AS A GUIDING PRINCIPLE IN MY LIFE" using the six-point scale of:

1 = Opposed to my values  
2 = Not Important  
3 = Neutral  
4 = Important  
5 = More than Important  
6 = Very Important  
7 = Of Supreme Importance

Examples:

<table>
<thead>
<tr>
<th>Values</th>
<th>Opposed to my values</th>
<th>Not Important</th>
<th>Neutral</th>
<th>Important</th>
<th>More than Important</th>
<th>Very Important</th>
<th>Supreme Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

1. Self-discipline 1 2 3 4 5 6 7

2. Influential 1 2 3 4 5 6 7

3. Creativity 1 2 3 4 5 6 7

4. Curious 1 2 3 4 5 6 7

"AS A GUIDING PRINCIPLE IN MY LIFE" the student above rated "Self-discipline" to be Important to him (4), "Influential" to be Very Important to him (6), "Creativity" to be of Supreme Importance to him (7), and "Curious" to be not important (2).
Please *rate according to you the importance of the following 10 values* "AS A GUIDING PRINCIPLE IN MY LIFE" using the six-point scale of:

- 1 = Opposed to my values
- 2 = Not Important
- 3 = Neutral
- 4 = Important
- 5 = More than Important
- 6 = Very Important
- 7 = Of Supreme Importance

<table>
<thead>
<tr>
<th>Values</th>
<th>Opposed to my values</th>
<th>Not Important</th>
<th>Neutral</th>
<th>Important</th>
<th>More than Important</th>
<th>Very Important</th>
<th>Supreme Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Social Power</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. Freedom</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3. Wealth</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4. Social Recognition</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5. Independent</td>
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<td>6. Ambitious</td>
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<td>7. Influential</td>
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<td>8. Choosing own goals</td>
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<td>9. Capable</td>
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<td>10. Preserving my public image</td>
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<td>11. Success</td>
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Section D

Study Process Questionnaire

Students learn in different ways and we are interested in how you go about your learning. Below are examples of how student X describes the way he went about his study while preparing for an examination that was worth 30% of the subject he is enrolled in. There are no right or wrong answers.

Examples

<table>
<thead>
<tr>
<th>Rarely True</th>
<th>Sometime True</th>
<th>Moderately True</th>
<th>Often True</th>
<th>Almost Always True</th>
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</table>

(a) "I tend to study only what's set. I usually don't do anything extra." .................1 2 3 4 5

Student X believed the statement is sometimes true for him, so response number 2 was circled.

<table>
<thead>
<tr>
<th>Rarely True</th>
<th>Sometime True</th>
<th>Moderately True</th>
<th>Often True</th>
<th>Almost Always True</th>
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</table>

(b) "I find studying some topics can be really exciting." .................1 2 3 4 5

Student X believed this statement to be moderately true for him, so response number 3 was circled.
Pretend that you are studying for an examination that is worth 30% of the total subject you are currently enrolled in. Circle the number that best describes the way you approach your study. Please respond to ALL of the following statements as truthfully as you can. There are no right or wrong answers.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Rarely True</th>
<th>Sometimes True</th>
<th>Moderately True</th>
<th>Often True</th>
<th>Almost Always True</th>
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<tbody>
<tr>
<td>1. I chose my present courses largely with a view to the job situation when I graduate rather than out of their intrinsic interest to me.</td>
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<td>2</td>
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<td>2. I find that at times studying gives me a feeling of deep personal satisfaction.</td>
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<td>3. I want top grades in most or all of my courses so that I will be able to select from among the best positions available when I graduate.</td>
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<td>2</td>
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<td>4. I think browsing around is a waste of time, so I only study seriously what’s given out in class or in the course outlines.</td>
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<td>5. While I am studying, I often think of real life situations to which the material that I am learning would be useful.</td>
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<td>6. I summarise suggested readings and include these as part of my notes on a topic.</td>
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<td>7. I am discouraged by a poor mark on a test and worry about how I will do on the next test.</td>
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<td>8. While I realise that truth is forever changing as knowledge is increasing, I feel compelled to discover what appears to me to be the truth at this time.</td>
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<td>9. I have a strong desire to excel in all my studies.</td>
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<td>10. I learn some things by rote, going over and over them until I know them by heart.</td>
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<td>11. In reading new material I often find that I’m continually reminded of material I already know and see the latter in a new light.</td>
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<td>12. I try to work consistently throughout the term and review regularly when the exams are close.</td>
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<td>13. Whether I like it or not, I can see that further education is for me a good way to get a well-paid or secure job.</td>
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<td>Moderately</td>
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<td>Almost True</td>
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<td>14. I feel that virtually any topic can be highly interesting once I get into it.</td>
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<td>15. I would see myself basically as an ambitious person and want to get to the top, whatever I do.</td>
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<td>16. I tend to choose subjects with a lot of factual content rather than theoretical kinds of subjects.</td>
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<td>17. I find that I have to do enough work on a topic so that I can form my own point of view before I am satisfied.</td>
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<td>18. I try to do all my assignments as soon as possible after they are given out.</td>
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<td>19. Even when I have studied hard for a test, I worry that I may not be able to do well in it.</td>
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<td>20. I find that studying academic topics can at times be as exciting as a good novel or movie.</td>
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<td>21. If it came to the point, I would be prepared to sacrifice immediate popularity with my fellow students for success in my studies and subsequent career.</td>
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<td>22. I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.</td>
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<td>23. I try to relate what I have learned in one subject to that in another.</td>
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<td>24. After a lecture or lab I re-read my notes to make sure that they are legible and that I understand them.</td>
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<td>25. Lecturers shouldn’t expect students to spend significant amounts of time studying material everyone knows won’t be examined.</td>
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<td>26. I usually become increasingly absorbed in my work the more I do.</td>
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<td>27. One of the most important considerations in choosing a course is whether or not I will be able to get top marks in it.</td>
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<td>Rarely</td>
<td>Sometimes</td>
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<td>28.</td>
<td>I learn best from lecturers who work from carefully prepared notes and outline major points on the blackboard.</td>
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<tr>
<td>29.</td>
<td>I find most new topics interesting and often spend extra time trying to obtain more information about them.</td>
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<td>30.</td>
<td>I test myself on important topics until I understand them completely.</td>
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<td>31.</td>
<td>I almost resent having to spend a further three or four years studying after leaving school, but feel that the end results will make it worthwhile.</td>
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<tr>
<td>32.</td>
<td>I believe strongly that my main aim in life is to discover my own philosophy and belief system and to act strictly in accordance with it.</td>
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<tr>
<td>33.</td>
<td>I see getting high grades as a kind of competitive game, and I play to win.</td>
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<tr>
<td>34.</td>
<td>I find it best to accept the statements and ideas of my lecturers and question them only under special circumstances.</td>
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<td>2</td>
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<td>35.</td>
<td>I spend a lot of my free time finding out more about interesting topics, which have been discussed, in different classes.</td>
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<tr>
<td>36.</td>
<td>I make a point of looking at most of the suggested readings that go with the lectures.</td>
<td>1</td>
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</tr>
<tr>
<td>37.</td>
<td>I am at university mainly because I feel that I will be able to obtain a better job if I have a tertiary qualification.</td>
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<tr>
<td>38.</td>
<td>My studies have changed my views about such things as politics, my religion, and my philosophy of life.</td>
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<td>39.</td>
<td>I believe that society is based on competition and schools and universities should reflect this.</td>
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<tr>
<td>40.</td>
<td>I am very aware that lecturers know a lot more than I do and so I concentrate on what they say is important rather than rely on my own judgement.</td>
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<tr>
<td></td>
<td>Rarely True</td>
<td>Sometimes True</td>
<td>Moderately True</td>
<td>Often True</td>
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<tr>
<td>41.</td>
<td>I try to relate new material, as I am reading it, to what I already know on that topic. ..........</td>
<td>1</td>
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<tr>
<td>42.</td>
<td>I keep neat, well-organised notes for most subjects. ..................................................</td>
<td>1</td>
<td>2</td>
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Thank you for your participation.

APPENDICES C

PLAIN LANGUAGE STATEMENTS
Dear participants,

My name is Swee Smith and I am completing a Ph.D degree in Psychology at Deakin University. I am doing my research under the supervision of Dr Robyn Miller. The aim of this research is to investigate how students normally go about their learning.

I would like to invite you to participate in the research. Participation will involve you in completing a questionnaire, the Studying Process Questionnaire. The questionnaire consists of statements that ask you to indicate how well they describe the way that you personally feel and operate when you study. Examples of such statements are, “I find that at times studying gives me a feeling of deep and personal satisfaction,” “I think browsing around is a waste of time, so I only study seriously what’s given out in class or in the course outlines.” You will also be asked some background information such as your age, gender, level of study and course of study, but your name will not be required. The questionnaire will take you approximately 20-25 minutes to complete.

Answering the questionnaire will not involve you in any greater stress or risk than you currently encounter in everyday life. However, if you do have concerns you wish to discuss you may do that with Dr Judy Lavery, who is a person independent of this research.

All the data that is collected will be analysed, interpreted and written up as group data. All completed questionnaires will be secured in a locked filing cabinet in an office at Deakin University for a minimum period of six years before they are finally destroyed. At no time will any person but the researcher access the data.

You are free to withdraw your participation at any time and any incomplete questionnaire will be destroyed immediately. Group results are available and will be placed on your School’s notice board or mailed to you on request. After completing the questionnaire, you will be informed of the purpose of the research. If you have any queries concerning the study, don’t hesitate to contact me or my supervisor.

Thank you for participating in this research.

Yours sincerely,

Swee Smith (Ph D Student)
School of Psychology, Deakin University, Geelong. 3217. Tel: (03) 52271414

Dr Robyn Miller (Supervisor)
School of Psychology, Deakin University, Geelong. 3217. Tel: (03) 52272928

Dr Judy Lavery (Independent person)
School of Psychology, Deakin University, Geelong 3217. Tel: (03) 5227 2852
DEAKIN UNIVERSITY ETHICS COMMITTEE
PLAIN LANGUAGE STATEMENT

Dear Participants,

My name is Swee Smith and I am completing a Ph.D degree in Psychology at Deakin University under the supervision of Dr Robyn Miller. The aim of this research is to determine whether student learning approaches will vary according to life values and exam anxiety.

I would like to invite you to participate in the research. Participation will involve you in completing a questionnaire consisting of four sections. Section A requires you to provide some personal information such as your major subject studied, your age group, country of birth, etc. Section B requires you to rate how well the statements characterise your thoughts and feelings about taking an exam. Examples of such statements are, "I feel confident and relaxed while taking tests" and "I wish examinations did not bother me so much". Section C requires you to identify the value that you consider to be most important and of least importance to you, and, also to rate the importance of 20 values as a guiding principle in your life. Two examples of cultural values are Social Power and Obedient. Section D requires you to rate how well each of the statements describes the way you generally go about your study. Two examples of such statements are, "I find that at times studying gives me a feeling of deep and personal satisfaction" and "I test myself on important topics until I understand them."

Answering the questionnaire is anonymous and there are no right or wrong answers. The questionnaire will take approximately 20-30 minutes to complete. When completed, please return the questionnaires in the addressed, prepaid envelope provided. Your return of the completed questionnaire signifies your consent to participate in the research.

All the data that is collected will be analysed, interpreted and written up as group data. All complete and incomplete questionnaires will be secured in a locked filing cabinet in an office at Deakin University for a minimum period of six years before they are finally destroyed. At no time will any person but the researcher access the data.

You are free to withdraw your participation at any time. If you have any concern that you were previously unaware of, please contact Deakin's Education Access & Counselling Unit on (03) 9244 6300. Group results are available and will be placed on your School's noticeboard or mailed to you on request. If you have any queries concerning the study, don't hesitate to contact me or my supervisor on the given number below.

Thank you for your assistance in this research.

Swee Smith (Ph.D student)
School of Psychology, Deakin University, Geelong. 3217. Tel: (03) 5227 1414

Dr Robyn Miller (Supervisor)
School of Psychology, Deakin University, Geelong. 3217. Tel: (03) 5227 2928.

Should you have any concern about the conduct of this research project, please contact the Secretary, Ethics Committee, Research Services, Deakin University, Burwood campus, 221 Burwood Highway, Burwood. Vic. 3215. Tel: (03) 9251 7123 (International +61 3 9251 7123).
Dear Participants,

My name is Swee Smith and I am completing a Ph.D degree in Psychology at Deakin University under the supervision of Dr Robyn Miller. The aim of my Ph.D research is to determine whether the way students approach learning varies according to test attitude, life values, and examination weighting.

I would like to invite you to participate in the research. Participation will involve you in completing a questionnaire consisting of four sections. Section A requires you to provide some personal information such as your major subject studied, age, native tongue, and country of birth. Section B requires you to rate how well the statements characterise your thoughts and feelings about taking an exam. Examples of such statements are, “I feel confident and relaxed while taking tests” and “I wish examinations did not bother me so much”. Section C requires you to rate the importance of 10 values as guiding principles in your life. Two examples of cultural values are Freedom and Independence. Section D requires you to rate how well each of the statements describes the way you generally go about your study. Two examples of such statements are: “I find that at times studying gives me a feeling of deep and personal satisfaction” and “I test myself on important topics until I understand them.”

You are not expected to give your name and there are no right or wrong answers. The questionnaire will take approximately 15-20 minutes to complete. When completed, please return the questionnaires in the addressed, prepaid envelope provided. Your return of the completed questionnaire signifies your consent to participate in the research.

All the data that is collected will be analysed, interpreted and written up as group data. All returned questionnaires will be secured in a locked filing cabinet in an office at Deakin University for a minimum period of six years before they are finally destroyed. At no time will any person but the researcher access the data.

You are free to withdraw your participation at any time. If you have any concern that you were previously unaware of, please contact Deakin’s Education Access & Counselling Unit on (03) 9244 6300. Group results are available and will be placed on your School’s noticeboard. If you have any queries concerning the study, don’t hesitate to contact me or my supervisor on the given number below.

Thank you for your assistance in this research.

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School of Psychology, Deakin University, Geelong. 3217. Tel: (03) 5227 1414

Dr Robyn Miller (Supervisor)
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Should you have any concern about the conduct of this research project, please contact the Secretary, Ethics Committee, Research Services, Deakin University, Burwood campus, 221 Burwood Highway, Burwood. Vic. 3215. Tel: (03) 9251 7123 (International +61 3 9251 7123).
### APPENDIX D

Table 4.13. Overall effects of independent variables on learning motives and strategies

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
<th>Affect coefficients</th>
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## APPENDIX E

Table 4.14. Factor loadings for Australian and Chinese students using different extraction methods with varimax rotations.

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<th>Factor identified</th>
<th>Life Value item</th>
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<th>Chinese Extraction</th>
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