Life Values and Approaches to Learning

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Life Values and Approaches to Learning: A Study of University Students from Confucian Heritage Cultures

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Preface

This study sought to examine the principles that guided the lives of students who came from countries in East Asia to study in Australia at the tertiary level. They are referred to here as students from a Confucian heritage culture (CHC), a term first advanced by Ho (1986) to include students whose lives have been influenced by the teachings of Confucius. Most of the students came from ethnically Chinese backgrounds. However, some came from Japan, Korea, and enclaves in countries where the Confucian way of thinking and learning was considered to be important.

The focus of the study was an investigation of the values and approaches to learning that guided CHC students' lives. The primary goals of the study were to gain a greater understanding of the way CHC students lived and learned and to investigate whether their values and approaches to learning were retained, modified or changed in a Western cultural and educational environment. A review of existing knowledge about the nature of Asian students' values and approaches to learning gave rise to the following questions: (a) what values were particularly important in the lives of CHC students; (b) what were CHC students' preferred approaches to learning; (c) was there a relationship between values and approaches to learning; (d) what were the personal characteristics of CHC learners; (e) did CHC students' values change over time in Australia; (f) did students' approaches to learning change over time in Australia; influence or change their values and approaches to learning over time in a new physical, social and cultural environment?

The students in this study were sojourners who came to Australia to pursue their education and intended to return to live in East Asia on the completion of their studies. The objective was to investigate the students' values and approaches to learning over a period of two years and to sample their values and attitudes on five occasions. This constituted a longitudinal study that gathered information over sufficient time for any change that was occurring to become evident. The investigation was based on a multiwave design that allowed individual change to be examined over regularly spaced intervals.

A model based on the research questions was proposed and tested. Two questionnaires were used to measure values and approaches to learning and a demographic questionnaire was employed to obtain background information about the students in the study. The data collected concerned students' gender, age, country of birth, religious practices, the number of hours spent studying outside classes, where and how they preferred to study, the length of time they had been in Australia, the language spoken outside classes, their main course of study, the influence of previous travel on their lives, the most influential person in their childhood, and the name of their tertiary institution. Students' values were measured using the *Chinese Value Survey* (CVS) (Chinese Culture Connection, 1987). This instrument was chosen because it included values that were deemed to be particularly important in Confucian culture. The *Study Process Questionnaire* (SPQ) (Biggs, 1987) was selected to measure students' approaches to learning. The instruments were self-report questionnaires that used Likert-type scales. They were chosen because of their availability in a bilingual format. The CVS and the SPQ were put on the internet for four of the five data collections.

In addition, small group interviews were undertaken. In these interviews students discussed six areas of relevance that they encountered in their Australian sojourn. They were: (a) the lifestyle in an English-speaking Western culture; (b) teaching styles in Australia; (c) the assessment of academic work; (d) students' lifestyle in Australia; (e) values and approaches to learning in Australia; and (f) expectations of academic outcomes in Australia.

The study was based on an original sample of 153 cases. After five data collections there were 573 records as not every student participated on all five occasions. However, an average of just over 60 per cent did complete the questionnaires five times. Data were included in the analysis if a student responded to the questionnaires on at least two occasions.

Canonical correlation analysis investigated the possibility of a relationship between values and approaches to learning. The four value dimensions: Integrity, Confucian Ethos, Loyalty and Wisdom were tested for relationships with the six approaches to learning: Surface, Deep and Achieving Motivations and Surface, Deep and Achieving Strategies. The maximum number of relationships possible was four and three of these proved to be statistically significant.

The results of canonical correlation analysis afforded new insights into the possibility of a positive and causal relationship with values influencing approaches to learning. However, it was not possible to examine whether the changes in values recorded had a causal relationship on changes in approaches to learning that were observed.

The study also provided extensive data on differences between specific groups of students in the sample. It had been expected, from a review of the extant literature that students from a Confucian culture would be likely to change as a group and in predictable ways. Some general trends confirmed what had been written about Asian learners in new academic environments. However, what was not anticipated was that identifiable groups of students would respond differently to social and cultural change.

There was clear evidence from this study that not only did specific groups of students differ in their values and approaches to learning when they came to Australia, but they also changed in different ways and to different extents during their time in Australia.

The only significant changes in the Integrity and Wisdom value dimensions over time were effects related to specific groups of students. When students came to Australia to study, Confucian Ethos values appeared, in general, to decline in importance, but not for all groups of students. In addition, values associated with the Loyalty dimension generally increased over the time of measurement in Australia. This indicated that some but not all groups of students considered these values to be increasingly important in their lives in Australia.

The results of multilevel modelling showed changes in students' approaches to learning. Surface Motivation generally dropped over time whereas Deep and Achieving Motivations and Strategies increased significantly over the time of the study. Although there was no significant change for the Surface Strategy approach over time, there were significant direct and interaction effects associated with this approach to learning and the characteristics of particular groups of students. CHC learners would appear to have adopted approaches to learning that assisted them to succeed at high levels academically and fulfil the demands of the family and work groups in Asia. In order to accomplish these goals, students appeared to be motivated to use strategies that produced successful outcomes. This was indicated by the movement away from a superficial approach and toward a deeper approach to learning together with an increase in the achieving approach. Importantly, the changes that occurred with respect to learning affected some but not all groups of students.

The changes noted might have been a response to a change in the method of assessment used in Australia. Surface learning that has been associated with an examination-based culture generally decreased over the time of this study while deep learning generally increased. This change in approach to learning would appear to be associated with problem-based learning that was assessed in written assignments and oral presentations. Therefore, it would appear that it is the Australian teaching and learning environment that was a primary cause of change in values and approaches to learning in some groups of students.

Nevertheless, despite the changes noted, it seemed unlikely that Confucian attitudes to knowledge and approaches to learning would be discarded completely by CHC students as these attitudes and values provided stability and structure to Asian society. Consequently, it is argued that regardless of the approaches to learning adopted, the need to achieve continued to remain a principal motivating force behind the successful attainment of educational goals.

Some of the principal findings of the study were that: (a) there were significant changes in students' values in Australia so that Confucian Ethos values generally decreased while Loyalty values increased; (b) values appeared to be precursors that were statistically related to approaches to learning; (c) students' approaches to learning generally became deeper over time; (d) there was a sustained motivation to achieve at a high level that was implemented by a complementary strategy; (e) factors such as age, gender and hours of study influenced both particular values and learning approaches in identifiable groups of CHC students; and (f) travel, religious practices, as well as where and how study was undertaken also influenced approaches to learning in Australia.

These findings have led to many new questions and issues. Educational goals set for overseas students must be culturally inclusive in order to ensure that all participants benefit. The appreciation of difference is the first step toward the ultimate goal of social cohesion that is an acknowledgement of the co-existence of multiple cultures. The appreciation of difference is seen as a primary goal for education in Australian universities in the twenty-first century.

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#### -Introduction to the Study

#### Introduction

This study seeks to examine the principles that guide the lives of students from East Asia who come to study in Australia. The more specific purpose is to investigate the values and approaches to learning that are important in the lives of Asian tertiary students and to examine changes that may occur when students come from East Asia in order to pursue their education in Australia. Subsequent analysis of the data collected should provide greater understanding of the values that pervade Asian students' thinking and the ways in which they prefer to learn. This study seeks to measure the initial values and approaches to learning that students bring with them from Asia and examine these factors over a period of time so that if change is occurring, it should become evident from the measurements made at regularly spaced intervals. The anticipated outcome is an understanding of changes that may provide greater insight into the lives of East Asian students with respect to their value structure and approaches to learning. Moreover, it is not assumed that all students are likely to be affected by changes in their physical, social, educational and cultural environment in the same way.

Values are seen as precursors to learning; therefore, it is necessary to understand Asian students' value systems before embarking on a study of their approaches to learning. What is important is the degree of acceptance and incorporation that particular values hold in a specific society. Values are generally moderated by cultural considerations. For example, respect for tradition, loyalty to superiors and having a sense of shame are values that are particularly important in Asian cultures that are based on the philosophy of Confucius (Jarrat, 2003; Yue and Ng, 1999). In Western culture, these values are acknowledged, but they are accorded less importance than they receive in Asia.

Furthermore, all people learn, but different ethnic groups approach learning tasks with culturally modified perspectives. For example, most Asian education systems are examination-based in their assessment of learning. This may require many hours of memorisation. However, it is not necessarily rote memorisation that takes place as it may involve a process that Biggs (1996b) has called deep memorisation where

material is learned and then internalised. The information may then be recalled for examinations and later modified as new skills and knowledge are acquired. The Asian approach to learning often appears to be superficial until the process of deep memorisation is understood and acknowledged.

Asian learning is generally group-centred. Students work together to solve problems as the group is the effective functioning unit. Reasoning is based on collective thinking and problem solving. This is in contrast to the Western approach to problembased learning that is individual-centred whereby the student solves problems by inferring solutions from information presented. In the Asian way of learning, information is deduced, generally in a group setting, in order to solve problems especially in subjects such as mathematics where deductive logic prevails and assists in problem solving. Learning viewed in this way appears to lie on a continuum. The motivation to learn and the strategies employed seem to be content-determined and based on specific academic requirements (Stevenson and Lee, 1996; Stevenson and Stigler, 1992; Stigler and Hiebert, 1999; Stigler and Stevenson, 1991).

# Why do Asian students choose to study in Australia?

Asian students say that they come to Australia for four principal reasons: (a) to learn English from native speakers, (b) the proximity and similarity of the time zones in Australia to those in Asia, (c) the lower cost of living and studying in Australia compared with North America or Great Britain, and (d) the climate (Smart, Volet and Ang, 2000).

First of all, it is necessary to recognise that English has become the most important language in the world today. Internationally, it is the language of commerce, trade, science, diplomacy and technology. Most textbooks, trade manuals and instruction booklets are written in English. Therefore, the ability to understand and utilise English for personal development and self-improvement is considered by most Asians to be the pathway to successful advancement. Second, since Australia is relatively close to Asia, students are generally able to return home in the long summer break. Also there is a maximum time change of three hours because Australia is almost directly south of East Asia. Third, the cost of study in Australia is considerably less than the cost in North America or England and the living expenses in Australia are also generally lower than in the other English-speaking countries. Finally, the climate in Australia does not have the temperature extremes found in North America, Great Britain and Europe. Most of Australia is temperate all the year round and only occasionally experiences temperature and climatic extremes (Smart, Volet and Ang, 2000).

#### Student expectations of study in Australia

Asian students say that they have come to Australia with the expectation of knowing more about Western culture, lifestyle and learning. However, some students feel that they are not encouraged to interact with lecturers and other Australians either in class or socially outside the classroom as they have done in Asia. Therefore, the question that requires serious consideration is: what can Australian tertiary institutions do to meet the expectations of sojourner students who are paying high fees to study in a Western culture (Ballard and Clanchy, 1984, 1988; Morris and Hudson, 1995; Poon et al., 1983; Samuelowicz, 1987; Smart and Ang, 1993, 1996; Smart, Volet and Ang, 2000; Slay, 1999; Volet and Kee, 1993)?

The difference between expectations and outcomes raises some important questions: (a) why do so many Asian students continue to choose Australia as a place to further their education when there are evident differences between Asian and Australian values and approaches to learning; and (b) why do relatively few Australian students choose to travel to Asia to study beyond the obvious advantage of learning an Asian language from native speakers?

A great deal of generalised, peripheral information is known about students who come from Asian countries to study in Australia. Facts and figures provide information about these students but few cross-cultural longitudinal studies have been undertaken. It is argued that to understand the values that guide students' lives and the approaches to learning that students prefer to use in the pursuit of knowledge is essential if we are to help them during their sojourn in Australia. How, then, may definitive information be acquired? Clearly a study involving a sample of overseas students needs to be undertaken and their values and approaches to learning need to be measured over time. Once the data have been gathered, statistical analyses may be undertaken to examine the dimensionality of the data, the likelihood of a causal relationship between values and approaches to learning and the possibility of change over time. Many research workers have argued that a longitudinal study is the only effective way to examine change over time (Goldstein, 1979, 1997; Willett, 1989, 1997; Willett and Singer, 1997). Others (Astill, 1998; Ninnes, 1995; Smart, Volet and Ang, 2000) have commented on the importance and usefulness of a longitudinal study and have recommended that such a study should be conducted. Therefore, this study is undertaken in order to learn more about the students who have come from what Ho (1986) has called a Confucian heritage culture (CHC). The discussion that follows provides the framework for an investigation of the value structure of students from a CHC. This is followed by an examination of the Chinese Diaspora that in the past has been instrumental in dispersing ethnically Chinese people to many parts of the world. Included in this discussion is an elaboration of the structural framework that supports the individual and the family in a society whose values are founded on the Confucian ethos. A comment on the impact of modernisation and Westernisation on Asian society is followed by a consideration of living and learning conditions experienced by CHC students in Asia and a discussion of the relationships between Asian values and approaches to learning. The chapter concludes with a brief account of the methods of inquiry that are planned for the investigation.

#### Theoretical background

#### Knowledge and empirical research on Chinese learners

Over the past 15 years, a body of literature has emerged concerning the Chinese learner in various physical and social settings. Some work has appeared in anecdotal form as interested people return from living, learning and teaching in China and other parts of Asia, but most of the studies consist of academic research that has been published as individual papers and within edited anthologies of scholarly research. An increasing amount of knowledge has been collected in book form, edited by workers in the fields of cross-cultural social psychology, language and learning and related disciplines. Some of the more pertinent recent works are *Growing up the Chinese Way* (Lau, 1996), *The Ethnographic Eye* (Liu, Ross and Kelly, 2000), *The Chinese Learner* and *Teaching the Chinese Learner* (Watkins and Biggs 1996, 2001) and two anthologies of collected articles: *Chinese ink, Western pen: stories of China* (Baker, 2000) and *Sinophiles and Sinophobes: Western views of China* (Mackerras, 2000). These compendia and other related investigations contain important research

on what has seemed, until recently, a paradox of how and why students from a Confucian culture achieve and succeed so well in most educational contexts (Maley, 1983; Rao, 1996; Rosenthal and Feldman, 1996; Salili, 1996; Salili et al., 2001; Yum, 1988; Zeegers, 2001; and Zeegers and Martin, 2001).

Consideration of the theoretical background to Asian values and approaches to learning by research workers has given rise to investigations that are conceptually occidental. The majority of these contributions have been made by Western investigators working either in CHC environments or with CHC data obtained through intermediary CHC workers who have collected the data on students in Asian environments. An evaluation of the relevance of these imported ideas for non-Western countries following the CHC traditions is found in Allright (1996), Cortazzi and Jin (1996, 2001), Edmunds (2000), Furnham (1988), Hofstede and Bond (1988), Hill (2003), Jose (1995), Kember and Gow (1990), Kraft (2000), Kwan et al. (1994), Ng (2001), Renshaw and Power (2003), Salisbury (2000), Scovel (1983), Smith (2001), Thomas and Bain (1984), Wang (1991), and Watkins et al. (2002). Because the impact of cross-cultural differences and issues on values, attitudes and approaches to learning is the focus of this study, it is argued that an understanding of the nature of values and approaches to learning and possible relationships between them is essential before an examination of change is undertaken.

Any consideration of cross-cultural differences should include an understanding of Berry's (1989) distinction between 'etic' and 'emic' approaches to research. The 'etic' approach seeks to compare different cultures on what are thought to be universal categories. In contrast, the 'emic' approach compares concepts within a given culture. Therefore, as Triandis (1972) points out, there is a danger of so-called 'pseudoetic' research if concepts of one culture are imposed on another as if the concepts are universal (Watkins, 2003). Biggs (2001b) notes that this can occur if CHC students are pressured into thinking that studying in a Western culture requires acceptance of Western values and approaches to learning. The present study seeks to assess whether change actually occurs when CHC students live and study in a Western context. Consequently, value and learning constructs need to be examined over time in order to evaluate whether change does, in fact, take place.

#### The background to the proposed study

Most studies examining values and learning look at individuals or groups of people within their own cultural setting. This study considers Asian sojourner students who have come to Australia to study for a period of time in a new cultural setting. Therefore, factors such as the adjustment to a new physical environment, different living conditions to those found in the home culture and the change to a new language environment need to be compared to living and learning in a familiar environment that poses no threat to learners. This study considers only sojourner students because, as Chan (1988), Feather (1975, 1999), and Ninnes (1995) point out, migrant students are generally anxious to adapt to their new environment. Migrants tend to alter their value structures and even approaches to learning in order to be assimilated as quickly as possible before the effects of marginalisation impact on them. These adjustments are not as critical to sojourners who intend to return to their home countries when they complete their studies. Some groups of students may want to alter their values or learning approaches, but the choice is a personal one. The Asian beliefs that emphasise the importance of hard work and effort as well as the pressure exerted by the family on students to succeed academically do not appear to have the same impact in Western academic settings, particularly when the students are away from the influence of the family and home culture.

# An initial consideration of the value structure of CHC learners

Confucian heritage and ideology continue to have a very powerful influence in East Asia today. The CHC ideology has filtered down, in modified form, to overseas cultural enclaves where ethnically Chinese people live (Ghumann, 2000; Hofstede, 1980; Kim and Gudykunst, 1988; Sodowsky and Plake, 1992; Ting-Toomey, 1988; Winchester, 1996; Wu, 1996; Yang, C., 2000; Yang, R., 2000; and Yu and Atkinson, 1988). Therefore, Confucian ideology is an important cultural force in countries such as Malaysia, Indonesia, Japan and Korea. Moreover, in neighbouring Southeast Asian countries, the Chinese influence is especially strong in the areas of commerce and trade.

#### The significance of Confucian heritage culture (CHC)

Reference to the Confucian heritage has been made in the consideration of the value structures already mentioned. Some elaboration of this dominant cultural construct would seem to be necessary. In traditional Chinese society, the parent-child, family and neighbour relationships are built on blood and marriage (Chiu, 1989). Families tend to live in the same area of a town or city and they form tight networks that are rarely broken. Traditionally it is difficult to separate self and group identity. The collective is preferred to the individual in parent-family-neighbour interactions. Friendship and work groups are voluntary in their formation as members are not required to relinquish individual identity, but cooperation is expected in order to attain social and functional goals. Modernisation is perceived as a weakening influence on traditional family relationships. This is particularly important with respect to the possibly declining importance of the extended family structure that has been the nurturing unit in traditional Chinese society. Today many young people are exchanging the rural-based family lifestyle for a more urban way of life. This change has also increased the importance of voluntary associations in interpersonal behaviour, often making cooperation and self-reliance more important than belonging to involuntary groups like the family where social identity is more rigidly defined. Such changes tend to challenge the perceived importance of Chinese collectivism that has been a central focus whereby some expectations are enforced and others are not (Chiu, 1989; Jarratt, 2003).

#### The Chinese Diaspora and the traditional CHC value structure

In Hong Kong and other countries and societies such as Malaysia, Singapore, Taiwan, Macau, Japan and Korea as well as Mainland China, rapid economic development and industrialisation have tended to reduce the significance of the impact of the collective on individual behaviour. These external changes have led to changes in the socialisation processes that have produced significant modifications in the endorsement, teaching and transcendence of traditional Chinese values (Chiu, 1989). There are now more nuclear families living in large cities and even greater evidence of change arising from the one child family policy that is practised out of necessity in Mainland China as it once was in Singapore. These changes, in turn, lead to a weakening of traditional family values, magnify the growing importance of the individual and change the way in which cultural values are brought into operation. This provides a clearer understanding of a personal cultural identity, an important component of which is a person's self-concept. In Eastern culture, however, the major component of self-concept is the individual's social group membership that subsequently affects individual identity (Chiu, 1989).

#### Modernisation and Westernisation

Hong Kong is a major provider of students who travel overseas to study. Since July 1997, Hong Kong has been resumed into the Mainland Chinese fold and exists as a Special Administrative Region (SAR) where, in theory, one country supports two systems of political, social and economic belief and practice. This ideological position is guaranteed for 50 years unless the people of Hong Kong initiate change. However, Hong Kong is essentially Chinese and the following introduction provides some information on the preferred values that guide the living and learning approaches of over six million people. A discussion of the philosophical outlook of this Confucian-thinking microcosm also provides an insight into CHC thought.

Bond and King (1985) have examined Hong Kong, a former British colony that is ethnically 98 per cent Chinese, and its emergence from a period of rapid economic and population growth after World War II, to its status in the mid 1980s as a modern industrialised region. The Chinese have held the view that 'China was the whole world' (*tian xia*, literally 'under heaven'). Mainland China was and still is referred to as 'the Middle Kingdom' (*zhong guo*) because it was thought to be the centre of the world. Historically, educated Chinese have seen little need to go beyond national borders as they, in limited exploration, have found no other civilisation better developed than their own. Any novel idea that is thought to improve their lifestyle has simply been adopted (Bond and King, 1985). The expatriate foreigners living there are still called 'ghosts' (in Mandarin Chinese, *gui lao*), to be tolerated, learned from and worked with, but never fully assimilated into the Hong Kong milieu.

This attitude extends to the Chinese understanding of Westernisation and modernisation. Modernisation is perceived to involve technological, behavioural and material progress, whereas Westernisation involves the adoption of values, thinking and traditions that originate in the West. Therefore, the Chinese are able to preserve their interior Chinese domain as culturally inviolate by rejecting Westernisation while simultaneously embracing modernisation. This distinction allows modern Chinese to adopt what they like from the West while still preserving Confucian values such as filial piety, thrift, respect for the teacher and the veneration of ancestors (Bond and King, 1985). The bifurcation created by these definitions has allowed technical modernisation to be applauded while condemnation of spiritual pollution of the culture is allowed to continue. In the time just prior to July 1997 and the resumption of Chinese sovereignty over Hong Kong, local Chinese did not seem to be apprehensive. After all, they said, 'we are all Chinese and that is all that matters'. As Hong Kong becomes more Chinese and less British in character, the life values and approaches to learning of students may change as well (Chong, 2002; Jose, 1995).

However, as long as the money is available students continue to seek overseas academic qualifications, as they are perceived to be more prestigious than locally acquired degrees. Further, it is easier to study in Australia as students are not subject to the quota system that exists in some countries with large ethnically Chinese populations such as Malaysia. The principal requirements for entrance into most degree programs are a high standard of English and sufficient personal funding to guarantee the payment of university fees and living costs. The students who choose Australia must be accommodated in the Australian living and learning environment. The accommodation process may involve substantial value changes as well as changes in approaches to learning of Asian students living in a country that embraces a Western value system and concomitant styles of teaching and learning.

#### Living in Mainland China and Confucian values

The social and cultural environment in Mainland China today needs to be compared with what previous investigators have encountered in Hong Kong, Malaysia, Singapore and other Western-influenced Asian countries because of the historical and philosophical importance of Mainland China as the birthplace of the Confucian ethos. This may then be contrasted with conditions that are encountered in Western cultures. The principal reason for making these comparisons is that Mainland China today is essentially a third world nation in the throes of an acculturation and readjustment process that has been brought about by its change from an isolated, insular country to one now attempting to compete economically with first world countries. In the course of this readjustment, there has been a growing urgency to make the changes necessary within the education system either in situ or by sending scholars abroad to learn how to initiate this change. In order to understand the full extent of the changes taking place and their implications for the Chinese people as they struggle to readjust, it is necessary to look at what exists in Mainland China today (Davis, 1995; Eckholm, 2000; Gittings, 2002; Hansen, 1985; Hayhoe, 1994, 1996; Lau 1996a, 1996b; Lau and Yeung, 1996; and Ping, Lee and Solomon, 1997).

Confucian values encourage strict morality that Cheng (2000) has been found to be as important as academic success to most Chinese families. However, Garrott (1993, 1995a, 1995b) and Zhang Zhen (2001) have found that there is a growing preoccupation with the concept of self and less of an inclination to show filial piety particularly among young people in Mainland China. This may be partially accounted for because of the implementation of the one child policy. The emergence of the socalled 'little emperors' who are over-indulged children is a very real outcome. Today, in Mainland China, there are potentially six people to look after every child. Therefore, when faced with the need to be independent in a Western setting, the following question needs to be addressed: how is it possible for such indulged young people to survive? Even now, Chinese students speak of having to do things for themselves such as cooking and washing clothes that they have never had to do before (O'Halloran, 2002). Australian students are expected to manage when faced with a personal or academic challenge. Conversely, most Asian young people have managed at home because there is an extended family network to support them, but can they live alone in Australia and meet the challenge successfully when they come to live and study for periods of two or more years?

Asian students come from an environment that acknowledges the importance of the group as instrumental to living. Confucian ideology is the constant cultural force that shapes both the individual student and the group collective in their home countries. This study involves an examination and identification of the changes in values that may occur when Asian students move from their home environment to a Western setting in order to broaden their educational experience.

#### An initial consideration of the approaches to learning of CHC learners

#### The changing learning environment

The learning situation in East Asia is influenced by a growing globalisation of ideas and attitudes. The worldwide transmission of Western culture and knowledge by organisations such as the BBC provides free access to news, current affairs, cultural and educational information through radio and television broadcasts and over the internet. This perpetuates the impression that the world is becoming metaphorically smaller and people, therefore, need to learn English to survive. Because of the worldwide usage of English, it has become a mandatory acquisition (Pennycock, 1996). Therefore, it is an aim of this study to investigate the changes in learning processes that may occur when students move from a CHC educational environment to a Western academic environment where English is the principal medium of instruction.

#### Previous research undertaken on learning in a CHC environment

Biggs (1994, 1996b, 1996c, 1999a, 2001a, 2001b) has advanced the idea that CHC students prefer deep memory-based strategies of learning that are more likely to achieve better academic results. This knowledge has enabled many Western observers to understand how CHC students consistently achieve at such a high level in examinations that require more than extensive superficial learning (Fan and Karnilowicz, 1997; Gu and Johnson, 1996; Pearson and Beasley, 1997, and Wen, 1993). Biggs (1996b) believes that this is due to students' strong sense of competition in academic endeavours and their ability to carry out deep memorisation. In this way, CHC students learn what they need to know by using a form of learning that produces immediate recall as well as long-term conceptual understanding.

#### The apparent paradox of Asian learning

Most CHC classroom settings appear to be large and impersonal to the Western observer. Similar learning environments are found in Mainland China, Malaysia, Hong Kong, Taiwan, Singapore, Japan and Korea where large teacher-centred classes are usual. There are normally over 40 students in most classes (Cortazzi and Jin, 1996, 2001). Students consider the teacher, his or her knowledge and their textbooks as the final word on what is to be learned. Learning is essentially preparation for the highly competitive external examinations that may determine a student's academic future (Eckholm, 2000). Moreover, in CHC classrooms resources are far fewer and support services, such as teacher aides, counselling and parental in-classroom help, are almost non-existent. Yet the high level of cognitive skills and the outstanding examination results obtained confound the obvious paucity of facilities that are considered to be essential in Western learning environments (Biggs, 2001b).

#### Compliance, passivity and academic success

It is necessary to add to this description the reported relative passivity and compliance of the students and their apparent lack of participation in class discussion in the CHC environment (Volet and Ang, 1998; Volet and Kee, 1993). The students' unquestioning acceptance of the teacher's knowledge endows learners with all the elements usually associated with the Confucian ethos, filial piety, strict discipline and proper behaviour in the classroom, and represents a transfer of the Confucian philosophy into the academic setting. Students are considered to be repositories of information that can be recalled and recited, often verbatim, at the teacher's command (Biggs, 1996b; Murphy, 1987). From a Western perspective CHC students should not be achieving so well when coming from classroom settings that use memorisation and repetition as a strategy of learning and they should not show such a strong preference for high level, meaning-based strategies as they do and succeed at very high levels. The paradox here is that in CHC classrooms highly adaptive modes of learning emerge and the students flourish academically (Biggs, 1996a; Hess and Azuma, 1991; Stigler and Hiebert, 1999). CHC students' overt docility when combined with their high level of industry make these perceived limited learning conditions in their own country workable, and helps to maintain their diligent, highly motivated approach. Their receptivity to learning makes the success gained by the students' own efforts, rather than their innate ability, so worthwhile in their eyes, even when they are subjected to harsh criticism by both parents and teachers if they fail to achieve. Their approach to learning is successful in a CHC environment, but does it transfer to a Western learning environment or does it require modification for affirmative outcomes?

#### The relationship between values and learning

A principal purpose of this study is to investigate the nature of values and approaches to learning of CHC students. Therefore, in order to achieve a better understanding of these constructs it is necessary to: (a) study the tenets of Confucianism and the heritage that guides the values and approaches to learning of students from ethnically Chinese and East Asian backgrounds; (b) review the research that exists on values and approaches to learning of students transplanted to a new and different social and cultural setting for the purpose of study; (c) investigate the relationships between values and learning approaches; and (d) study the changes that occur in values and approaches to learning in new physical, psychological and sociocultural environments.

#### Studying in an English-speaking country

Students seek access to the fluent use of English because they see this skill as a pathway to social and economic advancement. The desire of students to learn the language in an English-speaking environment is the point at which this study begins. However, it is the attitudinal and cultural changes that may cause problems of adjustment for students particularly if the move necessitates a change in inherent value systems and approaches to learning. Therefore, the primary purpose of this study is to investigate what happens to existing value constructs and approaches to learning when students move temporarily to live, work and study in a new cultural and educational environment in which English is the principal language of communication.

#### The impact of environmental change on values and learning

Relatively little is known about the impact of studying outside Asia on CHC students' values and approaches to learning. Most institutions of higher learning expect an assimilation of local values and approaches to learning by sojourner students. Therefore, the purpose of this study is to gain knowledge of Asian students in Australia. Previously published research by investigators such as Keats and Fang (1992), Kim (1988), Kirby et al. (1996), Smart, Volet and Ang (2000), Volet and Ang (1998), Volet and Kee (1993), Volet and Pears (1994), Volet and Renshaw (1995, 1996), Volet, Renshaw and Tietzel (1994), and Winter (1996) has examined the responses of students in new learning environments. A longitudinal study is planned to gather the data for the current investigation.

#### The impact of employment on values and learning

Many students undertake part-time employment. This can impact on both values and approaches to learning. Most CHC students do not work while studying in their home country as their families support them physically, financially and socially. Students who work do not have as much leisure time and may experience greater pressure to complete assignments on time. They may become physically stressed and this can accentuate feelings of loneliness and isolation (Burns, 1991). However, if they need to work, they must also learn to apportion their time and energy to accommodate to their new responsibilities.

#### Universities and international students

Australian universities have accepted the responsibility to be proactive in fostering cross-cultural interaction. The ever increasing numbers of Asians coming to Australia to study would appear to require that Australians know more about these students so that their scholastic undertaking is positive, constructive, and ultimately successful (AEI, 1999; Bohm, 2002). In this way their sojourn is also likely to be academically productive.

Teasdale and Ma Rhea (2000) point to the need for Western universities to accept many forms of knowledge and cultural beliefs. The desired outcome is a sharing of cultural values and beliefs when CHC students come to Australia to study without demanding assimilative change so that when they return to their home countries, they are able to fulfil the expectations that their families and the community have. The globalisation that comes through living and learning in a new environment does not require a collateral homogenisation of ideas. If overseas students are encouraged to maintain their cultural affiliations, the retention of preferred values and approaches to learning is likely to result (Ma Rhea, 1995; Masemann, 2000; Teasdale, 1997, 1998; Teasdale and Ma Rhea, 2000; Teasdale and Teasdale, 1999). Moreover, by fostering social cohesion, the potential of a cultural divide may be bridged.

#### **Methods of Inquiry**

For this study models and associated research questions need to be developed in order to examine and investigate values, approaches to learning, and the possibility of a relationship between these constructs. Examination of their dimensionality is also necessary particularly if change is to be examined over time. Models have to be advanced to understand and evaluate the relationships between the constructs associated with values and approaches to learning both in Asia and as well as over time in Australia. Moreover, these models need to be tested to see whether they are accurate representations of the students' world. These models are also the source of the major links that describe the relationships between values and approaches to learning in different cultural settings. The investigation tests the hypothesised relationships through an analysis of the data collected using questionnaires as well as an examination of recorded interview data.

If values and approaches to learning are to be measured and investigated, appropriate instruments are needed that permit the estimation of these constructs in a culturally inclusive manner. This requires the use of validated instruments that measure (a) values, including those that are important in Confucian cultures; (b) approaches to learning that reflect a diversity in learning motivations and strategies; and (c) the utilisation of instruments where language does not inhibit students' ability to respond to self-report questionnaires. This latter issue may be overcome by presenting materials in a bilingual format that have been tested and back translated for accuracy of meaning. If these criteria are adequately met then realistic measurement of values and approaches to learning may be undertaken. The intention is to measure these constructs on several occasions over a period of two years. This constitutes a longitudinal study that research workers such as Goldstein (1979, 1997), Willett (1989, 1997) and Willett and Singer (1997) have shown to be the most successful method to measure change over time if it occurs.

#### Conclusion

On the completion of the study, the investigation should provide enhanced understanding in five principal areas: (a) what the Confucian heritage culture (CHC) students' values are; (b) how students from a Confucian culture prefer to learn; (c) increased knowledge of relationships between students' values and approaches to learning; (d) whether there are changes in CHC students' values and approaches to learning that are general or specific to the particular groups of students that exhibit change; and (e) what factors influence changes in values and approaches to learning. Therefore, after at least two years of study by CHC students in Australia, it is anticipated that the measurement and examination of change in students' values and approaches to learning should provide data that answers these and other questions that may be raised.

Ultimately it is important to know more about Asian students who come to Australia to learn about life in a first world country in order to understand what the important values and approaches to learning are in cultures that follow the Confucian tradition. If it is possible to ascertain what is important to people from a Confucian culture, then it is possible to accommodate them successfully in this country. These students come to Australia to learn about the English language and Western culture. Some groups of sojourner students may modify their value structure and approaches to learning while they are in Australia. However, if they prefer to retain CHC values and learning approaches, these learners may need to be accepted as they are. By accepting students as they are, respect is shown for what they believe without requiring conformity to an Australian system of values or assimilation into an Australian way of learning. Thus the importance of difference is recognised. If this does not occur, there is likely to be a breakdown in communication and isolation rather than an acknowledgement of the contribution of difference to living and learning in a changing world.

It is difference that must be recognised and accepted because it is the acceptance of what is different as being of equal value to what already exists in Australia that can lead to effective globalisation of values and beliefs on educational practices. Understanding and acceptance of difference is a primary goal of this study and should be a primary aim of education in the twenty-first century.

# **2** Factors and Issues Influencing Life Values: Beyond the Chinese face

#### Preface

The subheading that has been chosen for the title of this chapter reflects the crosscultural insights obtained from psychology and social science that are contained in Bond's (1991b) book *Beyond the Chinese Face*. In the preface to this work Bond (p. v) compares André Maurois' reflection: "A people is a mirror in which each traveller contemplates his own image" to his insights of life in Hong Kong. Bond's choice of book title seems to infer that there is a need to look beyond the obvious to understand the observed. Bond refers to a golden thread that draws Eastern and Western traditions together and enables plausible comparisons to be made between the contrasts that are observed. He points to the confrontation with difference that creates a scientific basis for unity across cultures. Bond asserts that it is through scientific exploration that cross-cultural differences diminish and cease to matter. Bond also indicates that it is the large power differentials that exist in Chinese culture which make the rule of law seem ineffectual and the supportive network of interpersonal relationships a defence against these apparent inequalities (Bond, 1991b).

The strength of traditional Confucian cultural relationships often comes as a surprise to Western-trained social scientists. Two examples that are cited by Bond in this work are (a) the success of migrant Chinese students in the Australian education system, and (b) the economic success of the so-called four 'little dragon' societies (Hong Kong, Singapore, Taiwan and South Korea). These societies have averaged annual national growth rates that are over four times greater than the rate of economic growth in the United States measured over the last 20 years (Bond, 1991b, p. *vi*). In addition, the Third International Mathematics and Science Study (TIMSS) test results and PISA performances have shown that students in Asia and in Hong Kong, Korea, Japan, Taiwan and Singapore, in particular, have done and continue to do better in

mathematics and science than their North American counterparts (Bond and Hwang, 1986; Mok et al., 2001).

The recent economic success of societies in Southeast Asia provides a setting for the present study that measures and examines values in a new and different cultural environment that ethnically Chinese students bring with them as they move from Asia to Australia to live and study at the tertiary level. This study examines the nature of values and approaches to learning and investigates the changes that occur while students live and study in Australia in order to obtain university qualifications from a Western-style institution.

#### Introduction

This chapter examines knowledge and beliefs about values. It begins with a historical consideration of the importance of values in society and in Confucian cultures, in particular. The chapter provides an introduction to instruments that are used to measure values and gives definitions and examples of Confucianism and Daoism, the pillars around which Chinese values are built. The chapter continues with an examination of research into the value systems of students from a Confucian heritage culture (CHC), particularly, with respect to changes in values that occur as a result of cross-cultural contact.

#### Historical overview of research into value systems

Research into values has been carried out for nearly a century. In this research there is usually an implication that change occurs over time. Examples of causes of change are an alteration in lifestyle, cultural environment and economic circumstances. Inferences in reports of research indicate that any one or a combination of these factors can cause values to change. However, there has been little previous work that substantiates this idea, or with the development of values as adolescents grow into adulthood in culturally altered environments.

Allport (1924) and Rokeach (1973) were notable among the many research workers who carried out early work into the measurement of values. Schwartz also undertook studies that modified and advanced earlier work. He developed an instrument that was suitable for the assessment of contemporary value constructs in Western value systems. Schwartz (1992, 1994a, 1994b, 1996) also argued that his value survey was a suitable instrument for the measurement of values at the individual level within particular cultures. However, at the country level and even in enclaves within a country, this instrument might not be meaningful for groups in which Confucian values were predominant (Smith and Schwartz, 1997). None of the instruments that have been developed by workers in Western countries would appear to measure values that are particularly important in the lives of people living within a Confucian culture.

Bond and his colleagues, who called themselves the Chinese Culture Connection (CCC, 1987), constructed a measurement instrument that included values which were important to country groups that subscribed to Confucian values. Values such as filial piety, respect for elders and tradition were not unique to the Chinese, but they were considered to be more important in a cultural environment where Confucian values took precedence over Western values (Withers, 2004). Therefore, the measurement instrument developed by the CCC entitled the *Chinese Value Survey* (CVS) would appear to be appropriate and sensitive enough for the measurement of values that were uniquely Asian and important in an Eastern lifestyle.

A discussion of values and their place within a cultural context has universal relevance. However, before embarking on a discussion of the meaning and place of values in society, an understanding of the history of the Chinese value system is necessary because if a change in values occurs it needs to be understood in the context in which change takes place. Chinese values have two principal sources: Confucianism and Daoism.

#### Confucianism

Confucianism is a system of belief that is ethical in nature. It stresses the primacy of the family and the importance of collective over individual needs. Individual behaviour is regimented; loyalty to the group and consideration of others is expected as is the respect shown for parents, the group collective, family members, community leaders and ancestors. Leaders of the community may include teachers and others who influence, teach and guide young people and adults (Yen Mah, 2000; Wang, 1998).

One of the primary consequences of education in the Confucian tradition is correct and proper behaviour that is based on high morals and strong values. It follows, therefore, that excellence in moral, academic and physical education is of paramount importance to people from a culture steeped in Confucian heritage. The importance this culture places on education cannot be underestimated. The emphasis on the significance of education helps to explain behaviour that demonstrates the importance of knowledge which, as a product of education, appears to have a value worthy of making any sacrifice necessary. Scholars and teachers are respected as societal models of excellence. Their knowledge and wisdom are universally accepted and imitated in Confucian society. Even in the twenty-first century, knowledge that is imparted by teachers is rarely questioned or debated. It is accepted as truth. This concept has evolved out of a patrilineal system that stresses the importance of moral and social order in group and community regulation (Yen Mah, 2000; Wang, 1998).

#### Daoism

The *Dao* or 'the way' is a belief about personal salvation and is seen as a complement to Confucianism. Daoist belief represents an end state of existence, the liberation of consciousness and a transcendent immortality. In order to attain this state the Daoist aim is to live in harmony with nature and accept whatever follows because to live wisely is a goal in itself. This lifestyle requires moderation in all things, following the so-called 'middle way' and following the precepts of *yin* and *yang* that are opposite but essential elements of all objects and explain their characteristics. The *yin* is perceived as the negative element. It is passive and female and associated with the earth. The *yang* is considered to be positive, active and male. The *yang* is associated with heaven in Daoist philosophy. The *yin* and *yang* are used to explain the differences in objects in the universe and bring order out of chaos when they are in balance. Therefore, Confucianism stresses order as coming from human activity and Daoism stresses order in the natural world (Baynes, 1990 (as a translator of Lao Zi); de Bary, 1983; de Bary and Chaffee, 1989; Dong, 1996; Wang, 1998).

Yen Mah (2000) in her explanation of the writings of Confucius and Lao Zi's teachings in the work: *I Ching: the book of changes*, writes that Confucius believed that religion should exist for the purpose of education and moral development. Filial piety is part of that process and involves service and respect for parents. It begins with the individual's group or a country's leader and ends with the establishment of a person's character. Therefore, if an individual loves and respects his or her parents,

the person would be unlikely to show disrespect or hatred for others. In doing what is considered to be correct, the person also shows good morals and has a good name to pass on to his or her descendants. This also serves to glorify the person's ancestors. Thus the family becomes the bridge between the individual and society. It is fused together initially by blood, property and shared responsibilities as well as by common ideals such as the love of virtue and honour as well as earthly goals such as success, longevity, happiness and many sons.

Confucius also believed that the *dao* or the way represented a positive and just force in the universe. It was the source of truth and therefore knowledge, goodness and moral law. He also said that good or evil deeds entail their own consequences. Confucius did not believe in the reliance on spirits but felt men should direct their own destiny. Immortality was obtainable through an individual's personal endeavours as well as through virtue and wisdom (Yen Mah, 2000).

Moreover, everyone is given the chance to improve through education. An individual's position in society is realised through hard work. It is achieved by actively using given ability and not by mere heredity. Therefore, nobility is based on merit not birth. Consequently, Confucius, in his acknowledged agreement and in conjunction with the teachings of Lao Zi, said that there is no class distinction in learning and thus anyone willing to make the effort would gain wisdom, a quality that Confucius considered worthy of the effort to attain that state. Confucius and Lao Zi are thought to have been contemporaries who had met. They espoused similar philosophical ideas (Yen Mah, 2000; Wang, 1998).

#### The Meaning of Values

Values hold a critical place in a number of academic disciplines; they include social psychology, sociology, anthropology, education, philosophy, religion and history (Feather, 1975). The very diversity of meanings of the construct of values requires a focus, which in this study is the social psychological nature of values and value systems. Values, as defined by Williams (1979, p. 20), refer to interests, desires, goals, needs and standards of preference. They are analytical constructs by definition and are not object-bound. People may have similar values but to different degrees. Values have cognitive, affective and behavioural aspects. Consequently values also serve as criteria for the choice of actions and they may become criteria for judgments, preferences and choices. The use of value judgments is found together with systems of knowledge and belief, and as judgments of what 'should be' in relation to what 'is'. Therefore, changes in values may affect concepts of reality. Different societal groups often have very different patterns of values. This may occur in the hierarchical arrangement of values, in their order of importance and in the relationships that exist among them (Anderson and Bloom, 2001; Bloom, 1956; Krathwohl et al., 1964; Pratt, 1992; Williams, 1979; Yang, 1986, 1996).

Values occur as part of a system of beliefs. Therefore, a value system is an enduring organisation of beliefs relating to preferable modes of behaviour along a continuum of relative importance. The antecedents of values are culturally embedded in society and its institutions. Their consequences are manifest in an individual's actions and lifestyle. Moreover, values are enduring but not rigid or unchanging (Feather, 1975). It is the cultural basis of values and the changes that may occur in an individual's value structure as students move overseas to study that forms one focus of the present investigation.
#### Value perceptions

The valence of values is the extent to which they impact on people's lives. They can vary in intensity and power. Values are held as general beliefs whereas specific beliefs and attitudes are associated with particular objects and events.

Values are organised into value systems. These systems are used by people to resolve conflicts and make life decisions. Therefore, values and their attendant systems are presumed to function as providers of the standards that guide thought and action. All values are self-serving and help individuals adjust to society, defend their egos, if threatened, and test reality (Feather, 1999).

#### Values as behavioural influences and guides

Values may lead people to take positions on social issues and predispose people to a particular political or religious ideology. Values shape the standards involved in interactions with others, either to persuade and influence or to protest and challenge the ideas, attitudes and beliefs of others (Allport, 1924; Rokeach, 1973; Sacks, 2003; Saha, 2003; Saha and Tuijman, 2003).

Values are considered to influence social behaviour under a given set of conditions. Value systems have an anchoring effect on culture and groups with similar ideologies. Therefore, they can alter as life and temporal values change. Values may also modify lifestyles with the passage of time. Research on values and behaviour in both Eastern and Western societies at the group and individual level is the focal point of this chapter. It should be noted that the terms Eastern, Asian and Oriental are used interchangeably with respect to discussions on values and learning in this and subsequent chapters of this study.

Values may be expressed in universalistic statements of what is thought to be desirable or attractive. However, values do not normally contain expressions of how they are to be realised. Some types of behaviour are specific actions that occur in a specific place at a specific time. They are related to the way values are realised in a particular context (Smith and Bond, 1998).

Studies that have measured values, such as those carried out by Bond, Leung and Schwartz (1992) propose that differences in behaviour may be accounted for by the expectancies of an individual or the degree of embeddedness in his or her culture rather than by the subject's own fixed values. The studies uphold this point of view and indicate that the degree of a person's involvement in his or her own culture is likely to relate not only to the values the person holds but also to the individual's actions. Accordingly, these action-outcome expectancies are shaped by the culture in which an individual lives (Smith and Bond, 1998).

#### Value types and their measurement

Values are divided into two fundamental groups: *instrumental* and *terminal*. Instrumental values are concerned with preferred modes of conduct. Terminal values are grounded in the desirable end-states of existence. Terminal values may be personal or social; therefore they are either self- or society-centred. There are also two basic groups of instrumental values: moral values and competence values. Moral values are related to modes of behaviour and have an intra-personal focus. Rejection of these values may produce a sense of guilt in an individual. Competence or self-actualisation values have a personal focus. Violation of these values may give an individual a sense of shame about personal inadequacy rather than a sense of guilt.

Therefore, there are two distinct perspectives from which values may be viewed: the values which objects have and the values which people hold (Rokeach, 1973).

Instrumental behaviour was considered by Rokeach (1973) to involve actions directed toward goals. Instrumental goals were, in turn, directed toward terminal goals. Some paired examples of instrumental (I) and terminal (T) goals were: (a) ambition and imagination (I), that might be directed toward the achievement of a comfortable lifestyle or social recognition, and (b) respect or admiration (T). Terminal and instrumental values were measured in the *Rokeach Value Survey*. The *Schwartz Value Survey* (Schwartz, 1992) also used an enhanced selection of both instrumental and terminal values.

Schwartz (1992, 1994a, 1994b, 1996), Schwartz and Bilsky (1987, 1990), Schwartz et al. (2001) and Smith and Schwartz (1997) built on ideas originally developed by Rokeach (1973). Schwartz (1992) said that values were the criteria people used. He indicated that values involved three requirements for life: (a) biological needs, (b) requirements of social interaction, and (c) demands for survival and group functioning. Further, he said that there were specific values which both groups and individuals utilise cognitively to explain and justify behaviour (Schwartz, 1992). This led Schwartz to construct a typology of values that may be distinguished by the particular motivational goals that the value types represent. In his typology, there were ten distinct motivational goals with related value types listed in Table 2.1 along with 56 values that were used in summarising motivational goals. Many of Schwartz's 56 values came from Rokeach's (1973) original survey. Others were added to make the survey more culturally inclusive (Schwartz, 1992). The phrase that follows each motivational goal in Table 2.1 describes it more fully. This explanation is followed by synonyms that apply in different situations. It should be noted that values in square brackets are not used to specify the standard indices for value types because their meanings are not consistent across samples and cultures (Schwartz, 1996).

In the questionnaire developed by Schwartz, survey participants were requested to rate each value for its importance to them with (7) as 'being supremely important' to (-1) as 'being opposed to the person's values'. Therefore, Schwartz (1992) also allowed for values to which people might be opposed as well as differences in the way people rated values. By using a nine point Likert scale, a wide range of estimations on individual values could be elicited.

In Figure 2.1 Schwartz (1996) places his values in a circular arrangement whereby adjacent types are compatible and opposites may cause conflict. Figure 2.1 also shows the four superior value types that form two bipolar dimensions. In this way, Schwartz (1992) combines the ten value types into four higher order types representing the four quadrants of a circular space. For example, value types that involve conservation combine security, conformity and tradition to create a dimension that is ideationally opposed to having independent thought and action and reflects an openness to change in contrast to self-limitation and preservation of traditional thought. Therefore, self-transcendence is opposed to self-enhancement and openness to change is opposite to conservation.

Another area of contrast occurs between value types that involve self-enhancement where power and achievement are combined, and self-transcendence that combines benevolence and universalism. This latter dimension places values such as concern for the welfare of others in conflict with the pursuit of personal success and dominance over others. Some value types such as hedonism have shared elements of both openness to change and self-enhancement.

Power	Social status and prestige, control or dominance over people and re- sources. (Social Power, Authority, Wealth) [Preserving my Public Image, Social Recognition]
Achievement	Personal success through demonstrating competence according to social standards. (Successful, Capable, Ambitious, Influential) [Intelligent, Self-Respect]
Hedonism	Pleasure and sensuous gratification for oneself. (Pleasure, Enjoying Life)
Stimulation	Excitement, novelty, and challenge in life. (Daring, a Varied Life, an Ex- citing Life)
Self-direction	Independent thought and action-choosing, creating, exploring. (Crea- tivity, Freedom, Independent, Curious, Chooosing own Goals) [Self- Respect]
Universalism	Understanding, appreciation, tolerance and protection for the welfare of all people and for nature. (Broadminded, Wisdom, Social Justice, Equal- ity, a World at Peace, a World of Beauty, Unity with Nature, Protecting the Environment)
Benevolence	Preservation and enhancement of the welfare of poeple with whom one is in frequent contact. (Helpful, Honest, Forgiving, Loyal, Responsible) [True Friendship, Mature Love]
Tradition	Respect, commitment and acceptance of the customs and ideas that traditional culture or religion provide the self. (Humble, Accepting my Portion in Life, Devout, Respect for Tradition, Moderate)
Conformity	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms. (Politeness, Obedient, Self-Discipline, Honoring Parents and Elders)
Security	Safety, harmony and stability of society, of relationships, and of self. (Family Security, National Security, Social Order, Clean, Reciprocation of Favors) [Sense of Belonging, Healthy]

**Table 2.1** Definitions of motivational types in terms of their goals and the single values that represent them

Source: Schwartz, (1996) scanned from Feather (1999, p. 58)

*Note:* The values in round brackets come from the Schwartz Value Survey. The Survey consists of 56 values that are based on the analysis of the 10 motivational goals listed on the left-hand side of the Survey. The values in the square brackets are values not used in the computation of the indices as their meanings are not consistent across samples and cultures. These meanings are more culturally specific (Feather, 1999).

The wheel-like arrangement of value groups displays related and opposite values graphically. Value types that are close together are highly correlated. As the distance between values increases, the correlation drops. Schwartz uses smallest space analysis (SSA) in the examination of value systems. In SSA as developed by Guttman (1968) and discussed by Shye (1997), values are represented by points in a multi-dimensional space. The distance between the points reflects the relationships between the values that are measured and the correlations between the assessment of their importance. The closer the relationships between values conceptually, the closer are their location in the multi-dimensional space (Schwartz, 1992). This account of values relates to the analysis of data on values at the individual level.



Figure 2.1 The prototypical structure of value systems

Source: Schwartz (1996) in Feather (1999, p. 59)

Work undertaken at the cultural level revealed some differences in values prevalent in Western and Eastern cultures. For example, analyses of samples from Mainland China did not relate particularly well to samples taken from Japan, Singapore, Taiwan and Hong Kong.

This might have been due to the socio-economic differential between Mainland China and other more developed countries and regions. This tension was further heightened when comparisons between cultures favouring individualism over collectivism were made (Schwartz, 1992). For this reason, the *Schwartz Value Survey* was not selected for this study. Although excellent in conception, the *Schwartz Value Survey* was a Western instrument in its construction and conceptualisation. Therefore, it did not appear to be as suitable for the measurement of the values of students from Confucian cultures where Eastern life values were predominant.

# Measurement of Vietnamese migrant adaptation to the Australian cultural context

Ninnes (1995) examined the values of Vietnamese migrant students in Australia. He used the *Schwartz Value Survey* (1992) to measure students' values, and gathered data on senior secondary students to try to ascertain whether values changed in a new social and physical environment. He noted that time was an important factor in the retention of values in migrant groups and that even when assimilation into the host

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culture had commenced, home country values might be retained. Ninnes viewed the school as an agency for change in attitudes, values and behaviour of the young and he focussed on aspects of cultural values, attitudes and aspirations as manifest in students' language usage and behaviour.

Ninnes (1995) also examined cultural change using the model that Kim and Hurh (1993) proposed based on their work with Korean migrants in the United States. They described the modes of adjustment as follows: (a) replacement as the assimilation of the new culture's values or acculturation, (b) attachment as the retention of home culture values with little acceptance of the host culture's values or pluralism, (c) addition attachment as in (b) and selective acceptance of host culture without loss of home cultural values, (d) blending as similar to (c), but greater acceptance of host culture's values and some loss of home culture identity or melting pot, and (e) marginalisation as the loss of home culture values but little acceptance of host culture values.

This pattern of migrant adaptation to new host cultures has been cited in previous work by Berry (1988, 1989, 1994), Berry and Sam (1997), Feather (1975, 1979) and Feather and Wasyluk (1973). However, Ninnes (1995) observed that an intermediate set of values appeared to develop in Vietnamese migrant students after exposure to Western culture. The new value groups fell in an area between Eastern and Western values. Ninnes described the groups and their value changes in terms of his own definitions combined with those of Kim and Hurh (1993) as follows: (a) conservers-recent arrivals who retained Vietnamese values in an attachment type of adaptation; (b) enhancers-long time residents who showed replacement adaptation; and (c) two intermediate types in terms of time in Australia and age on arrival in Australia. These two types were: (c-1) high transcenders who considered personal equality more important than academic achievement; and (c-2) low transcenders who preferred to blend Vietnamese and Australian values. Ninnes noted that long-term residents of Australia who arrived at a young age appeared to show the greatest change in values as did males and students without strong religious affiliations. Ninnes also implied that long-term Vietnamese residents of Australia appeared to be moving towards the adoption of Western values as in a replacement mode of adjustment. These students appeared to be assimilating Australian values in the process of acculturation and were rejecting the values of their Asian heritage. Ninnes' (1995) findings have important implications for the present study as the student groups come from a geographical area where CHC influence is strong. The present study examines the likelihood of change in sojourner students who generally do not experience the pressure to conform to the value structure of the host culture that migrant groups appear to encounter.

#### Further research undertaken using the Schwartz Value Survey

Astill (1998) also examined the influence that the home, the family, the peer group, the teacher and the school had on the value systems of senior secondary students in Australia using the *Schwartz Value Survey* as a measurement instrument. He found that the family and the peer group had strong influences on students' values. However, the school setting appeared to have little direct influence on students' values except through the influence of the peer group. Teachers in the school setting also did not appear to influence students' values to any measurable extent.

#### The hierarchical nature of Asian value formation

These findings appear to be in direct contrast to the hierarchical and highly structured nature of value formation and implantation in CHC cultures. In Asia, values are moulded and shaped in the family setting. It is argued that they are modified and confirmed in the educational environment with the teacher as the role model whereby teachers' values are imitated and adopted by pupils as they always have been in Confucian society. Thus the school or learning environment is critical in shaping value constructs in CHC society. The family may instil values initially but it is the teacher's influence and the learning environment that modifies and shapes what the family implants (Ho, 1986, 1994; Hsu, 1972; King, 1985; Lee, 1996; Perkins, 2000; Wang, 1998; Wang, 1991, 2002; Yang, C., 2000; Yang, R., 2000; Yen Mah, 2000). Therefore, it is argued that if the place of learning changes as occurs when students come from Asia to Australia to study, it is possible that values may be modified over time. Further, in Western societies, social values are argued to be moulded initially by the family and later by the cultural influence of the peer group. However, in CHC societies, social values are considered to be formed in the family setting, culturally moulded and reinforced by the teacher and the school environment and only marginally influenced by the peer group and factors that are external to the family and the learning environment (Ho, 1986; Yen Mah, 2000).

#### Values and culture

Great care is needed when assessing the importance of specific values in particular cultures. For example, in Asian societies, the group and its needs generally take precedence over individual needs and values. Socialisation occurs primarily at the group level and individual needs generally receive secondary consideration. All people want freedom and equality to develop and grow as individuals and in Australia there is a marked distrust of status seekers and authority. Therefore, the ease with which a value is activated in a given setting depends on the importance of the particular value within a given cultural context. Harmony is essential in Asian cultures for the smooth functioning of the group and the achievement of its goals. If success places an individual above his or her group, then disapproval of the achievement may occur if it represents a threat to group harmony. In most societies, peace is achieved by compromise (Feather, 1993a, 1993b; Forgas, 1988; Fukuyama, 1998; Ghuman, 2000; Kim, 1988; Kim et al., 1994; Kim and Gudykunst, 1988; Triandis, 1972; Tu, 2000).

Therefore, values and culture are closely linked. Value systems vary across cultural groups. The antecedents of values involve the cultural context of individual group members. In this study values that are important in the lives of students who come from a Confucian culture are measured and examined.

#### Assimilation of values in migrant groups

Feather (1979) investigated the value systems of migrant groups in South Australia. He compared the values of migrant groups with those in the wider host society. He looked at similarities and differences that might lead to changes in the value systems of migrants in Australia. Feather considered the ways migrants perceived the need to adapt to a new culture. He pointed out that life itself is a series of transitions: from school to work, from one job to another and from work to retirement. Each transition involved change; some changes were minor, others were very challenging. However, some changes like migration to a new culture and physical environment required

much greater adaptation if the individuals were to experience an effective lifestyle in their new environment.

Migrants leave behind their entire support network, built up from early childhood, in order to live in a new country. Their new culture may be very different to what they previously knew. A new language, different patterns of beliefs and values as well as behaviours may confront them. Institutions and social structures may also be new. Within the culture they have to establish networks of communication, a home and a workplace and all in ways that are novel and different. Their systems of values and beliefs may be challenged and are certainly influenced by people within the new culture to whom they respond positively (Feather, 1979).

#### Adaptation and assimilation

The manner in which people from non-Western cultures attempt to adapt to a Western culture warrants examination and the stages of assimilation require consideration. The first stage involves the acquisition of skills, the enactment of new roles and the testing and changing of values with respect to new life roles. Values and aspirations are developed that match those of the society into which the migrants are received. The transition is not always a seamless one, nor is it always successful. It may take time and certainly takes effort on the migrants' part. Full absorption is thought to be complete when the migrant groups cease to have an identity separate to the host society (Feather, 1979). In reality, full absorption rarely takes place but a state of existence may develop where similarities and differences remain but cease to be disruptive. Separate roles and some degree of separate identity still exist but no longer cause conflict.

Many migrants never go past the early stages of absorption where only language learning and acculturation take place. Besides learning the new language, only basic changes occur to make life in the new culture tolerable. This means that if the group is large enough it may become an enclave within the larger society where there is minimal assimilation. Feather (1979) referred to this as a 'melting pot goal' within what has become a pluralistic society. Feather has written about life in America, and he notes that the same phenomenon has occurred and continues to occur in Australia where it is estimated that by 2010, the equivalent of 12 per cent of the population will be ethnically Asian (Price, 1997). These people will be partly assimilated, although in the larger cities, at least, they may continue to live in ethnic enclaves. They may be acculturated causing minimal conflict with the socially dominant Anglo-Saxon groups. However, intermarriage and full assimilation is likely to take much longer. The longer groups live in cultural enclaves, the longer the original homeland values are maintained because there is little need to absorb and utilise local language and values exclusively. As long as groups can maintain economic viability, succeed in education and in their chosen areas of work, there is less need for permanent change. Social isolation, exclusion and marginalisation are not issues as the enclave has social and psychological support from the ethnic group that lives in the particular enclave. It may well be that several generations need to be born and raised in the new country before there is sufficient pressure for permanent change to occur. In Feather's (1979) study it was found that older married students who brought their families with them were less inclined to change their system of values than were younger single students. Therefore, it is argued that in the present study there is a need to measure and investigate the values of CHC students over a two year period in a longitudinal study in order to understand the changes in values that may occur and the factors that influence such changes in an altered physical, social and cultural environment.

Feather (1979) called change in the cognitive sphere subjective assimilation. He saw this going beyond the overt acculturation stage that was easier to identify. It required an internal change that might occur in the children of migrants as the children only had traditional knowledge that they gained, in instances where they were born in the new culture, by word of mouth from parents or relatives born in the old country and culture. Feather (1979) concluded that generally second generation migrant children displayed more subjective assimilation than their parents did.

## **Early Studies of Chinese Values**

#### The Chinese worldview

Chen, Liu and Ennis (1997), Church (1982), and Kwan et al. (1994), noted that the thinking of Hong Kong and Taiwanese Chinese students was often modified in relation to their changing home environment when they were studying in a Western country. Whereas once they were totally collective in their human relationships, the students became more individualistic in their thinking and in their interactions with others. They had gone overseas to enrich their backgrounds and returned to put what was learned back into their own societies. Their worldview looked to the future as industrialisation gained momentum in their home societies. Their value orientation had also changed and paralleled the rapid growth of industry.

Bond and Cheung (1983) found Hong Kong students' self concept followed the traditions of the CHC where the group as a collective body was preferred to the self. This was ascertained with the use of the *Twenty Statements Test* (TST). The TST was a self-report questionnaire that was used to study participants' self-concept. It was found that English taught by native-speaking teachers made a statistically significant positive difference to students' self-concept. Countries such as Hong Kong, Singapore and Malaysia where English was or had been an important second language were examples of states that had a British colonial heritage. However, Western values and approaches to life did not appear to have had a lasting effect on their values and worldview beyond the overt desire to learn to use English as a language of communication.

#### **Comparative studies of values**

Feather (1986) reported clear evidence of a difference in the value patterns characterising two distinct national groups. This knowledge led to a better understanding of their value systems. Feather (1986) used two samples, one in China and the other in Australia to test the comparative importance of values in two groups of university students. In the study he used the Rokeach (1973) value survey. The individuals in each country group responded to the survey in their first language to ensure that bias was not introduced in the form of knowledge of language. Feather (1986) studied both groups of students' terminal and instrumental values. The most important terminal values for the Australian sample were an exciting life, a world at peace and happiness. The Chinese sample indicated that a world of beauty, national security and wisdom were their most important terminal values. The instrumental values that were important to the Australian sample were being cheerful, broadminded and honest. For the Chinese sample, Feather (1986) found that the most important instrumental values were being ambitious, self-controlled and courageous. There were measurable differences between cultures particularly in the instrumental values. Feather (1986) found differences that were consistent with overall cultural differences where individualistic values were the more important values for the

Australian sample and group-related values were more important for the Chinese sample. These findings supported the greater importance that the Chinese students placed on values associated with achievement. Even values such as being ambitious and courageous, often associated with individualistic thinking, were seen as ways of behaving that would be of service to the group collective and the family (Feather, 1986, 1994).

#### Research into the measurement of values in Mainland China

Garrott (1993, 1995a, 1995b) did extensive work on the values of students from Mainland China. She measured values with the *Chinese Value Survey* (CVS). Students were also asked what they were studying, their age and gender in a background questionnaire formulated in Chinese and presented with the CVS. She concluded that cultural attitudes had changed in Mainland China with the increased opening to the West that began in the late 1970s.

Garrott (1995a) found strong elements of a collective approach as well as an emerging self-centredness. Filial piety and the importance of a good education were still fundamental to the Chinese worldview. Collectivism emphasised the maintenance of group cohesion rather than self-seeking and was related to the post-Confucian hypothesis whereby aspects of Confucian social philosophy were responsible for the outstanding economic development of Eastern cultures with a Chinese heritage. This hypothesis implied that an agreement between cultural values and social conditions was essential for ultimate success of students in their studies (Garrott 1995a). She used a modified version of the CVS and found a marked difference in value perceptions between men and women, between English and non-English majors and between different age groups. The most highly rated value statement was knowledge; the least important value was being conservative. In addition, Garrott (1995a) and Johnson and Wen (1997) found that Chinese students in their samples appeared to have little respect for tradition. The individualism they encountered seemed to be part of a growing phenomenon among Mainland Chinese students in the final decade of the twentieth century that was also confirmed in the research of Zhang Zhen (2001).

## **Measurement of Chinese Values**

The measurement of values has been undertaken for many years but always using Western value surveys until the development of an instrument that include values of importance to Chinese people specifically. Individuals from Confucian heritage cultures (CHCs) share values with people everywhere but there are some values like the protection of face and filial piety that are more important in Chinese culture. The only survey known to measure what are called Confucian or Eastern values is the *Chinese Value Survey* (CVS). By giving status to East Asian values, a more accurate assessment of these values in CHC students' lives may be undertaken that gives the estimation of Eastern value statements made with the CVS measurable credibility.

The CVS is a survey instrument that was developed by Bond and a group of research workers known collectively as the Chinese Culture Connection (CCC, 1987). Its development was a response to a perceived need to evaluate cultural values and attitudes within the setting of a value system that was based on the Confucian ethos. When responses to instruments like the CVS that included Eastern life values were compared (Bond, 1983, 1988, 1991, 1996, 1997, 2000; Bond and Cheung, 1983; Bond, Cheung, and Wan, 1982; Bond et al., 2000; Bond and Forgas, 1984; Bond, Leung and Schwartz, 1992; Bond and Pang, 1991; Leung and Bond, 1989; Spencer-

Oatey et. al., 2000) major differences were evident. The CVS contains a decidedly Chinese cultural bias that has not been estimated in earlier Western value surveys. However, the CVS does complement the survey instruments constructed by Rokeach (1973) and Schwartz (1992) as it includes widely-accepted life values as well as those values that are pre-eminently Eastern in nature. In Western culture the search is for truth in life values, while people from Eastern cultures search for virtue that comes from the constructs central to an understanding of Confucius (Bond and Smith, 1996; Hofstede, 1991; Hofstede and Bond, 1988; Yen Mah, 2000).

# The uniqueness of the CVS and its relationship to Confucian ethos and values

The CVS has been instrumental in enabling the validity of the constructs associated with the Confucian ethos to be tested and evaluated. These value constructs have remained buried under Western perceptions of their importance in Chinese culture (Bond and King, 1985; Chang et al., 1997; Chen, Liu and Ennis, 1997; Harrison and Huntington, 2000; Pye, 2000). Therefore, Western research workers have not appeared to countenance values that have been considered to be important in Eastern society until relatively recently.

In the CVS consideration is focussed on four latent dimensions that describe values and the observed variables that comprise these factors. It is necessary to understand the latent factors of the CVS particularly because the responses made by students from a Western culture to the Rockeach (1973) and Schwartz (1992) value questionnaires are distinctly different from the responses given by students from ethnically Chinese backgrounds to these questionnaires. Previously CHC values have been almost invisible using Western survey instruments. Therefore, analytical consideration and thought needs to be given to data obtained using the CVS (Bond, 1988, 1991, 1996). The justification for the use of the CVS in this study is that it permits the examination and estimation of values using a survey instrument that has been designed to measure and evaluate values that are important to CHC students.

#### Initial analysis of the Chinese Value Survey

The CVS was analysed by Bond and his colleagues after its implementation by the CCC (1987). Four latent factors were identified, as follows: CVS I: Integration, CVS II: Confucian Work Dynamism, CVS III: Human-Heartedness, and CVS IV: Moral Discipline, CVS I was seen to reflect values that focussed on social stability, group integration, solidarity with others and values that promoted the importance of the familial bonding. Filial piety and chastity in women, although negatively correlated, were included in this factor. CVS II contained values that reflected the Confucian work ethic. The value statements included were thrift, persistence, having a sense of shame and the ordering of relationships. These values gave structure and order to life in Confucian cultures. Counter-pointed against this hierarchical dynamism were four negatively correlated values. They were the reciprocation of good and evil in others, personal steadiness, protection of face and respect for tradition. These latter values provided checks at the personal, interpersonal and social levels (CCC, 1987). CVS III contained value statements that embraced ideas suggestive of gentleness and compassion. Examples were kindness, patience and courtesy. This was in contrast to a sterner, legalistic approach to life that was exemplified by the negatively correlated values: a sense of righteousness and patriotism. On CVS IV, the positively loaded values reflected moral restraint. The positive value statements of moderation, keeping oneself disinterested and pure and having few desires implied a position lacking in self-control. In Bond's study, moderation or following the middle way was seen to

represent a firm, disciplined stance rather than the flexibility normally associated with this concept (CCC, 1987).

The CCC (1987) and Bond (1988, 1996) in the analysis of the data collected using the CVS looked for trans-cultural trends. Bond analysed data at the country level rather than the individual level using both factor and discriminant analysis and obtained very high factor loadings. However, the value structure at the group level was not always found to be the same as the value structure at the individual level of analysis (Smith and Schwartz, 1997).

# The nature of differences in Eastern and Western values

The nature of the differences between Eastern and Western values requires further consideration. In Asian societies a system of *guanxi*, or 'using connections to obtain favours', is integral to the existence and successful functioning of society. This is often viewed in Western eyes as a type of corruption but, in fact, it forms a vital network of social relationships that is essential in countries where the population density is high. This system also exists among the millions of ethnically Chinese who live in Asian communities throughout the world. Such a population density and the networks of communication involved are almost beyond comprehension until it is realised that without a nexus of intermingling networks, survival would be impossible either at the individual or group level (Chiu, 1989; Lloyd George, 1992).

Smith and Bond (1998) note that Chinese societies or enclaves in Western societies are believed to endorse Confucian values. Commercial success, so highly desirable in Chinese societies, also operates within networks of interpersonal relationships built on *guanxi*. These networks are formed through the exchange of personal favours and are most often built on family-based relationships or among persons of shared ethnic origin in non-CHC societies.

#### **Contemporary Asian values**

Wang, (1991, 2002) and Zhang Zhen (2001) have found that in the twenty-first century Asians are becoming aware of the need for self-definition and fulfilment as a reflection of personal identity. This results in the decreasing importance of the group collective as a life-directing force, and is seen to be particularly significant in urban areas of countries such as Mainland China where the one child family policy has created a generation of inner-directed and self-centred young people (Liu, 2000; O'Halloran, 2002; Storti, 1990; Zhang Zhen 2001).

Zhang Zhen (2001) has also argued that now the needs of the family may be considered secondary to the fulfilment of personal needs and desires in a rapidly changing society. In large Asian urban communities, the needs of the extended family may be relegated to the parental generation as young people push to follow their peers. This drive is directed by the desire of young adults to 'catch the train of global modernity' (Zhang Zhen, 2001, p. 131) because of their anxiety to overcome the existing developmental time lag between Asia and the West. The image of the 'iron rice bowl' (*tie fanwan*) is based on the outdated ideals of a communal egalitarian lifestyle. Today the iron rice bowl is being put to one side as social restructuring and the perceived need for monetary and personal advancement take on increased importance. It is being replaced by the 'rice bowl of youth' (*qingchunfan*), a term that describes highly-paid professionals, particularly young women, who are striving to take up roles of increasing importance in contemporary Asian society. These young

#### Contemporary Confucian ethos and competition

Moderation or following the middle way is another value that leads to harmony and stability. Values that support the collective rather than the individual way of thought and strengthen the construct of unity within the extended family unit are important in Asia (Chiu, 1989). Another value that has raised controversy because of its overtly contradictory nature is non-competitiveness, which is considered to be part of the Confucian ethos (CCC, 1987). Many perceive ethnically Chinese as one of the most competitive people groups. This may, in fact, be true. However, Asian perceptions of their motives and actions seem to be different. It is considered to be in very poor taste among Chinese people to condone openly aggressive competition. Competition is essential in sport and the attainment of goals in a Western individualistic society, but in Eastern societies it is also seen as contributing to the sustenance and protection of the family unit. However, in other aspects of life, outward competition and rivalry are considered negative influences and generally rejected in Eastern cultures. Nevertheless in business, competition would appear to be an acceptable course of action. Once again this may be a Western interpretation of an Eastern value construct (Ralston et al., 1992; Sheridan, 1999).

Chiu et al. (1998) have studied Chinese business people with respect to conflict behaviour, aggression and the acceptance of traditional Confucian values. They have found that conflict is avoided if at all possible. The Chinese businessmen tend to avoid openly assertive or competitive behaviour as it produces conflict and a lack of harmony and therefore, is socially unacceptable. Sublimation of personal goals to the collective whole is helpful in promoting values such as humility, patience, obedience and modesty. These values are also important in the development of self and the maintenance of the group. The collectivist ethic is also evident in inter-student relationships, especially in Asian university settings when six to eight students may share a single dormitory room. Self-control, strong self-effacement and the discipline required to avoid conflict are difficult for the Western mind to comprehend. The retention of traditional beliefs and cultural values as primal cohesive factors are considered to be essential in countries following collective patterns of life (Chiu et al., 1998).

Confucian values represent the cornerstones of Chinese morality. Filial piety can be traced directly to Confucius' thinking and is referred to in a work based on his thinking, entitled *Five Cardinal Relations*. This value remains an essential contemporary construct, engendering parental respect as well as respect for tradition, honouring ancestors and the financial support of parents when sickness or incapacity occurs. The reciprocation of greetings and favours and the protection of face are still important in a society that operates from an inner core of close personal relationships. This core is surrounded by others with whom people deal on a more casual, but no less significant basis (Bond, 1991b; Hwang, 1999, 2001; Yen Mah, 2000; Yue and Ng, 1999; Wang, 1998).

## **Comparative Value Studies**

From the comparison of students in Mainland China and Taiwan, Yuan and Shen (1998) found many shared values and concerns for the world in which the students

studied and lived. Although many young people seemed anxious to embrace the new and modern values from Western culture, the older, more stable Confucian values still pervaded their moral education, training and social interactions. Once again, the CVS permitted a clearer examination of these perceptions in the minds of young Chinese students as the CVS measured values relevant to their thinking. It gave credence to the concept of the *dao* or 'the way' which has led, guided and still transcends Chinese culture today (Yuan and Shen, 1998).

Ralston et al. (1992) also found that Confucian values have remained in Mainland China today despite attempts to discredit his teachings. These values, operating in a massive unwieldy bureaucracy of 1.3 billion people, have survived and even flourished since they promote the well being of the basic units of the family and work place. The work-place unit has been considered to be both a link between and a control over working men and women in Mainland China. Basic Confucian ideals and values have not changed. They have only been adapted to be consistent with contemporary political thought.

#### Chinese cultural values and family structure

Cultures are systems of shared meaning that may occur at the national level or across many nations, but specifically within groups that share common values. While preferred values vary both across and within nations, value differences across nations can help to interpret reported cultural as well as indigenous differences (Smith and Bond, 1998).

Studies undertaken by Chan (1988) have shown that students who had come to study in Australian universities, seemed to prefer to live in groups with people from the same home country or culture rather than alone even though they preferred to study alone rather than in a group. This seemed to be the case regardless of their English language fluency. Moreover, this appeared to reflect the degree of ease or comfort they experienced with people from their own cultural ethos. Chan (1988) also found that students who were better adapted to the Australian way of life had values and aspirations closer to those of Australian students than to other, more recently arrived CHC students. Migrant students appeared willing to forego their own cultural values in order to avoid conflict in their desire to be assimilated into their adopted culture. This trend was not found among sojourner students where Confucian values and desired academic success appeared to be more important factors influencing behaviour. The sojourner students seemed to identify with the Chinese rather than the Western ethos more than Asian migrants and refugees to this country. Chan argued that this was best understood in light of a common cultural heritage even though the actual country of origin might be different (Chan, 1988).

# Comparative studies using overseas and Mainland Chinese students

Guan and Dodder (1998; 2001) undertook a comparative study of Mainland Chinese university students in American universities and Chinese students in Mainland China. They examined the impact of cross-cultural contact on values and identity and measured students' values using the CVS. They also carried out individual interviews to assess the importance of cross-cultural contact on value change in Chinese students. They found that two principal factors: (a) the country where the students studied and (b) the length of time away from the home culture were important mediators of change. Chinese students who had studied in the United States and had contact with local students during their studies appeared to consider cultural conservation less important than did students who had not left Mainland China. Further, the longer the students were away from their home culture, the less important Chinese values and cultural conservation seemed to be. Two years absence from the home culture appeared to be the time barrier for change. If the time away from China was less than two years the students tended to retain values that enabled them to maintain their previous cultural identity within a Western learning context. However, it was found that the longer they were away from Mainland China, the greater the change in values. Guan and Dodder advanced two hypotheses to explain these results. The first claimed that for overseas Chinese students studying in a foreign culture, those staying longer considered cultural values to be less important than did newer arrivals. The second hypothesis was that Chinese students in an overseas environment tended to keep certain Chinese values that helped them to maintain their cultural identity in a new cultural context. The study sought to measure differences in values based on the time the students had been away from their home culture and the students' learning environment (Guan and Dodder, 1998, 2001).

These findings are similar to those of Ninnes' (1995) observations of values of Vietnamese students that are discussed earlier in this chapter. They have important implications for the present study that seeks to measure values over a two year period. If this is found to be a critical period of time for change, then it is argued that change should become apparent during that time and enable change in values to be measured and investigated.

## Conclusion

Research into values is extensive and varied. Values are seen as enduring and relatively stable within cultures. They are used as the basis for making judgments, indicating preferences and making decisions concerning modes of conduct in a given cultural setting. One instrument, the Chinese Value Survey (CVS), appears to measure values that are especially important to people from a Confucian heritage culture (CHC). An understanding of Eastern values is considered to be essential for an investigation of change in the values of students from Asian cultural backgrounds who sojourn in a Western cultural setting. Furthermore, an understanding of the relationship between values and culture is necessary in a study involving the possibility of change in values arising from change from one cultural context to another where different values are preferred. Moreover, an investigation of change in the value system held by people from an ethnically Chinese heritage is necessary for an inquiry into the learning experiences provided for students from East Asia who come to study in a Western educational environment in Australia. As a consequence, this study has relevance for those working in Australian universities who seek to attract students from Asian countries.

# **3** Learning Motivations and Strategies: *Failure is the mother of success*

# Introduction

This chapter examines previous research into approaches to learning. In particular, it considers the motivations and strategies associated with learning in students from a Confucian heritage culture (CHC). The chapter begins with a history of learning in Confucian cultures. This is followed by a consideration of learning preferences and styles. This section is followed by a discussion of the empirical research into CHC learning and learning from a cross-cultural perspective and includes a discussion of the importance of education in the Confucian tradition and the teaching and learning environments that support learning in Asia. The chapter concludes with an examination of the Chinese learner and the academic environment of present-day learning in East Asia.

Biggs (1999b, p. v) cites a comment by Shuell (1986) that summarises the conceptual goal of this chapter, "It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does." Shuell's comment reflects ideas that are increasingly widely held in Western societies.

# **Historical Overview**

Formal education in East Asia dates back to the time of Confucius (551-479 BC), possibly earlier. This is a form of education unfamiliar to most people in the West. Confucian ideology originated in what is now Mainland China but moved with the Chinese Diaspora initially to East and Southeast Asia and eventually to most parts of the world. Wherever the Chinese moved, they took their education system, beliefs and culture with them.

Confucian ideology has been subject to continuing evolution and change as the philosophical ideas from Buddhism and Daoism have emerged, developed and become selectively incorporated (Barlosky, 1996; Hayhoe, 1994, 1996; Hayhoe and Pan, 1996; Lloyd George, 1992; Pennycock, 1996; Scovel, 1983; Sodowsky and Plake, 1992; Zhou, 1988, 1996). It is the openness to external influences that is contrasted so strongly with the canonical approach that has come to be associated with the traditional education and examination systems. The educational institutions associated with this examination system in China predate even the earliest of the Papal chartered European universities as institutions of higher learning. The examination system had its origin in the Tang Dynasty (628-907AD) in China (Hayhoe, 1994; Wu and Singh, 2004). The examinations were run by the government, the Emperor and his court in order to find suitable individuals to staff the civil service. Results were based on effort and not on family position; however, success in these examinations assured the student and his family a position of importance for life.

In many CHC countries today university entrance is still based on a comprehensive national examination that can be traced back to the Imperial Examinations of the past. Furthermore, each year students can receive an award for moral, academic and physical excellence. This award is still used as a selection criterion for entrance to higher degrees in countries where education follows Confucian philosophy (Eckholm, 2000; Mok and Gurr, 2003; Watts, 2003). Cheng (2000) has also discussed the importance of moral education in Chinese education today. He points to parents' perception that academic excellence is expected, but parents are concerned about the decline of moral education in a world where the internet and other external influences are becoming increasingly influential in the lives of young people. Hence the role of the teacher as an educator and moral guide is critical in Asian schools.

# **Background to learning**

This study argues that when a student changes his or her study environment and is exposed to new and different approaches to learning, the approaches used in the first study environment may be modified by experiences in the new environment. Therefore, if approaches to learning do change, it is necessary to examine the change and then investigate: (a) what manifestations of change are evident in either the student's study behaviour or learning approaches; and (b) the causes of any changes that do occur.

Therefore, it is further argued that an understanding of the effects of cultural differences, the changes in the students' learning experiences and the tensions of physical relocation are being sought in this investigation because a student coming from a Confucian culture to Australia to study is likely to experience both social and cultural change. As a consequence, it is essential to investigate whether changes in approaches to learning occur as the student moves across cultural boundaries since it is probable that social and cultural changes are likely to affect learning in the move to a new physical and educational environment.

#### The process of learning

Research into student learning is based on two main theoretical sources: information processing and the contextually based student approaches to learning (Biggs, 1993). The cross-fertilisation that has occurred has been useful but is also the source of the misunderstandings and ambiguities evident in recent literature (Biggs, 1996a, 1996b, 1996c). The basic premise revolves around the conceptualisation of student learning.

In information processing learning takes place within the students themselves. In the contextually based approaches to learning, understanding develops from the teaching or learning environment. The latter system functions as an open system into which ideas may flow and in which knowledge and learning may enter, leave or remain.

The information processing (IP) approach has been applied to student learning and is based on the work of Liu, (1986), Schmeck (1988), Schmeck et al. (1977), and Weinstein et al. (1988). Biggs (1992, 1993) has pointed out several problems with this approach that arise because the IP approach appears to focus on study processes as if they occur in a vacuum. Therefore, Biggs argues that the learning environment has a profound effect on studying of all kinds. Moreover, learning does not occur in an isolated laboratory but in the real world (Entwistle, 1990; Entwistle and Waterson, 1988; Moran, 1991; Pong, 1993, 1996; Ramsden, 1992; Ramsden and Entwistle, 1983).

# Initial understanding of different approaches in the learning process

Ideas on the student approaches to learning advanced by Martön (1981) arose from dissatisfaction with the information processing IP system and have been developed from the perspective of the student, rather than the investigator (Watkins, 1996b). The initial impetus for these ideas came from a study undertaken by the Swedish team of Martön and Säljö (1976a, 1976b). Their report described an investigation undertaken with university students who were asked to read an academic paper and then were asked what they had learned and how this learning had come about. Their responses indicated that the students tended to use two principal ways of processing the information. Some tried to memorise details or key words in order to answer subsequent questions and tended to focus at the word or sentence level. Others attempted to understand the message imparted by the passage globally and focussed on themes and principal ideas as well as trying to process the content for meaning. These approaches and associated reading strategies were called 'surface' and 'deep' approaches respectively. The researchers found qualitative differences in learning outcomes that were related to the approaches taken. Those students using a surface approach were unable to explain the central message of the article read and only recalled fragments of the material. However, those students adopting a deep approach were able to show a more global understanding of the author's intentions and even recalled extracts from the text. Marton and Säljö called their research approach 'phenomenography' (Martön, 1981; Martön and Säljö, 1976a, 1976b). Martön et al. (1997) concluded that repetition was associated with mechanical rote learning whereas memorisation might be used to deepen and develop understanding. When memorisation was interpreted in this way, the tension associated with understanding the different approaches to learning was largely resolved. Therefore, the goal of their study was to understand how students perceived the content and processes of learning (Watkins, 1996a, 2003).

#### Memorisation and understanding in the learning process

Evidence for the concept that effort is more important than ability in the learning process is found in Dahlin and Watkins' (1997) research. They compared Hong Kong Chinese secondary students with expatriate students in a Western academic environment in Hong Kong. The belief that Asian students combined the processes of memorisation and understanding to produce highly successful outcomes was tested. This effective combination of techniques had seemed paradoxical to observers of learning in the past, but the evidence confirmed its existence, as memorisation was

seen as a useful precondition for understanding (Dahlin and Watkins, 1997, 1999). The aim of their investigation was to use the phenomenographic technique of interviewing (as described by Martön and Säljö, 1976a, 1976b) to try to discover what students' concepts of learning were. This research approach sought to reveal the qualitatively different ways in which students conceptualised various phenomena in the world around them (Dahlin and Watkins, 1997).

Biggs (1996b) also examined the apparent misperception by Western research workers concerning Asian students' learning. He argued that a paradox or tension did not actually exist over student learning in the Asian context. Asian students in their own countries had always studied in an externally controlled, examination-based learning environment. Each new learning phase required a test or examination before a student was admitted to a higher level. This resulted in what Western educators had perceived as a stressful environment. Asian students actually appeared to enjoy memorising and used repetition as a technique that enabled memorising initially, followed by understanding and finally learning. The students used this form of memorisation successfully in preparation for tests (Biggs, 1996b).

# Learning preferences and styles

Since the 1970s, studies of the learning preferences and styles of students from Confucian cultures has emanated from investigators interested in CHC learning.

#### Learning in English linked countries

The research has taken place in two major country groups. The first group includes highly developed countries like Malaysia, Singapore and Hong Kong, where the British colonial influence has been strong and continues today even though the political climate has changed. Hong Kong has returned to the People's Republic of China as a Special Administrative Region (SAR), where there has been a move to make everyone study and learn Chinese as a first language, but the desire for the effective use of English has not diminished. The influence of Western culture has remained strong. Most textbooks in English have been written by native speakers of English and published in Western countries. Nevertheless, a heritage of Confucian culture remains strong among the students themselves that emanates from influences in their home environment. Here, filial piety, obedience to authority and respect for elders and teachers is still evident in students' behaviour.

Another example exists in Singapore where most teaching from the very early school years is carried out in an English language medium. Once again, most study materials come from England, America and Australia. These information sources reflect Western culture and, consciously or unconsciously, must influence students' thinking. This is reinforced by the fact that English and Mandarin Chinese are the first and second official languages in a country where the majority of the population is ethnically Chinese and the Confucian heritage remains a strong influence in their lives.

#### Learning in non-English linked countries

The situation alters when the second major group of non-English linked countries is considered. This group includes CHC students from Mainland China and East Asian

Approach	Motive	Strategy
SA: Surface	Surface Motivation (SM) is instrumental: to meet requirements minimally; a balance between working too hard and failing.	Surface Strategy (SS) is reproductive: to limit target to bare essentials and reproduce through rote learning.
DA: Deep	Deep Motivation (DM) is intrinsic: study to actualise interest in what is being learned; to develop competence in academic subjects.	Deep Strategy (DS) is meaningful: read widely, inter-relating with previous relevant knowledge.
AA: Achieving	Achieving Motivation (AM) is based on competition and ego-enhancement: to obtain highest grades, whether or not material is interesting.	Achieving Strategy (AS) is based on organising time and working space; to follow up suggestions; behave as a 'model' student.

**Table 3.1** Motivations and strategies in student approaches to learning

Following Biggs (1987a) and Murray-Harvey (1994).

cultures such as Laos, Vietnam and Cambodia where there has been minimal contact with Western education and culture since the Second World War. The ethnically Chinese students who choose or are chosen to study in a Western environment are the very best students. In all respects they are an intellectually elite group relative to their homeland peers. These students are, by their very selection, also far above the average Australian university student.

Consequently, their very high achievement level is not surprising, but what does confound most Western lecturers is the manner in which this level of achievement occurs. CHC students have a reputation for being diligent students but few Western teachers and lecturers fully understand how they learn.

## Approaches to Learning

Table 3.1 presents a summary of the approaches to learning that has been developed by Biggs (1987a). He specifies the three approaches to learning as surface, deep and achieving. Each approach is composed of a motivation that directs learning and a strategy for the implementation of the learning approach. The surface approach is utilitarian; the aim is to gain maximum qualifications. The deep approach is based on actualising what is learned by reading widely and relating new materials to what has been learned previously. In the associated achieving approach, the learner attempts to attain the highest possible grades. This is done by being a model student, being punctual to class and by using strategies such as extra reading and research to attain desired goals (Watkins, 1996b). All students are likely to manifest all three of the approaches in the process of studying and learning. However, the primary concern of this investigation is to understand how CHC students learn. Therefore attention is focussed on research comparing CHC learners in Asian and Western environments.

Biggs (1999a) has indicated that learners are divided into two distinct groups: those who learn for the sake of knowledge acquisition and those who learn to gain a qualification. The first group uses a deep approach. These students' learning involves a problem-solving approach and their interest carries them beyond a superficial understanding of what they are studying. These students are actively involved in the learning process and the process involves metacognitive activities that narrow any gaps in knowledge acquisition. Learning in this manner is described by Martön (1981); Martön and Säljö (1976a, 1976b); and Martön et al. (1996) in terms of 'phenomenographic understanding'. Learning behaviour that is conceptually opposite to deep learning is described as surface learning. It involves only as much as is

needed to pass an examination. Learners using this approach do not achieve the cognitive levels of deep learning.

A third or achieving approach has also been described by Biggs (1987a). He notes that the students who manifest the characteristics of this approach may be aggressively competitive in their approach to learning and seek the egotistical reenforcement of their accomplishments whereas students who do not seek recognition in this manner manifest lower levels of achieving motivations and strategies. The achieving approach is usually found in association with either the deep or surface approach to learning that has been discussed above. This approach is characterised by a motivation that is based on techniques designed to achieve the highest grades possible regardless of the students' interest in what they are studying. The strategy employed is based on good organisation of time and resources. This approach appears to be particularly important to learning in students from Asian cultures that have come to a new learning environment such as Australia to pursue their education.

#### Research and analyses of approaches to learning

Research into learning motivations and strategies goes back to the latter decades of the twentieth century. In the past 30 years research in this field has intensified and has paralleled the movement of learners away from their homes in a CHC environment to study in English-speaking settings. Biggs' work has led to the development of the *Study Process Questionnaire* (SPQ) (1987a) and the *Learning Process Questionnaire* (LPQ) (1987a).

Approaches to learning are commonly measured on self-report questionnaires. The SPQ has been analysed by Biggs (1987a, 1992, 1993) using exploratory factor analysis as the principal analytical tool. Six distinct scales have been found to underlie the SPQ. However, even though application and measurement using these instruments has been carried out in Western and non-Western learning environments, there has only been minimal consideration given to the cultural differences in the groups sampled and Eastern cultural effects related to learning, in particular. More cross-cultural research that examines learning in Eastern and Western environments, such as the recent study by Ramburuth and McCormick (2001) which compares the learning diversity of Australian and Asian tertiary students, would appear to be needed particularly with students who have changed from an Eastern to a Western learning environment. Therefore, it can be argued that it is essential to comprehend any changes in students' approaches to learning that result from geographical and cultural relocation.

#### Student achievement goals and approaches to learning

There appears to be a strong link between students' learning motivation and their approaches to learning. Perceptions of the reasons for achievement and ways of learning are related to expectations of success or failure. In Confucian culture, effort, endurance and hard work are considered to be essential. Students are taught to work hard even if the probability of success is low. Achievement goal orientation and the motivation that drives it act as influences on achievement behaviour and the eventual approaches to learning that students employ (Kong and Hau, 1996).

Two types of achievement goal orientation have been identified: (a) performance goals whereby students try to maintain positive judgment of their competence; and (b) mastery goals whereby individuals seek to increase competence by understanding and becoming proficient at new tasks. Students who are highly motivated to achieve also exhibit stronger external locus of control and consider effort more important than ability in achieving desired goals. Kong and Hau (1996) have found a strong correlation between mastery and performance goals and approaches to learning. Therefore, students' goal orientation appears to have a significant effect on learning motivations and strategies. Students who are mastery oriented are able to regulate their own learning as their approach is deep or intrinsic whereas students who are performance oriented employ a more superficial approach to learning that is extrinsic in nature. Ng and Renshaw (2002, 2003) describe a positive relationship between performance and mastery goals. They explain this in terms of cultural factors and correlated achievement goals with values that mediate and influence the means of achievement. The relationship may be summarised as follows: mastery goals are associated with motivations or engagement patterns and strategies that are consistent with a deep approach to learning. This approach produces positive learning outcomes. In contrast, performance goals are associated with motivations and strategies which yield a lower level of achievement that tends to be superficial in nature (Chan, 2002; Grant and Dweck, 2001; Hau and Salili, 1990, 1996; Hong, 2001; Kong and Hau, 1996; Lai and Biggs, 1994; Lee et al., 1996; Salili, 1996; Salili, Chiu and Hong, 2001; Shi et al., 2001; Stipek, Weiner and Li, 1989; Volet, 2001; Watkins et al., 2002).

#### Tensions between values, culture and learning

The tenets of Eastern culture are almost entirely based on Confucian precepts of Chinese, Japanese, and Korean individuals. Geographically these precepts are found primarily in the East Asian and Southeast Asian regions but may also be found wherever large enclaves of ethnically Chinese people live work and learn. In recent years this geographical diaspora has extended to include urban areas in North America, Canada and Australia. The impetus for much of this migration and resettlement has been the opportunity to set up businesses outside of Asia. The impact has been the injection of Asian capital into Western societies (Lloyd George, 1992). However, differences have begun to emerge between the precepts and values that guide the learning behaviour of Asian migrant learners in Western societies and the precepts that have guided Western thought for over 500 years. The Western cultural contexts that exist are essentially British, American and French as these countries have been the primary colonial powers that have explored, settled and influenced the lifestyle in Asia as overseas extensions of their home countries during that period.

Some tensions are created when Asians come to study in the West. The students and their families pay high fees to study in countries such as Australia. They find that their Western lecturers do not always make the effort to understand them, their ways of learning and the problems they encounter. Therefore, although many Asian students appear to find the Western classroom unfriendly and even intimidating, most are too polite to complain. Their lack of protest is interpreted as passive acquiescence and acceptance (Allwright, 1996; Bessant, 1995; Cannon, 1999; Christensen et al., 1991; Davies, 1996; Delors, 1996; Hackett, 2004; Ng, 2001; Oxford and Anderson, 1995; Smart and Ang, 1993; Ting-Toomey, 1988; Yin and White, 1994; Zeegers, 2001; Zeegers and Martin, 2001; Zhang, 2000; Zhang and Collis, 1995; Zhang and Sternberg, 2001).

#### The 3P model of teaching and learning

Biggs' (1993) analysis showed that there were strong relationships built into the motivation and strategy model presented in Figure 3.1. Biggs argued that this model was related to students' perceptions of the learning context and their intentions in a given learning environment.



The 3P Model, culturally modified



Figure 3.1 3P model of teaching and learning

(Source: Biggs (1996b), pp. 51 and 62)

Biggs adapted a model first proposed by Dunkin and Biddle (1974) that considered the step-like phases of interaction between the learner and his or her environment. Each stage or step represented a phase in the development of the learning process. Phases needed to be examined together as they did not occur in isolation; rather a change in one step or phase would affect each of the other two steps. For this reason, the three steps or phases were considered to be in equilibrium.

Biggs (1993, 1996b) described the learning context in terms of Presage, Process and Product phases. The Presage or preparatory phase occurred before learning took place. The Process phase occurred during learning and described students' particular approaches to the learning situation. The Product phase described the outcomes of the learning process. Biggs called this the 3P Model of Teaching and Learning. The model was reciprocal or non-recursive as all three phases of learning were in equilibrium so that the directional nature of the model remained flexible and movements in the model were considered to have reciprocal relationships. These

relationships were indicated by the double-headed arrows that connected parts of the model. This also meant that phases interacted or could impact on one another. Any model in equilibrium is in a non-static state where losses in one part of the model lead to gains in another part.

Biggs also presented a culturally modified 3P Model. Figure 3.1 shows the original model followed by the culturally modified model that includes constructs unique to Chinese and Confucian-based ideology. The cultural modification is shown at the Presage stage. At this stage collectivism and collaboration are also included. These constructs are two of the principal concepts that undergird Chinese learning. They have a significant influence on attitudes to learning and modes of study in Confucian cultures. Therefore, in CHCs learning is not linear and unidirectional but interactive and multidimensional (Watkins, 1996b).

#### Apparent learning changes

In a longitudinal study undertaken in Western Australia, a group of research workers reported that changes occurred in Asian students' learning preferences and styles in a university semester (Renshaw, 1999; Volet, 1999; Volet and Renshaw 1995, 1996; Volet, Renshaw and Tietzel, 1994). Their assessment of change in approaches to learning was based on students' responses to the *Study Process Questionnaire* (SPQ) (Biggs, 1987a, 1987b) given in Week 1 and Week 12 of the study. Volet and Renshaw (1996) indicated that, even when they were totally immersed in an Australian learning environment, the Singaporean students still showed outward signs of their Confucian heritage even though their actual experiential learning context was Western.

All the students in the study were living in university dormitory accommodation. This might have led to outward manifestations of adaptation to their living and learning environment. These adaptations could have been reflected in their responses to the SPQ. However, the investigators did not report a post study measurement of learning preferences that might have revealed a reversion to earlier learning preferences after the students had returned to Singapore.

Volet, Renshaw and Tietzel (1994) used a modified version of the SPQ. They used four motivation and three strategy questions from each approach to learning in a 21item instrument. They evaluated the responses of 63 pairs of Singaporean and Australian students in their study. In general, they found Singaporean students to be higher in the surface and achieving approach and lower in the deep approach to learning than the matched Australian part of the pairing.

Consideration of the motivations alone showed that students from Singapore displayed higher surface motivation than Australian students did. Consideration of strategies alone showed that Singaporean students had higher achieving but lower deep strategies than their Australian counterparts.

Volet, Renshaw and Tietzel (1994) also commented on the adjustment of the students from Singapore and their perceptions of the specific study requirements of the new academic environment. Singaporean students in Australia seemed to show a significantly higher achieving approach to learning than colleagues in their home country. These results compared positively with the results obtained by Biggs (1996b) with students in Hong Kong. The Singaporean students' total immersion, both culturally and academically, in a completely Western living and learning environment in a Western university setting, was argued to explain the changes apparent after a semester in the new environment (Volet, Renshaw and Tietzel, 1994).

Volet and Renshaw (1995) pointed out that very little was known about how international students adapted to the specific academic requirements of their new host country. These investigators reported cultural and educational differences between each group's conceptualisation of personal goals at the outset of their study. They argued that characteristics of the actual study environment had a strong impact on students' learning. The Asian study environment had been based on group or collective learning while the Australian learning environment was founded on an individualistic approach to study (Volet and Renshaw, 1995, 1996). Therefore, the impact of Confucian culture on how Asian students learned, as related to the constructs of individualism and collectivism, would appear to distinguish Western from Eastern preferred forms of learning.

#### Differences in achievement and approaches to learning

In another investigation using the same sample but different analytical techniques Volet and Renshaw (1995, 1996) found that Singaporean students had higher level learning goals initially but that by the end of the study perceptions of course relevance declined as did their learning goals. Further, students were able to meet high educational requirements and retain a high level of achievement orientation. However, Singaporean students showed much more concern for understanding materials thoroughly before memorising them. Therefore, they showed an inclination to superficial but not rote learning. The memorisation was linked to examinations and the positive effects that good results would have on the family at home in Singapore. Finally, Volet and Renshaw (1996) commented on the high level of learner achievement in Asian university students that the investigators felt was related to the equally high value that CHC students placed on academic achievement.

In an earlier report of the same investigation, Volet and Kee (1993) and Renshaw and Volet (1995) discussed students' impressions of the learning environment and the differences they encountered studying in Australia. The students said that the lecturers spoke very quickly and often did not provide a clear outline of the content of their lectures. Students also requested greater detail on the presentation of their assignments, how references were to be cited and what level of participation was expected in tutorials. Singapore students were not accustomed to oral presentations and appeared to want more assistance with this form of assessment.

Two comparative measures were made on Singaporean students' perceptions of study in Singapore and expectations of learning in Australia. These perceptions were measured at the beginning and end of the study. The first response on both occasions was being able to read and understand the main ideas. Initially, obtaining the correct answer was second (out of 12 possible responses) but after 12 weeks this response dropped to tenth place and learning material by heart dropped from fourth to 12th position in the same time frame. Participation in tutorials was perceived to be very important, as was the need to acknowledge sources of information. From the data, it was concluded that students became more independent in their approach to learning and less teacher-dependent over time in Australia. Once they overcame initial language problems, the students said that they felt a strong need to succeed as it was costing their families a lot of money for them to study in Australia. They felt obliged to make a special effort to repay this debt with outstanding academic results. However, the pressure to succeed was perceived to come from within the students themselves and not from external factors. The study showed that the Singaporean students placed a high value on education and wanted assistance to achieve at a commensurate standard (Volet and Kee, 1993).

Therefore, when CHC students moved into a totally Western educational environment, they seemed to experience difficulties in the adaptation process. In the past their use of English for communication outside the classroom might have been quite limited despite the Western-style technological environment in which their original education had occurred in Singapore. The language of the home, marketplace and shops was usually a Chinese dialect, although most people educated to the upper secondary level were also able to communicate comfortably and well in English.

# Empirical research into CHC learning

#### Comparative types of learning

Tang (1996), studying tertiary science students in Hong Kong, also assessed a paired learning situation. She examined learning preference strategies by comparing two types of work undertaken by the same students. Learning was assessed using two different methods. For the first assessment, the students were asked to prepare for an examination on a specific topic. The second assessment task was based on a written assignment. Tang compared the learning strategies and preferences of the students before and after each of the assessment tasks. She found that students taking the examination used a form of deep memorisation as a strategy for achieving high grades in the examination. Their principal objective was to do well and they employed strategies that ensured that result. Memorisation was a form of learning that had previously been associated with surface learning only. The students' efforts were systematic and highly organised. They focussed on likely examination questions and sought cues from their examiners as to what their expectations were. Therefore, an initially paradoxical situation existed wherein strategies previously associated with surface learning context.

The second assessment was done for a written assignment prepared on materials provided by their lecturers. A large knowledge base and a good command of English were necessary to succeed in this task.

Interviews were conducted before and after each type of assessment. It was expected that surface strategies would be the preferred method of preparation for the examination and that deep strategies would be employed for the written assignment. Tang (1996) found that the opposite had occurred. She explained her findings as follows: the research assignment was a new form of assessment and the majority of the students initially perceived that only a superficial or surface strategy was required. However, the examination was a form of assessment familiar to the students and they were well equipped to handle this form of assessment by using a strategy that involved deep memorisation. The outcome of the study provided Tang (1996) with the idea that the way in which students handled assessment depended on what they perceived the assessment task required. When faced with a new form of assessment, such as the assignment, that involved research and the construction of an integrated argument, the students had few skills to undertake the new task. They perceived that deep strategies should be used but lacked experience in using these strategies. Furthermore, even students who were able to use deep strategies reverted to memorybased strategies in preparation for the examination.

Other investigators, (Ho and Crookall 1995; McDevitt, 2004; Oxford et al., 1992; Reid, 1995; Scarcella, 1990) as well as Tang undertook research to see if learning was mere rote memorisation and whether both long-term retention and understanding occurred. These researchers placed the teacher in a position of facilitator or adviser and therefore, no longer the control-figure in the learning situation. The novelty of

the approach was fully appreciated by the students. In both case studies collaborative learning was used to acquire information.

Therefore, deep memorisation is an approach to learning that must be accepted as a part of the Asian learning environment where it can comfortably co-exist with both surface and deep learning strategies. However, deep memorisation may not be successfully transposed or fully utilised out of the specifically CHC learning context (Tang, 1996; Tang and Biggs, 1996). Investigators have shown through experimental research that rote memorisation only takes place as a learning strategy under the pressure of last minute study for an examination. Tang (1996) points out that rote or superficial memorisation is not an exclusively Chinese approach; all students use this technique to learn details for an imminent examination. Therefore, it is a universal form of learning employed to meet an immediate need. Once the need has been met, the retention of information ceases to be important.

#### Causal models, academic self-concepts and CHC learners

Watkins (2003) has considered various approaches to learning to try and assess their strength and usefulness in non-Western cultures. His conclusions are that the Biggs' SPQ may be used to explore causal models that link personality factors, approaches to learning and learning outcomes in different cultures. The SPQ may also be used to show how students adjust to the learning environment they encounter. It may further be used as an indicator of teacher effectiveness and may, by repeated use after exposure to new and different teaching styles, be used in a longitudinal study. Of particular interest is Watkins' finding that the deep and achieving approaches that are measured in first year university students decrease through their years of tertiary study (Biggs, 1987a, 1996b; Post and Pong, 1998; Rose et al., 1996; Tam and Watkins, 1995; Watkins, 1996b). The intention of the present study is to use the SPQ to measure learning on five occasions over two years to try to ascertain whether approaches to learning change over the period of measurement.

Drew and Watkins (1998) hypothesised that positive academic self-concepts and causal attributions positively influenced achievement outcomes and approaches to learning in Hong Kong tertiary students. If the students thought they could succeed and had the ability, they usually did so. Drew and Watkins investigated first year full-time students' perceptions of what they needed to do to succeed as university students. Their findings supported those of investigators such as Biggs, Tang, Kember and others who have characterised Hong Kong Chinese students as hardworking, having a high achievement motivation and willing to take greater personal responsibility for their own learning. However, these students were reluctant to attribute academic success to individual ability and instead attributed success to efforts made. This might have been an adaptive factor as it protected the student's pride or face in the event of failure. The model that they tested involved the positive effects of locus of control, academic self-concept and learning approaches on ultimate academic achievement (Drew and Watkins, 1998).

Chinese students' academic success is normally attributed to effort rather than ability. This is in total accordance with Confucian ideology where effort is a moral value in itself. It is seen as character-building and related to self-cultivation. Effort-attribution correlates well with Chinese students' concept of the role of repetition and memorisation in the learning process. In contrast, the ability-attribution concept of Western culture is in agreement with Western students' greater emphasis on the importance of understanding and the ability to solve problems (Dahlin and Watkins, 1997, 1999).

#### The learning gap

A longitudinal study by Fuligni and Stevenson (1995), Stevenson and Stigler (1992), and Stigler and Hiebert (1999) asked two principal questions: (a) why were American students failing in mathematics; and (b) what could be learned from Japanese and Chinese educational practices? The study compared mathematics education in three countries and followed the same group of students over an extended period of schooling. Chinese and Japanese students were found to be well in advance of their Western counterparts. In mathematics, these results could not be attributed to rote learning. Chinese and Japanese students appeared to use more sophisticated strategies when attempting to solve problems in mathematics from the earliest levels of formal schooling. Learning was student-centred and focussed on high level outcomes. CHC learners also worked collaboratively to solve problems. Weaker students were encouraged to make additional efforts in problem solving activities. Within the larger class setting, smaller groups or subsets were found to be working together to solve problems. The teacher circulated and facilitated problem-solving activities. The Asian students achieved significantly higher standards by working more effectively at the group rather than the individual level (Stigler and Hiebert, 1999).

The research workers' conclusions pointed to cultural differences that accounted for perceived success or failure. In the United States, innate ability was thought to account for the results students obtained in mathematics. However, in Asian countries, results were attributed to environmental factors and students' personal efforts to achieve. Making mistakes and learning from them led to positive learning outcomes in Asian classrooms. Socialisation skills, developed early in life in Asian settings, assisted and encouraged slower learners. There was no pressure for preschool children to undertake academic tasks until they were ready, nor was there any loss of face if this did not occur immediately. The collective nature of Asian learning supported students in a nurturing environment and fear of failure was not a limiting factor. They achieved high standards in large classes, poorly equipped classrooms, using out-dated teaching methods (by Western standards) with low level public expenditure on education (Stigler and Hiebert, 1999).

Studies show that CHC students are consistently high performers in comparison to their Western counterparts when studying in either their home countries or in Western tertiary institutions. Biggs (1996b) cites evidence from the International Association for the Evaluation of Educational Achievement (IEA) studies in mathematics and science. These data show that the standards achieved by students from Korea, Japan, Hong Kong, Taiwan and Singapore are almost always markedly higher than those attained by students from most Western countries including Australia and the United States.

### The cross-cultural learning perspective

Until recently behavioural and cognitive theorists have looked for universality in the laws of learning and have not taken into account cultural differences in learning styles. Student approaches to learning that are discussed earlier in this chapter and presented in Table 3.1 have their conceptual origin in the Western learning context. In recent research (Watkins and Biggs, 1996, 2001a, 2001b) additional investigations have been undertaken in order to try and understand learning from a cross-cultural perspective. Measurement instruments are now translated and back translated into home country languages to ensure clarity of meaning and conceptual content. The instruments are scored as originally designed but interpretation is undertaken from a cross-cultural perspective and the measurement of specific constructs is described by

Hui and Triandis (1985) as being carried out on the same metric in different cultures. The procedure employed seeks to ensure that equivalent concepts and the relationship between similar variables are measured in the same way in different cultural contexts. If it could be shown that an instrument like the SPQ, originally developed by Western research workers, successfully used the same network of constructs, then there would be an assurance that the concepts were operationally equivalent in different cultures and metric equivalence might be assumed. This would involve testing both the internal structure of the constructs and relationships between the constructs in different cultural settings with instruments like the SPQ and the learning on which the model was based (Watkins, 1996b).

#### Cross-cultural testing of self-report questionnaires

The SPQ (Biggs, 1987b) has been designed to estimate learning motivations and strategies at the tertiary level. It has had extensive use in in-country university trials in many parts of the world, notably Australia, the United Kingdom, the United States, Hong Kong, Nepal, Nigeria and the Philippines (Biggs, 1987b; Bolen, Wurm and Hall, 1994; Gow et al., 1996; Harper and Kember, 1989; Kember et al., 2004; Rose et al., 1996; Watkins and Akande, 1994; Watkins and Biggs, 1996; Watkins, Hattie and Astilla, 1986; Watkins and Regmi, 1990). In these countries the SPQ has been used primarily with students native to that particular learning context. It has been employed in different cultural settings and also at different societal and economic levels within particular cultures. The questionnaire has shown adequate internal reliability and consistency across cultures when it was used at equivalent student levels. Further, the extensive research that has been carried out with the SPQ (Watkins, 1996) gave the instrument a consistency across cultural groups that has not been found with other instruments such as the *Approaches to Study Inventory* (Entwistle and Waterson, 1988; Ramsden and Entwistle, 1983).

In the research, only the surface approach scales of the SPQ appeared to have relatively low but significantly different reliabilities in different learning cultures. The underlying factors that represented surface and deep approaches to learning also appeared to correlate with academic achievement in the countries under investigation. Therefore, the research tended to support the within-and between-construct validities of the questionnaires considered and showed the strength and meaningfulness of their use as measurement instruments in different cultures (Watkins, 1996a). Biggs (1993, 1999a) argued that variations in the surface approach were due to the way in which this approach was used in some cultures. The surface approach might be used because of (a) a fear of failure, or (b) the desire on the students' part to obtain credentials as a mark of successful completion of the education process alone, rather than as an indicator of a preference for surface learning. Biggs (1996a, 1999a) also contended that the approach to learning that students selected was determined by the subject, the lecturer, the examination and assessment requirements of the subject being studied.

#### Learning in a CHC environment

Ho (1994) examined the environment in which CHC students were nurtured as children. It was an ambience in which the mother was the chief agent of impulse control from infancy to adulthood. The mother exerted strong social control, fostered an intolerance of deviant behaviour and an even stronger pressure to conform to the group ethic. The Confucian culture stressed the importance of achievement motivation to succeed at school, to get into university and, eventually, to get a good job. Creativity was not always encouraged but conformity was expected and was rooted in collectivist ideals that linked individual achievement to family or group

achievement. The traditional Chinese belief in learning through hard work was embodied in a popular adage: "The sea of learning knows no bounds; only through diligence may its shore be reached" (Ho, 1994, p. 296). Hard work and effort were seen as keys to academic achievement.

Gow and her colleagues (1991, 1996), working in Hong Kong, observed that students: (a) were pre-occupied by examinations; (b) concentrated their efforts on materials in the syllabus; (c) tended to rely on notes given out in lectures; and (d) did little beyond reading required texts. Ho (1994) indicated that while these observations might be correct, they were not a complete assessment of the Hong Kong student. He cited research indicating that Hong Kong tertiary students spent an average of 20.8 hours each week in additional study as well as an average of 33.5 hours each week attending classes. He contended that the Chinese academic environment was orderly and authoritarian and strict discipline was a necessary requirement. Teachers were the authority figures and were neither questioned nor challenged. Their role was to impart knowledge to students and teaching, therefore, was formal and expository in nature. Students were treated as passive recipients of knowledge and were not encouraged to be actively involved in classes. All of these characteristics reinforced the Confucian ideal of filial piety (Ho, 1986, 1994; Hwang, 1999, 2001). This described the learning process and environment that was typical not only in Hong Kong but was also generally confirmed by research in cultures that subscribed to Confucian ideology. It was rigid and formalised and large amounts of the students' time and effort were required to reach their desired levels of achievement (Banks, 1993; Biggs, 2001a, 2001b; Bond, 1996; Chan and Watkins, 1994; Cheung, 1996; Davies, 1988; Exum and Lau, 1988; Flowerdew, 1998; Graddol, 2004; Grant, n.d.; Johnson and Wen, 1997; Liu, 2000; Rao, 1996; Watkins, 1982, 1983; Watkins and Qi Dong, 1994; Wen, 1993).

# The importance of education in the Confucian tradition

Western educators and research workers have often found it difficult to comprehend the success of Asian learners in international educational settings. Lee (1996) discussed this phenomenon from an ethnic and cultural perspective to try to explain the excellence of Asian learners, their diligence and high achievement motivation. Lee also discussed the positive views of Asian students toward education and the drive that resulted in students' free time being spent in the pursuit of study. In particular, he focussed on the concept of learning in the Confucian tradition with respect to beliefs in human perfectibility and educability. He also showed the importance of effort and will power in order to provide a cultural background for understanding the prevalent East Asian attitude and motivation to learning and education.

Lee (1996) discussed the importance of education in the time of Confucius and the continued importance of education in a cultural setting where the Confucian tradition has remained influential. Today attention is still given to the importance of education in the Confucian tradition in societies where this tradition is perceived to be essential for both societal and personal development. The following verses are part of a Confucian work, *Three Character Classic*, a poem arranged in 356 alternately rhyming lines consisting of three characters (Chinese ideographs) each.

The Significance of Education

Men, one and all, in infancy are virtuous at heart. Their natures are much the same, the practice wide apart. Without instruction's aid, our instinct grew less pure. By aiming at thoroughness only teaching can ensure.

To feed the body, not the mind – fathers, on you the blame! Instruction without severity, the idle teacher's shame. If a child does not learn, this is not as it should be. How, with a youth of idleness, can age escape the blight?

> Diligence has its reward; play has no gain. Be on your guard, and put forth your strength.

The work of Confucius has been a guide to knowledge and learning for over 2600 years in East Asian countries. The section of the work cited here begins with a statement on the significance of education and concludes with an exhortation on the importance of diligence (Giles, 1972; Wu, 1989).

The importance of learning pervades Confucian literature as it did Confucius' personal life. He characterised his life span as a learning process. The Confucian tradition itself is characterised by discourse and debate on learning. Even today in Mainland China's expanding economic climate, where there is increased political pressure to devalue the importance of education, past educational values remain and permeate Marxist precepts (Cleverley, 1991; Wang, 2002). Other East Asian cultures that follow the Confucian tradition like Malaysia, Singapore, Taiwan, Japan and Korea perceive educational success as synonymous with success in life (Hwang, 2001; Lee, 1996).

#### Education and perfection for all

The Confucian tradition presumes that every person is able to be educated. The tradition is not limited to those of high rank in society. However, it does acknowledge that there are differences in ability. Confucius says in his *Analects* (XVII.3) that there are four categories of people in the context of learning: (a) those who are born with knowledge; (b) those who attain knowledge through study; (c) those who turn to study after difficulties; and (d) those who make no effort to study after encountering difficulties in life. Therefore, according to Confucius, differences in innate intelligence do not inhibit education but attitudes to learning may advance or inhibit achievement (Lee, 1996).

Confucius would not have refused to teach a person wanting to learn but might have refused a person not eager to learn. The importance of a good educational environment is essential in Confucian thought. It still is believed that both the education and the teaching environment are significant factors in personal development. The concept that everyone can be educated and is perfectible forms the basis for optimism and dynamism in the Confucian tradition (Hansen, 1985; Hwang, 1999, 2001; Zhu, 1992).

#### Learning, effort and will power lead to human perfection

The Confucian tradition is built on the precept that wisdom is a state that is achieved by cumulative effort. Wisdom is also acquired by devotion to study and may be attained by reading and reflection. Therefore, education leads a person to a rational appreciation of learning. Even when ability varies, rationality leads to wisdom through education. However, education and learning may only be achieved with effort and self-determination and will power is the driving force behind effort. Perfection is achieved in the Confucian tradition by the inextricable linking of learning, effort and will power (Tu, 1979).

#### Learning for self-realisation

In the Chinese tradition the self is usually undetermined. It is subject to restraint within the family. Therefore, individualistic behaviour may be seen among Chinese who have left the family setting. This may occur in migration from rural to urban areas or when moving overseas to live and study. Personal autonomy is relative to the individual's new position in an individual's new environment. Learning occurs as an end and not a means to an end. Learning as a means to an end that is done to please others or to show off is unacceptable in the Confucian tradition. The process of learning is seen as an inner-directed process and self-cultivation is viewed as an end product of learning that remains at the core of Confucian teaching (de Bary, 1983; Munro, 1985; Tu, 1985).

#### Learning promotes enquiry

Biggs' (1991, p. 30) observation of the Confucian tradition of teaching and learning concludes: "Confucius saw learning as deep: 'seeking knowledge without thinking is labour lost; thinking without seeking knowledge is perilous". The Confucian aim is to shape social and family values in order to conserve a particular political structure. Therefore, education in the Confucian tradition is considered to be important for its intrinsic value. Education is by nature inclined toward the deep and not the surface approach to learning. Memorisation by familiarisation with what is read; understanding, reflecting and questioning are considered to be the bases of learning. Memorisation for an examination may be. Therefore, recitation, reflective thinking, inquiry and repetition enhance understanding and ultimately strengthen the learning process in the Confucian tradition (Chu, 1990; Lee, 1996; Zhu, 1992).

Moreover, education is perceived as important for personal development and may be achieved by all. Education in the Confucian tradition is permeated by a sense of egalitarianism. It is achievable by effort and will power. As all may achieve, failure is due to a lack of the effective use of effort and the desire to achieve. Effort, combined with innate ability, yields success and is encapsulated in the ancient Chinese proverb used as the subheading for this chapter: 'failure is the mother of success'. Therefore, when students from the Confucian tradition come to study in a Western problem-based learning environment that values ability more than effort, changes may occur particularly if a student's confidence in his or her capacity to perform is undermined and a diminishing sense of personal accomplishment becomes a state of mind (Chang et al., 2004; Lee, 1996). The changes that may occur in CHC students' values and approaches to learning are the principal foci of ideas and relationships that are estimated and examined in this study.

# **Teaching and learning environments**

#### Western learning environments

A good learner in a Western learning environment is perceived as one who uses an intrinsic approach to learning. The student also uses metacognitive strategies for planning and monitoring the progress of work undertaken. A deep approach to learning is generally accompanied by high achievement in a teaching environment that has the following characteristics: (a) a variety of teaching and learning methods, (b) a comfortable classroom environment, and (c) the content presented in a meaningful way. High cognitive outcomes are expected and addressed in assessment that occurs in a non-threatening environment in the actual classroom (Biggs, 1996a, 1996b, 1996c; Little, 1999).

#### Asian learning environments

Asian teaching and learning environments present a picture that would seem to be the opposite of these conditions. Asian school systems are found in CHC societies including Mainland China, Hong Kong, Singapore, Taiwan, Japan, Korea, and the large ethnically Chinese enclaves in Malaysia, Indonesia, Brunei and Vietnam. The average class has over 40 students. The teaching method is expository and the teacher is the final repository of all knowledge. Most important examinations are external. The examinations are highly competitive and create pressure on both teachers and students to achieve at a high enough level to meet entrance requirements and attain a place at a prestigious university (Biggs, 1996b). This situation poses an interesting problem for CHC learners. If it is assumed that non-competitiveness is an important Confucian value, then why is so much importance placed on competition for high results in external examinations and places at university? The conundrum facing students who come from CHC countries where competition is so important increases when these students come to study in a learning environment where the emphasis is not so much on competition with colleagues as is self-improvement and the production of a high standard of work. The problem is best understood if it is explained that the competition in Western societies is based on self-improvement and winning is an individual's goal regardless of the cost. However, competition in Confucian societies, although still occurring for self-improvement, is group-based and is directed towards external goals such as examinations.

#### The paradox of the Asian learner and adaptive modes of learning

How then, do CHC students reach the acknowledged high levels of academic achievement if they are considered by Western observers to be so prone to using rotebased, low-level cognitive strategies in their home countries in Asia or in Australia when they come to study at the tertiary level? How then, can this apparent paradox be understood? One explanation seems to be that highly adaptive modes of learning emerge from CHC classrooms where students show a reported preference for high-level, meaning-based strategies of learning. This seems to contradict what has been noted by Western observers with respect to CHC students learning in Western countries until the adaptations that are made by students to their learning environments are considered in context (Stigler and Hiebert, 1999).

When schooling is poor, students are forced to generate their own self-regulating strategies for deep learning in order to survive what they perceive to be poor teaching and poor learning environments (Biggs, 1996b, p. 50). Research into the relationship between the teaching context, student learning processes and learning outcomes has

resulted in the 3P Model of Teaching and Learning that is depicted in Figure 3.1 and has been discussed earlier in this chapter. The learning process is not unidirectional, as the model is non-recursive and reciprocal in its mode of operation. Prior knowledge is used to solve current problems. The resultant solutions are then applied to new situations. Therefore, even in a CHC modified learning situation, the 3P Model appears to be in equilibrium. Teachers and students are seen to share learning-related beliefs and values that arise in the social and educational context. In CHC countries it is likely that these beliefs, values and practices lead students to internalise dispositions that enhance their ability to be taught and their docility. Such dispositions might include:

- (a) attributions that encourage further involvement and self-management after failure, including effort, interest in the task and skill of the teacher;
- (b) metacognitive skills such as scanning for clues that help the direction of effort and give assent to the direction of effort towards repetitive tasks, knowing that meaning will be found ultimately; and
- (c) recognition of group problem solving and the ability to accept rules governing social behaviour. (Biggs, 1996b, p. 61)

#### Student approaches to learning reconsidered

Initial discussion of the approaches to learning has focussed on how students meet and interact with their learning environment. After consideration of the 3P Model, an approach to learning may be considered to represent the way students adapt to their learning environment. It is in this context that comparisons between CHC and Western learners are usually made. Is there a possibility that these comparisons are flawed and that what is seen in a CHC classroom by Western observers is interpreted using only a Western paradigm? Biggs (1996b) focuses the understanding of the terms deep and surface on learning only. He has implied that specific meaning depends on the context, the task and the individual's encoding of both of these words. In this context, the surface approach is based on an intention extrinsic to the real purpose of the task. This may involve rote learning and repetition without understanding. Rote learning may be carried out in order to pass an examination. In addition, repetitive learning may involve a form of deep memorising as a means of ensuring accurate recall. The difference between rote and repetitive learning lies in the learner's intentions with respect to meaning. Repetitive learning may be transformed and encoded by the learner at a later time and therefore involves more than verbatim recall. The two processes may even follow one another (Biggs, 1996b). For example, if students memorise a speech for a competition, they may use rote memorisation initially. If the memorised speech is then modified and refined prior to the competition it may be thought of as repetitive learning combined with a deeper understanding of what has been learned.

If the learning takes place in order to understand, then the repetition becomes a deep strategy. Therefore, learning process factors describe the motivations that drive students to learn. This is the **why** of student learning. The **how** is the particular strategy that is chosen to accomplish the **why**. Repetition is important in the learning process for Asian students. It illustrates and re-enforces the point that systems of learning and studying need to be understood and interpreted in their cultural context and not extracted and examined using inappropriate cultural models (Biggs, 1996a; Carson, 1998; Furnham, 1988; Leach, 1999).

# Western and CHC teaching environments

A key to understanding the differences between Western and Eastern teaching and learning environments lies in the order in which learning activities occur. Western students tend to explore first, and then develop the appropriate skills needed for mastery. In a CHC culture, a skill is developed first and after repetition and exploration of the skill, a product involving that process or skill emerges. Hess and Azuma (1991) also see repetition as a way of developing understanding. Western education would appear to be more concerned with process than with product where exploration and creativity are considered to be more important than refining and developing specific skills (Biggs, 1996c; Biggs and Collis, 1982, 1989; Gardner, 1989a; 1989b; Hattie, Biggs, and Purdie, 1996; Hattie and Watkins, 1988; Marsh et al., 2000; Mongomery, 2004; Purdie, Hattie and Douglas, 1996; Renshaw and Power, 2003; Sternberg, 1997; Trigwell and Prosser, 1991; Watts, 2003; Winter, 1996; Wong, 1988).

CHC students undergo socialisation that is more group oriented and less individually oriented. Their early group socialisation predisposes the students to learn by following the teacher's instructions. The motivation to learn is generated as a natural by-product of this process. Asian students and teachers are more task-oriented than their Western counterparts, but tasks are attempted as group problem-solving exercises and governed by rules that regulate social behaviour in groups. Further, there is an adaptive predisposition by CHC students to put in effort and seek meaning, to persist even in the face of failure and to generate productive interaction between teacher and student and between student and student that involves higher cognitive processes. The achievement of excellence at both the local and international levels attests to the high level of cognitive development in students from CHC cultures and resolves the apparent paradox of the Asian learner (Biggs and Collis, 1983, 1989; Stigler and Hiebert, 1999).

Therefore, in the Confucian culture, the teaching environment has three principal features: (a) an emphasis on student learning through cooperation and activities of the group; (b) a warm learning environment as appropriate to the culture; and (c) an expectation of high cognitive outcomes (Biggs, 1996b; Stigler and Stevenson, 1991).

#### The CHC learner in retrospect

This concluding section on learning motivations and strategies examines three questions: (a) what then is unique about Chinese learners and their approach to learning; (b) what motivates them to learn; and (c) what strategies do students use that are specific to Confucian culture?

First, it is important to clarify the meaning of what the CHC learner is and also what he or she is not. Learners from CHCs are not strictly rote learners as some Western misperceptions have sought to imply. Other misperceptions are that CHC learners only use memorisation in their learning. Further, achievement motivation is seen as ego enhancement rather than the socially based construct that it actually represents in Confucian cultures where the orientation is collective and not individualistic. Controllable attributions such as effort and skill are seen as useful and able to be modified when compared to the uncontrollable attribute of ability (Watkins and Biggs, 1996, 2001a).

Further, in order to understand how students from CHCs can best be assimilated into Western classrooms and university settings, there is a need for a clear understanding of CHC beliefs about learning. There also needs to be an understanding of the role of the teacher, possible language difficulties that may arise, and what plagiarism means to the CHC learner. Greater comprehension of these points would help the Western observer and teacher to understand more about students (and people) from Confucian heritage cultures. Therefore, CHC learners are not particularly prone to using rote learning as the sole learning strategy. Rather, they memorise to understand more deeply (Bax, 2003; Biggs and Watkins, 1996; Clenton, 1998a, 1998b; Poona et al., 1983; Walker, 1998).

### Conclusion

This initial overview places the contemporary examination system in an historical perspective. The Confucian work ethic teaches that hard work, persistence and optimism can overcome initial mental and even physical impairment. This can occur because persistence and the support of the learning environment encourage students to overcome difficulties through a reduced emphasis on individual differences that are subsumed to the needs of the group. Today the CHC worldview is being modified by forces both within and around the learning environment. Approaches to learning and study are also changing in response to the perceived needs of students. Given the great task of adapting to a new and different cultural and physical environment as well as a new language of communication, it would seem that only a maximum effort on the part of CHC students can implement the changes required to succeed. In this chapter it is argued further that living in a learning environment that considers ability to be more important than effort may initiate a change in approaches to learning in CHC students. Consequently, measurement of approaches to learning over time is required in order to understand how CHC learners prefer to acquire knowledge, and to examine whether students' approaches to learning change. Moreover, any changes that may occur need to be examined over time as a single assessment only gives an indication of what is occurring at that particular point in time. Therefore, it is argued that a carefully planned research study that investigates change over four or five time points over a period of two years can provide a more accurate indication of the changes that are occurring, and lead to a greater understanding of how CHC learners undertake the learning tasks assigned to them.

The appropriateness of the SPQ for use in academic research is supported by results in different cultures obtained from students at the tertiary level of study. The studies referred to also tend to support the validity of the scores obtained from this questionnaire when used in different cultural settings (Watkins, 1996a). The use of the SPQ in this study to examine students' responses seeks to elicit information that can enable valid measurement of CHC students' learning in an Australian setting. In addition, information on the effects of environmental change on learning approaches is sought.

In this study consideration is given to the possibility of change in approaches to learning in the educational environment that CHC learners encounter when they study in Australia. In order to investigate learning in a longitudinal study a testable model and associated research questions must be advanced. Chapter 4 considers the development of a model proposed for the investigation of the problem and research questions associated with the estimation of changes in approaches to learning as well as the changes in values that may occur when students move from a Confucian heritage culture (CHC) in Asia in order to pursue tertiary studies in a Western social environment in Australia.

# **4** A Hypothesised Model and Associated Research Questions

### Introduction

This chapter advances a hypothesised model of the possible changes in the life values and approaches to learning for a sample of Asian students from Confucian heritage cultures (CHCs) who move to a Western culture to live and study. It examines issues and questions associated with the values and approaches to learning of CHC students from secondary and tertiary studies in Asia who come to study in Australian higher education institutions.

A model of the hypothesised processes of change in the values and approaches to learning of sojourner students from Asia is presented in Figure 4.1. Paths indicating relationships in the model are connected to the principal research questions. The questions are listed in Table 4.2. A discussion of each relationship leading to a research question forms the body of this chapter. The possible connections between values and approaches to learning are considered to be unidirectional in nature whereby values influence learning motivations and strategies. The model represents hypothesised relationships between constructs and needs to be tested. This is done initially by a consideration of the existing academic writing and previous research in the field of inquiry.

The hypothesised model presented in Figure 4.1 shows the latent constructs under investigation: life values, personal antecedents, attitudes to living and learning, living and working conditions, and learning motivations and strategies. The model shows these factors first in an Asian environment and then in an Australian setting.




In each environment there are collections of observed variables concerned with values and learning processes that are shown as rectangles. These variables either form or reflect the latent variables that are represented as ovals. The model is generally recursive as the CHC students in the proposed sample begin life in Asia and move to Australia where life values and approaches to learning are examined. An investigation of values and approaches to learning is planned initially to identify what values and approaches to learning are important to Asian students as well as the nature of the relationships that exist between values and learning approaches. The model shows the relationships that need to be tested. In the move to Australia personal antecedents such as life goals, parental expectations, home background characteristics, teacher and school influences, the students' lifestyle, the influence of the social group and cultural maintenance have the potential to alter values and attitudes. Modifications in lifestyle may bring about changes in both values and approaches to learning. These changes can, in time, alter the way students are motivated to study and the strategies they use to learn. The sections that follow examine these constructs in association with the research questions. These research questions and the hypothesised model that are presented in this chapter provide a framework for this investigation and the methods of inquiry that have been proposed.

# Research Question 1: What are the values of sojourner students from Confucian cultures?

The environment of the Asian learner is very prescriptive. It is rule-based and from a Western perspective seems restrictive to learners. The values that are particularly important in the Asian family and educational environment are those that have their foundation in the philosophy of Confucius.

Table 4.1 shows the possible disposition of value statements into dimensions from an administration of the Chinese Value Survey (CVS). It has been found that the 40 value statements in the CVS are divided into four dimensions (Bond, 1988 and the Chinese Culture Connection (CCC), 1987). In Matthews (2000) the dimensions are given the names: CVS I-'Integrity and Tolerance', CVS II-'Confucian Ethos', CVS III-'Loyalty to Ideals' and CVS IV-'Worldly Wisdom'. These value constructs are conceptually similar to those used by the CCC (1987). The value statements associated with the Confucian Ethos dimension are particularly important to life in a Confucian culture. This dimension describes relationships with others and the values included give importance to constructs that provide people with fixed positions in societies that are hierarchical in structure and governance. It is essential for people to know their place in society in Asia, a geographical region that has 60 per cent of the world's population in ten per cent of the physical area. In addition, the importance of a benevolent authority and being conservative provide stability for large population groups. Striving for excellence and competition in business occurs but never to the detriment of the family-based culture that is at the core of life in an Eastern society (Chiu et al., 1998; Ralston et al., 1992).

Consideration of values in Asian societies raises two important questions: (a) what values are particularly important in Confucian cultures; and (b) what values are important to CHC students, in particular?

Each of the four dimensions found in Table 4.1 is generated from a combination of values that form and reflect the constructs that are discussed here. The first dimension (CVS I) is based on the construct of Integrity and Tolerance and involves self-development. Some of the values included in this group are harmony, knowledge, patience, self-cultivation and persistence.

	CVS I Integrity and Tolerance		CVS II Confucian Ethos
	(Development of Self)		(Relationships with Others)
2	Industry	3	Tolerance
4	Harmony	6	Loyalty to superiors
9	Kindness	16	Benevolent authority
10	Knowledge	17	Non-competitiveness
13	Self-cultivation	22	Keeping oneself pure
15	Sense of righteousness	23	Thrift
18	Personal steadiness	33	Contendedness
19	Resistance to corruption	34	Being conservative
21	Sincerity	35	Protecting your 'face'
24	Persistence	37	Chastity in women
25	Patience	38	Having few desires
28	Adaptability	39	Respect for tradition
30	Trustworthiness		
32	Courtesy		
36	A close friend		
	CVS III Loyalty to Ideals		CVS IV Worldly Wisdom
	(Social Responsibility)		(Tolerance and Moral Discipline)
1	Filial piety	5	Humbleness
7	Observation of rites and rituals	12	Moderation-following the middle way
8	Reciprocation of greetings and favours	14	Ordering of relationships
11	Solidarity with others	26	Repayment of good and/or evil
20	Patriotism	27	Sense of superiority
31	Having a sense of shame	29	Prudence
		40	Wealth

 Table 4.1
 CVS value dimensions and names of included values

Values associated with the Loyalty to Ideals (CVS III) dimension are concerned with social responsibility. Three values in this group are particularly important in Asian culture namely, filial piety, having a sense of shame and the observation of rites and social rituals. Filial piety involves obedience and respect for family members including respect for older people and ancestor worship. Filial piety has been important since the time of Confucius and students in Asia today still show unquestioned respect for their parents and teachers. Having a sense of shame is important because to lose face when not doing the best in school or in life is to dishonour the teacher, the family as well as the Confucian system of belief. In Asia, observation of rites and rituals establishes networks and relationships that enable a society to function smoothly with the family at the core (Hwang, 1999, 2001; Xue and Ng, 1999).

Values associated with the Worldly Wisdom (CVS IV) dimension are widely accepted. The values associated with this dimension are related to the construct of tolerance and moral discipline. Moreover, values such as moderation or following the middle way, repayment of good or evil and a sense of superiority are important in Asian societies as they assist in the ordering of relationships. Value structures provide solidarity to societies. However, it is the degree and strictness associated with the incorporation of specific values into the overall system that makes adherence to some of these values particularly important in Asian societies. Repayment of good or evil is

also rigid in its application. In the Confucian value hierarchy there is always an expectation of repayment of favours (Bond, 1996; Smith and Bond, 1998).

The values that are especially important in Eastern culture are associated with the Confucian Ethos (CVS II) dimension. Two values that are particularly Confucian in nature are non-competitiveness and protecting your face. Academic achievement is not considered to be based on competition between students; rather it is striving to achieve the highest standard possible. The protection of face is another value that leads to smooth and harmonious group functioning. Loss of face goes beyond the affected individual. In Asia the entire social group may be discredited or socially isolated by a loss of face. The values associated with the Confucian ethos dimension encompass constructs important in interpersonal relationships that individuals have with others both within the immediate family group and between social groups (Bond, 1991a; Chan et al., (in press); Zhou, 1988). Being conservative and following a benevolent authority are values that assist in the development and maintenance of the hierarchical structure of CHC society (CCC, 1987).

# Research Question 2: What are the approaches to learning taken by CHC students?

Learning in Asia is often characterised as surface or memory-based (Ballard, 1996; Ballard and Clanchy, 1984, 1988, 1991a, 1991b; Burns, 1991; Chalmers and Volet, 1997; Hellmundt, Rifken and Fox, 1998; McKay and Kember, 1997; Pratt, 1992; Smart and Ang, 1992; Smart, Volet and Ang, 2000; Smith, Miller and Crassini, 1998; Volet and Ang, 1998). However, the way memorisation is defined depends on individual interpretation. Some research workers (Ballard and Clanchy, 1988, 1991a; Biggs, 1996b, 1996c; Harmer, 2003; Lamb, 1990; Littlewood, 2000; Smith et al, 1998; Watkins and Biggs, 1996, 2001) contend that course work and examinations influence the type of learning that occurs. Many Asian school systems rely heavily on external examinations for entry into advanced courses at the secondary and tertiary levels of education. This may create a constrained learning environment particularly when the pressure to succeed comes from both the home and the school. Preparation for examinations can take a large part of the available teaching and learning time. Examinations often employ multiple choice responses and the learning is, therefore, extensive but possibly superficial in nature (Volet and Kee, 1993).

#### Entrance to tertiary study

In Asian countries entrance to university generally requires students to pass a rigorous examination (Eckholm, 2000; Mok and Gurr, 2003; Weiner et al., 1991). Entrance to famous universities is keenly contested as a degree from a prominent university is considered essential to obtain a well-paying position after graduation. In Asian countries, the main hurdle would appear to be the entrance examination itself. Once entry to a university is achieved, very few students seem to fail. However, the availability of postgraduate study is often limited. For this reason many Asians students look to Canada, the United States and Australia to further their education particularly in the areas of commerce and trade.

Ballard (1996) notes that Asian students have a high pass rate in international examinations such as IELTS (International English Language Testing Service). This examination needs to be passed at a high level for entry to tertiary study in Australia. However, even when the required level is achieved students often find they are poorly prepared for actual study in an Australian university. When students enter a Western

university to study, they need to be able to reason, think and manipulate the language. Fluent English is required to understand their specific subject area, to engage in social discourse and to survive in the monolingual culture in Australia. Although Asian students may have a good understanding of English grammar their practical linguistic experience is often limited (Allwright, 1988; Ballard, 1996; Wall et al., 1988; White, 1988).

# Research Question 3: Is there a relationship between values and approaches to learning in CHC students?

In Asia, programs of study are often rigid, fixed and traditional in composition. Electives and choice often do not exist. A student's major field of study may be limited as teachers and parents normally decide what course of study a student should follow even when students pursue their education overseas. The decision is usually based on family or community needs. Whatever is chosen, success is anticipated because it is expected that the necessary effort will be made to ensure success. For example, if a family owns a factory, the student may be expected to pursue studies in commerce so that when the student returns to the home country, he or she can assist in the improvement of the family business.

The primary purpose of any education system is to pass on the heritage of a given culture to learners as well as social, political, scientific, and technological knowledge. The learner tests, applies, creates and then accepts or rejects this heritage (Jackson, 1997). In Confucian cultures, the role of a teacher is that of an interpreter and guide for the pathway to knowledge. This is a far more structured role than in Western countries. Ramsden (1992) indicates that teaching that promotes learning allows students to make choices and to experience the consequences of their choices. However, in most CHC classrooms direct teaching of information needed to pass externally-prepared examinations does not encourage choice. Students are not given the chance to experiment, take risks or make mistakes and learn from their errors. Flexibility is lacking, as is experiential learning that occurs without much questioning and appears to be external to thinking and reflecting on what is learned (Ballard and Clanchy, 1988, 1991b; Jackson, 1997; Watkins and Biggs, 1996). Therefore, in Confucian cultures, education and approaches to learning are grounded in the social and cultural antecedents, attitudes and life values derived from the Confucian heritage and modified by the need to acquire knowledge and skills to take their culture and society into the twenty-first century.

However, there may be a degree of causality whereby students' values influence approaches to learning. Attribution of causal relations as described by Vogt (1999) may be simple or multiple; however, multiple causation is more likely with respect to the constructs of values and approaches to learning. Further, it is not always possible to attribute a direct causal relationship. Nevertheless it may be possible to show the direction and strength of the association between values and approaches to learning and argue that these constructs are causally linked. The statistical nature of causality and the procedure used to test this hypothesis are discussed in Chapter 6.

# Research Question 4: What are the personal characteristics of CHC students?

An examination of personal characteristics includes consideration of personal antecedents and attitudes to living, working and studying. Personal antecedents are characteristics that involve factors such as the influence of family on what courses of study a student pursues, the way a student prefers to study, as well as the people who form an individual's social group and guide their religious practices. Antecedents may also influence the development of moral and ethical principles on issues of family life and living. Antecedents, in turn, may be influenced by whether the student comes from a rural or an urban environment in his or her country of birth. These antecedents are likely to influence adaptation to life in a Western living and study environment.

## Asian beliefs, practices and moral development

Family and religious influence are reflected in students' values. Family influence is especially strong; it guides and directs members' lives. Families are patriarchal in governance. Women are considered essential in the traditional roles of bearing and raising children. However, in Asia today the importance of women as individuals is growing particularly in urban areas (Zhang Zhen, 2001). Nevertheless, no matter how important a woman's position is in an East Asian society, a woman is rarely permitted to challenge male dominance in decision-making and family governance (Butcher, 2002; Chan and Mok, 2001; Yen Mah, 2000).

Many students have followed formal religious practices in their country of birth. Often religious tenets and experience come from contact with grandparents. Older people are held in positions of respect and wisdom is passed on to the young by grandparents while the parents are occupied with career development. This wisdom may include religious precepts particularly if the grandparents have had religious instruction at secondary school or university in their own youth (Liu, 2000).

Grandparents may also teach the young the importance of morality and ethics in life. Culture and mores are passed from one generation to another in this manner. Cheng (1990, 2000) and other research scholars have pointed to the significance of high moral standards in Confucian culture. Awards for moral, academic and physical excellence are still given each year in Hong Kong, Mainland China, Singapore, Malaysia (in ethnically Chinese schools), Taiwan and in overseas enclaves where the CHC influences child development. High morals, according to Cheng (2000), are thought to be the most important educational outcome because without them the character of the individual is incompletely developed. Values and religious training contribute to the moral advancement of the individual and the family unit.

A change in religious beliefs and practices can influence attitudes to living and learning. When students leave their home environments in Asia to live and study in Australia, they often find friendship and support through following religious practices even if they attend church services initially for social interaction rather than actual religious beliefs (Butcher, 2002).

# CHC attitudes to living and learning

In Asia, attitudes to living and learning are shaped principally by people external to individual students. Personal desires do not have the importance they occupy in Western society. Parental and family goals and desires mould students' thinking and

responses as do the tenets discussed in association with Confucian thinking and heritage. Everything possible is done to maintain the integrity of the family group that is the functioning unit in Asian society. The family group is pivotal in retaining cultural links with the past and paths to the future (Hamp-Lyons, 1988; Lloyd George, 1992). The principal influences on students' values and approaches to learning are: (a) the family's desires for particular academic outcomes; (b) the guidance given by the teacher; and (c) the knowledge imparted in the teaching process. Today, young people are beginning to show more interest in the choice of subjects that they study. However, most young people still defer to parental desires and expectations. This behaviour ensures the maintenance of links with the Confucian tradition. Young people show respect for the past and a desire to retain an ethos that is effective and functionally supportive of the family and social group. This gives stability to society and allows life to flow smoothly toward desired goals (Smith and Bond, 1998).

# Research Question 5: Do students' values change over time in a new environment?

The initial section of this chapter has concentrated on values and approaches to learning that students bring with them to Australia. This provides background knowledge about the CHC learner in his or her home environment as well as what appears to take place initially in the period of transition to a Western learning environment. Two additional questions arise in association with this research question: (a) do the values that are considered to be particularly important in Chinese culture such as filial piety change over time and (b) if values are found to change over time, do all values change in the same way for all groups of students?

Asian sojourners come to Australia with cultural, social and intellectual experiences that are different from those of their Australian counterparts. They have been nurtured with values, beliefs and attitudes that may require adaptation and adjustment in a new cultural context. Areas that may cause concern are the potential conflict between old and new value systems, cultural differences, independent living, and the lack of adequate spoken English (Burns, 1991).

Many overseas students come from the less developed countries in East Asia. Students who come from rural areas have had to make an initial adjustment to city life in Asia. In Australia, the adjustment must go a step further with the addition of cultural change. In Asia, students may have shared a dormitory with other students who speak their own language. In Australia, they may live in shared accommodation with students from countries that do not share a common language or they may live on their own. In either case, a cultural adjustment involving a need to change or modify some values and practices is likely to occur. Students are liable to experience more freedom of choice and also be required to make decisions for themselves that others have made for them in their own countries (Ballard, 1996; O'Halloran, 2002).

The culture change experienced by new overseas students may cause physical symptoms associated with stress, especially in students just beginning to study at the tertiary level. CHC students may appear to be less confident initially about their ability to manage course requirements independently. These students may also feel that their language skills are inadequate and are, therefore, initially reluctant to participate in tutorial discussions (Burns, 1991; McKay and Kember, 1997; Volet and Kee, 1993). The questioning of authority figures contradicts the Asian students' value system that demands respect for superiors and the traditional hierarchical ordering of relationships. Therefore, with all the potential pressures on existing value systems,

the CHC value structure is likely to be modified during the Asian students' educational sojourn in Australia. Further, the values of different groups of students are not likely to change in the same way. For example, older female students may be more liable to retain Confucian Ethos values than younger students because older women often consider that values such as respect for tradition and loyalty to superiors are still important in their lives (Zhang Zhen, 2001).

# Research Question 6: Do students' approaches to learning change over time in a new environment?

The problem-based approach to learning that characterises Western tertiary study is often beyond the experience of Asian students on their arrival in Australia. Tertiary students in Australia are expected to develop ideas and form judgments based on a synthesis of ideas from reading and research. Discussion, experimentation, reflection and individual learning are required at all levels of university study. Therefore, the individual student must be self-sustaining. This may be a major hurdle for Asian students accustomed to the support of the group network and a supportive teacher (Ballard, 1996).

Collaboration in tutorials in Australia is encouraged. Asian students, when offered the choice, prefer to work with other Asian students, even if they come from different countries in Asia. They say that they prefer to work with other Asians because they fear being misunderstood by Western students (Volet and Ang, 1998). Asian students are not afraid of hard work; that has always been expected in their home countries and relates to success. It is the manner in which learning is undertaken that is culturally different. Asian students prefer to model their work on the teachings and writings of respected academics (Walker, 1998). To criticise or judge the views of respected scholars is also considered to be impolite whereas to a Western student critical debate is an accepted vehicle for the analysis and extension of knowledge. However, initial reticence to discuss and debate information or data by Asian students may be modified over time in Western learning environments (Ballard, 1996; Burns, 1991; Chalmers and Volet, 1997; Kember and Leung, 1998; Volet, 2001; Volet and Kee, 1993).

Learning in Western countries is individual and not group centred. Teamwork is only encouraged in situations where a group effort is required as, for example, in laboratory research. The apparent academic isolation may seem strange to Asian students who come to Australia to study as is the fact that the only contact they have with their lecturers and Australian classmates is during classes. After hours contact is not encouraged and social interaction rarely seems to occur. Most universities are located in urban and suburban settings and few Australian students or lecturers live on campus. Therefore, the university may seem to be run like a business centre that operates from 8am to 5pm from Monday to Friday. After that time, only the library appears to function and then with reduced staff and facilities. Food outlets and other campus facilities are also usually closed after 5pm and may not open at all during semester breaks. These circumstances may require a period of adjustment by CHC students, especially postgraduate students who often pursue their study during breaks when the library and internet facilities are in less demand.

Students seek to fill gaps in their lives once their initial reaction to the new environment has subsided. They want to establish living and working conditions that enable them to continue to achieve at high levels. University study in Australia is generally different to what they have been accustomed to in their home country. Aside from obvious language differences, there are different emphases requiring modified approaches to learning and studying. Memorisation of factual material may be required in some subjects but in the majority of topics, assessment is based on written assignments and essays, tutorial papers, and oral presentations rather than exclusively on examinations (Volet and Kee, 1993). This requires a major change in students' approaches to learning if the high level of achievement that is sought is to be realised and sustained. However, changes in learning approaches may also affect groups differently. For example, students who undertake courses that require more memory-based learning than analysis may prefer to retain a superficial approach to learning whereas students who enrol in courses that require more analysis may adopt a deeper approach to learning.

# Research Question 7: Do personal antecedents, living and working conditions influence values and changes in values?

Asian students' social interaction skills are often less developed than their academic skills. In Asia students' principal personal interaction is with the family as this is the basic functioning unit in society and the place where values are instilled. When CHC students travel to Australia to study they must rebuild networks and establish connections with people who share similar values. Therefore, when CHC students arrive in Australia, they are likely to seek other Asians with whom they are able to communicate and also share common values. This may lead to the establishment of a new social group that is supportive of the CHC value structure in a Western setting and assists in the adjustment to a new and different physical, social and cultural environment.

# Feelings of inadequacy, isolation and culture shock

Many Asian students experience loneliness and some have associated health problems and feelings of inadequacy. Asian students are under great pressure to achieve, as failure would incur an embarrassing loss of face with those who have saved their money to provide the students with an overseas education (Burns, 1991). Students' values and reactions to their new learning environment may be affected if they experience the shame that follows a drop in achievement. If shame and a loss of face increase because of poor academic performance, students' value systems may also come under pressure as their self-confidence diminishes. This can be threatening to their core values and beliefs.

Independent living and learning may also cause culture shock. This becomes a significant issue if a student needs additional time to master language skills in order to continue studying in Australia. It may also occur if a student fails to achieve and is required to repeat subjects in order to go on to a higher level of study. Additional strength of character, confidence and perseverance are needed. These personality characteristics may require further reinforcement when academic ability comes under pressure. New found academic freedom may prove to be overwhelming to an Asian student who has always had people higher up the hierarchical structure making decisions about his or her life. Freedom brings responsibility but only to those ready and able to assume it (Berry and Sam, 1997; Ng, 2001; Ward et al., 2001; Ward and Kennedy, 1993, 1999).

# The importance of the social group as an influence on values

Asian sojourner students usually live with other Asian students by choice. This is not always because of a shared home language. Asians appear to be more comfortable with people from a similar cultural background. Many students from Malaysia, for example, speak English and have only attended English language schooling prior to coming to Australia to study. These students still seem to prefer the company of other Asians to that of Australian or other Western students. The need is deeper and finds its origin in the cultural inclusivity of ethnically Chinese students who leave their home country to study overseas. These students share common values and perhaps even learning strategies in addition to ethnic and cultural similarities (Volet, 2001; Volet and Kee, 1993).

Students' lifestyle is likely to be quite different from that in their home countries. Overseas student associations on campus can assist students to form links with other students from their home or similar culture if new arrivals want this contact. The associations are supported by the universities that provide them with space and facilities where students may meet other overseas students and relax together. The associations are generally staffed by students from overseas countries who have been in Australia for some time and local staff who are experienced in dealing with new arrivals. The associations provide a point of contact where students can seek information and assistance on campus during office hours.

# Research Question 8: Do personal antecedents, attitudes, living, and working conditions influence approaches to learning and changes in approaches to learning?

Changes in values and attitudes can bring about change in studying and learning processes. CHC students may consciously discard old ways of study that no longer seem helpful in their new learning environment. Whatever they choose, a period of adjustment is generally needed, as learning in Western countries is open and flexible and often very different from their previous study environment.

In Asia, students tend to follow study programs devised by their CHC mentors that are usually based on societal rather than individual needs or personal desires. The reasons given are that the group, company or university faculty needs the expertise the student has been sent to acquire. This is especially true if the student is being financed by a particular government instrumentality in his or her home country and has already demonstrated knowledge and ability in the study area chosen. A change in direction or course of study may prove difficult, particularly if the student comes from a third world country seeking to improve its academic and technological capabilities (Ward et al., 2001).

## Living, working and studying in Australia

Asian students seem to prefer the company of other Asians as a learning milieu. This is not necessarily a single country group but a mixture of Asian students who come from places as geographically diverse as Malaysia, Singapore, Hong Kong, Taiwan, Mainland China, Indonesia and Brunei. Their link is their Asian ethnicity and similarity of thinking and learning styles (Chalmers and Volet, 1997; Nesdale and Todd, 1993; Smart, Volet and Ang, 2000; Volet, 2001; Volet and Ang, 1998). The presence of this prominent Asian minority gives the university the appearance of

cultural diversity, but unless all student groups attempt to mix or are encouraged to do so by their lecturers and classmates, the two groups are likely to lead parallel existences.

Volet and Ang (1998) give four reasons that shape students' attitudes and indicate a preference to work and learn with their own people (Asians with Asians and Australians with Australians). The reasons are (a) cultural-emotional connections; (b) commonality of language; (c) pragmatism; and (d) negative stereotypes.

(a) Cultural-emotional connections. Students feel more comfortable with their own kind as they share a common cultural heritage that facilitates understanding. In this way Asian students are also able to maintain a sense of personal identity in a foreign country or culture.

(b) Commonality of language. Asian students feel they can use their own language to communicate with each other. This avoids misunderstanding.

(c) *Pragmatism.* From a pragmatic point of view, working with students from a home or related culture is easier. In addition, most Australian students live at home and are often harder to contact for group-work meetings.

(d) Negative stereotypes. Finally, Asian students say that Australians are not usually as highly motivated to study as they are. In addition, Asian students feel that they and not the Australian students must change and adapt to the Australian way of living and learning. There also may be elements of jealousy that perpetuate the negative stereotyping, as Asian students are generally considered to be intelligent and hardworking.

In the conclusion to their study, Volet and Ang (1998) report that they have found no evidence to indicate that Asian and Australian students want to mix for academic work. They agree that both groups miss out on the benefits of learning from one another, however, the strength of a common heritage acts as a unifying force for group cohesion that draws similar students together. They conclude that perceptions of cultural distance need to change for social integration and cohesion to occur and enable positive educational benefits to come from cross-cultural contacts. Therefore, Australian tertiary institutions have a responsibility to create learning environments that foster inter-cultural communication as a means to engender cultural inclusivity (Volet and Ang, 1998).

# **Globalisation of educational objectives**

Nesdale and Todd (1993), Smart, Volet and Ang (2000), and Volet and Ang (1998) have found that students' interest in cross-cultural mixing decreases over time in Australia. Further, internationalisation of the objectives of education cannot be achieved unless Australian students are committed to cross-cultural awareness and an acceptance of overseas students' cultural differences. Barker et al. (1989), Gallois et al. (1992), Mukherjee (1990), and Volet and Ang (1998) feel that this is one-sided and point out that successful adjustment to cultural diversity is a task that needs to be undertaken by both local and sojourner students.

## The Western learning environment

In Australia, formal assessment occurs but often takes a non-examination format. This may require CHC students to learn new study techniques. The use of the internet and other media resources is expected. Synthesis and development of new ideas require independent thought that cannot be accomplished using rote memorisation alone. However, CHC students seem to enjoy the challenge of deeper learning when they are confident and understand what is required of them. Above all they want to achieve and succeed in their studies. Therefore, fear of failure acts as a spur and the home environment acts as a stimulus from a distance to encourage and enhance student performance (Smith et al., 1998).

# **Principal research questions**

Table 4.2 lists the principal research questions under consideration in this study. They begin with a consideration of the values and approaches to learning that students bring from their lives and study experiences in Asia and follow the processes of adaptation to a new environment and knowledge acquisition in the Australian living and learning environment.

**Table 4.2**Principal Research Questions

- 1. What are the values of sojourner students from Confucian cultures?
- 2. What are the approaches to learning taken by CHC students?
- 3. Is there a relationship between values and approaches to learning in CHC students?
- 4. What are the personal characteristics of CHC students?
- 5. Do students' values change over time in a new environment?
- 6. Do students' approaches to learning change over time in a new environment?
- 7. Do personal antecedents, living and working conditions influence values and changes in values?
- 8. Do personal antecedents, attitudes, living, and working conditions influence approaches to learning and changes in approaches to learning?

# Conclusion

CHC students may seem to be passive learners initially as Chalmers and Volet (1997), Smith et al. (1998), and Volet and Pears (1994) have implied but once they have confidence in their ability, they become actively involved in the learning process. Biggs (1990, 1991, 1992, 1996a, 1996c, 1999a, 1999b, and 2001) believes CHC learners are inclined to adopt a deep and meaningful approach to learning. CHC learners use deep memorisation where practice and repetition lead to understanding and application. Smith et al. (1998) have also found that students prefer to use a deep approach to study and are motivated to study in order to achieve at a consistently high level. The evidence from their research indicates that those students who are highly motivated and have a clearly defined purpose succeed in whatever they choose to study.

CHC students are positively encouraged by their home culture, family and social group to achieve. As Chalmers and Volet (1997) point out, CHC learners come from a background that has traditionally emphasised the value of knowledge and respect for those who teach. Therefore, academic success is Asian students' principal goal.

After a period of two years of study in Australia students are reported to be perceptibly different in thought and action. Therefore, students would seem to have made an effort to adapt to the new physical, social and cultural environment and in the process show changes in personal values and attitudes to study as well as modifications in their approaches to learning (Chalmers and Volet, 1997; Volet and Ang, 1998).

Therefore, it is argued that a change in values and approaches to learning is likely to occur over time in a new environment. If this argument is to be accepted,

measurement on several occasions over a time period of not less than 18 months is needed to provide evidence that change is, in fact, occurring and to examine whether the changes that are observed take place in all groups of students. Chapter 5 considers the design of a longitudinal study that permits the measurement and examination of changes in values and approaches to learning over time.

# **5** The Design of the Study

# Introduction

This chapter presents the design of the study. Consideration is given to the rationale involved in longitudinal studies, the way in which a sample is obtained, the use of pilot studies in the investigation, the questionnaires that are chosen for use in the study, the process of data collection and a discussion of the efficacy of the methods that are used in data collection.

# Sampling and data collection

# Longitudinal studies

Longitudinal studies provide useful information if they are planned and executed correctly. They measure data taken from the same sample of students at several points in time. At least three and preferably five points are needed with intervals of several months between measurements to provide evidence to substantiate observed change. Two data points, as in before and after studies are generally not sufficient to account meaningfully for change that is observed. A third point produces a multiwave effect that permits any unexpected variation associated with change to be estimated. A fourth time point is required to determine if the change is linear, and a fifth time point is needed to examine for non-linearity, which might be expected in a study of this kind.

The present study uses five data points. It uses concurrent equating to bring the five sets of scores to a common scale for statistical analysis. The data points have been spaced over two years, with three points in the first year and two in the second year. A shorter period of time may have been sufficient, as three months between estimations is considered to be a reasonable length of time, but four to five months between sampling provides better estimations. This time frame is not always feasible or practical. However, what is important is that there is sufficient time for change to occur between measurements. Therefore, three time points evenly spaced in a one year period allows sufficient time for change to occur. Willet (1989; 1997) points out

that if three measurement points are used, as in a multiwave design, it allows for a smoother and more meaningful regression line to be obtained over a given period of time. Therefore, five points should improve the fit of the line even more in order to measure change both within and between individual students.

#### Sampling occasions

Willett (1997) states that when learning is under investigation the data should include what occurs within an individual as well as between individuals. In this study it is argued that values and approaches to learning are likely to change over time within and between students in a new physical, social and cultural environment.

After two years of data collection, analyses are undertaken to assist the investigator to answer the following broad questions: (a) is there a measurable change in students' values and approaches to learning over time while CHC students are studying in Australia (b) what are the personal antecedents that can influence change in values in Confucian heritage culture (CHC) students; and (c) what factors influence changes in students' learning processes?

#### **Ethics Committee approval**

Before the students were asked to participate in this or any study, approval was sought from the ethics committees and responsible persons in the institutions where they were studying. In addition, the permission of the students themselves was obtained. An explanation of the importance of the information being gathered as well as an assurance of complete privacy and the voluntary nature of participation in the study were mandatory before data collection was undertaken.

The Flinders University Social and Behavioural Research Ethics Committee were approached and the data collection plan, copies of all the questionnaires and permission forms for the students to sign were submitted to it. Provisional approval was given with the stipulation that students would be free to withdraw from the study at any time.

#### Data collection

It was anticipated that the five collections would be undertaken in March, June and December 1999 and March and June 2000. However, because of unanticipated delays, data collection was not completed until December 2000.

It should be noted that the student researcher was not permitted to make the initial direct contact with students except through the persons specifically employed to work with overseas students. Even then the written permission of the students themselves was required before data collection could begin.

Letters were written to students in Chinese and English concerning dates and times for data collection. The assistance of a Chinese colleague was necessary as the researcher spoke Chinese but could not write the letter in Chinese characters and did not have access to the necessary Chinese computer software to undertake this task.

# Sampling

A sample of CHC tertiary students who were sojourners in Australia was sought. It was thought that sojourners who came to Australia to study and then planned to return to their home country would provide a clearer indication of changes that occurred in values, attitudes and approaches to learning than would data from a sample that included both migrants and sojourners from Asia.

Feather (1979, 1986, 1993b, 1999) discussed changes in values that occurred in migrants to Australia. He also examined the modification that occurred in attitudes and behaviour of migrants compared with changes in sojourners. Feather argued that migrants seemed to feel a more urgent need to become part of their new environment. They showed this in their willingness to adapt and to change in order to become part of their new culture. A change in values that preceded the adaptive process generally also led to a change in the approaches to learning and studying among migrant students. Chan (1988) also noted that there appeared to be a greater desire to adapt and change among migrant students than among sojourner students. Therefore, it is argued that it was important to measure sojourners' values and approaches to learning in order to try to learn more about CHC students coming to Australia to study. Further, if change occurred in either values or approaches to learning during the students' sojourn, then the measurements that had been made would assist in the examination of the change and the factors influencing change.

# Procedures for gathering the actual sample

The sample was gathered through contacts with the overseas student associations at Flinders University through the Flinders International Students Association-(FISA), at Adelaide University through the Overseas Students Association-(OSA), and at the City West campus as well as a small group from the Levels campus of the University of South Australia. Another group was invited to participate in the study from the Adelaide College of Technical and Further Education (TAFE), from the students who were studying English in preparation for study at the university level in Australia. The TAFE students had all completed secondary schooling and in some cases tertiary degrees in their home countries prior to coming to study in Australia. The TAFE students needed to enhance their English listening, speaking and writing skills to reach a standard that was adequate for tertiary studies in Australia or another Englishspeaking environment. Thus the students in the sample had entered or planned to enter undergraduate or postgraduate degree programs in Australia. This was also the situation for the students who attended the Intensive English Language Institute (IELI) located on the Sturt campus at Flinders University who agreed to be in the sample. The transitional stage at both TAFE and IELI enabled some initial adaptation and adjustment to the Australian cultural and living environment to occur before the demands of university study began. The transitional period also provided the students with direct contact with the Australian learning environment where they were able to gain knowledge and experience of studying in a Western educational environment and particular learning skills that were expected to be used in that environment.

Once ethics committee approval had been provisionally granted at Flinders University, it was also sought at Adelaide University and the University of South Australia. Adelaide University was extremely co-operative and the researcher was most grateful to the staff associated with the OSA and the overseas students' administrative office for the space they provided for interviews and day parking permits that saved both time and money. The OSA allowed the researcher to invite student participation in their overseas student rooms, as did the staff at FISA. It was found that the lunch hour was the best time for enlisting the students' assistance as students were on campus for classes and said they did not mind the interruption. This was also an opportunity to meet the students personally, answer questions and explain the nature of the study. The University of South Australia was initially reluctant to be part of the study, but when the staff understood that participation was voluntary on the students' part, approval was given and both staff and students became quite interested in the project. Several Malaysian Chinese student leaders voluntarily assisted the researcher in making contact with Asian students at the City West campus, in particular.

#### **Contacting students**

The sample was composed of students studying at the tertiary level. However, some of the students at the three universities were undergraduate students and others were postgraduate students. Most ethnically Chinese students received regular emails from the Chinese Students Association in South Australia. The Chinese email postmen (and women) kept their colleagues informed of world and cultural events that were of particular importance to Chinese students such as the dates and times of national days and the celebration of important Chinese holidays and special days such as the midautumn festival and the dragon boat festival when special foods were prepared and eaten. The times of these events varied from year to year because they were celebrated according to the Eastern lunar calendar that followed a different time frame to the Western solar calendar. The researcher was very grateful for the personal contacts made with these student postmen and women. They were extremely helpful and co-operative in encouraging Chinese students to participate and continue in this research. Many of the students involved followed the data collection with genuine interest and communicated this interest and their questions about the study by email to the researcher. This communication had positive results and even brought additional students into the study sample.

#### Pilot studies

Two background questionnaires were constructed by the investigator. They were tested with newly arrived AusAID (Australian Aid for International Development) students who were not included in the actual study sample. These students all used English as their first language even though they came from culturally diverse backgrounds. Therefore, if they encountered difficulties, non-native English speakers might have had some serious problems as the background questionnaires were only presented in English. After the pilot studies an evaluation of the wording of the questionnaires was undertaken. The students who participated in the pilot studies were helpful in making constructive suggestions about topics, questions and issues that were unclear or concerned them. The researcher was able to alter some questions and modify others on the basis of the pilot studies. A second background questionnaire was piloted but not used partly because the language level was inappropriate for all potential students in the proposed sample, but also because it would have meant that only Flinders University students would have been close enough to be contacted and invited to participate as it was a longer and more complex questionnaire. As the English in the second background questionnaire required a more extensive knowledge of specialised terminology, it was decided to use another method to gather similar information. An interview was considered to be a more useful method. It was decided to undertake small focus group interviews with a total of about 20 students. These interviews were completed between October and December 2000. The information recorded was of such a diverse nature that it was decided to use the material gathered to assist in answering the research questions presented in Chapter 4 and in a discussion of any perceived changes in values and learning motivations and strategies that had occurred since the students' time of arrival in Australia. This information is discussed in Chapter 11.

# The choice of questionnaires

The actual questionnaire used in the background data collection may be found in the appendix to Chapter 5. It is presented as Table 5A.1 and is entitled Questionnaire 1–Personal Information of Students. The complete bilingual versions of the *Chinese Value Survey* (CVS) and the *Study Process Questionnaire* (SPQ), including all the instructions given to the students in both Chinese and English and the answer sheets employed, may be found in the appendix to Chapter 5 in the original thesis. A copy of the original English version of the SPQ has also been included in the thesis appendix to Chapter 5.

## The Chinese Value Survey (CVS)

The *Chinese Value Survey* (CVS) (Chinese Culture Connection (CCC), 1987) is a self-report questionnaire measuring life values. It uses Likert-type scales for scoring purposes (Dunn-Rankin and Zhang, 1997; Likert, 1932). There are some values, specifically those associated with the Confucian Ethos dimension, that are particularly important to ethnically Chinese people. There are many surveys that measure values such as the *Rokeach Value Survey* and the *Schwartz Value Survey*, but these emphasise values that are considered to be important in Western culture; whereas the CVS includes these constructs as well as values that are especially important in cultures that follow the teachings of Confucius (Smith and Schwartz, 1997). Therefore, it is argued that the CVS permits better measurement of values that guide the lives of people from CHCs, in particular. For this reason, the CVS was selected to measure the possibility of change in values over time.

The introduction to the Chinese Value Survey stated:

The aim of this study is to find out what matters are important or unimportant to people...Please indicate how important to **you** is each of the 40 items. To express your opinions, imagine an Important Scale that varies from 1 to a maximum of 9. (1) stands for **'of no importance to me at all'**, and (9) stands for **'of supreme importance to me.'** In other words, the larger the number, the greater will be the degree of importance to you. Circle one number...for each item...to express the importance of that item to you personally. You can concentrate better by asking yourself the following question when you rate an item: **"How important is this item to me personally?"** Repeat the same question when you rate the next item, and so on. Thank you.

#### (Chinese Culture Connection, 1987, p. 1)

The students were, therefore, asked to consider the importance of each item to them. The survey was presented in both Mandarin Chinese and English. The Chinese was translated, tested and back translated on a sufficient number of occasions to ensure the validity of the translation. The intention was to measure values not English language level. Therefore, presenting a bilingual survey ensured that the respondent's time and energy would be spent responding to the 40 value statements.

# The Study Process Questionnaire (SPQ)

The *Study Process Questionnaire* (SPQ) (Biggs, 1987b) is also a self-report questionnaire. It measures approaches to learning on distinct dimensions. The questions have been constructed to measure what Biggs (1987a) calls approaches to learning. He names them as surface, deep and achieving approaches and also comments that each approach is composed of a motivation and a strategy. Biggs' approaches to learning have been discussed in Chapter 3. The SPQ (Biggs, 1987b) is

designed to measure students' approaches to learning and their preferred methods of study. The students are told that there is no 'correct' or 'right' way of learning or studying. This depends on the students' personal or preferred style and the requirements of the course of study they are undertaking. The SPQ questionnaire contains 42 statements that form six groups of seven questions. All statements are positively worded so that no recoding is necessary when scoring SPQ questionnaires.

The SPQ was administered on five occasions in this study and also was presented to the study sample in both Chinese and English. In the introduction to the SPQ the students were given the following information about the questionnaire:

There is no *right* way of studying. It all depends on what suits you own style and the courses you are studying. The following questions have been carefully selected to cover the more important aspects of studying. It is accordingly important that you answer each question as honestly as you can. If you think that your answer would depend on the subject being studied, give an answer that would apply to the subject(s) most important to you. (Biggs, 1987a, p. 1)

This introduction was followed by a set of instructions that explained the five point Likert-type scale that was used to respond to the statements on the questionnaire. Responses are to be made by marking the answer sheet provided by circling one of the following responses:

- (1) this item is *never* or *only rarely true of me*
- (2) this item is *sometimes* true of me
- (3) this item is true of about *half the time*
- (4) this item is *frequently* true of me
- (5) this item is *always* or *almost always* true of me

As the questionnaire was presented in both Chinese and English, it allowed the participants to concentrate on the content and not on the language of the questionnaire.

This instrument was translated to ensure correctness of meaning and clarity of conceptual content. It was scored as originally designed, but interpretation was undertaken from a cross-cultural perspective (Watkins, 1996). Translations and back translations were done to validate the language used on the SPQ.

# The nature of the questionnaires that are used in the study

Both questionnaires were self-report instruments that permitted the students to express personal opinions when making their responses. The format of the two questionnaires was similar. Precisely the same information in both Chinese and English was in the hard copy as well as the internet version so that the students were not likely to encounter any problems in knowing how to respond to the questionnaires on line. The bilingual and English versions of the SPQ are found in the appendix to Chapter 5.

#### The background questionnaire

The appendix to Chapter 5 also contains the questionnaire that was used to gather information about students' background. This information was collected on the first occasion of measurement. The background questionnaire was devised by the investigator with reference to Anderson and Berdie (1974), Keeves (1997), Mann et al. (1998), and Oppenheim (1992). The questionnaire was written in English but as the investigator was present, students were able to ask for explanations about their responses in Chinese, if necessary. The questionnaire sought information about the

students' preferences with respect to (a) the number of hours of study undertaken outside classes; (b) their preferred manner of study; (c) the language spoken outside classes; (d) the students' course of study in Australia; (e) the influence of travel on their lives; (f) the students' preferred choice of study location; and (g) the future plans the students had after the completion of their study in Australia. The questionnaire also sought specific information about: (a) the particular individual who had been the most influential person in their early lives; (b) attitudes to religion; and (c) personal religious practices.

The questionnaire sought additional information about: (a) the country of the students' birth; (b) the nature of the place of birth (an urban or rural environment); (c) the length of time the student had been in Australia; (d) the students' reasons for coming to Australia to study; (e) the student's country of birth; and (f) the name of the tertiary institution where the student was studying in Australia. The background questionnaire was answered by all students at the initial meeting between the investigator and the students in the sample. It was administered on one occasion only.

# Initial data collection

Before the data collection was initiated, all participants were asked to agree formally in writing to be part of the project. The students were told that the study would require their help over a period of 18 months or more. This developed into two years as explained earlier. Some students were lost from the sample because of the need to extend the time frame and several others dropped out from an apparent lack of interest, despite the encouragement of the investigator.

Email was the contact method of choice because it was direct but not invasive. Individual names were used on the emails sent. This provided both a personal element as the contact was with a particular student as well as the element of distance because only that student received a given email. Other students received the same email content but with a personal salutation and this enabled space to be created between the investigator and the participants. The space could be closed if the student so desired or left open if that was the desired relationship with the investigator. Both situations occurred in the course of data collection. The method chosen was based entirely on individual choice.

Some students only answered on three or four occasions. Nevertheless over 60 per cent participated on all five occasions. The initial data collection was done as a pencil and paper exercise. On the first occasion, students responded to the two questionnaires as well as the personal information questionnaire. The CVS and the SPQ were answered initially on separate answer sheets to save paper and printing.

# Maintaining student contact

Keeping an initial sample of 153 tertiary students interested for two years caused some unanticipated problems. It required both patience and persistence. The principal problems, as perceived by the researcher and the students in the sample, were: (a) loss of interest especially as funds were not available to offer financial inducement or rewards for continued participation in the study; and (b) the need to extend the data collection for an additional six months. For the researcher, the additional six months had advantages. The longer time frame increased the overall time of measurement. This, in turn, provided a greater opportunity to investigate any estimated changes in values and approaches to learning over an extended period. Increased time was likely to be reflected in improved estimations of change. Therefore, patience with the initial

lack of response and persistence in reminding students to respond to the survey were required to ensure a reasonable sample size for the estimation of questionnaire dimensionality and change over time in specific groups of students.

# Data collection on the internet

It seemed to be a logical, if novel approach, to collect questionnaire data responses on line at the time the study began in 1999. Students were provided with personal email addresses by their tertiary institution and had free internet access in the library of their places of study through student email accounts. Many students also had email on personal computers where they lived. Undergraduate students who had computers at home seemed to prefer so-called 'hotmail' email addresses, perhaps because these addresses could be accessed anywhere in the world, whereas only postgraduate students could access their email at home or around the world on the world wide web using a university-based email address.

# Limitations of the internet

Collection of data on line had some unexpected limitations. Initially the server used to collect data did not have an IP (Internet Protocol) address of its own. This meant that if there was a power failure, and there were three in the first two months of on-line data collection, the IP address of the server changed when power was restored. This occurred because there were several computers that shared part of an IP address that varied in the final group of numbers. It was just a matter of chance which numbers would be used in the new address after the power was restored and therefore, the IP address kept changing. This required sending out emails with the new IP address and sincere apologies to the students for any inconvenience. After the third power failure the server was changed to a computer that had its own IP address. This address remained stable and accessible except in the case of a city wide power failure when all the computers on campus shut down. From that point until December 2000 data collection proceeded smoothly and the IP address remained constant. Data collected on the internet could be entered into SPSS directly. This eliminated the need for the hand entering of data collected on a case by case basis. The data were transferred from a MS Word file directly into SPSS by copying, cutting and pasting.

# Benefits of the internet

The students appeared to have sufficient computer knowledge to handle the transition from pencil and paper to on-line responses. Most students said that they preferred to respond on line. They said that using the internet gave them greater privacy and they did not feel the pressure to respond in a particular time period, rather they were able to respond when it suited them especially if they had a computer and internet access where they lived. Most of the university residential colleges in Adelaide seemed to provide students with computer, telephone and internet access in their living accommodation.

There were safety mechanisms built into the on-line presentation to ensure that students responded to all the questions. Before the students were able to submit their on-line responses, the computer checked to make sure there was a single response to every question. If an answer was missing, the student was requested to go back and check over their responses in order to find and fill in any missing answers. The responses to both questionnaires were based on the students' initial reaction to each statement. The internet also gave students in the sample greater flexibility in answering the questionnaires and in the time taken to respond to the questionnaires. However, because of its very flexibility some students put off responding and needed weekly reminders and encouragement to respond to the questionnaires. Fortunately the computer email programs came with address books and the program could remember the addresses of people who had been sent emails in the past. However, as students responded to surveys, their names had to be temporarily removed from the email lists so they did not continue to receive reminders when they had already completed the task. Therefore, continuous additions and deletions of names were needed as the data collections proceeded.

#### Subsequent data collections

The subsequent data collections were done on the internet in the manner explained above. The flexibility had both positive and negative aspects. From a positive point of view, students were able to respond when and where it suited them. They only had to click on the web address in their email, and the web site with the two questionnaires came up on their computer through their internet software. The Flinders students whom the researcher saw and spoke with in that period seemed to appreciate the independence and privacy that on-line data collection gave them. The students did not feel as constrained as they might have done if they had to meet with the researcher on each occasion. The researcher too, might have encountered problems as well because the students were in different faculties and some on entirely different and widely dispersed campuses. Their common link was that they were ethnically Chinese and Asian sojourner students studying in Australia at the tertiary level.

#### The problems associated with real and virtual distance

The major negative aspect was ensuring that the students kept up with their responses to the questionnaires. The students were busy people. Consequently, finding the time and remembering to fill in their responses became a long and arduous process for some students especially if they had to be reminded several times during each data collection. The four on-line data collections took three to four months to complete. This was partly because the students were not clustered into classes that were located into the same or nearby schools as had been the case in studies cited in the literature, but were scattered as already described. The first data collection took almost six months to complete partly because of administrative delays but also because the researcher visited and met each of the students in the sample and assisted them with the background questionnaire in English. Some students needed an explanation in Chinese about one or two questionnaire items. The researcher was happy to assist in this task, as the object was to gather information and not to test students' English language ability. As well, some students were not able to come to a central location so the researcher went to their research work place or laboratory or met with the interested students in the refectory or the overseas student association rooms. In some cases this was as close as visiting the research laboratories at the Flinders Medical Centre while in another, a visit was made on a Sunday to a science research seminar for Chinese postgraduate students from many parts of Adelaide held on the Waite Campus of the University of Adelaide. Flexibility, persistence and a willingness to travel almost anywhere in the metropolitan area were definitely three of the requirements needed to carry out this research.

An unanticipated administrative delay caused a drop in the number of participants and some students had to return to their home country before completing the five data collections. A few students decided not to continue with the study and the researcher had to respect their wishes despite the diminished size of the sample. In the end there were 573 responses to the published questionnaires based on the original sample of 153 students. This included a second data collection with only 70 responses. The third, fourth and fifth data collections had over 100 students each that meant a response rate in the final three data collections of about 70 per cent. It became evident that the procedures used for the data analysis would have to make appropriate allowance for missing and incomplete data in the estimation procedures employed. Therefore, it was decided to include responses if students participated in at least two data collections. It should be noted that the hierarchical linear modelling procedure used makes allowance for missing data in the estimation procedures employed. This issue is discussed in Chapters 6 and 9.

#### Student mobility

The mobility of the students in the sample occasioned some problems in keeping in contact with those students whose addresses, telephones and email contact addresses changed particularly after the long summer break. Many students returned to their Asian homes at that time and moved to different accommodation on their return to Australia. In addition, students often did not use the email addresses that were given to them by their universities and colleges. If students used email before they entered the university and had a favourite hotmail address that they had used in their home country before coming to Australia, they often preferred to use that hotmail address. Therefore, it became the researcher's responsibility to ensure that the contact email address was correct and one which students would read regularly and respond to. This meant continuous changing and upgrading of student contacts, either email, telephone or actual street or university addresses in the case of postgraduate students who worked in laboratories or offices on a regular basis. The students were not trying to be elusive. It was a matter of keeping a step ahead and, at times, making an educated guess as to their probable location. Students also needed to have their privacy respected. Therefore, email, rather than personal contact was used whenever possible if contact had to be made.

# The Second Interview

Table 11A.1 lists the principal question and question prompts that have been used for the second interview with small focus groups of students. The actual interview schedule is given in the appendix to Chapter 11. The students' responses are considered and discussed in Chapter 11. These interviews were undertaken in groups of three to five students. The interview procedure was chosen to maximise the opportunity for the overseas students to reflect on living and learning in Australia. The interview also enabled students to comment on similarities and differences they had encountered in living in Australia compared to living in their home country. As well, it gave students the opportunity to discuss individual or specific group changes with respect to their values and approaches to learning that they felt had occurred in the move from their countries in Asia to Australia.

The question and the associated prompts were designed to encourage free discussion on issues that had arisen during their time in Australia that might be of interest to friends and colleagues of overseas students in their home countries. For example, in some countries drinking was not permitted on university campuses and some students found places like the student tavern strange while other students were offended that drinking was permitted at all on campus. Still other students thought it strange that smoking was not permitted in or between classes as it was permitted in their home countries and universities.

# Conclusion

The purpose of this chapter was to discuss the issues related to the selection and use of questionnaires, sampling and data collection, and the measurement instruments involved. Two published instruments were selected in order to measure values and approaches to learning. The validity, reliability and dimensionality of these instruments appeared to confirm their usefulness and led the investigator to adopt these instruments for use in the present study. It was also necessary to develop and pilot a background questionnaire that measured the experiences, beliefs, and preferred approaches to learning of students from Confucian-based cultures who were studying as sojourners in Australia. While the sample of students responding to these questionnaires could not be considered to be a sample drawn at random from a clearly defined population, it sought representativeness and completeness to learning of students from Confucian heritage cultures (CHCs) sojourning and studying in Australia.

# **6** Measurement and Method of Analysis

# Introduction

The purpose of this chapter is to consider the methods of analysis that were considered to be most appropriate to investigate the research questions raised in Chapter 4. The questions arose from previous research done on Confucian heritage culture (CHC) values that are presented in Chapter 2 and approaches to learning that are examined in Chapter 3. The questions relate to the nature of CHC values and approaches to learning, the relationship between them, and the type and extent of any changes that occurred over the time during which this study was undertaken. This chapter examines the techniques that were chosen to investigate and estimate the nature of the observed changes. Several analytical procedures were required to test the model that is presented in Figure 4.1. Therefore, the chapter considers: (a) the use of a longitudinal study; (b) the processes of equating and measuring of change over time; (c) the assumptions associated with causality; (d) the role of structural equation models; (e) the methods that were selected to analyse the data collected; and (f) the computer programs used in data analyses.

The analytical procedures were selected to assist the researcher to investigate the principal argument on which this study is based: that values and approaches to learning are likely to undergo change when students from a Confucian living and learning environment become sojourner students in Australia. It is further argued that the changes that occur in either values or approaches to learning are likely to occur because of the students' altered reactions to the physical, social, and cultural environments that are found in Australia and the differences in the Australian way of teaching and learning. However, it is not assumed that all students are likely to be affected by these variations in the same way.

The methods of analysis that were selected enabled the following constructs and relationships to be investigated: (a) the dimensionality of the questionnaires, namely the *Chinese Value Survey* (CVS) and the *Study Process Questionnaire* (SPQ); (b) the

relationships between values and approaches to learning; and (c) the relationships that exist in two-level modelling; at Level-1 of change between occasions of measurement, and at Level-2 between students, their personal characteristics and change in particular values and approaches to learning.

# Purpose of the study

It is argued that the use of particular procedures of measurement and methods of analysis would provide the means to examine: (a) the nature and structure of values of students from a Confucian culture; (b) the nature and structure of approaches to learning of these students; (c) the relationship between values and approaches to learning in a different physical; social and cultural environment; (d) whether values and approaches to learning changed over time in a new cultural and educational environment; and (e) the factors that influenced any change that occurred in values and approaches to learning. In addition, small group interviews were planned and conducted to obtain additional information on students' responses to the changes that they perceived had occurred within themselves while they had been living and learning in Australia. Interviews were carried out during the period between the fourth and fifth data collections. This was sufficiently separated from the first data collection when the written background questionnaire gathered personal information on the students that if change had occurred, it would be incorporated into the responses to questions at the time of the interview. Change might not have occurred in all groups of students, but this too, would provide information about, and a deeper understanding of, difference.

# The use of a longitudinal study

Longitudinal studies measure data taken from the same sample at several points in time. Measurement of change over time is seen as one of the most important issues in educational research since it is central to the empirical analysis of data that involves learning. Education is concerned with learning that includes changes in attitudes, values and achievement. Only by measuring individual change in performance is it possible to assess the effectiveness of the education system as a whole and its component parts. The problems of the measurement of change have given rise to extensive discussions about the difficulty of measuring change. There is a widely held misconception that argues that individual change should be viewed as a separate increment, as in the difference between before and after the administrations of a treatment or after learning has occurred (Willett, 1989, 1997; Willms and Raudenbush, 1997). This situation is often called a two-wave design because it measures data at two points in time.

Recent studies have shown that individual change can be measured and analysed more effectively if research moves beyond the limitations of the pre-post or two-wave design. Willett (1989) argues that the continuous process of human development can be more effectively documented if each person is assessed on more than two occasions over extended periods of time in a multiwave design in which individual change is examined at evenly spaced intervals. If growth is occurring steadily and smoothly, three or four measurements on each individual should capture the shape and direction of the change. Once data on the characteristics under survey are collected, a graph of the empirical growth-trajectory for each individual can be plotted. This is a graph of observed status plotted against time and is summarised by a linear trend-line that may be fitted by ordinary least squares regression analysis. Data on the empirical growth trajectories for each student under investigation can be

collected thereby providing a simple but effective way of exploring questions about within-person and between-person differences (Marsh, Hau and Kong, 2000; Willett, 1989; 1997; Willett and Singer 1997).

Goldstein (1979; 1997) has stated the minimum requirements of studies that lead to satisfactory inferences about change over time: (a) the study should be longitudinal in order to account for pre-existing student differences and later events; (b) multilevel analysis should be used; (c) repetition over time should be undertaken; and (d) a plausible explanation of processes of effect should be provided. This study achieves all of these conditions. It addresses issues involved with the process of change from an analysis of the data collected and from a study of existing literature about CHC students' values and approaches to learning. Moreover, it is anticipated that in this study a substantial change in the living conditions and educational context of the students under survey is likely to lead to changes in values and approaches to learning over time. Student maturation and development may also affect change over time. The analysis of change data is readily accomplished using the HLM5 computer program (Bryk, Raudenbush and Congdon, 2000).

# The process of equating and measuring change over time

# Item calibration and Rasch analysis

In order to investigate change over time, it is necessary to equate the performance of students in the sample on the questionnaires that are answered on the five occasions of measurement. Calibration is necessary before undertaking the equating. In the calibration process, item threshold values are estimated and steps are taken to identify items that behave differently on the five occasions. If any items are found to be misfitting, they are removed and calibration undertaken on the remaining items. In this way the items that are effective are identified as fitting a common scale. This process is necessary with items that measure not only values but also motivations and strategies associated with approaches to learning. The effective items are identified and formed into common scales. The purpose of the Rasch analysis used in this study is to calculate Rasch scaled scores in logits that may be employed as outcome measures in subsequent analyses.

# **Requirements for equating**

When the basic requirements that underlie item response theory (IRT) models are met, items and respondents may be measured at the same time on the same scale. The probability of a person answering an item correctly is used to relate a person's ability level to the item difficulty level. The scaling procedure used in this study is based on the one-parameter model devised by Rasch (1960) to express the probability of a person responding to an item in a consistent way. This model allows for differences in the difficulty level of items. In addition, the Rasch model produces (a) an item estimate that is independent of the sample population doing a particular test; and (b) an estimate of a person's score that is independent of the items attempted (Keeves, 1992; Stocking, 1997). Where the data can be shown to meet the requirements of the Rasch model, the use of scores that are based on Rasch model estimates improves the meaningfulness and accuracy of measurement (Lietz, 1995).

# **Equating of scores**

When scores based on different test forms or on the same test on different occasions are compared, it is necessary that they are equivalent in some sense. In order to achieve this equivalence, statistical procedures, known as equating methods, have been devised. Equating is a process of computing a statistical adjustment to the scores on one form of a test that will make them equivalent to the scores on another form of the test or the same test done at a different time (Gow and Balla, 1994; Dorans, 1990; Dunn-Rankin and Zhang, 1997; Kolen, 1997; Lord 1952, 1980; Mohandas, 1996; Petersen et al., 1989; and Touloumtzoglou, 1998).

The requirement of unidimensionality underlies the procedures used in this study to measure values and approaches to learning and underlies the methods that are used to equate achievement tests. The actual items responded to may vary, with items sometimes being omitted and sometimes new items being included, but the property of unidimensionality remains (Bejar, 1983). An item pool that measures a complex attribute like a value construct may contain different value components that share some similarity and yet the attribute still retains its own dimensionality. However, it is necessary to establish that Integrity and Tolerance, Worldly Wisdom, Loyalty to Ideals and Confucian Ethos are all dimensions of values that meet the unidimensionality requirements of item response theory models. This issue is examined in Chapter 7. Even though each value construct contains specific components that are quite different in nature, these components share a commonality that is adequate for the measurement of the identified value construct in terms of a single dimension (Bejar, 1983).

# **Equating issues**

Equating, as defined by Skaggs and Lissitz (1986), is the process of determining the relationship between raw and scaled scores on two or more tests or occasions. In the present study the responses to the questionnaires are linked by common or anchor items. The raw or scaled scores on each new set of results on the same questionnaires are equated to scores on previous occasions. Common items or persons are necessary to equate new responses with previous scores on the same questionnaires.

The process employed to equate scores is defined by Morrison and Fitzpatrick (1992) as 'concurrent calibration'. The data from the occasions may be combined into a single data set and calibrated simultaneously. Because all the items are calibrated at the same time, all the item parameters are brought together and estimated on a common scale and no additional equating is needed. Therefore, concurrent calibration puts all items that satisfy the requirement of unidimensionality on the same scale automatically by calibrating all the responses in a single calibration run. Concurrent calibration also results in very little equating error or so-called 'scale drift' and has, therefore, been used in these data analyses as the same questionnaires are used on five separate occasions (Morrison and Fitzpatrick, 1992). This renders the scales comparable between occasions, even though individual students may have omitted responding to the questionnaires on one, two or three of the five occasions, or have failed to respond to particular items on one or more occasions.

The purpose of this study is to measure within-individual changes in values and approaches to learning and to identify any intra-student or over time differences as well as the inter-student factors that influence these differences, for example age and gender. The scaling of the raw data collected has been undertaken and scales have been formed after examining the scalability of the *Chinese Value Survey* (CVS) and the *Study Process Questionnaire* (SPQ) as unidimensionality is a requirement for the

use of the Rasch model (Anderson, 1997). Therefore it is argued that in order to give equal value to all student responses to the CVS and the SPQ, it is necessary to undertake the process of concurrent equating before further analysis of the data.

# **Methods of Analysis**

In this section several analytical techniques are discussed that address the research questions posed in Chapter 4 that are associated with the measurement of values and approaches to learning. Initially exploratory factor analysis is used to identify latent constructs which exist in the data that are collected using the two questionnaires. Confirmatory factor analysis is then employed to examine the models of values and motivations and strategies associated with the approaches to learning for dimensionality, reliability and validity. It is argued that this is the best analytical procedure to confirm (or reject) the hypothesised dimensionality of models that underlie the construction of the questionnaires. Further, confirmatory factor analysis is particularly useful because it is able to examine several alternative models associated with the same data and compare the goodness of fit of the hypothesised models.

Subsequently another single level multivariate technique, canonical analysis, is used to examine models of the way values may influence approaches to learning. Canonical correlation analysis is used to test meaningful relationships between paired sets of latent variables. In addition, consideration is given to a multilevel analysis procedure, namely, hierarchical linear modelling (HLM). This procedure examines an outcome variable measured over several occasions, at the micro level or Level-1. The student level variables are used to examine differences between individuals and the significant outcome variables at the macro level or Level-2. The interaction of the student level variables with change over time in the outcome variables is also examined in multilevel analysis. Each of these structural equation modelling procedures is discussed in turn in the sections that follow.

#### Assumptions associated with causality

The model that is presented in Chapter 4 is a generally recursive model indicating causality. It orders constructs or latent variables in time and space. Causality as described by Vogt (1999, p. 36) is attributed to the influence of X on Y if three conditions are met: (a) X precedes Y, (b) X and Y covary and (c) no rival explanations account as well for the covariance of X and Y.

In longitudinal studies where a specific sample is followed over a period of time, condition (a) is clearly met. In the present study, data are gathered from a target population on five occasions. This allows replication of analysis and the examination of factors that give rise to change. The second condition that is implied in causality involving covariance considers whether or not variation in the assumed cause is related to variation in effect. With regard to the third condition, Tuijnman and Keeves (1997) have stressed the need to be as precise as possible when specifying models and the interrelations between variables that define the models. Nevertheless, results that are obtained from analyses of causal models do not necessarily confirm causality. However, where a model fits the data, the results can only be reported as evidence that supports theoretical considerations of causality.

# The role of structural equation models

Structural equation models provide a representation of the relationships between observed and latent variables. They may be depicted in the form of path models or they may be described by means of mathematical equations. Figure 6.1 shows a structural equation model that represents the hypothetical relationships which may occur between the observed and latent variables. The latent variables are represented as ovals and the manifest or observed variables as rectangles. The arrows indicate what is formed or reflected. For example, an arrow from a latent variable to an observed variable indicates the reflection of the observed variables that are derived from the latent variables.

Figure 6.1 is a graphic representation of a structural equation model using confirmatory factor analysis elements that are shown in Figure 6.2. Normally the researcher proposes a structural equation model that is based on a related theory or on findings from other research. The model is then tested and the goodness of fit between the hypothesised model and the sample data is examined. As it is unlikely that a perfect fit exists between the hypothesised model and the observed data, a differential, called the residual, is likely to exist (Byrne, 1998).

Figure 6.2 is a graphic representation of the symbols associated with structural equation models that are discussed in the previous section. The symbols show the manner in which manifest or observed variables, latent variables, causal relationships and error are illustrated in typical structural equation models.



Figure 6.1 A LISREL structural equation model (after Byrne, 1998, p.14)



**Figure 6.2** Symbols associated with structure equation models in LISREL (after Byrne, 1998, p.15) (ξ and η are latent variables [LV]).

# **Exploratory factor analysis**

## Background to factor analysis

In the social and behavioural sciences, researchers are often interested in studying theoretical constructs that cannot be observed directly. These phenomena are called latent variables, dimensions or constructs. Examples of latent variables are value dimensions such as Integrity, Wisdom, Loyalty and Confucian Ethos. Since latent variables are not observable, they cannot be measured directly. Therefore, the investigator must define a latent variable in terms of characteristics that it is believed to produce and assess the construct indirectly through the measurement of observable activities. Measures of characteristics can includes scores on achievement tests, responses to interview questions or responses to the self-report questionnaires that are used in this study. These response data are the observed variables and they serve as indicators of the underlying latent variables they are presumed to represent (Byrne, 1989, 1998).

The best known statistical procedure that is used to investigate the relationship between a set of manifest or observed variables and its underlying construct is factor analysis. The researcher studies the covariation among the manifest variables to obtain data on a smaller number of latent variables (Byrne, 1998).

There are two types of factor analysis: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). When researchers use EFA they have little prior knowledge of the underlying latent variables, and there is little expectation with respect to the latent variable structure. Therefore, EFA is undertaken to find the number of factors underlying the observed variables (Byrne, 1989, 1998). In CFA, the researcher has specific expectations about the underlying latent variables based on theory or previous empirical research and can use these ideas to develop models to be tested. For example, in the CVS the factor structure has been examined in previous research studies (Bond, 1988, 1996; Chinese Culture Connection, 1987; Garrott 1993, 1995a, 1995b; Matthews, 2000). In this way a priori postulation may be specified for the items on the CVS that are related to the latent variables or dimensions they are expected to measure. In factor analysis these relationships are called factor loadings. Therefore, it may be said that the manifest variables are expected to load highly on the latent factors they are designed to measure and minimally on other factors. EFA is normally undertaken using SPSS while CFA requires the analysis of covariance matrices that are the basis for the LISREL approach to data analysis. Further, because CFA gives an indication of the overall fit of the model under investigation, it is considered to be superior to EFA when testing hypotheses (Afrassa, 1998; Byrne, 1998).

#### Initial results using principal components exploratory factor analysis

When the initial data collection with the student sample had been completed a preliminary analysis was undertaken with the CVS data to investigate three points: (a) the number of dimensions along which values were identified; (b) the meaning of each dimension; and (c) how the dimensions correlated with each other. Principal components factor analysis (PCA) was chosen, as the initial cohort of 153 cases was small. However, the subjects to variables ratio of 153/40 or 3.8 was barely sufficient to use PCA to identify a set of latent variables with a reasonable portion of the variance explained (Thorndike, 1978). Matthews (2000) presented the analysis undertaken. A scree plot test (Cattell, 1966) confirmed that there were three definite factors or dimensions present and a fourth factor was a possibility. In order to

interpret the results of the PCA more clearly, an orthogonal or varimax rotation was undertaken. The minimum accepted value for the manifest variable loadings was set at 0.40. The final solution was reached by an iterative process in which four dimensions or factors were found to include 39 of the 40 value statements. The amount of variance explained (47.1 per cent) by the four factors did not change after the varimax rotation. Only the disposition of the amount and the location of the variance had altered (George and Mallery, 2001; Grimm and Yarnold, 1995).

The results of analyses using EFA suggested that four separate and meaningful dimensions or factors were found that related to the four principal value constructs on the CVS and six dimensions that represented factors on the SPQ. Therefore, the main purpose of EFA was to identify the common underlying dimensions associated with the observed variables (Afrassa, 1998; Hair et al., 1995). However, prior to the use of Rasch scaling and bringing the data together on a common scale, it was necessary to confirm the dimensionality of the data that had been collected. Dimensionality was tested using confirmatory factor analysis (CFA).

## Confirmatory factor analysis and the LISREL computer program

EFA is, as its name implies, only exploratory. A stronger tool is needed to confirm a factor model, or find the model that best fits the given data, and to define what assumptions and limitations exist. Confirmatory factor analysis (CFA) allows data to be tested in a model and then generates fit statistics that show how well the model explains the data. CFA also allows the researcher to test alternative models with a given set of data. Thus, with EFA a model is induced from a data set, while with CFA, alternative models are proposed *a priori*, with structures that are deduced beforehand and then their fitness is tested.

LISREL 8.30 for Windows (Jöreskog and Sörbom, 1999) was the computer program that was selected for use in CFA analysis. It generated its own covariance matrix and, when specified correctly, it produced a path diagram if a valid syntax had been used. Models needed careful specification. Standardised or completely standardised solutions could also be requested in the model specification. These were generated together with the factor loadings in a model that was as unrestricted as possible but one that produced an adequate fit. Therefore, a balance was needed between a desire for conceptual parsimony and a fully saturated or unrestricted model where all factors were free to correlate. In practice, the models with some degree of orthogonality and some freedom of correlation between latent variables appeared to produce models with the best fit indices (Byrne, 1998).

LISREL uses maximum likelihood by default for parameter estimation. It assumes that the following conditions have been met: (a) the sample is large (asymptotic); (b) the scale of observed or manifest variables is continuous; (c) the distribution of the manifest variables is multivariate normal; and (d) the model hypothesised is valid. Therefore, based on research reported in Byrne (1989, 1996, 1998), Hoyle (1995, 1995a), Hoyle and Panter (1995), Kline (1998), and West, Finch and Curran (1995), the maximum likelihood procedure appears to be the preferred choice for parameter estimation and thus for confirmatory factor analysis.

#### The development of alternative models

The first stage in model specification involves identifying the likely number of latent factors or dimensions that underlie the data and the manifest variables that load on each of the latent factors. Three types of models can be advanced: (a) baseline models, where correlation is allowed to occur between the latent and manifest

variables; (b) hierarchical models, where there is a dominant higher order latent factor and several latent factors located beneath the dominant factor; and (c) nested models, where some latent variables are allowed to correlate and others are set orthogonal to one another with the manifest variables located between the latent variables. The three types of models are illustrated in Chapter 7 in Figures 7.1 and 7.3 where the model types are discussed and the fit indices for each model tested are considered.

In CFA observed variables are influenced by latent constructs or underlying factors, unmeasured variables and variance due to random error. CFA allows error variance to be independent or correlated. CFA also examines relationships between sets of measures but the sample must be larger than that used in EFA. A sample of 400 to 500 cases is desirable for reliable fit indices to be generated (Byrne, 1998; Kline, 1998; Tabachnick and Fidell, 2001).

#### Model fitting

The assessment of goodness of fit involves testing a series of models where the models are subsets of one another. They may range from the independent, unsaturated or null models where all the variables are unrelated and the degrees of freedom are equal to the number of data points minus the variance estimated. At the other end of the continuum is the saturated or perfect model with no degrees of freedom. Therefore, indices that use a comparative fit approach place estimated models along this scale with a descriptive fit index that lies in a range of 0 to 1. Higher values indicate a better-fitting model (Tabachnick and Fidell, 2001).

The modification indices (MIs) that are given in the LISREL output provide information on the predicted decrease in chi-square ( $\chi^2$ ) if a particular parameter is relaxed and the model is re-estimated. The MIs also assist in the movement of manifest variables to different latent variables. If a transfer needs to be undertaken, it must be carried out by moving one exogenous or manifest variable at a time and then re-specifying the model. It is a time-consuming but necessary procedure. When all the manifest variables have positive loadings, they should lie between 0 and 1 and there should be an improved model fit. One of the possible explanations for misspecified models is factor crossloadings where a variable is believed to load on more than one latent variable. The MIs for any crossloading factors would be very high and indicate that the manifest variable might need to be relocated on a different latent variable. Lower MIs indicate a better-specified model (Byrne, 1998).

LISREL 8.30 generates a considerable amount of output including variance estimates and covariance matrices, factor loadings for the variables measured, standard errors, modification indices, t-values, standardised and completely standardised solutions, correlations of parameter estimates and goodness of fit indices. The goodness of fit indices are used to compare and evaluate the hypothetical models that are estimated and also to select the model that best fits the data. These include: the Adjusted Goodness of Fit Index (AGFI), the Chi-square statistic ( $\chi^2$ ), the Comparative Fit Index (CFI), the Goodness of Fit Index (GFI), the Normed Fit Index (NFI), the Nonnormed Fit Index (NNFI), the Parsimonious Goodness of Fit Index (PGFI), Root Mean Square Error of Approximation (RMSEA), the Root Mean Square Residual (RMR), the Standardised Root Mean Square Residual (SRMR), and the Relative Fit Index (RFI). The CN or critical number estimates the size of a sample that would be sufficient to yield an adequate model fit for a  $\chi^2$  test. Generally a CN value in excess of 200 indicates that a model represents the sample data well (Afrassa, 1998; Byrne, 1998).

### Choosing among fit indices

In a comparative examination of the fit of any model to other hypothetical models using LISREL and CFA it is necessary to consider more than one goodness of fit index because none are perfect measures (Marsh et al., 2000). Some indices are affected by sample size. Marsh, Balla and McDonald (1988) recommend that researchers focus on the sources of information relevant to their particular situation (Afrassa, 1998). In this study, the ratio of  $\chi^2/df$ , the RMSEA, the GFI, the NNFI, and the SRMR are used to identify which are the best models to measure change in values and approaches to learning over time. The  $\chi^2$  value is sample size dependent and therefore, adequate numbers are needed for meaningful results. The ratio of the  $\chi^2$  to the degrees of freedom  $(\chi^2/df)$  is a way to overcome problems arising from sample size. The closer the ratio is to 1.0 the better the fit of the model. The RMSEA value estimates how well a model fits the covariance matrix. Values of less than 0.08 represent adequate model fit (Byrne, 1989; 1998). The RMSEA estimates the lack of fit in a model when compared to the fit of a perfect model that has a value of zero. The SRMR is based on standardised residuals. Good models have small SRMRs and values of 0.10 or less indicate a good model fit (Kline, 1998). The GFI and NNFI are commonly used fit indices, and the NNFI is claimed not to be dependent on factors such as sample size. Their values range from 1.0 for a perfect fit to 0.0 for no fit. The higher these values are the better the fit of the model. The accepted values for these indices are greater than or equal to 0.80 for the GFI and greater than or equal to 0.70 for the NNFI (Hair et al., 1995). Data that are analysed at the item level do not produce as low RMSEAs and SRMRs or as high GFIs as analyses that are done at the scale level. However, analyses that are done at the item level generally produce statistically acceptable fit indices if the model is an adequate representation of the data.

Unfortunately, there is not unanimous agreement as to which of these indices provides the strongest and most useful information in testing the goodness of fit of a given model. Therefore, several indices are generally presented to give an indication of goodness of fit. Some fit indices yield information bearing on a model's lack of fit, not its plausibility or usefulness. An assessment of model adequacy needs to be based on multiple criteria that take into account theoretical, statistical and practical considerations. Good fitting models produce consistent results on many fit indices in most cases. Therefore, if all fit indices lead to similar conclusions, the choice of which indices to report may be a matter of personal preference. The RMSEA and a comparative fit index are most frequently reported. If results are consistent, then the RMSEA, the GFI and perhaps the SRMR are sufficient (Bentler, 1990; Byrne, 1998; Crawford et al., 1998; Tabachnick and Fidell, 2001). The specific fit indices that are used to evaluate the proposed models are discussed in Chapter 7. The fit indices listed earlier in this chapter that are not used to evaluate the models under consideration are discussed in the appendix to Chapter 6.

# **Canonical analysis**

Canonical analysis was first developed by Hotelling (1935) but was not used extensively until many years later because of the complex mathematical calculations involved. However, with the advent and improvement of computers, programs became available that were able to do the necessary calculations quickly and cheaply. Canonical variate analysis is the general analytical algorithm from which most statistical procedures have developed and evolved. These include t-tests, analysis of variance (ANOVA), and principal components factor analysis (Keeves, 1995, 1997;

Keeves and Saha, 1997; Keeves and Sellin, 1997; Wright, 1997). Discriminant analysis and regression analysis are special cases of canonical analysis (Keeves and Thompson, 1997).

Figure 6.3 shows the hypothetical relationship that may exist between sets of canonical variates that form latent variables when viewed as a regression model. Figure 6.4 shows the relationship between canonical variables when viewed as a reduced regression model. The relationships between the sets of variates can be considered causal and unidirectional in a regression model (Keeves and Thompson, 1997).

Canonical analysis is a procedure used to study relationships between two sets of variables. Each set is composed of one or more variates. Three types of questions may be asked in the study of the correlation matrix of variates seen in Figures 6.3 and 6.4. They concern: (a) the number and nature of independent relations between the sets of variates; (b) the amount of redundancy between the sets of variates; and (c) the degree to which one set may be predicted from the other set of variates (Keeves and Thompson, 1997).

Canonical correlation analysis may be used when either set of variables contains one or more variates that are continuous, categorical or mixed. In the analysis, the first canonical correlation (Rc₁) is the highest correlation that can be found between a weighted composite of the X-variates and a weighted composite of the Y-variates. The composites represent the first pair of canonical variables. The second pair of canonical variables is the next highest pair of weighted composites. Each pair of canonical variables is uncorrelated and orthogonal to the preceding or following pair. Each pair formed is tested for significance using Bartlett's (1941)  $\chi^2$  approximation to the distribution of either Wilk's lambda or an *F* ratio. The canonical correlation coefficients (labelled Rc₁ and Rc₂ in Figures 6.3 and 6.4) describe the strength of the relationship between the latent variables. When each coefficient is squared, the proportion of variance of one latent variable that is predictable from the other latent variable in the pair is estimated (Keeves and Thompson, 1997).



Figure 6.3 Canonical variate analysis (Seen as a regression model with two pairs of orthogonal latent variables, after Keeves and Thompson, 1997, p. 463)





There are two types of coefficients that assist with the interpretation of canonical correlation analysis, the transformation weights and the structure coefficients. The transformation weights are similar to beta weights in multiple regression. They are weights given to the variates that form each latent variable as a linear combination. The structure coefficients are correlations between each of the resultant canonical variables and the variates from which they are formed. Structure coefficients are loadings that allow pairs of canonical variables to be identified and related to the relevant variates. The sum of the squared structure coefficients gives the proportion of variance of each set of variates extracted by a variable to be estimated. In Figure 6.4 the size of a pathway between an X-variate and the corresponding X-latent variable is given by the transformation weight. The X-variates completely determine the X-latent variables. The paths from the Y-variables (labelled as  $\eta$  in Figures 6.3 and 6.4) to the Y-variates are given by the structure coefficients (Keeves and Thompson, 1997).

Figure 6.4 shows the relationship between variates with two latent variables. The line of causation moves from the X-variates, through the latent variables ( $\eta$ ) to the Y-variates. The values of the path coefficients in the reduced regression model are the products of the transformation weights and the corresponding canonical correlations, for example w₁₁*Rc₁. The redundancy that is estimated in canonical analysis is a combination of the proportion of the variance of one canonical variable that is predictable from the other set of canonical variates. This is estimated for each canonical variable and is called the factor redundancy. All factor redundancies are totalled and the result describes how much variance is predictable from one set of variates. Variance is later partitioned by separate amounts of variance associated with overlapping sets of predictor variables (Keeves and Thompson, 1997).

Therefore, the transformation weights and structure coefficients assist in giving meaning to the canonical variates. The structure coefficients help to identify the related variables in the predictor and criterion sets and are especially useful in interpreting relationships between the original variates and the derived canonical variables (Tatsuoka, 1973). Redundancy measures the proportion of a set of variates
that is predictable from its paired canonical latent variable. The computer program that is best used to estimate the parameters in canonical analysis has been developed by SAS, Inc. (1985).

### The use of canonical analysis in this study

Canonical analysis is proposed as a measure of the overall relationship that is hypothesised to exist between the measures of values and approaches to learning. Values that guide students' learning appear to have a direct effect on learning behaviour. Information that has been collected using the CVS and the SPQ provide the data for analysis. The paths to be examined extend from the four value dimensions to a single values factor. This, in turn, leads to a single learning factor and finally to the six motivations and strategies associated with learning. Therefore, a statistically significant pathway would indicate a direct correlation between values and approaches to learning in which values act as precursors to the approaches to learning. Further, particular value dimensions may show specific relationships to specific motivations and strategies associated with learning. Therefore, it is argued that canonical analysis is likely to be the best way to examine the possibility of a direct or causal relationship between values and approaches to learning.

### **Hierarchical linear modelling**

### Introduction

Hierarchical linear modelling (HLM) is a multilevel analytical procedure that is used in regression analysis to partition effects at two or more levels. HLM is used to provide unbiased estimates of effects in situations where data at a lower level are nested within groups at a higher level and where treatments operate at different levels. This is a common situation in educational research where students are nested within classrooms and classrooms are nested within schools that may be nested within geographical regions (Keeves, 1995).

Bryk and Raudenbush (1992) and Raudenbush and Bryk (1988, 1997) identify three advantages of hierarchical modelling over traditional modelling methods that use repeated measures: (a) an improved estimation of within-unit effects (in this study, occasion); (b) the formulation and testing of cross-level or interaction effects between the two levels of measurement; and (c) the ability to partition variance and covariance components between the levels of measurement (in this study, between occasions at Level-1 and between students at Level-2).

In this study, the outcome variables are modelled by the between-occasion regression equations relating time to students' assessment of the outcome variables. Therefore, it is important to estimate a separate regression equation for each value dimension for each student and thus examine changes in values as a function of time at Level-1. In addition, the effects of student characteristics are examined at Level-2. This is accomplished in HLM by relating the between-occasion effects to the student characteristics. HLM is able to estimate these relationships and their effects on the outcome variables, thereby overcoming methodological issues such as the misestimation of standard errors, aggregation bias and inadequate methods of examining heterogeneity of regression (Raudenbush and Bryk, 1997).

Heterogeneity of regression can cause problems. However, empirical Bayes estimation methods that are employed in hierarchical linear model estimations help to overcome this problem. HLM/2L assumes normality of residual variance at Level-1

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and provides the user with the capacity to test the adequacy of this assumption (Johnson, 1995). Heterogeneity of regression is also considered through the use of robust standard errors in the final estimation of fixed effects.

One of the limitations of HLM is that it does not allow manifest variables to be combined into latent variables. Therefore, the outcome variables that are selected and used in the regression equations are those derived from confirmatory factor analysis. In addition, HLM allows for the specification of direct effects of the predictor on the outcome variables, but does not permit the examination of mediating effects. However, specification of interaction effects can be made and examined between variables at different levels (Aitken and West, 1996; Probyn, 1999; Touloumtzoglou, 2002).

### The hierarchical nature of multilevel data to examine change over time

Since the mid-1980s attempts have been made to model educational data in order to examine change over time. This technique takes into account the hierarchical structure of data obtained in educational research and is referred to as hierarchical linear modelling (Raudenbush and Bryk, 1992). In this study it is necessary to use a statistical procedure that is able to analyse both within-student and between-student variance. Willett (1989) argues that when a statistical model is selected to examine change, it should consist of (a) structural parts that represent the dependence of performance on time; and (b) stochastic parts that represent the random effects of measurement error. Willett (1989) adds that the structural part of an individual growth model contains unknown constants that represent the individual's growth parameters, which influence an individual's growth over time.

If different measurements of an individual's ability or attitudes to study are made at different points in time, the time points or occasions are taken to represent the micro or Level-1 data. The personal characteristics that are considered to have contributed to changes that occur at Level-1 are introduced to the model at the macro level or Level-2 (Lietz, 1995). It should be noted that the terms micro and Level-1 and macro and Level-2 are used interchangeably in the discussion of hierarchical or multilevel modelling.

### Assumptions associated with hierarchical linear modelling

Bryk and Raudenbush (1992) identify five assumptions that must be met prior to carrying out HLM analysis: (a) that the error term of each Level-1 unit should have a mean of zero and that the residuals should be normally distributed; (b) that the Level-1 predictors should be independent of the Level-1 error term and that there is no covariance between these terms; (c) that Level-2 predictors have a mean of zero and have a multivariate normal distribution; (d) that Level-2 predictors are independent of all Level-2 error terms; and (e) that Level-1 error terms are also independent of Level-2 error terms. The last assumption presumes that no relationship exists between the error term at Level-1 and the error term in the Level-2 equation for the Level-1 intercept, or the error term in any of the equations that are used to estimate the slopes of Level-1 variables. Therefore, it is assumed that (a) each level in a hierarchical model has random, not fixed error variance terms; (b) Level-1 contains outcome and independent or predictor variables; and (c) at Level-2, the  $\beta_0$  variables are the intercept effects and the  $\beta_1$  variables are the occasion slope effects associated with a particular hierarchical model that may be used to examine change over time.

Therefore, the full multilevel regression model used in HLM5 for Windows computer program (Bryk et al., 2000) assumes that there is a hierarchical data set with a single dependent or outcome variable that is measured at the lowest level as well as explanatory or independent variables at other levels. Conceptually the model can be viewed as a hierarchical system of regression equations (Hox, 1994; 2002).

The first step in the analysis of the data was to create a Sufficient Statistics Matrix (SSM) from the SPSS data. The SSM matrix was generated in batch mode from the Level-1 and Level-2 data files using HLM5/2L. This was then used as the data file to examine models that were generated in the HLM5/2L input file. The SSM was generated from the Level-1 and Level-2 data files obtained from the *Chinese Value Survey* (CVS), the *Study Process Questionnaire* (SPQ) and the demographic questionnaire answered by all 153 participants in the original sample. SPSS version 8 (Norusis, 1986) was used to enter the data for all questionnaire responses. Later SPSS version 10.0 was used to provide the data for the generation of the SSM Matrix. The SSM Matrix has been used in all subsequent multilevel analyses.

### Practical outcomes of hierarchical linear modelling analysis

In this study one aspect of the proposed research is to establish whether or not changes in values are influenced by factors such as the age or gender of the students over time. The one variable that is involved at the micro level or Level-1 is time as measured by occasion. Information about age and gender is examined at the macro level, or Level-2. Using hierarchical linear modelling, the examination of the data is undertaken in two consecutive steps, first at the micro level and then at the macro level. The steps employed in hierarchical linear modelling are as follows: (a) student values are regressed on occasion and (b) the intercepts and slopes calculated in the first step become the outcomes in the second step where an attempt is made to explain variation in intercepts and occasion slopes on the basis of differences between students' ages, gender and other personal characteristics that are measured. In addition, it is possible to calculate scale or dimension reliability, variance at both levels of measurement and the deviance statistic that represents the difference between the null or unconditional model and the final model. In this study all of these factors are presented in the tables of fixed effects in Chapters 9 and 10.

### Conclusion

This chapter identifies and discusses methods of analysis that are considered appropriate to undertake an investigation of the research questions that are posed in Chapter 4 and discussed in the design of the study proposed in Chapter 5. The methods have been discussed with respect to their value as tools to search for answers to the research questions posed as well as to examine the model presented in Chapter 4. No one method of analysis is likely to be suitable to address the issues that are involved in answering the questions posed as well as to analyse the model presented in Chapter 4. Each method supplies useful but different information and, like the pieces of a jigsaw puzzle, needs to be fitted together to seek answers to the questions posed. Every method of investigation has strengths and limitations. Consequently, it is planned to use a combination of several methods to investigate the issues raised by the proposed model and the research questions. Statistically significant and meaningful answers are sought to the questions that are raised in the course of the investigation. Therefore, it is argued that by using a combination of several methods of analysis, strong and meaningful models that are consistent with the data may be specified and tested. Chapter 7 considers the results of confirmatory factor analysis that have been obtained using the LISREL computer program and asks the question: do values and approaches to learning show levels of dimensionality that are sufficiently high for the constructs involved to be considered unidimensional?

## **7** Confirmatory Factor Analysis and LISREL

### Introduction

Earlier chapters of this study discuss previous studies of values and approaches to learning. In addition, proposed methods of analysis, survey instruments and their implementation have been discussed. This chapter presents the results of confirmatory factor analysis using the computer program LISREL 8.30 for Windows (Jöreskog and Sörbom, 1999). The examination of the *Chinese Value Survey* (CVS) and the *Study Process Questionnaire* (SPQ) data are presented separately. The principal argument of this study is that values and approaches to learning are likely to change over time in a new social, cultural and educational environment. Therefore, it is necessary to identify the factor structure of the values that are measured with the CVS, as well as the factor structure of the approaches to learning that are measured using the SPQ. Consequently, an examination of the dimensionality of the measurements made with these instruments is undertaken.

However, prior to a consideration of the results of confirmatory factor analysis, it is useful to advance the anticipated factor structure. The initial examination may be carried out using exploratory factor analysis and principal components factor analysis as preliminary techniques that are used to explore the dimension-reducing procedures. Their exploratory nature assists in the identification of possible latent constructs. Confirmatory factor analysis is then used to test and confirm or reject the findings of the exploratory factor analyses. Confirmatory factor analysis requires the researcher to develop precise structural hypotheses. The hypotheses are evaluated and assessed using procedures such as LISREL and the goodness of fit indices of the models that are generated using this procedure (Bryant and Yarnold, 1995).

Therefore, the purpose of this chapter is to investigate the values and approaches to learning constructs that provide the best models for the data collected on five occasions over two years. In this way, the fit of the models that are tested using confirmatory factor analysis and LISREL are evaluated. The analysis of the data in this chapter assists in deciding which models best fit the data collected. As well, the analysis helps to identify the best models. For example, the model with the best fit indices may not be the model that provides the most logical estimation of the data. A similar model may give slightly inferior fit indices, but may provide a better theoretical explanation for the disposition of the manifest and latent variables. The most suitable models indicate the value dimensions and the approaches to learning scales that may then be used in multilevel modelling. Therefore, it is argued that consideration must be given to both the actual factor structure that results from the analysis as well as the meaningfulness of the structure that is chosen to model the data that have been collected.

The LISREL computer program uses maximum likelihood procedures to estimate model parameters. Maximum likelihood procedures provide an overall chi-square  $(\gamma^2)$ statistic for testing the adequacy of the model. The theoretical background to the maximum likelihood procedure is discussed in Chapter 6 and the appendix to Chapter 6. A number of models are developed, presented and examined in this chapter. Three types of model have been generated and tested: baseline, hierarchical and nested. These models are illustrated in Figures 7.1a, 7.1b and 7.1c and Figures 7.3a, 7.3b and 7.3c. The following fit indices are presented: the ratio of the chi-square to degrees of freedom  $(\chi^2/df)$ , the root mean square error of approximation (*RMSEA*), the goodness of fit index (GFI), the non-normed fit index (NNFI) and the standardised root mean square residual (SRMR). After the data are presented, the fit indices are examined for each model. The models that most adequately describe values and approaches to learning are discussed in the chapter. The fit indices and the conceptual compatibility of these models in relation to values and approaches to learning are examined. The remaining models that have been generated are discussed or referred to in the appendix to Chapter 7.

In addition, the completely standardised solutions and Lambda X ( $\lambda$ X) values are presented for the best fitting model for each questionnaire. The Phi matrices and communalities for these models are also presented. The Phi matrices show the matrix of variance-covariance relationships that exists between the latent variables of the model and the communalities show the percentage of variance explained by a given model.

### An examination of values

The *Chinese Value Survey* (CVS) was developed by Bond and his colleagues known as the Chinese Culture Connection (CCC, 1987) to measure life values. The CVS includes values that are distinctly Chinese or Asian. Some examples of particularly Asian values are filial piety, the ordering of relationships, the observation of rites and rituals, loyalty to superiors and respect for tradition. A complete copy of the questionnaire may be found in the appendix to Chapter 5 of the thesis.

### Initial data analysis

Initial data analysis was undertaken using principal components factor analysis with varimax rotation using the SPSS computer program (Norusis, 1986). This provided an indication of the disposition of the manifest and latent variables. Preliminary results obtained from exploratory factor analysis are presented in a published report on this study (Matthews, 2000). The latent dimensions were named as follows: 'CVS I: Integrity and Tolerance', 'CVS II: Confucian Ethos', 'CVS III: Loyalty to Ideals' and 'CVS IV: Worldly Wisdom'. The initial analysis showed that CVS I had 17 value statements, CVS II had 11 manifest values, CVS III had nine value statements and

CVS IV had three observed values. In addition, the initial analysis of the data showed that the 40 values were located on four dimensions and that 39 out of the 40 value statements had loadings greater than 0.40 (Matthews, 2000).

The Confucian Ethos dimension differs most from the Western conceptualisation of values. This scale includes values that are of particular importance to adherents of an Eastern value system. They describe relationships with others (Smith and Schwartz, 1997).

Aside from the Confucian factor, the largest number of value statements is associated with the Integrity and Tolerance dimension that includes value statements that promote the development of the self. Therefore, values such as knowledge, self-cultivation, personal steadiness and stability, patience and adaptability are included. The third dimension, Loyalty to Ideals, embodies social responsibility. This factor promotes moderation and following the middle way, the hierarchical ordering of relationships, the observation of rites and rituals, resistance to corruption and solidarity with others. The latter three values reinforce a collectivist approach to group maintenance and living in a peace-seeking manner (Bond, 1988, 1996; CCC, 1987).

The final factor, Worldly Wisdom, encompasses the ideas of tolerance and moral discipline. Moderation, including wealth and a sense of cultural superiority promotes an aura of worldly wisdom, as does the repayment of good or evil to others. Self-discipline is reflected in the implied self-control needed to maintain these values positively. Bond's (1988, 1996) interpretation of the CVS dimensions is discussed in Chapter 2.

In the initial exploratory analysis with data collected from Asian university students in Australia, some repositioning of value statements occurred because the resulting factor structure derived from principal components factor analysis was different from Bond's original factor structure (CCC, 1987). In light of the realigned content, distinctive names for the factors were employed (Matthews, 2000).

### Model generation using confirmatory factor analysis and LISREL

Figure 7.1 shows the three types of model that were hypothesised and tested using confirmatory factor analysis and LISREL. Figure 7.1a represents the baseline model where the four latent factors are correlated. Figure 7.1b shows a two level hierarchical model in which the four latent factors are nested beneath the latent variable Values. Figure 7.1c represents the nested model in which the four latent variables are orthogonal to the latent variable Values.

### Restructuring models using modification indices

The LISREL program generates modification indices (MIs). The MIs are introduced in Chapter 6 and represent the expected drop in the overall  $\chi^2$  value if a particular parameter is freely estimated. LISREL identifies the largest MI in the theta-delta matrix that presents the error covariances. The expected change for the theta-delta value gives the expected value if the covariance is freely estimated (Byrne, 1998). These values may be used to re-specify models by relocating variables on different value dimensions. After relocating variables the model is re-estimated and the fit is examined. This procedure is particularly helpful if a manifest variable is found to crossload on more than one factor.





#### Figure 7.1 The structure of the CVS baseline, hierarchical and nested models

It is necessary to test the variable location in order to decide its best location as well as the overall arrangement of all the manifest variables and thus obtain the best model fit. Where this procedure is utilised, the word restructured or the letter 'R' appears next to the model name. This is especially important where two models are identified using the same name as in B(4) or N(1,4) in Table 7.1. It indicates that the four latent variables still exist but that the location of the manifest variables on the latent factors has changed.

### Models tested and their fit

Table 7.1 shows the fit indices for six hypothesised models for values tested using confirmatory factor analysis and LISREL with the complete data set of 573 cases. All analyses have been done at the item level. The table shows the  $\chi^2$ , df,  $\chi^2/df$ , the *RMSEA* and *SRMR* values as well the *GFI* and *NNFI* fit indices.

Table 7.1 shows three Baseline models, B(1), B(4) and B(4)R (restructured). Restructured means that the manifest variables are relocated on different latent variables in order to improve the model fit. The Baseline models show the value constructs at a single level. Associations between latent factors and manifest variables may occur. Correlation permits these variables to interact and does not restrict association that occurs in nested models with orthogonal constraints.

$\chi^2$ , Degrees of Freedom	ndices	( <i>N</i> = 5	73)						
Model	$\chi^2$	df	$\chi^2/df$	RMSEA	GFI	NNFI	SRMR		
Model B(1)	6786	665	10.20	0.125	0.62	0.54	0.099		
Model B(4)	4150	737	5.63	0.092	0.73	0.64	0.140		
Model H(1,4)	3659	736	4.97	0.083	0.76	0.68	0.089		
Model B(4)R restructured	3466	734	4.72	0.081	0.77	0.71	0.080		
Model N(1,4)	2787	694	4.02	0.073	0.80	0.75	0.056		
Model N(1,4)R restructured	2782	694	4.01	0.073	0.80	0.76	0.059		
$\chi^2 = Chi square$			RMSEA =	=Root mean squ	are error	of approxima	tion		
df = degrees of freedom	GFI = Go	GFI = Goodness of fit index							
$\chi^2/df =$ Chi squared divided by the	NNFI =Non-normed fit index (Tucker-Lewis Index)								
	SRMR = S	SRMR = Standardised root mean square residual							

**Table 7.1**Summary of fit for the CVS raw data factor models

The baseline models B(1) and B(4) have relatively high *RMSEA* values but in the restructured B(4)R, the *RMSEA* is much lower and therefore, very much improved with higher *GFIs* and *NNFIs*.

The table also shows one hierarchical model, H(1,4). Hierarchical models are often called 'or' models because of the way variance is apportioned. Correlation occurs between the latent variables in hierarchical models.

Table 7.1 shows two nested models. They are N(1,4) and N(1,4)R. In nested models, the variance may load onto both specific and general groups of values at the same time. Therefore, these models are often referred to as 'and' models. There may be correlations between the specific groups of values such as Integrity values and Confucian values but correlation between the specific value groups and the general construct Values is constrained and is set to be equal to zero.

The baseline and hierarchical models provide a less than adequate explanation whereas the nested models provide a better explanation for the observed data. The best models are those that use the latent variable, Values, as well as the four latent variables of Integrity (Integ), Confucian Ethos (Confu), Loyalty (Loyal) and Wisdom. These two models, both called N(1,4), provide the best fit indices, the lowest *RMSEAs* and *SRMRs* and the highest *GFIs* and *NNFIs*. However, the N(1,4)R restructured model has slightly better fit indices because of the relocation of some of the manifest variables on different latent variables.

### Results

## The completely standardised solution, communalities and variance explained

Table 7.2 shows the completely standardised solution and table of communalities. The figures shown confirm that all value loadings are positive both for the single latent factor, Values, as well as for the individual manifest variable loadings on the four correlated latent factors. The variance explained seems fairly well apportioned between Values and the other four latent factors. The manifest values, as found on the four latent factors in the completely standardised solution, all have positive values greater than 0.15 except for three variables and these have positive loadings.



**Figure 7.2** Path diagram of the CVS N(1,4)R model

	$\lambda x$ values for the completely standardised solution				Communalities and percentage of variance explained (h ² )					
Items										
	Integ	Confu	Loyal	Wisdom	Values	Integ	Confu	Loyal	Wisdom	Values
Cvs2-Industry	0.50				0.46	0.25				0.21
Cvs4-Harmony	0.04				0.54	0.00				0.29
Cvs9-Kindness	0.35				0.54	0.12				0.29
Cvs10-Knowledge	0.34				0.45	0.12				0.20
Cvs13-Self-cultivation	0.48				0.45	0.23				0.20
Cvs15-Sense of righteousness	0.41				0.47	0.17				0.22
Cvs18-Personal steadiness	0.07				0.54	0.00				0.29
Cvs19-Resistance to corruption	0.18				0.58	0.03				0.34
Cvs21-Sincerity	0.33				0.66	0.11				0.44
Cvs24-Persistence	0.27				0.59	0.07				0.35
Cvs25-Patience	0.08				0.68	0.01				0.46
Cvs28-Adaptability	0.28				0.45	0.08				0.20
Cvs30-Trustworthiness	0.44				0.56	0.19				0.31
Cvs32-Courtesy	0.36				0.64	0.13				0.41
Cvs36-A close friend	0.17				0.38	0.03				0.14
Cvs3-Tolerance		0.19			0.49		0.04			0.24
Cvs6-Loyalty to superiors		0.45			0.25		0.20			0.06
Cvs16-Benevolent authority		0.32			0.45		0.10			0.20
Cvs17-Non-competitiveness		0.45			0.22		0.20			0.05
Cvs22-Keeping oneself pure		0.44			0.30		0.19			0.09
Cvs23-Thrift		0.30			0.44		0.09			0.19
Cvs33-Contentedness		0.41			0.48		0.17			0.23
Cvs34-Being conservative		0.63			0.23		0.40			0.05
Cvs35-Protecting your 'face'		0.49			0.16		0.24			0.03
Cvs37-Chastity in women		0.31			0.51		0.10			0.26
Cvs38-Having few desires		0.56			0.30		0.31			0.09
Cvs39-Respect for tradition		0.41			0.44		0.17			0.19
Cvs1-Filial piety			0.34		0.39			0.12		0.15
Cvs7-Observation of rites and			0.78		0.22			0.61		0.05
rituals										
Cvs8-Reciprocation of greetings and favours			0.68		0.25			0.46		0.06
Cys11-Solidarity with others			0.43		0.47			0.18		0.22
Cvs20-Patriotism			0.50		0.38			0.25		0.14
Cys31-Having a sense of shame			0.35		0.50			0.12		0.22
Cvs5-Humbleness				0.26	0.50				0.07	0.25
Cvs12-Moderation-following the				0.36	0.34				0.13	0.12
middle way				010 0						
Cys14-Ordering of relationships				0.66	0.23				0 44	0.05
Cvs26-Repayment of good and/or				0.52	0.18				0.27	0.03
evil				0.52	0.10				0.27	0.05
Cys27-Sense of superiority				0.53	0.22				0.28	0.05
Cvs29-Prudence				0.25	0.47				0.26	0.00
Cvs40-Wealth				0.14	0.18				0.00	0.03
a =	0.89	0.83	0.77	0.69	0.92	1.54/40 =	$2\ 21/40=$	1.74/40 =	= 1 27/40=	= 7.62/40=
~	0.07	0.05	0.77	0.07	0.72	0.039	0.055	0.044	0.032	19.05

**Table 7.2**Completely standardised solution and communalities and<br/>percentage of variance explained for Model N(1,4)R(N=573)

Total variance for four factors = 6.76/40=0.169=16.9% (Integ, Confu, Loyal and Wisdom)

Total variance for one factor = 7.62/40 = 0.1905 = 19.15% (Values)

The items with lower loadings are numbers CVS4 (harmony), CVS18 (personal steadiness) and CVS25 (patience). For the latent variable, Values, all  $\lambda x$  numerical values are positive and greater than 0.15.

Figure 7.2 shows the path diagram from the LISREL analysis of the nested N(1,4)R model. All the residual values and correlations are included. The Values factor is placed orthogonal to the four latent factors. The specification of the syntax for this model is found in the appendix to Chapter 7.

Table 7.2 also shows the completely standardised  $\lambda x$  values on the left and the  $h^2$  or communalities values on the right hand side of the table. The reliabilities for complete data set of 573 cases are found in the panel below the  $\lambda x$  values. These values are calculated using the Cronbach (1951) alpha ( $\alpha$ ) function in SPSS. Although the number of factors located on each value dimension has changed from the initial measurement discussed in Matthews (2000), the overall reliability for the CVS has remained high (0.92). Table 7.2 further shows the percentage of variance explained for model N(1,4)R. The communalities represent the proportion of the total variance that is shared by two or more factors. It is calculated by totalling the squared factor loadings of a given variable and represented by the expression  $h^2$  (Vogt, 1999). The total variance explained for the model N(1,4)R is found in the panel below the table. The variance explained for the four factors is 16.9 per cent and for the Values construct is 19.1 per cent. This shows that the general Values factor takes more of the variance and therefore, cannot be subsumed into the four latent value constructs as occurs in baseline models. As well, the t-values associated with the  $\lambda x$  values in the completely standardised solution, aside from the three exceptions already discussed, are greater than 2.0 and only one variable has a value below 1.0. The item is CVS4 and its t-value is below 1.0 in the completely standardised solution. However, the items that have low values in the estimation of the four latent constructs have high loadings and t-values in the corresponding Values factor. The N(1,4)R model clearly shows that variance not present in one part of the model is found in another part and provides further substantiation for the acceptance of a nested model as the best explanation for the data collected using the CVS.

### The Phi matrix

Table 7.3 presents the Phi matrix generated for the final N(1,4)R solution. It justifies the creation of a separate Values factor, particularly when it is placed orthogonal to the other four factors. The Phi matrix for the final N(1,4)R model has positive correlations except for the Confucian (-0.38) and Wisdom factors (-0.02) with respect to the Integrity factor. Such values are often found to be opposite to values associated with factors allied to Western thinking encompassed in the ideas associated with Integrity, the development of self and Loyalty to Ideals. The Integrity and Loyalty factors show a large positive correlation (0.70) as do the Confucian and Wisdom factors (0.75) whereas the Loyalty and Wisdom factors show a smaller but still meaningfully large correlation (0.59) (Cohen, 1990, 1992, 1994; Hox, 2002). Integrity and Loyalty concepts would appear to be less important to those who follow the way or the *Dao* and Confucian thinking where the values of the individual are generally secondary to those of the group and its well being (Wang, 1991, 2002; Yen Mah, 2000).

	Integ	Confu	Loyal	Wisdom	Values
Integ	1.00				
Confu	-0.38	1.00			
Loyal	0.70	0.20	1.00		
Wisdom	-0.02	0.75	0.59	1.00	
Values					1.00

**Table 7.3**Phi matrix for the model N(1,4)R

### Summary of the data on the CVS

Five measurements made over a period of two years have provided a great deal of information about the values that appear to be important in the lives of students from a Confucian culture. The overall data set shows a consistency that confirms the dimensionality of the values that are measured with the CVS. The data also indicate that it is the degree in which particular values are held that is controlled by external factors that guide different cultural groups' thinking. The results show that the general Values construct is more important than the separate value dimensions because the general Values factor accounts for a greater percentage of the variance explained as noted in Table 7.2 than the four value dimensions combined.

Therefore, the nested model N(1,4)R together with the final placement of the value statements found in Table 7.2, appears to provide the best explanation for the data collected using the CVS questionnaire as developed by Bond and his colleagues known as the Chinese Culture Connection (CCC) (1987). These results indicate that the CVS is an instrument that is appropriate for the measurement of values in Asian students from a Confucian heritage culture (CHC).

However, in calculating raw scores on the Values dimension as well as the four separate dimensions that have been identified in the analysis presented above, the raw item data are simply combined together by addition of the relevant item scores. The estimated reliabilities of the scores are given in Table 7.2. The reliability of the Values dimension formed from the 40 items is estimated to be 0.92. In subsequent analyses these raw scores are not used. The corresponding Rasch scaled scores are employed since they provide in appropriate ways for missing data as well as converting the scores to an interval scale.

### An examination of approaches to learning

Martön and Säljö (1976a, 1976b) have identified two distinct learning approaches from their research on students' understanding of what they are reading. Students working at the task specific level employ either a surface or a deep approach depending on the task in hand and its particular demands. The teaching and learning environments also appear to influence the approach taken with a given task. These approaches are considered to be alternative in nature. A third, or achieving approach, is considered to operate for many students. This approach is argued to be particularly significant when students are pressured by external forces to achieve. The achieving approach may occur either independently or in conjunction with the deep or surface approach to learning (Kember and Leung, 1998). The sojourner students in this study are thought to experience pressure to achieve from family or others in the students' home environment.

Since the 1980s, many research workers have attempted to explain results obtained with the *Study Process Questionnaire* (SPQ). Many types of statistical procedures

have been used. In recent years some researchers have employed confirmatory factor analysis as the analytical tool of choice (Andrews et al.,1994; Biggs, 1992; Gow and Balla, 1994; Kember et al., 1997; Kember and Leung, 1998; Kember and Wong, 2000; Kember, Wong and Leung, 1999; Loehlin, 1987; Sachs and Gao, 2000; Watkins, 1998; Watkins and Biggs, 1996; Wilson, Smart and Watson, 1996; Wong, Lin and Watkins, 1996). The published results have provided explanations of the approaches to learning.

This section of the chapter advances 12 models that have been tested using confirmatory factor analysis and LISREL in order to provide improved results for the SPQ. The models presented are conceptually similar to Biggs' (1987a) original constructs of the approaches to learning that are measured on the SPQ and demonstrate that the SPQ has been designed to measure the three dimensions or approaches to learning. Each approach is considered to be composed of two parts: a motivation and a strategy. The motivation defines what influences a student to learn whereas the strategy describes how the learning takes place. The dimensional structure of the SPQ is discussed in Chapter 3.

### The dimensionality of learning measured with the SPQ

The internal dimensionality of the SPQ was originally tested and refined using exploratory factor analysis (Albaili, 1995; Biggs, 1987a, 1993, 1994, 1996b; Cantwell and Moore, 1998; Chou et al, 1998; Gow, Kember and Chow, 1991; Gu and Johnson, 1996; Hall et al., 1996; Harper and Kember, 1989; Hattie, Biggs and Purdie, 1996; Hilliard, 1995; Jones, 1999; Kember, 1996; Kember and Gow, 1990; McLaughlin, 1995; Niles, 1995; Renshaw and Volet, 1995; Schmeck et al., 1977, 1988; Volet and Renshaw, 1995, 1996; Volet, Renshaw and Tietzel, 1994; Watkins and Biggs, 1996; Watkins and Cheng, 1995; Watkins and Dahlin, 1997; Weinstein, 1988; Wilson, 1987; Zeegers, 2001; Zeegers and Martin, 2001; Zhang, 2000). Kember and Gow (1990) used exploratory factor analysis to examine the cultural specificity of the SPQ by considering data obtained from Hong Kong students and Hattie and Watkins (1988) examined data obtained from Australian and Filipino students. Kember and Gow (1991) reported that Hong Kong Chinese students showed an apparent preference for the surface approach, which could be understood in terms of cultural effects. The high regard in Eastern cultures for tradition in both schooling and home life and the elevated respect for external authority were clear examples of these effects. This was further confirmed by Clarke (1986), Ho (1986), Kember et al. (1997), Murphy (1987), Richardson (1994, 1995), and Watkins and Murphy (1994). However, Wilson et al. (1996) found no evidence of gender differences in learning approaches among American university students.

### Models used for the examination of the SPQ data

Twelve models are tested using confirmatory factor analysis and LISREL on a sample of 153 Asian students that has been measured on five occasions. The confirmatory factor models that are tested fall into two broad categories: single and higher order models. Figure 7.3 is a graphic representation of the structure of the baseline, hierarchical and nested models. Figure 7.3a presents an example of a single level or baseline model, where all the manifest variables or items are subdivided into six factors based on the three motivations and three strategies of the SPQ. The first level latent variables in all SPQ models are labelled SM, DM, AM, SS, DS, and AS. These abbreviations represent Surface, Deep and Achieving Motivations and Surface, Deep and Achieving Strategies respectively.

The higher order models may be classified as either nested or hierarchical models. In the hierarchical models, variance is apportioned first to the six lower level constructs and the common variance between these six constructs is partitioned into one, two or three higher level constructs. A degree of correlation may exist between the latent variables in hierarchical models (Byrne, 1998; Kline, 1998). A concrete example is one in which General Motivation has Surface, Deep and Achieving Motivations set beneath it and General Strategy has Surface, Deep and Achieving Strategies set beneath it. This is shown in Model H(2,6) found in Figure 7.3b. In all models motivation is represented as 'motiv' and strategy as 'strat'.

In the nested models, the three approaches are considered to be independent of the motivation or strategy components and are set orthogonal to them. In addition, the three approaches may be correlated or orthogonal to each other and the motivation and strategy components also may be orthogonal or correlated with each other depending on the way the model has been specified.



Figure 7.3 The structure of the SPQ baseline, hierarchical and nested models

Gustafsson (1999), Gustafsson and Balke (1993), Gustafsson and Stahl (1999) and Unheim and Gustafsson (1987) also use orthogonality and separation for their nested models. Moreover, they describe their higher order or hierarchical model as a twolevel model where one, the second order or general factor, is decomposed into several first order factors which, in turn, give rise to a number of manifest variables.

In nested models, for example, in the Model N(1,3), the variance may load onto both an approach and a general characteristic. In the Model N(2,3), the items load on an approach and on either strategy or motivation. There may be correlations between the approaches or between motivation and strategy but the correlation between the motivation or strategy and the three approaches is constrained and set at zero. The amount of correlation between latent variables may vary as they are not constrained. The correlation and orthogonality are shown in Figure 7.3c and discussed in the appendix to Chapter 7.

### Results

### Reliability

The reliabilities listed in Table 7.4 provide estimates of the internal consistency of the SPQ and its scales. Estimates that are greater than 0.70 suggest that the items in an index measure the same concept. The six scales show internal consistency in that the items in each scale measure the same general characteristic. In general, the reliabilities for the SPQ scales in this study are higher than those reported by Bessant (1995); Biggs (1992, 1993); Bolen et al. (1994); Crawford et al. (1998); Hall, Bolen and Gupton (1996); Kember and Leung (1998); Sadler-Smith (1996); Saddler-Smith and Tsang (1998); Schmeck (1988); Volet, Renshaw and Tietzel (1994); Weinstein (1988); Wen (1993); Wong, Lin and Watkins (1996). The higher reliabilities may be a consequence of the lack of independence in the data with 573 records that is unavoidable in a longitudinal study using repeated measures. Clearly these reliabilities may be slightly inflated as the analysis utilises data from the same measurement instrument that is replicated on five occasions and, therefore, does not represent a simple random sample that has been measured on a single occasion. However, even allowing for some inflation due to replication, there appears to be a trend that is consistent with the other analyses which have been carried out on the data that have been collected.

Biggs' Scales	N=573 (a Coefficient)	Number of Items
Overall (42 items)	0.87	42
All motivations (21 items)	0.80	21
All strategies (21 items)	0.79	21
Surface Approach	0.75	14
Deep Approach	0.79	14
Achieving Approach	0.81	14
Surface Motivation	0.57	7
Surface Strategy	0.67	7
Deep Motivation	0.63	7
Deep Strategy	0.73	7
Achieving Motivation	0.73	7
Achieving Strategy	0.79	7

Table 7.4Reliabilities(N= 573)

### Model fit

Table 7.5 summarises the  $\chi^2$ , df,  $\chi^2/df$ , *RMSEA*, *SRMR*, the *GFI* and the *NNFI* fit indices and progresses from models showing a barely adequate fit to models showing reasonable fit indices. Although the Model N(2,3) has the best fit indices it does not provide a solution as practically useful as the Model B(6). Therefore, Model B(6) is presented as the best model for the explanation of the SPQ data. It is shown in Figure 7.4. The other 11 models for the SPQ data are considered in greater depth in the appendix to Chapter 7. A more detailed examination of all fit indices generated by the LISREL program and used in the present analysis may be found in Chapter 6 and the appendix to Chapter 6.

Before a final decision is made as to which of these models best fits the data, consideration must be given to the Lambda-X ( $\lambda x$ ) loadings and the apportioning of variance.

In the Model N(2,3), the greatest portion of the variance is taken by the approaches (deep, surface and achieving) rather than the motivation and strategy latent variables. The total variance explained is 27.58 per cent. In the model N(1,3) the single learning factor explains 13.98 per cent of the variance while the three learning approaches explain slightly less at 13.14 per cent. However, the overall variance explained is just over 27 per cent. That amount is less than the B(6) model that explains 27.45 per cent of the variance. Details of the  $\lambda x$  values, communalities and apportioning of variance for the models N(2,3) and N(1,3) as well as other SPQ models not discussed in this chapter are presented in the appendix to Chapter 7.

Figure 7.4 shows the path diagram for the Baseline (6) model constructed using confirmatory factor analysis and LISREL. The figure shows six distinct latent variables. The six scales are based on those described by Biggs (1987a).

	χ², Deg	$\chi^2$ , Degrees of Freedom and Fit Indices (N = 573)						
Model	$\chi^2$	df	$\chi^2/df$	RMSEA	GFI	NNFI	SRMR	
Model B(1)Baseline	6460	819	7.89	0.110	0.65	0.41	0.100	
Model B(2)Baseline	5604	818	6.85	0.100	0.68	0.46	0.097	
Model B(3)Baseline	4781	816	5.86	0.092	0.72	0.52	0.093	
Model H(2,6) Hierarchical	3343	812	4.12	0.074	0.78	0.62	0.089	
Model H(1,6) Hierarchical	3342	813	4.11	0.074	0.78	0.62	0.089	
Model N(3,6) Nested	2867	756	3.79	0.700	0.81	0.66	0.070	
Model H(3,6) Hierarchical	3033	810	3.74	0.069	0.80	0.65	0.079	
Model N(1,6) Nested	2835	762	3.71	0.069	0.81	0.67	0.061	
Model N(2,6) Nested	2774	755	3.67	0.068	0.81	0.68	0.061	
Model B(6)-Baseline	2934	804	3.65	0.068	0.80	0.66	0.075	
Model N(1, 3) Nested	2662	774	3.44	0.065	0.82	0.68	0.064	
Model N(2, 3) Nested	2606	773	3.37	0.064	0.82	0.68	0.070	
$\chi^2 = Chi \ square$		RM	ISEA =Root	mean square er	ror of appi	roximation		
df= degrees of freedom	df = degrees of freedom $GFI = Goodness of fit index$							
$\chi^2/df = Chi$ squared divided by degrees of freedom NNFI = Non-normed fit index (Tucker-Lewis Index)								
SRMR = Standardised root mean square residual								

### **Table 7.5**Summary of fit for the SPQ raw data factor models

## The use of confirmatory factor analysis in the estimation of structural models

### Description of models estimated

Models B(1), B(2), B(3) and B(6) are baseline models (see Figure 7.3 and Figure 7.4). Correlations are not constrained among the latent factors. The specification of the syntax for this model may be found in the appendix to Chapter 7. The path model is illustrated in Figure 7.4. Model B(6) separates all motivations and strategies but allows correlation between them to occur without restraint. Analysis of Model B(6) is undertaken at the item level. Kember and Leung (1998), Kember, Wong and Leung (1999) and Wong, Lin and Watkins (1996) also tested similar models but have only reported results that are based on subscale data. This type of analysis produces correspondingly higher fit indices but also aggregates item level data to the scale level that necessarily inflates the coefficients estimated.

Three hierarchical models are tested as well: Model H(1,6), Model H(2,6) and Model H(3,6). Model H(1,6), uses a general learning construct, Model H(2,6) separates the motivations and strategies and Model H(3,6) separates the approaches from the baseline six motivations and strategies. These models are not constrained and therefore correlations are allowed to occur between the factors.

The nested models, Model N(1,6), Model N(2,6) and Model N(3,6) are constrained and involve orthogonally restricted correlations between the levels of nesting. The final group to be considered involves two nested models. Model N(1,3) locates the general learning factor orthogonal to the three approaches to learning, and Model N(2,3) places the motivations and the strategies orthogonal to the three learning approaches.

Model B(6) requires no apportioning of variance beyond the basic six motivations and strategies and all loadings are positive. The six latent variables in the Model B(6) explain 27.5 per cent of the variance. The variance for each of the scales may be found in the lowest panel of Table 7.6. The six latent variables provide the most logical explanation of results obtained using the SPQ as they give equal importance to the motivations and strategies. Other models, such as the N(2,3) and N(1,3), provide better fit indices, but the B(6) model is the most helpful in understanding the motivations and strategies that CHC sojourner students use when they study in Australia.

Table 7.6 shows the completely standardised solution, communalities and per cent of variance explained for Model B(6).

Table 7.7 presents the Phi matrices for Models B(6) and N(2,3). This table considers the correlations that exist between the latent variables. The Phi matrix for Model N(2,3) shows a strong correlation between the achieving and deep approaches. The Phi matrix for the model B(6) shows a high degree of correlation between the Deep Motivation and Deep Strategy scales (0.76), the Deep Motivation and Achieving Strategy (0.70) and the Deep and Achieving Motivations (0.63). In addition, there are moderately large correlations between the Achieving Strategy scales (0.50) and the Deep and Achieving Strategy scales (0.56). There is also a medium, but positive correlation between the Surface and Deep Motivations (0.33).However, there is a negative correlation between the Surface and Deep Strategies (-0.03) (Cohen, 1990, 1992, 1994; Hox, 2002).



Figure 7.4 Path diagram of the B(6) SPQ model

	Model Baseline(6)											
λχν	alues for	the com	pletely st	andardise	d solution	Com	nunalities	and percer	ntage of va	ariance ex	p <i>lained (</i> h	2)
Items	SM	DM	AM	SS	DS	AS	SM	DM	AM	SS	DS	AS
Spq1	0.44						0.19					
Spq7	0.48						0.23					
Spq13	0.55						0.30					
Spq19	0.42						0.18					
Spq25	0.42						0.18					
Spq31	0.44						0.19					
Spq37	0.62						0.38					
Spq2		0.54						0.29				
Spq8		0.40						0.16				
Spq14		0.50						0.25				
Spq20		0.52						0.27				
Spq26		0.55						0.30				
Spq32		0.44						0.19				
Spq38		0.22						0.04				
Spq3			0.60						0.36			
Spq9			0.62						0.38			
Spq15			0.69						0.48			
Spq21			0.38						0.14			
Spq27			0.41						0.17			
Spq33			0.68						0.46			
Spq39			0.35						0.12			
Spq4				0.39						0.15		
Spq10				0.50						0.25		
Spq16				0.39						0.15		
Spq22				0.49						0.24		
Spq28				0.41						0.17		
Spq34				0.58						0.37		
Spq40				0.53						0.28		
Spq5					0.37						0.14	
Spq11					0.64						0.41	
Spq17					0.47						0.22	
Spq23					0.67						0.45	
Spq29					0.52						0.27	
Spq35					0.47						0.22	
Spq41					0.68						0.46	
Spq6						0.49						0.24
Spq12						0.67						0.45
Spq18						0.63						0.40
Spq24						0.71						0.50
Spq30						0.65						0.42
Spq36						0.58						0.37
Spq42	<u> </u>					0.44	ļ					0.19
Total=	1						1.65/	1.50/	2.11/	1.51/	2.19/	2.57/
	1						42 =	42 =	42 =	42 =	42 =	42 =
							0.039	0.036	0.052	0.036	0.052	0.061

 Table 7.6 Completely standardised solution, communalities and percentage of variance explained

(SM, DM, AM, SS, DS and AS) = Total variance explained  $(h^2)=11.53/42=0.2745=27.45\%$ 

Model N(2,3)	1					
	Strat		Motiv	Surf	Deep	Achi
Strat	1.00					
Motiv	0.12		1.00			
Surf				1.00		
Deep				0.15	1.00	
Achi				0.22	0.85	1.00
Model B(6)						
	SM	DM	AM	SS	DS	AS
SM	1.00					
DM	0.33	1.00				
AM	0.51	0.63	1.00			
SS	0.75	0.17	0.46	1.00		
DS	0.06	0.76	0.35	-0.03	1.00	
AS	0.17	0.70	0.50	0.22	0.56	1.00

**Table 7.7**Phi Matrices for Models N(2,3) and B(6)

The positive correlations that are found in Table 7.7 indicate an association of the need to achieve with the methods Confucian heritage culture (CHC) students use to accomplish this goal.

### Summary of the data on the SPQ

There are several LISREL models that may be used to explain the results obtained with confirmatory factor analysis of the SPQ. However, the baseline B(6) model has been chosen as the most suitable to explain CHC student learning in a new educational environment. It has acceptable fit indices that are close to the two nested models that have been discussed. The baseline B(6) model uses the six original latent variable scales that Biggs' (1987a) has described. The model has adequate  $\lambda x$  values that are all positive and greater than 0.35 in 41 of the 42 items when a completely standardised solution is considered and even the remaining item has a  $\lambda x$  value greater than 0.20.

The model also provides a Phi matrix that shows that the Deep and Achieving Approaches (B6) to Learning are closely correlated but only minimally correlated with the Surface Motivation and Surface Strategy scales. This finding confirms Martön and Saljö's (1976a, 1976b) separation of a surface and deep approach to learning. The B(6) model also retains the Achieving Motivation and Achieving Strategy scales that are found to be highly significant in CHC students. The reliabilities that are given in Table 7.4 confirm the usefulness of the achieving scales for CHC sojourner students in Australia. Therefore, even though Biggs (1987a, 2001a) and Biggs, Kember and Leung (2001) suggest that the achieving scales can be combined with either deep or surface scales, the evidence from this study does not support this suggestion. Rather, it confirms the need to view the approaches to learning in terms of six separate and distinct motivations and strategies.

Therefore, the B(6) model provides a statistically sound basis for undertaking canonical analysis, and the six scales found for the SPQ provide the outcome variables for multilevel modelling of change over time.

### Conclusion

The application of confirmatory factor analysis and LISREL to the CVS and SPQ data provided support for the use of four plus one CVS dimensions and six SPQ scales. LISREL has also enabled testing of five alternative models for the CVS and 11 alternative models for the SPQ. The models that have been developed and tested largely confirm what Bond (1988, 1996) has found with the CVS and Biggs (1987a) has found with the SPQ. The most successful model for values is nested in construction where a Values factor is placed orthogonal to the four value dimensions when estimating CVS data. For the approaches to learning, the baseline model is the most useful for the analysis of the six motivation and strategy scales to describe the learning processes that are measured on the SPQ. The models supported in this chapter enable the testing of hypotheses that argue for a causal relationship between values and approaches to learning.

## 8 The Relationships between Values and Learning

### Introduction

In Chapter 7, a single level modelling procedure, confirmatory factor analysis using the LISREL 8.30 program is considered. The analysis establishes the existence of four dimensions associated with values and six scales that define students' approaches to learning. It is argued that in doing so, confirmatory factor analysis provides a clearer understanding of the values that guide the lives of students from a Confucian heritage culture (CHC) as well as the way in which these students approach learning. In this chapter a second single level modelling procedure, canonical correlation analysis is employed. This analysis seeks to investigate the possibility of a relationship between the constructs associated with values and learning in order to ascertain whether values may be shown to be statistically significant precursors of approaches to learning.

This chapter considers the results of canonical correlation analysis that examines the relationships between the four value dimensions of the *Chinese Value Survey* (CVS) and the six learning scales of the *Study Process Questionnaire* (SPQ). The CVS dimensions are Integrity and Tolerance, Confucian Ethos, Loyalty to Ideals and Worldly Wisdom. The SPQ scales are Surface Motivation, Deep Motivation, Achieving Motivation, Surface Strategy, Deep Strategy and Achieving Strategy.

The chapter begins with a discussion of the data collected on the four value dimensions and the six approaches to learning that provide the framework for the analysis. This discussion is followed by (a) an introduction to canonical correlation analysis, (b) the measurement of the coefficients that are used in the analysis, (c) the results of estimations undertaken, (d) a discussion of the relationships between the predictor and criterion variates and their latent variables, and (e) an examination of the path diagram that summarises graphically the results of the analysis that has been undertaken. The chapter concludes with a discussion of the results of the analysis.

### The meaning and measurement of values

Values are considered to be precursors as well as predictors of behaviour. Values that guide students' lives in their home countries are believed to influence the way in which their learning takes place. Feather (1986) has pointed to historical evidence that value patterns have characterised nations and cultures within nations. In addition, Biggs (1976, 1990a, 1990b, 2001b) and Lai and Biggs (1994) have examined the differences in the learning approaches of ethnically different groups of students. Therefore, it is argued that attitudes and their underlying values are likely to influence the learning behaviours of Asian students who come to Australia to pursue their education. However, the nature and extent of such influences have rarely been examined.

The results obtained from the analysis of data using canonical correlational analysis also relate to the importance of learning in Chinese society. Group-related orientations are characteristic of the Chinese culture and give credence to specific values like competence in scholarship, security, group-directed self-control, wisdom and the virtue of hard work with respect to the efforts made to learn and acquire knowledge for the benefit of the group (Hofstede, 1980; Hofstede and Bond, 1988; Kelly, 2000; Kim et al., 1994). The strong base that values have in Chinese students' lives provides an obvious precursor for learning (Feather, 1986). The inference for this study is that values are likely to affect learning and specific value groups are likely to affect particular kinds of learning (Lau, 1996; Lau and Yeung, 1996; Leung, 2001; Mukherjee, 1990). In addition, not all groups of students are likely to be affected in the same way. However, these relationships would not appear to have been investigated in previous research studies.

### Values dimensions

Data analysis undertaken with confirmatory factor analysis and the LISREL program on the *Chinese Value Survey* (CVS) has established that values may be considered in terms of four separate dimensions. The value dimensions have been given the following names and subheadings: (a) 'CVS I-Integrity and Tolerance' and the development of self, (b) 'CVS II-Confucian Ethos' and relationships with others, (c) 'CVS III-Loyalty to Ideals' and social responsibility and (d) 'CVS IV-Worldly Wisdom' and tolerance and moral discipline. In addition, there appears to be a strong general Values factor that is statistically significant. Table 7.2 presented in Chapter 7, contains the loadings for the single Values factor and the four value dimensions, the communalities and the variance explained for the five latent variables.

The four factor solution supports the constructs that have been described by Bond and his colleagues (Chinese Culture Connection (CCC), 1987). Analysis using the LISREL program has confirmed the nested factor structure whereby the formation of a general values construct gives a better-estimated model than a baseline four-factor solution. The nested model that provides the best fit is illustrated in Figures 7.1c and 7.2. It places the general values dimension orthogonal to the four separate values constructs. The reliabilities for the latent constructs further confirm the structure of the model used in this analysis. They are found in the lower panel of Table 7.2.

If the four value dimensions of the CVS were orthogonal to each other the examination of data with canonical analysis would have little meaning, as would the analysis if there was only one value dimension involved in the CVS. It is a consequence of the confirmed structure of the CVS that the undertaking of canonical analysis is likely to be both meaningful and informative with respect to the theoretical and statistical relationships between values and approaches to learning.

### Approaches to Learning

Biggs' (1987a) has described the student approaches to learning as Surface, Deep and Achieving. Each approach has a motivation and a complementary strategy. The characteristics of each approach are listed in Table 3.1 and discussed in considerable depth in Chapter 3.

The *Study Process Questionnaire* (SPQ) is an instrument that has been designed to assess students' perceptions of learning (Biggs, 1987a, 2001a). Data in this study have been collected using a bilingual version of the SPQ. The data have been examined using confirmatory factor analysis and the LISREL program. The results of the analysis are discussed in Chapter 7 and the six factor model is accepted in preference to the nested models. The analysis confirms the use of six scales associated with learning. Three scales are related to the motivations that guide learning and three scales describe the strategies that are used to implement the learning process. The six latent constructs that are used are those named by Biggs (1987a) as Surface, Deep and Achieving Motivations and Surface, Deep and Achieving Strategies. The reliabilities of the scores obtained from these latent constructs are recorded in Table 7.4. They are sufficiently high to assume that dimensionality exists in the scales are correlated and not orthogonal to each other.

Therefore, as a consequence of the confirmed structure of the SPQ and that of the CVS, the undertaking of canonical analysis using these ten scales is likely to be both instructive and meaningful with regard to the relationships between values and approaches to learning.

### Background to canonical analysis

### **Concurrent equating**

Before canonical analysis was undertaken, the five data sets from each questionnaire were combined. Therefore, all the data collected using the CVS was collated in a single file and the QUEST (Adams and Khoo, 1993) computer program was used to undertake concurrent equating in order to give equal value to all responses as described in Chapter 6. Concurrent calibration was also carried out with the single data file constructed from all the SPQ responses. In both files, students were included if they had responded to the questionnaires on at least two of the five occasions of measurement.

A set of mean scaled scores was generated for each of the four value dimensions of the CVS and the six learning scales of the SPQ for each occasion of measurement. A table of scaled scores for values and a figure showing the data in graph form are found in Chapter 9 as Table 9.1 and Figure 9.1. A similar table and graphic representation for the data on the approaches to learning are found in Chapter 10 as Table 10.1 and Figure 10.1.

### The purpose of canonical analysis

Canonical analysis is able to analyse two sets of data simultaneously to see if there are strong and meaningful links between the data. The analysis that is undertaken in this study investigates the possible relationships between students' values and approaches to learning. Canonical correlation analysis has been selected as the statistical procedure for the analysis in this study because it permits the analysis of

two sets of variates at the same time. It also allows the examination and testing of the significance of the relationships between the sets of variates. The purpose of the analysis is to investigate whether life values and approaches to learning are meaningfully related to one another. Canonical correlation analysis using the SAS (1985) computer program is the preferred analytical tool as it is able to demonstrate clearly whether statistically significant relationships do exist between the two sets of measures. In canonical analysis the term 'variate' refers to the manifest or observed value dimensions and learning scales that may combine to produce the latent variables. These terms are discussed in Chapter 6 and are illustrated in Figures 6.3 and 6.4 where the ideas of canonical analysis are introduced.

In canonical analysis, the variates in each set are weighted to form the first pair of variables. The canonical correlation between this pair of variables is highest between the first pair of variables. The second canonical correlation is the highest that can be found between the X and Y weighted composites that are uncorrelated with or orthogonal to the first pair of variables. The significance of each correlation may be tested using Wilks' lambda and an F ratio. Likewise, a third and fourth pair of canonical variables may be identified and tested to assess whether they are significantly related. Canonical analysis is also able to analyse the statistical significance of any relationships within a set of data and the degree of overlap between sets of variates. In the present study values act as predictors of learning behaviour with the maximum number of variable pairs equal to four that corresponds to the number of variates.

The canonical correlation coefficients (R) between each pair of canonical variables describe the strength of the relationships between the pairs of latent variables. The square (R²) of this relationship estimates the amount of variance of one latent variable that is predictable from the other latent variable in the pair. The relationship between the two latent variables that form a pair may be viewed as causal and therefore unidirectional, whereby the latent X variable forms a causal link with its paired latent Y variable. Figures 6.3 and 6.4 in Chapter 6 show these relationships graphically. Measures of redundancy are used to examine commonality between blocks of variates in an analysis (Cooley and Lohnes, 1971, 1976; Harris, 1989; Keeves, 1975, 1986; Keeves and Thompson, 1997; Pedhazur, 1997; and Van de Geer, 1971).

### Transformation weights and structure coefficients

There are two types of coefficients that are used in the interpretation of canonical variate analysis. These are the transformation weights and the structure coefficients. The transformation weights are assigned to the variates that form the latent variables in the linear combination of variates. Structure coefficients are the correlations between the derived variables and the original variates. The structure coefficients are loadings that enable the pairs of variables to be identified and related to their respective variates. The sum of the squared structure coefficients enables the proportion of variance estimated by each factor to be calculated (Keeves and Thompson, 1997).

Transformation weights and structure coefficients assist in attaching meaning to canonical variables. The transformation weights are assigned to the original variates that make up the predictor and criterion sets of variables. The structure coefficients help to identify the related variables in the predictor and criterion sets and are particularly useful in identifying relationships between the original variates and the derived canonical variables (Tatsuoka, 1973). Transformation weights may be greater

than 1.0 as they represent beta weights derived from the analysis. Therefore, two quite distinct and disparate sets of data can be compared and the influence of each evaluated using the transformation weights and the corresponding structure coefficients that are equivalent to factor loadings. Redundancy also measures the proportion of variance of a set of variates that is predictable from its paired canonical latent variable (Keeves and Thompson, 1997).

### Results

### Relationships between the latent variables

Table 8.1 shows the results of the tests of successive latent roots for statistical significance. Three of the four possible roots are found to be significant when p is <0. 01. The fourth root is not significant at the 0.05 level. The table also gives the results of tests using Wilks' Lambda, Pillai's Trace and the Hotelling-Lawley Trace. These are all measures of overall statistical significance of the canonical correlation analysis.

In the testing of the successive latent roots, the first pair shows a significant relationship and a moderate degree of correlation (0.40). The second pair of variables is significantly correlated (0.34) and is set orthogonal to the first pair. The third pair is also orthogonal to the other two pairs and the two latent variables are significantly correlated (0.24) (Keeves and Thompson, 1997).

Number of roots	Canonical R	$\mathbf{R}^2$	Approx F	df	p <
1	0.40	0.16	8.99	24	0.01
2	0.34	0.11	7.23	15	0.01
3	0.24	0.06	4.78	8	0.01
4	0.10	0.01	1.77	3	N.S.
Overall analysis					
Statistics	Value	F	Num <i>df</i>	Den <i>df</i>	p <
Wilks' Lambda	0.695	8.99	24	1965	0.01
Pillai's Trace	0.340	8.77	24	2264	0.01
Hotelling-Lawley Trace	0.389	9.11	24	2246	0.01

Table 8.1 Canonical analysis: tests of successive latent roots

N.S. = not significant

## Relationships between the predictor and criterion variates and their latent variables

Table 8.2 records the transformation weights, the structure coefficients and the variance extracted for the canonical variables. The transformation weights are indicated with the letter 'U'. The transformation weights are the sizes of the paths that link the predictor variates to the predictor latent variables. The structure coefficients are designated with the letter 'V'. The structure coefficients are correlations and are the paths between the latent criterion variables and the criterion variates.

	Transform	nation weight	s (U)•	Structure coefficients (V)†			
Predictor measures	U 1	U 2	U ₃	Vı	V ₂	V ₃	
INTEGRSC	0.22	-1.29	0.22	0.76	-0.64	0.09	
CONFURSC	0.18	0.05	-1.25	0.71	0.01	-0.70	
LOYALRSC	0.35	0.50	0.32	0.82	0.03	0.19	
WISDOMRS	0.48	0.61	0.52	0.87	0.27	0.08	
Variance extracted	0.63	0.12	0.14				
Criterion measures	U 1	U ₂	U ₃	V ₁	V ₂	V ₃	
SURMOTRS	0.42	-0.01	0.47	0.61	0.37	0.18	
DEEPMOTR	0.20	-0.68	-0.04	0.54	-0.50	0.25	
ACHMOTRS	-0.12	0.57	0.61	0.45	0.50	0.42	
SURSTRRS	0.30	0.51	-0.73	0.61	0.62	-0.27	
DEEPSTRR	0.08	0.09	0.75	0.41	-0.25	0.59	
ACHSTRRS	0.62	-0.30	-0.52	0.77	-0.26	-0.07	
Variance extracted	0.33	0.19	0.12				
Canonical R	0.40	0.34	0.24				
Canonical R ²	0.16	0.11	0.06				
‡Redundancy	0.05	0.02	0.01				

### Table 8.2 Transformation weights and factor structure coefficients of canonical variates

‡Redundancy of criteria given predictor/latent variable

The first predictor latent variable is the general Values factor. The second predictor latent variable involves the contrasting relationship between the Wisdom and Loyalty and the Integrity factors and the third predictor latent variable involves a contrast between the Confucian factor and the Integrity, Loyalty and Wisdom factors.

The first criterion latent variable is concerned with general learning style. It involves Surface, Deep and Achieving Motivations and Surface, Deep and Achieving Strategies. The second criterion canonical factor involves Achieving Motivation and Surface Strategy contrasted with Deep Motivation. The third criterion latent variable involves Achieving Motivation and Deep Strategy.

### Path Diagram

Figure 8.1 shows a path diagram of the canonical correlation analysis following an approach suggested by Keeves (1975, 1986). Four sets of predictors that comprise the four groups of values from the CVS give rise to a single latent variable that is labelled 'Values'. This relates to the criterion latent variable that is called 'Learn'. Learn involves the six criterion variates that are concerned with the learning styles proposed by Biggs (1987a) for the SPQ.

The path coefficients for Values are the transformation weights for the first predictor factor and are shown in Figure 8.1. They are Integrity (0.22), Confucian (0.18), Loyalty (0.35) and Wisdom (0.48). The path coefficients associated with Learn are given by the structure coefficients from the latent variable Learn, with a residual effect (0.92) that is due to exogenous disturbance (Keeves, 1975). The path

coefficients, designated as structure coefficients and associated with Learn are Surface Motivation (0.61), Deep Motivation (0.54), Achieving Motivation (0.45), Surface Strategy (0.61), Deep Strategy (0.41) and Achieving Strategy (0.77). It should be noted that only transformation weights >0.10 and structure coefficients >0.40 are considered to be significant. The significant values are shown in bold font in Table 8.2.



Figure 8.1 Path diagram showing the correlation between values and learning

The second latent variable, Low Integrity involves three significant predictor variates, Integrity (-1.29), Loyalty (0.50) and Wisdom (0.61). The path coefficients for Low Integrity are the transformation weights involved in forming the second predictor variable and are shown in Figure 8.1 The path coefficients associated with the second criterion factor are given by the structure coefficients that come from the latent variable Surface Learning. Surface Learning involves three variates associated with learning styles, Achieving Motivation (0.50) and Surface Strategy (0.62) with positive correlations and Deep Motivation (-0.50) that is negatively correlated to the variable Surface Learning. The canonical correlation between low Integrity and Surface Learning is 0.34 with a residual effect of 0.94 acting on Surface Learning.

The third latent variable, Low Confucian involves the predictor variates Integrity (0.22), Confucian ethos (-1.25), Loyalty (0.32) and Wisdom (0.52). This latent variable is formed with the transformation weights given for these variates in Table

8.2 and the path coefficients for Low Confucian are the transformation weights for the third predictor factor that are shown in Figure 8.1. The path coefficients associated with the third criterion variable are given by the structure coefficients that come from the latent variable Deep Learning.

Deep Learning involves two variates with strong structure coefficients, Deep Strategy (0.59) and Achieving Motivation (0.42) contrasted with the non-significant Surface Strategy (-0.27) (Matthews, 2001). The canonical correlation between Low Confucian and Deep Learning is 0.24, with a residual effect of 0.97 acting on Deep Learning.

### Variance extracted

The results recorded in Table 8.2 show that the largest contribution to the explained variance for the predictor variables is 63 per cent for the first predictor variable or general Values factor, 12 per cent for the second predictor variable and 14 per cent for the third predictor variable. The largest variance for the criterion variables is extracted by the general Learning factor of 33 per cent. The second factor accounts for 19 per cent and the third for 12 per cent of the variance.

### Redundancy

The redundancies of the criterion variables given the predictors are five, two and one per cent respectively. These values are also recorded in Table 8.2. This indicates that the general Values factor explains five per cent of the variance of the six learning factors. The Low Integrity factor explains two per cent of the variance of the learning variates and Low Confucian factor explains only one per cent of the variance of the learning variates respectively.

### **Discussion of results**

### The relationship between values and learning

The first factor shows a strong and statistically significant relationship between values and learning. These factors extract the largest amount of variance, 63 per cent for the first predictor variable, the general Values factor, and 33 per cent for the first criterion variable, the general Learning factor. All of the predictor variates have significant loadings and contribute to the general Values factor. As well, all the criterion variates associated with learning motivations have significant loadings as do the learning strategies. Therefore, the first canonical factors assist in the confirmation of the relationship that all four value dimensions are important precursors to the six approaches to learning for the students in this study.

The second factor shows that students who have low Integrity values tend to be surface learners with high Surface Strategy and Achieving Motivation and low Deep Motivation. Learners who use a surface approach tend to learn key facts and principles in a superficial way. Their goal is to avoid failure by meeting requirements minimally. Their strategy is probably repetitive in nature because many students only reproduce what they have memorised without being motivated towards deeper learning. They are low in values such as persistence, industry and sincerity that are associated with Integrity that is related to self-development, but may be relatively high in values associated with Wisdom and Loyalty that are related to a sense of social responsibility, tolerance and moral discipline such as moderation or following the middle way, filial piety, a sense of superiority, prudence and having a sense of shame. These students show a high level of Achieving Motivation and highly developed Surface Strategies in their learning. This demonstrates their need to achieve despite a poorly developed deep motivation to learn. They do not appear to have a profound commitment to study or a need to persevere in order to understand what they are learning.

The third factor shows that low Confucian values are associated with learning styles related to a deep approach to learning. Students with low Confucian values are generally attempting to satisfy their curiosity about what they are learning and they appear to have a need to understand. Their goal is to develop an interest in what is being learned in order to increase competence in academic subjects. Moreover, deep learners tend to read widely and attempt to correlate what they read with previous knowledge (Biggs, 1987a, 1996b).

In contrast, students who are low in Confucian values such as tolerance, noncompetitiveness and being conservative are also likely to be low in the importance they attach to relationships with others, but are relatively high in Loyalty values such as observation of rites and social rituals and solidarity with others, values that tend to promote group social responsibility. The same students are also high in Wisdom values such as humbleness, prudence and the ordering of relationships that promote tolerance and moral discipline and relatively high in Integrity values such as industry, self-cultivation, adaptability, patience and having a sense of righteousness that assist in personal development. They show high levels of Achieving Motivation to learn as well as highly developed deep learning strategies. Their commitment and motivation to acquire knowledge and use deep strategies to learn as the basis for inquiry into new areas of study may assist these students to adapt quickly and easily to university life in Australia.

### The causal nature of learning

Canonical correlation analysis has demonstrated the existence of strong relationships between Values and Learning factors. Further, the first derived canonical variable pairing indicates a statistically significant and positive relationship between values in general and learning approaches. It is presumed that most Asian students come to Australia with the intention to study to achieve their desired goals. Therefore, it is the manner in which their study is pursued, the values that guide this study and the approaches to learning that CHC students prefer to use that are important for this investigation to examine. Moreover, the results of this analysis appear to afford a clearer understanding of the causal relationships that exist between values and approaches to learning in the Confucian heritage culture (CHC) students in this study who are sojourner students in Australia.

### Conclusion

Canonical correlation analysis has shown that two seemingly disparate areas of a student's life, namely, values and approaches to learning, may be analysed at the same time and found to be related. The results of the analyses undertaken are statistically significant and show that, in general, students with significant values have strong learning motivations and strategies. Further, students who are low in Integrity values tend to use a superficial learning strategy. They are high in Achieving Motivation, but low in Deep Motivation. Moreover, students who are low in Confucian values tend to use a deeper learning strategy and manifest a strong motivation to achieve and succeed in their studies. The questions awaiting further analysis are: (a) is there evidence of change in the values and approaches to learning

of particular groups of students during their period of study in Australia; further, (b) if there are changes, in what way are values and approaches to learning modified over time in Australia; and (c) what factors influence change in values and approaches to learning of sojourner students who are studying in Australia?

# **9** Change in Values Over Time

### Introduction

This chapter examines changes over time in Confucian heritage culture (CHC) students' values during their stay in Australia with respect to four value dimensions that are measured using the *Chinese Value Survey* (CVS): Integrity and Tolerance (Integ), Confucian Ethos (Confu), Loyalty to Ideals (Loyal) and Worldly Wisdom (Wisdom). The value constructs referred to have been introduced and discussed in Chapters 2 and 7 and the individual component values that make up each dimension are discussed there.

The principal objective of this chapter is to test how the four outcome variables associated with the students' values are influenced by the independent or predictor variable, Occasion, at Level-1 and students' background characteristics as predictor variables at Level-2 in a multilevel analysis.

### **Direct and interaction effects**

There are two types of Level-2 effects that involve between-student relationships. The first effect is described as a direct effect and influences the intercept ( $\beta_0$ ). This effect influences the outcome variable directly and explains why the intercepts on the graphs for the values differ when plotted against time. The difference between the value measures for the five occasions is assessed by  $\gamma_{10}$ , the estimate of Occasion slope ( $g_{10}$ ) for each outcome variable. The interaction effects influence the Occasion slope ( $\beta_1$ ). An interaction effect relates three variables to one another, the outcome variable, the Level-1 predictor which in this study is always the variable Occasion, and a Level-2 variable that is considered to interact with the effect of the Level-1 predictor on the outcome variable.

### Scaling and equating procedures

In order to ensure precision of measurement of the raw score data that are obtained from the CVS, scaling and equating procedures have been undertaken. These have been discussed in Chapter 6. The Rasch model is employed to produce a common interval scale on which all items in a scale and all participants in the study sample may be placed. Table 9.1 shows mean scaled scores for the value dimensions that are obtained using the QUEST program (Adams and Khoo, 1993). The unit of measurement is the logit. The data points for the four value dimensions and the 153 cases collected on five occasions are brought to common scales by Rasch scaling so that these estimates may be used in further statistical analyses with hierarchical linear modelling (HLM). Table 9.1 gives the means of the scaled scores that are obtained for the value dimensions for each of the five occasions. The number of participants on each occasion is also found in Table 9.1.

Figure 9.1 presents graphically the mean scaled scores in logits. It shows the changes in values that have occurred on five occasions over two years. It is important to examine the performance of individual students over time, rather than the mean performance of the sample of students, since there is considerable variability between the students who have provided responses on the five occasions. Therefore, if a student responded on at least two of the five occasions, the data provided have been included. The computer program provides satisfactorily for missing data on individual occasions for particular scales at Level-1. While the graphs in Figure 9.1 would appear to indicate that the changes in the mean scale estimates over time are not linear, in the examination of change over time for each individual a linear relationship is fitted to estimate the level of change over the five occasions.

Table 9.1Mean scaled scores (in Logits)

Scale Names	Occasion 1	Occasion 2	Occasion 3	Occasion 4	Occasion 5
INTEG	1.24	1.29	1.25	1.50	1.39
CONFU	0.30	0.20	0.26	0.26	0.19
LOYAL	0.85	0.62	0.90	1.02	0.95
WISDOM	0.41	0.33	0.37	0.47	0.34
N =	153	70	111	122	117

CVS Scales Trends



Figure 9.1 CVS scales trends over time

(Integ=Integrity; Confu=Confucian Ethos; Loyal=Loyalty to Ideals and Wisdom=Worldly Wisdom)

### The selection of variables for the analysis

Table 9.2 presents a list of the Level-1 variables used in the HLM analysis of values. The table gives the name of the variable and the number of times the variable has been measured. The column on the left states the acronyms that appear in the text. These represent the four latent variables that have been derived from confirmatory factor analysis undertaken on the data collected from the administration of the CVS over five occasions of measurement. In addition, dummy-variables (Pedhazur, 1997) for each occasion were formed in the Level-1 data file.

Actual name	Times	Description of variable	Scale values
Occasion	5	Occasion	1-5
Integ	5	Integrity and Tolerance scale of the CVS	RSS‡ + 15 items
Confu	5	Confucian Ethos scale of the CVS	RSS‡ + 12 items
Loyal	5	Loyalty to Ideals scale of the CVS	RSS‡ + 6 items
Wisdom	5	Moderation and Moral Discipline scale of the CVS	RSS + 7 items
Occasion ²	5	The square of Occasion for use in a non-linear or quadratic relation	1-25
Occasion 1 to 5	5	Dummy variables to identify each Occasion	0, 1

 Table 9.2
 Level-1 variables for measuring values used in HLM analysis

‡ RSS=Rasch scaled scores

Table 9.3 presents a list of the Level-2 variables, an explanation of the coding used and a description of the meaning of each Level-2 variable. Table 9.3 also explains the meaning of the variable acronym names used in the HLM printouts that are included in this chapter. After an examination of the frequencies of the Level-2 data obtained from the background questionnaire, it was decided to recode the demographic responses to a set of dichotomous variables as 0 and 1. The background questionnaire asked students to provide the investigator with personal information about their age, gender, country of birth, subjects they were studying, where and with whom they preferred to study, how many hours they studied each week outside their classes, their religious beliefs and practices, whether, where and how long they had travelled before coming to Australia and which tertiary institution they were attending. Students were asked to respond to all questions. If, however, they did not wish to reply to a question, their privacy was respected.

Table 9.4 contains a list of descriptive statistics for the variables at the two HLM levels. The Level-1 statistics describe the possible outcome or dependent variables and Occasion variables. Table 9.4 also provides the mean and the standard deviation for each variable as well as the minimum and maximum values for each variable after the conversion of all Level-2 variables to dichotomous variables. It should be noted that HLM cannot handle missing data at Level-2; therefore, any missing data have been replaced by the mean.

### **Model specification**

In this chapter four models that correspond to the four dimensions describing values are estimated and discussed. The first to be examined is the Integrity model. The examination involves a description of the fully unconditional, the Occasion and final models that have resulted from a refining process.

Actual name	Coding	Description of variable with associated code	Scale values
GENDER	1 / 0	Sex of student	In <u>all</u> variables = $0,1$
		Female=1, Male=0	
BORN	1 / 0	Where was the student born?	
		City=1, Country=0	
LIVE	1 / 0	Where does the student's family live in home count	ry?
		City=1, Country=0	-
FAMAD	1 / 0	Does the student have family living in Australia?	
		Yes=1, No=0	
SPEAK	1 / 0	Language of home environment in Australia	
		English=1, Home or other language=0	
STUDY	1 / 0	Student's major area of study	
		Business subjects=1, Not business subjects=0	
PREST	1 / 0	Where the student prefers to study	
		Home=1, Not at home=0	
PREFER	1 / 0	How the student prefers to study	
		Alone=1, With others=0	
HOURS	1 / 0	How many hours the student studies outside of actu	al classes each week
		10+ hours=1, $< 10$ hours=0	
COMAUS	1 / 0	Why did the student come to Australia?	
		Advancement=1, To improve his or her English=0	
TRAVEL	1 / 0	Travel before coming to Australia	
		Travel=1, No travel=0	
COUVIS	1 / 0	Countries visited before coming to Australia	
		Beyond Asia=1, Asia only=0	
TRIP	1 / 0	Students lived overseas before coming to Australia	
		Trip=1, No trip=0	
AFFLIF	1 / 0	The effect of travel on the student's lifestyle	
		Some effect=1, No effect=0	
RELIG	1 / 0	Does the student have religious beliefs?	
		Has religious beliefs=1, Does not have religious be	liefs=0
SPREL	1 / 0	Student has specific religious beliefs	
		Christian =1, Non-Christian=0	
CHURCH	1/0	Does the student attend church in Australia?	
DIDDET		Attends church in Australia=1, Does not attend chu	rch in Australia=0
PARREL	1/0	Does the student have same religious beliefs as pare	ents?
		Different beliefs to parents=1, Same beliefs as pare	nts =0
GRANKEL	1/0	Does the student have same religious beliefs as gran	ndparents?
DI ANG	1 / 0	Different beliefs to grandparents=1, Same beliefs as	s grandparents=0
PLANS	1/0	Students' plans after study in Australia	
ACECD	1 / 0	Continue overseas 1, Go nome=0	
AGEGP	1/0	Age group of the student	
	1 / 0	University attended by the stydent	
ADELAIDE	170	Attenda Adalaida University=1. Attenda aithar Elin	dors or UniSA/TAEE=0
ELINIDEDS	1 / 0	Attends Adelaide University-1, Attends ether Fill	ders of UHISA/TAFE=0
FLINDERS	170	Attends Elinders University =1. Attends either Ade	laida or UniSA/TAFE-0
LINUS A	1/0	University attended by the student	laide of OlliSA/TAFE=0
UNISA	170	$\Delta$ then ds UniSA/TAEE=1 Attends either Adelaide c	r Flinders Universities=0
COUNTRY	1/0	Country of birth: developed or not developed?	in Thinders Oniversities=0
COUNTRI	170	Less developed=1 Developed=0	
MOMINELU	1/0	The most influential person in student's early life	
WICHINI'LU	170	Mother=1 Another person=0	
ARINOZ	1/0	When did the student arrive in Australia?	
	1,0	More than one year ago=1 Less than one year ago=	=0
			*

**Table 9.3**Level-2 Variables used in HLM analysis
LEVEL-1	Descriptive	statistic	s		
VARIABLE N	iame n [‡]	MEAN	SD	MINIMUM	MAXIMUM
OCCASION	573	2.97	1.49	1.00	5.00
INTEG	573	1.33	0.96	-1.39	5.19
CONFU	573	0.25	0.49	-2.18	2.28
LOYAL	573	0.89	0.91	-0.84	4.21
WISDOM	573	0.39	0.54	-0.66	3.81
OCC1	573(1	53) 0.27	0.44	0.00	1.00
OCC2	573(0	70) 0.12	0.33	0.00	1.00
OCC3	573(1	11) 0.19	0.40	0.00	1.00
OCC4	573(1	22) 0.21	0.41	0.00	1.00
OCC5	573(1	17) 0.20	0.40	0.00	1.00
OCCSQD	573	11.01	8.89	1.00	25.00
OCC01234	573	1.97	1.49	0.00	4.00
LEVEL-2	Descriptive st	atistics			
VARIABLE N	IAME N	MEAN	SD	MINIMUM	MAXIMUM
GENDER	153	0.55	0.50	0.00	1.00
BORN	153	0.78	0.41	0.00	1.00
LIVE	153	0.87	0.34	0.00	1.00
FAMAD	153	0.24	0.43	0.00	1.00
SPEAK	153	0.46	0.50	0.00	1.00
STUDY	153	0.51	0.50	0.00	1.00
PREST	153	0.49	0.50	0.00	1.00
PREFER	153	0.73	0.44	0.00	1.00
HOURS	153	0.52	0.50	0.00	1.00
COMAUS	153	0.85	0.36	0.00	1.00
TRAVEL	153	0.75	0.43	0.00	1.00
COUVIS	153	0.33	0.47	0.00	1.00
TRIP	153	0.16	0.37	0.00	1.00
AFFLIF	153	0.61	0.49	0.00	1.00
RELIG	153	0.54	0.50	0.00	1.00
SPREL	153	0.23	0.42	0.00	1.00
CHUR	153	0.17	0.38	0.00	1.00
PARREL	153	0.55	0.50	0.00	1.00
GRANREL	153	0.59	0.49	0.00	1.00
PLANS	153	0.44	0.50	0.00	1.00
AGEGP	153	0.33	0.47	0.00	1.00
ADELAIDE	153	0.32	0.47	0.00	1.00
FLINDERS	153	0.42	0.49	0.00	1.00
UNISA	153	0.26	0.44	0.00	1.00
COUNTRY	153	0.67	0.47	0.00	1.00
MOMINFLU	153	0.58	0.50	0.00	1.00
ARINOZ	153	0.49	0.50	0.00	1.00

#### **Table 9.4**Descriptive statistics for values

* Number of data points observed given in parenthesis

Included in a discussion of the occasion model is the predictor variable, Occasion, which was measured on five separate occasions and is entered grand mean centred. The final model involves the outcome variable Integrity, the Level-1 predictor variable Occasion and the Level-2 variables that have a statistically significant impact on the outcome variable.

### The fully unconditional or null model

In HLM the proportion of variance associated with each level is provided in the form of estimates. Each hypothetical model maybe compared to the so-called 'fully unconditional' or 'null' model. This is done by considering the estimated proportions of variance from which it is possible to obtain an indication of the amount of variance explained by the predictor variables at each level. The fully unconditional or null model also provides information about the proportion of variance left to be explained and the deviance value. These figures are used as baseline estimates for later analyses. For example, the variances at the between-Occasion and between-students levels of the null model can indicate by how much the variance can be reduced when explanatory variables and random slopes are added to a model (Hox, 1994, 2002; Kreft and de Leeuw, 1998). Because HLM does not give an overall indication of goodness-of-fit of a particular model, comparisons between the deviance values and variance components that are found in the null model may be made with similar values found in the final model. As the model is refined with the addition of explanatory variables and compared to previous models, comparisons of variance and deviance are made. The model that explains the greatest proportion of variance and presents a significant drop in the deviance value provides the best indication of improvement of fit. In the final estimation of fixed effects tables for each of the value dimensions, the null and final deviance are recorded on a line above the figures for the estimation of variance explained by the model. The reliability for each scale is presented in the table of fixed effects. Estimates of the reliabilities, p-values of the intercept and the final Occasion slope, and the within level variance are also presented. However, no discussion of the levels of reliability of the dimensions and scales for either values or approaches to learning is presented as such, but for inclusion in Chapters 9 and 10, the model reliability was sufficient and did not prevent convergence being obtained. All final models show the greatest decrease in deviance from the unconditional or null model to the final model that appears in the text.

At Level-1 the fully unconditional or null model may be stated

$$Y_{ij} = \beta_{0j} + r_{ij}, \qquad [Equation 9.1]$$

where

- Y_{ij} is the Rasch scaled score for outcome variable on the Integrity scale for Occasion i and student i;
- $\beta_{0i}$  is the intercept at the micro level;
- $r_{ij}$  is the random error term for the micro level with a mean of zero and a variance of  $\sigma^2$ .

The null model assumes no differences in (Integrity) values between occasions or between students. In this unconditional model the score is considered to be equal to the occasion mean plus random error, that is, the model is equivalent to a one-way analysis of variance (ANOVA) (Bryk and Raudenbush, 1992). The null model is the simplest of all multilevel models and has no capacity to explain variability in  $Y_{ij}$  at the individual or group level, but does include a source of random variation,  $r_{ij}$ , for the micro level in this analysis.

A useful statistic calculated from a one-way ANOVA is the reliability ( $r_{tt}$ ) of the criterion variable. It measures the relationship between the true variance of the criterion and the total variance of the criterion. The coefficient  $\sigma^2$  is divided by (n=3.745), the average number of occasions on which measurement was obtained. Although measurement occurred on five occasions, not every student responded on all occasions. Therefore,

$$\begin{aligned} r_{tt} &= \tau_{00} / (\sigma_{00}^2/3.745) + \tau_{00} \\ &= 0.0441 / (0.868/3.745) + 0.0441 \\ &= 0.159 \end{aligned}$$

From this estimation, it may be concluded that the reliability of the Integrity scale is low (0.159) when assessed over time, but still adequate for further analysis.

At Level-2 the fully unconditional or null model is given by:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$
 [Equation 9.2]

where

 $\beta_{0i}$  is the intercept or mean value for each student j

and

- $\gamma_{00}$  is the mean value for all students across all occasions that samples are taken.
- $u_{0j}$  is the unique random error associated with each student j. It is assumed to be randomly distributed with a mean of zero and a variance of  $\tau_{00}$ .

The fully unconditional model contains only one parameter to be estimated, the intercept  $\gamma_{00}$  and two variance components, that are the between-occasion variance,  $\sigma^2$ , and between-student variance,  $\tau_{00}$ .

The equation for the combined model is derived by substituting the Level-2 equation for  $\beta_{0i}$  into the Level-1 equation as follows:

$$X_{ij} = \gamma_{00} + u_{0j} + r_{ij}$$
 [Equation 9.3]

### Table 9.5 Final estimation of the null model for the Integrity and Tolerance scale

			Standar	d	Approx.	
Fixed Effect		Coefficier	nt Error	T-rati	o d.f.	P-value
For INTH	RCPT1, BO					
INTRCPT2,	G00	1.331	0.045	31.32	2 152	0.000
Final estimat:	ion of va	riance compo	onents for	the null	model:	
Random Effect	ρ	Standard	Variance	df	Chi-square	p-value
		Deviation	Component			
INTRCPT1, U0	0.159	0.210	0.044	152	176.92	0.081
Level-1,	R	0.932	0.868			
Deviance	1575.	.15 for 2 pa	rameters			

As there are no Level-1 or Level-2 predictors in the fully unconditional or null model, any effects are a consequence of the error terms  $u_{0j} + r_{ij}$ . The reliability estimate for intercept 1 ( $\beta_0$ ) is 0.159 that is above 0.05, but showing a relatively high degree of error. Further, in Table 9.5 intercept 2 ( $\gamma_{00}$ ) is also significantly different from zero at the five per cent level, with a probability (0.000) large enough for the intercept to be considered different from zero. The Chi-square test for variance indicates that there is enough variance to be explained, making it worthwhile proceeding with the analysis. The p-value (0.081), as shown in the final estimation of variance in Table 9.5, is associated with the Level-2 variance and is greater than 0.05, but is marginal as it is less than 0.10. In addition, the deviance for the null model is 1575.15 for 2 parameters as estimated for the Integrity value dimension. All subsequent deviance estimates are then compared to this value in order to identify an improved fit.

### The Occasion model

Table 9.6 shows the final estimation for the Occasion model, the deviance and the estimation for the variance associated with the Occasion model.

The Occasion model for the Integrity scale may be specified as follows:

Level-1 model

$$Y_{ij} = \beta_{0j+}\beta_{1j} * (Occasion) + r_{ij}$$
 [Equation 9.4]

Level-2 Model

$$\begin{aligned} \beta_{0j} &= \gamma_{00} + u_{0j.} \\ \beta_{1j} &= \gamma_{10} + u_{1j} \end{aligned} \end{tabular} \end{tabul$$

This may be written as a general equation as follows:

$$Y_{ij} = \gamma_{00} + \gamma_{10} * (Occasion) + r_{ij} + u_{0j} + u_{1j}$$
 [Equation 9.6]

The only predictor in this equation is Occasion. The value for the initial Occasion slope is positive ( $g_{10}$ =0.049) and is marginally significant with a t-value of 1.79 and p-value (0.072) that is greater than 0.05, consequently the null hypothesis is not rejected. The other effects are a consequence of the error terms  $u_{0j} + u_{1j} + r_{ij}$ . The p-value (0.082) associated with the intercept variance is greater than 0.05. Therefore, it may be concluded that any variation in the Level-2 residual is only marginally significant. In addition, the p-value for Occasion slope variance is 0.197 and as it is also greater than 0.05 and the fit of the Occasion slope variation is clearly not significant as it is greater than 0.10 indicating, however, that there is relatively little residual variation remaining to be explained.

#### **Table 9.6** The Occasion model for the Integrity and Tolerance scale

Final estimation of fixed effects for Integrity and Occasion						
(with robust standa	rd erro	rs):				
			Standard		Approx.	
Fixed Effect	Co	efficient‡	Error	T-rati	o d.f.	P-value
For INTRCPT1, B0						
INTRCPT2, G00	1	.330	0.043	31.45	152	0.000
For OCCASION slope	, B1					
INTRCPT2, G10	0	.049	0.027	1.79	152	0.072
Final estimation of	varian	ce componen	ts:			
Random Effect	ρ	Standard	Variance	df	Chi-square	P-value
		Deviation	Component			
INTRCPT1, U0	0.175	0.223	0.050	150	174.63	0.082
OCCASION slope, U1	0.109	0.113	0.013	150	164.57	0.197
Level-1, R		0.910	0.830			
Deviance 1572.63 for 4 parameters						

 $\pm$  coefficient = a metric coefficient; d.f. = degrees of freedom;  $\rho$  = represents reliability estimates for the intercept ( $\beta_0$ ) and the Occasion slope ( $\beta_1$ ). The  $\rho$  values are found in the first column of the section that provides the final estimation of variance components in the table of final estimation of fixed effects for each of the outcome variables associated with values.

### **Exploratory analyses**

Before accepting any equations as the final results of the analysis, it is necessary to undertake an examination of all the potential Level-2 variables. This is done for the intercept ( $\beta_0$ ) and occasion ( $\beta_1$ ) coefficients by including the possible Level-2 variables as predictors of  $\beta_0$  and  $\beta_1$  in the equations for the Level-2 model. Variables are entered 12 at a time under the optional specifications heading of the HLM5 program. This permits the examination of potential Level-2 predictors without their inclusion in the actual equations. The effect of any variable that shows a t-value of 2.0 or greater is then estimated in the actual model. If the variable is found to have a p-value of less than 0.05, it is retained in the model and other potential Level-2 predictors are added separately and estimated in the model. In these analyses, a five per cent level of significance is used. Estimation is done in successive steps until all possible significant Level-2 predictors are included. This has given the final model that is shown in Table 9.7. This model contains the outcome variable Integrity, the Level-1 predictor, Occasion and three significant Level-2 variables: age group (Agegp), Gender and Flinders.

# Specification of the components of the Integrity and Tolerance scale

In the Level-1 model, the one independent variable that is used is Occasion. The Level-1 variable is specified in Equation 9.7 as follows:

Level-1 Model

$$Y_{ij} = \beta_{0j} + \beta_{1j} * (Occasion) + r_{ij}, \qquad [Equation 9.7]$$

where

- Y_{ii} is the Rasch scaled score for values on the Integrity scale;
- $\beta_{0i}$  is the intercept at Level-1;
- $\beta_{1i}$  is regression slope in relation to Occasion
- $r_{ii}$  is the random error term for the micro level or Level-1.

#### Level-2 Model

The between-Occasion regression equation is specified according to Equations 9.8a and 9.8b.

$$\beta_{0j} = \gamma_{00} + \gamma_{01} * (\text{Gender}) + \gamma_{02} * (\text{Agegp}) + u_{0j},$$
 [Equation 9.8a]

where

 $\beta_{0i}$  is the intercept at Level-1

- $\gamma_{00}$  is the mean value for all students across all occasions that samples are taken.
- $\gamma_{01}$  is the regression coefficient for gender (Gender)
- $\gamma_{02}$  is the regression coefficient for age group (Agegp)
- u_{0i} is the random effect associated with the Intercept at Level-2

and

$$\beta_{1j} = \gamma_{10+} \gamma_{11} * (\text{Flinders})_+ u_{1j}, \qquad [\text{Equation 9.8b}]$$

where

- $\gamma_{10}$  is the expected slope for the predictor variable Occasion
- $\gamma_{11}$  is the regression slope in relation to Flinders
- $u_{1j}$  is the unique random effect in relation to Occasion and between students.

The between-student regression equations show that Age Group (Agegp) and Gender have direct effects on the Integrity value dimension and that Flinders interacts with predictor variable, Occasion, and the outcome variable Integrity.

Equations 9.8a and 9.8b may be written as a general equation:

 $Y_{ij} = \gamma_{00+} \gamma_{01} * (Gender) + \gamma_{02} * (Agegp) + \gamma_{10} (Occasion)$ 

+  $\gamma_{11}$ *(Flinders)*(Occasion)+ $r_{ij}$ + $u_{0j}$ + $u_{1j}$  [Equation 9.9]

After substitution of the estimated values of the parameters, the equation is:

INTEG = 1.147+0.217(Gender)+0.194(Agegp)+(.012)*(Occasion)

+ 0.151(Flinders)*(Occasion)+ $r_{ij}+u_{0j}+u_{1j}$  [Equation 9.10]

# Discussion of the analysis of the Integrity dimension

#### The final model for the Integrity scale

Table 9.7 shows the final estimation for the predictor variables with robust standard errors, the deviance as well as the final estimation and partitioning of the variance components associated with the Integrity scale of the CVS. An explanation of the reasons for the use of robust standard errors is found below Table 9.7. The reliability estimates ( $\rho$ ) are shown in Table 9.7 (and all final tables of fixed effects) in the section that contains the variance components.

The analysis shows a change in the estimated value of the slope between the Occasion-only model and the final model. The Occasion slope in the final model is negative with a value of ( $g_{10} = -0.012$ ) that is not significant (p=0.727). This indicates that values associated with the Integrity scale have not changed significantly over the time of measurement after allowance is made for the effects of the Level-2 variables that are statistically significant.

Table 9.7 shows reliability estimates ( $\rho$ ) of 0.143 for the Intercept (U₀) and 0.099 for the Occasion slope (U₁) and a within student variance of ( $\sigma^2$ =0.82). Estimates of variance components are computed as well and are found next to the reliability estimates. The p-values reveal that there is relatively little residual variance left to be explained for the intercept (p=0.161) or the Occasion slope (p=0.267).

The calculation for the proportion of variance in the Integrity value dimension that is explained at Level-1 as well as the proportion of variance in the outcome measure that is explained by the Level-2 units provide an estimation of the strength of the model to explain effects. These figures are found in the section below the deviance values in Table 9.7 and in the same position in the tables for the final estimation of fixed effects for other value dimensions. The method of calculation of these effects is shown in Table 9.8 using estimates for the Integrity dimension as examples.

estimates of variance standard errors†)	components fo:	r Integrity	values	(with rob	ust
		Standard		Approx	•
Fixed Effect	Coefficient‡	Error	T-ratio	d.f.‡	P-value
For INTRCPT1, B0					
INTRCPT2, G00	1.147	0.065	17.71	150	0.000
GENDER, G01	0.217	0.080	2.69	150	0.007
AGEGP, G02	0.194	0.089	2.18	150	0.029
For OCCASION slope, B	1				
INTRCPT2, G10	-0.012	0.034	-0.35	151	0.727
FLINDERS, G11	0.151	0.055	2.76	151	0.006
Final estimation of va	riance compone	ents:			
Random Effect p‡	Standard	Variance	df	Chi-squar	e P-value
	Deviation	Component			
INTRCPT1, U0 0.1	43 0.197	0.039	148	164.97	0.161
OCCASION slope, U1 0.0	99 0.107	0.011	149	159.29	0.267
Level-1, R	0.906	0.821			
Deviance null= 1575.15	for 2 paramet	ters Final=	1567.77	for 4 par	ameters
Variance explained	$\sigma^{2}{}_{00}$ $\tau_{00}$	σ² _{occ}	τ _{occ}	$\sigma^{2}_{\text{final}}$	τ _{final}
	0.868 0.04	14 0.830	0.050	0.821	.039
Variance partitioned	$\sigma^2{}_{00}/\sigma^2{}_{00}+\tau_{00}\qquad \tau$	$\sigma_{00/} \sigma_{00}^2 + \tau_{00}$	$\sigma^2{}_{00}$ . $\sigma^2{}_{final}$	$\sigma^{2}_{00}$	$\tau_{00}$ - $\tau_{final}$ / $\tau_{00}$
	0.952 0	.042	0.054		0.118
Total Variance explain	ed For INTEG =	=0.0572			

#### Table 9.7 The final model for the Integrity scale

Final estimation of fixed effects, reliability estimates, and

 $\ddagger$  coefficient = a metric coefficient; d.f. = degrees of freedom;  $\rho$  = represents reliability estimates for the intercept ( $\beta_0$ ) and the Occasion slope ( $\beta_1$ ). The  $\rho$  values are found in the first column of the section that provides the final estimation of variance components in the table of final estimation of fixed effects for each of the outcome variables associated with values.

[†] The robust regression solution is provided because of the heterogeneity of variance in the outcome measure across occasions and the possible presence of outliers in the data. Results with robust standard errors seem to provide a more stable and meaningful analysis of the data collected. This is because robust standard errors are consistent even if the HLM assumptions that random effects and the assumed structure of variation and covariation of these random effects at both levels are normally distributed do not occur (Statistical Support, ACITS, 2001).

Table 9.8 shows the two types of variance and the estimates that are obtained at each level. The tables also show the results of the estimation of the two types of variance as partitioned at each level and initial and final estimations of this variance in the cases of first and second level variance for the Integrity scale.

Table 9.8 also shows the estimation of variance components for the Integrity scale in greater detail than in Table 9.7. It shows the actual method of estimation of the variance explained at Level-1 ( $\sigma_{00}^2$ ) and Level-2 ( $\tau_{00}$ ) in the final model for the analysis of the Integrity scale. Further, Table 9.8 shows the variance explained in the final two-level model. It indicates that 5.41 per cent of the variance is explained at Level-1 and 11.8 per cent of the variance at Level-2. Overall 5.8 per cent of the total variance is explained by the final model.

Model	Estimation of variance components			
	Between Occasions ( $\sigma^2$ )	Between student events $(\tau_{00})$		
	(N=5)	(N=573)		
	$\sigma^2_{00}$	$ au_{00}$		
Fully unconditional model	0.868	0.0441		
Final two-level model	0.821	0.0390		
Variance partitioned at each le	vel in the final two-level model			
(a) Between Occasions	$\sigma^{2}{}_{00}\!/\sigma^{2}{}_{00}\!+\tau_{00}$			
	= 0.868 / (0.868 + 0.0441)			
	= 0.952			
(b) Between students	$\tau_{00}\left(null\right)/\sigma^{2}_{00}\left(null\right)+\tau_{00}\left(null\right)$	1)		
	= 0.0441 / (0.868 + 0.0441)			
	= 0.0482			
(a) Between Occasions	$\sigma^{2}_{00}$ (null)- $\sigma^{2}$ (final) / $\sigma^{2}$ (null)	)		
	= (0.868-0.821) / 0.868			
	= 0.0541			
(b) Between students	$\tau_{00}\left(null\right)$ - $\tau_{00}\left(final\right)$ / $\tau_{00}\left(null\right)$	)		
	= (0.0441-0.0390) / 0.0441			
	= 0.1181			
(c) The total variance explain	ed is (0.054)*(0.952) + (0.118)*(0.0	0482)		
	= 0.00514 + 0.006 = 0.058 = 5	5.8% for the Integrity scale		

Table 9.8 Estimation of variance components for Integrity and Tolerance scale

#### The deviance statistic

The deviance statistic is also used to compare models. The successive values for the deviance may be found below the estimation of variance in Tables 9.5, 9.6, and 9.7 and for all subsequent final estimates of fixed effects. It is possible to compare the deviance for the null model (1575.15) with that of the final model (1567.77) for the Integrity scale by subtracting the final deviance from the null deviance. This difference is then divided by the difference in the number of estimated parameters and finally taking the square root of the resulting value, to obtain a t-statistic. If the t-statistic is 2.0 or greater, then the model involves a significant reduction in the deviance. The t-statistic for the Integrity scale is 1.92. This indicates that the estimated values for the Integrity scale have borderline significance and shows that the final model is only a marginally better model of the data than the null model.

# The final estimation of fixed effects of the Integrity value dimension

When making estimations there are advantages for centring the data for outcome and predictor variables around the grand mean. This is particularly important in the consideration of longitudinal data. Hox (1994, 2002), Kreft and de Leeuw (1998), Probyn (1999) and Touloumtzoglou (2002) provide extended discussions of the types of centring that may be undertaken. In this study, only the outcome variables for values and approaches to learning and the predictor variable, Occasion, have been centred, since the other predictor variables involve the use of dummy variables.

The final estimation of fixed effects for the Integrity dimension is given in Table 9.7 where the regression coefficients ( $\gamma$ ), their corresponding t-ratios and p-values are recorded. These estimates include only metric coefficients; values below 2.0 for a t-ratio together with a p-value greater than 0.05 have not been included in the table except for the value of the Occasion slope that has already been noted and recorded to be not significant. It is included because there are Level-1 and Level-2 variables associated with the Integrity dimension that are significant and constitute an important part of the discussion on values. Integrity is a continuous variable and is a criterion or dependent variable. Therefore, data on Integrity values are hypothesised to be related to Occasion. At Level-2 the between-student characteristics are predictors of the criterion variable Integrity. Gender and Age Group (Agegp) are directly related to the mean level of the Integrity values, and the variable Flinders interacts with Occasion and the outcome variable Integrity. These variables, as with all other Level-2 variables, have been entered and estimated uncentred as they have been measured on one occasion only.

#### Effect of Gender on Integrity

There are two additional types of effects that may occur in HLM. The first is the effect of a predictor variable on the outcome variable directly. In the Integrity scale, the final intercept ( $\beta_0$ ) involves two significant variables, Gender and Age Group (Agegp).

The equation for the effect of Gender on Integrity is:

INTEG =  $\gamma_{00} + \gamma_{01}$ *(Gender) +  $\gamma_{10}$ *(Occasion) +  $r_{ij}$  +  $u_{0j}$ 

By substitution,

INTEG =  $1.147 + 0.217*(Gender) + (-0.012)*(Occasion) r_{ij} + u_{0j}$ 

Occasion takes the values -2, -1, 0, 1, and 2 for the five Occasions 1, 2, 3, 4, and 5 respectively. The calculations involved for plotting these and the relationships for all Level-2 variables are given in the appendix to Chapter 9.

Figure 9.2 shows the effect of Gender on Integrity, where women=1 and men=0.



Figure 9.2 The effect of Gender on Integrity

The magnitude of the coefficients for these effects that are obtained from the analysis provides information with respect to the size of the effects specified in the model. Therefore, a large positive coefficient ( $g_{01}$ =0.22) noted for the Level-2 variable Gender, indicates that the women in this study who come from Confucian cultures have higher Integrity values than men do and this effect is significant (p=0.007). The values associated with this scale decrease marginally over time as the value for the Occasion slope ( $g_{10}$  = -0.012) is negative but the decrease is not significant (p=0.727).

#### Effect of Age Group on Integrity

The equation for effect of Age Group (Agegp) on Integrity is

INTEG =  $\gamma_{00} + \gamma_{02}$ *(Agegp) +  $\gamma_{10}$ *(Occasion) +  $r_{ij}$  +  $u_{0j}$ 

By substitution,

INTEG = 
$$1.147 + 0.194*(Agegp) + (-0.012)*(Occasion) + r_{ii} + u_{0i}$$

Figure 9.3 shows the effect of age group on Integrity, where 25+ years =1 and 25 years or less = 0.

Older students have higher Integrity values ( $g_{02}=0.19$ ) than younger students and the difference is significant (p=0.029). According to Yen Mah (2000) and Volet and Ang (1998) older Asian students generally have experienced less of the outside world than their younger counterparts who have not been as sheltered. As well, older students may have experienced greater family, teacher and school control on their lives than students under the age of 25. In the past ten to 15 years, life has changed extensively in Asia and the changes experienced may have influenced students' Integrity values. Older students may also be married and have come under the influence of in-laws. Teachers and lecturers may have had a greater influence on the older students in the study sample. Asian students, until very recent times, have acceded to the strong suggestions and have been influenced by the values of their elders more than Western students appear to have been. This is said to be changing (Yen Mah, 2000; Zhang Zhen, 2001). Therefore, obedience, adaptability, industry, and patience are some of the component values that are part of the Integrity dimension that are particularly important to older female CHC students.



**Figure 9.3** The effect of Age Group on Integrity

### Examination of interaction effects

#### Interaction effect associated with Occasion, Flinders and Integrity

There is one interaction effect that is observed to influence the outcome variable Integrity. This interaction is between the Level-1 predictor, Occasion, the Level-2 variable Flinders, and the outcome variable Integrity.

The equation for the interaction is:

INTEG =  $\gamma_{00+} \gamma_{10}$  (Occasion) + $\gamma_{11}$  (Flinders)*(Occasion) +  $r_{ij}$  + $u_{1j}$ 

By substitution,

INTEG =  $1.147 + (-0.012)*(Occasion) + 0.151(Flinders)*(Occasion) + r_{ii} + u_{1i}$ 

The variable Flinders compares the values of students who attend Flinders University with students who attend other universities. In order to represent this effect graphically, co-ordinates need to be calculated and a figure drawn. The lines representing the co-ordinates cross at time zero that is located at the centre of the graph. In all interactions, Occasion is represented on the x-axis and the specific outcome variable on the y-axis on the graphs for direct and interaction effects.

Figure 9.4 shows the interaction of Flinders with Occasion and Integrity, where Flinders = 1 and not Flinders = 0. The slope for Flinders is positive and indicates that students who attend Flinders University show an increase in Integrity values compared with students who attend another university who show a very slight decrease (-0.012) in Integrity values. The interaction of Occasion, Flinders and Integrity is significant (p=0.006) over time.

The analysis of the Integrity value dimension has been considered in some detail and the estimation of the significant results (with robust standard errors), the estimation and meaning of the reliability, the estimation of the variance at each of the levels of the two-level HLM model and the meaning of the direct and interaction effects associated with this value dimension have also been considered in some depth.



Figure 9.4 The effect of the interaction of Flinders with Occasion and Integrity

In the remainder of the chapter, the effects are presented and explained only in as much detail as is required for the reader to understand and interpret the tables and graphs.

### Analysis of the Confucian Ethos scale

Table 9.9 shows the final estimation for the predictor variables associated with the Confucian Ethos scale of the CVS. The Occasion slope in the final model is negative ( $g_{10}$ = -0.086) and significant (p=0.000). This indicates that values associated with the Confucian Ethos scale have, in general, declined significantly over the time of measurement after other statistically significant factors are taken into account.

Table 9.9 shows a reliability level of 0.119 for the Intercept (U₀) and 0.032 for the Occasion slope (U₁) and a within student variance of ( $\sigma^2=0.22$ ). The p-values reveal that there is relatively little variance left to be explained for the intercept (p=0.196) or the Occasion slope (p=>0.500).

### Examination of interaction effects

The intercept ( $\beta_0$ ) does not have any variables that have a direct effect on the Confucian Ethos outcome variable. However, there are two variables that interact with the Occasion slope and the outcome variable. They are Age Group (Agegp) and attendance at Flinders University (Flinders).

**Table 9.9** Final estimation of fixed effects for the Confucian Ethos scale:

Final estimation of fixed effects, reliability estimates, and estimates of variance components for Confucian Ethos values (with robust standard errors)

011010)					
		Standard		Approx	ζ.
Fixed Effect	Coefficient	Error	T-ratio	d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	0.250	0.021	11.90	152	0.000
For OCCASION slope, B1					
INTRCPT2, G10	-0.086	0.018	-4.54	150	0.000
AGEGP, G11	0.080	0.027	2.97	150	0.003
FLINDERS, G12	0.100	0.027	3.64	150	0.001
Final estimation of var	iance compon	ents:			
Random Effect $ ho$	Standard	Variance	df Chi	-square	P-value
	Deviation	Component			
INTRCPT1, U0 0.11	9 0.092	0.008	150 16	4.61	0.196
OCCASION slope, U1 0.03	2 0.031	0.001	148 13	9.97	>.500
Level-1, R	0.472	0.223			
Deviance null = 824.35	for 2 parame	eters Fina	1 = 808.63	for 4 par	rameters
Variance explained	$\sigma^{2}_{00}$ $\tau_{00}$ 0.240 0.004	σ ² 0CC 0.229	τ _{OCC} 0.007	$\sigma^{2}_{\text{final}}$	$\tau_{\text{final}}$
Tranianan mantitian a	-2 -2 -	2 -	-2 -2 -2	0.255 2 = =	-
variance partitioned	$\sigma_{00}^{-}/\sigma_{00}^{-}+\tau_{00}^{-}$	$\tau_{00/} \sigma_{00+} \tau_{00}$	$\sigma_{00} - \sigma_{\text{final}} / \sigma$	-00 τ ₀₀ τ _{fina}	$1/\tau_{00}$
m	U.985	0.01034	0.029	aĻ	
Total variance explaine	a Ior CONFU:	= 0.016			

‡ a indicates that a negative variance term has been estimated

# Interaction effects associated with Age Group (Agegp), Occasion and Confucian Ethos

The equation for the interaction between age group (Agegp), Occasion and Confucian Ethos is:

 $CONFU = \gamma_{00+} \gamma_{10} * (Occasion) + \gamma_{11}(Agegp) * (Occasion) + r_{ij} + u_{1j}$ 

By substitution,

 $CONFU = 0.250 + (-0.086)*(Occasion) + 0.080(Agegp)*(Occasion) + r_{ij}+u_{1j}$ 

Figure 9.5 shows the interaction of Age Group, Occasion and Confucian Ethos where 25+ years =1 and 25 years or less = 0.

It appears that older students do not change significantly in Confucian values; when the numerical value of this effect is considered ( $g_{11}$ = 0.080) it is cancelled by the estimated interaction value for the Occasion slope ( $g_{10}$ = -0.086). The drop in Confucian values over time by younger students may be the result of the reduced strength of values such as acceding to a benevolent authority, being conservative and having few personal desires while living in Australia. Today younger students, even in Asia, appear to want more personal freedom and independence, ideas that contradict the hierarchical value structure associated with the Confucian Ethos. Older students seem content to retain these values. These ideas are confirmed in the research findings of Butcher (2002) and Whymant (2003).



Figure 9.5 Effect of interaction of Age Group with Occasion and Confucian Ethos

# Interaction effect associated with Flinders, Occasion and Confucian Ethos

The equation for the interaction effect between Flinders and Occasion and Confucian Ethos is:

 $CONFU = \gamma_{00+} \gamma_{10} * (Occasion) + \gamma_{12} (Flinders) * (Occasion) + r_{ij} + u_{1j}$ 

By substitution,

CONFU = 
$$0.250 + (-0.086)*(Occasion) + 0.100(Flinders)*(Occasion) + r_{ij} + u_{1j}$$

The graph for the interaction effect between Flinders with Occasion and Confucian Ethos is shown in Figure 9.6, where Flinders = 1 and not Flinders =0.



Figure 9.6 Effect of interaction of Flinders with Occasion and Confucian Ethos

The interaction effect shows that students who attend Flinders University show a minimal increase in Confucian values. The effect is negligible because Occasion slope for this value dimension ( $g_{10}$ = -0.086) and the value of the interaction effect ( $g_{12}$ =0.100) almost cancel each other. The interaction indicates the retention of CHC value structure by students who attend Flinders University. The other universities in South Australia are city-based and students who attend these universities may prefer a lifestyle that is not evident at Flinders. The social and cultural environment at Flinders may be more like that in their home country where Confucian values predominate (Butcher, 2002; Whymant, 2003).

### Analysis of the Loyalty scale

Table 9.10 shows the final estimation for the predictor variables of the Loyalty scale of the CVS. The Occasion slope in the final model (p=0.055) is positive and marginally significant over time with a value of ( $g_{10}$ =0.082). This indicates that Loyalty values have, in general, increased over the time of measurement after allowance is made for the effects of the significant Level-2 variables.

### Direct effects of Gender and Age Group (Agegp) on Loyalty

At Level-2 two between-student characteristics are predictors of the criterion variable Loyalty. Gender and Age Group (Agegp) are related to the mean level of the Loyalty values directly. In addition, the variables Hours of Study and Age Group (Agegp) interact with Occasion and Loyalty.

	Star	ndard		Approx.	
Coefficier	nt Erro	or	T-ratio	d.f.	p-value
0.7	27 0.06	57	10.83	150	0.000
0.1	.74 0.07	77	2.25	150	0.024
0.2	22 0.08	33	2.67	150	0.008
B1					
0.0	0.04	13	1.92	150	0.055
-0.1	.91 0.05	58	-3.27	150	0.001
0.2	206 0.07	70	2.97	150	0.003
variance co	mponents	3:			
ρ St	andard	Varianc	e df (	Chi-square	P-value
De	eviation	Compone	nt		
0.150 (	.180	0.033	148	174.72	0.066
0.344 0	.211	0.045	148	222.29	0.000
(	.807	0.652			
16 for 2 pa	rameters	s Final	= 1489.4	6 for 4	
$ au_{00}$	$\sigma^2$	occ 1	T OCC	$\sigma^{2}_{final}$	$ au_{ ext{final}}$
815 0.0	0.09	.656 (	0.056	0.652	0.033
$\sigma / \sigma^2_{00} + \tau_{00} = \tau_0$	$00/ \sigma^2_{00} + \tau_{00}$	$\sigma^2_{00}$ .	$\sigma^2_{final} / \sigma^2_{00}$	$ au_{00}$ - $ au$ final / $ au$	00
989 0	.011	0.1	99	0.411	
For LOYA	L=0.200				
	Coefficier 0.7 0.1 0.2 B1 0.0 -0.1 0.2 variance co ρ St De 0.150 0.344 0 16 for 2 pa 0.344 0 16 for 2 pa 0.150 0.344 0 16 for 2 pa 0.150 0.7 0.2 0.1 0.2 0.2 0.1 0.2 0.2 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	Star           Coefficient         Error           0.727         0.06           0.174         0.07           0.222         0.08           B1         0.082         0.04           -0.191         0.05         0.206         0.07           variance         components         0         0.007         0           0.150         0.180         0.344         0.211         0.807           16         for 2         parameters         0         0         0           0.009         0         0         0         0         0           0.607         0.009         0         0         0         0           0.90         0.011         For LOYAL =0.200         0         0         0 <td>Standard           Coefficient         Error           0.727         0.067           0.174         0.077           0.222         0.083           B1         0.082         0.043           -0.191         0.058         0.206         0.070           variance components:         ρ         Standard Variance           Deviation Compone         0.150         0.180         0.033           0.344         0.211         0.045         0.807         0.652           16 for 2 parameters         Final         0.009         0.656         0.070           815         0.009         0.656         0.070         0.011         0.1           For LOYAL =0.200</td> <td>Standard           Coefficient         Error         T-ratio           0.727         0.067         10.83           0.174         0.077         2.25           0.222         0.083         2.67           B1         0.082         0.043         1.92           -0.191         0.058         -3.27           0.206         0.070         2.97           variance         components:         p           Standard         Variance         df           0.150         0.180         0.033         148           0.344         0.211         0.045         148           0.807         0.652         16         for 2 parameters         Final=         1489.4           0         <b>T</b>00         <b>G</b>²occ         <b>T</b> occ         815         0.009         0.656         0.056           0/G²00+T00         T00/G²00+T00         <b>G</b>²00-G²final/G²00         989         0.011         0.199</td> <td>Standard         Approx.           Coefficient         Error         T-ratio         d.f.           0.727         0.067         10.83         150           0.174         0.077         2.25         150           0.222         0.083         2.67         150           B1         0.082         0.043         1.92         150           -0.191         0.058         -3.27         150           0.206         0.070         2.97         150           variance         components:         p         Standard         Variance         df         Chi-square           Deviation         Component         0.045         148         222.29         0.307         0.652           16         for 2         parameters         Final=         1489.46         for 4           0.150         0.180         0.056         0.056         0.652           16         for 2         parameters         Final=         1489.46         for 4           0.009         0.656         0.056         0.652         0.652         0.011         0.199         0.411</td>	Standard           Coefficient         Error           0.727         0.067           0.174         0.077           0.222         0.083           B1         0.082         0.043           -0.191         0.058         0.206         0.070           variance components:         ρ         Standard Variance           Deviation Compone         0.150         0.180         0.033           0.344         0.211         0.045         0.807         0.652           16 for 2 parameters         Final         0.009         0.656         0.070           815         0.009         0.656         0.070         0.011         0.1           For LOYAL =0.200	Standard           Coefficient         Error         T-ratio           0.727         0.067         10.83           0.174         0.077         2.25           0.222         0.083         2.67           B1         0.082         0.043         1.92           -0.191         0.058         -3.27           0.206         0.070         2.97           variance         components:         p           Standard         Variance         df           0.150         0.180         0.033         148           0.344         0.211         0.045         148           0.807         0.652         16         for 2 parameters         Final=         1489.4           0 <b>T</b> 00 <b>G</b> ² occ <b>T</b> occ         815         0.009         0.656         0.056           0/G ² 00+T00         T00/G ² 00+T00 <b>G</b> ² 00-G ² final/G ² 00         989         0.011         0.199	Standard         Approx.           Coefficient         Error         T-ratio         d.f.           0.727         0.067         10.83         150           0.174         0.077         2.25         150           0.222         0.083         2.67         150           B1         0.082         0.043         1.92         150           -0.191         0.058         -3.27         150           0.206         0.070         2.97         150           variance         components:         p         Standard         Variance         df         Chi-square           Deviation         Component         0.045         148         222.29         0.307         0.652           16         for 2         parameters         Final=         1489.46         for 4           0.150         0.180         0.056         0.056         0.652           16         for 2         parameters         Final=         1489.46         for 4           0.009         0.656         0.056         0.652         0.652         0.011         0.199         0.411

 Table 9.10
 Final estimation of the fixed effects for the Loyalty to Ideals scale

Final estimation of fixed effects, reliability estimates, and estimates of variance components for Loyalty to Ideals values (with robust

### The effect of Age Group (Agegp) on Loyalty

Older students' values are found to have a direct positive influence on the outcome variable Loyalty ( $g_{02}=0.22$ ) and the difference is significant (p=0.008). In addition, Age Group interacts with Occasion (0.206) to show change in Loyalty values over time.

The equation for the combined effect of Age Group (Agegp) on Loyalty directly and the interaction of Age Group, Occasion and Loyalty is:

$$\begin{split} LOYAL = \gamma_{00} + \gamma_{02} (Agegp) + \gamma_{10} (Occasion) + \gamma_{11} (Agegp)*(0ccasion) \\ + r_{ij} + u_{0j} + u_{1j} \end{split}$$

By substitution,

LOYAL = 0.727 +0.222+ 0.082*(Occasion) + 0.206*(Occasion)

 $+ r_{ij} + u_{0j} + u_{1j}$ 

The equations indicate that there are two effects for Age Group at Level-2. The first is an effect on the intercept ( $\beta_0$ ). It is a main effect and acts directly on the outcome variable Loyalty. The second involves a significant interaction ( $g_{12}$ =0.21) with the Occasion slope ( $\beta_1$ ) (p=0.003). Both effects demonstrate that older students' Loyalty

values are higher than younger students' Loyalty values. The combined effects of the variable Age Group (Agegp) are shown in Figure 9.7 and calculations for these relationships are given in the appendix to Chapter 9, where 25+ years =1 and 25 years or less = 0.

In this study, students over the age of 25 have higher Loyalty values than students aged 25 years or younger. Moreover, their Loyalty values increase significantly over time in Australia. Values such as observation of rites and rituals and reciprocation of greetings and favours are very much part of the Confucian tradition in which a hierarchy of people and life values is very important. This may be especially important to married students with children who consider the ordering of their lives to be a stabilising influence on family life and child-rearing practices.



Figure 9.7 Combined effects of Age Group on Loyalty and with Age Group (Agegp), Occasion and Loyalty

Married students are also generally older and may be subject to immediate family influences on their lives. These ideas would appear to apply to older students who are stronger in Confucian traditions than their younger class mates. These students would appear to indicate that having a sense of shame and solidarity with others are values that are still important in their lives. Hwang (1999, 2001), Whymant (2003), and Yen Mah (2000) have encountered similar results in their research.

#### The effect of Gender on Loyalty

The equation for this effect is:

 $LOYAL = \gamma_{00} + \gamma_{01} * (Gender) + \gamma_{10} * (Occasion) + r_{ij} + u_{oj}$ 

By substitution,

 $LOYAL = 0.727 + 0.174*(Gender) + 0.082*(Occasion) + r_{ij} + u_{oj}$ 

The graph for the effect of Gender on Loyalty is found in Figure 9.8, where women = 1 and men = 0.



Figure 9.8 Effect of gender on Loyalty

A large positive coefficient ( $g_{01}$ =0.17) noted for the variable Gender, indicates that the women in this study who come from Confucian cultures have higher Loyalty values than men do and this difference is significant (p=0.024). Women appear to consider that values such as solidarity with others and having a sense of shame are very important. These values as well as filial piety are customarily associated with the Loyalty dimension of the Confucian value system. In parts of Asia, male children have been preferred and in the past women have been considered to be secondary and subservient to men. Therefore, adherence to a traditional value structure in older women is an expected outcome of a rigid, hierarchical system of beliefs (Hwang, 1999, 2001; Yen Mah, 2000; Yue and Ng, 1999; Zhang Zhen, 2001).

#### Examination of interaction effects

## Interaction effect between Hours of Study (Hours), Occasion and Loyalty

The effect of Age Group (Agegp) on the Loyalty dimension has already been examined in this section. However, there is one additional variable that interacts with the predictor variable Occasion, Hours of Study (Hours).

The equation for the interaction for Hours of Study (Hours), Occasion and Loyalty is:

 $LOYAL = \gamma_{00} + \gamma_{10} + (Occasion) + \gamma_{11} (Hours) + (Occasion) + r_{ij} + u_{1j}$ 

By substitution,

 $LOYAL = 0.727 + 0.082*(Occasion) + (-0.191)(Hours)*(Occasion) + r_{ii} + u_{1i}$ 

Figure 9.9 shows the graph the effect of the variable Hours of Study (Hours) and the predictor variable Occasion on the outcome variable Loyalty, where 10+ hours =1 and less than 10 hours = 0.



Figure 9.9 Effect of the interaction of Hours of Study (Hours) with Occasion and Loyalty

The interaction between Occasion and Hours of Study indicates that students who spend ten hours or more each week on study show a decrease  $(g_{11} = -0.19)$  in Loyalty values over the time of the study. This interaction is significant (p=0.002). This may indicate a change in their estimation of the values associated with the Loyalty dimension. This may also indicate that some students are questioning these values in a different social and cultural environment. Therefore, from the results of this investigation, it is evident that some students' Loyalty values are changing in Australia.

### Analysis of the Wisdom scale

Final estimation of	of fixed	effects,	reliabilit	y estima	ates, and e	stimates
of variance compo	nents fo	or Worldly	v Wisdom va	lues (w	ith robust	standard
errors)						
			Standard		Approx.	
Fixed Effect	Co	efficient	Error	T-rati	o d.f.	P-value
For INTRCPT	L, ВО					
INTRCPT2, G00		0.395	0.024	16.3	31 152	0.000
For OCCASION slop	be, Bl					
INTRCPT2, G10		0.005	0.023	0.2	23 150	0.821
HOURS, G11		-0.087	0.034	-2.5	54 150	0.011
AGEGP, G12		0.115	0.036	3.1	7 150	0.002
Final estimation of	of varia	nce compor	ents:			
Random Effect	ρ	Standard	Variance	df	Chi-square	P-value
		Deviation	Component			
INTRCPT1, UO	0.219	0.142	0.020	150	209.69	0.001
OCCASION slope, U	L 0.121	0.066	0.004	148	179.21	0.041
Level-1,	ર	0.501	0.251			
Deviance null=	913.48	for 2 para	meters Fina	l= 906.	93 for 4 pa	arameters
Variance explained	$\sigma^{2}_{00}$	$ au_{00}$	$\sigma^{2}_{OCC}$	$\tau_{OCC}$	$\sigma^{2}_{final}$	$ au_{ ext{final}}$
	0.276	0.010	0.253	0.102	0.251	.020
Variance partitioned	$\sigma^{2}_{00}$ / $\sigma^{2}_{00}$ +	$\tau_{00}$ $\tau_{00}/$	$\sigma^{2}_{00} + \tau_{00}$	$\sigma^2_{00}$ - $\sigma^2_{fina}$	$\sigma^{2}_{00}$ $\tau$	₀₀ - $ au$ _{final} / $ au$ ₀₀
	0.965		0.382	0.091		a ‡
Total Variance explained For WISDOM=0.086						

Table 9.11 Final estimation effects for the Worldly Wisdom scale of the CVS

‡ a indicates that a negative variance term has been estimated

Table 9.11 shows the final estimation for the predictor variables with the Wisdom scale of the CVS. The Occasion slope in the final model is positive, but very small with a value of ( $g_{10} = 0.005$ ) that is not statistically significant (p=0.821).

The intercept  $(\beta_0)$  does not have any variables that are predictors of a direct effect on the outcome variable Wisdom. However, there are two variables that have significant interaction effects on the Occasion slope  $(\beta_1)$ . They are Hours of Study (Hours) and Age Group (Agegp) of the students in the sample.

### **Examination of interaction effects**

# Interaction effect between Hours of Study (Hours), Occasion and Wisdom

The equation for this interaction is given below:

WISDOM =  $\gamma_{00} + \gamma_{10}$ (Occasion) +  $\gamma_{11}$  (hours)*(Occasion) +  $r_{ij} + u_{1j}$ 

By substitution,

WISDOM =  $0.395 + 0.005^{*}(Occasion) + (-0.087)(Hours)^{*}(Occasion) + r_{ij} + u_{1j}$ 

Figure 9.10 shows the interaction between Occasion and Hours of Study (Hours) and the Wisdom where, 10+ hours =1 and less than 10 hours = 0.



Figure 9.10 Interaction effect of Hours of Study with Occasion and Wisdom

Students who spend ten hours or more a week on study outside their classes or laboratories show a decrease ( $g_{11}$ = -0.09) in Wisdom values that is significant over time (p=0.011). The decrease in Wisdom values for students who study more than ten hours a week indicates that these students would appear to be changing their priorities with respect to the values associated with both the Loyalty and Wisdom value dimensions.

# Interaction effect between Age Group (Agegp), Occasion and the Wisdom scale

The equation for the interaction between Age Group, Occasion and Wisdom is:

WISDOM =  $\gamma_{00} + \gamma_{10}$ (Occasion) +  $\gamma_{12}$  (Agegp)*(Occasion)+  $r_{ij} + u_{1j}$ 

By substitution

WISDOM =  $0.395 + 0.005*(Occasion) + 0.115(Agegp)*(Occasion) + r_{ij} + u_{1j}$ 

Figure 9.11 shows the interaction between Occasion, Age Group (Agegp) and the Wisdom, where 25+ years = 1 and 25 years or less = 0.

Older students show an increase in Wisdom values over time compared with younger students ( $g_{12}$ = 0.12) and the interaction is significant (p=0.002). This indicates that older students appear to be increasingly influenced by Wisdom values such as a sense of superiority, the repayment of good or evil and the importance and security that wealth brings.

Figure 9.12 summarises the Level-1 and Level-2 effects for the four value dimensions using the Rasch scaled scores for the outcome variables estimated and presented in this chapter. At Level-1, the significant effects on Occasion are indicated as solid or continuous lines and the non-significant effects as dashed lines. At Level-2, an effect that influences the outcome variable directly is indicated by a long dashed line and the effect of a variable that influences the outcome variable outcome variable indirectly through an interaction with the Level-1 predictor variable Occasion is indicated by a line composed of long dashes and dots.



Figure 9.11 Interaction effect of age group (Agegp) with Occasion and Wisdom



Figure 9.12 Summary of HLM Level-1 and Level-2 effects for values

(Standard error values are given in parentheses in the figure)

### Principal changes in value dimensions

Table 9.12 gives a summary of the significant effects, the Occasion slopes that occur for each of the four outcome variables as well as the significant Level-2 variables that influence the outcome variable directly and indirectly as interaction effects with the predictor variable, Occasion. The statistically significant Occasion slopes are shown in bold font. The statistically significant Level-2 variables are also shown in bold font. In order to be included in the effects table, the Level-2 variables must be significant at the five per cent level.

 Table 9.12
 Predictor and interaction effects for values

Direct effects on:	Integrity and Tolerance	Confucian Ethos	Loyalty to Ideals	Worldly Wisdom
Adjusted Occasion slope $(\beta_1)s$	-0.012	-0.086†	0.082	0.0051
Gender-sex of students	0.217†		0.172	
Female = 1, Male = $0$				
Agegp-age group of student	0.194		0.222	
Over $25 = 1, 25$ years or under $= 0$				
Interaction effects				
Hours-Hours of study			-0.191	-0.087
10+ hours each week=1, <10 each week=0				
Agegp-age group of student		0.080	0.206	0.115
Over $25 = 1, 25$ years or under $= 0$				
Flinders- University attended by student	0.151	0.100		
Flinders = 1, Another university = $0$				

+All significant slopes (effects) and variables

### Concluding summary of effects on values

This study has provided evidence that some values do change measurably over a two year period. The important questions are: why do some Level-2 values change while some do not change and others remain the same?

The Occasion slopes of the Confucian Ethos and Loyalty value dimensions are statistically significant. The Occasion slope for the Loyalty dimension is positive and indicates that, in general, the values associated with this dimension have increased over the time of measurement. The Occasion slope for the Confucian Ethos dimension is negative and indicates that the values associated with this dimension generally have decreased over the five occasions of measurement.

These changes demonstrate that two dimensions of the students' value structure have changed significantly over the time of measurement, but not for all groups of students. It should be noted that these changes have occurred while students have been living and studying at the tertiary level in Australia.

Values associated with the Confucian Ethos dimension are particularly important to an Asian way of thinking. Students may have accepted these values in Asia where the influence of the family, the teacher, and the school are very important in value formation and reinforcement. However, when some of these students come to Australia to study and experience a lifestyle free of strong adult influence, they would appear to question the veracity of what they have believed in the past.

In contrast, values associated with the Loyalty dimension have, in general increased over the time of measurement. Some of the particular values associated with this dimension such as filial piety and observation of rites and rituals are important in cultures that follow the Confucian tradition. In Australia, this group of values increases over the time of measurement and indicates that identifiable groups of students consider these values to be increasingly important in their lives.

# Differences between groups of students shown by Level-2 direct effects

1. Gender of students. Female students (Gender) are higher than male students in Integrity and Loyalty values. The higher level of Integrity values indicates that women are higher in industry and working hard, knowledge, persistence and sincerity. These values are associated with students who consider education and self-cultivation important. Women are also higher in Loyalty values such as filial piety, observation of rites and rituals and solidarity with others, values that are generally associated with group solidarity.

2. Age of students. Older students (Agegp) are also higher than younger students in Integrity and Loyalty values. This indicates that Integrity values such as knowledge, a sense of righteousness and trustworthiness are important guides to the way older students live. In addition, values that promote ideas such as reciprocation of greetings and favours, patriotism and having a sense of shame which are indicators of the Loyalty dimension and are related to the development of social responsibility are stronger for older students. Integrity and Loyalty values appear to be more important to older students than to their younger classmates while they are living and studying in Australia.

# Differences between groups of students shown by Level-2 interaction effects

1. Age group effects. Age group (Agegp) shows interaction effects with the Confucian, Loyalty and Wisdom value dimensions. However, the interaction effect of age group with the Confucian Ethos value dimension shows no significant change over time for the older age group, but a significant decline over the five Occasions for the younger age group. The interaction effect between age group and Occasion shows a significant increase in the level of Wisdom values of older students. This means that values such as moderation or following the middle way, a sense of superiority and the hierarchical ordering of relationships become more important over the occasions of measurement to the older students. Moreover, older students show a significant increase in Loyalty values over time compared to the younger students in the sample. The interaction effect shows that the values associated with this dimension become even more important to older students over time while younger students also show a significant positive change in Loyalty values over time.

2. Hours of study effects. Students who study more than ten hours outside their classes each week (Hours) show a significant decrease in Loyalty values as well as Wisdom values over the time of the study when compared with students who study less than ten hours each week. Long hours of study would appear to be associated with changes in the students' values. In this instance, longer hours of study would appear to be related to a decrease in the values associated with the Loyalty and Wisdom dimensions. However, those students who study less than ten hours each week show a significant increase in Loyalty values over time, but no change in Wisdom values.

3. Flinders University effects. Students who attend Flinders University (Flinders) show an increase in Integrity values through an interaction with the predictor Occasion and the Integrity outcome variable, but no change in Confucian values while non-Flinders students decline in Confucian values over time. These interaction effects would appear to indicate that students who attend Flinders University show an increase in the values associated with the Integrity dimension when compared with students who attend other universities and have been involved in this study. Moreover, Flinders students do not change their level of Confucian Ethos values over time, while other tertiary students show a significant decline in Confucian Ethos values.

### Conclusion

In this chapter the results of the hierarchical linear modelling (HLM) of the data collected from the administration of the *Chinese Value Survey* (CVS) on five Occasions over two years are presented and discussed. The chapter presents comparisons of the initial, occasion and final estimates of the Integrity value dimension in some detail. It also considers the final estimates of effects for explanatory models of the four dimensions associated with values. The evidence shows that changes associated with the Confucian and Loyalty value dimensions are significant, but not for all groups of students. The Confucian Occasion slope decreases, in general, over the occasions of measurement whereas the Occasion slope of the Loyalty scale increases over the same period of time in Australia. The following question is now raised: are the changes evident in values accompanied by concomitant changes in approaches to learning?

# **10** Change in Students' Approaches to Learning Over Time

### Introduction

Chapter 10 examines changes in students' approaches to learning over time. The chapter seeks to investigate the question: are the changes evident in values accompanied by changes in students' approaches to learning? The analytical procedures that have been used in Chapter 9 to examine changes in values have also been used to investigate changes in the approaches to learning. The Level-1 variables are listed in Table 10.2 and the significant Level-2 variables for learning are listed in Table 10.4. A complete list of all Level-2 variables is found in Table 9.3 and the variables have been discussed in Chapter 9.

Factor analysis of the *Study Process Questionnaire* (SPQ) (Biggs, 1987a) identified six dimensions for approaches to learning that influence CHC students' assessment of the importance of particular approaches in their learning. Therefore, the purpose of this chapter is to examine changes over time in students' approaches to learning during their stay in Australia with respect to six scales: Surface Motivation (Sur Mot) (SM), Surface Strategy (Sur Strat) (SS), Deep Motivation (Deep Mot) (DM), Deep Strategy (Deep Strat) (DS), Achieving Motivation (Ach Mot) (AM) and Achieving Strategy (Ach Strat) (AS). These scales are used as outcome variables for the multilevel modelling of change in learning approaches over time.

In order to ensure an interval scale of measurement, the raw score data that are obtained from the SPQ are scaled and equated using the QUEST program (Adams and Khoo, 1993). These procedures have been discussed in Chapter 6. The Rasch model is employed to produce interval scales on which all items in a particular scale and all participants in the study are placed. Table 10.1 gives the means of the scaled scores that are obtained for the six approaches to learning for each of the five occasions. The number of participants on each occasion is also found in Table 10.1.

Scale Names	Occasion 1	Occasion 2	Occasion 3	Occasion 4	Occasion 5
SUR MOT (SM)	0.34	0.49	0.39	0.21	0.34
SUR STRAT (SS)	0.06	0.18	0.24	-0.16	-0.22
ACH MOT (AS)	0.26	0.31	0.34	0.33	0.28
ACH STRAT (AS)	0.39	0.19	0.35	0.43	0.45
DEEP MOT (DM)	0.56	0.64	0.61	0.64	0.66
DEEP STRAT (DS)	0.65	0.71	0.75	1.00	0.92
N =	153	70	111	122	117

<b>Table 10.1</b> N	Aean scaled	scores (	in I	logits)	)
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Figure 10.1 presents graphs of the mean scaled scores in logits. It shows the changes in approaches to learning that have occurred on five occasions over the two years of the study. However, it is important to examine the performance of individual students over time, rather than the mean performance of a sample of students, since there is considerable variability between the different students who have provided responses on the five occasions. Therefore, if a student responded on at least two of the five occasions, the data provided have been included. While the graphs in Figure 10.1 would appear to indicate that the changes in the mean scale estimates over time are not always linear, in the examination of change over time, a relationship is fitted for each student to estimate the extent of change over the five occasions.



Figure 10.1 SPQ scales trends

(SM=Surface Motivation; SS=Surface Strategy; DM=Deep Motivation; DS=Deep Strategy; AM=Achieving Motivation; AS=Achieving Strategy).

### The variables used in the analysis

Table 10.2 presents a list of the Level-1 variables used in the HLM analysis and students' approaches to learning. The table gives the name of the variable and the number of times the variable has been measured. The column on the left shows the variable names in abbreviated forms as they appear in the text. In addition, dummy-variables (Pedhazur, 1997) for each occasion were formed in the Level-1 data file.

 Table 10.2
 Level-1 Variables used in HLM analysis of learning

Acronym	Times	Description of variable	Scale values
Occ	5	Occasion	1-5
Sur Mot (SM)	5	Surface Motivation scale of the SPQ	RSS ‡ + 7 items
Deep Mot (DM)	5	Deep Motivation scale of the SPQ	RSS ‡ + 7 items
Ach Mot (AM)	5	Achieving Motivation scale of the SPQ	RSS ‡ + 7 items
Sur Strat (SS)	5	Surface Strategy scale of the SPQ	RSS ‡ + 7 items
Deep Strat (DS)	5	Deep Strategy scale of the SPQ	RSS ‡ + 7 items
Ach Strat (AS)	5	Achieving Strategy scale of the SPQ	RSS ‡ + 7 items
Occ ²	5	The square of Occasion for use in a non-linear or quadratic relation	1-25
Occ 1 to 5	5	Dummy variables to identify each Occasion	0, 1

‡ RSS=Rasch scaled scores

Table 10.3 lists the descriptive statistics of the variables included in the Sufficient Statistics Matrix (SSM) file. The table includes the number of students measured on each occasion on the SPQ, the mean and the standard deviation for each variable as well as the minimum and maximum values for each variable in its original form after the conversion of all Level-2 variables to dichotomous (0, 1) variables.

The Level-2 statistics list shows the variables that are used to examine effects on the predictor variable (Occasion) or on the outcome variable directly. Table 10.3 also provides a list of the descriptive statistics for the Level-1 and Level-2 variables associated with the analysis using HLM. The Level-1 statistics give the relationships between the outcome or dependent variables and the occasion variable. Table 9.3 gives all the Level-2 variables that may have effects on approaches to learning in the HLM analysis with their scale values. Table 10.4 presents a list of the significant Level-2 variables associated with learning, an explanation of the coding used and a description of the meaning of each Level-2 variable and its acronym.

### Analysis of the Surface Motivation dimension

### The final model for the Surface Motivation scale

Table 10.5 shows the final estimation for the predictor variables with robust standard errors, the deviance as well as the final estimation and partitioning of the variance components associated with the Surface Motivation scale of the SPQ. The Occasion slope in the final model has a value of ( $g_{10}$ = -0.087) that is significant (p=0.041). This indicates that values associated with the Surface Motivation scale have changed significantly over the period of measurement after allowance is made for the effects of the Level-2 variables that are statistically significant.

VARIABLE NAME         N [†] MEAN         SD         MINIMUM         MAXIMUM           OCCASION         573         2.97         1.49         1.00         5.00           Sur Mot         573         0.34         0.79         -2.99         4.20           Deep Mot         573         0.62         0.74         -1.52         3.34           Ach Mot         573         0.30         0.90         -2.45         4.35           Sur Strat         573         0.30         0.90         -2.45         4.35           Sur Strat         573         0.30         0.90         -2.45         4.35           Deep Strat         573         0.30         0.90         -2.45         4.35           Deep Strat         573         0.81         1.01         -1.74         5.20           Ach Strat         573         0.38         1.04         -3.75         4.79           OCC1         573(153)         0.27         0.44         0.00         1.00           OCC2         573(111)         0.19         0.40         0.00         1.00           OCC4         573(122)         0.21         0.41         0.00         1.00	LEVEL-1 Descriptive	statistic	s			
OCCASION         573         2.97         1.49         1.00         5.00           Sur Mot         573         0.34         0.79         -2.99         4.20           Deep Mot         573         0.62         0.74         -1.52         3.34           Ach Mot         573         0.30         0.90         -2.45         4.35           Sur Strat         573         0.80         0.81         -4.55         4.55           Deep Strat         573         0.81         1.01         -1.74         5.20           Ach Strat         573         0.38         1.04         -3.75         4.79           OCC1         573(153)         0.27         0.44         0.00         1.00           OCC2         573(070)         0.12         0.33         0.00         1.00           OCC4         573(11)         0.19         0.40         0.00         1.00           OCC5         573(11)         0.21         0.41         0.00         1.00           OCC5         573(117)         0.20         0.40         0.00         1.00           OCC3QD         573         11.01         8.89         1.00         25.00           OCC01234 </th <th>VARIABLE NAME</th> <th>N[‡]</th> <th>MEAN</th> <th>SD</th> <th>MINIMUM</th> <th>MAXIMUM</th>	VARIABLE NAME	N [‡]	MEAN	SD	MINIMUM	MAXIMUM
Sur Mot         573         0.34         0.79         -2.99         4.20           Deep Mot         573         0.62         0.74         -1.52         3.34           Ach Mot         573         0.30         0.90         -2.45         4.35           Sur Strat         573         0.00         0.81         -4.55         4.55           Deep Strat         573         0.38         1.01         -1.74         5.20           Ach Strat         573         0.38         1.04         -3.75         4.79           OCC1         573(153)         0.27         0.44         0.00         1.00           OCC2         573(070)         0.12         0.33         0.00         1.00           OCC4         573(122)         0.21         0.41         0.00         1.00           OC5         573(117)         0.20         0.40         0.00         1.00           OC5         573(117)         0.20         0.40         0.00         1.00           OCC1234         573         1.97         1.49         0.00         4.00	OCCASION	573	2.97	1.49	1.00	5.00
Deep Mot         573         0.62         0.74         -1.52         3.34           Ach Mot         573         0.30         0.90         -2.45         4.35           Sur Strat         573         0.00         0.81         -4.55         4.55           Deep Strat         573         0.381         1.01         -1.74         5.20           Ach Strat         573         0.38         1.04         -3.75         4.79           OCC1         573(153)         0.27         0.44         0.00         1.00           OCC2         573(070)         0.12         0.33         0.00         1.00           OCC4         573(122)         0.21         0.41         0.00         1.00           OC5         573(117)         0.20         0.40         0.00         1.00           OCCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00	Sur Mot	573	0.34	0.79	-2.99	4.20
Ach Mot         573         0.30         0.90         -2.45         4.35           Sur Strat         573         0.00         0.81         -4.55         4.55           Deep Strat         573         0.81         1.01         -1.74         5.20           Ach Strat         573         0.38         1.04         -3.75         4.79           OCC1         573(153)         0.27         0.44         0.00         1.00           OCC2         573(070)         0.12         0.33         0.00         1.00           OCC4         573(122)         0.21         0.41         0.00         1.00           OC5         573(117)         0.20         0.40         0.00         1.00           OC5         573(117)         0.20         0.40         0.00         1.00           OC5         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00	Deep Mot	573	0.62	0.74	-1.52	3.34
Sur Strat         573         0.00         0.81         -4.55         4.55           Deep Strat         573         0.81         1.01         -1.74         5.20           Ach Strat         573         0.38         1.04         -3.75         4.79           OCC1         573(153)         0.27         0.44         0.00         1.00           OCC2         573(070)         0.12         0.33         0.00         1.00           OCC         573(11)         0.19         0.40         0.00         1.00           OCC4         573(122)         0.21         0.41         0.00         1.00           OCS         573(117)         0.20         0.40         0.00         1.00           OCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00	Ach Mot	573	0.30	0.90	-2.45	4.35
Deep Strat         573         0.81         1.01         -1.74         5.20           Ach Strat         573         0.38         1.04         -3.75         4.75           OCC1         573(153)         0.27         0.44         0.00         1.00           OCC2         573(070)         0.12         0.33         0.00         1.00           OCC         573(11)         0.19         0.40         0.00         1.00           OC4         573(12)         0.21         0.41         0.00         1.00           OC5         573(117)         0.20         0.40         0.00         1.00           OC5         573(117)         0.20         0.40         0.00         1.00           OC5         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00	Sur Strat	573	0.00	0.81	-4.55	4.55
Ach Strat         573         0.38         1.04         -3.75         4.79           OCC1         573(153)         0.27         0.44         0.00         1.00           OCC2         573(070)         0.12         0.33         0.00         1.00           OCC         573(11)         0.19         0.40         0.00         1.00           OCC         573(11)         0.19         0.40         0.00         1.00           OC4         573(12)         0.21         0.41         0.00         1.00           OC5         573(117)         0.20         0.40         0.00         1.00           OCCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00	Deep Strat	573	0.81	1.01	-1.74	5.20
OCC1         573 (153)         0.27         0.44         0.00         1.00           OCC2         573 (070)         0.12         0.33         0.00         1.00           OCC         573 (111)         0.19         0.40         0.00         1.00           OC4         573 (122)         0.21         0.41         0.00         1.00           OC5         573 (117)         0.20         0.40         0.00         1.00           OCCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00	Ach Strat	573	0.38	1.04	-3.75	4.79
OCC2         573 (070)         0.12         0.33         0.00         1.00           OCC         573 (111)         0.19         0.40         0.00         1.00           OC4         573 (122)         0.21         0.41         0.00         1.00           OC5         573 (117)         0.20         0.40         0.00         1.00           OCCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00	OCC1	573(153)	0.27	0.44	0.00	1.00
OCC         573 (111)         0.19         0.40         0.00         1.00           OC4         573 (122)         0.21         0.41         0.00         1.00           OC5         573 (117)         0.20         0.40         0.00         1.00           OCCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00	OCC2	573(070)	0.12	0.33	0.00	1.00
OC4         573 (122)         0.21         0.41         0.00         1.00           OC5         573 (117)         0.20         0.40         0.00         1.00           OCCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00           LEVEL-2         Descriptive         statistics         Image: statistic statis	OCC	573(111)	0.19	0.40	0.00	1.00
OC5         573 (117)         0.20         0.40         0.00         1.00           OCCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00           LEVEL-2         Descriptive         statistics         Image: constraint of the statistic statistic statistic statistics         Image: constraint of the statistic statistic statistic statistics	OC4	573(122)	0.21	0.41	0.00	1.00
OCCSQD         573         11.01         8.89         1.00         25.00           OCC01234         573         1.97         1.49         0.00         4.00           LEVEL-2         Descriptive         statistics         1.00         25.00	OC5	573(117)	0.20	0.40	0.00	1.00
OCC01234         573         1.97         1.49         0.00         4.00           LEVEL-2         Descriptive         statistics         1.49         1.49         1.49         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00 <th1.00< th=""> <th1.00< th=""> <th1.00< td="" th<=""><td>OCCSQD</td><td>573</td><td>11.01</td><td>8.89</td><td>1.00</td><td>25.00</td></th1.00<></th1.00<></th1.00<>	OCCSQD	573	11.01	8.89	1.00	25.00
LEVEL-2 Descriptive statistics	OCC01234	573	1.97	1.49	0.00	4.00
	LEVEL-2 Descriptive	statistic	s			
VARIABLE NAME N MEAN SD MINIMUM MAXIMUM	VARIABLE NAME	N	MEAN	SD	MINIMUM	MAXIMUM
GENDER 153 0.55 0.50 0.00 1.00	GENDER	153	0.55	0.50	0.00	1.00
BORN 153 0.78 0.41 0.00 1.00	BORN	153	0.78	0.41	0.00	1.00
LIVE 153 0.87 0.34 0.00 1.00	LIVE	153	0.87	0.34	0.00	1.00
FAMAD 153 0.24 0.43 0.00 1.00	FAMAD	153	0.24	0.43	0.00	1.00
SPEAK 153 0.46 0.50 0.00 1.00	SPEAK	153	0.46	0.50	0.00	1.00
STUDY 153 0.51 0.50 0.00 1.00	STUDY	153	0.51	0.50	0.00	1.00
PREST 153 0.49 0.50 0.00 1.00	PREST	153	0.49	0.50	0.00	1.00
PREFER 153 0.73 0.44 0.00 1.00	PREFER	153	0.73	0.44	0.00	1.00
HOURS 153 0.52 0.50 0.00 1.00	HOURS	153	0.52	0.50	0.00	1.00
COMAUS 153 0.85 0.36 0.00 1.00	COMAUS	153	0.85	0.36	0.00	1.00
TRAVEL 153 0.75 0.43 0.00 1.00	TRAVEL	153	0.75	0.43	0.00	1.00
COUVIS 153 0.33 0.47 0.00 1.00	COUVIS	153	0.33	0.47	0.00	1.00
TRIP 153 0.16 0.37 0.00 1.00	TRIP	153	0.16	0.37	0.00	1.00
AFFLIF 153 0.61 0.49 0.00 1.00	AFFLIF	153	0.61	0.49	0.00	1.00
RELIG 153 0.54 0.50 0.00 1.00	RELIG	153	0.54	0.50	0.00	1.00
SPREL 153 0.23 0.42 0.00 1.00	SPREL	153	0.23	0.42	0.00	1.00
CHUR 153 0.17 0.38 0.00 1.00	CHUR	153	0.17	0.38	0.00	1.00
PARREL 153 0.55 0.50 0.00 1.00	PARREL	153	0.55	0.50	0.00	1.00
GRANREL 153 0.59 0.49 0.00 1.00	GRANREL	153	0.59	0.49	0.00	1.00
PLANS 153 0.44 0.50 0.00 1.00	PLANS	153	0.44	0.50	0.00	1.00
AGEGP 153 0.33 0.47 0.00 1.00	AGEGP	153	0.33	0.47	0.00	1.00
ADELATDE 153 0.32 0.47 0.00 1.00	ADELATOE	153	0.32	0.47	0.00	1.00
FLINDERS 153 0.42 0.49 0.00 1.00	FLINDERS	153	0.42	0.49	0.00	1.00
UNISA 153 0.26 0.44 0.00 1.00	UNTSA	153	0.26	0.44	0.00	1.00
COUNTRY 153 0.67 0.47 0.00 1.00	COUNTRY	153	0.67	0.47	0.00	1.00
MOMINELU 153 0.58 0.50 0.00 1.00	MOMINFLU	153	0.58	0.50	0.00	1.00
ARINOZ 153 0.49 0.50 0.00 1.00	ARINOZ	153	0.49	0.50	0.00	1.00

Table 10.3	Descriptive	statistics	for	learning
	1			0

* Number of data points observed given in parenthesis

Table 10.5 also shows reliability estimates ( $\rho$ ) of 0.180 for the intercept (U₀) and 0.191 for the occasion slope (U₁). Estimates of variance components are computed and are recorded next to the reliability estimates. The p-values reveal that there are significant amounts of variance left to be explained associated with the intercept (p=0.053) and the slope (p=0.036) as well as considerable variance at the within student level ( $\sigma^2 = 0.53$ ).

The intercept  $(\beta_0)$  for Surface Motivation (SM) is not influenced by any significant Level-2 predictor variables. However, there are three variables that influence the Occasion slope  $(\beta_1)$ , and interact with the predictor variable Occasion and the outcome variable Surface Motivation.

## Table 10.4Significant Level-2 variables for learning (with acronyms and their<br/>meanings)

Gender-sex of students	Female = 1, Male = 0
Granrel- grandparents' religion	Different beliefs to grandparents $= 1$
	Same beliefs as grandparents =0
Agegp-age group of student	Over 25 years = 1, 25 years or under = $0$
Mominflu-Most influential person in childhood	Mother = 1, Another person= $0$
Arinoz-When student arrived in Australia	>1 year ago = 1 , $<1$ year ago = 0
Prest-Where student prefers to study	Home = 1, Not at home = $0$
Prefer How the student prefers to study	Alone = 1, With others = $0$
Trip-Student lived overseas before coming to	Trip = 1, No $trip = 0$
Australia	
Country-Country of birth	Less developed=1, Developed = $0$
UniSA-University attended by student	UniSA or TAFE = 1, Another university = $0$
Parrel- Parents' religion	Different beliefs to parents $= 1$
	Same beliefs as parents =0
Study- Student's major area of study	Business subjects=1, Other subjects=0
Hours-Hours of study	10+ hours each week =1, <10 hours each week=0
Couvis-Countries visited before coming to Australia	Beyond Asia = 1, Asia only = $0$
Travel- Travel before coming to Australia	Travel = 1, No travel 0
Speak-Language spoken at home in Australia	English = 1, Home or other language=0

### Table 10.5 Final estimation of fixed effects for the Surface Motivation dimension

Final estimation of fixed effects, reliability estimates, and estimates of variance components for Surface Motivation (with robust standard errors):

Final estimation of	of fixed	effects:				
			Standard		Approx.	
Fixed Effect	Coef	ficient‡	Error	T-ratio	d.f.	P-value
For INTRCPT1	l, вО					
INTRCPT2, G00	0	.342	0.033	10.24	152	0.000
For OCCASION slop	pe, Bl					
INTRCPT2, G10	-0	.087	0.042	-2.04	149	0.041
STUDY, G11	0	.121	0.043	2.80	149	0.006
PREST, G12	-0	.113	0.044	-2.56	149	0.011
PARREL, G13	0	.111	0.043	2.54	149	0.011
Final estimation of	of varia	nce compo	nents for S	Surface Mo	otivation:	
Random Effect	ρ	Standard	Variance	df (	Chi-square	P-value
		Deviation	Component	5		
INTRCPT1, U0	0.180	0.182	0.03319	150	178.9	0.053
OCCASION slope,U1	0.191	0.127	0.01603	147	179.3	0.036
level-1, R		0.729	0.53076			
Deviance Null=	1357.06	for 2 pa	rameters	Final=	1341.06	for 4
parameters		_				
Variance explained	$\sigma^{2}_{00}$	$ au_{00}$	$\sigma^{2}_{OCC}$	$\tau_{OCC}$	$\sigma^{2}_{final}$ $\tau_{fin}$	al
	0.784	0.007	0.544	0.027	0.531 0.0	33
Variance partitioned	$\sigma^{2}_{00} / \sigma^{2}_{00}$	⊦τ ₀₀	$\tau_{00/} \sigma_{00+}^2 \tau_{00}$	$\sigma^2_{00}$ - $\sigma^2_{\text{final}}$	$\sigma_{00}^2 = \tau_{00}$	$\tau_{\rm final}/\tau_{00}$
	0.991	(	0.0088	0.32	a ‡	

**Total Variance explained** For Surface Motivation = 0.32 ‡ a indicates that a negative variance term has been estimated

[‡] coefficient = a metric coefficient; d.f. = degrees of freedom; ρ = represents reliability estimates for the intercept ( $β_0$ ) and the Occasion slope ( $β_1$ ). The ρ values are found in the first column of the section that provides the final estimation of variance components in the table of final estimation of fixed effects for each of the outcome variables associated with approaches to learning.

### **Examination of interaction effects**

Interaction effect associated with Occasion, Study and Surface Motivation

The first interaction is between the Level-1 predictor variable, Occasion, the Level-2 variable Study, and the outcome variable Surface Motivation. The equation for the interaction is:

 $SM = \gamma_{00} + \gamma_{10}(Occasion) + \gamma_{11}(Study)^*(Occasion) + r_{ij} + u_{1j}$ 

By substitution

 $SM = 0.342 + (-0.087)*Occasion + 0.12 (Study)*(Occasion) + r_{ii} + u_{1i}$ 

Figure 10.2 shows the interaction between Occasion and Study and its effect on Surface Motivation, where Business = 1 and Other Subjects = 0. All calculations for direct and interaction effects for learning are given in the appendix to Chapter 10.



Figure 10.2 Effects of the interaction between Study with Occasion and Surface Motivation

The estimated coefficient ( $g_{11}$ = 0.12) for subjects studied (Study) is positive and indicates that students who study business and commerce subjects show a slight increase (0.034) in Surface Motivation over time (p=0.006). Students who study other subjects show a decrease in Surface Motivation over time that is represented by the value of the Occasion slope ( $g_{10}$ = -0.87). It is possible that business subjects require more memorisation than other subjects and a surface approach to learning that uses rote memorisation is preferred, while learning in other subjects leads to a decrease in the use of rote memorisation during the time of study in Australia.

### Interaction effect associated with Occasion, where students Prefer to Study (PREST) and Surface Motivation

The equation for the interaction between where students prefer to study (PREST), Occasion and Surface Motivation is:

 $SM = \gamma_{00} + \gamma_{10} (Occasion) + \gamma_{12} (PREST) * (Occasion) + r_{ij} + u_{1j}$ 

By substitution

$$SM = 0.342 + (-0.087) * (Occasion) + (-0.113) (PREST) * (Occasion) + r_{ii} + u_{1i}$$

Figure 10.3 shows the interaction between Occasion and where students Prefer to Study (PREST) and Surface Motivation, where studying at home = 1 and studying away from home = 0.



Figure 10.3 Effects of interaction of where students prefer to study (PREST) with Occasion and Surface Motivation

Students who prefer to study at home show a greater decrease ( $g_{12}$ = -0.11) in Surface Motivation over time (-0.200) than students who prefer to study away from home. The interaction is significant (p=0.011). Students who prefer to study at home would appear to decrease further in their use of Surface Motivation compared to those who prefer to work away from home over the time of their study in Australia. Students who choose to study at home would appear to learning than students who choose to study away from the home environment.

# Interaction effect associated with Occasion, Parents' Religious Beliefs (Parrel) and Surface Motivation

The equation for this interaction is:

 $SM = \gamma_{00} + \gamma_{10}(Occasion) + \gamma_{13}(Parrel)*(Occasion) + r_{ij} + u_{1j}$ 

By substitution

 $SM = 0.342 + (-0.087)*(Occasion) + (0.111)(Parrel)*(Occasion) + r_{ij} + u_{1j}$ 

Figure 10.4 shows the interaction relationship between the religious beliefs of students and those of their parents (Parrel), Occasion and Surface Motivation. Students who have different beliefs to their parents are coded 1 and those with the same beliefs as parents are coded =0.



Figure 10.4 Effect of the interaction of Parents' Religious Beliefs (Parrel) with Occasion and Surface Motivation

Students who have religious beliefs that are different to those of their parents show a very slight increase (0.024) in Surface Motivation (p=0.011). However, if students do not change their religious beliefs in Australia, the decrease in Surface Motivation over time is given by the value of the occasion slope  $(g_{10}=-0.087)$ . Butcher (2002), Chang (2000), Ward and Chang (1997), and Ward et al. (2001) have commented that many overseas students have expressed the desire to follow different religious practices when they are studying in cultural environments dissimilar to those in their home countries.

### Analysis of the Surface Strategy dimension

Table 10.6 shows the final estimation for the analysis of the Surface Strategy scale of the SPQ. The occasion slope in the final model is negative with a value of ( $g_{10} = -0.070$ ) that is not significant (p= 0.184). This indicates that values associated with the Surface Strategy scale have not changed significantly over the time of the study.

#### The final estimation of direct effects of the Surface Strategy scale

For the Surface Strategy dimension, there are two significant variables that show direct effects at Level-2: the most influential person in a student's early life (Mominflu) and time of arrival in Australia (Arinoz).

### Effect of the Most Influential Person (Mominflu) on Surface Strategy

The equation for the effect of the Most Influential Person (Mominflu) on Surface Strategy is:

 $SS = \gamma_{00+} + \gamma_{01} * (Mominflu) + \gamma_{10} * (Occasion) + r_{ij} + u_{0j}$ 

By substitution

 $SS = -0.144 + 0.147*(Mominflu) + (-0.070)*(Occasion) + r_{ij} + u_{0j}$ 

Figure 10.5 shows the effect of the Most Influential Person (Mominflu) on Surface Strategy, where mother = 1 and another person = 0.

Total Variance explained For Surface Strategy = 0.0546							
	0.9992	(	0.0008	0.0546	0.	0192	
Variance partitioned	$\sigma^{2}_{\ 00\ /}\ \sigma^{2}_{\ 00\ +}\ \tau_{0}$	0 1	$\tau_{00/} \sigma_{00+}^2 \tau_{00}$	$\sigma^2_{00}$ , $\sigma^2_{final}$	$\sigma_{00}^{2} = \tau_{0}$	$_0$ - $ au$ final / $ au_{00}$	
	0.663	0.001	0.649	0.007	0.627	0.005	
Variance explained	$\sigma^{2}_{00}$	T ₀₀	σ ² OCC	$\tau_{OCC}$	$\sigma^{2}_{\text{final}}$	$ au_{ ext{final}}$	
Deviance Null =13	94.81 for	2 param	neters Final	= 1377.5	52 for 4	parameters	
level-1, R		0.792	0.627	1			
OCCASION slope,U1	0.001	0.010	0.000	148	118.3	>.500	
INTRCPT1, U0	0.003	0.023	0.001	148	132.5	>.500	
		Devia	ation Compon	ient	-		
Random Effect	ρ	Stand	dard Varian	nce df	Chi-squa	are P-value	
Final estimation of variance components for Surface Strategy:							
TRAVEL, G12	-0.1	.15	0.053	-2.15	150	0.031	
STUDY, G11	0.1	.55	0.038	4.04	150	0.000	
INTRCPT2, G10	-0.0	70	0.053	-1.33	150	0.184	
For OCCASION slo	pe. B1		0.002	2.10	100	0.000	
ARINOZ, GO2	0.1	34	0.062	2.13	150	0.033	
MOMINFLU, G01	0.1	47	0.062	2.36	150	0.018	
INTROPT2. GOO	-0 1	44	0 056	-2 54	150	0 011	
For INTROD	1 00	CICIC	DITOI	1 14010	u	1 Varue	
Fixed Effect	Coeffi	cient	Error	T-ratio	d f	· P-value	
rinar cotimation	or rincu c		Standard		Approv		
Final estimation	of fixed e	ffects	•				
errors):							

Final estimation of fixed effects, reliability estimates, and estimates of variance components for Surface Strategy (with robust standard

 Table 10.6
 Estimation effects for the Surface Strategy dimension



0.2

Figure 10.5 The effect of the Most Influential Person (Mominflu) on Surface Strategy

A large positive coefficient ( $g_{01}$ =0.147) noted for the Level-2 variable Mother's Influence (Mominflu), indicates that students who say their mother has been the most important influence in their childhood are higher in Surface Strategy than students who say another person has had more influence on their lives. Ho (1994) discusses

the importance of mother's influence on Confucian heritage culture (CHC) students' lives. The coefficient for mother indicates that mother's influence (Mominflu) has a significant (p=0.018) and positive effect on Surface Strategy.

### Effect of time of Arrival in Australia (Arinoz) on Surface Strategy

The equation for the effect of students' time of Arrival in Australia (Arinoz) and Surface Strategy is:

 $SS = \gamma_{00+} + \gamma_{02} * (Arinoz) + \gamma_{10} * (Occasion) + r_{ij} + u_{0j}$ 

By substitution

 $SS = -0.144 + 0.134*(Arinoz) + (-0.070)*(Occasion) + r_{ij} + u_{0j}$ 

Figure 10.6 shows the effect of time of Arrival in Australia (Arinoz) on Surface Strategy, where more than one year =1 and less than one year = 0.



Figure 10.6 The effect of Arrival in Australia (Arinoz) on Surface Strategy

Students who arrived in Australia more than one year ago (Arinoz) are higher in Surface Strategy ( $g_{02}=0.134$ ) than students who have been in Australia less than one year. The effect is significant (p=0.033). Students who have been in Australia for more than one year may consider that they need to memorise study materials in order to succeed academically and therefore, choose a superficial learning strategy.

### Examination of interaction effects

Interaction effect associated with Occasion, Study and Surface Strategy

The equation for the interaction of Subjects Studied (Study), Occasion and Surface Strategy is:

 $SS = \gamma_{00} + \gamma_{10}(Occasion) + \gamma_{11}(Study) * (Occasion) + r_{ij} + u_{1j}$ 

By substitution

 $SS = -0.144 + (-0.070)^{*}(Occasion) + 0.155(Study)^{*}(Occasion) + r_{ij} + u_{1j}$ 

Figure 10.7 shows the interaction between Occasion, the Subjects Studied (Study) and Surface Strategy, where business subjects = 1 and other subjects = 0.



Figure 10.7 Effect of the interaction of Subjects Studied (Study) with Occasion and Surface Strategy

The coefficient for Subjects Studied (Study) is positive ( $g_{11}=0.16$ ) and indicates that students who study business and commerce subjects show an increase in Surface Strategy over time. The interaction is significant (p=0.000). Students who study business subjects appear to increase (0.085) their use of Surface Strategy. These subjects may require more rote memorisation than deep thought.

### Interaction effect associated with Occasion, Travel and Surface Strategy

The equation for the interaction is:

$$SS = \gamma_{00} + \gamma_{10} (Occasion) + \gamma_{12} (Travel)*(Occasion) + r_{ij} + u_{1j}$$

By substitution

 $SS = -0.144 + (-0.070)*(Occasion) + (-0.115)(Travel)*(Occasion) + r_{ij} + u_{1j}$ 

Figure 10.8 shows the interaction between Occasion and Travel and its effect on Surface Strategy scores, where travel =1 and no travel = 0.



Figure 10.8 Effect of the interaction of Travel with Occasion and Surface Strategy

Students who have travelled overseas before coming to Australia to study show a greater decrease (-0.045) in Surface Strategy compared with students who have not travelled (p=0.031). This would appear to indicate that students who have travelled have decreased their use of superficial Strategy to study as a result of travel.

### Interaction effects for the Surface approach to learning

Figure 10.9 shows the direct and interaction effects for the Surface Approach to learning involving both the Surface Motivation and Surface Strategy scales of the SPQ. At Level-1, the significant occasion slope is shown as a solid line and the slope that is not significant as a dashed line. At Level-2, an effect that influences the outcome variable directly is indicated by a long dashed line and an interaction effect that involves both the outcome variable and the predictor variable Occasion is indicated by a line composed of long dashes and dots.





(Standard error values are given in parentheses in the figure)

### Analysis of the Deep Motivation dimension

Table 10.7 shows the final estimation for the predictor variables associated with the Deep Motivation scale of the SPQ. The occasion slope in the final model has a positive value of  $(g_{10}=0.073)$  that is significant (p=0.007). This indicates that values associated with the Deep Motivation scale have increased over the time of measurement after allowance is made for the effects of the Level-2 variables that are statistically significant.

Final estimation of of variance components:	fixed nents	l effects, for Deep	reliabili Motivati	ty estima lon (with	ites, and n robust	estimates standard
Final estimation of	fixed	effects:				
			Standard		Approx.	
Fixed Effect	Coe	efficient	Error	T-ratio	d.f.	P-value
For INTRCPT1,	в0					
INTRCPT2, G00		0.555	0.074	7.45	150	0.000
PREST, G01		-0.166	0.065	-2.54	150	0.011
PREFER, G02		0.189	0.074	2.55	150	0.011
For OCCASION slope	, B1					
INTRCPT2, G10		0.073	0.027	2.71	151	0.007
HOURS, G11		-0.093	0.038	-2.44	151	0.015
Final estimation of variance components for Deep Motivation:						
Random Effect	ρ	Standard	Variance	e df	Chi-squar	e P-value
		Deviation	Componer	nt		
INTRCPT1, UO	0.242	0.210	0.044	148	192.9	0.008
OCCASION slope,U1	0.022	0.037	0.001	149	143.9	>.500
level-1, R		0.695	0.483			
Deviance Null = 1274.87 for 2 parameters Final =1273.94 for 4 parameters						
Variance explained	$\sigma^{2}_{00}$	$ au_{00}$	$\sigma^{2}_{OCC}$	τocc	$\sigma^{2}_{final}$ $\tau_{fin}$	al
	0.494	0.050	0.490	0.512	0.483 0.04	44
Variance partitioned	$\sigma^2_{00}/\sigma^2_{00}$	$\tau_{00} + \tau_{00}$ $\tau_{00}/\sigma_{00}$	$\sigma^{2}_{00} + \tau_{00}$	$\sigma^2_{00}$ . $\sigma^2_{final}$ / $\sigma^2_{final}$	$\sigma_{00}^2 = \tau_{00} - \tau$	_{final} / $ au_{00}$
	0.908	0.092	2	0.024 3	0.120	
Total Variance explained For Deep Motivation = 0.0331						

<b>Table 10.7</b>	Estimation	Effects for	or Deep	Motivation
-------------------	------------	-------------	---------	------------

### The final estimation of direct effects on the Deep Motivation scale

For the Deep Motivation outcome variable, the intercept,  $(\beta_0)$ , is influenced by two Level-2 variables. They show where (PREST) and (Prefer) how the students prefer to study.

### The effect of where students Prefer to Study (PREST) on Deep Motivation

The equation for the effect of the variable PREST on Deep Motivation is:

 $DM = \gamma_{00+} + \gamma_{01}*(PREST) + \gamma_{10}*(Occasion) + r_{ij} + u_{0j}$ 

By substitution

 $DM=0.555 + (-0.166) * (PREST) + 0.073*(Occasion) + r_{ij} + u_{0j}$ 

Figure 10.10 shows the relationship between where a student Prefers to Study (PREST) and the Deep Motivation dimension, where studying at home = 1 and studying away from home = 0.


Figure 10.10 Effect of where students prefer to study (PREST) on Deep Motivation

Students who prefer (PREST) to study at home are significantly lower ( $g_{01} = -0.166$ ) in Deep Motivation (p=0.011) compared with those who prefer to study away from home. This may occur because the place where students can afford to live is either too noisy or crowded so that students who are serious about their academic work look for a quiet place to study away from the distractions found in the home environment. Finding a suitable place to study may increase students' motivation to produce good written assignments in English.

#### The effect of how students prefer to study (Prefer) on Deep Motivation

The equation for the interaction is:

 $DM = \gamma_{00+} + \gamma_{02} * (Prefer) + \gamma_{10} * (Occasion) r_{ij} + u_{0j}$ 

By substitution

$$DM = 0.555 + 0.189*(Prefer) + 0.073*(Occasion) rij + u_{0j}$$

Figure 10.11 shows the effect of how students Prefer to Study (Prefer) on Deep Motivation, where studying alone = 1 and studying with others =0.



Figure 10.11 Effect of how students prefer to study on Deep Motivation

Students who prefer to study alone are higher ( $g_{02}=0.189$ ) in Deep Motivation. This choice has a significant (p=0.011) influence on Deep Motivation. Studying on their own represents a change from what Biggs (1996b) has said about CHC students' preference for studying in groups in their home environment in Asia.

#### Examination of interaction effects

# Interaction effect associated with Occasion, Hours of Study (Hours) and Deep Motivation

The equation for this interaction is:

 $DM = \gamma_{00} + \gamma_{10} (Occasion) + \gamma_{11} (Hours)^* (Occasion) + r_{ij} + u_{1j}$ 

By substitution

$$DM = 0.555 + 0.073*(Occasion) + (-0.093)(Hours)*(Occasion) + r_{ii} + u_1$$

Figure 10.12 shows the relationship between Hours of Study (Hours), Occasion and Deep Motivation, where 10+ hours = 1 and less than 10 hours = 0.



Figure 10.12 Effect of the interaction of Hours of Study (Hours) with Occasion and Deep Motivation

Students who say they study more than ten hours a week ( $g_{11}$ = -0.093) show a very slight decrease (-0.020) in Deep Motivation whereas students who study less than ten hours a week show an increase in Deep Motivation that is equal to the value of the Occasion slope. The interaction is significant (p=0.015).

# Analysis of the Deep Strategy dimension

Table 10.8 shows the final analysis associated with the Deep Strategy scale of the SPQ. The value of the Occasion slope in the final model is positive ( $g_{10}$ =0.164) and significant (p=0.000) over time. This indicates that scale scores associated with the Deep Strategy scale have increased over the time of measurement after allowance is made for the effects of the Level-2 variables that are statistically significant.

Total Variance explained	For Deen St	a tegy = 0.1028					
0.971		0.030		0.098		0.263	
Variance partitioned	$\sigma^2_{00} / \sigma^2_{00} + \tau_0$	$\sigma_{00}^2 \sigma_{00}^2 + \tau_{00} = \tau_{00}^2 \sigma_{00}^2$		$\sigma_{0} \sigma_{1}^{2} \sigma_{0}^{2} \sigma_{0}^{2}$	$_{\tau 00}$ - $\tau$ final / $\tau_{00}$		
	0.990	0.030 0.8	391 0.0	0.89	91	0.042	
Variance explained	$\sigma^{2}_{00}$	$\tau_{00}$ $\sigma^{2}_{0}$	$\tau_0$	$_{\rm CC}$ $\sigma^2_{\rm fin}$	al	$ au_{\mathrm{final}}$	
Deviance Null = 16	540.14 for	2 paramete	rs Final=	1624.91 f	for 4 p	arameters	
level-1, R		0.944	0.891				
OCCASION slope,U1	0.171	0.153	0.023	149 192.	.17328	0.010	
INTRCPT1, U0	0.143	0.206	0.042	148 182.	.22618	0.029	
		Deviation	Component				
Random Effect	ρ	Standard '	Variance	df Chi-s	quare	P-value	
Final estimation of	of varianc	e component	s for Dee	p Strategy	/:		
HOURS, G11		-0.156	0.058	-2.69	151	0.008	
INTRCPT2, G10		0.164	0.042	3.93	151	0.000	
For OCCASION slop	be, B1						
PARREL, G02		0.167	0.083	2.00	150	0.046	
TRIP, GO1		0.280	0.111	2.53	150	0.012	
INTRCPT2, G00		0.670	0.061	11.04	150	0.000	
For INTRCPT1	L, ВО						
Fixed Effect		Coefficient	Error	T-ratio	d.f.	P-value	
			Standard	b	Approx	κ.	
Final estimation of	of fixed e	ffects:					

#### Table 10.8 Final estimation of fixed effects for Deep Strategy

Final estimation of fixed effects, reliability estimates, and estimates of variance components for Deep Strategy (with robust standard errors): Final estimation of fixed effects:

#### The final estimation of direct effects of the Deep Strategy scale

The intercept  $(\beta_0)$  is influenced by two significant variables, Trip and Parents' Religious Beliefs (Parrel).

#### The effect of Trip on Deep Strategy

The equation for the relationship between Trip and Deep Strategy is:

 $DS = \gamma_{00+} + \gamma_{01} * (Trip) + \gamma_{10} * (Occasion) + r_{ij} + u_{0j}$ 

By substitution

 $DS=0.671+0.280*(Trip)+0.164*(Occasion)+r_{ij}+u_{0j}$ 

Figure 10.13 shows the effect of Trip on Deep Strategy, where trip =1 and no trip=0.

Students who have travelled extensively before coming to Australia are considerably higher in Deep Strategy ( $g_{01}$ =0.280) compared with those who have not travelled. This variable is coded 1 for students who have travelled for a period of a month or more and 0 for students who have not travelled at all or just to the Asian region. As Ward and Kennedy (1993a, 1993b, 1994, 1999) and Ward et al. (2001) have commented students who have lived overseas for longer than a holiday visit are markedly higher in deeper approaches to learning than those who have travelled for short periods to a similar cultural environment or have not travelled at all.



Figure 10.13 Effect of Trip on Deep Strategy

#### The effect of Parents' Religious Beliefs (Parrel) on Deep Strategy

The equation for the effect of Parents' Religious Beliefs (Parrel) on Deep Strategy is:

 $DS = \gamma_{00+} + \gamma_{02}^{*}(Parrel) + \gamma_{10}^{*}(Occasion) + r_{ij} + u_{0j}$ 

By substitution

 $DS=0.671+0.167*(Parrel)+0.164*(Occasion) + r_{ij} + u_{0j}$ 

Figure 10.14 shows the effect of Parents' Religious Beliefs (Parrel) on Deep Strategy, where different beliefs to parents=1 and beliefs the same as parents=0.



Figure 10.14 Effect of parents' religious beliefs of Deep Strategy

The graph for the effect of Parents' Religious Beliefs on Deep Strategy shows that students who have different religious beliefs to those of their parents are higher in Deep Strategy ( $g_{02}$ =0.166) compared with students who have the same religious beliefs as their parents. Butcher (2002) comments that a change in religious beliefs is a common phenomenon in Asian students who study in Western learning environments. The change is associated with a significant change in the use of Deep Strategy (p=0.046) and students who change religious beliefs during their time in Australia are higher in Deep Strategy.

#### **Examination of interaction effects**

Interaction effect associated with Occasion, Hours of Study (Hours) and Deep Strategy

The equation for the interaction is:

 $DS = \gamma_{00} + \gamma_{10} * (Occasion) + \gamma_{11} (Hours) * (Occasion) + r_{ij} + u_{1j}$ 

By substitution

 $DS = 0.671 + 0.164*(Occasion) + (-0.156)(Hours)*(Occasion) + r_{ij} + u_{1j}$ 

Figure 10.15 shows the relationship between Occasion, Hours of Study (Hours) and Deep Strategy, where 10+ hours = 1 and 10 hours or less = 0.



Figure 10.15 The relationship between Occasion and hours of study and Deep Strategy.

The variable Hours of Study (Hours) is involved in a significant interaction between the predictor variable Occasion and the outcome variable Deep Strategy. Students who spend more than ten hours may still prefer to use a learning strategy that assists them to memorise the materials they are studying as the graph indicates that there is little change (0.008) in these students' approach to learning whereas students who spend less than ten hours each week studying show an increase in Deep Strategy. The interaction with Deep Strategy is significant over time (p=0.008).

#### Interaction effects for the Deep Approach to learning

Figure 10.16 shows the direct and interaction effects for the Deep Approach to learning involving both the Deep Motivation and Deep Strategy scales of the SPQ. At Level-1, the significant occasion slopes are shown as solid lines. At Level-2, an effect that influences the outcome variable directly is indicated by a long dashed line and an interaction effect that involves both the outcome variable and the predictor variable Occasion is indicated by a line composed of long dashes and dots.



Figure 10.16 Summary of HLM effects for the Deep Approach to learning

(Standard error values are given in parentheses in the figure)

### Analysis of the Achieving Motivation dimension

Table 10.9 shows the final analysis associated with the Achieving Motivation scale of the SPQ. The value of the Occasion slope in the final model has a positive value of  $(g_{10}=0.053)$  that is marginally significant at the ten per cent level (p=0.074). This indicates that values associated with the Achieving Motivation scale have increased slightly over the time of measurement after allowance is made for the effects of the Level-2 variables that are statistically significant.

# The final estimation of direct effects of the Achieving Motivation scale

For the Achieving Motivation outcome variable, the intercept,  $(\beta_0)$ , at Level-2 has effects associated with five significant variables: Gender, Grandparents' Religious Beliefs (Granrel), Age Group (Agegp), Attendance at the University of South Australia or Adelaide College of TAFE (UniSA) and whether the students come from a developed or an undeveloped country (Country).

#### Effect of Gender on Achieving Motivation

The equation for the effect of Gender on Achieving Motivation is:

 $AM = \gamma_{00} + \gamma_{01}*(Gender) + \gamma_{10}*(Occasion) + r_{ij} + u_{0j}$ 

By substitution

 $AM = 0.177 + 0.217*(Gender) + 0.053*(Occasion) + r_{ij} + u_{0j}$ 

INTROPTI OCCASION level-1, Deviance e Variance p	1, N slop , e Null explained	U0 e,U1 R = 14 d ed	0.135	$\begin{array}{c c} 0.180 \\ 0.058 \\ 0.853 \\ \hline for 2 parame \\ \hline \sigma^{2}_{00} & \underline{\tau}_{00} \\ 0.742 & 0.05 \\  & 9 \\ \hline \sigma^{2}_{00} / \sigma^{2}_{00} + \underline{\tau}_{00} \\ 0.932 \\ \end{array}$	0.032 0.003 0.729 tters Fina. $\sigma^{2}_{OCC}$ 0.737 $\tau_{00'} \sigma^{2}_{00} + \tau_{00}$ 0.068	$145 \\ 149 \\ 1 = 1493 \\ T OCC \\ 0.060 \\ G^{2}_{00} - G \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 \\ 0.011 $	168.9 148.6 .62 for 4 p $\sigma^{2}_{final}$ 0.729 $r^{2}_{final}/\sigma^{2}_{00}$ T	0.085 >.500 parameters $\tau_{final}$ 0.032 $r_{00} - \tau_{final} / \tau_{00}$ 0.454
INTROPTI OCCASION level-1, Deviance Variance p	l, N slop , e Null explained	U0 e,U1 R = 14 d ed	0.135 0.035 98.24	$\begin{array}{c} 0.180\\ 0.058\\ 0.853\\ for 2 parame\\ \overline{\sigma^{2}_{00}} & \overline{\tau_{00}}\\ 0.742 & 0.05\\ & 9\\ \overline{\sigma^{2}_{00}}/\overline{\sigma^{2}_{00}}+\overline{\tau_{00}}\\ \end{array}$	0.032 0.003 0.729 tters Fina. $\sigma^{2}_{OCC}$ 0.737 $\tau_{00/} \sigma^{2}_{00} + \tau_{00}$	$145 \\ 149 \\ 1 = 1493 \\ \hline \tau_{OCC} \\ 0.060 \\ \hline \sigma^{2}_{00} \cdot \sigma^{2}_{00}$	168.9 148.6 .62 for 4 <u>p</u> σ ² final 0.729	$0.085$ $>.500$ parameters $\frac{\tau_{\text{final}}}{0.032}$ $\frac{\tau_{\text{final}}}{\tau_{\text{final}}} / \tau_{00}$
INTRCPT1 OCCASION level-1, Deviance Variance e	l, N slop , e Null explained	U0 e,U1 R = 14 d	0.135 0.035 98.24	0.180 0.058 0.853 for 2 parame $\sigma_{00}^2 = \frac{\tau_{00}}{0.742} = 0.05$ 9	0.032 0.003 0.729 ters Fina <b>6²0CC</b> 0.737	145 149 1 =1493 τ _{occ} 0.060	168.9 148.6 .62 for 4 <u>]</u> <b>σ²final</b> 0.729	$0.085$ $>.500$ parameters $\frac{\tau_{\text{final}}}{0.032}$
INTRCPTI OCCASION level-1, Deviance Variance e	1, N slop , e Null explained	U0 e,U1 R = 14	0.135 0.035 98.24	0.180 0.058 0.853 for 2 parame <b>o²00 Tu0</b>	0.032 0.003 0.729 tters Fina. <b>6²0CC</b>	145 149 1 =1493 <b>Tocc</b>	168.9 148.6 .62 for 4 p <b>o²final</b>	0.085 >.500 parameters $\tau_{final}$
INTRCPT1 OCCASION level-1, Deviance	l, N slop , e Null	U0 e,U1 R = 14	0.135 0.035 98.24	0.180 0.058 0.853 for 2 parame	0.032 0.003 0.729 ters Fina	145 149 1 =1493	168.9 148.6 .62 for 4 ]	0.085 >.500 parameters
INTRCPT1 OCCASION level-1,	l, N slop ,	UO e,U1 R	0.135	0.180 0.058 0.853	0.032 0.003 0.729	145 149	168.9 148.6	0.085 >.500
INTRCPT1 OCCASION	l, N slop	U0 e,U1	0.135	0.180 0.058	0.032	145 149	168.9 148.6	0.085 >.500
INTRCPT	1,	U0	0.135	0.180	0.032	145	168.9	0.085
	1		0 1 2 5	0 100	0 0 0 0	145	1 C O O	0 005
				Deviation	component			
Random E	SIIECT		ρ	Standard	Commonont	ar (	uni-square	P-Value
		1011 0	I VALIO					
Final es	etimat	ion o	fwari	-0.104	nte for M	-2.14	TJT Motivati	0.032
LNTF	RCPTZ,	GIU C11		0.053	0.030	1./8 -2.14	151	0.074
For OCC	CASION	slop	e, B1	0.050	0 0 0 0 0	1 20	1 - 1	0 074
COI	COUNTRY, G05			0.166	0.084	1.98	147	0.047
τ	UNISA,	G04		-0.189	0.091	-2.09	147	0.037
I	AGEGP,	G03		0.206	0.086	2.39	147	0.017
GRA	ANREL,	G02		-0.217	0.087	-2.49	147	0.013
GE	ENDER,	G01		0.217	0.074	2.93	147	0.004
INTE	RCPT2,	G00	, 20	0.177	0.115	1.54	147	0.124
For	TNT.	RCPT1	вÛ	00011101010		1 1401		1 14140
Fixe	ed Eff	ect		Coefficient	Error	T-ratio	Appiox.	P-value
rinar estimation of fixe				standard			Approv	

 Table 10.9
 Final estimation of fixed effects for Achieving Motivation

Final estimation of fixed effects, reliability estimates, and estimates of variance components for Achieving Motivation (with robust standard

Figure 10.17 shows the effect of Gender on Achieving Motivation, where female is = 1 and male is = 0.

Women are significantly higher in Achieving Motivation ( $g_{01}$ =0.217) than men in this study. Women may feel a greater need to achieve and are, therefore, more highly motivated to achieve in Australia than men from CHC cultures. Zhang Zhen (2001) comments that women have a stronger motivation to achieve than men do and that this effect is particularly strong in contemporary Asian women who live in urban environments.



Figure 10.17 Effect of Gender on Achieving Motivation

#### Effect of Age group on (Agegp) Achieving Motivation

The equation for effect of age group (Agegp) on Achieving Motivation is:

 $AM = \gamma_{00+} + \gamma_{03}^{*}(Agegp) + \gamma_{10}^{*}(Occasion) + r_{ij} + u_{0j}$ 

By substitution

```
AM = 0.177 + 0.206*(Agegp) + 0.053*(Occasion) + r_{ij} + u_{0j}
```

Figure 10.18 shows the effect of Age Group (Agegp) on Achieving Motivation, where students over 25 years old = 1 and 25 years or younger = 0.



Figure 10.18 Effect of Age Group (Agegp) on Achieving Motivation

Older students are higher in Achieving Motivation ( $g_{03}$ =0.206) than younger students (p=0.017). Older students appear to have a stronger need to achieve. This may occur because they have been working in their home country before coming to Australia to study and therefore, feel the need to achieve at a high level so that they will be of greater use in their place of work on their return home. A high level of Achieving Motivation is consistent with effects desired by their home group and is confirmed in research reported by Butcher (2002) and Ward and Kennedy (1993a, 1993b, 1999).

#### Effect of Grandparents' Religion (Granrel) on Achieving Motivation

The equation for effect of Grandparents' Religion on Achieving Motivation is

 $AM = \gamma_{00+} + \gamma_{02}$ *(Granrel)  $+ \gamma_{10}$ *(Occasion)  $+ r_{ij} + u_{0j}$ 

By substitution

$$AM = 0.177 + (-0.217) * (Granrel) + 0.053* (Occasion) + r_{ij} + u_{0j}$$

Figure 10.19 shows the effect of Grandparents' Religious Beliefs (Granrel) on Achieving Motivation, where beliefs different to those of grandparents = 1 and the same beliefs as grandparents = 0.

Students who have religious beliefs that are different to those of their grandparents are lower in Achieving Motivation ( $g_{02}$ = -0.217), whereas students who have the same religious beliefs as their grandparents are higher in Achieving Motivation. In Asia many young people are brought up or strongly influenced by their grandparents. This is especially true in countries and regions where the extended family is of cultural and practical importance. Young people may spend more time with their grandparents than with their parents. Therefore, grandparents often have an important role in the cultural and attitudinal development of young people. If grandparents have strong religious beliefs, it is likely that these beliefs will have been passed on to their grandchildren (Yen Mah, 2000). If grandparents have positively influenced students' religious beliefs, this influence is likely to remain with them because it provides a measure of stability in their lives in a new academic setting and is related to the higher level of Achieving Motivation noted in this study and in a recently published study by Butcher (2002).



Figure 10.19 Effect of grandparents' religion (Granrel) on Achieving Motivation

Effect of Attendance at the University of South Australia or TAFE Colleges (UniSA) on Achieving Motivation

The equation for the effect of Attendance at University of South Australia (UniSA) or TAFE colleges on Achieving Motivation is:

$$AM = \gamma_{00+} + \gamma_{04} * (UniSA) + \gamma_{10} * (Occasion) + r_{ii} + u_{0i}$$

By substitution

AM= $0.177 + (-0.189)*(UniSA) + 0.053*(Occasion) + r_{ij} + u_{0j}$ 

Figure 10.20 shows the effect of attending the University of South Australia (UniSA) on Achieving Motivation where, UniSA = 1 and another university =0.

Students who attend the University of South Australia or Adelaide TAFE (Adelaide College of Technical and Further Education) are much lower in Achieving Motivation ( $g_{04}$ =-0.189) than students who attend either Flinders or Adelaide Universities. This effect is significant (p=0.037).



Figure 10.20 Effect of attending UniSA on Achieving Motivation

The information that may be deduced from these data is that students who attend Adelaide or Flinders Universities may be more academically inclined and more motivated to achieve than University of South Australia students or those who come to Australia to study English at the tertiary level as TAFE students.

#### Effect of Country of Birth (Country) on Achieving Motivation

The equation for the effect of Country (Country) of Birth on Achieving Motivation is:

 $AM = \gamma_{00} + \gamma_{05} (Country) + \gamma_{10} (Occasion) + r_{ij} + u_{0j}$ 

where

 $AM = 0.177 + 0.166*(Country) + 0.053*(Occasion) + r_{ij} + u_{0j}$ 

Figure 10.21 shows the effect of the Country of Birth (Country) on Achieving Motivation, where less developed countries = 1 and developed countries = 0.



Figure 10.21 Effect of Country of Birth on Achieving Motivation

Students who come from less developed countries are higher in Achieving Motivation compared with students from more developed countries ( $g_{05} = 0.166$ ). The difference is significant (p=0.047). This is understandable because students from countries less developed than Australia are generally sent to acquire skills needed to improve the technology, education and agriculture in their own countries. These students are likely to have been chosen because of their high motivation to achieve and enthusiasm to learn skills to take back to their own countries after study in Australia as well as their awareness of the particular needs of their home countries (Butcher, 2002; Cannon, 1999; Chan, 1988).

#### Examination of interaction effects

# The effect of interaction of Language Spoken (Speak) with Occasion and Achieving Motivation

The Occasion slope  $(\beta_1)$  has one significant variable that interacts with Occasion and the outcome variable Achieving Motivation.

The equation for the interaction between the variable and the Language that students use outside classes (Speak), Occasion and Achieving Motivation is:

$$AM = \gamma_{00} + \gamma_{10} (Occasion) + \gamma_{11} (Speak)*(Occasion) + r_{ij} + u_{1j}$$

By substitution

$$AM = 0.177 + 0.053*(Occasion) + (-0.104)(Speak)*(Occasion) + r_{ij} + u_{1j}$$

Figure 10.22 shows the relationship between the Language Spoken at Home (Speak), Occasion and Achieving Motivation, where English = 1 and home or another language = 0.

Students who speak English when they are away from the tertiary institution they attend show a slight, but significant (p=0.032) decrease (-0.051) in Achieving Motivation, whereas students who prefer to use their home or another language show an increase in Achieving Motivation.



Figure 10.22 Effect of interaction of Language Spoken at Home, (Speak) Occasion and Achieving Motivation.

Speaking their home language may have a positive influence on their motivation to achieve. It may help students to retain cultural ties with the country they expect to return to when they complete their studies. Retention of cultural links assists and encourages achievement.

# Analysis of the Achieving Strategy dimension

Final estimation of fixed effects, reliability estimates, and estimates							
of variance compon	ents fo	r Achie	ving Stra	tegy (w:	ith robust	t standard	
errors):							
			Standard		Appi	rox.	
Fixed Effect	Coeffi	cient	Error	T-rati	o d.f	. P-value	
For INTRCPT1,	BO						
INTRCPT2, G00		0.209	0.082	2.55	150	0.011	
AGEGP, G01		0.222	0.093	2.40	150	0.017	
MOMINFLU, G02		0.174	0.091	1.91	150	0.056	
For OCCASION slope	, B1						
INTRCPT2, G10		0.127	0.048	2.64	150	0.009	
HOURS, G11		-0.267	0.059	-4.55	150	0.000	
COUVIS, G12		0.113	0.062	1.83	150	0.067	
Final estimation of	varianc	e compoi	nents for A	Achievin	g Strategy	:	
Random Effect	p St	andard	Variance	df	Chi-squar	e P-value	
	De	eviation	Component	t			
INTRCPT1, U0	0.190	0.248	0.062	148	190.4	0.011	
OCCASION slope, U1	0.156	0.147	0.022	148	189.7	0.012	
level-1, R		0.959	0.920				
Deviance Null = 167	5.62 for	2 parame	eters Final	1 =1654.	33 for 4 p	arameters	
Variance explained	$\sigma^{2}_{00}$	$ au_{00}$	$\sigma^{2}_{OCC}$	$\tau_{OCC}$	$\sigma^{2}_{final}$	$ au_{\mathrm{final}}$	
	1.039	0.048	0.918	0.075	0.919	0.063	
Variance partitioned	$\sigma_{00}^2 / \sigma_{00+}^2 \tau_{00} = \tau_{00/}$		$\sigma^2_{00}+\tau_{00}$	$\sigma^2_{00}$ - $\sigma^2_{\text{final}}$	$\tau_{00} = \tau_{00} = \tau_{00}$	$ au_{ m final}$ / $ au_{ m 00}$	
	0.956	0.04	14	0.115	0.160	)	
Total Variance explained For Achieving Strategy = 0.1173							

 Table 10.10
 Final estimation of fixed effects for Achieving Strategy

Table 10.10 shows the results of the analysis associated with the Achieving Strategy scale of the SPQ. The Occasion slope in the final model has a positive value of ( $g_{10}$ = 0.127) that is significant (p=0.009). This indicates that scale scores associated with the Achieving Strategy scale have increased over the time of measurement after allowance is made for the effects of the Level-2 variables that are statistically significant.

# The final estimation of direct effects on the Achieving Strategy scale

For the Achieving Strategy variable, the final intercept,  $(\beta_0)$ , at Level-2 has two significant variables: Age Group (Agegp) and the Most Influential Person in a student's early life (Mominflu).

#### The effect of age group on Achieving Strategy

The equation for the effect of Age Group (Agegp) on Achieving Strategy is:

 $AS = \gamma_{00+} + \gamma_{01} * (Agegp) + \gamma_{10} * (Occasion) + r_{ij} + u_{0j}$ 

By substitution

 $AS = 0.209 + 0.222(Agegp) + 0.127*(Occasion) + r_{ij} + u_{0j}$ 

Figure 10.23 shows the effect of Age Group (Agegp) on Achieving Strategy, where over 25 years = 1 and 25 years or less = 0.



Figure 10.23 Effect of Age Group (Agegp) on Achieving Strategy

Older students are significantly higher ( $g_{01}$ =0.222) in Achieving Strategy (p=0.017) than younger students. Once again, the background of the students involved must be considered. If older students are sent by their country or work group to learn about new technological advancements in a Western country like Australia, they are likely to be highly motivated to achieve. These students may be expected to use strategies that assist them to achieve at a high level so they are able to learn as much as possible to take back to their home countries on their return. Ward et al. (2001) have found similar results in their research.

#### The effect of the Most Influential Person on Achieving Strategy

The equation for the effect of mother's influence (Mominflu) on Achieving Strategy is:

 $AS = \gamma_{00+} + \gamma_{02} * (Mominflu) + \gamma_{10} * (Occasion) + r_{ij} + u_{0j}$ 

By substitution

 $AS = 0.209 + 0.174(Mominflu) + 0.127*(Occasion) + r_{ij} + u_{0j}$ 

Figure 10.24 shows the effect of the Most Influential Person (Mominflu) on Achieving Strategy, where mother = 1 and another person = 0.



Figure 10.24 Effect of mother's influence (Mominflu) on Achieving Strategy

The second significant variable that affects the intercept ( $\beta_0$ ) relates to the most influential person in a student's early life. Students who say that their Mother has been the most Influential person in their early lives are higher in Achieving Strategy ( $g_{02}$ =0.174) than students who say other people have been more important influences. Mothers' Influence is marginally significant (p=0.056) in its effect on Achieving Strategy. However, the effect of increasing Achieving Strategy confirms the importance of mothers as people who encourage high levels of achievement, in particular (Butcher, 2002; Yue and Ng, 1999).

#### Examination of interaction effects

The Occasion slope ( $\beta_1$ ) associated with the Achieving Strategy outcome variable has two variables that have significant interaction effects: Hours of Study (Hours) and Countries Visited beyond Asia (Couvis).

#### The effect of interaction of hours of study (Hours) with Occasion and Achieving Strategy

The equation for the interaction between Hours of Study (Hours), Occasion and Achieving Strategy is:

 $AS = \gamma_{00} + \gamma_{10} (Occasion) + \gamma_{11} (Hours) * (Occasion) + r_{ij} + u_{1j}$ 

By substitution

$$AS = 0.209 + 0.127*(Occasion) + (-0.267)(Hours)*(Occasion) + r_{ii} + u_{1i}$$

Figure 10.25 shows the interaction between Hours of Study (Hours), Occasion and Achieving Strategy, where 10+ hours =1 and less than 10 hours = 0.



# Figure 10.25 Effects of interaction of Hours of Study (Hours) with Occasion and Achieving Strategy

Students who spend more than ten hours a week on study beyond their classes show a large decrease (-0.140) in Achieving Strategy ( $g_{11}$ = -0.267) and this interaction effect is highly significant (p=0.000) over time. This observation may result from a change in approach to learning that is necessitated by a difference in methods of assessment practised in Australia. In Asian countries education is examination-dependent (Biggs, 1996); Tang, 1996; Tang and Biggs, 1996) whereas Western education tends to depend more on written assignments and oral presentations as the primary methods of assessment.

#### The effect of interaction of Countries Visited (Couvis) with Occasion and Achieving Strategy

The equation for the interaction between Countries Visited (Couvis), Occasion and Achieving Strategy is:

AS =  $\gamma_{00} + \gamma_{10}$  (Occasion)  $\gamma_{12}$  (Couvis)*(Occasion) +  $r_{ij} + u_{1j}$ 

By substitution

 $AS = 0.209 + 0.127*(Occasion) + 0.113(Couvis)*(Occasion) + r_{ij} + u_{1j}$ 

Figure 10.26 shows the relationship between Countries Visited (Couvis), Occasion and Achieving Strategy, where countries beyond Asia = 1 and Asian countries only or no travel = 0.

Figure 10.26 shows that students who have travelled beyond Asia before coming to Australia show a higher level (0.240) of interaction with Occasion and Achieving Strategy than students who have visited Asia only or have not travelled before coming to Australia. This difference has a marginally significant effect on Achieving Strategy over time (p=0.067).



Figure 10.26 Effects of interaction of Countries Visited (Couvis) with Occasion and Achieving Strategy

The variable, Countries Visited, is similar to Travel except that with the variable Travel any travel beyond the home country is considered significant. Here consideration is given to two factors: (a) greater distances travelled and (b) travel for periods of a month or more. Travel of any kind gives individuals the opportunity to experience life in different living and learning environments. This may explain why students who have travelled beyond Asia also show a marginally higher level of Achieving Strategy compared with students who have only visited Asian countries that are socially and culturally similar to their home living and educational environment. Ward and Kennedy (1993a, 1993b, 1999) have confirmed this in their research with students who travelled to different cultures and countries to live and study.

#### Interaction effects for the Achieving Approach to learning

Figure 10.27 shows the direct and interaction effects for the Achieving Approach to learning involving both the Achieving Motivation and Achieving Strategy scales of the SPQ. At Level-1, the significant occasion slopes are shown as solid lines. At Level-2, an effect that influences the outcome variable directly is indicated by a long dashed line and an interaction effect that involves both the outcome variable and the predictor variable Occasion is indicated by a line composed of long dashes and dots.

# Concluding summary of effects on learning

Table 10.11 presents a summary of the effects recorded in this chapter on the approaches to learning. The following abbreviations have been used in this table: Surface Motiv-Surface Motivation, Surface Strat-Surface Strategy, Deep Motiv-Deep Motivation, Deep Strat-Deep Strategy, Achiev Motiv-Achieving Motivation and Achiev Strat-Achieving Strategy. Table 10.11 also presents the significant Level-2 characteristics associated with learning, their meaning and the acronyms used.



Figure 10.27 Summary of HLM effects for the Achieving Approach to learning

(Standard error values are given in parentheses in the figure)

#### Changes in learning approaches over time

Five of the six scales associated with learning show significant changes over time. These changes are shown as the adjusted occasion slopes and denoted in bold font in Table 10.11. Surface Motivation decreases ( $g_{10}$ = -0.87) while the Deep Motivation ( $g_{10}$ =0.073) and Strategy ( $g_{10}$ =0.164) and Achieving

Motivation ( $g_{10}$ =0.053) and Achieving Strategy ( $g_{10}$ =0.127) increase over the time of measurement. Therefore, it would appear that there has been a general shift from a Surface to a Deep approach to learning accompanied by an increase in the Achieving approach to learning in CHC students over time in Australia.

This study has provided evidence that learning approaches do change measurably over a two year period. The important questions are: why do some groups of students' approaches to learning change whereas some do not change and other groups remain the same?

A key point in understanding why the learning approaches change is knowledge of the Australian teaching and learning environment. The Australian way of teaching appears to be different to what students from Confucian cultures are accustomed to and it is this difference that would seem to be producing changes in some students' approaches to learning. Different teaching approaches and learning environments can generate changes in motivations to learn that, in turn, require different learning strategies.

Table 10.11	Predictor and	interaction	effects	for	learning

	Surface Motiv	Surface Strat	Deep Motiv	Deep Strat	Achiev Motiv	Achiev Strat
Direct effects; Adjusted occasion slope	-0.087†	-0.070	0.073	0.164	0.053‡	0.127
(Slope at $\beta$ 1)						
Gender-sex of students					0.216†	
Female = 1, Male = $0$						
Granrel-grandparents religion					-0.217	
Different beliefs to grandparents $= 1$						
Same beliefs as grandparents =0						
Agegp-age group of student					0.206	0.223
Over $25 = 1$ , 25 years or under = 0						
Mominflu-Most influential person in		0.147				0.174‡
childhood - under five years						
Mother = 1, Another person= $0$						
Arinoz – When student arrived in		0.134				
Australia						
>1 year ago = 1, $<1$ year ago = 0						
PREST-Where student prefers to study			-0.166			
Home = 1. Not at home = $0$						
Prefer How the student prefers to study			0.189			
Alone = 1. With others = $0$						
Trip –Student lived overseas before				0.280		
coming to Australia						
Trip = 1. No trip = 0						
Country -Country of birth					0.166	
Less developed=1. Developed = $0$						
UniSA-University attended by student					-0.189	
UniSA or TAFE = 1. Another						
university =0						
Parrel- Parents' religion				0.166		
Different beliefs to parents = $1$ Same						
beliefs as parents =0						
Interaction effects						
Study Student's major area of study	0 1 2 1	0 155				
Business subjects=1 Other subjects=0	0.121	0.100				
DUSINESS Subjects-1, Other Subjects-0	_0 113					
Home = 1. Not at home = $0$	0.115					
Parrel Parents' religion	0 111					
Different beliefs to parents = $1$ Same	0.111					
beliefs as parents =0						
Hours Hours of study			-0 093	-0 156		-0.267
$10\pm$ hours and weak $=1 < 10$ hours			-0.095	-0.130		-0.207
$10^+$ hours each week $-1$ , $<10$ hours						
Couvis Countries visited before coming						0 113+
to Australia						0.113+
Beyond Asia = 1 Asia only = 0						
Travel Travel before coming to		_0 115				
Australia		-0.113				
Travel = 1 No travel 0						
Speak Language and ten at home in					_0 104	
Australia					-0.104	
English = 1. Home or other language=0.						
English = 1, frome of other language=0						

+These variables are significant at the ten per cent level +All significant slopes and effects are shown in bold font

Research discussed in Watkins and Biggs (1996, 2001b) notes that Asian students previously considered surface learners often become deep learners if they encounter learning environments that encourage and promote this change. In Australia, these observations are confirmed by students in the study sample who have generally shown a change to a deeper, more problem-based learning approach. Importantly, the

fact that the Surface Approach to learning generally decreases over the time of the study at the same time as the Deep Approach increases indicates that some groups of students who come to study in Australia clearly change their approach to learning. Achievement seems to be a crucial factor to students from Confucian cultures. This is shown by the fact that both Achieving Motivation and Achieving Strategy have, in general, increased over the time of study in Australia. An important longitudinal study has reported that a change in cultural and educational environment can lead to change in approaches to learning. The results are discussed in publications by Renshaw and Volet (1995), Volet and Renshaw (1994, 1995, 1996), and Volet, Renshaw and Tietzel (1994).

# Differences between groups of students shown by Level-2 direct effects

1. Age of students. Older students (Agegp) are higher in Achieving Motivation and Achieving Strategy. Older students in this study appear to be more highly motivated to succeed in their studies than the younger students. They seem to be motivated to make a greater effort to study than younger students and to use strategies that assist them to achieve better results.

2. Gender of students. Women are higher in Achieving Motivation than men in this study. Women may feel a greater need to achieve and therefore, are more highly motivated to achieve in Australia than men from CHC cultures. Further, if these students are married, their families and their Asian work-place group may be encouraging them to reach higher levels of achievement. Berry and Sam (1997) and Ward et al. (2001) have found similar results in their research.

3. Most influential person. Students who say their mothers (Mominflu) have been the greatest influence during their pre-school years are higher in both Surface and Achieving Strategies. Mothers encourage higher levels of excellence and seem to demand higher academic outcomes than other, less involved persons. Therefore, students influenced by their mothers' encouragement would appear to choose to use Surface and Achieving Strategies to assist them to succeed at a higher level in their chosen area of study.

4. Grandparents' religious beliefs. Students who have different religious beliefs to their grandparents (Granrel) are lower in Achieving Motivation than those who have the same religious beliefs as their grandparents. These students may have rejected their traditional religious beliefs or may have sought a new support network that a different religious group is able to provide and one that has replaced the encouragement to achieve and succeed given by grandparents and the extended family in Asia. Butcher (2002) has reported that overseas students in New Zealand often seek the companionship of others from their home culture through interactions with religious groups.

5. *Time of arrival in Australia*. Students who have been in Australia (Arinoz) for more than one year are higher in Surface Strategy than students who have been in Australia for less than one year. A superficial approach that uses more rote memorisation may assist those students who have been in Australia longer to achieve the qualifications they are seeking from their study in Australia.

6. *Students' preferred place and manner of study*. Students who study alone (Prefer) and away from home (Prest) are higher in Deep Motivation than students who prefer to study with other students in a group or at home. Finding a quiet place to

study on their own enables most students to ponder over what they are learning and to try to produce good written assignments in English.

7. *Parents' religious beliefs*. Students who have different religious beliefs to their parents (Parrel) are higher in Deep Strategy. These students read widely and relate what they are studying to previous knowledge. This may lead to a change in religious beliefs that, in turn, leads to the development of a deeper strategy towards learning.

8. Attendance at UniSA or TAFE. Students who attend University of South Australia (UniSA) or the Adelaide College of TAFE are lower in Achieving Motivation. These students would appear to be less motivated to achieve than students who attend the other two universities in South Australia and may not be seeking the rewards that a higher level of achievement is able to provide. They also may not be as motivated to compete for high grades as students from the other universities.

9. Development of the home country. Students who come from less developed countries (Country) are higher in Achieving Motivation than those students who come from more developed countries. Many of these students have been sent to study and develop skills desired by their home work group or educational institution. Therefore, these students would seem, in general, to be more highly motivated to do whatever is required to achieve at a higher level.

10. Previous travel. Students who have travelled before coming to Australia (Trip) are higher in Deep Strategy than those who have not had the opportunity to travel. Their previous travel would appear to have shown them more of the world than students who have not travelled. These students generally seem to prefer a deeper learning strategy compared with those who have never travelled. Previous travel may also have heightened their interest in what they are studying and encouraged them to use deeper strategies in their academic studies.

# Differences between groups of students shown by Level-2 interaction effects

1. Subject of study effects. Students who study business and commerce subjects (Study) show interaction effects with the Surface Motivation and Surface Strategy learning scales. The interaction effect with Surface Motivation does not show a significant change over the occasions of measurement, but the interaction with Surface Strategy shows an increase in this effect. Further, it shows a trend over time by students who study business subjects to use a more superficial strategy in their learning. These students may be using rote memorisation as a learning strategy whereas students who study other subjects may find a deeper learning strategy more helpful in achieving high learning outcomes.

2. Students' preferred place of study effects. Students who prefer to study at home (Prest) show a greater decrease in Surface Motivation over the five occasions of measurement than students who study away from home. The students who study at home may find that they are not as motivated to use a superficial approach to learning as they were in their country of birth. Moreover, it should be noted that this decrease in Surface Motivation is not accompanied by an increase in a deeper approach by this particular group of students.

3. *Parents' religious beliefs effects*. Students who have different religious beliefs (Parrel) to those of their parents show no significant change in Surface Motivation over time. They may have changed their religious beliefs but this has not affected the

motivation that directs their study. However, students who have not changed their religious beliefs show a significant decrease in Surface Motivation.

4. Student travel effects. Students who have travelled (Travel) before coming to Australia to study show a greater decrease in Surface Strategy over time compared with students who have not travelled. Students who have travelled may have been influenced by what they have seen and experienced and this influence is shown by a decrease in Surface Strategy.

5. Hours of study effects. Hours of study (Hours) is a variable that shows interaction effects with three approaches to learning. In the case of the Deep Motivation and Deep Strategy scales there is no significant change by students who study more than ten hours each week over the occasions of measurement. However, there is a strong interaction effect with the Achieving Strategy learning scale. This effect shows that students who spend more than ten hours each week studying show a decrease in Achieving Strategy whereas students who spend ten hours or less show an increase in Achieving Strategy over the five occasions of measurement as well as an increase in Deep Motivation and Deep Strategy. While this finding may on the surface appear to be anomalous, it suggests that such students are thinking about their work and making more efficient use of their time in contrast with those who spend longer hours studying, but continue to employ a surface approach to their learning through extensive use of rote memorisation.

6. Students' preferred language effects. Students who speak English (Speak) rather than their home language in their free time show a marginal decrease in Achieving Motivation over time. Such students may be engaged in activities that are apart from their studies such as working part time in cafes and restaurants. Therefore, speaking the home language may positively influence their motivation to learn.

7. *Effects of countries visited on students' learning.* Students who have travelled beyond the Asian region (Couvis) show a marginal and positive interaction with the predictor variable Occasion and the outcome variable Achieving Strategy. These students have travelled further and longer than other students who have travelled less or not at all and consequently are likely to have been commensurately affected by their travel. This effect is reflected in an increase in Achieving Strategy over the occasions of measurement.

# Conclusion

This chapter has analysed and compared the final models of the six scales associated with the approaches to learning. The estimates have been derived from the administration of the Study Process Questionnaire (SPQ) (Biggs, 1987b) on five occasions over two years. One Level-1 predictor variable, Occasion, has been used in all the estimations to assess change in approaches to learning over time of study in Australia. The chapter has also considered Level-2 or between-student relationships of two kinds: (a) those variables that have a direct effect on the outcome variables and (b) those variables that show an interaction effect between the Level-1 predictor Occasion, a particular Level-2 variable and one of the six outcome variables. The chapter has also considered the final estimates of effects for the explanatory models associated with the six approaches to learning. The data show that changes associated with five of the six approaches to learning are statistically significant, but not for all groups of students. These changes indicate that some groups of students' approaches to learning appear to have changed or have been modified over time in the Australian learning environment. Further, the data show that the Surface Approach to learning has generally decreased while the Deep and Achieving Approaches have increased.

# **11** Asian Students' Impression of Australia

### Introduction

This chapter examines Asian students' responses to the questions posed at the small group interviews that were conducted between the fourth and fifth data collections. The students were asked about their impressions of living and learning in Australia. In order to focus this information, the students were asked to consider the following question and then formulate a response:

Imagine when you return to your home country that you are asked to present a seminar for students about to come to Australia to live and study at university. What would you talk about?

In order to assist students to recollect their feelings and shape their responses, several additional prompt questions were used. All questions are recorded in Table 11A.1 in the appendix to Chapter 11.

Student impressions are based on data from tape-recorded student interviews and records of informal conversations with students in the study sample. The themes and trends identified in the data are corroborated with findings from previously published research.

The chapter is divided into five parts: (a) students' impressions of the differences in lifestyle they encountered, problems of adjustment to living in a Western environment using a new language, adapting to Western customs, and the availability of information technology; (b) differences in teaching and learning styles, adjustments required to study in a new language, parental involvement and familial expectations about the outcomes of study in Australia, academic assessment of work in Australia and the effects of part-time employment on learning; (c) how and with whom students spent their leisure time; (d) an examination of factors that have led to changes in values and approaches to learning after a period of time in Australia; and (e) special memories and highlights of students' time in Australia, whether students' expected that their Australian experiences would remain part of their lives in Asia and

whether the students had particular anxieties or expectations of anticipated changes in living on their return to Asia.

The information that is presented in this chapter relates to the principal research questions concerned with (a) the values of the students interviewed; (b) their preferred approaches to learning; and (c) the personal antecedents, living and working conditions that influence students' values and approaches to learning.

The major question and prompts sought to ascertain what values the students held at the time of the interview and how they preferred to learn. In order to investigate whether students perceived that they had changed since their arrival in Australia, the prompt questions were used to try to assess any apparent change in either values or approaches to learning from the students' perspective. The prompt questions are the four major questions with their associated parts that are found in Table 11A.1 and asked the students to compare living and learning in Australia to their home environment in Asia. If students responded that things were different, the investigator's response was, 'in what ways do you think things are different?' These questions led to group discussions about the reasons for their responses and what they did to overcome negative feelings. Their responses showed that all students did not handle these feelings in the same ways and further, that some students had not experienced either boredom or loneliness that has been cited in the literature as one of the consequences of study in a new and different cultural environment (Burns, 1991). Their responses were partly reliant on values and attitudes that they brought with them to Australia. In many cases the students said that they handled these situations easily while other students encountered difficulties. Still other students said that they could handle being alone better after having lived in Australia for several years away from their home and family. The wide range of replies to each of these questions made direct comparisons to previous value structures difficult. Nevertheless, it has been possible to compare students' attitudes and values expressed in the interviews with material from research that described students' feelings and reactions in Western cultures such as Australia to attitudes and values in their homes countries in Asia (Hwang et al. 2003; Samuelowicz, 1987; Tam and Watkins, 1995; Tan and Goh, 1999; Ward et al., 2001).

Therefore, it is argued that changes in living circumstances led to changes in the value structure in some but not all groups of students. This was accompanied by appreciable changes in some but not all students' approaches to learning over the time of this study.

The interviews were done in groups of three to five students. The reason for group interviews was the observed Asian preference for working in groups and the social and moral support that a group setting provided for its members (Stevenson and Stigler, 1992; Stigler and Hiebert, 1999). Interviews were conducted in English but students were able to ask each other or the interviewer questions in Chinese if clarification was required. As with the written questionnaire data, information was the desired goal hence the choice of language was left up to the student. The interview was not intended to be stressful; therefore, any way in which potential anxiety could be reduced was pursued.

The data that are included in this chapter may appear to be peripheral to the principal areas of concern in this study, namely whether values and approaches to learning change over time in a new social, physical, cultural, and educational environment. However, it is argued that students' responses reflect their personal feelings and reactions to situations and issues raised. Therefore, the students' responses complement their values as measured within the time frame of the study. Further,

many of the responses to the issues that are discussed relate to the ways in which the students said they adapted to living and learning and the academic environment in Australia. Where reference is made to other investigators' research, it is because that research reflects or contrasts with students' responses to issues that have been discussed in the interviews. Therefore, if particular groups of students have noticed that living in Australia has changed them, then it is likely that their values and approaches to learning may have been modified in some way since their arrival from Asia. Further, the very broad range of students' responses to the interview questions has provided an indication of the breadth of change rather than specific details.

The responses the students offered have not been attributed to particular students and students have not been identified in any way. This has been done for several reasons: (a) many students provided similar responses to the same questions; (b) the intention of the investigator has been to gather information and impressions and not identify the respondents in any way by linking them to the data that have been collected; (c) the desire of the researcher to protect the identity of those students who have participated in the interviews as most of the students were from the same tertiary institution.

## **Differences in lifestyle**

#### The effect of interpersonal relationships on values

In Confucian heritage cultures (CHCs) parents and teachers are the principal forces that shape students' values. In Western societies, the peer group is considered to be an important influence on value formation and the school and the teacher would appear to have only a minimal influence on students' values (Astill, 1998). However, it is quite different in CHCs where the hierarchical line of influence moves from the family to the teacher and the school and then only very incidentally to the impact of the peer group.

Most students interviewed indicated that this line of influence occurred in their home countries and they missed the assurance it provided when they came to Australia to study. Ninnes (1995) found that the pathway of influence in migrant students was moderated by the length of time students had been away from Vietnamese culture and also the age of the students when migration to Australia occurred. Guan and Dodder (2001) found that time away from the home environment in East Asia was a key factor in value retention and that after a period of two years or more away from their home culture, CHC values began to diminish in importance. The present study considered the impact of change on sojourner students' values. Therefore, it is argued that any perceived need to change values was likely to be related to the length of time away from the home culture and family who were instrumental in value formation as well as the fact that the students in this study planned to return to their home culture upon the completion of their studies. These factors might not give rise to the marked changes in values that were noted by Feather (1986) and Ninnes (1995) in migrant students. Even if change did occur, it might not occur in all groups of sojourner students and might not be permanent in these students.

Most students interviewed indicated that they felt the need to make adjustments early in their Australian sojourn. The major areas of concern related to the changed living situations and learning environment particularly as English was now their principal language of communication both at the university and in the wider community. However, students said that it took time to adapt to new living arrangements, to find suitable accommodation and food and to adjust to the lifestyle in Australia.

#### Mixing with Australian students

Bohm (2002) and Smart, Volet and Ang (2000) examined the hope and intention that overseas students had of mixing with Australian students both in and after classes. They noted that CHC students came to Australia with the desire to mix with students who had similar academic interests. Many Asian students had attempted to mix but they found that most Australian students were not really interested and some were openly hostile toward Asians. This was confirmed in interviews with postgraduate students in this study. The CHC students commented that overseas students who looked like Australians blended in and seemed to be warmly welcomed whereas Asians were noticed and avoided. Therefore, the hope of inclusivity and the appreciation of difference that was held by many Asian students died stillborn and forced Asians to mix with other Asians if they wanted social contact and interaction with other students while they were living and studying in Australia.

Students interviewed in the International Students Association rooms said they were more comfortable living and working with other Asians, even ones to whom they could only speak in English. They said that it was easier to mix with people from the same cultural background who knew and understood the values that were important to the Asian way of life even if they had to use English to communicate. Many of the English-speaking Asians came from Singapore where the first language was English or from Malaysia where many Chinese-Malaysian students had also grown up speaking only English although in both of these groups some students were able to speak or understand one or more Chinese dialects.

#### Language difficulties that cause a lack of mixing

Another reason that was cited by students for lack of mixing was that Australian students spoke too quickly and used unfamiliar slang. The TAFE students interviewed felt that teachers and lecturers should give additional assistance to students whose first language was not English. Some students said that by the time they understood Australian English it was almost time to return to Asia. Some students also commented that lecturers and tutors spoke more slowly to them on a one-to-one basis as well as in class if there were other Asians doing the same course particularly at the postgraduate level. However, the reactions were mixed. Some students commented that Asians were misunderstood in Australia and some students from Mainland China remarked that some Australians seem to shout at them when they spoke and treated them as if they were deaf. This opinion was expressed by a number of Chinese students in separate interviews and was clearly a reaction that was often encountered when people did not appear to speak the same language.

Therefore, a change in ways of living might lead to values associated with knowledge and education seemed to be questioned by some groups of students. For example, non-competitiveness is a value associated with the Confucian value system. Values associated with this system were found in this study to drop over time for some groups of students, whereas solidarity with others was a value associated with the Loyalty dimension. Values associated with this dimension were found to rise over the time of this study in some groups of students. However, the change detected was not universal.

#### Language and living in a new culture

Language affected everything students did: shopping, asking for street directions, understanding the many forms that must be filled in and even crossing the street. Supermarkets and local shops had employees who generally had had little experience

understanding languages other than English. If students wanted to purchase things they often had to spend time finding out where specific foods or other necessities were located in the supermarket if their English was limited. Today a significant proportion of the larger shops are self-service and although such shops are found in most parts of the world, the disposition of goods and services is not universal. Therefore it takes time, concentration and physical stamina to learn to shop in a new language and culture as the arrangement, labelling and location of items is often different.

#### Travel and shopping

Asking directions and crossing the street in Australia could be problematic if students were not familiar with Australian road and traffic conditions. If students came from countries that had been under British or Dutch colonial governance, the adjustment seemed easier as in Australia people drive on the same side of the road and street signs have a similar physical orientation. However, if students came from countries or societies where the traffic followed a different pattern, for example Cambodia, Laos, Vietnam, Taiwan or Mainland China, the adjustment took longer. Some students commented that even the street names were located in places that seemed to be directly opposite to what was anticipated, thus requiring change and reorientation.

One issue that arose in most interviews was the difference in shopping hours. In Asia most shops were open longer, sometimes until 10pm. This permitted shopping after school or work. Most shops were also open over the whole weekend. The availability of extended shopping hours is only a very recent innovation in some parts of Australia.

#### The availability of information technology

Students had mixed reactions about the availability of information technology (IT). Postgraduate students who came from more developed countries like Singapore, Japan, Korea, Taiwan and Hong Kong said that the computers and other IT facilities provided by universities and TAFE Colleges in Australia were less advanced than those they had in their home countries where schools and universities had the latest equipment. Other students said that IT was more available here as was email access especially in the library. These students said that there was not as much money for IT in their home countries for students or even staff and therefore, IT facilities were often shared. Most students said that IT was easier to access in Australia even if computers and photocopiers were older or slower.

Therefore, when CHC students came to Australia to study, their first experiences were related to lifestyle changes. Many students underwent social and cultural changes as they had to learn to live and communicate in a new language. Some students experienced loneliness and disappointment at the overt lack of interest in mixing by local students and other were surprised by the initial hostility shown by Australian students. The process of adaptation caused changes in some groups of students and might have led to changes in values whereby some groups of values dropped, some remained the same, and others rose in their importance to identifiable groups of students.

## Differences in learning

A discussion of students' first impressions of Australia elicited similarities and differences made by comparisons with learning in Asia. Students were anxious to

discuss the differences they encountered in teaching styles between Asia and Australia and the role of the teacher in the two learning environments

#### **Differences in teaching styles**

Students interviewed identified differences in the methods of teaching. Most students said teaching in Asia was 'one-way,' from teacher to student and never in reverse as they had found in Australia. Students interviewed said that it took time to accept the apparent openness of lecturers in Australia. Asian students were not accustomed to questioning a teacher even when they did not agree with what the lecturer had said. Students who came from a Confucian culture would never openly challenge a teacher, as this was not an acceptable form of behaviour.

In Asia teachers were said to be held in especially high regard as both strong and respected role models and conveyors of knowledge. In Australia, however, many students had experienced some difficulties in trying to understand what was required of them by their lecturers. Comments came most often from postgraduate students who had to plan their time carefully as they were required to submit extended pieces of writing for assessment each semester. Students said that they would have appreciated clearer and even written instructions on the nature of the assessment tasks required for specific courses. Lack of definitive feedback and specific criticism on work assessed were seen to be areas where communication problems occurred. Students were cognisant of cultural difference and hoped that their Australian lecturers would accommodate diversity and appreciate difference. These comments are consistent with the research of Bretag et al. (2002), Kember, Wong and Leung (1999), Volet and Kee (1993), and Volet and Pears (1994).

Because teaching in Asia was generally one way, students seemed inclined to accept this difference and work with it rather than coming into direct conflict on issues that were not of great consequence to them. Postgraduate students commented on the benefits they derived from learning to develop and express a point of view even when it differed from that of their classmates or the lecturer. Moreover, the students noted that the confidence to express opinions developed and grew with experience in the Western learning environment. Asians generally did not debate and rebut in their home environment and therefore, were likely to find this challenging in a new cultural setting. Students said that they were willing to learn to discuss issues as long as they were confident in their capacity to substantiate a point of view with accurate information. The fact that students were prepared to use new learning approaches substantiated the argument that the approaches to learning of some groups of students were changing in different educational environments. This was particularly true for those students who felt that the change increased their level of achievement. As well, students said that given the time, they were able to adapt to specific course requirements, sometimes utilising extrinsic and at other times intrinsic strategies in order to achieve their desired goals.

#### Differences in the role of the teacher

Volet and Ang (1998) and Volet and Kee (1993) have reported that in Asia the teacher talked and the students listened and learned what the teacher said. Students in Asia still behaved in a manner that had been advocated since the time of Confucius where when the master spoke the pupils listened and then memorised the words of the master. In a modified form this behaviour still existed in Asia today. What the teacher said was not questioned. Teachers spent many years learning how to teach what they had learned. Their depth of knowledge was known and respected by students. This

#### Adjustments required to study in a new language

However, the methods that are employed to teach English, while natural in a Western learning situation, may seem difficult to rationalise with the Asian way of thinking and learning. Ballard has argued that in Asia, the macroskills of reading, writing, listening and speaking are taught separately (Ballard, 1996; Hill, 2003; Maley, 1983). In Western learning institutions these skills are integrated into what is often referred to as the communicative approach to teaching and learning. This is the principal approach that is used to teach both English and foreign languages in Western countries. This approach sees the teacher as a facilitator and classroom manager of learning that is student-based and owned. Westrup (2002) has found that this method of second or foreign language teaching is prevalent in countries such as England, Australia and in North America where English is used in everyday interpersonal communication.

In this study, when this approach to learning was practised with CHC learners in Australia, students from countries as diverse as Hong Kong, Singapore, Laos, Cambodia and Indonesia said they felt uncomfortable. The students said that they were used to a teacher-centred approach and learning from a textbook that often contained Chinese translations of new vocabulary incorporated into the text. The TAFE and undergraduate students interviewed said that the in-text translations facilitated learning. Further, the same students said that they were more comfortable and accustomed to lessons where drilling and repetition of words and phrases preceded learning and understanding. The internalisation of new materials was what Biggs (1996b, 2001b) referred to as deep memorisation. He argued that it was an intrinsic form of learning that CHC students said they preferred but did not always have the opportunity to use in Asia. Most groups of students expressed a preference to change from surface to deep learning over the time of this study and thought that deep memorisation was a useful technique to accomplish this change in their approach to learning.

#### Perceived differences in teacher and student roles in Australia

Smart and Ang (1993, 1996) argued that Asian teachers of English had extensive training not only as teachers but also in the language they were teaching. The teachers understood points of grammar and were accustomed to preparing students for examinations that generally preceded entry to higher levels of education. However, in the Australian education system when CHC students were faced with a communicative approach to learning, they commented that the lecturer expected students to do assignments and undertake examination preparation without their assistance even though many of the students initially did not feel prepared to carry out this work on their own. However, students seemed to be unwilling to ask their lecturers for more precise instructions, but detailed information was what the postgraduate students, in particular, said in the interviews was what they wanted and needed. Nevertheless, after a period of adjustment and a decrease in personal reticence, the CHC students with more detailed instruction on their assignments if

the students requested their help. It was asking for help and more direction that students said was most difficult.

There was, however, an additional issue that students stressed at several interviews. CHC students from Cambodia, Singapore and Indonesia said that when they did understand what was required, they were able to produce a standard of work that resulted in the superior grades they had received in Asia. The high standard of work was expected by those in their home environment and desired by CHC students who had only wanted and needed some initial assistance with procedural issues. These students said that they preferred to ask other CHC students who had been in Australia longer. This was the Asian way; the older, wiser and more experienced helped and supported the younger, less experienced students in their quest for knowledge and excellence (Stigler and Hiebert, 1999).

The use of a modified version of the communicative approach to learning that was advocated by Westrup (2002) would seem more suitable for sojourner CHC students. This approach could be combined with approaches that already existed in Asian countries that were based on learning the four macroskills separately. Therefore, it is argued that this combination would place both the learner and the teacher in a situation where the skills needed would be learned and the CHC educational culture would be respected. In addition, students' understanding of what is expected would be met and the knowledge and cultural norms students bring from Asia to Australia would be considered complementary additions to the learning environment. Further, the acknowledgement and appreciation of difference would be promoted.

Therefore, two areas in which most students interviewed found differences when comparing studying in Asia to learning in Australia were in the role of the teacher and the method of instruction. Teachers in CHC countries tended to be more didactic and prescriptive in what and how they taught. The Asian method of instruction was restricted in four principal ways: (a) by the nature of the curriculum that was set by national educational bodies; (b) by the extensive and sometimes superficial nature of the material that was required to be taught and learned; (c) by the way instruction was carried out; and (d) by the nature of the examination system (Kong et al., 1998; Stigler and Hiebert, 1999; Tang, 1999). Teachers perceived that one of their primary roles was to prepare students well for examinations that could, in many Asian countries, determine entry not only to university but also to particular universities.

The TAFE students interviewed said that they expected their teachers to be critical of poor efforts or results and these students endorsed the belief that greater efforts produced improved results. One student from Vietnam even commented that if she, as a student, were to argue a point with a teacher in her home country, the teacher would find a way to seek revenge and the student would certainly fail. However, her perception was that in Australia academic qualifications were not for sale and education here was what she called 'real' or 'genuine'.

#### Practical problems with a new language

Learning to think in a new language presented a real challenge. Students interviewed spoke of the strategies they employed to learn and improve their English. Some students found language exchange partners among their Australian classmates or friends. In this way the Australian students learned the Asian language and the CHC students were able to practise and improve their English. Beneficial as such an exchange was it did take time to learn to think in a new language. Students spoke of translating ideas back into their home language for six months to a year before they were able to think in English. Many students said this took longer because they were

older and had not learned to speak English as children. The same students said that reading and writing in English did not cause as many difficulties as listening and speaking did.

#### English in the classroom

The difficulty that was experienced with spoken English was magnified by the need to prepare and contribute actively to class or tutorial discussion. Students said that there were several reasons for this: (a) in Asia they were expected to listen to the teacher and not express their personal opinions in class; (b) the lack of spoken English language experience; and (c) the fact that oral work was not usually assessed or did not have the importance in CHC cultures that it did in Australia. According to Volet and Kee (1993), in Asia some participation was expected in tutorials but was generally not assessed as it was considered to be voluntary. However, in Australia active participation could be a major part of the assessment especially at the postgraduate level where students might be required to present seminars on current research in their area of study. The actual presentation and content were often peerassessed. CHC students found this to be a particularly harrowing experience as they had rarely done individual oral presentations in Asia or used English as the language of presentation. Almost every student interviewed commented on the genuine dread they felt when they were required to give an oral presentation. However, most said that after six to 12 months they actually enjoyed this form of assessment and many even said that they had come to prefer it to learning for examinations. Peer assessment was also a challenge because in Asia that role was always taken by the teacher.

#### Parental and family involvement in students' lives

Asian parents, like teachers, were exigent about student learning. High grades needed to be achieved to obtain entry to a good university and ultimately to a desirable career path. CHC parents also expected high moral standards as well as physical and academic excellence (Cheng, 1990, 2000). Parents and the extended family network considered the pursuit of academic excellence to be a family responsibility (Lau, 1996a, 1996b). A personal and financial sacrifice was often required if a student wanted to study, particularly overseas, but parents considered this to be part of raising and educating a child (Goodman, 2003). Young people accepted the sacrifice made in the knowledge that they, in their turn, would do the same for their own children. These expectations were mentioned by most students who did not seem to resent parental control and even expected it as a way to promote inter-generational bonding. Many students commented that it was not uncommon for parents and members of the extended family to save for many years to pay for their children to study overseas. Volet and Kee (1993) in their investigations confirmed this to be the situation for the students from Singapore who came to study in Australia.

In many Asian countries, grandparents were often the principal caregivers (Liu, 2000). A number of university students said they felt a greater affinity to their grandparents as their childhood has been spent in their company. CHC students in Australia confirmed that grandparents were an important influence on their attitudes, beliefs, and approaches to learning.

#### Expectations of university study

CHC students said that they preferred formal teaching and seemed to expect it in Australia. They saw the teacher as a model of: (a) knowledge and understanding, (b)

the way to speak correctly and teach young people, (c) good manners and formal behaviour, and (d) what a professional person should wear and how they should behave (Smart, Volet and Ang, 2000; Volet and Kee, 1993). Thus, many students interviewed found life in Australian universities uncomfortably casual. They commented that staff looked and dressed like students so that the line of demarcation between teacher and student did not exist. CHC students did not expect lecturers and tutors to waste time on social chitchat in class. They did not seem to care if they were not given the chance to express their personal opinions in classes, as they preferred to hear the lecturer's viewpoint and not the opinions of other students.

Students felt they were given much more freedom in Australia but freedom brought its own responsibilities. One of the areas most often mentioned was the need to develop good time-management skills. Students were not told what to do and how to do it. Therefore, students had to plan assignments in advance. They had to do the research and discover relationships in materials they read in order to undertake their assignments. If they were required to do a major essay for assessment, students said they had to plan the work at the beginning of the semester. However, they also commented that study in Australia seemed informal and they would have preferred to encounter the sense of urgency they had experienced in Asia (Cheng, 1995). CHC students felt that this would help them to organise themselves better.

Many overseas students commented on the freedom that Australian students had to say and do what they believed in. The need to be politically correct was not an issue in Australia as it was in some countries such as Laos, Vietnam and Mainland China where students said they were required to study political theory and pass examinations in order to proceed to the next level of study.

#### Assessment in Australia

Another area that brought a wide range of comments from students from all parts of Asia was the manner and method of assessment. In Asia the majority of assessment was done by formal examination, but in Australia, although examinations existed, particularly at the undergraduate level, most assessment was done by written assignments. Tang (1996) compared assessment by examination and written assignment and students' reactions to both forms of assessment. Tang's work was undertaken using Hong Kong students in their home setting. The problems that Tang's students encountered were magnified when students left their home support networks to study in Australia. All students who were interviewed commented on the initial difficulties they encountered with the written assignment as a form of assessment.

Therefore, Asian students seemed to find essay writing a real challenge. They said that they were not accustomed to structuring written responses to questions and citing references. Further, they were not used to arguing issues in writing and defending a point of view using prior research in the construction of an argument. Almost all students said they would like more detailed instructions on how to build an argument into an assignment. Most Australian students had had some training in writing assignments in secondary school as well as summarising information from external sources, whereas CHC students said they had had little or no experience in these areas. The students said they were able to find the information, but taking it to the next stage of extracting what was relevant to their argument presented genuine difficulties. Students indicated that analysing, synthesising and constructing coherent responses were the areas that caused the greatest problems. Therefore, CHC students perceived that they needed assistance in this area.

#### Student employment and learning

Burns (1991) found that the need to find part-time employment impacted on students' free time and leisure activities so that the need to work reduced leisure time significantly. Part-time employment was often necessary to bridge the financial gap. Students said that they had to use different learning approaches in order to achieve the desired academic standards in the time available if they worked.

This was particularly true when postgraduate students needed to look for part-time employment. Numerous students made remarks about the necessity to plan ahead because assessments were generally based on longer written assignments that required large amounts of library time. If they were also working part time, they said that they had to plan their available time very carefully. This often meant a modification of previously successful learning strategies because of the decreased preparation and research time available.

However, the extra money allowed the purchase of special foods and items that eased differences, strangeness and loneliness that accompanied the move to a new culture. A mobile telephone was one example of a desirable acquisition that allowed students to keep in touch with local friends and also their families in Asia. Therefore, it was argued that a change in living conditions and educational environment would appear to lead to changes in approaches to learning in some CHC students.

## **Preferred leisure activities**

#### **Differences between Asia and Australia**

Many students interviewed said that they had less free time in Asia because they lived in extended families and felt obliged to assist parents, spouses, children and close relatives outside their hours of work or study. These ties did not exist in Australia because their families were usually in Asia. Therefore, overseas students said that they had a lot of free time.

In Australia, many CHC students said that they experienced homesickness as they missed their family and friends and the faster pace of the Asian lifestyle. They said that they also missed the supportive extended family that was an important part of life in most Asian countries. These comments came from students from all the interviews especially those who came from rural areas or smaller cities and villages in Asia. They said that would like to meet their lecturers in a social setting as they did at university in Asia but students said Australian lecturers actively discouraged contact outside classes. Smart, Volet and Ang (2000) commented that in Asia, lecturers were like parents especially at the undergraduate level and often assisted students with social as well as academic problems.

#### The Asian choice of leisure activities and companions

In Asia students enjoyed shopping as a leisure activity. They could not do this in Australia because the shops were usually closed when they had free time. Instead they studied or read the news from their home country on the internet on their computers or in the university library. They also liked to play the latest computer games that were usually readily available in Asia. Asians said they preferred to spend the time with other Asians as they could speak their home language, had similar customs, and liked the same food. Some students also said that they enjoyed spending time playing tennis or other sports using the university facilities. In Asia, individual sport was for the wealthy as playing space was limited and joining sports clubs was very expensive.

#### Asian views on Western entertainment

During an informal discussion with a group of postgraduate students from Singapore, Cambodia and Laos, some interesting observations emerged about humour and entertainment. The Asian students commented that they found Western television and especially humour very blatant or as they said 'in your face.' The students said there were few nuances and very little skill required in the interpretation of what they saw and heard. They said that Asian forms of entertainment were subtler, had more finesse and contained many possible shades of meaning.

The same students felt that Western culture was more publicised in the media in all countries and therefore, more penetrating. They also said that because of the publicity and overexposure to Western media and other forms of entertainment that Asians were able to choose selectively that they wanted from Western culture. Moreover, the same students believed that Asians kept the best of their own entertainment and culture for themselves and were not inclined to share or explain the finer points of meaning of Asian humour. However, if a Western person was able to understand what was said in their language, the students were not concerned but did not feel inclined to explain their culture or traditions to non-Asians.

## Perceptions of changes over time in Australia

Students were asked if they thought their values or approaches to learning had changed during their sojourn in Australia. They were also asked about special memories of their time in Australia and their perceptions of adjustments needed to reenter life in a CHC culture.

#### **Changes in values**

Many students commented on the perceived need to think for themselves. This need had grown and developed since they had come to Australia to study. Students seemed to have greater confidence in their own ability to think more critically about issues and questions related to their studies. They said they had more freedom to express their own ideas in Australia. Many students said that they had found that their value system had become more open to change during their stay in Australia. They felt this change had been in response to living in a Western cultural environment. In addition, some of the postgraduate students perceived that they were more tolerant of difference. Students also said that living in a Western social environment had altered their attitudes and heightened their cultural awareness. Students' perception that change had occurred provided evidence that some groups of students had modified their value structure in response to a change in their social and cultural environment.

#### Changes in learning

Some students said that the changes encountered in styles of teaching in Australian universities led to differences in the way they learned. Exposure to new cultural experiences had been instrumental in the development of deeper approaches to learning in some groups of students. Many of the students felt that their approaches to learning had changed during their time in Australia. In particular, students learned to express personal opinions based on evidence.

#### Students' memories of Australia

Students were asked to discuss highlights of their time in Australia and particular memories they would take back with them to their home countries in Asia. The topic most often mentioned was the friendships they had made in Australia. For many of the students this provided a new dimension to the meaning of friendship, and with email and the internet they would be able to maintain their newly-established interpersonal relationships and friendships on their return to Asia.

Many students also mentioned the beautiful scenery they had seen and some of the special places they had visited. Others mentioned the fireworks displays they had seen especially during the millennium celebrations and other sky shows they had found novel and spectacular. To others, the beaches and the Australian native animals were a special memory and still other students commented on Australian homes, the space around each house and the beautiful gardens that people had created to make their homes unique. These comments came from students whose homes in Asia were in flats or densely populated urban regions. Most students agreed that the pace of life was slower when compared to that in Asia. However, they felt that they had more time to appreciate what they saw and learned because life was not as frenetic in Australia as it was in Asia even though they said they would have preferred a faster, more urgent pace in the learning environment.

#### Perceptions of readjustment to life in Asia

The final topic discussed was the students' perception of the process of readjustment to life in Asia on their return. This point was made because some students had made short visits and had experienced culture shock as they tried to fit into life in their Asian home environment during their brief return.

Some of the issues and concerns that students discussed about their permanent return to living and working in Asia were firstly, the loss of the ability to speak English on their return to their home country. Secondly, they mentioned that some students they knew had experienced career disadvantages on their return home. This had occurred in employment sectors associated with government systems where promotion was based on length of service rather than on actual qualifications. Some of the postgraduate students, in particular, were concerned that this might happen to them as they said it had happened to others before them. Further, when students were studying overseas they missed out on the social network formation that took place in their absence and they did not want to lose touch with friends and colleagues who were important in their lives and also provided a connection to opportunities for career advancement.

Cannon (1999) found similar instances in his research with Indonesians who studied overseas. Many of the students he interviewed said that they experienced what was described as 'reverse culture shock' in their attempts to re-enter their own culture after time spent overseas. These people appeared to be at a social and cultural disadvantage on their return home and were not able to re-establish relationships with former colleagues. Some of the returned students appeared to have an affective disadvantage after a period of overseas study. Some students said that they had experienced frustration with old ways of doing things and others had experienced jealousy among their peers because people who had not studied overseas were envious of those who had done so. The jealousy was often combined with a lack of acceptance of the newly-returned colleague. Many returned students seemed to live in an intercultural world for a period of time but most appeared to settle back into their own culture by resuming old ways.

the maintenance of the *status quo* (Cannon, 1999). It is hoped that other sojourner students returning to their lives in CHC cultures do not have similar negative experiences. However, it is an area that needs further investigation. Negative outcomes are more likely to be avoided if the acceptance of difference is actively encouraged in the receiving culture.

## Conclusion

This chapter has examined students' responses to living and learning in a new educational, social, and cultural environment. The opinions and ideas expressed were taken from a series of recorded interviews and informal conversations with 25 students from the sample of respondents in this study. Where appropriate, comparisons with the research of other investigators have been cited to substantiate recorded observations. Differences in living and learning that students have encountered were examined as were student impressions of the differences in values and approaches to learning encountered between Asia and Australia. The chapter concluded with a brief examination of students' perceptions of change in their value structures and approaches to learning in a new environment as well as perceived advantages and disadvantages of studying in an English-speaking Western environment.

# **12** Conclusion of the Study

## Introduction

This study has sought to examine the principles that guide the lives of students who have come from countries in East Asia to study in Australia at the tertiary level. Throughout this study they have been referred to as students from a Confucian heritage culture (CHC), a term first advanced by Ho (1986) to include students whose lives have been influenced by the teachings of Confucius. Most of the students have come from ethnically Chinese backgrounds. However, some have come from Japan, Korea, and enclaves in countries where the Confucian way of thinking and learning is considered to be important.

# The focus of the study

The focus of the study was an investigation of the values and approaches to learning that guided CHC students' lives. The primary goals of the study were to gain a greater understanding of the way CHC students lived and learned and to investigate whether their approaches to living and learning were retained, modified or changed in a Western social, cultural, and educational environment. A review of existing knowledge about the nature of Asian students' values and approaches to learning has given rise to the following questions: (a) what values were particularly important in the lives of CHC students; (b) what were CHC students' preferred approaches to learning; (c) was there a relationship between values and approaches to learning; (d) what were the personal characteristics of CHC learners; (e) did students' values change over time in Australia; (f) did CHC students' approaches to learning change over time in Australia; and (g) did the antecedents and attitudes that students brought with them to Australia influence or change their values and approaches to learning over time in a new physical, social and cultural environment? These questions formed the basis for the research questions that are discussed individually in this chapter and were the questions that were formally introduced, presented and discussed in Chapter 4.
The students in this study were sojourners who came to Australia to pursue their education and intended to return to their lives in East Asia on the completion of their studies. Therefore, no migrant students were consciously included in the study. The objective was to investigate the students' values and approaches to learning over a period of two years and to sample the population on five occasions. This constituted a longitudinal study that gathered information over sufficient time for any change that was occurring to become evident. The investigation was based on a multiwave design that allowed individual change to be examined over regularly spaced intervals.

A model based on the research questions was proposed and tested. Two questionnaires were used to measure values and approaches to learning and a demographic questionnaire was employed to gain background information about the students in the study. The data collected through the background questionnaire concerned students' gender, age, country of birth, religious practices, the number of hours spent studying outside classes, where and how they preferred to study, the length of time they had been in Australia, the language spoken outside classes, their main course of study, the influence of previous travel on their lives, the most influential person in their childhood, and the name of the tertiary institution where the students studied.

The values of the students in the study were measured using the *Chinese Value Survey* (CVS) (Chinese Culture Connection (CCC), 1987). The CVS was chosen for use because it included values that were deemed to be particularly important in Confucian culture. The *Study Process Questionnaire* (SPQ) (Biggs, 1987b) was used to measure students' approaches to learning. The CVS and the SPQ were self-report questionnaires that used Likert-type scales. They were selected for their availability in a bilingual format that permitted students to concentrate on the content of the questionnaires. The CVS and the SPQ were put on the internet for four of the five data collections.

In addition, small group interviews were undertaken. In these interviews the students discussed six areas of interest that they encountered in their Australian sojourn. They were concerned with: (a) lifestyle in an English-speaking Western culture; (b) teaching styles in Australia; (c) the assessment of academic work; (d) students' lifestyle in Australia; (e) values and approaches to learning in Australia; and (f) expectations of academic outcomes of study in Australia.

The study was based on an original sample of 153 cases. After five data collections there were 573 records as not every student participated on all five occasions. However, an average of just over 60 per cent did complete the questionnaires five times. Data were included in the analysis if a student responded to the questionnaires on at least two occasions. Therefore, the study sought to examine differences in values and approaches to learning of CHC students based on the measurement of change over time in a new living and learning environment.

## Consideration of the principal issues raised by the research questions

In Chapter 4, a model is presented and eight research questions are raised for theoretical consideration and statistical analysis. In the following section answers to the questions raised in testing the model are considered. Findings from the statistical analyses are incorporated into the responses to the questions.

## Research Question 1: What are the values of sojourner students from Confucian cultures?

Values are widely acknowledged latent constructs that have observable manifestations. For example, kindness, loyalty and sincerity have similar meanings in most cultural contexts. However, the importance of particular values may be greater in specific cultural settings. One example is respect for age and tradition that is very important in Eastern cultures where older people and ancestors are esteemed.

In societies that follow Confucian traditions, the status of the family, the community and the school or workplace is of great significance. This is demonstrated in the Asian concern for social harmony where group goals take precedence over personal desires, and individual initiative is secondary to the survival of the family (Ho, 1996; Ho and Chiu, 1994; Stevenson and Lee, 1996).

When Asian students come to Australia to study they bring a set of values with them that have been influenced by factors in the Asian social and cultural environment. The family exerts a strong influence on students' values; teachers and persons in authority also have an important effect on the values of young people, as does the social group to which the students belong. Chiu (1989) has found that in Asia the young are brought up to respect authority and are comfortable living in a highly regulated society. The formalised hierarchical communal structure provides stability and gives its members a sense of place in that society.

### The dimensional structure of values

If values are considered to be located on a continuum and to be measurable, what is important is the degree of acceptance and incorporation that particular values have in a given society and for particular individuals. Therefore, it was necessary to ascertain whether: (a) values measured on the CVS fell into discrete groups as latent constructs or variables; (b) the latent variables measured on the CVS showed unidimensionality; (c) there was one model that best accounted for the arrangement of values; and (d) there was a particular arrangement of value statements that was theoretically as well as statistically meaningful.

In order to test these four propositions a series of models was advanced and their dimensionality was tested using both exploratory and confirmatory factor analysis. Confirmatory factor analysis was carried out with the LISREL 8.30 program. It confirmed the existence of four distinct value dimensions. The dimensions were named: 'CVS I-Integrity and Tolerance' with manifest values that were associated with the development of self, 'CVS II-Confucian Ethos' with values that were connected to relationships with others, 'CVS III-Loyalty to Ideals' with values that represented social responsibility, and 'CVS IV-Worldly Wisdom' with values related to tolerance and moral discipline. The analysis further identified six possible structural models that explained the data obtained from the survey. Each model was examined for goodness of fit to the observed data. The fact that the reliability remained high over a period of two years, in which five separate measurements were made, supported the acceptance of baseline, hierarchical, and nested models as plausible explanations for the disposition of the four value dimensions. However, it was found that a nested model whereby the four correlated value dimensions were placed orthogonal to a single Values factor represented the best explanation of the data. Previous work had supported a baseline four factor solution (Bond, 1988, 1996; CCC, 1987). Moreover, the more complex nested structure of the model N(1,4)R was found to be an improved and more meaningful solution after confirmatory factor

analysis. This solution was supported by the fit indices generated in the LISREL analysis. The best model had fit indices that were within an acceptable range; particularly with respect to the *RMSEA* and *SRMR* values that were considered to be independent of sample size (Byrne, 1998).

The table of communalities confirmed that the nested model N(1,4)R had the greatest percentage of variance explained. The Phi matrix justified the creation of a Values factor that was orthogonal to the four correlated factors. The Phi matrix for the final model showed a positive correlation between the Confucian and Wisdom factors that were opposed to the Integrity and Loyalty factors. In this study the Integrity value construct is argued to be less important to those who follow the way or the *Dao* and Confucian thinking where the values of the individual are considered to be secondary to those of the group.

In summary, values were found to be located in four discrete dimensions: Integrity and Tolerance, Confucian Ethos, Loyalty to Ideals, and Worldly Wisdom. In addition, a single Values factor, that encompassed all of the manifest variables when placed orthogonal to the four latent constructs, represented the best theoretical and statistical explanation for values of CHC students that were measured over a two year period using the CVS.

## Research Question 2: What are the approaches to learning taken by CHC students?

Approaches to learning also involve constructs that are difficult to examine directly. However, specific learning behaviours are observable. If students spend all their study time memorising materials, they display a surface approach to learning particularly if the memorisation is done to pass an examination. However, if students deliberate over aspects of a subject and try to understand more than is required to pass, the students are considered to be deep learners. Surface and deep learning are, therefore, considered to be observable manifestations of broader learning constructs. Biggs (1987a) and Watkins and Biggs (1996) have suggested that three distinct approaches to learning exist; a surface and a deep approach that are considered to be complementary in operation. In addition, an achieving approach is found to operate for many students and is argued to be particularly significant in this study where students experience external pressure to succeed.

In Asia, an examination-based culture that is considered to be allied to surface, memory-based learning is believed to be dominant. In contrast, problem-based learning relies on a deeper approach to learning. A deeper approach is required in learning environments where assessment is based on written assignments that demand the synthesis of information from primary sources (Biggs, 1996b; Tang, 1996; Tang and Biggs, 1996).

#### The dimensional structure of learning

The dimensional structure of the *Study Process Questionnaire* (SPQ) was tested using confirmatory factor analysis with the LISREL computer program. The names of the learning dimensions assigned were those proposed by Biggs (1987a): Surface Motivation, Deep Motivation, Achieving Motivation, Surface Strategy, Deep Strategy and Achieving Strategy.

Twelve possible models were examined for fit and suitability to explain the data obtained. While certain nested models provided the best fit indices, the baseline, B(6), model provided the most convincing structure for the data and was, therefore,

accepted as the best model of the approaches to learning used by sojourner CHC students. The Phi matrix summarised the relationships between the latent variables. In the final B(6) model, the Deep and Achieving approaches showed strong positive correlations and indicated that these approaches to learning were significantly related in CHC students. In contrast, the Surface learning scales showed low or negative correlations with the Deep and Achieving learning scales.

# Research Question 3: Is there a relationship between values and approaches to learning in CHC students?

### The association of values and approaches to learning

Values were considered to be the precursors of approaches to learning. It was argued that attitudes and the underlying values were likely to influence the approaches to learning of Asian students who came to Australia to pursue their education.

### The relationship between values and learning

Canonical correlation analysis was selected for use in this study because it enabled the examination and testing of the significance of the relationships between two sets of data. The purpose of this analysis was to investigate whether life values and approaches to learning were significantly related. Canonical analysis was able to demonstrate clearly that statistically significant relationships did exist between values and approaches to learning.

Three of the four possible factor pairs generated in canonical analysis were found to be statistically significant. The first pair of factors showed a strong overall relationship between the four value dimensions and the six approaches to learning. These factors extracted the largest amount of variance, 63 per cent, for the general values factor and 33 per cent for the general learning factor. Therefore, the first pair of canonical factors assisted in the confirmation of the construct that values were important precursors to learning for the students in the sample. The second pair of canonical factors showed that students who had low Integrity values tended to adopt a Surface Approach to learning. The third pair of canonical factors showed a significant relationship between low Confucian values and a Deep Approach to learning whereby students who had low Confucian values were higher in Deep Strategy and Achieving Motivation (Matthews, 2001).

In summary, canonical correlation analysis showed three significantly related factor pairs involving the four value dimensions and the six approaches to learning scales. Therefore, it is argued that this procedure was particularly useful in drawing together two seemingly disparate sets of constructs and demonstrating statistically significant relationships between them.

## Research Question 4: What are the personal characteristics of CHC students?

Small group interviews provided additional personal information about students in the study. The interviews indicated that CHC students preferred to spend time with other Asians. CHC students did not seem to want to mix with Australian students if there were Asians with whom they were able to socialise or work in an academic setting. Therefore, CHC students would appear to prefer to associate with people who held similar values and approaches to learning. This observation was also made in previous research (Banks, 1993; Dion and Dion, 1996; Exum and Lau, 1988; Lau and Yeung, 1996; Mann et al., 1998; Melton, 1990; Volet and Ang, 1998; Volet and Kee, 1993) and confirmed in this study.

#### Differences encountered by CHC students

The students interviewed discussed the differences that they encountered in their Australian sojourn. The students considered that in Asia teaching was unidirectional from teacher to student only. They argued that in Confucian cultures teachers were held in very high regard as conveyors of knowledge. In Asia the line of authority moved from the family to the teacher and the school and the peer group was only involved peripherally, if at all. The students accepted a difference in social status in their home environment and worked within it to succeed in academic endeavours. Ninnes (1995) found similar results in his work with Vietnamese migrant students in Australia.

However, students felt that they needed time to adjust to a new form of study grounded in problem-based learning. The students said that assessment based on written work that required research and synthesis of ideas from many sources was initially very challenging and required new skills such as careful planning and good time-management skills. In addition, the students said they would have appreciated clearer written instructions and increased specific feedback on their work, as they were anxious to achieve at a high standard. The type of assignment that caused the greatest anxiety initially was the oral presentation. This form of assessment was different to anything previously experienced and induced the greatest stress level until students became accustomed to speaking and presenting information orally in a tutorial setting where the presentation was formally assessed. Students commented that if increased clarity of instruction was provided by lecturers, personal anxiety about their ability to adjust to living and studying in a Western academic setting decreased and they were better able to meet personal and family expectations successfully.

## Research Question 5: Do students' values change over time in a new environment?

When students moved to a new physical, social and cultural environment to pursue their education, adaptation and change were expected. It was important in this study to consider what precisely had changed, and what had not changed. Multilevel analysis using the hierarchical linear modelling program (HLM5 for Windows) was, therefore, employed to examine change in both values and approaches to learning.

### Multilevel analysis of value dimensions

In multilevel analysis it was possible to consider two levels of analysis simultaneously. Occasions of measurement were considered at the micro level (Level-1) and the magnitude of change in values over time was estimated. The effects of student level predictor variables on change over time were examined at the macro level (Level-2). Therefore, the purpose was to analyse change over time as measured by the variable Occasion on the values that Asian students brought with them when they came to study in Australia. Further, it was argued that the measurement and understanding of the type and extent of change in values was of interest in this study.

The data showed that changes in two of the four value dimensions were statistically significant: Confucian Ethos and Loyalty to Ideals. The Occasion slope for the Loyalty dimension was positive and indicated that, in general, the values associated with this dimension increased over the time of measurement. The Occasion slope for the Confucian Ethos dimension was negative and indicated that the values associated with this dimension generally decreased over the five occasions of measurement. These changes demonstrated that two of the four dimensions of the students' value structure changed over the time of measurement, but not for all groups of students. In addition, while there was no change over time for the Integrity and Wisdom dimensions, there were direct and interaction effects between the Occasion variable and the characteristics for particular groups of students and these two value dimensions. It should be noted that these changes occurred while students were living and studying at the tertiary level in Australia.

## Value changes for students who spend a longer time studying in Australia

If a student remained in Australia for an extended period of study or research, an increasing dissatisfaction with Confucian values and beliefs might occur. The experience of one postgraduate student illustrates this point. When a family member wanted to visit the student in Australia, the student was expected to assist with the airfare and provide food and accommodation for the visitor. The student was also expected to send expensive gifts back to the extended family in Asia. This obligation was resented by the student; nevertheless, the family was so important that the obligations had to be met, regardless of the personal cost. Tension was an inevitable outcome when values came into conflict.

Therefore, it is argued that when Asian students study in Australia the values that guide the lives of some students can be expected to change. The values that seemed to undergo the greatest change in this study were those associated with the Confucian Ethos and Loyalty to Ideals dimensions. However, it would seem that only when students left Asia to study in a Western environment such as Australia that their values were questioned and then only after they had been exposed to life in a new cultural milieu. However, changes were found only for some groups of students, and for different groups on different value dimensions.

## Research Question 6: Do students' approaches to learning change over time in a new environment?

This study sought evidence that approaches to learning used by CHC students changed over a two year period in the educational environment that was found in Australia.

### Multilevel analysis of approaches to learning

Five of the six scales associated with learning showed significant changes over time. Surface Motivation decreased significantly while the Deep Motivation and Strategy and the Achieving Motivation and Strategy scales increased over the time of measurement. This study provided evidence that learning approaches changed measurably over a two year period. The occasion slope for Surface Motivation was negative and indicated that learning that was superficial in nature decreased over the time of measurement. In contrast the occasion slopes for the four scales associated with the Deep and Achieving Approaches to learning were positive and indicated that learning which was problem-based, intrinsic in nature and directed toward achievement generally increased over the five occasions of measurement. These changes demonstrated that five of six approaches to learning changed during the period when measurements were made, but not for all groups of students. While there was no significant change for Surface Strategy over time, there were direct and interaction effects between this outcome variable and characteristics for particular groups of students. The changes occurred while the students were living and studying in Australia. The most important question raised was: why did some students' approaches to learning change while others remained the same?

A key point in understanding why the learning approaches changed was knowledge of the Australian teaching and learning environment. The Australian way of teaching appeared to be different to what students from Confucian cultures were accustomed and it was this difference that would seem to have produced changes in some students' approaches to learning. Volet and Ang (1998) and Volet and Kee (1993) found similar results in their research.

Research discussed in Watkins and Biggs (1996, 2001b) noted that Asian students who were initially considered to be surface learners often became deep learners if they encountered learning environments that encouraged and promoted this change. In Australia, these observations were confirmed by students in this study who had generally shown a change to a deeper, more problem-based learning approach. Importantly, the fact that the Surface Approach to learning generally decreased over the time of the study at the same time as the Deep Approach increased indicated that some groups of students who came to study in Australia clearly changed their approach to learning. Achievement seemed to be a crucial goal for students from Confucian cultures. This was shown by the fact that both Achieving Motivation and Achieving Strategy had, in general, increased over the time of study in Australia. Similar results have been discussed in publications by Renshaw and Tietzel (1994).

## Research Question 7: Do personal antecedents, living and working conditions influence values and changes in values?

Multilevel modelling was undertaken with the HLM program. The results of this analysis provided a greater understanding of the way in which personal antecedents, as well as living and working conditions influenced changes in values. There were four significant Level-2 variables that affected the outcome variables. Two variables affected the outcome variables directly and three variables interacted with the predictor variable occasion and one or more of the outcome variables for which change was recorded.

Differences between groups of students were shown by Level-2 direct effects. Differences in values showed that older students were higher in Integrity and Loyalty values than younger students in the sample. According to Volet and Ang (1998) and Yen Mah (2000) older Asian students generally had experienced less of the outside world than their younger counterparts.

Women were also higher in Integrity and Loyalty values than men in the study. Women were found to consider that values such as solidarity with others, patience, sincerity and having a sense of shame were more important than men did. Ho (1996), Hwang (1999, 2001), Yue and Ng (1999), and Zhang Zhen (2001) have noted that adherence to a traditional value structure in women was an expected outcome of a

rigid, hierarchical system of beliefs that would appear to have been maintained in some groups of students' lives in Australia. Until very recently in many parts of Asia, male children were preferred and women were considered to be secondary and subservient to men.

The interaction effects indicated that age group showed an interaction effect with the Confucian, Loyalty and Wisdom value dimensions. However, the interaction effect of age group with the Confucian value dimension revealed no significant change over time for older students, but a significant decline in Confucian values over time for the younger students. The interaction effect between age group and Occasion also showed a significant increase in the level of Wisdom and Loyalty values of older students over time compared with the younger students in the sample. This evidence is supported by research of Ward et al. (2001) and showed that Asian students generally had been influenced by the values of their elders more than Western students appeared to have been. Further, students who studied more than ten hours outside their classes each week showed a significant decrease in Wisdom and Loyalty values over the time of the study. In contrast, those students who studied less than ten hours each week show a significant increase in Loyalty values, but no change in Wisdom values over time. Moreover, students who attended Flinders University showed an increase in Integrity values over time. This interaction would appear to indicate that students who attended Flinders University showed an increase in the values associated with the Integrity dimension when compared with students who attended other universities that were involved in this study. Further, Flinders University students did not change the level of their Confucian Ethos values over time, while other tertiary students showed a significant decline in Confucian Ethos values. The fact that there appeared to be a significant alteration in value dimensions indicated that change was moderated by factors in CHC students' social and cultural environment in Australia. This change was seen in some but not all groups of students across the period of the study.

In summary, the only significant changes in the Integrity or Wisdom value dimensions over time were effects related to specific groups of students. However, when students came to Australia to study, Confucian values appeared, in general, to decline in importance, but not for all groups of students. In addition, values associated with the Loyalty dimension generally increased over the time of measurement in Australia. This indicated that some but not all groups of students considered these values to be important in their lives. These changes in values occurred while the students were studying in Australia.

## Research Question 8: Do personal antecedents, attitudes, living and working conditions influence approaches to learning and changes in approaches to learning?

The multilevel analysis provided results that permitted a greater understanding of the way in which personal antecedents, attitudes, living and working conditions influenced changes in approaches to learning. There were two types of effects that were associated with approaches to learning: (a) those that influenced the outcome variables directly; and (b) those that influenced outcome variables indirectly through interaction effects with the Level-1 predictor variable Occasion. There were 18 significant Level-2 effects associated with the outcome variables. Eleven variables affected the outcome variables directly and seven variables interacted with the

predictor variable Occasion and one or more of the outcome variables for which change was recorded.

Differences between groups of students were shown by Level-2 direct effects. Differences in approaches to learning indicated that: (a) older students were higher in Achieving Motivation and Achieving Strategy than younger students; (b) women were higher in Achieving Motivation than men in this study; (c) students who said their mothers had the greatest influence during their pre-school years were higher in both Surface and Achieving Strategies; (d) students who had the same religious beliefs as their grandparents who were higher in Achieving Motivation than those who had different religious beliefs to their grandparents; (e) students who had been in Australia for more than one year were higher in Surface Strategy than students who had been in Australia for less than one year; (f) students who preferred to study alone were higher in Deep Motivation than students who preferred to study with other students and students who preferred to study away from home were higher in Deep Motivation than students who preferred to study at home; (g) students who had different religious beliefs to their parents were higher in Deep Strategy than students who had the same religious beliefs as their parents; (h) students who attended the University of South Australia or who came to study English at the tertiary level at the Adelaide College of Technical and Further Education (TAFE) were lower in Achieving Motivation than students who studied at the two other tertiary institutions in South Australia; (i) students who came from less developed countries were higher in Achieving Motivation than those students who came from more developed countries; and (j) students who had lived overseas for some time or who had travelled before coming to Australia were higher in Deep Strategy than students who had not travelled before coming to Australia to study.

Differences between groups of students were also shown by Level-2 interaction effects that indicated: (a) students who had studied business and commerce subjects showed interaction effects with the Surface Motivation and Surface Strategy learning scales. However, the interaction effect with Surface Motivation scale did not show a change over time, but the interaction with Surface Strategy showed an increase in this effect over time; (b) students who preferred to study at home showed a greater decrease in Surface Motivation over time than students who studied away from home; (c) students who had different religious beliefs to those of their parents showed little change in Surface Motivation over time whereas those who had not changed their religious beliefs showed a significant decrease in Surface Motivation; (d) students who travelled before coming to Australia to study showed a greater decrease in Surface Strategy over time whereas students who had not travelled showed a higher level of Surface Strategy; (e) the number of hours students spent studying showed interaction effects with three approaches to learning. For the Deep Motivation and Deep Strategy scales there was little or no significant change in these approaches to learning over time in students who studied more than ten hours each week. These students showed a steady or unchanged level of Deep Motivation and Deep Strategy, however, there was a strong interaction effect with the Achieving Strategy scale. This indicated that students who spent more than ten hours each week studying showed a considerable decrease in Achieving Strategy whereas students who studied less than ten hours a week showed an increase in Achieving Strategy over time; (f) students who preferred to speak English rather than their home language in their free time showed a marginal decrease in Achieving Motivation over time whereas students who said they preferred to speak their home language showed an increase in Achieving Motivation; and (g) students who had travelled beyond the Asian region before coming to Australia showed a marginal, but positive interaction with the predictor

variable Occasion and the outcome variable Achieving Strategy and thus a clearly significant increase in Achieving Strategy over time.

In summary, the results of multilevel modelling showed changes in students' approaches to learning. Surface Motivation, in general, dropped over time whereas Deep and Achieving Motivations and Strategies increased significantly over the time of the study. CHC learners, in general, would appear to have adopted approaches to learning that assisted them to succeed at high levels academically and fulfil the demands of the family and work groups in Asia. In order to accomplish these goals, students appeared to be motivated to use strategies that produced successful outcomes that fulfilled their expectations. This was indicated by the movement away from a superficial approach and toward a deeper approach to learning together with an increase in the achieving approach. Importantly, the changes that occurred with respect to approaches to learning affected some but not all groups of students. The direct and interaction effects that have been discussed affected only the groups indicated. These changes occurred while students were living and studying in Australia.

These changes might have been a response to a change in the method of assessment used in Australia. Surface learning that has been associated with an examinationbased culture generally decreased over the time of this study while deep learning generally increased. This change in approach to learning would appear to be associated with problem-based learning that is assessed on written assignments and oral presentations. However, what appeared to be of particular importance to CHC students in this study has been the continuing need to achieve.

Nevertheless despite the changes noted, it seemed unlikely that Confucian attitudes to knowledge and approaches to learning would be discarded completely by CHC students as these attitudes and values provided stability and structure to Asian society. Consequently, it is argued that regardless of the approaches to learning adopted, the need to achieve continued to remain a principal motivating force behind the successful attainment of educational goals. Similar ideas have also been considered in research undertaken by Ward et al. (2001) and Ward and Kennedy (1993a, 1993b, 1994, 1999).

## Implications for theory and the body of knowledge

## An understanding of the relationship between values and approaches to learning

Canonical correlation analysis permitted the investigation of the possibility of a relationship between values and approaches to learning. The four value dimensions were paired with the six approaches to learning. The maximum number of pairs possible was four and three of these proved to be statistically significant.

The results of canonical correlation analysis provide new insights into the possibility of a positive and causal relationship with values influencing approaches to learning. The issue of whether the changes in values recorded would have causal relationships with changes in approaches to learning that were observed identifies an area that requires further investigation. Alternatively it is possible that both changes in values and changes in approaches to learning could each be caused directly by a common contextual factor. Further consideration needs to be given to the nature and causes of change.

### Differences between identifiable groups of students

This study also provided extensive data on differences between specific groups of students who were part of the study sample. However, it must be remembered that all the students in the study were sojourners and were in Australia to acquire a tertiary education. It was their intention to return to their homes in Asia on the completion of their academic studies. It had been expected, from a review of the extant literature (Bond, 1996; Lau, 1996; Liu, Ross and Kelly, 2000; Watkins and Biggs, 1996, 2001b among others) that students from a Confucian culture would be likely to change as a group and in predictable ways. There were some general trends that have already been discussed that have confirmed what had been written about Asian learners in new learning environments. However, what was not anticipated was that identifiable groups of students would respond differently to social and cultural change.

There is clear evidence from this study that not only did specific groups of students differ in their values and approaches to learning when they came to Australia, but they also changed in different ways and to different extents during their time of study in Australia.

### Implications for educational practice

### The appreciation of difference

These findings have led to many new questions and issues. Educational goals set for overseas students must encompass diversity and be culturally inclusive in order to ensure that all participants benefit equally. To presume that one culture or one group is superior or even inferior is to deny the variability in other cultures and groups. Australia or any Western nation that invites students to study in its institutions must demonstrate a genuine desire to acquire greater cultural understanding of sojourner students. Only when Westerners are able to accommodate all ways of thinking and learning equably, will they cease to demand the acceptance of Western values and approaches to learning as the primary source of knowledge and influence. Further, there needs to be an understanding that Western values are culturally specific and not a universally applicable panacea because embedded in the lack of respect for other cultures is barely concealed racism that still remains in places that were once part of the empires of Western Europe and North America. It would be contrary to generally accepted belief to deny the existence and underestimate the legacy that racism has left in the European-speaking world (Jacques, 2003). Therefore, the appreciation of difference is the first step toward the ultimate goal of social cohesion that is an acknowledgement of the co-existence of multiple cultures within a single nation-state, thereby taking the challenge of togetherness in distance seriously as discussed by Ang (2001) and proposed by Zubrzycki (1977) in his seminal report to the Australian Ethnic Affairs Council. When Westerners are able to accommodate Eastern ways of thinking in a Western learning environment, they will be taking the first steps toward a system of education that has positive outcomes for all concerned. This is seen as a primary goal for education in Australian universities in the twenty-first century.

### Implications for research

### Further study of Asian value structures

There is a need to try to establish a point of demarcation where different groups of students begin to show a change in their values and systems of belief. Some research

(Chan, 1988; Guan and Dodder, 2001; Maley, 1983; Ng, 2001; Ninnes, 1995) has shown that this point is reached when students have been away from their home environment and living in a different culture for more than two years. However, the precise time cannot be fixed and varies between groups of students. It is necessary to try to establish what factors affect value changes in sojourner students in order to understand when and why these changes occur. If two years were to be used as a general guide, it might be possible to investigate contributing circumstances and draw some tentative conclusions. Also, it would be just as important to look for indicators

#### Values and approaches to learning

There needs to be additional research done into the structure of Asian value systems and approaches to learning so that more precise measurements may be made to enable improved analysis to be undertaken of the data collected. For example, it is particularly important to try and understand why CHC students are so highly motivated to achieve in their scholastic endeavours and why achievement is so important to the people who send these students to study in Western cultures. Learning motivations and strategies can be measured using the instruments that have been employed in this study. However, these instruments only measure students' feelings and thoughts at the point of measurement and do not consider the factors that influence students' responses. This may require the development of different questionnaires and more extensive interviews with individual students at several points in time to see if the influence of those persons who expect high achievement changes over time and whether newly-acquired value structures and learning approaches do, in fact, supersede the previously held Asian ones.

of change as to observe the effects of the factors that influence change.

## The role of the family, the teacher and the school in Asia and Australia

There is also a need to have a greater understanding of the importance of the role of the Asian family, school and study group that are of paramount importance in Asia. Ninnes (1995) has provided evidence on Vietnamese migrant students in Australia and Butcher (2002) has reported on sojourner students in the tertiary institutions in New Zealand, but relatively little is known about how these three influences impact on the lives of students. Again, carefully structured interviews would provide useful information that would enable greater understanding of the values held and approaches to learning employed by students who come to study in Australia. This may require interviews that are carried out in the students' home language as well as with CHC students in their homes in Asia prior to their departure for overseas study. It would also be extremely useful to have follow-up interviews with the students as well as influential older people within one month of their return to their homes in Asia to try to estimate the impact of overseas study on the students, their families, and their study groups.

### The nature of the Australian teaching and learning process

The nature of Australian teaching and learning processes is an important area that needs to be investigated as overseas students would appear to represent an increasing proportion of the tertiary student population, in particular, if the research undertaken by Bohm (2002) and Smart, Volet and Ang (2000) are accepted as providing reliable predictions of the educational environment over the next 20 years in Australia. This question could only be investigated in a carefully conducted longitudinal study.

Therefore, there is a need to investigate further when, why and if the values and approaches to learning of Confucian heritage culture (CHC) students changed when they studied in a Western learning environment. If values changed, there would be a series of factors that either acted as causal agents or supported the changes when they did occur. In order to understand what was occurring, there would be a need to encourage more study and greater understanding of the nature of the values that were particularly important in the lives of Asian students. If particular values were considered to be linked to the smooth social and economic functioning of Asian society as Chiu (1989) and Chiu et al. (1998) have argued, it would be essential to investigate the pivotal values in greater depth in order to understand the motivations and strategies that guided CHC living and learning in cultures where economic factors had become increasingly important and social change was also more evident. Importantly, increased Western knowledge of the values that guided the lives of students who came to Australia to study as sojourner students would enable greater accommodation of Asian students' preferred approaches to learning. By removing the pressure to change while in Australia, sojourners would be able to choose the beliefs that guided their lifestyle and the way they preferred to learn. Therefore, if the sojourners were able to make choices then the need to conform to a Western value structure and approach to learning would cease to exist.

## Conclusion

This study began by asking what were the values and approaches to learning that Confucian heritage culture (CHC) students brought to Australia. It continued with an investigation of these questions and an assessment of both values and learning approaches over a two year period to try to ascertain if life values and approaches to learning changed over time in a new physical, social, cultural and educational environment. The investigation of the values that were significant in CHC students' lives enabled a clearer and more meaningful understanding of the approaches to learning that were preferred by CHC students. Further, it would appear that it was the Australian teaching and learning environment that was a primary cause of change in values and approaches to learning in some groups of students. However, this apparent influence demands further investigation.

Evidence that has been found in this investigation suggests that identifiable groups of students hold different values and approaches to learning. When the students from Confucian cultures come to Western universities as sojourner students some groups show change in their values and approaches to learning over time. It would appear that a change in the cultural and educational environment is instrumental in implementing the changes that occur. The available evidence also appears to indicate that the changes are occurring while CHC students are undertaking study in Australia. Therefore, it is crucial that those who work with students from Confucian cultures openly acknowledge the students' preferred values and approaches to learning as an indication of their appreciation and approbation of difference.

# **13** References

- Adams, R. J. and Khoo, S. T. (1993). *QUEST The interactive test analytic system*. Melbourne: Australian Council for Educational Research.
- Afrassa, T. M. (1998). Mathematics achievement at the lower secondary level school stage in Australia and Ethiopia, a comparative study of standards of achievement and student level factors influencing achievement. Unpublished PhD thesis. Adelaide: The Flinders University of South Australia.
- Aitken, L. S. and West, S. G. (1996). *Multiple regression, testing and interpreting interactions*. Newbury Park: Sage.
- Albaili, M. A. (1995). An Arabic version of the Study Process Questionnaire, reliability and validity. *Psychological Reports*, 77(3 part 2), 1083-1089.
- Allport, F. H. (1924). Social psychology. Boston: Houghton Mifflin.
- Allwright, D. (1996). Social and pedagogic pressures in the language classroom, the role of socialisation. In H. Coleman (Ed.), *Society and the language classroom* (pp. 209-228). Cambridge: Cambridge University Press.
- Allwright, J. (1988). Don't correct-reformulate! In P. C. Robinson (Ed.), Academic writing: process and product. ELT Documents 129 (pp. 109-116). London: Modern English Publications and The British Council.
- Anderson, J. F. and Berdie, D. R. (1974). *Questionnaire, design and use*. Metuchen: The Scarecrow Press.
- Anderson, L. W. (1997). Measurement of attitudes. In J. P. Keeves (Ed.), Educational research methodology and measurement, an international handbook (2nd edition, pp. 885-895). Oxford: Pergamon.
- Anderson, L. W. and Bloom, B. S. (Eds.) (2001). A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives. New York: Longman.

- Andrews, J., Violato, C., Rabb, K. and Hollingsworth, M. (1994). A validity study of Biggs' three factor model of learning approaches, confirmatory factor analysis employing a Canadian sample. *British Journal of Educational Psychology*, 64, 179-185.
- Ang, I. (2001). On not speaking Chinese: living between Asia and the West. London: Routledge.
- Astill, B. R. (1998). Influences on the social values of students in year 12: a South Australian study. Unpublished PhD thesis. Adelaide: Flinders University of South Australia.
- Australian Education International (1999). *Overseas Student Statistics 1998*. Canberra: Department of Education, Training and Youth Affairs.
- Baker, B. (Ed.) (2000). Chinese ink, Western pen. New York: Oxford University Press.
- Ballard, B. (1996). Through language to learning, preparing overseas students for study in Western universities. In H. Coleman (Ed.), Society and the language classroom (pp.148-168). Cambridge: Cambridge University Press.
- Ballard, B. and Clanchy, J. (1984). *Study abroad, a manual for Asian students*. Kuala Lumpur: Longman Malaysia.
- Ballard, B. and Clanchy, J. (1988). *Studying in Australia*. Melbourne: Longman Cheshire.
- Ballard, B. and Clanchy, J. (1991a). Assessment by misconception, cultural influences and intellectual traditions. In L. Hamp-Lyons (Ed.), *Assessing second language writing in academic context* (pp. 19-36). Norwood: Ablex Publishing.
- Ballard, B. and Clanchy, J. (1991b). *Teaching students from overseas, a brief guide for lecturers and supervisors.* Melbourne: Longman Cheshire.
- Banks, J. A. (1993). The canon debate, knowledge construction and multicultural education. *Education Researcher*, 22(5), 4-14.
- Barker, M. (1990). Cross-cultural communication at Australian universities, issues faced by learners, ethnic Chinese and Australian students. In C. Hedrick and R. Holten (Eds.), Cross-cultural communication and professional education (pp. 259-267). Adelaide: Centre for Multicultural Studies.
- Barlosky, M. (1996). Sinic science, postmodernism and knowledge, rethinking knowledge in the social sciences. In R. Hayhoe and J. Pan (Eds.), *East-west dialogue in knowledge and Higher Education* (pp. 51-63). New York: Sharpe.
- Bartlett, M. S. (1941). The significance of canonical correlations. *Biometrika*, 32, 29-38.
- Bax, S. (2003). The end of CLT: a context approach to language teaching. *ELT Journal*, 57(3), 278-287.
- Baynes, C. F. (1990). *The I Ching or book of changes*. Princeton: Princeton University Press.
- Bejar, I. I. (1983). Achievement testing: recent advances. Beverly Hills, CA: Sage.

- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107 (2), 238-246.
- Berry, J. W. (1988). Psychological acculturation of immigrants. In Y. Y. Kim and W. B. Gudykunst (Eds.), *Cross-cultural adaptation, current approaches* (pp. 62-89). Newbury Park, Sage.
- Berry, J. W. (1989). Imposed emic-derived etics. The operationalism of a compelling idea. *International Journal of Psychology*, 24, 721-735.
- Berry, J. W. (1994). Ecology of individualism and collectivism. In U. Kim, H. C. Triandis, C. Kagatcibasi, S-C. Choi and G. Yoon (Eds.), *Individualism and collectivism, theory, method and application* (pp. 77-84). Thousand Oaks: Sage.
- Berry, J. W. and Sam, D. L. (1997). Acculturation and adaptation. In J. W. Berry, M. H. Segall and C. Kagitcibasi (Eds.), *Handbook of cross-cultural psychology (2nd edition)* (Volume 3, pp. 291-326). Needham Heights, Mass: Allyn and Bacon.
- Bessant. K. C. (1995). Factors associated with types of mathematics anxiety in college students. *Journal of Research in Mathematics Education*, 26(4), 327-345.
- Biggs, J. B. (1976). Dimensions of study behaviour, another look at ATI. British Journal of Educational Psychology, 46, 68-80.
- Biggs, J. B. (1987a). *Student approaches to learning and studying. (Research monograph).* Melbourne: Australian Council for Educational Research.
- Biggs, J. B. (1987b). *Study Process Questionnaire manual*. Melbourne: Australian Council for Educational Research.
- Biggs, J. B. (1990a). Asian students' approaches to learning, implications for teaching overseas students, Keynote discussion paper. 8th Australasian tertiary learning skills and language conference, 11-13 July 1990. Queensland University of Technology, 1-51.
- Biggs, J. B. (1990b). Teaching design for learning. Keynote discussion paper. HERDSA. Brisbane, 6-9 July 1990. Griffiths University.
- Biggs, J. B. (1991). Approaches to learning in secondary and tertiary students in Hong Kong: some comparative studies. *Educational Research Journal*, 6, 27-39.
- Biggs, J. B. (1992). How and why do Hong Kong students learn? Using the *Learning* and *Study Process Questionnaires*. (*Education paper 14*). Hong Kong: Faculty of Education, University of Hong Kong.
- Biggs, J. B. (1993). What do inventories of students' learning processes really measure? A theoretical review and clarification. *British Journal of Educational Psychology*, 84, 272-281.
- Biggs, J. B. (1994). Asian learners through Western eyes, an astigmatic paradox. Australia and New Zealand Journal of Vocational Educational Research, 2(2), 40-63.

- Biggs, J. B. (1996a). Learning, schooling and socialization, a Chinese solution to a Western problem. In S. Lau (Ed.), *Growing up the Chinese way* (pp. 147-167). Hong Kong: The Chinese University Press.
- Biggs, J. B. (1996b). Misperceptions of the Confucian-heritage learning culture. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences (pp. 45-67)*. Hong Kong: ACER and CERC.
- Biggs, J. B. (1996c). Approaches to learning of Asian students, a multiple paradox. In J. Pandey and D. Sinha (Eds.), *Asian contributions to cross-cultural psychology* (pp 180-199). New Delhi: Sage.
- Biggs, J. B. (1997). Locus of control and college students' approaches to learning, a comment. *Psychological Reports, 78(3, part 1),* 993-994.
- Biggs, J. B. (1999a). What the student does for enhanced learning. *Higher Education Research and Development, 18 (1),* 57-75.
- Biggs, J. B. (1999b). *Teaching for quality learning at university*. Buckingham: Open University Press.
- Biggs, J. B. (2001a). Enhancing learning, a matter of style or approach? In R. J. Sternberg and L-F. Zhang (Eds.), *Perspectives on thinking, learning and cognitive styles (The education psychology series)* (pp. 73-102). Mahwah: Lawrence Erlbaum Associates Inc.
- Biggs, J. B. (2001b). Teaching across cultures. In F. Salili, C. Y. Chiu and Y. Y. Hong (Eds.), Student motivation: the culture and context of learning (Plenum series on human exceptionality) (pp. 293-308). New York: Plenum Publishers.
- Biggs, J. B. and Collis, K. (1982). Evaluating the quality of learning, the SOLO taxonomy. New York: Academic Press.
- Biggs, J. B. and Collis, K. (1989). Towards a model of school-based curriculum development and assessment using the SOLO taxonomy. *Australian Journal* of education, 33(2), 151-163.
- Biggs, J. B., Kember, D. and Leung, D. Y. P. (2001). The revised two factor Study Process Questionnaire, R-SPQ-2F. *British Journal of Educational Psychology*, 71(1), 133-149.
- Biggs, J. B. and Watkins, D. A. (1996). The Chinese learner in retrospect. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 269-285). Hong Kong: ACER and CERC.
- Biggs, J. B. and Watkins, D. A. (2001). Insights into teaching the Chinese learner. In D. A. Watkins and J. B. Biggs (Eds.), *Teaching the Chinese learner: Psychological and pedagogical perspectives* (pp. 277-300). Hong Kong: CERC and ACER.
- Bloom, B. S. (Ed.) (1956). *Taxonomy of educational objectives, the classification of educational objectives*. New York: David McKay Company Inc.
- Bohm, A. (2002, 2 November). Australia's international students. Retrieved 2 January 2003, from <u>http://www.abc.net.au/rn/science/ss/stories/s715503.htm</u>.

- Bolen, L. M., Wurm, T. R. and Hall, C. W. (1994). Factorial structure of the Study Process Questionnaire. *Psychological Reports*, 75 (3 part 1), 1235-1241.
- Bond, M. H. (1983). How language variation affects inter-cultural differentiation of values by Hong Kong bilinguals. *Journal of Language and Social Psychology*, 2(1), 57-67.
- Bond, M. H. (Ed.) (1986) The psychology of the Chinese people. Hong Kong: Oxford University Press.
- Bond, M. H. (1988). Finding dimensions of individual variation in multicultural studies of values, the Rokeach and Chinese value surveys. *Journal of Personality and Social Psychology*, 55(6), 1009-1115.
- Bond, M. H. (1991a). Chinese values and health, a cultural level examination. *Psychology and Health, An International Journal, 5*, 137-152.
- Bond, M. H. (1991b). Beyond the Chinese face, insights from psychology. Hong Kong: Oxford.
- Bond, M. H. (1996). Chinese values. In M. H. Bond (Ed.), *The handbook of Chinese psychology* (pp. 208-226). Hong Kong: Oxford University Press.
- Bond, M. H. (Ed.) (1996). The handbook of Chinese psychology. Hong Kong: Oxford University Press.
- Bond, M. H. (1997). Values and moral behaviour in Mainland China. *Psychologia*, 40, 251-254.
- Bond, M. H. (2000). Distant anguish and proximal brotherhood, using psychology to move beyond the Chinese face. Commentary on "In search of the Chinese in all the wrong places!" *Journal of Psychology in Chinese Societies*, 1(1), 143-148.
- Bond, M. H. and Cheung, T. S. (1983). College students' spontaneous self-concept, the effect of culture among respondents in Hong Kong, Japan and the United States. *Journal of Cross-cultural Psychology*, 14 (2), 153-171.
- Bond, M. H., Cheung, K. and Wan, K. C. (1982). How does cultural collectivism operate, the impact of task and maintenance on reward distribution. *Journal* of Cross-cultural Psychology, 13(2), 186-200.
- Bond, M. H. and Forgas, J. P. (1984). Linking perception to behaviour intention across cultures, the role of cultural collectivism. *Journal of Cross-cultural Psychology*, 15(3), 337-352.
- Bond, M. H. and Hwang, K-K. (1986). The social psychology of Chinese people. In M. H. Bond (Ed), *The psychology of the Chinese people* (pp. 213-266). Hong Kong: Oxford University Press.
- Bond, M. H. and King, A. Y. C. (1985). Coping with the threat of westernisation in Hong Kong. *International Journal of Intercultural Relations*, *9*, 351-364.
- Bond, M. H., Leung, K. and Schwartz, S. (1992). Explaining chores in procedural and distributive justice across cultures. *International Journal of Psychology*, 27(2), 211-225.

- Bond, M. H. and Pang, M. K. (1991). Trusting to the *Tao*, Chinese values and the recentering of psychology. *Bulletin of the Hong Kong Psychological Society*, 26-27, 5-27.
- Bond, M. H. and Smith, P. B. (1996). Cross-cultural social and organisational psychology. *Annual Review of Psychology*, 47, 205-227.
- Bond, M. H., Zegarac, V. and Spencer-Oatey, H. (2000). Culture as an explanatory variable: problems and possibilities. In H. Spencer-Oatey (Ed.), *Culturally speaking: managing rapport through talk across cultures* (pp. 47-75). London: Continuum.
- Bretag, T., Horrocks, S. and Smith, J. (2002). Developing classroom practices to support NESB students in information systems courses: some preliminary findings. *International Educational Journal 3(4)*, 57-69.
- Browne, M. W. and Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen and J. S. Long (Eds.), *Testing structural equation models* (pp. 445-455). Newbury Park: Sage.
- Bryant, F. B. and Yarnold, P. R. (1995). Principal-components analysis and exploratory and confirmatory factor analysis. In L. G. Grimm and P. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (pp 99-136). Washington, DC: American Psychological Association.
- Bryk, A. S. and Raudenbush, S. W. (1992). *Hierarchical linear models*. Newbury Park: Sage.
- Bryk, A. S., Raudenbush, S. W. and Congdon, R. T. (2000). *HLM5 for Windows*. Chicago: Scientific Software International.
- Burns, R. B. (1991). Student stress among first year overseas students in an Australian university. *Higher Education Research and Development*, 10(1), 61-77.
- Butcher, A. (2002). A grief observed: grief experiences of East Asian international students returning to their countries of origin. *Journal of Studies in International Education*, 6(4), 354-368.
- Byrne, B. M. (1989). A Primer of LISREL, Basic application and programming for confirmatory factor analytic models. New York: Springer-Verlag.
- Byrne, B. M. (1996). *Measuring self-concept across the life span, issues and instrumentation*. Washington: American Psychological Association.
- Byrne, B. M. (1998). *Structural equation modeling with LISREL, PRELIS and SIMPLIS, basic concepts, application and programming.* Mahwah: Lawrence Erlbaum Associates.
- Cannon, R. (1999). International education and a professional edge for Indonesian graduates: the third place? In D. Davis and A. Olsen (Eds.), *International education: the professional edge.* A set of research papers presented at the 13th Australian international education conference, Fremantle, 1999 (pp.15-36). Canberra: IDP Education Australia.
- Cantwell, R. H. and Moore, P. J. (1998). Relationship among control beliefs, approaches to learning and the academic performances of final year nurses. *Alberta Journal of Educational Research*, 44(1), 98-102.

- Carson, J. G. (1998). Cultural backgrounds, what should we know about multilingual students? *TESOL Quarterly*, *32(4)*, 735-740.
- Cattell, R. (1966). The meaning and strategic use of factor analysis. In R. Cattell (Ed.), *Handbook of multivariate experimental psychology* (pp. 174-243). Chicago: Rand McNally.
- Chalmers, D. and Volet, S. (1997). Common misperceptions about students from South-East Asia studying in Australia. *Higher Education Research and Development*, 16(1), 87-99.
- Chan, D. and Mok, K-H. (2001). Education reforms and coping strategies under the tidalwave of marketisation, a comparative study of Hong Kong and the Mainland. *Comparative Education*. 37(1), 21-40.
- Chan, G. and Watkins, D. A. (1994). Classroom environment and approaches to learning: an investigation of Hong Kong secondary students. *Instructional Science*, 22, 233-246.
- Chan, H. (1988). Chinese students, adaptation, life satisfaction and academic achievement. In P. Hanks and A. Perry (Eds.), *The Chinese in Australia*. Conference held 19 March 1988 (pp. 25-36).
- Chan, K. W. (2002, December). Students' epistemological beliefs and approaches to learning. Paper presented at the AARE Conference, Brisbane, Australia.
- Chan, S. K-C., Bond, M. H., Spencer-Oatey, H. and Rojo-Laurilla, M. A. (in press). Culture and relationship promotion.
- Chang, L-C., Arkin, R. M., Leong, F. T., Chan, D. K. S. and Leung, K. (2004). Subjective overachievement in American and Chinese college students. *Journal of Cross-Cultural Psychology*, 35(2), 152-173.
- Chang, W. N. (2000). In search of the Chinese in all the wrong places. *Journal of Psychology in Chinese Societies, 1(1),* 125-142.
- Chang, W. N., Wing, K. W., Teo, G. and Fam, A. (1997). The motivation to achieve in Singapore, in search of a core construct. *Psychology and Individual Differences*, 23(5), 885-895.
- Chen A., Liu Z. and Ennis C. (1997). Universality and uniqueness of teacher educational values orientation, a cross-cultural comparison between the United States and China. *Journal of research and development in education*, 30(3), 135-143.
- Chen, C-S., Lee, S-Y. and Stevenson, H. W. (1996). Academic achievement and motivation of Chinese students, a cross-cultural perspective. In S. Lau (Ed.), *Growing up the Chinese way* (pp. 69-91). Hong Kong: The Chinese University Press.
- Cheng, J. Y. S. (1995). Higher Education in Hong Kong the approach to 1997 and the China factor. *Higher Education*, *30*, 257-271.
- Cheng, K. M., (1990). The culture of schooling in East Asia. In N. Entwistle (Ed.), Handbook of educational ideas and practices (pp. 163-173). London: Routledge.
- Cheng, K. M., (2000). Understanding basic education policies in China, an ethnographic approach. In J. Liu, H. A. Ross and D. P. Kelly (Eds.), *The*

*ethnographic eye, interpretive studies of education in China* (pp. 29-50). New York: Falmer Press.

- Cheung, K. M. (1996). Cultural adjustment and differential acculturation among Chinese new immigrant families in the United States. In S. Lau (Ed.), *Growing up the Chinese way* (pp. 321-355). Hong Kong: The Chinese University Press.
- Chinese Culture Connection. (1987). Chinese values and the search for culture-free dimensions of culture. *Journal of Cross-cultural Psychology*. 18(2), 143-164.
- Chiu, C. Y. (1989). Normative expectations of social behaviour and concern for members of the collective in Chinese society. *Journal of psychology*, 124(1), 103-111.
- Chiu, R. K., Wong, N. M. and Kosinski, F. A. (1998). Confucian value and conflict behaviour of Asian managers, a comparison of two countries. *Social Behaviour and Personality*, 26(1), 11-22.
- Chong, F. (2002, 24-25 August). Hong Kong puts reform top of the curriculum, *The Weekend Australian*, Careers, p. 7.
- Chou, C. P. and Bentler, P. M. (1995). Estimates and tests in structural equation modeling. In R. H. Hoyle (Ed.), *Structural equation modeling: concepts, issues and applications* (pp. 37-55). Thousand Oaks: Sage Publications Inc.
- Chou, T. F., Taylor, D. W. and Su, H. (1999). In K. Martin, N. Stanley and N. Davison (Eds.), *Teaching in the disciplines/learning in context* (pp. 76-83). Proceedings of the 8th Annual Teaching and Learning Forum, the University of Western Australia, February, 1999. Perth, UWA. <a href="http://cleo.murdoch.edu.au/asu/pubs/tlf/tlf99/ac/chou.html">http://cleo.murdoch.edu.au/asu/pubs/tlf/tlf99/ac/chou.html</a>
- Christensen, C. A., Massey, D. R. and Isaacs, P. J. (1991). Cognitive strategies and study habits, an analysis of the measurement of tertiary students' learning. *British Journal of Educational Psychology*, *61*, 290-299.
- Chu, H. (1990). Learning to be a sage: selections from the conversations of Master Chu, arranged topically. (D. K. Gardner, Trans.). Berkeley: University of California Press.
- Church, A. (1982). Sojourner adjustment. Psychological Bulletin, 91(3), 540-572.
- Clarke, R. (1986). Students' approaches to learning in an innovative medical school, a cross-cultural study. *British Journal of Educational Psychology*, *56*, 309-321.
- Clenton, J. (1998). Academic writing: towards an integrated approach. Unpublished M. A. dissertation. Brighton: University of Sussex. Retrieved 31 January 2004 from <u>http://www.sussex.ac.uk/langc/skills</u>.
- Clenton, J. (1998). *Learning styles and the Japanese*. Unpublished M. A. dissertation. Brighton: University of Sussex. Retrieved 31 January 2004 from <u>http://www.sussex.ac.uk/langc/skills</u>.
- Cleverley, J. (1991). The schooling of China (2nd Edition). Sydney: Allen and Unwin.
- Cohen, J. (1990). Things I have learned so far. American Psychologist, 45, 1304-1312.

Cohen, J. (1992). A power primer. Psychological Bulletin, 112 (1), 155-159.

- Cohen, J. (1994). The earth is round (p < 0.05). American Psychologist, 49, 997-1003.
- Confucius (1979). *The analects,* (D. C. Lao, Trans.). Harmondsworth: Penguin Books.
- Cooley, W. W. and Lohnes, P. R. (1971). *Multivariate data analysis*. New York: John Wiley and Sons Inc.
- Cooley, W. W. and Lohnes, P. R. (1976). *Evaluation research in education*. New York: Irving Publishers Inc.
- Cortazzi, M. and Jin, L. (1996). Cultures of learning, language classrooms in China. In H. Coleman (Ed.), *Society and the language classroom* (pp. 169-206). Cambridge: Cambridge University Press.
- Cortazzi, M. and Jin, L. (2001). Large classes in China: 'good' teachers and interaction. In D. A. Watkins and J. B. Biggs (Eds.), *Teaching the Chinese learner: Psychological and pedagogical perspectives* (pp. 115-134). Hong Kong: CERC and ACER.
- Crawford, J. R., Deary, I. J. Allan, K. M. and Gustafsson, J-E. (1998). Evaluating competing models of the relationship between inspection time and psychometric intelligence. *Intelligence*, 26(1), 27-42.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 35,79-98.
- Dahlin, B. and Watkins, D. (1999). The role of repetition in the processes of memorising and understanding. *British Journal of Educational Psychology*, 70, 65-84.
- Dahlin, B. and Watkins, D. A. (26-30 August 1997). The role of repetition in the process of memorisation and understanding, a comparison of the view of Western and Chinese school students in Hong Kong. A paper presented at the 7th conference of the European association for research on learning and instruction. Athens, Greece.
- Davies, B. (1996). What makes Australian education strange: Australian education in the Asian context. In Jones, G. (Ed.) *Cunningham lecture and symposium* (pp. 22-30). Canberra: Academy of the Social Sciences.
- Davies, F. (1988). Designing a writing syllabus in English for academic purposes: process and product. In P. C. Robinson (Ed.), Academic writing: process and product. ELT Documents 129 (pp. 130-142). London: Modern English Publications and The British Council.
- Davis, M. C. (Ed.) (1995). Human rights and Chinese values, legal, philosophical and political perspectives. New York: Oxford University Press.
- De Bary, W. T. (1983). *The liberal tradition in China*. Hong Kong: The Chinese University of Hong Kong Press.
- De Bary, W. T. and Chaffee, J. W. (1989). *Neo-Confucian education, the formative stage.* Berkeley: University of California Press.

- Delors, J. (1996). Learning, the treasure within, UNESCO report of the international commission on education for twenty-first century. Paris: UNESCO publishing.
- Dion, K. L. and Dion, K. K. (1996). Chinese adaptation to foreign cultures. In M. H. Bond (Ed.), *The handbook of Chinese psychology* (pp. 457-478). Hong Kong: Oxford University Press.
- Dong, Y. (1996). Laozi's thought and contemporary Chinese higher education. In R. Hayhoe and J. Pan (Eds.), *East-west dialogue in knowledge and higher education* (pp. 280-295). New York: Sharpe.
- Dorans, N. J. (1990). Equating methods and sampling designs. *Applied Measurement in Education*, *3(1)*, 3-17.
- Drew, P. Y. and Watkins, D. (1998). Affective variables, learning approaches and academic achievement, a causal modelling investigation with Hong Kong Chinese tertiary students. *British Journal of Educational Psychology*, *68(2)*, 173-188.
- Dunkin, M. J. and Biddle, B. J. (1974). *The study of teaching*. New York: Holt Rhinehart and Winston.
- Dunn-Rankin, P. and Zhang, S. (1997). Scaling methods. In J. P. Keeves (Ed.), *Educational research methodology and measurement, an international handbook (2nd edition, pp. 790-798).* Oxford: Pergamon.
- Eckholm, E. (2000, 10 July). For Chinese students, fate is a single exam. *The New York Times (Beijing Journal).*
- Edmunds, C. (2000). Chinese education. In C.Mackerras (Ed.), *Sinophiles and sinophobes: Western views of China*. (pp. 103-104). New York: Oxford University Press.
- Entwistle, N. (Ed.) (1990). Handbook of educational ideas and practices. London: Routledge.
- Entwistle, N. and Waterson, S. (1988). Approaches to studying and levels of processing in university students. *British Journal of Educational Psychology*, 58, 258-265
- Exum, H. A. and Lau, E. Y. (1988). Counseling style, preference of Chinese college students. *Journal of Multicultural Counseling and Development, 16,* 84-92.
- Fan, C. and Karnilowicz, E. (1997). Measurement of definitions of success among Chinese and Australian girls. *Journal of Cross-cultural Psychology 28(5)*, 589-599.
- Feast V. and Churchman D. (1997). The CHC student success story, a case study in one Australian university. Presented at the HERDSA 1997 conference, advancing international perspectives (Adelaide, 8-11 July 1997).
- Feather, N. T, (1999). Values, achievement and justice. New York: Kluwer Academic, Plenum Press.
- Feather, N. T. (1975). Values in education and society. New York: The Free Press.

- Feather, N. T. (1979). Assimilation of values in migrant groups. In M. Rockeach (Ed.), Understanding human values (pp. 97-129). New York: The Free Press.
- Feather, N. T. (1986). Value systems across cultures. *International Journal of Psychology*, 21, 697-715.
- Feather, N. T. (1993a). Devaluing achievement within a culture, measuring cultural change. Australian Journal of Psychology, 46(3), 182-188.
- Feather, N. T. (1993b). Values and culture. In W. J. Lonner and R. Malpass (Eds.), *Psychology and culture* (pp.183-189). Boston: Allyn and Bacon.
- Feather, N. T. (1994). Values, national identification and favouritism towards the ingroup. *British Journal of Social Psychology*, *33*, 467-476.
- Feather, N. T. and Wasyluk, G. (1973). Subjective assimilation among Ukrainian migrants: value similarity and parent-child differences. *Australian and New Zealand Journal of Sociology, 9,* 16-31.
- Flowerdew, L. (1998). A cultural perspective on group work. *ELT Journal*, 52(4), 323-329.
- Forgas, J. P. (1988). Episodic representation Intercultural communication. In Y. Y. Kim and W. B. Gudykunst (Eds.), *Theories of intercultural communication* (pp. 186-212). Newbury Park: Sage.
- Fukuyama, F. (1998). Asian values and the Asian crisis. Commentary, 105(2), 23-27.
- Fuligni, A. and Stevenson, H. W. (1995). Time use and mathematical achievement among American, Chinese and Japanese high school students. *Child Development*, 66, 830-842.
- Furnham, A. (1988). The adjustment of sojourners. In Y. Y. Kim and W. B. Gudykunst (Eds.), *Cross-cultural adaptation, current approaches* (pp. 42-61). Newbury Park: Sage.
- Gallois, C., Barker, M., Jones, E and Callen, V. (1992). International communication, evaluations of lecturers and Australian and Chinese students. In S Iwawaki, Y. Kashima and K. Leung (Eds.), *Innovations in cross-cultural psychology* (pp. 86-102). Amsterdam: Swets and Zeitlinger.
- Gardner, H. (1989a). To open minds: Chinese clues to the dilemma of contemporary education. New York: Basic Books.
- Gardner, H. (1989b). The key in the slot: creativity in a Chinese key. *Journal of Aesthetic Education, 23 (Spring),* 141-158.
- Garrott, J. R. (1993). Student attitudes toward English language learning and teaching in China. In N. Bird, J. Harris and M. Ingham (Eds.), *Language content* (pp. 236-249). Hong Kong: Institute of language education.
- Garrott, J. R. (1995a). Chinese cultural values, new angles, added insights. International Journal of Cultural Relations, 19(2), 211-225.
- Garrott, J. R. (1995b). On the search for Chinese values, 1948-1994. Paper presented at the 24th annual Southwest conference on Asian studies. 13-14 October 1995.

- George, D. and Mallory, P. (2001). SPSS for windows, step by step. 10.0 update (3rd edition). Needham Heights, Mass: Allyn and Bacon.
- Ghuman, P. A. S. (2000). Acculturation of South Asian adolescents in Australia. British Journal of Educational Psychology, 70, 305-316.
- Giles, H. A. (1972). San Tzu Ching: elementary Chinese. Taipei: Cheng Wen Publishing Company.
- Gittings, J. (2002, May 23-29). Need for creative thinking by China's youth poses a dilemma for Jiang. *Guardian Weekly*, 166(24), 6.
- Goldstein, H. (1979). *The design and analysis of longitudinal studies*. London: Academic Press.
- Goldstein, H. (1997). Methods in school effectiveness research. School Effectiveness and School Improvement, 8(4), 369-395.
- Goodman, P. S. (2003, September 4-10). Creating anxiety by degrees. *Guardian Weekly*, 169(11), 29.
- Gow, L. and Balla, J. (1994). Beyond the principle of normalization to the principle of aggregation. *Downs Syndrome Down Under, 6,* 24-38.
- Gow, L., Balla, J., Kember, D. and Hau, K-T. (1996). The learning approaches of the Chinese people: a function of socialization processes and the context of learning. In M. H. Bond (Ed.), *The handbook of Chinese psychology* (pp. 106-123). New York: Oxford University Press.
- Gow, L., Kember, D. and Chow, R. (1991). The effects of English language ability on approaches to learning. *RELC Journal 22(1)*, 49-68.
- Graddol, D. (2004). The future of language. Science 303(5662),1329-1331.
- Grant, H. and Dweck, C. S. (2001). Cross-cultural response to failure: considering outcome attributions with different goals. In F. Salili, C. Y. Chiu and Y. Y. Hong (Eds.), *Student motivation: the culture and context of learning.* (*Plenum series on human exceptionality*) (pp. 203-219). New York: Plenum Publishers.
- Grant, J., (no date). Small potatoes? Students and teachers in Shanghai, 1988-1989. Australian institute of international affairs, 4, 1-25.
- Grimm, L. G. and Yarnold, P. R. (Eds.) (1995). *Reading and understanding multivariate statistics*. Washington, DC: American Psychological Association.
- Gu, Y. and Johnson, R. (1996). Vocabulary learning strategies and language learning outcomes. *Language Learning*, 46(4), 643-679.
- Guan, J. and Dodder, R. (1998). Instrument validity of cross-cultural studies, a further search for culture-free dimensions. Poster presentation at the 93rd meeting of the American sociological society. San Francisco, 31-8-1998.
- Guan, J. and Dodder, R. (2001). The impact of cross-cultural contact on value and identity, a comparative study of Chinese students in China and in the U. S. A. Mankind Quarterly, 41(3), 271-288.
- Gustafsson, J-E. (1999). Measuring and understanding G, experimental and correlational approaches. In P. L. Ackerman and P. C. Kyllonen (Eds.),

*Learning and individual differences, process, trait and content determinant* (pp. 275-291). Washington: American Psychological Association.

- Gustafsson, J-E. and Balke, G. (1993). General and specific abilities as predictors of school achievement. *Multivariate Behavioral Research, 28 (4)*, 407-434.
- Gustafsson, J-E. and Stahl, P. E. (1999). *Streams user's guide, version 2.0.* Mölndal, Sweden: MultivariateWare.
- Guttman, L. (1968). A general nonmetric technique for finding the smallest coordinate space for a configuration of points. *Psychometrika*, *33*, 469-506.
- Hackett, S. (2004, April 15-21). The time has come to let learners take control of their assessment. *Guardian Weekly*, 170(17), Learning English, p.3.
- Hair, J. F., Anderson, R. E., Tatham, R. L. and Black, W. C. (1995). *Multivariate data analysis with readings (4th edition)*. New Jersey: Prentice Hall.
- Hall, C. W., Bolen, L. M. and Gupton, R. H. (1996). Predictive validity of the Study Process Questionnaire for undergraduate students. *College Student Journal*, 29 (2), 234-239.
- Hamp-Lyons, L. (1988). The product before: task-related influences on the writer. In P. C. Robinson (Ed.), *Academic writing: process and product. ELT Documents 129* (pp. 35-46). London: Modern English Publications and The British Council.
- Hansen, C. (1985). Individualism in Chinese thought. *Individualism and holism, studies in Confucian and Taoist values* (pp.35-55). Ann Arbor: Center for Chinese Studies, University of Michigan.
- Harmer, J. (2003). Popular culture, methods, and context. *ELT Journal*, *57(3)*, 288-293.
- Harper, G. and Kember, D. (1989). Interpretation of factor analysis from the approaches to studying inventory. *British Journal of Educational Psychology*, 59, 66-74.
- Harris, R. J. (1989). A canonical cautionary. *Multivariate Behavioral Research*, 24(1), 17-39.
- Harrison, L. E. and Huntington, S. P. (Eds.) (2000). *Culture matters: how values shape human progress.* Basic Books: New York, New York.
- Hattie, J. and Watkins, D. A. (1988). Preferred classroom environment and approach to learning. *British Journal of Educational Psychology* 58, 345-349.
- Hattie, J., Biggs, J. B. and Purdie, N. (1996). Effects of learning skills intervention of student learning, a meta-analysis. *Review of Educational Research*, 66(2), 99-136.
- Hau, K-T. and Salili, F. (1990). Examination result attribution, expectancy and achievement goals among Chinese students in Hong Kong. *Educational Studies*, 16 (1), 17-31.
- Hau, K-T. and Salili, F. (1996). Achievement goals and causal attributions. In S. Lau (Ed.), *Growing up the Chinese way* (pp. 121-145). Hong Kong: The Chinese University Press.

- Hayhoe, R. (1994). Ideas of higher learning, east and west, conflicting values in the development of the Chinese university. *Minerva*, 32(4), 361-382.
- Hayhoe, R. (1996). The context of the dialogue. In R. Hayhoe and J. Pan (Eds.), *Eastwest dialogue in knowledge and higher education* (pp. 3-14). New York: Sharpe.
- Hayhoe, R. and Pan, J. (Eds.) (1996). *East-west dialogue in knowledge and higher education*. New York: Sharpe.
- Hellmundt, S., Rifkin, W. and Fox, C. (1998). Enhancing intercultural communication among business communication students. *Higher Education Research and Development*, *17(3)*, 333-344.
- Hess, R. D. and Azuma, M. (1991). Cultural support for schooling, contrasts between Japan and the United States. *Education Researcher*, 20(9), 2-8, 12.
- Hill, D. (2003, May 15-21). Learners need 'natives' to guide not dictate. *Guardian Weekly*, *168*(21), Learning English, p.7.
- Hilliard, R. I. (1995). How do medical students learn, medical student learning styles and factors that affect these learning styles. *Teaching and Learning in Medicine*, 7(4), 201-210.
- Ho, D. Y. F. (1986). Chinese patterns of socialisation: a critical review. In M. H. Bond (Ed.), *The psychology of the Chinese people* (pp. 1-37). Oxford: Oxford University Press.
- Ho, D. Y. F. (1994). Cognitive socialization in Confucian heritage cultures. In P. M. Greenfield and R. R. Cocking (Eds.), *Cross-cultural roots of minority child development* (pp. 285-313). Hillsdale: L. Erlbaum Associates.
- Ho, D. Y. F. (1996). Filial piety and its psychological consequences. In M. H. Bond (Ed.), *The handbook of Chinese psychology*. (pp. 155-165). Hong Kong: Oxford University Press.
- Ho, D. Y. F. and Chiu, C-Y. (1994). Components of individualism and social organisation. In U. Kim, H. C. Triandis, C. Kagatcibasi, S-C. Choi and G. Yoon (Eds.), *Individualism and collectivism, theory, method and applications* (pp.137-156). Thousand Oaks: Sage.
- Ho, J. and Crookall, D. (1995). Breaking with Chinese cultural traditions, learner autonomy in English language learning. *System, 23(2),* 235-243.
- Ho, Y. H. W. (1996). Filial piety and its psychological consequences. In M. H. Bond (Ed.), *The handbook of Chinese psychology* (pp.155-165). Hong Kong: Oxford University Press.
- Hofstede, G. (1980). Culture's consequences: international differences in workrelated values. Newbury Park: Sage.
- Hofstede, G. (1991). Empirical models of cultural differences. In N. Bleichrodt and P. D. Drenth (Eds.), *Contemporary issues in cross-cultural psychology* (pp.4-20). Amsterdam: Swets and Zeitlinger.
- Hofstede, G. and Bond, M. H. (1988). The Confucius connection, from cultural roots to economic growth. *Organisational Dynamics*, 16, 5-21.
- Hong, Y. Y. (2001). Chinese students' and teachers' inferences of effort and ability. In F. Salili, C. Y. Chiu and Y. Y. Hong (Eds.), *Student motivation: the*

*culture and context of learning. (Plenum series on human exceptionality),* (pp. 105-120). New York: Plenum Publishers.

- Hotelling, H. (1935). The most predictable criterion. *Journal of Experimental Psychology, 26,* 139-142.
- Hox, J. J. (1994). Applied multilevel analysis. Amsterdam: T-T Publikaties.
- Hox, J. J. (2002). *Multilevel analysis: techniques and applications*. Mahwah: Lawrence Erlbaum Associates, Inc.
- Hoyle, R. H. (1995a) The structural equation modeling approach: basic concepts and fundamental issues. In R. H. Hoyle (Ed.), *Structural equation modeling: concepts, issues and applications* (pp. 1-15). Thousand Oaks: Sage Publications Inc.
- Hoyle, R. H. (Ed.) (1995). Structural equation modeling: concepts, issues and applications. Thousand Oaks: Sage Publications Inc.
- Hoyle, R. H. and Panter, A. T. (1995). Writing about structural equation models. In R. H. Hoyle (Ed.), *Structural equation modeling: concepts, issues and applications* (pp. 158-176). Thousand Oaks, CA: Sage.
- Hsu, F. L. K. (1972). *American and Chinese*. New York: Doubleday Natural History Press.
- Hu, L. and Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), Structural equation modeling: concepts, issues and applications (pp. 76-99). Thousand Oaks: Sage Publications Inc.
- Hu, L-T., Bentler, P. M. and Kano. Y. (1992). Can test statistics in covariance structure analysis be trusted? *Psychological Bulletin*, *112*, 351-362.
- Hui, C. H. and Triandis, H. C. (1985). Measurement in cross-cultural psychology, a review and comparison of strategies. *Journal of Cross-cultural Psychology*, 16, 131-152.
- Hwang, A., Francesco, A. M. and Kessler, E. (2003). The relationship between individualism-collectivism, face, and feedback and learning in Hong Kong, Singapore, and the United States. *Journal of Cross-cultural Psychology*, 34(1), 72-91.
- Hwang, K. K. (1999). Filial piety and loyalty: two types of social identification in Confucianism. Asian Journal of Social Psychology, 2(1), 163-183.
- Hwang, K. K. (2001). The deep structure of Confucianism: a social psychological approach. *Asian Philosophy*, 11(3), 179-204.
- Iwawaki, S., Kashima, Y. and Leung, K. (Eds.) (1992). *Innovations in cross-cultural psychology*. Amsterdam: Swets and Zeitlinger.
- Jackson, M. (1997). But learners learn more. *Higher Education Research and Development*, 16(1), 101-109.
- Jacques, M. (2003, May 29-June 4). The power of one, (Comment and analysis). *Guardian Weekly*, 168(23), 11.

- Jarratt, B. (2003, March 6-12). Enjoying the festivities as the sheep comes in, (Letter from Taiwan). *Guardian Weekly*, *168(11)*, 20.
- Johnson, R. and Wen, Q. (1997). L2 learner variables and English achievement, a study of tertiary-level English majors in China. *Applied Linguistics*, 18(1), 27-48.
- Johnson, T. G. (1995). *Multilevel models of student achievement in science*. Unpublished PhD thesis. Adelaide: The Flinders University of South Australia.
- Jones, A. (1999). The Asian learners, an overview of approaches to learning. <u>http://www.ecom.unimelb.edu.au/tluwww/apptolearn.htm</u>.
- Jones, A. P., Rozelle, R. M. and Chang, W. N. (1990). Perceived punishment and reward values of supervisor actions in a Chinese sample. *Psychological studies*, 35(1), 1-10.
- Jöreskog, K. G. and Sörbom, D. (1988). LISREL 7: a guide to the program and applications. Chicago: SPSS, Inc.
- Jöreskog, K. G. and Sörbom, D. (1993). *LISREL 8: structural equational modeling* with Simplis command language. Chicago: Scientific Software International.
- Jöreskog, K. G. and Sörbom, D. (1999). *LISREL 8.30*. Chicago: Scientific Software International.
- Jose, N. (1995). Chinese whispers: cultural essays. Adelaide: Wakefield Press.
- Kaiser, H. F. and Caffrey, J. (1965). Alpha factor analysis. *Psychological Studies*, 30(1), 1-14.
- Kaplan, D. (1995). Statistical power in structural equation modeling. In R. H. Hoyle (Ed.), *Structural equation modeling: concepts, issues and applications* (pp. 100-117). Thousand Oaks: Sage Publications Inc.
- Keats, D. M. and Fang, F-X. (1992). The effect of modification of the cultural content of stimulus materials on social perspective talking ability in Chinese and Australian children. In S Iwawaki, Y. Kashima and K. Leung (Eds.), *Innovations in cross-cultural psychology* (pp.319-327). Amsterdam: Swets and Zeitlinger.
- Keeves, J. P. (1975). The home, the school and achievement in mathematics and science. *Science Education*, 59 (4), 439-460.
- Keeves, J. P. (1986). Canonical correlation analysis. International Journal of Educational Research, 10(2), 164-173.
- Keeves, J. P. (1992). The IEA technical handbook. The Hague: IEA.
- Keeves, J. P. (1995). A lexicon and concordance of terms used in statistics and empirical research in education. Adelaide: The Flinders University of South Australia.
- Keeves, J. P. (Ed.) (1997). Educational research methodology and measurement, an *international handbook (2nd edition)*. Oxford: Pergamon.
- Keeves, J. P. and Saha, L. J. (1997). Measurement and social background. In J. P. Keeves (Ed.), *Educational research methodology and measurement, an international handbook (2nd edition, pp. 930-937)*. Oxford: Pergamon.

- Keeves, J. P. and Sellin, N. (1997). Multilevel analysis. In J. P. Keeves (Ed.), Educational research methodology and measurement, an international handbook (2nd edition, pp. 395-403). Oxford: Pergamon.
- Keeves, J. P. and Thompson, J. D. (1997). Canonical analysis. In J. P. Keeves (Ed.), Educational research methodology and measurement, an international handbook (2nd edition, pp. 461-466). Oxford: Pergamon.
- Kelly, D. P. (2000). A discussion on ethnography. In J. Liu, H. A. Ross and D. P. Kelly (Eds.), *The ethnographic eye, interpretive studies of education in China* (pp.1-28). New York: Falmer Press.
- Kember, D. (1996). The intention to both memorise and understand, another approach to learning? *Higher Education*, 21, 341-354.
- Kember, D. (1999). Teaching beliefs and their impact on students' approaches to learning. In B. Dart and G. Boulton-Lewis (Eds.), *Teaching and learning in higher education* (pp. 1-25). Camberwell: ACER Press.
- Kember, D. (2000). Misperceptions about the learning approaches, motivation and study practices of Asian students. *Higher Education*, 40, 99-121.
- Kember, D., Biggs, J. and Leung, D. Y. P. (2004). Examining the multidimensionality of approaches to learning through the development of a revised version of the Learning Process Questionnaire. *British Journal of Educational Psychology*, 74, 261-279.
- Kember, D., Charlesworth, M., Davies, H., McKay, J. and Stott, V. (1997). Evaluating the effectiveness of educational innovations, using the *Study Process Questionnaire* to show that meaningful learning occurs. *Studies in Educational Evaluation*, 23(2), 141-157.
- Kember, D. and Gow, L. (1990). Cultural specificity of approaches to study. British Journal of Educational Psychology, 60, 356-363.
- Kember, D. and Gow, L. (1991). A challenge to the anecdotal stereotype of the Asian student. *Studies in Higher Education*, *16(2)*, 117-128.
- Kember, D. and Leung, D. Y. P. (1998). The dimensionality of approaches to learning, and investigation with confirmatory factor analysis on the structure of the SPQ and LPQ. *British Journal of Educational Psychology*, 68, 395-407.
- Kember, D. and Wong, A (2000). Implications for evaluation from a study of students' perceptions of good and poor teaching. *Higher Education*, 40, 69-97.
- Kember, D., Wong, A. and Leung, D. Y. P. (1999). Reconsidering the dimensions of approaches to learning. *British Journal of Educational Psychology*, 69, 323-343.
- Kim, K. C. and Hurh, W. M. (1993). Beyond assimilation and pluralism: syncretic adaptation of Korean migrants in the US. *Ethnic and Racial Studies*, 16, 696-713.
- Kim, U., Triandis, H. C., Kagatcibasi, C., Choi, S-C., and Yoon, G. (Eds.) (1994). Individualism and collectivism, theory, method and applications. Thousand Oaks: Sage.

- Kim, Y. Y. (1988). On theorising intercultural communication. In Y. Y. Kim and W. B. Gudykunst (Eds.), *Theories of intercultural communication* (pp. 11-21). Newbury Park: Sage.
- Kim, Y. Y. and Gudykunst, W. B. (Eds.) (1988). *Theories of intercultural communication*. Newbury Park: Sage.
- King, A. Y. C. (1985). The individual in Confucianism, a relational perspective. Individualism and holism, studies in Confucian and Taoist values. (pp.57-70). Ann Arbor: Center for Chinese Studies, University of Michigan.
- Kirby, J. R., Woodhouse, R. and Ma, Y. (1996). Studying in a second language, the experiences of Chinese students in Canada. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 141-159). Hong Kong: ACER and CERC.
- Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: Guilford.
- Kolen, M. (1997). Equating of tests. In J. P. Keeves (Ed.), Educational research methodology and measurement, an international handbook (2nd edition, pp.730-736). Oxford: Pergamon.
- Kong, C-K. and Hau, K-T. (1996). Students' achievement goals and approaches to learning: the relationship between emphasis on self-improvement and thorough understanding. *Research in Education 55*, 74-85.
- Kong, C-K., Hau, K-T. and Cheng, Z-J. (1998, April). Chinese students' self-concept and academic performance, big fish-little pond effects and the role of perceived school status. Paper presented at the American Education Research Association Annual Meeting, San Diego, CA.
- Kraft, J. (2000). Are the Chinese different? In C. Mackerras (Ed.), Sinophiles and sinophobes: Western views of China (pp. 167-168). New York: Oxford University Press.
- Krathwohl, D. R., Bloom, B. S. and Masia, B. B. (1964). *Taxonomy of educational objectives, the classification of educational goals, handbook II, the affective domain.* New York: David McKay Company Inc.
- Kreft, I. G. G. and de Leeuw, J. (1998). *Introducing multilevel modeling*. Newbury Park, CA: Sage.
- Kwan, K. L. K., Sodowsky, G. R. and Ihle, G. M. (1994). Worldviews of Chinese international students, an extension of new findings. *Journal of College Student Development*, 35,190-197.
- Lai, P. and Biggs, J. B. (1994). Who benefits from mastery learning? *Contemporary Educational Psychology, 19 (1),* 13-23.
- Lamb, S. (1990). Cultural selection in Austrlian secondary schools. *Research in Education*, 43, 1-14.
- Lau, S. (1996a). Self-concept development, is there a concept of self in Chinese culture? In S. Lau (Ed.), *Growing up the Chinese way* (pp. 357-374). Hong Kong: The Chinese University Press.

- Lau, S. (1996b). In search of the course of Chinese children's development. In S. Lau (Ed.), Growing up the Chinese way (pp. 375-383). Hong Kong: The Chinese University Press.
- Lau, S. (Ed.) (1996) *Growing up the Chinese way*.. Hong Kong: The Chinese University Press.
- Lau, S. and Yeung, P. W. (1996). Understanding Chinese child development, the role of culture in socialisation. In S. Lau (Ed.), *Growing up the Chinese way* (pp. 29-44). Hong Kong: The Chinese University Press.
- Leach, F. (1999). Dilemmas between economics and culture in educational aid. In F. Leach and A. Little (Eds.) *Education, culture and economics, dilemmas for development* (pp. 371-394). New York: Garland.
- Lee, W. O. (1996). The cultural context for Chinese learners, conceptions of learning in the Confucian tradition. In Watkins, D. A. and Biggs, J. B. (Eds.). *The Chinese learner: Cultural, psychological and contextual influences* (pp. 25-42). Hong Kong: ACER and CERC.
- Leung, C. (2001). The sociocultural and psychological adaptation of Chinese migrant adolescents in Australia and Canada. *International Journal of Psychology*, 36 (1), 8-19.
- Leung, K. and Bond, M. H. (1989). On the empirical identification of dimensions for cross-cultural comparisons. *Journal of Cross-cultural Psychology*, 20(2), 133-151.
- Lietz, P. (1995). *Changes in reading comprehension across cultures and over time*. Unpublished PhD thesis. Adelaide: Flinders University of South Australia.
- Likert, R. (1932). A technique for the measurement of attitudes. Archives of Psychology, 140(52), 357-361.
- Little, A. (1999) Development and education: cultural and economic analyses. In F. Leach and A. Little (Eds.) *Education, culture and economics, dilemmas for development* (pp. 3-32). New York: Garland.
- Littlewood, W. (2000). Do Asian students really want to listen and obey? *ELT Journal*, 54(1), 31-35.
- Liu, I-M. (1986). Chinese cognition, In M. H. Bond (Ed), The psychology of the Chinese people (pp. 73-105). Hong Kong: Oxford University Press.
- Liu, J. (2000). Reconstructing the past, reminiscences of missionary school days. In J. Liu, H. A. Ross and D. P. Kelly (Eds.), *The ethnographic eye, interpretive studies of education in China* (pp. 153-177). New York: Falmer Press.
- Liu, J., Ross, H. A. and Kelly, D. P. (Eds.) (2000). *The ethnographic eye, interpretive studies of education in China*. New York: Falmer Press.
- Lloyd George, R. (1992). The East-West pendulum. London: Woodhead Faulkner Ltd.
- Loehlin, J. C. (1987). Latent variable models, an introduction to factor, path and structural analysis. Hillsdale: Lawrence Erlbaum.
- Lord, F. M. (1952). A theory of test scores. *Psychometric Monograph*, Number 7.

- Lord, F. M. (1980). *Practical applications of item response theory*. Hillsdale, NJ: Lawrence Erlbaum.
- MacCallum, R. C. and Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology*, 51, 201-226.
- Mackerras, C. (Ed.) (2000). Sinophiles and sinophobes: Western views of China. New York: Oxford University Press.
- Maley, A. (1983). Xanadu–a miracle of rare device, the teaching of English in China. Language Learning and Communication, 2(1), 102-112.
- Mann, L., Radford, M., Burnett, P., Ford, S., Bond, M., Leung, K., Nakamura, H., Vaughan, G., and Yang, K-S. (1998). Cross cultural differences in selfreported decision-making style and confidence. *International Journal of Psychology*, 33(5), 325-335.
- Ma Rhea, Z. (1995). Changing manifestations of wisdom and knowledge in Thailand. *Prospects*, 25(4), 669-682.
- Ma Rhea, Z. and Teasdale, G. R. (2000). A dialogue between the local and the global. In G. R. Teasdale and Z. Ma Rhea (Eds.), *Local knowledge and wisdom in higher education* (pp.1-14). Oxford: Elsevier Science Ltd.
- Marsh, H. W., Balla, J. R. and McDonald, R. P. (1988). Goodness of fit indexes in confirmatory analysis, the effect of sample size. *Psychological Bulletin*, 103 (3), 391-410.
- Marsh, H. W., Hau, K-T. and Kong, C-K. (2000). Late immersion and language of instruction in Hong Kong high schools: achievement growth in language and nonlanguage subjects. *Harvard Educational Review*, 70(3), 302-436.
- Martön, F. (1981). Phenomenography describing the conceptions of the world around us. *Instructional Science*, 10, 177-200.
- Martön, F. and Säljö, R. (1976a). On qualitative differences in learning–I, outcome and process. *British Journal of Educational Psychology*, *46*, 4-11.
- Martön, F. and Säljö, R. (1976b). On qualitative differences in learning-II, Outcome as a function of the learner's conception of the task. *British Journal of Educational Psychology, 46,* 115-127.
- Martön, F., Dall'Alba, G. and Tse, L. K. (1996). Memorising and understanding, the keys to the paradox? In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 69-84). Hong Kong: ACER and CERC.
- Martön, F., Watkins, D. and Tang, C. (1997). Discontinuities and continuities in the experience of learning, an interview study of high school students in Hong Kong. *Learning and Instruction*, 7(1), 21-48.
- Masemann, V. L. (2000). Contextualising the dialogue. In G. R. Teasdale and Z. Ma Rhea (Eds.), *Local knowledge and wisdom in higher education*. (pp. xvii-xxxi). Oxford: Elsevier Science Ltd.
- Matthews, B. (2000). The *Chinese Value Survey*: an interpretation of value scales and consideration of some preliminary results. *International Education Journal*, *1(2)*, 117-126.

- Matthews, B, (2001). The relationship between values and learning, *International Education Journal*, 2(4), 223-232.
- Matthews, B. (2004). *Life values and approaches to learning: a study of university students from Confucian heritage cultures.* Unpublished PhD thesis. Adelaide: The Flinders University of South Australia.
- McAllister, W. (1995). Are pupils equipped for group work without training or instruction? *British Educational Research Journal 21(3)*, 395-404.
- McDevitt, B. (2004). Negotiating the syllabus: a win-win situation? *ELT Journal*, 58(1), 3-9.
- McInernay, D. M. and Van Etten, S. (Eds.) (2002). *Research on sociocultural influences on motivation and learning*. Greenwich CT:Information Age Publishing, Inc.
- McKay, J. and Kember, D. (1997). Spoon feeding leads to regurgitation, a better diet can result in more digestible learning outcomes. *Higher Education Research and Development*, *16*(*1*), 55-67.
- McLaughlin, D. (1995). Teaching overseas students and learning from them, a professional and moral dimension. *Educational Research and Perspectives*, 22(1), 103-113.
- Melton, C. (1990). Bridging the gap, a case study of Chinese students learning style preferences. *RELC 21(1)*, 29-54.
- Mohandas, R. (1996). Test equating problems and solutions, equating English test forms for the Indonesian secondary school final examination administered in 1994. Unpublished Master's thesis. Adelaide: Flinders University of South Australia.
- Mok, I., Chik, P. M., Ko, P. Y., Kwan, T., Lo, M. L., Marton, F., Ng, D. F. P., Pang, M. F., Runesson, U. and Szeto, L. H. (2001). Solving the paradox of the Chinese teacher? In D. A. Watkins and J. B. Biggs (Eds.), *Teaching the Chinese learner: Psychological and pedagogical perspectives* (pp. 161-179). Hong Kong: CERC and ACER.
- Mok, M. M. C. and Gurr, D. (2003). Quality assurance and school monitoring. In J. P. Keeves (Ed.), *Handbook of educational research in the Asia-Pacific region*. (pp. 945-958). Dordrecht: Kluwer.
- Montgomery, S. L. (2004). Of towers, walls, and fields: perspectives on language in science. Science 303(5662), 1333-1335.
- Moran, A. (1991). What can learning styles research learn from cognitive psychology? *Educational Psychology*, *11(3 and 4)*, 239-245.
- Morris, S. and Hudson, W. (1995). International education and innovative approaches to university teaching. *Australian Universities Review*, *32(2)*, 70-74.
- Morrison, C. A., Hedrick, C. and Holten, R. (Eds.) Cross-cultural communication and professional education (pp. 278-284). Adelaide: Centre for Multicultural Studies.
- Munro, D. J. (Ed.) (1985). Individualism and holism, studies in Confucian and Taoist values. Ann Arbor: Center for Chinese Studies, University of Michigan.

- Murphy, D. (1987). Offshore education, a Hong Kong perspective. Australian Universities Review, 30(2), 43-44.
- Murray-Harvey, R. (1994). Learning styles and approaches to learning, distinguishing between concepts and instruments. *British Journal of Educational Psychology*, *64*, 373-388.
- Nesdale, D. and Todd, P. (1993). Internationalising Australian universities, the intercultural contact issue. *Journal of Tertiary Education Administration*, 15(2), 189-202.
- Ng, A. K. (2001). *Why Asians are less creative than Westerners*. Singapore: Prentice Hall-Pearson Education Asia Pte Ltd.
- Ng, C. H. and Renshaw, P. D. (2002). Self-schema, motivation and learning: a crosscultural comparison. In D. M. McInernay and S. Van Etten (Eds.), *Research* on sociocultural influences on motivation and learning (Vol. 2, pp. 55-87). Greenwich, CT: Information Age Publishing, Inc.
- Ng, C. H. and Renshaw, P. D. (2003). Motivation and school learning. In J. P. Keeves (Ed.), *Handbook of educational research in the Asia-Pacific region*. (pp. 495-510). Dordrecht: Kluwer.
- Niles, F. S. (1995). Cultural differences in learning motivation and learning strategies, a comparison of overseas and Australian students at an Australian university. *International Journal of Intercultural Relations*, 19(3), 369-385.
- Ninnes, P. M. (1995). *The cultural adaptation of students of Vietnamese ethnic background*. Unpublished PhD thesis. Adelaide: The Flinders University of South Australia.
- Norusis, M. (1986). SPSS Guide to data analysis for SPSS-X with Additional instructions for SPSS/PC+. Chicago: SPSS Inc.
- Norusis, M. (1993). SPSS for Windows, basic system user's guide: Release 8.0. Chicago: SPSS Inc.
- O'Halloran, M. (2002, July 25-31, TEFL Supplement). Ireland rises to Chinese student 'flood.' *Guardian Weekly*, 167(5), 19.
- Oppenheim, A. N. (1992). *Questionnaire design, interviewing and attitude measurement*. London: Printer Publishers.
- Oxford, R. L. and Anderson, N. (1995). A cross-cultural view of learning styles. Language Teaching, 28, 201-215.
- Oxford, R. L., Hollaway, M. E. and Murillo, D. (1992). Language learning styles: research and practical considerations for teaching in the multicultural tertiary ESL/EFL classroom. *System*, 20(4), 349-456.
- Pearson, C. A. L. and Beasley, C. J. (1997). The learning approaches of international and local students, a comparative study using Biggs' Study Process Questionnaire. *Research and development in Higher Education*, 20, 589-597. (Proceedings of the HERDSA Annual Conference, 1997).
- Pedhazur, E. (1997). *Multiple regression in behavioral research (3rd edition)*. Orlando: Harcourt Brace College Publishers.

- Pennycock, A. (1996). English, universities and struggles over culture and knowledge. In R. Hayhoe and J. Pan (Eds.), *East-west dialogue in* knowledge and higher education (pp. 64-80). New York: Sharpe.
- Perkins, D. H. (2000). Law, family ties, and the East Asian way of business. In L. E. Harrison and S. P. Huntington (Eds.), *Culture matters: how values shape human progress* (pp. 232-243). Basic Books: New York, New York.
- Petersen, N. S., Kolen, M. J. and Hoover, H. D. (1989). Scaling, norming and equating. In R. L. Linn (Ed.), *Educational measurement (3rd edition)*. New York, American Council on Education.
- Ping, X., Lee, A. M. and Solomon, M. A. (1997). Achievement goals and their correlates among American and Chinese students in physical education. *Journal of Cross-cultural Psychology 28(6)*, 645-660.
- Pong, S-L. (1993). Preferential policies and secondary school attainment in peninsula Malaysia. Sociology of Education, 66(4), 245-261.
- Pong, S-L. (1996). School participation from single-mother families in Malaysia. Comparative Education Review, 40(3), 231-249.
- Poon, R., Goodnow, J. and Cooney, G. (1983). Adults' involvement in second language learning, interest in English among recent Chinese-speaking arrivals in Australia. *Journal of Intercultural Studies*, 4(1), 39-56.
- Post, D. and Pong, S-L. (1998). The waning effect of sibship composition on school attainment in Hong Kong. *Comparative Educative Review*, 42(2), 99-117.
- Pratt, D. D. (1992). Chinese conception of learning and teaching, a Westerner's attempt at understanding. *International Journal of Lifelong Education*, 11(4), 301-319.
- Price, C. (1997). The Asian element in Australia: 1996. People and Place, 5(4), 35-36.
- Probyn, I. D. (1999). Factors influencing the award of school grades, an action research study. Unpublished Master's thesis. Adelaide: The Flinders University of South Australia.
- Purdie, N., Hattie, J. and Douglas, G. (1996). Student conceptions of learning and their use of self-regulated learning strategies: a cross-cultural comparison. *Journal of Educational Psychology*, 88, 87-100.
- Pye, L. W. (2000). Asian values: from dynamos to dominoes. In L. E. Harrison and S. P. Huntington (Eds.), *Culture matters: how values shape human progress* (pp. 244-255). Basic Books: New York, New York.
- Ralston, D. A., Gustafson, D. J., Elsass, P. M., Cheung, F., and Terpstra, R. H. (1992). Eastern values, a comparison of managers in the United States, Hong Kong and the People's Republic of China. *Journal of Applied Psychology*, 77(5), 664-671.
- Ramburuth, P. and McCormick, J. (2001). Learning diversity in higher education: a comparative study of Asian international and Australian students. *Higher Education, 42,* 333-350.
- Ramsden, P. (1992). Learning to teach in higher education. London: Routledge.
- Ramsden, P. and Entwistle, N. J. (1983). Effects of academic department on students approaches to studying. *British Journal of Educational Psychology*, 51, 368-383.
- Rao, Z. (1996). Reconciling communicative approaches to the teaching of English with traditional Chinese methods. *Research in Teaching of English*, 30(4),458-471.
- Rasch, G. (1960). *Probabilistic models for some intelligence and attainment tests*. Copenhagen: Danish Institute for Educational Research.
- Raudenbush, S. W. and Bryk, A. S. (1988). Methodological advances in analysing the effects of schools and classrooms on student learning. In E. Rothkopf (Ed.), *Review of Research in Education 1988-89 (Volume 15, pp. 423-475).* Washington, D. C.: American Research Association.
- Raudenbush, S. W. and Bryk, A. S. (1997). Hierarchical linear modeling. In J. P. Keeves (Ed.), *Educational research methodology and measurement, an international handbook (2nd edition, pp. 549-556)*. Oxford: Pergamon.
- Reid, J. M. (Ed.) (1995). *Learning styles in the ESL/EFL classroom*. Boston: Heinle and Heinle Publishers.
- Renshaw, P. D. (1999). Learning and culture: representations of the Chinese learner at Australian universities. In Lu Jie, *Education of the Chinese: the global perspective of national cultural tradition,* (pp. 48-71). Nanjing: Nanjing University Press.
- Renshaw, P. D. and Power, C. (2003). The process of learning and human development. In Keeves, J. P. (Ed.), *Handbook of educational research in the Asia-Pacific region* (pp. 351-364). Dordrecht: Kluwer.
- Renshaw, P. D. and Volet, S. E. (1995). South-east Asian students at Australian universities: a reappraisal of their tutorial participation and approaches to study. *Australian Educational Researcher*, 22(2), 85-106.
- Richardson, J. T. E. (1994). Cultural specificity of approaches to studying in higher education, a literature survey. *Higher Education*, 27, 449-468.
- Richardson, J. T. E. (1995). Mature students in higher education, II, an investigation of the approaches to studying and academic performance. *Studies in Higher Education, 20 (1), 5-17.*
- Rokeach, M. (1973). The nature of human values. New York: The Free Press.
- Rose, R. J., Hall, C. W., Bolen, L. M. and Webster, R. E. (1996). Locus of control and college students' approaches to learning. *Psychological Reports*, 79(1), 163-171.

- Rosenthal, D. A. and Feldman, S. S. (1996). Crossing the border, Chinese adolescents in the West. In S. Lau (Ed.), *Growing up the Chinese way* (pp. 287-314). Hong Kong: The Chinese University Press.
- Sachs, J. and Gao, L. (2000). Item level and subscale level factoring of Biggs' Learning Process Questionnaire (LPQ) in a Mainland Chinese sample. *British Journal of Educational Psychology*, 70, 405-418.
- Sacks, J. (2003). *The dignity of difference: how to avoid the clash of civilizations*. London: Continuum.
- Sadler-Smith, E. (1996). Approaches to studying, age gender and academic performance. *Educational Studies*, 22(3), 367-379.
- Sadler-Smith, E. and Tsang, F. (1998). A comparative study of approaches to study in Hong Kong and the United Kingdom. *British Journal of Educational Psychology*, 68, 81-93.
- Saha, L. (2003). Cultural and social capital in Asian and Pacific countries. In J. P. Keeves (Ed.), *Handbook of educational research in the Asia-Pacific region*. (pp. 59-72). Dordrecht: Kluwer.
- Saha, L. and Tuijnman, A. (2003). Comparative indicators in education. In J. P. Keeves (Ed.), *Handbook of educational research in the Asia-Pacific region*. (pp. 1123-1136). Dordrecht: Kluwer.
- Salili, F. (1996). Achievement motivation: a cross-cultural comparison of British and Chinese students. *Educational Psychology 16(8)*, 271-281.
- Salili, F., Chiu, C. Y. and Hong, Y. Y. (Eds.) (2001). Student motivation: the culture and context of learning. (Plenum series on human exceptionality). New York: Plenum Publishers.
- Salisbury, H. (2000). A new spirit. In C. Mackerras (Ed.), *Sinophiles and sinophobes: Western views of China* (pp. 169-172). New York: Oxford University Press.
- Samuelowicz, K. (1987). Learning problems of overseas students, two sides of a story. *Higher Education Research and Development 6(2)*, 121-133.
- SAS Institute Inc. (1985). SAS user's guide, basics version (5th edition). Cary, N. C.: SAS Institute Inc.
- Scarcella, R. (1990). *Teaching minority students in the multicultural classroom*. Englewood Cliffs: Prentice-Hall, Inc.
- Schmeck, R. R. (1988). Strategies and styles of learning, an investigation of varied perspectives. In R. R. Schmeck (Ed.), *Learning Strategies and Style* (pp. 317-347). New York: Plenum Press.
- Schmeck, R. R., Ribich, F. D and Ramanaiah, N. (1977). Development of self-report inventory for assessing individual differences in learning processes. *Applied Psychological Measurement*, 1, 413-431.
- Schwartz, S. H. (1992). Universals in the content and structure of values, theoretical advances and empirical tests in 20 countries. In M. Zouma (Ed.), Advances in Experimental Social Psychology, 25,1-65. Orlando: Academic.

- Schwartz, S. H. (1994a). Are there universal aspects in the structure and contents of human values? Human values and social issues, current understanding and implications for the future. *Journal of Social Issues*, 50(4), 19-45.
- Schwartz, S. H. (1994b). Beyond individualism and collectivism, new cultural dimensions of values. In U. Kim, H. C. Triandis, C. Kagatcibasi, S-C. Choi, and G. Yoon (Eds.), *Individualism and collectivism, theory, method and applications* (pp.85-119). Thousand Oaks: Sage.
- Schwartz, S. H. (1996). Value priorities and behavior: applying a theory of integrated value systems. In C. Seligman, J. M. Olson and P. Zanna (Eds.), *The psychology of Values: the Ontario Symposium*. (Vol. 8, pp.1-24). Mahwah: Erlbaum.
- Schwartz, S. H. and Bilsky, W. (1987). Toward a psychological structure of human values. *Journal of Personality and Social Psychology*, 53, 550-562.
- Schwartz, S. H. and Bilsky, W. (1990). Toward a theory of the universal content and structure of values: extensions and cross-cultural replications. *Journal of Personality and Social Psychology*, 58 (5), 878-891.
- Schwartz, S. H., Melech, G., Lehmann, A., Burgess, S., Harris, M. and Owens, V. (2001). Extending the cross-cultural validity of the theory of basic human values with a different method of measurement. *Journal of Cross-cultural Psychology*, 32(5), 519-542.
- Scovel, T. (1983). The impact of foreign experts, methodology and materials on English language in China. *Language Learning and Communication*, 12(1), 83-91.
- Sheridan, G. (1999). Asian values Western dreams: understanding the new Asia. St. Leonards, NSW: Allen and Unwin.
- Shi, K., Wang, P., Wang, W., Zuo, Y., Liu, D., Maehr, M. L., Mu, X., Linnenbrink, L. and Hruda, L. (2001). Goals and motivation of Chinese Students-testing the adaptive learning model. In F. Salili, C. Y. Chiu and Y. Y. Hong (Eds.), *Student motivation: the culture and context of learning. (Plenum series on human exceptionality)* (pp. 249- 270). New York: Plenum Publishers.
- Shuell, T. J. (1986). Cognitive conceptions of learning. *Review of Educational Research*, 56, 411-436.
- Skaggs, G. and Lissitz, R. W. (1986). IRT test equating, relevant issues and a review of recent research. *Review of Educational Research*, 56(4), 495-529.
- Slay J. (1999). The nature of native Chinese culture and science education. Paper presented at the national association for science research in science teaching (NARST). Boston 28-31 March 1999.
- Smart, D. and Ang, G. (1993). Medium-term market opportunities for Australian education: a survey of Hong Kong students. Asia Research Centre for Social, Political and Economic Change: Murdoch University, Western Australia.
- Smart, D. and Ang, G. (1996). The internationalization of Australian higher education. *International Higher Education (6)*. (The newsletter of the Boston College Centre for International Higher Education).

- Smart, D., Volet, S. and Ang, G. (2000). Fostering social cohesion in universities: bridging the cultural divide. Canberra: Australian Education International.
- Smith, P. B. and Bond, M. H. (1998). *Social psychology across cultures (2nd edition)*. Needham Heights, Mass: Allyn and Bacon.
- Smith, P. B. and Schwartz, S. H. (1997). Values. In J. W.Berry, M. H. Segall and C. Kagitcibasi (Eds.), *Handbook of cross-cultural psychology (2nd edition)*. (Volume 3, pp. 77-118). Needham Heights, Mass: Allyn and Bacon.
- Smith, S. N. (2001). Approaches to study of three Chinese national groups. British Journal of Educational Psychology, 71, 429-441.
- Smith, S. N., Miller, R. J. and Crassini, B. (1998). Approaches to studying of Australian and overseas Chinese university students. *Higher Education Research and Development*, 17(3), 261-276.
- Sodowsky, G. R. and Plake, B. (1992). A study of acculturation differences among international people and suggestions for sensitivity to within-group differences. *Journal of Counseling and Development*, *71*, 53-59.
- Spencer-Oatey, H., Ng, P. and Dong, L. (2000). Responding to compliments: British and Chinese evaluative judgements. In H. Spencer-Oatey (Ed.), *Culturally speaking: managing rapport through talk across cultures* (pp. 98-120). London: Continuum.
- Statistical Support, a division of Research Consulting at ACITS (2001). *Getting started with HLM for Windows*. Retrieved 18 January 2001 from the University of Texas online available, <u>http://www.utexas.edu/cc/tutorials/hlm/index/html</u>.
- Statistical Support, a division of Research Consulting at ACITS (2001). SPSS for windows: descriptive and inferential statistics. Retrieved 24 December 2003 from the University of Texas online available, http://www.utexas.edu/cc/stat/tutorials/spss/SPSS2/Outline2.html
- Sternberg, R. J. (1997). Thinking styles. New York: Cambridge University Press.
- Stevenson, H. W. and Lee, S-Y. (1996). The academic achievement of Chinese students. In M. H. Bond (Ed.), *The handbook of Chinese psychology* (pp. 124-142). Hong Kong: Oxford University Press.
- Stevenson, H. W. and Stigler, J. W. (1992). *The learning gap, why our schools are failing and what we can learn from Japanese and Chinese education*. New York: Touchstone.
- Stigler, J. W. and Hiebert, J. (1999). *The teaching gap, best ideas from the world's teachers for improving education in the classroom*. New York: The Free Press.
- Stigler, J. W. and Stevenson, H. W. (1991). How Asian teachers polish each lesson to perfection. American Education, 15(1), 12-47.
- Stipek, D., Weiner, B. and Li, K. (1989). Testing some attribution-emotion relations in the People's Republic of China. *Journal of Personality and Social Psychology*, 56(1), 109-116.

- Stocking, M. L. (1997). Item response theory. In J. P. Keeves (Ed.), *Educational* research methodology and measurement, an international handbook (2nd edition, pp. 315-322). Oxford: Pergamon.
- Tabachnick, B. G. and Fidell, L. S. (2001). Using multivariate statistics (4th edition). Needham Heights, Mass: Allyn and Bacon.
- Tam, A. S. F. and Watkins, D. (1995). Towards a hierarchical model of self-concept of Hong Kong Chinese adults with physical disabilities. *International Journal of Psychology*, 30, 1-17.
- Tan, J. and Goh, J. (1999). Assessing cross-cultural variations in student study approaches – an ethnographic approach. In K. Martin, B. Stanley and N. Davison (Eds.), *Teaching in the discipline/learning in context*. (pp. 409-416). Proceedings of the 8th annual teaching and learning forum. The University of Western Australia, February, 1999, Perth, W. A, available online at: http://cleo.murdoch.edu.au/asu/pubs/tlf/tlf99/tz/tan.html
- Tang, C. (1996). Collaborative learning; the latent dimension in Chinese students learning. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 183-204). Hong Kong, ACER and CERC.
- Tang, C. and Biggs, J. B. (1996). How Hong Kong students cope with assessment. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 159-182). Hong Kong: ACER and CERC.
- Tang, S. (1999). Cooperation or competition, a comparison of United States and Chinese college students. *Journal of Psychology*, *133(4)*, 413-424
- Tatsuoka, M. M. (1973). Multivariate analysis in education research. In F. N. Kerlinger (Ed.), *Review of Research in education* (pp. 273-319). Itasca, Illinois: Peacock.
- Teasdale, G. R. (1997). Globalisation, localisation, impacts and implications for teacher education in the Asia-Pacific region. Paper presented at the 27th conference of the Australian Teacher Education Association. 5 August 1997.
- Teasdale, G. R. (1998). Local and global knowledge in higher education, a search for complementarity in the Asia-Pacific region. *International Journal of Educational Development*, 18(6), 501-511.
- Teasdale, G. R. and Ma Rhea, Z. (Eds.) (2000). Local knowledge and wisdom in higher education, Oxford: Elsevier Science Ltd.
- Teasdale, G. R. and Teasdale. J. I. (1999). Alternative cultures of knowledge in higher education in the Australia-Pacific region. In F. Leach and A. Little (Eds.), *Education, culture and economics, dilemmas for development* (pp. 241-260). New York: Garland.
- Thomas, P. R. and Bain, J. D. (1984). The contextual dependence of learning approaches: the effects of assessment. *Human Learning*, ³/₄, 227-240.
- Thorndike, R. M. (1978). *Correlation procedures for research*. New York: Gardner Press.

- Ting-Toomey, S. (1988). Intercultural conflict styles, a face-negotiation theory. In Y. Y. Kim and W. B Gudykunst (Eds.), *Theories of intercultural communication* (pp. 213-238). Newbury Park: Sage.
- Touloumtzoglou, J. (1998). *The effectiveness of the keyword mnemonic in modern Greek (second language) vocabulary acquisition*. Unpublished Master of Arts thesis. Adelaide: The Flinders University of South Australia.
- Touloumtzoglou, J. (2002). Changes in student learning and development in art production across grades and over time at secondary school. Unpublished PhD thesis. Adelaide: The Flinders University of South Australia.
- Triandis, H. C. (1972). The analysis of subjective culture. New York: John Wiley.
- Trigwell, K. and Prosser, M. (1991). Improving the quality of student learning: the influence of learning context and approaches to learning on learning outcomes. *Higher Education*, 22, 251-266.
- Tu, W. M. (1979). *Humanity and self-cultivation: essays in Confucian thought*. Berkeley: Asian Humanities Press.
- Tu, W. M. (1985). Confucius thought: selfhood as a creative transformation. New York: State University of New York.
- Tu, W. M. (2000). Multiple modernities: a preliminary inquiry into the implications of East Asian modernity. In L. E. Harrison and S. P. Huntington (Eds.), *Culture matters: how values shape human progress* (pp. 256-266). Basic Books: New York, New York.
- Tuijnman, A. C. and Keeves, J. P. (1997). Path analysis and linear structural equations. In J. P. Keeves (Ed.), *Educational research methodology and measurement, an international handbook (2nd edition, pp. 621-633).* Oxford: Pergamon.
- Unheim, J. O. and Gustafsson, J-E. (1987). The hierarchical organization of cognitive abilities, restoring general intelligence through the use of Linear Structural Relations (LISREL). *Multivariate Behavioral Research, 22*, 149-171.
- Van de Geer, J. P. (1971). Introduction to multivariate analysis for the social sciences. San Francisco: W. H. Freeman and Company.
- Vogt, W. P. (1999). Dictionary of statistics and methodology: a nontechnical guide for the social sciences (2nd edition). Newbury Park: Sage.
- Volet, S. (1999). Learning across cultures: appropriateness of knowledge transfer. International Journal of Educational Research, 31, 625-643.
- Volet, S. E. (2001). Significance of cultural and motivational variables on students' attitudes towards group work. In F. Salili, C. Y. Chiu and Y. Y. Hong (Eds.), *Student motivation: the culture and context of learning (Plenum series on human exceptionality)* (pp. 309- 333). New York: Plenum Publishers.
- Volet, S. E. and Ang, G. (1998). Culturally mixed groups on international campuses, an opportunity for intercultural learning. *Higher Education Research and Development*, 17, 5-23.
- Volet, S. E. and Kee, J. P. P. (1993). Studying in Singapore, studying in Australia-a student perspective. Occasional paper 1, Murdoch University Teaching Excellence Committee. Perth: Murdoch University.

- Volet, S. and Pears, H. (1994). International students in technical and further education colleges (TAFE) Western Australia: past students' reflections on their TAFE experience and attitudes toward educational change between their country and Australia. Murdoch University / TAFE International (WA). Perth: CCTN.
- Volet, S. and Renshaw, P. (1995). Cross-cultural differences in university students' goals and perceptions of study settings for achieving their goals. *Higher Education*, 30, 407-433.
- Volet, S. and Renshaw, P. (1996). Chinese students at an Australian university, adaptability and continuity. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 205-220). Hong Kong: ACER and CERC.
- Volet, S., Renshaw, P. and Tietzel, K. (1994). A short-term longitudinal investigation of cross-cultural differences in study approaches using Biggs SPQ questionnaire. *British Journal of Educational Psychology*, 64, 301-318.
- Walker, J. (1998). Student plagiarism in universities, what are we doing about it? *Higher Education Research and Development*, 17, 89-106.
- Wall, D., Nickson, A., Jordan, R. R., Allwright, J., and Houghton, D. (1988). Developing student writing – a subject tutor and writing tutors compare points of view. In P. C. Robinson (Ed.), *Academic writing: process and product. ELT Documents 129* (pp. 117-129). London: Modern English Publications and The British Council.
- Wang G. (1991). The Chineseness of China. Hong Kong: Oxford University Press.
- Wang G. (2002, 31 December). The emergence of China. Retrieved 20 January 2003, from <a href="http://www.abc.net.au/ra/ralectures/lecture1.htm">http://www.abc.net.au/ra/ralectures/lecture1.htm</a>.
- Wang K. (1998). The classic of the Dao: a new investigation. Beijing: Foreign Languages Press.
- Ward, C. A., Bochner, S. and Furnham, A. (2001). *The psychology of culture shock* (2nd edition). London: Routledge.
- Ward, C. and Chang, W. C. (1997). "Cultural fit": a new perspective on personality and sojourner adjustment. *International Journal of Intercultural Relations*, 21(4), 525-533.
- Ward, C. and Kennedy, A. (1993a). Where is the "culture" in cross-cultural transition? *Journal of Cross-cultural Psychology*, 24(2), 221-249.
- Ward, C. and Kennedy, A. (1993b). Psychological and socio-cultural adjustment during cross-cultural transitions: a comparison of secondary students overseas and at home. *International Journal of Psychology*, 28, 129-147.
- Ward, C. and Kennedy, A. (1994). Acculturation strategies, psychological adjustment and sociocultural competence during cross-cultural transitions. *International Journal of Intercultural Relations*, 18(3), 329-343.
- Ward, C. and Kennedy, A. (1999). The measurement of sociocultural adaptation. International Journal of Intercultural Relations, 23(4), 659-677.
- Watkins, D. A. (1982). Identifying the study dimensions of Australian university students. *Australian Journal of Education 26(1)*, 76-85.

- Watkins, D. A. (1983). Assessing tertiary study processes. *Human Learning*, *2*, 29-37.
- Watkins, D. A. (1996a). Learning theories and approaches, a cross-cultural perspective. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 3-24). Hong Kong: ACER and CERC.
- Watkins, D. A. (1996b). Hong Kong secondary school learners, a developmental perspective. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 107-120). Hong Kong: ACER and CERC.
- Watkins, D. A. (1998). Assessing approaches to learning, a cross-cultural perspective. In B. Dart and G. Boulton-Lewis (Eds.), *Teaching and learning in higher education* (pp. 124-144). Camberwell: ACER Press.
- Watkins, D. A. (2003) Student learning: a cross-cultural perspective. In J. P. Keeves (Ed.), Handbook of educational research in the Asia-Pacific region (pp. 441-462). Dordrecht: Kluwer.
- Watkins, D. A. and Akande, A. (1992). Assessing the approaches to learning of Nigerian students. Assessment and Evaluation in Higher Education 17, 11-20.
- Watkins, D. A. and Biggs, J. B. (Eds.) (1996). *The Chinese learner, cultural, psychological and contextual influences.* Hong Kong: ACER and CERC.
- Watkins, D. A. and Biggs, J. B. (2001a). The paradox of the Chinese learner and beyond. In D. A. Watkins and J. B. Biggs (Eds.), *Teaching the Chinese learner: Psychological and pedagogical perspectives* (pp. 3-23). Hong Kong: CERC and ACER.
- Watkins, D. A. and Biggs, J. B. (Eds.) (2001b). *Teaching the Chinese learner: Psychological and pedagogical perspectives.* Hong Kong: CERC and ACER.
- Watkins, D. A. and Cheng, C. (1995). The revised causal dimension scale, a confirmatory factor analysis with Hong Kong students. *British Journal of Educational Psychology*, 65, 249-252.
- Watkins, D. A. and Dahlin, B. (1997). Assessing study approaches in Sweden. *Psychological Reports*, *81(1)*, 131-136.
- Watkins, D. A., Hattie, J. and Astilla, E. (1986). Approaches to studying by Filipino students: a longitudinal investigation. *British Journal of Educational Psychology*, 56, 357-362.
- Watkins, D. A., McInerney, D., Lee, C., Akane, A. and Regmi, M. (2002). Motivation and learning strategies: a cross-cultural perspective. In D. M. McInernay and S. Van Etten (Eds.), *Research on sociocultural influences on motivation and learning* (Vol.2, pp. 329-343). Greenwich CT: Information Age Publishing, Inc.
- Watkins, D A. and Murphy, J. (1994). Modifying the Study Process Questionnaire for students learning English as a second language, comparisons of reliability and factor structure, *Psychological Reports*, 74, 1023-1026.

- Watkins, D. A. and Qi Dong (1994). Assessing the self-esteem of Chinese school children. *Educational Psychology*, 14(1), 129-137.
- Watkins, D. A. and Regmi, M. (1996). Toward the cross-cultural validation of a western model of student approaches to learning. *Journal of Cross-cultural Psychology* 27(5), 547-560.
- Watts, J. (2003, May 22-28). Hotbed of academia. Guardian Weekly, 168 (22), 13.
- Weiner, R., Murphy, M. and Li, A. (1991). *Living in China*. San Francisco: China Books and Periodicals Inc.
- Weinstein, C. E. (1988). Assessment and training of student learning strategies, the LASSI (Learning and Study Strategies Inventory). In R. R. Schmeck (Ed.), *Learning Strategies and Styles* (pp. 291-316). New York: Plenum Press.
- Wen, Qiufang (1993). Advanced level of English level language learning in China: the relationship of modifiable learner variables to learner outcomes. Unpublished PhD thesis. Hong Kong: The University of Hong Kong.
- West, S. G., Finch, J. F. and Curran, P. J. (1995). Structural equation models with nonnormal variables: problems and remedies. In R. H. Hoyle (Ed.), *Structural equation modeling: concepts, issues and application* (pp. 56-75). Thousand Oaks, CA: Sage.
- Westrup, H. (2002, 26 September-2 October). Methodology that doesn't travel. *Guardian Weekly*, Learning English, p. 3.
- White, R. V. (1988). Academic writing: process and product. In Robinson, P. C. (Ed.), Academic writing: process and product. ELT Documents 129 (pp. 109-116). London: Modern English Publications and the British Council.
- Whymant, R. (2003, 8-9 March). Dispatches from Tokyo: Work? I'd rather dye. The Weekend Australian Magazine, p. 33.
- Willett, J. B. (1989). Questions and answers in the measurement of change. In E. Rothkopf (Ed.), *Review of Research in Education 1988-89, (Volume 15, pp.* 345-422). Washington, DC: American Educational Research Association.
- Willett, J. B. (1997). Change, the measurement of. In Keeves, J. P. (Ed.), *Educational* research methodology and measurement, an international handbook (2nd edition, pp. 327-334). Oxford: Pergamon.
- Willett, J. B. and Singer, J. D. (1997). Event history and analysis. In J. P. Keeves (Ed.), Educational research methodology and measurement, an international handbook (2nd edition, pp. 513-519). Oxford: Pergamon.
- Williams, R. M. (1979). Changes and stability in values and value systems, a sociological perspective. In M. Rokeach (Ed.), Understanding human values (pp. 15-46). New York: The Free Press.
- Willms, J. D. and Raudenbush, S.W. (1997). Effective schools research. In J. P. Keeves (Ed.), *Educational research methodology and measurement, an international handbook (2nd edition, pp. 357-361)*. Oxford: Pergamon.
- Wilson, A. (1987). Approaches to learning among third world tertiary science students, Papua New Guinea. *Research in Science and Technological Education*, 5(1), 59-66.

- Wilson, K. L., Smart, R. M. and Watson, R. J. (1996). Gender differences in approaches to learning in first year psychology students. *British Journal of Educational Psychology*, 66, 59-71.
- Winchester, J. (1996). Cultural differences and the reception of university disciples. In R. Hayhoe and J. Pan (Eds.), *East-west dialogue in knowledge and higher education* (pp.17-25). New York: Sharpe.
- Winter, S. (1996). Peer tutoring and learning outcomes. In D. A. Watkins and J. B. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual influences* (pp. 221-242). Hong Kong: ACER and CERC.
- Withers, R. (2004, November 5-11). Eat, drink and be married. *Guardian Weekly*, *171(20)*, 17.
- Wong, N-Y., Lin, W-Y. and Watkins, D. (1996). Cross-cultural validation of models of approaches to learning. *Educational Psychology*, 16(3), 317-329.
- Wong, S. C. (1988). What we can do and don't know about Chinese learners of English, a critical review of selected research. *RELC*, 19(1),1-20.
- Wright, D. B. (1997). Understanding statistics, an introduction for the social sciences. London: Sage.
- Wu, D. Y. H. (1996). Psychological interpretations of Chinese patterns of socialisation. In S. Lau (Ed.), *Growing up the Chinese way* (pp. 1-28). Hong Kong: The Chinese University Press.
- Wu, J. and Singh, M. (2004). 'Wishing for dragon children': ironies and contradictions in China's education reform and the Chinese diaspora's disappointments with Australian education. *The Australian Educational Researcher*, 31(2), 29-44.
- Wu, P. Y. (1989). Education of children in the Sung. In W. T. De Bary and J. W. Chaffee (Eds.), *Neo-Confucian education, the formative stage* (pp. 307-324). Berkeley: University of California Press.
- Yang, C. F. (2000). In the wrong places? Or with the wrong people? Commentary on "In search of the Chinese in all the wrong places!" *Journal of Psychology in Chinese Societies*, 1(1), 153-158.
- Yang, K-S (1986). Chinese personality and its change. In M. H. Bond (Ed), *The psychology of the Chinese people* (pp. 106-170). Hong Kong: Oxford University Press.
- Yang, K-S. (1996). Psychological transformation of the Chinese people as a result of societal modernization. In M. H. Bond (Ed.), *The handbook of Chinese psychology* (pp. 479-498). Hong Kong: Oxford University Press.
- Yang, R. (2000). Tensions between the global and the local, a comparative illustration of the reorganisation of China's higher education in the 1950s and 1990s. *Higher Education*, *39*, 319-337.
- Yen Mah, A. (2000). *Watching the tree to catch a hare*. London: Harper Collins Publishers.
- Yin, Q. and White, G. (1994). The marketisation of Chinese higher education, a critical assessment. *Comparative Education*, 30(3), 217-237.

- Yu, V. W. S. and Atkinson, P. A. (1988). An investigation of the language difficulties experienced by Hong Kong secondary students in English-medium schools: the problems. *Journal of Multilingual and Multicultural Development*, 9(3), 264-284.
- Yuan, B. and Chen, J. P. (1998). Moral values held by early adolescents in Taiwan and Mainland China. *Journal of Moral Education*, 27(2),191-207.
- Yue, X. and Ng, S. H. (1999). Filial obligations and expectations in China: current views from young and old people in Beijing. Asian Journal of Social Psychology, 2, 215-226.
- Yum, J. O. (1988). Network theory intercultural communication. In Y. Y. Kim and W. B. Gudykunst (Eds.), *Theories of intercultural communication* (pp. 239-258). Newbury Park: Sage.
- Zeegers, P. (2001). Approaches to learning in science, a longitudinal study. British Journal of Educational Psychology, 71, 115-132.
- Zeegers, P. and Martin, L. (2001). A learning-to-learn program in a first year chemistry class. *Higher Education Research and Development, 20 (1),* 35-52.
- Zhang Zhen (2001). Mediating time: "rice bowl of youth" in fin de siècle urban China. In A. Appadurai (Ed.), *Globalization* (pp. 131-154). Durham: Duke University Press.
- Zhang, J. P. and Collis, B. (1995). A comparison of teaching models in the west and in China. *Journal of Instrumental Science and Technology*, 1(1), 1-10.
- Zhang, L F. (2000). University students' learning approaches in three cultures, an investigation of Biggs's 3P model (statistical data included). *Journal of Psychology*, 134(1), 37-55.
- Zhang, L-F. and Sternberg, R. J. (2001). Thinking styles across cultures: their relationships with student learning. In R. J. Sternberg and L-F. Zhang (Eds.), *Perspectives on thinking, learning and cognitive styles. (The education psychology series)* (pp. 197-226). Mahwah: Lawrence Erlbaum Associates Inc.
- Zhou N. (1988). Historical contexts of educational reforms in present-day China. *Interchange*, 19(3/4), 8-18.
- Zhou N. (1996). Interactions of education and culture for economic and human development, an Asian perspective. In J. Delors, *Learning, the treasure* within, UNESCO report of the international commission on education for twenty-first century (pp.73-80). Paris: UNESCO publishing.
- Zhu, W. (1992). Confucius and traditional Chinese education: an assessment. In R. Hayhoe (Ed.), *Education and modernization: the Chinese experience*. (pp. 3-22). Oxford: Pergamon Press.
- Zubrzycki, J. (1977). Australia as a Multicultural Society. Canberra: Australian Ethnic Affairs Council.

# Appendix to Chapter 5

#### Table 5A.1 Personal Information of Students- Questionnaire 1

Instructions: Answer carefully and as clearly as you can in English Name of Researcher: Bobbie Matthews 1. Your Name: 2. Your email address: 3. How old are you? a. <16 1 b. 17-18 2 c. 19-20 3 d. 21-22 4 5 e. 23-24 f. 25+ 6 1 4. Sex: a. Male b. Female 2 5. What country do you come from? 1 a. Japan 2 b. Hong Kong 3 c. Singapore 4 d. Korea e. Malaysia 5 f. Macau 6 g. P. R. China 7 h. Vietnam 8 i. Other 9 6. Father's occupation: (Please be as specific as you can be) 7. Mother's occupation: (Please be as specific as you can be)

a. Was it in the country?country/country 8- city/city 8-2b. Was it in a city?city/city 8-29. Where does your family live today?city/country 9-1a. In the country?city/country 9-1b. In a city?country/city 9-2	1
b. Was it in a city?city/city 8-29. Where does your family live today?a. In the country?city/country 9-1b. In a city?country/city 9-2	
9. Where does your family live today?     city/country 9-1       a. In the country?     city/country 9-1       b. In a city?     country/city 9-2	
a. In the country?city/country 9-1b. In a city?country/city 9-2	
b. In a city? country/city 9-2	
10. Who was the most influential person in your early life (up to 6 years)?	
a. Mother 1	
b. Father 2	
c. Grandparents 3	
d. Older brothers/sisters 4	
e. Younger brothers/sisters 5	
f. Aunts/uncles 6	
Others, please say who 7	
Did the most influential person affect the choice of what to study? Yes/No	
If yes, please explain how this happened.	

11. When did you arrive in Australia?

*	
a. More than a year ago?	1
b. A year ago?	2
c. In the past six months?	3
d. In the past month?	4
e. Other	5
12. Do you have family living in Adelaide Yes/No?	1,0
a. Do you live with a family member? Yes/No?	1,0
b. Do you live with other people Yes/No?	1,0
13. Do the people in (12b) speak	
a. Your home language?	1
b. English?	2
c. Another language?	3
14. Major field of study	
a. Arts	1
b. Social sciences	2
c. Education	3
d. Business/management studies	4
e. Medicine/dentistry	5
f. Science	6
g. Nursing	7
h. Engineering	8
15. Where do you prefer to study?	
a. In the library?	1
b. In a classroom?	2
c. At home?	3
d. Other?	4

16. Do you prefer to study	
a. Alone?	1
b. In a group?	2
c. Other?	3
17. How many hours do you study each week outside of class?	
a. More than 15 hours?	1
b. 10-15 hours	2
c. 10 hours?	3
d. 5-10 hours?	4
e. Less than 5 hours?	5
18. Why did you come to Australia to study? The major reason was	
a. To improve your English?	10
b. You thought it was better to study overseas?	20
c. To get a better job when you finish your degree?	30
d. Because those who study overseas are more highly regarded in your country?	40
e. Because you have family/friends	50
1. Who live in Australia?	51
2. Who have already studied here?	52
3. Other	53
f. To get a degree not offered in your home country?	60
g. Other reasons? Please say what they are.	70
19. Have you ever travelled to other countries?(Before coming to Australia) Yes/No	1,0
20. What countries did you visit?	
a. No travel	0
b. Southeast Asian countries?	2
c. Other countries?	1
21. How long was your trip?	
a. No travel	0
b. A short trip/holiday?	1
c. A longer trip?	
1. To study/as an exchange student?	2
2. To live where your father (mother) worked?	3
3. To work/ learn about the country(ies) you visited?	4
4. Other reasons?	5
22. If you have travelled, has it affected your lifestyle?	
a. A little	1
b A lot	2
c. Not at all (or no travel)	0
23. Do you have definite religious beliefs? Yes/No	1 / 0

24. Do you follow a specific religion?	
a. Confucianism/Daoism?	10
b. Buddhism?	20
c. Islam? (Muslim)	30
d. Christianity?	
1. Catholicism?	41
2. Protestantism?	42
3. Orthodox	43
e. No religion	0
f. Others? Please specify.	50
25. Do you attend regular religious services? Yes/No	1/0
26. Do your parents also have religious beliefs?	
a. The same as yours	2
b. Other beliefs?	1
c. None at all?	0
27. Does one or both of your grandparents have religious beliefs?	
a. The same as yours?	2
b. Others please specify.	1
c. None at all?	0
28. What do you plan to do after you complete your degree?	
a. Return to your home country and return to your job?	10
b. Travel to other countries?	20
c. Do another degree?	30
1. In Australia?	31
2. In your home country?	32
3. In another country?	33
4. If yes, unsure where	34
d. Get a (better/another) job?	40
1. In your home country?	41
2. In Australia?	42
3. In another country?	43
29. Name of your university in Adelaide?	
a. University of Adelaide	1/10
b. Flinders University	2/20
c. University of South Australia or TAFE College	3/30
1. City or Adelaide College of TAFE	31
2. City West	32
3. Magill	33
4. Underdale	34
5. The Levels	35

## B

#### Appendix to Chapter 6

#### Confirmatory factor analysis (CFA) and LISREL

LISREL uses methods of estimation such as maximum likelihood to generate its output as well as many types of fit indices to assess the goodness of fit of a particular model.

#### Maximum likelihood (ML) estimation

The estimation of ML is calculated iteratively. This means that the computer derives an initial solution and then attempts to improve the estimates through subsequent cycles of calculations. Improvement means that the model-implied covariances based on the estimates from each step become more similar to the observed values. The iterative estimation continues until a point is reached where the improvement in the solution falls below a predefined minimum value (Byrne, 1998; Kline, 1998).

#### **Model specification**

ML also estimates the variances and covariances of the observed or exogenous variables of the observed values. The disturbances are also represented in the syntax of model-fitting programs as latent variables that have observed endogenous variables associated with them. Further, ML allows model-implied correlations between endogenous variables and the disturbances of subsequent variables that the endogenous variables affect and ML assumes multivariate normality and the continuous nature of variables (Kline, 1998).

The CFA output produces factor loadings that are designated as  $\lambda x$  or  $\lambda y$  values. The variance and covariance values form either a phi ( $\phi$ ) or a gamma ( $\gamma$ ) matrix of relationships between the latent or endogenous variables depending on the type of model that is specified. Baseline and nested models generate phi matrices between the latent variables and hierarchical models generate gamma matrices showing the relationships between the endogenous variables.

#### Evaluation indices to test the fit of models generated by LISREL

#### Model fit indices

This section discusses the fit indices that have been mentioned in Chapter 6 and selected for use in Chapter 7 and provides information about the parameters that define these indices. One of the best ways to evaluate CFA models is to compare the ratio of the  $\chi^2$  to the degrees of freedom ( $\chi^2$ /df). The lower the ratio, the better the model fit. If this ratio is used, several models may be compared that are of similar complexity. Ideally this ratio should be close to zero but this rarely happens particularly if the models specified are complex and use item level data.

#### Evaluating the chi-square statistic

The  $\chi^2$  statistic in the LISREL output is used to identify the model that best fits the data from among the hypothetical models tested, as the smaller the  $\chi^2$  values, the better the model fit, all other things being equal. Byrne (1998) points out that the  $\chi^2$ test is sample size dependent. Therefore, a sample of 400-600 is needed to produce a statistically significant  $\chi^2$  value. A sample that is smaller than 400 may not result in a significant  $\chi^2$  value and adequate fit cannot be expected. In order to overcome the problem of sample size, Byrne (1989) has suggested an alternative measurement based on the ratio of the chi-square to the degrees of freedom ( $\chi^2/df$ ). If the value is less than 2.00, then a smaller sample may be considered, however with larger samples, the ratio will be greater than 2.00 and other fit statistics need to be considered. The p-value is equal to the probability associated with the  $\chi^2$  value. It gives the likelihood of obtaining a value greater than the  $\chi^2$  associated with the null hypothesis. Therefore, the higher the probability associated with the  $\chi^2$ , the closer the fit between the hypothesised model and the perfect fit of 1.0. An example of a perfect fit is when the  $\chi^2$  value equals the degrees of freedom or 1.0. Thus the closer the  $\chi^2$ value relative to the df, the better the fit of the model. If the figures p=<0.0001 appear next to p-values associated with the  $\chi^2$  value, the interpretation is that the probability is that this is an unlikely event, occurring less than one time in ten thousand times. The p-value may also be used in the examination of the  $\chi^2$  value. Small p-values correspond to model misfits (Byrne, 1998).

#### Absolute fit indices

The goodness of fit index (GFI) is also provided by the LISREL 8.30 computer program. The value of the GFI ranges from 0.00 (poor or no fit) to 1.00 (perfect fit); higher values indicate a better fit. The GFI represents the overall degree of fit but is not adjusted for the degrees of freedom of the model (Hair et al., 1995). The adjusted goodness of fit index (AGFI) is an extension of the GFI. It is a ratio of the degrees of freedom of the proposed model compared to the degrees of freedom for the null model and contains a built-in adjustment for model complexity. Therefore more complex models or those with more parameters, tend to fit the same data better than do simpler models. The AGFI takes this factor into account by correcting the value of the GFI downward as the number of parameters increases. The GFI and AGFI are absolute indices of fit, as they stand alone and are not used to compare models. The accepted value for these indices should be  $\geq 0.8$  to indicate reasonable model fit (Byrne, 1998; Hair et al., 1995; Kline, 1998).

#### Residual-based fit indices

There are two indices that are based on the residuals that are part of the LISREL output. They are the Root Mean Square Residual (RMR) and the Standardised Root Mean Square Residual (SRMR). These indices are the average differences between the sample variances and covariances and the estimated variances and covariances. Good fitting models have small RMRs and SRMRs. Small values indicate good model fit. The SRMR has a range of 0 to 1 and values of 0.08 or less indicate a good model fit (Bentler, 1990; Chou and Bentler, 1995; Hu and Bentler, 1995; Hu, Bentler and Kano, 1992; Kaplan, 1995; MacCallum and Austin, 2000).

Residuals are said to represent the discrepancy between observed and fitted covariance values. The SRMRs represent these values divided by their estimated standard errors (Jöreskog and Sörbom, 1988, 1993). The SRMR are independent units of measurement for each variable estimated. They provide a standard metric for assessing the size of the residual and represent a clearer interpretation than the unstandardised residuals. Residuals in a model should not only be small but also evenly distributed (Byrne, 1998; Tabachnick and Fidell, 2001).

#### The RMSEA value

The root mean square error of approximation (RMSEA) has been recognised as one of the most informative criteria in structure equation modelling. The RMSEA takes into account the error of approximation in the population and asks the question, how well would the model fit the covariance matrix if it were available? This discrepancy, as measured by the RMSEA, is expressed per degree of freedom, making it sensitive to the estimated parameters in the model. RMSEA values of less than 0.05 indicate a good fit and values as high as 0.08 represent reasonable fit in terms of errors of approximation in the population. Values between 0.08 and 0.10 indicate a mediocre fit and values greater than 0.10 indicate a poor fit. These values are reasonable when matched with a probability >0.50, given the upper bound of the 90 per cent interval is 0.06. The RMSEA can also be influenced by the sample size (Byrne, 1998). Gustafsson and Stahl (1999) have recommended that values <0.05 represent a good fit, while values >0.07 indicate a poor fit. Thus the RMSEA estimates the lack of fit in a model compared to the fit of a perfect or saturated model. In this instance, the perfect model has a value equal to zero. A value of 0.06 or less indicates a good fitting model relative to the degrees of freedom (Browne and Cudeck, 1993).

The non-normed fit index (NNFI) is also known as the Tucker-Lewis Index. It is used to compare alternative models by substitution for the null model. The value ranges from 0.00 to 1.00. A recommended value is also  $\geq 0.90$ . However, values above 0.70 indicate a reasonable degree of fit (Hair et al., 1995).

#### Issues associated with hierarchical linear modelling

#### HLM and the problems associated with standard errors and aggregation bias

Misestimation of standard errors arises when the variability of the outcome data within a particular group is not taken into consideration in an appropriate way at the micro (Level-1) or macro level (Level-2). Therefore, in a school situation, students of a particular class group share common group characteristic (for example, grade level or subjects studied) because they are grouped together in the same class. In order to overcome the problem of misestimated precision resulting from ignoring the

clustering effects of students within classrooms, HLM takes into account the intraclass correlations in the standard error estimates for the ( $\gamma$ ) coefficients. The consequences of misestimated precision in past analyses of educational data have been investigated and when the data are reanalysed, considerably larger standard errors have resulted and inferences previously recorded have been thrown into doubt (Raudenbush and Bryk, 1997).

Another potential problem that is resolved with HLM is the effect of aggregation bias that may occur when a variable takes different meanings and has different effects at different levels of aggregation within an organisational hierarchy, as may occur when data collected at one level are analysed at another level. This may be overcome by permitting the decomposition of any observable relationships between variables found at different levels into separate components at each level. Further, Raudenbush and Bryk (1997) argue that "the most significant advantage of HLM is that it permits representation of random within-unit regression slopes and modeling variation in the slope as a function of unit-level characteristics" (Raudenbush and Bryk, 1997, p.553). Therefore, the modelling of slopes as outcomes is particularly important in the present study that focuses on factors that influence students' values and approaches to learning because both the effects of occasion and the influences of between students' characteristics are important in understanding change over time.

### Appendix to Chapter 7

#### Introduction

C

Chapter 7 has discussed the best models that have been developed using confirmatory factor analysis and LISREL 8.30 for Windows (Jöreskog and Sörbom, 1999). However, there are five additional models for values and 11 models for approaches to learning models that have also been tested. Although these models have not been accepted as the best explanations of the data, nevertheless they need to be examined and considered.

Prior to using confirmatory factor analysis, it was necessary to gain an idea of what the latent variables and factor structure were for the data collected on the two questionnaires. The questionnaires used to collect the data were the Chinese Value Survey (CVS) and the Study Process Questionnaire (SPQ). In order to ascertain this information it was necessary to carry out exploratory factor analysis to establish a preliminary factor structure. Once the probable factor structure for the CVS and the SPQ was known, models were able to be hypothesised and tested using confirmatory factor analysis. This procedure enabled an assessment of the dimensionality and reliability of the items on the factors to be calculated and assessed. The dimensionality that confirmatory factor analysis established served as a foundation for one parameter Rasch scaling. This was done in order to equate the five data sets that provided a basis for an assessment of the data from the longitudinal study that was undertaken. In order to corroborate the dimensional nature of values and approaches to learning an assessment of the reliability of the factors was needed to establish the dimensional nature of the data. It was also necessary to generate and test several models of the data. The reliability of the questionnaire data has been presented and discussed in Chapter 7. All scales on both questionnaires appeared to have reasonable reliabilities.

This appendix is divided into two main sections. The first part examines the structure of values and the second part examines the structure associated with the approaches to learning. The examination is carried out by an inspection of their dimensionality with respect to (a) the syntaxes that were used to test model structure with a diagrammatic representation of the models under consideration; and (b) the amount of variance explained by a given model. A discussion and explanation of the material is presented with this information.

#### An examination of values

The six models generated from the CVS data were presented in Chapter 7, but only the N(1,4)R model was discussed in the chapter. This model provided the best representation of the data and the best fit indices. All models were based on the complete data set of 573 records. The principal sources of variation were (a) the type of model that was estimated; and (b) the restructuring that was necessary to obtain positive values for the manifest variables. Three baseline models, one hierarchical and two nested models were examined.

#### Exploratory factor analysis

Exploratory factor analysis was carried out with the first data set (153 records) to establish the number of latent variables that were derived from the CVS data. The results were reported in Matthews (2000). The reliabilities (Kaiser and Caffrey, 1965) were assessed with the Cronbach (1950) alpha ( $\alpha$ ) function in SPSS and used in the estimation. The alpha ( $\alpha$ ) function measures the internal consistency of items in an index or scale. It is a widely used form of Kuder-Richardson formula 20 (KR 20) that may be used with data that is collected using Likert scales (Vogt, 1999) that were used to collect data in both questionnaires in this study. The alpha ( $\alpha$ ) coefficients are found in the panel below the lambda-x ( $\lambda$ x) values in Table 7.2 and discussed in Chapter 7.

#### CVS syntax utilised in the final values model

Table 7A.1 presents the syntax that has been used in the generation of the final model for values in Chapter 7. It lists the variables and then shows them reordered into the final restructured position that is described in the chapter. The syntax also shows the designated latent variables, the relationships between the variables, the constraints that have been imposed on the variables, the data file that is used to specify and assess the model, the size of the sample, and the specific outcomes requested from the model estimation including the path diagram and the type of solution that is required.

#### **CVS** baseline model



Figure 7A.1 CVS baseline model

 Table 7A.1
 CVS final syntax for the N(1,4)R nested model

observed variables
cvs1 cvs2 cvs3 cvs4 cvs5 cvs6 cvs7 cvs8 cvs9 cvs10 cvs11 cvs12 cvs13
cvs14 cvs15 cvs16 cvs17 cvs18 cvs19 cvs20 cvs21 cvs22 cvs23 cvs24
cvs25 cvs26 cvs27 cvs28 cvs29 cvs30 cvs31 cvs32 cvs33 cvs34 cvs35
cvs36 cvs37 cvs38 cvs39 cvs40
reorder variables
cvs2 cvs4 cvs9 cvs10 cvs13 cvs15 cvs18 cvs19 cvs21 cvs24
cvs25 cvs28 cvs30 cvs32 cvs36 cvs3 cvs6 cvs16 cvs17
cvs22 cvs23 cvs33 cvs34 cvs35 cvs37 cvs38 cvs39 cvs1 cvs7 cvs8 cvs11
cvs20 cvs31 cvs5 cvs12 cvs14 cvs26 cvs27 cvs29 cvs40
raw data from file a:\cvsdecem.txt
latent variables
integ confu loval wisdom values
relationshins
let the correlation between values and integ be zero
let the correlation between values and confu be zero
let the correlation between values and loval be zero
let the correlation between values and wisdom be zero
cvs? integ values
cvs4 integ values
cvsQ integ values
cvs10 integ values
cvs13 integ values
cvs15 integ values
cvs1s integ values
cvs10 integ values
evs1 integ values
cvs21 integ values
cvs25 integ values
cvs2s integ values
cvs20 integ values
cvs30 integ values
cvs52 integ values
cvs30 mileg values
cvso contu values
cvs16 contu values
cvs1/ confu values
cvs22 confu values
cvs23 confu values
cvs33 confu values
cvs34 confu values
cvs35 confu values
cvs3/ confu values
cvs38 confu values
cvs39 confu values
cvs1 loyal values
cvs/ loyal values
cvs8 loyal values
cvs11 loyal values
cvs20 loyal values
cvs31 loyal values
cvs5 wisdom values
cvs12 wisdom values
cvs14 wisdom values
cvs26 wisdom values
cvs27 wisdom values
cvs29 wisdom values
cvs40 wisdom values
path diagram
sample size = $573$
lisrel output it=5000 ad=300 se tv mi sc

Figure 7A.1 shows a diagrammatic representation of a baseline B(4) model that has been generated with LISREL. In this and all baseline models the latent and manifest variables are able to correlate freely. The dimensions in this model are based on the complete data set and the disposition of the variables is the same as that presented in Table 7A.2. They show that the model has reasonable fit and therefore, unidimensionality as all the value statements have lambda-x ( $\lambda x$ ) values that are positive and above 0.40 except for the final value and that is above 0.20. These values together with the communalities and percentage of variance explained may be found in Table 7A.2. In all the CVS data the following names are used for the value dimensions: Integ-Integrity and Tolerance, Confu-Confucian Ethos, Loyal-Loyalty to Ideals and Wisdom- Worldly Wisdom.

Table 7A.2	Completel	y standardised	d solution	and c	communalit	ties and	percentage
	of varian	ce explained	for Model	l B(4)			

Items	Integ	Confu	Loyal	Wisdom	Integ	Confu	Loyal	Wisdom
Cvs2	0.64				0.41			
Cvs4	0.48				0.23			
Cvs9	0.64				0.41			
Cvs10	0.56				0.31			
Cvs13	0.64				0.41			
Cvs15	0.62				0.38			
Cvs18	0.50				0.25			
Cvs19	0.59				0.35			
Cvs21	0.73				0.53			
Cvs24	0.64				0.41			
Cvs25	0.62				0.38			
Cvs28	0.54				0.29			
Cvs30	0.70				0.49			
Cvs32	0.73				0.53			
Cvs36	0.41				0.17			
Cvs3		0.45				0.20		
Cvs6		0.52				0.27		
Cvs16		0.54				0.29		
Cvs17		0.46				0.21		
Cvs22		0.53				0.28		
Cvs23		0.52				0.27		
Cvs33		0.64				0.41		
Cvs34		0.60				0.36		
Cvs35		0.47				0.22		
Cvs37		0.57				0.32		
Cvs38		0.59				0.34		
Cvs39		0.60	0.52			0.36	0.27	
Cvs1			0.52				0.27	
Cvs/			0.69				0.48	
Cvso Cvs11			0.65				0.42	
Cvs20			0.03				0.42	
Cvs20			0.04				0.41	
Cvs5			0.50	0.52			0.54	0.27
Cvs12				0.49				0.24
Cvs14				0.66				0.42
Cvs26				0.51				0.26
Cvs27				0.54				0.29
Cvs29				0.48				0.23
Cvs40				0.21				0.04

 							1	<u> </u>		<b>A A</b>
N NO DI	upe tor t	ha aammalat	alt atoma	lordicod	colution	( 'ommunolitio	a and noraant	ngo of voriono	avalamad	( 64)
 N X V 2111		neconniei	ELV SLAHR	1/1/1/Set		1 OHHHHHHAHHE	s and ben ema		- exmanieu	
with the the the the the the the the the t			ory blunc	ananoee	i boration	Communitation	o una percenta	age or running	<i>c</i> chpiunicu	111 /
		1	2				1	0	1	× /

5.56/40=0.14 3.55/40=0..09 2.34/40=0.06 1.76/40=0.044

Total four factors = 13.21/40 = 0.3328 = 33.28%

#### **CVS** hierarchical model



Figure 7A.2 CVS hierarchical model

Figure 7A.2 shows a hierarchical H(1,4) model that has been generated with LISREL. In this and all hierarchical models the latent and manifest variables are able to correlate freely. The scales in this model are based on the complete data set and the disposition of the variables is the same as that presented in Table 7.2. The fit indices for this model may be found in Table 7.1. They show that the model has reasonable fit and therefore, unidimensionality as all the value statements have  $\lambda y$  values that are positive and above 0.40 except for the final value and that is above 0.20. These values together with the communalities and percentage of variance explained may be found in Table 7A.3.

Hierarchical models are described as 'or' models. This means that the variance is apportioned to the lower level of latent variables first and the remaining variance is taken by the higher order latent variable(s). In other words, variance is apportioned to one or the other of the higher order variables and therefore, variance is shared between the latent variables. These models are different to nested models that are considered 'and' models where the variance associated with a particular latent variable occurs at one of the higher levels in a model only. Therefore, in nested models the variance of manifest and latent variables is totalled to arrive at the final amount of variance explained by a model, but in hierarchal models only the  $\lambda y$  values may be used to calculate variance explained.

#### **CVS** nested model



Figure 7A.3 CVS nested model

$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Items	Integ	Confu	Loyal	Wisdom	Integ	Confu	Loyal	Wisdom
$\begin{array}{cccc} Cvs4 & 0.48 & 0.23 \\ Cvs10 & 0.56 & 0.31 \\ Cvs13 & 0.63 & 0.40 \\ Cvs15 & 0.62 & 0.38 \\ Cvs18 & 0.52 & 0.27 \\ Cvs19 & 0.60 & 0.36 \\ Cvs21 & 0.73 & 0.53 \\ Cvs24 & 0.65 & 0.42 \\ Cvs25 & 0.64 & 0.41 \\ Cvs28 & 0.54 & 0.30 \\ Cvs30 & 0.70 & 0.49 \\ Cvs30 & 0.70 & 0.52 \\ Cvs36 & 0.41 & 0.17 \\ Cvs3 & 0.46 & 0.21 \\ Cvs6 & 0.52 & 0.28 \\ Cvs16 & 0.54 & 0.29 \\ Cvs17 & 0.43 & 0.18 \\ Cvs22 & 0.52 & 0.27 \\ Cvs23 & 0.64 & 0.41 \\ Cvs23 & 0.64 & 0.41 \\ Cvs28 & 0.54 & 0.29 \\ Cvs16 & 0.54 & 0.29 \\ Cvs17 & 0.43 & 0.18 \\ Cvs23 & 0.53 & 0.28 \\ Cvs33 & 0.64 & 0.41 \\ Cvs34 & 0.60 & 0.36 \\ Cvs35 & 0.47 & 0.22 \\ Cvs35 & 0.47 & 0.22 \\ Cvs35 & 0.47 & 0.22 \\ Cvs37 & 0.58 & 0.34 \\ Cvs38 & 0.59 & 0.35 \\ Cvs38 & 0.59 & 0.35 \\ Cvs19 & 0.61 & 0.37 \\ Cvs10 & 0.63 & 0.40 \\ Cvs20 & 0.64 & 0.41 \\ Cvs21 & 0.63 & 0.45 \\ Cvs11 & 0.63 & 0.45 \\ Cvs11 & 0.63 & 0.45 \\ Cvs11 & 0.63 & 0.40 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.64 & 0.37 \\ Cvs11 & 0.55 & 0.30 \\ Cvs12 & 0.55 & 0.30 \\ Cvs12 & 0.48 & 0.23 \\ Cvs14 & 0.61 & 0.37 \\ Cvs26 & 0.51 & 0.30 \\ Cvs27 & 0.55 & 0.30 \\ Cvs27 & 0.55 & 0.30 \\ Cvs27 & 0.55 & 0.30 \\ Cvs40 & 0.23 & 0.05 \\ \hline \\ $	Cvs2	0.63				0.40			
$\begin{array}{cccc} Cvs0 & 0.64 & 0.41 \\ \hline Cvs10 & 0.56 & 0.31 \\ \hline Cvs11 & 0.63 & 0.40 \\ \hline Cvs15 & 0.62 & 0.38 \\ \hline Cvs19 & 0.60 & 0.36 \\ \hline Cvs21 & 0.73 & 0.53 \\ \hline Cvs24 & 0.65 & 0.42 \\ \hline Cvs25 & 0.64 & 0.41 \\ \hline Cvs22 & 0.54 & 0.30 \\ \hline Cvs30 & 0.70 & 0.49 \\ \hline Cvs32 & 0.72 & 0.52 \\ \hline Cvs36 & 0.46 & 0.18 \\ \hline Cvs22 & 0.54 & 0.29 \\ \hline Cvs36 & 0.46 & 0.29 \\ \hline Cvs6 & 0.52 & 0.28 \\ \hline Cvs16 & 0.54 & 0.29 \\ \hline Cvs17 & 0.43 & 0.18 \\ \hline Cvs22 & 0.52 & 0.27 \\ \hline Cvs33 & 0.64 & 0.41 \\ \hline Cvs23 & 0.53 & 0.28 \\ \hline Cvs33 & 0.64 & 0.41 \\ \hline Cvs24 & 0.55 & 0.28 \\ \hline Cvs34 & 0.60 & 0.36 \\ \hline Cvs34 & 0.60 & 0.36 \\ \hline Cvs38 & 0.59 & 0.35 \\ \hline Cvs38 & 0.59 & 0.35 \\ \hline Cvs11 & 0.55 & 0.37 \\ \hline Cvs1 & 0.51 & 0.26 \\ \hline Cvs1 & 0.55 & 0.37 \\ \hline Cvs1 & 0.51 & 0.26 \\ \hline Cvs1 & 0.55 & 0.37 \\ \hline Cvs1 & 0.51 & 0.26 \\ \hline Cvs1 & 0.55 & 0.37 \\ \hline Cvs1 & 0.51 & 0.26 \\ \hline Cvs1 & 0.55 & 0.37 \\ \hline Cvs1 & 0.51 & 0.26 \\ \hline Cvs1 & 0.55 & 0.37 \\ \hline Cvs1 & 0.51 & 0.26 \\ \hline Cvs1 & 0.55 & 0.37 \\ \hline Cvs1 & 0.51 & 0.26 \\ \hline Cvs7 & 0.73 & 0.53 \\ \hline Cvs1 & 0.55 & 0.37 \\ \hline Cvs1 & 0.55 & 0.30 \\ \hline Cvs2 & 0.64 & 0.41 \\ \hline Cvs34 & 0.61 & 0.37 \\ \hline Cvs4 & 0.55 & 0.30 \\ \hline Cvs5 & 0.54 & 0.29 \\ \hline Cvs12 & 0.64 & 0.41 \\ \hline Cvs21 & 0.63 & 0.40 \\ \hline Cvs20 & 0.64 & 0.41 \\ \hline Cvs21 & 0.55 & 0.30 \\ \hline Cvs5 & 0.54 & 0.29 \\ \hline Cvs1 & 0.55 & 0.30 \\ \hline Cvs5 & 0.54 & 0.29 \\ \hline Cvs1 & 0.61 & 0.37 \\ \hline Cvs4 & 0.61 & 0.37 \\ \hline Cvs2 & 0.55 & 0.30 \\ \hline Cvs2 $	Cvs4	0.48				0.23			
$\begin{array}{cccc} Cvs10 & 0.3b & 0.31 \\ Cvs15 & 0.62 & 0.38 \\ Cvs15 & 0.52 & 0.27 \\ Cvs19 & 0.60 & 0.36 \\ Cvs21 & 0.73 & 0.53 \\ Cvs24 & 0.65 & 0.42 \\ Cvs25 & 0.64 & 0.41 \\ Cvs28 & 0.54 & 0.30 \\ Cvs30 & 0.70 & 0.49 \\ Cvs30 & 0.70 & 0.49 \\ Cvs36 & 0.41 & 0.17 \\ Cvs36 & 0.52 & 0.28 \\ Cvs16 & 0.54 & 0.29 \\ Cvs16 & 0.54 & 0.29 \\ Cvs17 & 0.43 & 0.18 \\ Cvs22 & 0.52 & 0.27 \\ Cvs23 & 0.53 & 0.28 \\ Cvs16 & 0.54 & 0.29 \\ Cvs17 & 0.43 & 0.18 \\ Cvs22 & 0.52 & 0.27 \\ Cvs33 & 0.64 & 0.41 \\ Cvs34 & 0.60 & 0.36 \\ Cvs35 & 0.47 & 0.22 \\ Cvs37 & 0.58 & 0.34 \\ Cvs38 & 0.59 & 0.35 \\ Cvs38 & 0.59 & 0.35 \\ Cvs11 & 0.51 & 0.26 \\ Cvs7 & 0.73 & 0.53 \\ Cvs11 & 0.61 & 0.37 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.64 & 0.41 \\ Cvs34 & 0.60 & 0.36 \\ Cvs35 & 0.47 & 0.22 \\ Cvs7 & 0.73 & 0.53 \\ Cvs11 & 0.51 & 0.26 \\ Cvs7 & 0.73 & 0.53 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.64 & 0.37 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.63 & 0.40 \\ Cvs20 & 0.64 & 0.41 \\ Cvs20 & 0.64 & 0.41 \\ Cvs21 & 0.55 & 0.30 \\ Cvs5 & 0.54 & 0.29 \\ Cvs12 & 0.63 & 0.40 \\ Cvs20 & 0.64 & 0.41 \\ Cvs21 & 0.63 & 0.40 \\ Cvs20 & 0.64 & 0.41 \\ Cvs21 & 0.63 & 0.40 \\ Cvs20 & 0.64 & 0.41 \\ Cvs21 & 0.63 & 0.40 \\ Cvs20 & 0.64 & 0.41 \\ Cvs21 & 0.63 & 0.40 \\ Cvs20 & 0.64 & 0.41 \\ Cvs21 & 0.61 & 0.37 \\ Cvs26 & 0.49 & 0.22 \\ Cvs12 & 0.55 & 0.30 \\ Cvs27 & 0.55 & 0.30 \\ Cvs26 & 0.49 & 0.24 \\ Cvs27 & 0.55 & 0.30 \\ Cvs20 & 0.53 & 0.28 \\ Cvs40 & 0.23 & 0.05 \\ \hline \begin{array}{c} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Cvs9	0.64				0.41			
$\begin{array}{c cccc} Cvs15 & 0.63 & 0.40 & 0.38 & 0.53 & 0.53 & 0.27 & 0.53 & 0.27 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.54 & 0.30 & 0.53 & 0.53 & 0.52 & 0.54 & 0.39 & 0.53 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.53 & 0.28 & 0.53 & 0.28 & 0.53 & 0.28 & 0.53 & 0.28 & 0.53 & 0.28 & 0.53 & 0.28 & 0.53 & 0.28 & 0.53 & 0.53 & 0.53 & 0.53 & 0.54 & 0.22 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.52 & 0.53 & 0.28 & 0.53 & 0.28 & 0.53 & 0.28 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.53 & 0.54 & 0.65 & 0.45 & 0.54 & 0.51 & 0.30 & 0.53 & 0.53 & 0.53 & 0.54 & 0.29 & 0.53 & 0.54 & 0.29 & 0.53 & 0.54 & 0.29 & 0.53 & 0.54 & 0.29 & 0.53 & 0.54 & 0.29 & 0.53 & 0.54 & 0.29 & 0.53 & 0.54 & 0.29 & 0.55 & 0.30 & 0.57 & 0.54 & 0.29 & 0.55 & 0.30 & 0.53 & 0.54 & 0.29 & 0.55 & 0.30 & 0.53 & 0.54 & 0.29 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.30 & 0.57 & 0.55 & 0.50 & 0.55 & 0.50 & 0.55 & 0.50 & 0.55 & 0.50 & 0.55 & 0.5$	Cvs10	0.56				0.31			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Cvs15	0.63				0.40			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Cvs15	0.62				0.38			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs10	0.52				0.27			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs19 Cvs21	0.00				0.50			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs21 Cvs24	0.75				0.33			
Cvs25     0.04     0.41       Cvs28     0.54     0.30       Cvs30     0.70     0.49       Cvs32     0.72     0.52       Cvs36     0.46     0.21       Cvs6     0.52     0.28       Cvs17     0.43     0.18       Cvs23     0.52     0.27       Cvs16     0.54     0.29       Cvs17     0.43     0.18       Cvs23     0.53     0.28       Cvs33     0.64     0.41       Cvs34     0.60     0.36       Cvs35     0.47     0.22       Cvs38     0.59     0.35       Cvs38     0.59     0.35       Cvs39     0.61     0.37       Cvs1     0.51     0.26       Cvs1     0.55     0.30       Cvs20     0.64     0.41       Cvs21     0.55     0.30       Cvs1     0.55     0.30       Cvs20     0.64     0.41       Cvs21     0.55     0.30       Cvs22     0.55     0.30       Cvs20     0.64     0.41       Cvs21     0.48     0.23       Cvs14     0.61     0.37       Cvs25     0.53     0.30       Cvs	CVS24 CVS25	0.63				0.42			
Cvs30         0.34         0.30           Cvs30         0.70         0.49           Cvs36         0.41         0.17           Cvs3         0.46         0.21           Cvs3         0.52         0.28           Cvs16         0.54         0.29           Cvs17         0.43         0.18           Cvs23         0.52         0.27           Cvs23         0.53         0.28           Cvs33         0.64         0.41           Cvs23         0.53         0.28           Cvs34         0.60         0.36           Cvs33         0.64         0.41           Cvs34         0.60         0.35           Cvs34         0.60         0.35           Cvs35         0.47         0.22           Cvs37         0.58         0.34           Cvs38         0.59         0.35           Cvs1         0.51         0.26           Cvs1         0.61         0.37           Cvs1         0.63         0.40           Cvs2         0.64         0.41           Cvs2         0.55         0.30           Cvs1         0.55         0.30 <td>Cvs23</td> <td>0.04</td> <td></td> <td></td> <td></td> <td>0.41</td> <td></td> <td></td> <td></td>	Cvs23	0.04				0.41			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs20	0.34				0.30			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs30	0.70				0.49			
Cvs30       0.41       0.17         Cvs30       0.52       0.21         Cvs6       0.52       0.28         Cvs16       0.54       0.29         Cvs17       0.43       0.18         Cvs22       0.52       0.27         Cvs33       0.64       0.41         Cvs33       0.64       0.41         Cvs34       0.60       0.36         Cvs37       0.58       0.34         Cvs38       0.59       0.35         Cvs39       0.61       0.37         Cvs1       0.51       0.26         Cvs7       0.73       0.53         Cvs1       0.63       0.40         Cvs20       0.64       0.41         Cvs1       0.63       0.40         Cvs1       0.63       0.40         Cvs1       0.63       0.30         Cvs20       0.64       0.41         Cvs20       0.55       0.30         Cvs14       0.61       0.37         Cvs25       0.54       0.23         Cvs26       0.48       0.23         Cvs27       0.55       0.30         Cvs29       0	CVS52 CVs26	0.72				0.52			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs30	0.41	0.46			0.17	0.21		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs6		0.40				0.21		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Cvs16		0.52				0.28		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs17		0.34				0.29		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cvs22		0.45				0.18		
Cvs23     0.53     0.64     0.41       Cvs33     0.64     0.36       Cvs34     0.60     0.36       Cvs35     0.47     0.22       Cvs37     0.58     0.34       Cvs38     0.59     0.35       Cvs39     0.61     0.37       Cvs1     0.51     0.26       Cvs7     0.73     0.53       Cvs8     0.65     0.45       Cvs11     0.63     0.40       Cvs20     0.64     0.41       Cvs31     0.55     0.30       Cvs24     0.64     0.41       Cvs20     0.64     0.41       Cvs21     0.54     0.29       Cvs11     0.63     0.40       Cvs20     0.54     0.23       Cvs14     0.61     0.37       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.23       Confu     0.80     0.23       Loyal     0.80     0.23       Wisdom     0.98     0.44	Cvs22		0.52				0.27		
Cvs33     0.04     0.71       Cvs34     0.60     0.36       Cvs35     0.47     0.22       Cvs37     0.58     0.34       Cvs38     0.59     0.35       Cvs1     0.51     0.26       Cvs7     0.73     0.53       Cvs8     0.65     0.45       Cvs1     0.63     0.40       Cvs20     0.64     0.41       Cvs20     0.64     0.41       Cvs1     0.55     0.30       Cvs21     0.48     0.23       Cvs12     0.48     0.23       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.23       Confu     0.80     0.23       Loyal     0.80     0.98	Cvs23		0.55				0.28		
Cvs37     0.00     0.30       Cvs35     0.47     0.22       Cvs37     0.58     0.34       Cvs38     0.59     0.35       Cvs39     0.61     0.37       Cvs1     0.51     0.26       Cvs7     0.73     0.53       Cvs8     0.65     0.45       Cvs1     0.63     0.40       Cvs20     0.64     0.41       Cvs20     0.64     0.41       Cvs1     0.55     0.30       Cvs5     0.54     0.29       Cvs12     0.48     0.23       Cvs14     0.61     0.37       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.23       Confu     0.80     0.23       Loyal     0.80     0.98	Cvs34		0.60				0.36		
Cvs37     0.58     0.34       Cvs38     0.59     0.35       Cvs39     0.61     0.37       Cvs1     0.51     0.26       Cvs7     0.73     0.53       Cvs8     0.65     0.45       Cvs1     0.63     0.40       Cvs20     0.64     0.41       Cvs5     0.55     0.30       Cvs12     0.48     0.23       Cvs14     0.61     0.37       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs29     0.53     0.23       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.23       Confu     0.80     0.23       Loyal     0.80     0.98	Cvs35		0.00				0.20		
Cvs37     0.50     0.35       Cvs38     0.59     0.35       Cvs39     0.61     0.37       Cvs1     0.51     0.26       Cvs7     0.73     0.53       Cvs8     0.65     0.45       Cvs11     0.63     0.40       Cvs20     0.64     0.41       Cvs31     0.55     0.30       Cvs12     0.48     0.23       Cvs14     0.61     0.37       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.05       Loyal     0.80     0.98	Cvs37		0.58				0.22		
Cvs39     0.61     0.37       Cvs1     0.51     0.37       Cvs7     0.73     0.53       Cvs8     0.65     0.45       Cvs11     0.63     0.40       Cvs20     0.64     0.41       Cvs31     0.55     0.30       Cvs41     0.63     0.29       Cvs12     0.48     0.23       Cvs14     0.61     0.37       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs29     0.53     0.28       Cvs20     0.63     0.28       Cvs20     0.63     0.28       Cvs12     0.63     0.28       Cvs29     0.53     0.28       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.45       Loyal     0.80     0.98	Cvs38		0.50				0.35		
Cvs1     0.51     0.26       Cvs7     0.73     0.53       Cvs8     0.65     0.45       Cvs11     0.63     0.40       Cvs20     0.64     0.41       Cvs31     0.55     0.30       Cvs4     0.61     0.23       Cvs20     0.64     0.41       Cvs31     0.55     0.30       Cvs4     0.61     0.37       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs20     0.63     0.23       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.49       Loyal     0.80     0.23       Wisdom     0.98     0.98	Cvs39		0.61				0.37		
Cvs7         0.73         0.53           Cvs8         0.65         0.45           Cvs11         0.63         0.40           Cvs20         0.64         0.41           Cvs31         0.55         0.30           Cvs5         0.54         0.29           Cvs14         0.61         0.37           Cvs26         0.48         0.23           Cvs14         0.61         0.37           Cvs27         0.55         0.30           Cvs29         0.53         0.24           Cvs29         0.53         0.28           Cvs40         0.23         0.05           Gamma         Values         0.23           Integ         0.63         0.23           Confu         0.80         0.23           Wisdom         0.98         0.98	Cvs1		0.01	0.51			0.57	0.26	
Cvsb     0.65     0.45       Cvsl     0.63     0.40       Cvs20     0.64     0.41       Cvs31     0.55     0.30       Cvs5     0.54     0.29       Cvs12     0.48     0.23       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.49       Loyal     0.80     0.23	Cvs7			0.73				0.53	
Cvs1         0.63         0.40           Cvs20         0.64         0.41           Cvs31         0.55         0.30           Cvs5         0.54         0.29           Cvs12         0.48         0.23           Cvs14         0.61         0.37           Cvs27         0.55         0.30           Cvs29         0.53         0.24           Cvs29         0.53         0.28           Cvs40         0.23         0.05           Gamma         Values         0.23           Integ         0.63         0.23           Confu         0.80         Uage           Loyal         0.80         Uage	Cvs8			0.65				0.35	
Cvs20         0.64         0.41           Cvs31         0.55         0.30           Cvs5         0.54         0.29           Cvs12         0.48         0.23           Cvs26         0.49         0.24           Cvs27         0.55         0.30           Cvs29         0.53         0.28           Cvs40         0.23         0.05           Gamma         Values         0.23           Integ         0.63         0.23           Confu         0.80         0.98	Cvs11			0.63				0.40	
Cvs31         0.55         0.30           Cvs5         0.54         0.29           Cvs12         0.48         0.23           Cvs14         0.61         0.37           Cvs26         0.49         0.24           Cvs27         0.55         0.30           Cvs29         0.53         0.28           Cvs40         0.23         0.05           Gamma         Values         0.05           Integ         0.63         0.23           Confu         0.80         0.23           Loyal         0.80         0.98	Cvs20			0.64				0.41	
Cvs5     0.54     0.29       Cvs12     0.48     0.23       Cvs14     0.61     0.37       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs40     0.23     0.05       Gamma     Values     0.05       Integ     0.63     0.49       Confu     0.80     0.23       Wisdom     0.98     0.23	Cvs31			0.55				0.30	
Cvs12     0.48     0.23       Cvs14     0.61     0.37       Cvs26     0.49     0.24       Cvs27     0.55     0.30       Cvs29     0.53     0.28       Cvs40     0.23     0.05       Gamma     Values     0.23       Integ     0.63     0.48       Confu     0.80     0.23       Wisdom     0.98     0.98	Cvs5			0.00	0.54			0.00	0.29
Cvs14         0.61         0.37           Cvs26         0.49         0.24           Cvs27         0.55         0.30           Cvs29         0.53         0.28           Cvs40         0.23         0.05           Gamma         Values         0.05           Integ         0.63         0.23           Confu         0.80         0.20           Loyal         0.80         0.98	Cvs12				0.48				0.23
Cvs26         0.49         0.24           Cvs27         0.55         0.30           Cvs29         0.53         0.28           Cvs40         0.23         0.05           Gamma         Values         0.23           Integ         0.63         0.49           Confu         0.80         0.23           Loyal         0.80         0.98	Cvs14				0.61				0.37
Cvs27       0.55       0.30         Cvs29       0.53       0.28         Cvs40       0.23       0.05         Gamma       Values       0.23         Integ       0.63       0.40         Confu       0.80       0.80         Loyal       0.98       0.98	Cvs26				0.49				0.24
Cvs29         0.53         0.28           Cvs40         0.23         0.05           Gamma         Values         0.23           Integ         0.63         0.21           Confu         0.80         0.23           Loyal         0.80         0.23	Cvs27				0.55				0.30
Cvs40         0.23         0.05           Gamma         Values         0.05           Integ         0.63         0.05           Confu         0.80         0.23           Loyal         0.80         0.05	Cvs29				0.53				0.28
GammaValuesInteg0.63Confu0.80Loyal0.80Wisdom0.98	Cvs40				0.23				0.05
Integ         0.63           Confu         0.80           Loyal         0.80           Wisdom         0.98	Gamma	Values	_						
Confu         0.80           Loyal         0.80           Wisdom         0.98	Integ	0.63							
Loyal 0.80 Wisdom 0.98	Confu	0.80							
Wisdom 0.98	Loyal	0.80							
	Wisdom	0.98							

 Table 7A.3 Completely standardised solution and communalities and percentage of variance explained for model H(1,4)

λy values for the completely standardised solution Communalities and percentage of variance explained (h²)

5.61/40=0.14 3.57/40=0.09 2.35/40=0.06 1.77/40=0.04

Total four factors = 13.3/40 = 0.3343 = 33.43%

Figure 7A.3 shows a nested model with the higher order variables constrained to one side of the model diagram. The syntax for the model N(1,4)R that is found in Table 7A.2 also indicates the way in which the constraint is applied. Correlation between the four value dimensions shown in Figure 7A.3 is therefore, permitted.

#### Summary of the CVS data and variance

The models that have been discussed in the appendix did not have fit indices that were as good as those of the nested model that was discussed in Chapter 7. However, most of the fit indices were within an acceptable range as defined by Byrne (1998) and Kline (1998). The fact that item level analysis used raw and not scale level data had a slightly negative effect on the absolute fit indices including the goodness of fit, *GFI*, and the non-normed fit index, *NNFI*. Therefore, other indices such as the *RMSEA*, the root mean square error of approximation and the *SRMR*, the standardised root mean square residual were also used. These indices were discussed in detail in Chapter 6, referred to in Chapter 7, and the loadings presented in Table 7.1. Both of these indices had acceptable values in the analyses undertaken.

The three types of CVS models produced similar fit statistics particularly the models B(4), H(1,4) and the N(1,4)R. All of the models discussed in this section had factor loadings for each item that were greater than 0.20 that Afrassa (1998) and other investigators have noted is sufficiently high. The N(1,4)R had the best fit and also confirmed the dimensionality of values whereby in that model the values factor accounted for 19.2 per cent of the variance whereas the four factors together only accounted for 16.9 per cent of the variance. The total amount of variance explained for the nested model, N(1,4)R, accounted for a total of 36.1 per cent of the variance and hierarchical models had almost identical amounts of variance, 33.3 and 33.4 per cent respectively.

Therefore, there appeared to be a single dominant factor underlying values. It is indicated by the proportion of variance extracted by this factor in the analyses compared to the four separate values factors. The N(1,4)R nested model provided the best evidence for the existence of a single underlying general values factor in addition to the four separate, but correlated value dimensions on the CVS questionnaire.

#### An examination of the approaches to learning

The 12 models generated from the SPQ data were presented in Chapter 7, but only the B(6) model was discussed in the chapter. This model provided the best representations of the data. All models were based on the complete data set of 573 records. The principal sources of variation were (a) the type of model that is estimated, (b) the disposition of variables to explain the important findings in the study, and (c) the loadings of the manifest variables. Four baseline models, three hierarchical and five nested models were proposed.

#### SPQ syntax utilised in the final model for approaches to learning

Table 7A.4 presents the syntax that has been used in the generation of the final model for learning in Chapter 7. It lists the variables and then shows them reordered into the final disposition that is discussed in the chapter. The syntax also shows the designated latent variables, the relationships between the variables, the data file that is used to estimate the model, the sample size, and the specific outcomes requested from the model estimation including the path diagram and the type of solution that is required.

**Table 7A.4**SPQ syntax for the B(6) model of the SPQ

observed variables:
it1 it2 it3 it4 it5 it6 it7 it8 it9 it10 it11 it12 it13 it14 it15 it16
it17 it18 it19 it20 it21 it22 it23 it24 it25 it26 it27 it28 it29 it30
it31 it32 it33 it34 it35 it36 it37 it38 it39 it40 it41 it42
reorder variables
it1 it7 it13 it19 it25 it31 it37 it2 it8 it14 it20 it26 it32 it38
it3 it9 it15 it21 it27 it33 it39 it4 it10 it16 it22 it28 it34 it40
it5 it11 it17 it23 it29 it35 it41 it6 it12 it18 it24 it30 it36 it42
raw data from file a spodecem tyt
latent variables
em dm am es de ac
iti - em
$1 \cup 1 - Sim$
$1 \leq 1 \leq -1 \leq -1 \leq 1 \leq 1 \leq -1 \leq -1 \leq -1 $
$LL_2 = Sin$
113 / = Sm
$L_2 = dm$
$1 \pm 14 = dm$
120 = dm
1126 = dm
it32 = dm
it38 = dm
it3 = am
it9 = am
it15 = am
it21 = am
it27 = am
it33 = am
it39 = am
it4 = ss
itl0 = ss
itl6 = ss
it22 = ss
it28 = ss
it34 = ss
it40 = ss
it5 = ds
itl1 = ds
it17 = ds
it23 = ds
it29 = ds
it35 = ds
it41 = ds
it6 = as
it12 = as
it18 = as
it24 = as
it30 = as
i+42 = as
LISEL OUTPUT IT=5000 AD=150 SE TV MI SC
path diagram
Sample size =573

Figure 7A.4 shows a baseline B(6) model that was generated with LISREL. In this and all baseline models the latent and manifest variables correlated freely.

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#### SPQ baseline model



Figure 7A.4 SPQ baseline model

Table 7A.5 Completely standardised	d solution and	d communalities	and percentage
of variance explained	for model B	(3)	

values for the	e completely stand	dardised solution	C	ommunalities a	nd percentage	of variance explai	ined (h ²
Items	Surf	Deep	Achi	Surf	Deep	Achi	
Spq1	0.48			0.23			
Spq7	0.41			0.17			
Spq13	0.46			0.21			
Spq19	0.50			0.25			
Spq25	0.58			0.34			
Spq31	0.45			0.20			
Spq37	0.17			0.03			
Spq2		0.45			0.02		
Spq8		0.55			0.30		
Spq14		0.55			0.30		
Spq20		0.37			0.14		
Spq26		0.13			0.02		
Spq32		0.45			0.20		
Spq38		0.29			0.08		
Spq3			0.35			0.12	
Spq9			0.43			0.18	
Spq15			0.32			0.10	
Spq21			0.38			0.14	
Spg27			0.38			0.14	
Spq33			0.58			0.34	
Spq39			0.49			0.24	
Spq4	0.31			0.09			
Spq10	0.58			0.34			
Spa16	0.54			0.29			
Spq22	0.56			0.31			
Spq28	0.62			0.38			
Spq34	0.51			0.26			
Spq40	0.61			0.37			
Spq5		0.55			0.30		
Spq11		0.63			0.40		
Spq17		0.66			0.44		
Spq23		0.68			0.46		
Spq29		0.65			0.42		
Spq35		0.59			0.35		
Spa41		0.49			0.22		
Spa6		0.17	0.44		•- <b></b>	0.19	
Spa12			0.41			0.17	
Spa18			0.43			0.18	
Spg24			0.44			0.19	
Spq30			0.51			0.26	
Spq36			0.59			0.28	
Spa42			0.07			0.00	

3.47/42=0.08 3.84/42=0.09 2.56/42=0.06

Total variance for three factors 9.87/42 = 0.2310 = 23.1%

The values for the Baseline B(3) model together with the communalities and percentage of variance explained are found in Table 7A.5. The scales in this model were based on the complete data set of 573 data records. The fit indices were listed in Table 7.5. They showed that the model has reasonable fit and therefore unidimensionality as all the motivations and strategies have  $\lambda x$  values that are positive and above 0.30 except for the items 26, 37, 38 that are above 0.10 and 42 that is above 0.05. This model estimated the three approaches to learning. However, it only explained 23.1 per cent of the variance and was therefore, not as useful as the B(6) model as an explanation for learning motivations and strategies or as a basis for multilevel modelling.

#### SPQ hierarchical models



Figure 7A.5 SPQ Hierarchical H(3,6) path model

Figure 7A.5 shows a hierarchical model that has been generated with LISREL. In this and all hierarchical models the latent and manifest variables are left to correlate freely. The higher order variables are the three approaches to learning with the six latent variables for learning nested beneath them. The scales in this model are based on the complete data set of 573 records. The fit indices are found in Table 7.5. They show that the model has reasonable fit and therefore, unidimensionality as all the motivations and strategies had  $\lambda y$  values that were positive and above 0.30 except for item 38 that was above 0.20. This model is similar to a model that has been described by Wong, Lin and Watkins (1996).

The Phi matrix in the LISREL output showed a high degree of correlation between the deep and achieving approaches to learning but a low correlation between the surface and deep approaches. This confirmed the original findings of Biggs (1987a). The values for the hierarchical model H(3,6) together with the communalities and percentage of variance explained may be found in Table 7A.6. It should be noted that the  $\lambda x$  and communality values (h²) for the baseline model B(6) and the hierarchical model H(3,6) are similar. This has occurred because the H(3,6) model has extracted variance at the lower level first and the remaining variance is apportioned to the higher level where one or more latent variables exist as in the case of the hierarchical model. This is the reason that hierarchical models are called 'or' models; variance is apportioned to the lower level first and the remainder to the higher level. This is not the case in baseline models where there is only one level of variance or in nested models where variance explained.

#### SPQ nested model

Figure 7A.6 shows a nested model that has been generated with LISREL. In this and all nested models the latent and manifest variables are able to correlate freely when they are not constrained. The higher order variables are the motivations and strategies as well as the approaches associated with learning. The approaches to learning show a high degree of correlation. This is similar to the relationship between the deep and achieving approaches that reflects a similar degree of correlation in the hierarchical model. However, the motivations and strategies show very low correlation in nested models that is understandable as they are conceptually unrelated in their operation. The strategies are related to the way learning is carried out. They are driven by the motivations. The scales in this model are based on the complete data set of 573 case records. The fit indices are found in Table 7.5. They show that this nested model had the best fit indices and therefore unidimensionality as all the approaches to learning have  $\lambda x$  values that are positive and above 0.20 except for items 27 and 38. However, a number of the motivations and strategies have values below 0.10.



Figure 7A.6 SPQ nested model

Items	SM	DM	AM	SS	DS	AS	SM	DM	AM	SS	DS	AS
Spq1	0.44						0.19					
Spq7	0.49						0.24					
Spa13	0.53						0.28					
Spa19	0.43						0.18					
Spq15	0.41						0.17					
Spq23	0.44						0.17					
Spq31	0.44						0.20					
spq37	0.00	0.55					0.50	0.20				
Spq2		0.55						0.30				
Spq8		0.38						0.14				
Spq14		0.48						0.23				
Spq20		0.54						0.29				
Spq26		0.56						0.36				
Spq32		0.43						0.19				
Spq38		0.20						0.04				
Spq3			0.59						0.35			
Spq9			0.63						0.40			
Spq5			0.05						0.10			
Spq13 Spq21			0.38						0.50			
Spq21 Spq27			0.38						0.14			
Spq27			0.58						0.14			
Spq33			0.67						0.45			
Spq39			0.34						0.12			
Spq4				0.39						0.12		
Spq10				0.49						0.24		
Spq16				0.41						0.17		
Spq22				0.48						0.23		
Spq28				0.41						0.17		
Spa34				0.59						0.35		
Spa40				0.53						0.28		
Spq 10				0.00	0.38					0.20	0.14	
Spq5					0.50						0.11	
Spq17					0.04						0.23	
Spq17					0.40						0.25	
Spq25					0.07						0.43	
Spq29					0.52						0.27	
Spq35					0.46						0.21	
Spq41					0.68						0.46	
Spq6						0.50						0.25
Spq12						0.68						0.46
Spq18						0.64						0.41
Spq24						0.71						0.50
Spq30						0.63						0.40
Spq36						0.58						0.34
Spq42						0.44						0.21
Gamma		SA	DA	AA		····						0.21
SM		0.83	DI	1 11 1	-							
DM		0.05	1.04									
			1.04	0.71								
AM		0.01		0.71								
88		0.91					1					
DS			0.73									
AS				0.70								
T-4-1							1.63/	1.50/	2.10/	1.56/	2.18/	2.58/
i otai=												
i otai=							42=	42=	42=	42=	42	42=

 Table 7A.6 Completely standardised solution and communalities and percentage of variance explained for model H(3,6)

(SM, DM, AM, SS, DS and AS) = Total variance explained  $(h^2)=11.55/42=0.2754=27.45\%$ 

Table 7A.7	SPQ final	syntax for the	e N(2,3)	nested model
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observed variables: it1 it2 it3 it4 it5 it6 it7 it8 it9 it10 it11 it12 it13 it14 it15 it16 it17 it18 it19 it20 it21 it22 it23 it24 it25 it26 it27 it28 it29 it30 it31 it32 it33 it34 it35 it36 it37 it38 it39 it40 it41 it42 reorder variables it1 it7 it13 it19 it25 it31 it37 it2 it8 it14 it20 it26 it32 it38 it3 it9 it15 it21 it27 it33 it39 it4 it10 it16 it22 it28 it34 it40 it5 it11 it17 it23 it29 it35 it41 it6 it12 it18 it24 it30 it36 it42 raw data from file a:spqdecem.txt latent variables strat motiv surf deep achi Let the correlation between strat and surf be zero Let the correlation between motiv and surf be zero Let the correlation between strat and deep be zero Let the correlation between motiv and deep be zero Let the correlation between strat and achi be zero Let the correlation between motiv and achi be zero it1 = surf motiv

it7 = surf motivit13 = surf motivit19 = surf motiv it25 = surf motivit31 = surf motiv it37 = surf motivit2 = deep motiv it8 = deep motiv it14 = deep motiv it20 = deep motivit26 = deep motiv it32 = deep motiv it38 = deep motiv it3 = achi motiv it9 = achi motiv it15 = achi motiv it21 = achi motiv it27 = achi motiv it33 = achi motiv it39 = achi motiv it4 = surf stratit10 = surf stratit16 = surf stratit22 = surf strat

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it28 = surf stratit34 = surf strat it40 = surf stratit5 = deep strat it11 = deep stratit17 = deep strat it23 = deep stratit29 = deep strat it35 = deep strat it41 = deep strat it6 = achi strat it12 = achi strat it18 = achi strat it24 = achi strat it30 = achi strat it36 = achi strat it42 = achi strat LISREL OUTPUT IT=5000 AD=150 SE TV MI SC

path diagram

Sample size = 573

Table 7A.7 presents the syntax from the printout taken from LISREL that has been used to specify the N(2,3) nested model that had the best fit for the data collected. This syntax was not discussed in Chapter 7 as this model was not considered to provide the best explanation the observed data and also not the best model to use as a basis for multilevel modelling. However, because models N(2,3) and N(1,3) did have the best fit indices, it is useful to discuss them in this appendix. Both of the nested models have constraints although correlation was permitted between some of the nominated latent variables.

Figure 7A.7 shows the path diagram for the N(2,3) nested model including the constraints that are set between the approaches to learning and the motivations and strategies. However, the approaches to learning have been permitted to correlate freely as have the motivations and strategies associated with learning.



Figure 7A.7 SPQ Nested N(2,3) path model

The completely standardised solution for the nested model N(2,3) together with the communalities and percentage of variance explained are found in Table 7A.8. Nested models are called 'and' models as the variance is apportioned at two levels and then summed as a total measure of variance explained.

Ax values for the	completely s	standardised	solution			Communa	lities and perce	entage of variat	ice explained (	n*)
Items	Strat	Motiv	Surf	Deep	Achi	Strat	Motiv	Surf	Deep	Achi
Spq1		0.16	0.36				0.03	0.13		
Spq7		0.21	0.38				0.04	0.14		
Spq13		0.30	0.34				0.09	0.12		
Spq19		0.10	0.35				0.01	0.12		
Spq25		0.12	0.40				0.01	0.14		
Spq31		0.16	0.40				0.03	0.16		
Spq37		0.27	0.47				0.07	0.22		
Spq2		0.07		0.53			0.00		0.28	
Spq8		0.31		0.32			0.10		0.10	
Spq14		0.16		0.43			0.03		0.18	
Spq20		-0.02		0.57			0.00		0.32	
Spq26		0.11		0.51			0.01		0.26	
Spq32		0.24		0.36			0.06		0.13	
Spq38		0.23		0.14			0.02		0.02	
Spq3		0.53			0.30		0.28			0.09
Spq9		0.49			0.37		0.24			0.14
Spq15		0.53			0.41		0.28			0.17
Spq21		0.25			0.27		0.06			0.07
Spq27		0.45			0.08		0.20			0.00
Spq33		0.59			0.32		0.33			0.10
Spq39		0.25			0.26		0.06			0.07
Spq4	0.16		0.34			0.03		0.12		
Spq10	0.15		0.46			0.02		0.21		
Spq16	-0.01		0.40			0.00		0.16		
Spq22	0.10		0.44			0.01		0.19		
Spq28	0.01		0.42			0.00		0.18		
Spq34	0.34		0.52			0.02		0.27		
Spq40	0.23		0.48			0.07		0.23		
Spq5	-0.35			0.23		0.12			0.07	
Spq11	-0.42			0.47		0.18			0.22	
Spq17	-0.05			0.51		0.00			0.26	
Spq23	-0.70			0.41		0.49			0.17	
Spq29	-0.02			0.59		0.00			0.35	
Spq35	-0.04			0.51		0.00			0.26	
Spq41	-0.46			0.49		0.21			0.24	
Spq6	0.09				0.48	0.01				0.23
Spq12	0.14				0.64	0.02				0.41
Spq18	0.20				0.61	0.04				0.37
Spq24	0.19				0.69	0.04				0.48
Spq30	-0.06				0.67	0.00				0.45
Spq36	0.04				0.59	0.00				0.35
Spq42	0.26				0.41	0.07				0.17
Total=						1.31/42	1.95/42	2.39/42	2.85/42	3.09/42
						=0.031	=0.046	=0.057	=0.068	=0.074

 Table 7A.8 Completely standardised solution and communalities and percentage of variance explained for model N(2,3)

Total for three factors 8.35/42 = 0.1990 = 19.90%

Total for two factors 3.35/42 = 0.0770 = 7.70%

Total variance explained = 27.60%

Table 7A.9 shows the N(1,3) model that also has fit indices that are better than the B(6) model but does not explain the data as well. However, what is especially interesting in the N(1,3) model is that the 'Learn' factor took more of the variance than the three approaches combined. 'Learn' took 14 per cent of the variance whereas the three combined approaches to learning took 13.2 per cent of the total variance explained that is 27.2 per cent. This information has given credence to the fact that there is a definite dimensionality in the learning construct.

$\lambda x$ values for the completely standardised solution					Communalitie	Communalities and percentage of variance explained (h2)				
Items	Learn	Surf	Deep	Achi	Learn	Surf	Deep	Achi		
Spq1	0.17	0.37			0.03	0.14				
Spq7	0.09	0.48			0.01	0.19				
Spq13	0.29	0.34			0.08	0.14				
Spq19	0.11	0.38			0.01	0.14				
Spq25	0.07	0.40			0.01	0.16				
Spq31	0.13	0.44			0.02	0.19				
Spq37	0.20	0.50			0.04	0.25				
Spq2	0.46		0.20		0.22		0.04			
Spq8	0.32		0.18		0.10		0.03			
Spq14	0.38		0.17		0.15		0.03			
Spq20	0.49		0.12		0.24		0.01			
Spq26	0.46		0.22		0.21		0.05			
Spq32	0.35		0.15		0.12		0.02			
Spq38	0.14		0.11		0.02		0.01			
Spq3	0.43			-0.41	0.19			0.17		
Spg9	0.48			-0.34	0.23			0.12		
Spq15	0.55			-0.40	0.30			0.16		
Spq21	0.31			-0.16	0.10			0.03		
Spq27	0.22			-0.44	0.05			0.20		
Spq33	0.49			-0.51	0.24			0.26		
Spq39	0.33			-0.17	0.11			0.03		
Spq4	-0.02	0.38			0.00	0.14				
Spq10	0.10	0.48			0.01	0.23				
Spq16	0.22	0.29			0.05	0.08				
Spq22	-0.01	0.48			0.00	0.23				
Spq28	0.22	0.35			0.05	0.12				
Spq34	0.24	0.50			0.06	0.25				
Spq40	0.22	0.44			0.05	0.20				
Spq5	0.15		0.38		0.02		0.14			
Spq11	0.33		0.57		0.11		0.32			
Spq17	0.48		0.21		0.23		0.04			
Spq23	0.21		0.76		0.04		0.58			
Spq29	0.49		0.23		0.24		0.06			
Spq35	0.44		0.21		0.20		0.04			
Spq41	0.33		0.62		0.11		0.38			
Spq6	0.49			0.09	0.21			0.01		
Spq12	0.60			0.25	0.36			0.06		
Spq18	0.58			0.18	0.34			0.03		
Spq24	0.64			0.35	0.41			0.12		
Spq30	0.64			0.67	0.41			0.04		
Spq36	0.57			0.14	0.32			0.02		
Spq42	0.44			-0.03	0.19			0.00		
Total=					5.87/42=	2.51/42=	1.77/42=	1.24/42=		
					0.1398	0.060	0.042	0.030		

 Table 7A.9 Completely standardised solution and communalities and percentage of variance explained for model N(1,3)

Total for three factors 5.52/42 = 0.1315 = 13.15%

Total for one factor 5.87= 0.1398= 13.98%

Total variance explained = 27.13%

#### Summary of the SPQ data and variance

Most of the models discussed in this appendix did not have fit indices that were as good as those of the nested models. However, most of the fit indices were within an acceptable range as defined by Byrne (1998) and Kline (1998). The fact that item level analysis used raw and not scale level data had a slightly negative effect on the absolute fit indices including the goodness of fit and the non-normed fit indices.

Therefore, other indices such as the *RMSEA*, the root mean square error of approximation and the *SRMR*, the standardised root mean square residual were used. Both of these indices had acceptable values in the analyses undertaken and were not considered to be sample size dependent.

The three types of SPQ models produced similar fit statistics particularly the models B(3), H(3,6) and the N(2,3) and the N(1,3). All of the models discussed in this section had factor loadings for each item that were greater than 0.20, except where it has been noted specifically, which Afrassa (1998) and others have noted was sufficiently high to continue with the analysis. The N(1,3) had a very good fit and also confirmed the dimensionality of the approaches to learning whereby in this model the six learning factors accounted for 13.2 per cent of the variance and the single Learn factor accounted for 14 per cent of the variance. Together these accounted for a total of 27.2 per cent of the variance explained. The total variance for the nested model, N(2,3) had the best fit and accounted for 23.5 per cent of the variance explained. The hierarchical models H(3,6) and H(2,6) had an identical amount of variance. The amount of variance explained by these models was the same as found for baseline, B(6) model which accounted for a total of 27.5 per cent.

#### Conclusion

Therefore, there appeared to be a single factor underlying approaches to learning. It was indicated by the proportion of variance extracted by learning motivations and strategies in the analyses of the baseline and hierarchical models. When the learning factor was compared to the three approaches to learning factors, learning took more of the variance than the Surface, Deep and Achieving Approaches combined.

The nested models provided evidence for the existence of a single underlying factor on both the CVS and the SPQ questionnaires. This evidence was confirmed by the fit indices. The principal reason that a nested model was not accepted as the best explanation for the approaches to learning was that the more complex models N(1,3)and N(2,3) showed only slightly better fit. Moreover, these models would have required more complex explanations for the examination of change over time than would the simpler baseline model B(6). Furthermore, the low correlation between Deep Strategy and Surface Strategy (-0.03) and Deep Strategy and Surface Motivation (0.06) indicated that combining any of the six scales might conceal differences that were of potential interest in the investigation of change.
### D Appendix to Chapter 9

The appendix to this chapter shows the detailed calculations that have been carried out in order to arrive at the values on the axes of the graphs seen in the chapter itself. Occasion is seen on the x-axis of all graphs and appears on the left of the calculations as -2, -1, 0, 1 and 2. These figures represent occasions 1, 2, 3, 4 and 5 respectively. The values for each variable appear on the y-axis and represent the actual values for each variable measured on five occasions.

#### Integrity and Tolerance Scale

Occasion	Men	Women
-2	(1.147+0.217*0*+-0.012*-2=1.171	1.147+0.217*1+-0.012*-2=1.388)
-1	(1.147+0.217*0*+-0.012*-1=1.159	1.147+0.217*1+-0.012*-1=1.376)
0	(1.147+0.217*0*+-0.012*0=1.147)	1.147+0.217*1+-0.012* 0=1.364)
1	(1.147+0.217*0*+-0.012*1=1.135	1.147+0.217*1+-0.012* 1=1.352)
2	(1.147*0.217*0*+-0.012*2=1.123)	1.147+0.217*1+-0.012* 2 =1.340)

Table 9A.1Gender and Integrity

	Men	Women
-2	1.171	1.388
-1	1.159	1.376
0	1.147	1.364
1	1.135	1.352
2	1.123	1.340

Occas	sion 25 o	r less	Over 25
-2	(1.14	47+0.194*0-0.012*-2=1.171	1.147+0.194*1+-0.012*-2=1.365)
-1	(1.14	47+0.194*0-0.012*-1=1.159	1.147+0.194*1+-0.012*-1=1.353)
0	(1.14	47+0.194*0-0.012* 0=1.147	1.147+0.194*1+-0.012*0=1.341)
1	(1.14	47+0.194*0-0.012* 1=1.135	1.147+0.194*1+-0.012*1=1.329)
2	(1.14	47+0.194*0-0.012* 2=1.123	1.147+0.194*1+-0.012*2=1.317)
	25 or less	Over 25	
-2	1.171	1.365	
-1	1.159	1.353	
0	1.147	1.341	
1	1.135	1.329	
2	1.123	1.317	

**Table 9A.2**Age group and Integrity

 Table 9A.3
 Interaction of Flinders with Occasion and Integrity

Occasion	Not Flinders	Flinders
-2	1.147 +0.151*0*-2 + -0.012*-2 =1.171	0.151*1*-2 + -0.012*-2 = 0.869
-1	1.147 +0.151*0*-1 + -0.012*-1 =1.159	0.151*1*-1 + -0.012*-1 = 1.008
0	1.147 + 0.151 * 0 * 0 + -0.012 * 0 = 1.147	0.151*1*0+-0.012*0=1.147
1	1.147 + 0.151 * 0 * 1 + -0.012 * 1 = 1.135	0.151*1*1+-0.012*1 = 1.286
2	1.147 + 0.151 * 0 * 2 + -0.012 * 2 = 1.123	0.151*1*2+-0.012*2=1.425

	Not Flinders	Flinders
-2	1.171	0.869
-1	1.159	1.008
0	1.147	1.147
1	1.135	1.286
2	1.123	1.425

#### **Confucian Ethos scale**

 Table 9A.4
 Interaction for Occasion, age group and Confucian Ethos

Occasion		25 or less	Over 25
-2	0.250 +	0.08*0*-2 + -0.086*-2 = 0.422	0.08*1*-2 + -0.86*-2 = 0.262
-1	0.250 +	0.08*0*-1 + -0.086*-1 = 0.336	0.08*1*-1 + -0.86*-1 = 0.256
0	0.250 +	0.08*0*0+-0.086*0=0.250	0.08*1*0 + -0.86*0 = 0.250
1	0.250 +	0.08*0*1 + -0.086*1 = 0.164	0.08*1*1 + -0.86*1 = 0.244
2	0.250 +	0.08*0*2 + -0.086*2 = 0.078	0.08*1*2 + -0.86*2 = 0.238

	25 or less	Over 25
-2	0.422	0.262
-1	0.336	0.256
0	0.250	0.250
1	0.164	0.244
2	0.078	0.238

 Table 9A.5
 Interaction for Occasion, Flinders and Confucian Ethos

Occasion		Not Flinders	Flinders
-2	0.250+	0.100*0*-2+-0.086*-2=0.422	0.100*1*-2+-0.086*-2=0.222
-1	0.250+	0.100*0*-1+-0.086*-1=0.336	0.100*1*-1+-0.086*-1=0.236
0	0.250+	0.100*0*0+-0.086*0 =0.250	0.100*1*0+-0.086*0 =0.250
1	0.250+	0.100*0*1+-0.086*1 =0.164	0.100*1*1+-0.086*1 =0.264
2	0.250+	0.100*0*2+-0.086*2 =0.078	0.100*1*2+-0.086*2 =0.278

	Not Flinders	Flinders
-2	0.422	0.222
-1	0.336	0.236
0	0.250	0.250
1	0.164	0.264
2	0.078	0.278

#### Loyalty to Ideals Scale

Table 9A.6	Direct and	Interaction	effects	for	Occasion,	Age	Group	and
	Loyalty							

Occ	asion	25 years or less	Over 25 years
-2	0.727 +	0.222*0+0.082*-2+0.206*0*0=0.564	0.222*1+0.082*-2+0.206*-2*1=-0.071
-1	0.727 +	0.222*0+0.082*-1+0.206*0*0=0.646	0.222*1+0.082*-1+0.206*-1*1=0.439
0	0.727 +	0.222*0+0.082*0+0.206*0*0=0.727	0.222*1+0.082*0+0.206*0*1=0.949
1	0.727 +	0.222*0+0.082*1+0.206*1*0=0.810	0.222*1+0.082*1+0.206*1*1 = 1.459
2	0.727 +	0.222*0+0.082*2+0.206*2*0=0.892	0.222*1+0.082*2+0.206*2*1 = 1.969

	25 or less	Over 25
-2	0.564	-0.071
-1	0.646	0.439
0	0.727	0.949
1	0.810	1.459
2	0.892	1.969

0.983

1.065

0.809

0.891

1 2

Occa	sion	Men	Women	
-2		(0.727+0.082*-2=0.563	0.901+0.082*-2=0.737)	
-1		(0.727+0.082*-1=0.645	0.901+0.082*-1=0.819)	
0		(0.727+0.082*0=0.727	0.901+0.082*0=0.901)	
1		(0.727+0.082*1 = 0.809	0.901+0.082*1 =0.983)	
2		(0.727+0.082*2=0.891	0.901+0.082*2=1.065)	
	Men	Women		
-2	0.563	0.737		
-1	0.645	0.819		
0	0.727	0.901		

Table 9A.7Gender and Loyalty

Occasion		Less than 10 hours	Ten hours or more
-2	0.727 +	-0.191*-2+0.082*-2=0.563	-0.191*1*-2+0.082*-2=0.945
-1	0.727 +	-0.191*-1+0.082*-1=0.645	-0.191*1*-1+0.082*-1=0.836
0	0.727 +	-0.191*0+0.082*0 =0.727	-0.191*1*0+0.082*0 =0.727
1	0.727 +	-0.191*1+0.082*1 =0.809	-0.191*1*1+0.082*1 =0.618
2	0.727 +	-0.191*2+0.082*2 =0.891	-0.191*1*2+0.082*2 =0.509

	10+hours	<10 hours
-2	0.945	0.563
-1	0.836	0.645
0	0.727	0.727
1	0.618	0.809
2	0.509	0.891

#### **Worldly Wisdom**

 Table 9A.9
 Interaction for Occasion, Age Group and Wisdom

Occasion		25 years or less	Over 25 years
-2	0.395 +	0.115*0*-2+005*-2=0.385	0.115*1*-2 + 0.005*-2 = 0.155
-1	0.395 +	0.115*0*-1+005*-1 = 0.390	0.115*1*-1 + 0.005*-1 = 0.275
0	0.395 +	0.115*0*0+ 005*0 = 0.395	0.115*1*0 + 0.005*0 = 0.395
1	0.395 +	0.115*0*1 + 005*1 = 0.400	$0.115^{*}1^{*}1 + 0.005^{*}1 = 0.515$
2	0.395 +	0.115*0*2 + 005*2 = 0.405	0.115*1*2 + 0.005*2 = 0.635

	25 or less	Over 25
_2	0.385	0.155
-1	0.390	0.275
0	0.395	0.395
1	0.400	0.515
2	0.405	0.635

Table 9A.10 Interaction for Occasion, Hours of Study and Wisdom

Occasion		Less than 10 hours	10 hours or more
-2 (	0.395+	-0.087*0*-2+0.005*-2=0.385	-0.087*1*-2+0.005*-2=0.559
-1 (	0.395+	-0.087*0*-1+0.005*-1=0.390	-0.087*1*-1+0.005*-1=0.477
0 0	0.395+	-0.087*0*0+0.005*0 =0.395	-0.087*1*0+0.005*0 =0.395
1 (	0.395+	-0.087*0*1+0.005*1 = 0.400	-0.087*1*1+0.005*1 =0.313
2 (	0.395+	-0.087*0*2+0.005*2 =0.405	-0.087*1*2+0.005*2 =0.231

	10+ hours	<10 hours
-2	0.559	0.385
-1	0.477	0.390
0	0.395	0.395
1	0.313	0.400
2	0.231	0.405

# E

### Appendix to Chapter 10

The appendix to this chapter shows the detailed calculations that have been carried out in order to arrive at the values on the axes of the graphs that may be seen in the chapter itself. Occasion is seen on the x-axis of all graphs and appears on the left of the calculations as -2, -1, 0, 1 and 2. These figures represent Occasions 1, 2, 3, 4 and 5 respectively. The values for each variable appear on the y-axis and represent the actual values for each variable measured on five Occasions.

#### **Surface Motivation scale**

	Business	Other subjects	
-2	0.516	0.274	
-1	0.429	0.308	
0	0.342	0.342	
1	0.255	0.376	
2	0.168	0.410	

 Table 10A.1 Surface Motivation, Occasion and Subjects Students Study (Study)

Occasion		Other subjects	Business
-2	0.342 +	0.121*0*-2 + -0.087*-2 =0.516	0.121*1*-2+ -0.087*-2 =0.274
-1	0.342 +	0.121*0*-1 + -0.087*-1 = 0.429	0.121*1*-1+ -0.087*-1 =0.308
0	0.342 +	0.121*0*0 + -0.087*0 = 0.342	0.121*1*0+-0.087*0 = 0.342
1	0.342 +	0.121*0*1 + -0.087*1 = 0.255	0.121*1*1+-0.087*1 = 0.376
2	0.342 +	0.121*0*2 + -0.087*2 = 0.168	0.121*1*2+-0.087*2 = 0.410

	Not at Home	At Home
-2	0.516	0.742
-1	0.429	0.542
0	0.342	0.342
1	0.255	0.142
2	0.168	-0.058

 Table 10A.2
 Surface Motivation, Occasion and Where Students Prefer to Study (Prest)

Occasion		Not at Home	At Home
-2	0.342+	-0.113*0*-2+-0.087*-2=0.516	-0.113*1*-2+-0.087*-2=0.742
-1	0.342+	-0.113*0*-1+-0.087*-1=0.429	-0.113*1*-1+-0.087*-1=0.542
0	0.342+	-0.113*0*0+-0.087*0 =0.342	-0.113*1*0+-0.087*0 = 0.342
1	0.342+	-0.113*0*1+-0.087*1 =0.255	-0.113*1*1+-0.087*1 =0.142
2	0.342+	-0.113*0*2+-0.087*2 =0.168	-0.113*1*2+-0.087*2 =-0.058

 Table 10A.3
 Surface Motivation, Occasion and Parents' Religion (Parrel)

	Same Beliefs as Parents	Different Beliefs to Parents
-2	0.516	0.294
-1	0.429	0.318
0	0.342	0.342
1	0.255	0.366
2	0.168	0.390

Occasion		Same Beliefs as Parents =0	Different Beliefs to Parents=1
-2	0.342+	0.111*0*-2+-0.087*-2=0.516	0.111*1*-2+-0.087*-2=0.294
-1	0.342+	0.111*0*-1+-0.087*-1=0.429	0.111*1*-1+-0.087*-1=0.318
0	0.342+	0.111*0*0+-0.087*0 =0.342	0.111*1*0+-0.087*0 =0.342
1	0.342+	0.111*0*1+-0.087*1 =0.255	0.111*1*1+-0.087*1 =0.366
2	0.342+	0.111*0*2+-0.087*2 =0.168	0.111*1*2+-0.087*2 =-0.390

#### Surface Strategy scale

 Table 10A.4
 Surface Strategy and Most Influential Person (Mominflu)

	Mother	Another person
-2	0.143	0.004
-1	0.07	-0.074
0	0.03	-0.144
1	-0.67	-0.214
2	-0137	-0.284

Occasion	Another Person	Mother
-2	(-0.144+0-0.070*-2=-0.004	-0.003+-0.070*-2=0.143)
-1	(-0.144+0-0.070*-1=-0.074	-0.003+-0.070*-1=0.073)
0	(-0.144+0-0.070*0 =-0.144	-0.003 + -0.070 * 0 = 0.003)
1	(-0.144+0-0.070*1 =-0.214	-0.003+-0.070*1 =-0.067)
2	(-0.144+0-0.070*2 =-0.284	-0.003+-0.070*2 =-0.137)

Table 10A.5 Surface Strategy and Arrival in Australia (Arinoz)

	<1 year in Aus	>1 year in Aus
-2	-0.004	0.130
-1	-0.074	0.060
0	-0.144	-0.010
1	-0.214	-0.080
2	-0.284	-0.150

Occasion	<1 year in Aus	>1 year in Aus	
-2	(-0.144+-0.070*-2=-0.004	-0.010+-0.070*-2=0.130)	
-1	(-0.144+-0.070*-1=-0.074	-0.010+-0.070*-1=0.060)	
0	(-0.144+-0.070*0=-0.144	-0.010+-0.070*0 =-0.010)	
1	(-0.144+-0.070*1 =-0.214	-0.010+-0.070*1 =-0.080)	
2	(-0.144+-0.070*2 =-0.284	-0.010+-0.070*2 = -0.150)	

 Table 10A.6
 Surface Strategy, Occasion and Subjects Students Study (Study)

	Business	Other Subjects	
-2	-0.314	-0.004	
-1	-0.229	-0.074	
0	-0.144	-0.144	
1	-0.059	-0.214	
2	0.026	-0.284	

Occasion		Other Subjects	Business
-2	-0.144 +	0.155*0*-2+-0.070*-2=-0.004	0.155*1*-2 + -0.07*-2=-0.314
-1	-0.144 +	0.155*0*-1+-0.070*-1=-0.074	0.155*1*-1 + -0.07*-1=-0.229
0	-0.144 +	0.155*0*0+-0.070*0=-0.144	0.155*1*0 + -0.07*0 = -0.144
1	-0.144 +	0.155*0*1 + -0.070*1 = -0.214	0.155*1*1 + -0.07*1 = -0.059
2	-0.144 +	0.155*0*2 + -0.070*2 = -0.284	0.155*1*2 + -0.07*2 = 0.026

	No Travel	Travel
-2	-0.004	0.226
-1	-0.074	0.041
0	-0.144	-0.144
1	-0.214	-0.329
2	-0.284	-0.514

 Table 10A.7
 Surface Strategy, Occasion and Travel (Travel)

Occasion		No travel	Travel
-2	-0.144+	-0.115*0*-2 + -0.070*-2 = -0.004	-0.115*1*-2 + -0.070*-2 = 0.226
-1	-0.144+	-0.115*0*-1 + -0.070*-1 = -0.074	-0.115*1*0 + -0.070*-1 = 0.041
0	-0.144+	-0.115*0*0 + -0.070*0 = -0.144	-0.115*1*0 + -0.070*0 = -0.144
1	-0.144+	-0.115*0*1 + -0.070*1 = -0.214	-0.115*1*0 + -0.070*1 = -0.329
2	-0.144+	-0.115*0*2 + -0.070*2 = -0.284	-0.115*1*0 + -0.070*2 = -0.514

#### **Deep Motivation scale**

 Table 10A.8
 Deep Motivation and Where Students Prefer to Study (Prest)

	Not at Home	At Home
-2	0.409	0.243
-1	0.482	0.316
0	0.555	0.389
1	0.628	0.462
2	0.701	0.535

Occasion	Not at Home	At Home	
-2	(0.555+0.073*-2=0.409	0.389+-2*0.073=0.243)	
-1	(0.555+0.073*-1=0.482	0.389+-1*0.073=0.316)	
0	(0.555+0.073*0=0.555	0.389+0*0.073 =0.389)	
1	(0.555+0.073*1 = 0.628	0.389+1*0.073 =0.462)	
2	(0.555+0.073*2 =0.701	0.389+2*0.073 =0.535)	

Table 10A.9 Deep Motivation and How Students Prefer to Study (Prefer)

	With Others	Alone
-2	0.409	0.598
-1	0.482	0.671
0	0.555	0.744
1	0.628	0.817
2	0.701	0.890

Occasion	With Others	Alone	
-2	(0.555+0.073*-2=0.409	0.744+0.073*-2=0.598)	
-1	(0.555+0.073*-1 =0.482	0.744+0.073*-1=0.671)	
0	(0.555+0.073*0 =0.555	0.744+0.073*0 =0.744)	
1	(0.555+0.073*1 =0.628	0.744+0.073*1 =0.817)	
2	(0.555+0.073*2 =0.701	0.744+0.073*2 =0.890)	

Table 10A.10 Deep Motivation, Occasion and Hours of Study (Hours)

	<10 hours	10+ hours	
-2	0.409	0.595	
-1	0.482	0.575	
0	0.555	0.555	
1	0.628	0.535	
2	0.701	0.515	

Occasion		< 10 hours	10 + hours
-2	0.555 +	-0.093*0*-2+0.073*-2=0.409	-0.093*1*-2+0.073*-2=0.595
-1	0.555 +	-0.093*0*-1+0.073*-1=0.482	-0.093*1*-1 + 0.073*-1 = 0.575
0	0.555 +	-0.093*0*0+0.073*0 = 0.555	-0.093*1*0 + 0.073*0 = 0.555
1	0.555 +	-0.093*0*1+0.073*1 = 0.628	-0.093*1*1 + 0.073*1 = 0.535
2	0.555 +	-0.093*0*2+0.073*2 = 0.701	-0.093*1*2 + 0.073*2 = 0.515

#### **Deep Strategy scale**

Table 10A.11 Deep Strategy and Trip (Trip)

	No Trip	Trip		
-2	0.342	0.622		
-1	0.506	0.786		
0	0.670	0.950		
1	0.834	1.114		
2	0.998	1.278		

Occasion	No Trip	Trip	
-2	(0.670+0.164*-2=0.342	0.950+0.164*-2=0.622)	
-1	(0.670+0.164*-1=0.506	0.950+0.164*-1=0.786)	
0	(0.670+0.164*0=0.670	0.950+0.164*0 =0.950)	
1	(0.670+0.164*1=1.114	0.950+0.164*1 =1.114)	
2	(0.670+0.164*2=1.278	0.950+0.164*2 =1.278)	

	Same beliefs as parents	Different beliefs to parents
-2	0.342	0.508
-1	0.506	0.672
0	0.670	0.836
1	0.834	1.000
2	0.998	1.164

Table 10A.12 Deep Strategy and Parents' Religious Beliefs (Parrel)

Occasion	Same Beliefs as Parents	<b>Different Beliefs to Parents</b>	
-2	(0.670+0.164*-2=0.342	0.836+0.164*-2=0.508)	
-1	(0.670+0.164*-1=0.506	0.836+0.164*-1=0.672)	
0	(0.670+0.164*0=0.670	0.836+0.164*0=0.836)	
1	(0.670+0.164*1 = 0.834	0.836+0.164*1 =1.000)	
2	(0.670+0.164*2 = 0.998	0.836+0.164*2=1.164)	

Table 10A.13 Deep Strategy, Occasion and Hours of Study (Hours)

	< 10 Hours	10+ Hours
-2	0.342	0.654
-1	0.506	0.662
0	0.670	0.670
1	0.834	0.678
2	0.998	0.686

Occa	asion	< 10 Hours	10 + Hours
-2	0.670 +	-0.156*0*-2+0.164*-2=0.342	-0.156*1*-2 + 0.164*-2 = 0.654
-1	0.670 +	-0.156*0*-1+0.164*-1=0.506	-0.156*1*-1 + 0.164*-1 = 0.662
0	0.670 +	-0.156*0*0+0.164*0 = 0.670	-0.156*1*0 + 0.164*0 = 0.670
1	0.670 +	-0.156*0*1 + 0.164*1 = 0.834	-0.156*1*1 + 0.164*1 = 0.678
2	0.670 +	-0.156*0*2 + 0.164*2 = 0.998	-0.156*1*2 + 0.164*2 = 0.686

#### Achieving Motivation scale

Table 10A.14	Achieving Motivation and Gender of Student (Gender)
--------------	-----------------------------------------------------

	Men	Women
-2	0.071	0.287
-1	0.124	0.340
0	0.177	0.393
1	0.230	0.446
2	0.283	0.499

Occasion	Men	Women
-2	(0.177+0.053*-2=0.071	0.393+0.053*-2=0.287)
-1	(0.177+0.053*-1=0.124	0.393+0.053*-1=0.340)
0	(0.177+0.053*0=0.177	0.393+0.053*0=0.393)
1	(0.177+0.053*1 = 0.230	0.393+0.053*1 =0.446)
2	(0.177+0.053*2 = 0.283	0.393+0.053*2 =0.499)

Table 10A.15 Achieving Motivation and Age of Student (Agegp)

	25 or less	Over 25
-2	0.071	0.277
-1	0.124	0.330
0	0.177	0.383
1	0.230	0.436
2	0.283	0.489

Occasion	25 or less	Over 25	
-2	(0.177+0.053*-2 =0.071	0.383+0.053*-2 =0.277)	
-1	(0.177+0.053*-1 =0.124	0.383+0.053*-1 =0.330)	
0	(0.177+0.053*0 =0.177	0.383+0.053*0 =0.383)	
1	(0.177+0.053*1 =0.230	0.383+0.053*1 =0.436)	
2	(0.177+0.053*2 =0.283	0.383+0.053*2 =0.489)	

 
 Table 10A.16
 Achieving Motivation and Grandparents' Religious Beliefs (Granrel)

	Same beliefs as grandparents	Different beliefs to grandparents
-2	0.071	-0.146
-1	0.124	-0.093
0	0.177	-0.040
1	0.230	0.013
2	0.283	0.066

Occasion	Same Beliefs as Grandpa	rents Different Beliefs to Grandparents	
-2	(0.177+0.053*-2=0.071	-0.040+0.053*-2 = -0.146)	
-1	(0.177+0.053*-1 =0.124	-0.040+0.053*-1 =-0.093)	
0	(0.177+0.053*0 = 0.177	-0.040+0.053*0 =-0.040)	
1	(0.177+0.053*1 =0.230	-0.040+0.053*1 = 0.013)	
2	(0.177+0.053*2 = 0.283	-0.040+0.053*2 = 0.066)	

	Not UniSA	UniSA
-2	0.071	-0.118
-1	0.124	-0.065
0	0.177	-0.012
1	0.230	0.041
2	0.283	0.094

Table 10A.17 Achieving Motivation and Attending Uni SA (UniSA)

Occasion	Not UniSA	UniSA	
-2	(0.177+0.053*-2 =0.071	-0.012+0.053*-2 =-0.118)	
-1	(0.177+0.053*-1 =0.124	-0.012+0.053*-1 =-0.065)	
0	(0.177+0.053*0 =0.177	-0.012+0.053*0 =-0.012)	
1	(0.177+0.053*1 =0.230	-0.012+0.053*1 = 0.041)	
2	(0.177+0.053*2 =0.283	-0.012+0.053*2 = 0.094)	

Table 10A.18 Achieving Motivation and Country of Birth (Country)

	Developed	< Developed	
-2	0.071	0.237	
-1	0.124	0.290	
0	0.177	0.343	
1	0.230	0.396	
2	0.283	0.449	

Occasion	Developed	Less Developed	
-2	(0.177+0.053*0=0.071	0.343+0.053*0=0.237)	
-1	(0.177+0.053*0=0.124	0.343+0.053*0=0.290)	
0	(0.177+0.053*0=0.177	0.343+0.053*0=0.343)	
1	(0.177+0.053*0=0.230	0.343+0.053*0=0.396)	
2	(0.177+0.053*0=0.283	0.343+0.053*0=0.449)	

 Table 10A.19 Achieving Motivation, Occasion and Language Spoken at Home (Speak)

	Home Lan	guageEnglish
-2	0.071	0.279
-1	0.124	0.228
0	0.177	0.177
1	0.230	0.126
2	0.283	0.075

Occasi	on	Home Language	English	
-2	0.177 +	-0.104*0*-2+0.053*-2=0.071	-0.104*1*-2 + 0.053*-2=0.279	
-1	0.177 +	-0.104*0*-1 + 0.053*-1=0.124	-0.104*1*-1 + 0.053*-1=0.228	
0	0.177 +	-0.104*0*0+0.053*0 = 0.177	-0.104*1*0 + 0.053*0 = 0.177	
1	0.177 +	-0.104*0*1 + 0.053*1 = 0.230	-0.104*1*1 + 0.053*1 = 0.126	
2	0.177 +	-0.104*0*2+0.053*2 =0.283	-0.104*1*2 + 0.053*2 = 0.075	

#### Achieving Strategy scale

Table 10A.20 Achieving Strategy and Age of Students (Agegp)

	25 or less	Over 25
-2	-0.045	0.177
-1	0.082	0.304
0	0.209	0.431
1	0.336	0.558
2	0.463	0.685

Occasion	25 or less	Over 25	
-2	(0.209+0.127*-2=-0.045	0.431+0.127*-2=0.177)	
-1	(0.209+0.127*-1= 0.082	0.431+0.127*-1=0.304)	
0	(0.209+0.127*0=0.209)	0.431+0.127*0=0.431)	
1	(0.209+0.127*1 = 0.336	0.431+0.127*1 =0.558)	
2	(0.209+0.127*2=0.463)	0.431+0.127*2=0.685)	

Table 10A.21 Achieving Strategy and the Most Influential Person (Mominflu)

	Not Mother	Mother
-2	-0.045	0.129
-1	0.082	0.256
0	0.209	0.383
1	0.336	0.510
2	0.463	0.637

Occasion	Not Mother	Mother	
-2	(0.209+0.127*-2=-0.045	0.383+0.127*-2=0.129)	
-1	(0.209+0.127*-1=0.082)	0.383+0.127*-1=0.256)	
0	(0.209+0.127*0 = 0.209)	0.383+0.127*0 =0.383)	
1	(0.209+0.127*1 = 0.336)	0.383+0.127*1 =0.510)	
2	(0.209+0.127*2 = 0.463)	0.383+0.127*2 =0.637)	

	<10 hours	10+ Hours
-2	-0.045	0.489
-1	0.082	0.349
0	0.209	0.209
1	0.336	0.069
2	0.463	-0.071

Table 10A.22 Achieving Strategy, Occasion and Hours of Study (Hours)

Occas	sion	< 10 hours	10 + hours
-2	0.209 +	-0.267*0*-2+0.127*-2=-0.045	-0.267*1*-2+0.127*-2=0.489
-1	0.209 +	-0.267*0*-1+0.127*-1=0.082	-0.267*1*-1+0.127*-1=0.349
0	0.209 +	-0.267*0*0+0.127*0 = 0.209	-0.267*1*0 + 0.127*0 = 0.209
1	0.209 +	-0.267*0*1+0.127*1 = 0.336	-0.267*1*1 + 0.127*1 = 0.069
2	0.209 +	-0.267*0*2 + 0.127*2 = 0.463	-0.267*1*1 + 0.127*2 = -0.071

Table 10A.23 Achieving Strategy, Occasion and Countries Visited (Couvis)

	Asia only	<b>Beyond Asia</b>
-2	-0.045	-0.271
-1	0.082	-0.031
0	0.209	0.209
1	0.336	0.449
2	0.463	0.689

-2 $0.209+$ $0.113*0*-2+0.127*-2=-0$ -1 $0.209+$ $0.113*0*-1+0.127*-1=0$ 0 $0.209+$ $0.113*0*0+0.127*0=0$ 1 $0.209+$ $0.113*0*1+0.127*1=0$	045 0.113*1*-2+0.127*-2=-0.271
-1 $0.209+$ $0.113*0*-1+0.127*-1=0.$ $0$ $0.209+$ $0.113*0*0+0.127*0=0.$ $1$ $0.209+$ $0.113*0*1+0.127*1=0.$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	082 0.113*1*-1+0.127*-1=-0.031
1 $0.209+$ $0.113*0*1+0.127*1=0$	0.113*1*0+0.127*0 = 0.209
	0.113*1*1+0.127*1 = 0.449
2    0.209+   0.113*0*2+0.127*2 = 0.	

## Appendix to Chapter 11

#### Table 11A.1 Tentative Interview Questions

#### Major question

- 1. Imagine when you return to your home country that you are asked to present a seminar for students about to come to Australia to live and study at university. What would you talk about?
  - (Additional questions and prompts used to elicit responses to the major question).
  - a. What do you like about living and studying in Australia?
  - b. Is there anything you did not like about living in Australia?
  - c. Is life in Australia different from the life of a student in your home country? If so, how is it different?
  - d. What coping strategies do you use for living and studying in Australia?
  - e. What would you want other students to know about exams, lectures, practical classes or essay writing?
  - f. Is the availability of IT (information technology) similar to what you have at home e.g. photocopying, computer and internet access?
  - g. Have you found a difference in teaching styles between Australia and your home country?
- 2. a. Were you able to cope with English when you first arrived in Australia? If not, what did you do to try and overcome this problem and what particular strategies did you use?
  - b. How do you prefer to spend your free time?
  - c. In Australia, do you think you have more or less free time than you do in your home country?
  - d. Do you ever feel lonely or isolated in Australia?
  - e. What do you think is the cause of your loneliness?
  - f. What can you do to overcome your loneliness?
  - g. Are there places you wanted to go or things you wanted to do that you did not have time for?

- 3. a. Is the life of a student in Australia different to the life of a student in your home country? How is it different?
  - b. What have you found most difficult or hardest about living and studying in Australia?
  - c. Are there people or situations with which you feel more comfortable? Are they from your own country or from Australia or from yet another country?
  - d. Do you find you have more freedom to think about things and have more choices about what you can study in Australia?
  - e. How do like being able to drink alcohol on campus? Can you do this in your home country at university? Do you enjoy 'the pub culture'?
  - f. Do you ever feel marginalised or isolated or both? Why do you think you feel this way?
- 4. a. Do you think you changed your value structure or your approach to learning since coming to Australia?
  - b. Are there any specific things or situations you have found difficult?
  - c. What are the special memories you think will stay with you when you return to your home country?



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