

Examining the Influence of Culture on Critical Thinking in Higher Education

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## **ABSTRACT**

In the midst of an increasingly changing world, the ability to think critically has become a crucial attribute expected of university graduates. However, the endorsement of critical thinking in higher education has been challenged by the growing cultural diversity in university classrooms. Concerns about Asian students' lack of critical thinking and the appropriateness of critical thinking instruction in international education have been raised by teaching professionals. The present dissertation sought to understand the influence of culture on the teaching and learning of critical thinking in higher education.

Chapter 2 presented a study examining the instructional contexts of Hong Kong and New Zealand. It was found that similar assessment methods were employed in the university courses in both cultures, but university courses in Hong Kong placed more emphasis on knowledge development whereas those in New Zealand explicitly described critical thinking in the course objectives. Chinese international and New Zealand European postgraduate students were individually interviewed to investigate the exact influence of cultural-educational contexts in Asia and New Zealand on university students' conception and practice of critical thinking (Chapter 3). Both samples of students held similar conceptions of critical thinking, but reported differences in their socialization experiences regarding the practice of critical thinking in their respective cultures. Specifically, stronger inhibition on students' practice of critical thinking was noted in Asia than in New Zealand.

In Chapter 4, two studies that investigated the differences in critical thinking skills between Asian and New Zealand European students are presented. In both studies, New Zealand European students were found to perform better than their

Asian counterparts on an objective measure of critical thinking skills. The difference was explained by students' English language ability but not cultural factors such as cultural differences in cognitive styles or behavioral adoption of New Zealand culture. It was suggested that observed cross-cultural difference in critical thinking skills is related more to language ability rather than cultural variables. A significantly positive relationship between critical thinking skills and academic performance was found, and the relationship was not significantly different between Asian and New Zealand European student samples (Chapter 5). The relationship was also not different as a function of students' adoption of New Zealand culture, indicating that pedagogy with an emphasis on critical thinking is similarly applicable to both Asian and New Zealand European students.

Overall, the present findings indicated that culture has an important influence on students' practice of critical thinking. Although there is cross-cultural difference in critical thinking skills between Asian and Western student samples, the difference appears to be related more to language ability rather than cultural factors. The present thesis provided empirical evidence to show that culture influences the educational practice of critical thinking, but the influence of culture does not necessarily impede the application of critical thinking instruction in international classrooms. With appropriate adaptation, critical thinking instruction can be beneficial to the intellectual development of students regardless of their cultural backgrounds.

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## CHAPTER 1

### **Critical Thinking and Culture in the Context of Higher Education**

The acquisition of information in itself does not bring about such a [effective learning] change, but the way we *structure* that information and think with it does. Thus, education is about *conceptual change*, not just the acquisition of information.

Biggs and Tang (2007), p.21

Education is an indispensable part of human culture. It is vital for the development and continuance of civilization. A major function of education is to transmit knowledge, beliefs, values and meanings through the processes of teaching and learning, so that culture can be sustained through generations (Salili & Hoosain, 2007). At the same time, culture also influences how knowledge, teaching and learning are construed as well as how teaching and learning are practiced (Merriam, 2007). This may be best illustrated by the challenges facing educational policies, theories, and practices brought by social changes related to increasing global communications and international information flows in the recent decade (Crossley, 2000; Green, 1999). A better understanding of the interplay between education and culture is paramount to the development of appropriate educational strategies to meet the needs of an increasingly changing world. This thesis examines the influence of culture on education in relation to the teaching and learning of critical thinking in the context of higher education.

Changes in the global environment have brought about a different focus on education, especially higher education. Learning outcomes expected of university graduates are now more than mere equipment of knowledge and skills to contribute to the future workforce. University graduates are expected to develop the qualities for being responsible citizens in a global society (Biggs & Tang, 2007; ten Dam & Volman, 2004). The broader scope of expectations of university

graduates has been detailed by a framework employed in a research-based revision of university policy (Barrie, 2004). Under this framework, three core attributes have been identified as the major outcomes of university education: scholarship, global citizenship, and lifelong learning. University graduates are expected to have a scholarly attitude towards knowledge (scholarship), be willing to contribute to the society in a meaningful way (global citizenship), and be committed to and capable of continuous learning (lifelong learning). According to Barrie (2004), these core attributes are supported by the development of five clusters of skills and abilities: research and inquiry, information literacy, personal and intellectual autonomy, ethical, social and professional understanding, and communication. The emphases on global citizenship and lifelong learning in this framework suggest that university education is expected to serve more than knowledge transmission (Biggs & Tang, 2007). It is also evident that the skills and abilities required of university graduates are more than just 'being knowledgeable: the ability to think well and learn independently has also become vitally important (Costa, 2006).

Pithers and Soden (2000) pointed out that "national government policy as well as employers are demanding that education, no matter in what discipline or at which level, ought to enable graduates to think 'smarter' than was the case in the past" (p. 237). The demand for better intellectual abilities of the future workforce is a logical consequence of the fact that information is now more readily available to individuals by means of electronic communication. The ability for individuals to travel from one place to another to acquire new culture-specific knowledge and experiences is also occurring like never before. When gaining access to factual knowledge and information is becoming easy, the focus

of education should be moved from the level of knowledge acquisition to another level. Appropriate ways of handling knowledge and information, that is, ‘good thinking’ or ‘smart thinking’ as suggested by Pithers and Soden (2000), becomes more important than mere acquisition of information.

Ideas related to cultivation of general intellectual or cognitive capacity and skill among university students often come under the term *critical thinking*, which has frequently been used by higher educational institutions to describe their educational goals in terms of students’ cognitive development (Pascarella & Terenzini, 2005; Phillips & Bond, 2004). For example:

*“It Makes You Think”* illustrates how Victoria promotes critical discussion of topical issues of national and global importance... For example, one of the ads poses the question, ‘If New Zealand profits, does it really matter where it’s made?’ This demonstrates to prospective students how Victoria University educates students to think critically and intelligently, rather than telling them what to think. (Excerpt of *Victoria campaign promotes critical thought*, Victoria University of Wellington, 11 September 2006)

Government documents also included critical thinking as an educational goal at the policy level. For instance, the U.S. National Education Goals Panel (1991) stated that “the proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially” (p.5). The popularity of the concept in higher education is also shown by the large number of studies on critical thinking targeting university or college student samples (e.g., Bauer & Liang, 2003; Stupnisky, Renaud, Daniel, Hayes, & Perry, 2008; Terenzini, Springer, Pascarella, & Nora, 1995; Tsui, 2006).

Cultivation of critical thinking has been considered as an educational ideal (Siegel, 1988) and even the primary reason for higher education (Halpern, 1999).

The increasing emphasis on critical thinking in higher education is applicable to any culture that is currently influenced by changes in the global environment, but how culture may influence an increasing emphasis on critical thinking is not certain. Just as culture affects how people construe and practice teaching and learning (Mirriam, 2007), culture can also have important influence on how critical thinking is perceived and exercised. Is critical thinking similarly embraced as an educational goal across different cultures? How do people of different cultural backgrounds conceive of and show their critical thinking? How can critical thinking be effectively taught to students of different cultural backgrounds? The present thesis seeks to address these questions to understand the influence of culture on the growing importance on critical thinking in higher education.

### *1.1. Critical thinking in higher education*

Critical thinking has been commonly used to describe a desirable intellectual or cognitive outcome of university graduates, but the exact meaning of the term in this context varies. What is critical thinking? What constitutes critical thinking? A precise understanding of the concept and its nature provides the basis for meaningful discussion about how it may be influenced by culture.

#### *1.1.1. The nature of critical thinking – what it is and what it is not*

To understand the nature of critical thinking, it is best to start by relating the concept to other popular concepts of human intellectual competence, which include intelligence (e.g., Halpern, 2007) and creative thinking (e.g., Hartman & Sternberg, 1993). The debate as to whether critical thinking is a generic or

subject-specific skill reveals its relationship to content knowledge specific to a discipline or field of study (e.g., Ennis, 1990; McPeck, 1990a), and thereby providing an anchor for our understanding of the nature of critical thinking.

*(1) Critical thinking versus intelligence*

Critical thinking is in many ways similar to intelligence (Halpern, 2007; Nickerson, Perkins, & Smith, 1985). Both concepts are related to human cognition and are used to describe effective thinking or a high level of intellectual competence. Although the concepts are similar and may even overlap, they should not be viewed as identical. There are three common perspectives of human intellectual competence that can be applied to understand the difference between critical thinking and intelligence.

Perkins (1987) suggested that there are three commonly adopted views of human intellectual competence. The first one is called the *power* perspective of intellectual competence, which is considered as related more to the concept of intelligence. According to this perspective, a person cannot enhance performance in tasks that measure intellectual competence by extensive practices, because performance in those tasks is based on the person's basal intelligence – the raw neurophysiological power of the brain – which for the most part cannot be altered. This is also a position taken by researchers who study genetic influences on intelligence (Jensen, 1998; Rushton, 1995).

The second perspective is labeled the *tactical* approach of intellectual competence, which suggests that good thinking is dependent on the strategies used for a given cognitive task. Teaching of tactics can help to improve one's performance in a number of cognitive tasks by using the appropriate strategies. Cognitive strategies are considered to be related to the concept of critical thinking.



The last perspective of intellectual competence emphasizes context-specific *content knowledge*. From this perspective, knowledge consists of both facts and know-how, which can be accumulated to develop a person's domain-specific expertise and intellectual competence (Perkins, 1987). It is considered that the use of critical thinking requires a certain level of content knowledge. This idea will be further elaborated in the discussion about subject-specific versus generic critical thinking below.

The power and tactical perspectives on human intellectual competence help to differentiate between intelligence and critical thinking in relation to the usage of the terms. In a similar discussion about the relationship between intelligence and thinking ability, intelligence has been suggested to relate more to the raw mental power that a person has, whereas thinking ability refers to a collection of skills involved in the use of that mental power (Nickerson et al, 1985). This idea is further supported by Halpern's (2007) differentiation between critical thinking and intelligence. According to Halpern, the concept of critical thinking differs from intelligence in two ways. First, critical thinking is a less controversial concept than intelligence, where the controversy of intelligence is in part related to the putative genetic influence of an individual's mental power as assessed by standardized intelligence tests (e.g., Jensen, 1998; Rushton, 1995). Second, critical thinking differs from intelligence in that it is composed of a set of skills that can be learned and improved through appropriate training and instruction (see also Nickerson et al., 1985).

In other words, although both concepts of intelligence and critical thinking have been used to represent the idea of good thinking, the former is more frequently used to describe "raw mental power" whereas the latter is more

commonly related to teachable skills in using the mental power. However, it should be cautioned that although the two concepts are distinct, they are interrelated in such a way that critical thinking can be understood as the skilled use of one's intelligence (Nickerson et al., 1985; Halpern, 2007).

*(2) Critical thinking versus creative thinking*

Similar to critical thinking, creative thinking has become increasingly popular as an expected attribute of university graduates (Biggs & Tangs, 2007). Both concepts have been considered as more advanced forms of thinking (ten Dam & Volman, 2004). Creativity is commonly defined in terms of the generation of products, ideas, or outcomes that can be judged as novel and appropriate for the task at hand (Amabile, 1983; see also Sternberg, 2001). With a focus on outcomes of the thought processes, Hartman and Sternberg (1993) distinguished between critical and creative thinking according to their respective functions. According to Hartman and Sternberg, the main function of critical thinking is to enable an individual to process information and make a decision, whereas the function of creative thinking is to allow an individual to generate, select, combine, and modify ideas or information so as to shape a new reality. Because of the different focuses on outcomes, critical thinking and creative thinking may be treated as two independent forms of thinking.

Yet, there has been another perspective that proposes that the two kinds of thinking are inseparable from each other because of the nature of thought processes (e.g., Paul, 1987, 1993b). Paul (1993b) argued that critical thinking and creative thinking are similar to each other because they are both a form of purposeful thinking and are related to one's ability to figure things out. Critical thinking requires people to take different perspectives and consider information

or data from different sources in order to make decisions or solve problems. The act of considering a wide range of information and perspectives requires the ability to *imagine* oneself in alternative roles, so that reasons or counterarguments can be constructed according to each respective role, which is then used as the basis for information processing through critical thinking (Paul, 1987). Simply put, critical thinking requires the use of creative thinking.

A similar position was endorsed by Ennis (1987) and Halpern (1998, 2007). Ennis (1987) argued that many of the cognitive skills involved in critical thinking, such as formulating hypotheses, devising alternative ways of viewing a problem and planning for action require creative thinking. Halpern (1998) also suggested that creative thinking is required in thinking critically for decision-making and problem-solving, because generation and selection of alternatives requires a certain level of creativity. She has later included creative thinking in her proposed taxonomy of critical thinking skills (Halpern, 2007).

As both critical thinking and creative thinking are needed in problem-solving (see Amabile, 1983 for an introduction of the relationship between creativity and problem-solving), the two forms of thinking might actually share something in common in terms of their potential application. Recent empirical research has demonstrated that both creative thinking and critical thinking are necessary for tasks related to the evaluation of arguments (Glassner & Schwarz, 2007). Therefore, in relation to the thought processes involved in problem-solving and argument evaluation, critical thinking and creative thinking could be considered inseparable.

Perkins' (1990) formulation can be used to synthesize the literature on the relationship between critical thinking and creative thinking. He argued that

creative thinking and critical thinking might be different in terms of their goals: the goal of critical thinking is to evaluate and assess ideas, whereas the goal of creative thinking is to generate original ideas. However, good creative thinking depends on multiple evaluations of options (i.e., a critical thinking task), whereas good critical thinking relies on the imagination of different perspectives (i.e., a creative thinking task). Therefore, the two kinds of thinking are in fact interrelated and interdependent on one another, and it would be difficult (or even impossible) to make a clear distinction between them.

### *(3) General versus subject-specific critical thinking*

Although critical thinking has usually been conceived of as a set of *general* intellectual or cognitive competencies and skills required of university graduates (e.g., Pascarella & Terenzini, 2005), there has been a debate about whether critical thinking should be conceptualized as a set of general cognitive skills that applies across fields or subjects (Ennis, 1989, 1990) or as a list of skills that vary as a function of the fields or subjects under consideration (McPeck, 1990a, b).

Consistent with the common understanding of the term *critical thinking*, the mainstream literature of critical thinking has formulated the concept in terms of a set of skills which is general, applicable, and transferable across fields or subjects (e.g., Ennis, 1987; Halpern, 1998, 1999). However, McPeck (1981, 1990a) maintained that thinking requires sufficient knowledge or information specific to a field or subject, so it is impossible to have a set of *general* thinking skills that can be transferred across multiple problem domains. Ennis (1989, 1990), in response to McPeck's position, suggested that different degrees of subject specificity in relation to the epistemological requirement of critical thinking are likely, but this does not necessarily exclude the possibility that a *general* set of

critical thinking skills exists in the overlap across disciplines. Paul (1993a) also argued that conceptual schemes that differentiate a field, domain, or subject from the others are actually the result of human thinking, and there could be infinite ways to differentiate the conceptual schemes. Therefore, it would be more logical to suggest that thinking shapes knowledge but not the other way round, and the contention that there are no general critical thinking skills is conceptually problematic (Paul, 1993a).

Ten Dam and Volman (2004) pointed out that this debate has been depolarized in the recent literature, as most researchers of critical thinking tend to agree that while knowledge and cognitive skills are interdependent, certain general principles of critical thinking exist and transcend specific subjects and are applicable to a range of disciplines and problems (see also Moore, 2004). However, it should be acknowledged that critical thinking skills are partly acquired in conjunction with subject matter and that training within a particular discipline could indeed benefit more from the improvement of subject-specific than general critical thinking skills (Renaud & Murray, 2008).

The differentiation between ‘tactics’ and ‘content knowledge’ of intellectual competence (Perkins, 1987) may again be applied to understand the relationship between knowledge and critical thinking skills. Perkins (1987) suggested that many cognitive activities, such as playing chess, involve intellectual competences in a mix of both tactics and content knowledge, so it would be impossible to draw a sharp line between tactics and content in such occasions. However, if the contrast between tactics and content is treated as a continuum of knowledge, then theoretically it would be possible to find pure general tactics, such as making a plan at one extreme, and pure context-specific

content knowledge, such as knowing the ground rules for playing chess at the other (Perkins, 1987). In between these two extremes there could be domain-specific but still rather general tactics, such as trying to control the center in chess.

Based on this analysis, it seems reasonable to conclude this literature review by suggesting that both subject-specific and general critical thinking skills do exist, where the former serves a narrower range of issues and the latter is less sensitive to subject-specific problems. In addition, it is possible to switch from specific to general critical thinking skills or vice versa by varying the amount of subject-specific content knowledge throughout the thinking process.

In sum, critical thinking can be considered as a form of thinking that is not identical to what we usually describe as intelligence or creative thinking. However, critical thinking is related to intelligence and creative thinking in that these terms are all used to signify an individual's intellectual competence and good thinking. In relation to intelligence, critical thinking can be conceived as the strategic use of one's neurophysiological brain power that is more related to intelligence. Critical thinking is similar to creative thinking in that they are both needed for problem-solving or decision-making, even though the goals or products of these forms of thinking are different. The execution of one form of thinking actually requires the use of the other (Paul, 1987; Perkins, 1990). Lastly, critical thinking skills can be general or subject-specific in nature: it depends on the epistemological requirement of a task.

### *1.1.2. The content of critical thinking – its formal definition(s)*

Theorists have formulated a number of definitions of critical thinking in order to facilitate research and assessment. The critical thinking movement that began in North America in the late 70's and early 80's generated much

enthusiasm in theorizing and understanding the concept. An introduction of the movement provides information about the historical background of the many definitions of critical thinking that are currently available in the literature. Although there has not yet been a unanimously agreed-on single definition of critical thinking, there are considerable overlaps between different conceptualizations that enables meaningful theorization and research (Halpern, 1993; Tsui, 2006).

*(1) The critical thinking movement in North America*

Paul (1985; revised in Paul, 1993a) offered a comprehensive historical sketch of the critical thinking movement that emerged in the 1980's in California. He argued that dating back to the 17<sup>th</sup> century the North American schooling system had been marked by an anti-intellectualism which discouraged students from engaging in analytical thinking and critical questioning. Until 1900, the majority of people did not even attend school for more than two years in their lifetime; therefore it is not surprising that the development of critical thinking in education had not drawn much attention. Although the situation of higher education was slightly better in the 17<sup>th</sup> and 18<sup>th</sup> centuries, it was only limited to people in the upper class society and was marked by an emphasis on practices such as memorization and repetition rather than an education emphasizing critical thinking.

Then between the 1930's and the 1980's, the education system in the U.S. underwent a series of what have been called "pseudo-reforms" (Paul, 1993a, p. 43), which were still neglectful of the transformation of thinking and introduction of intellectual standards to the classrooms. However, in the late 70's and early 80's, there were rapid changes in the global socioeconomic and political

environment. Since then, educational and political leaders in the United States began to argue for an education that generates large masses of people to be “capable of thinking critically, creatively, and imaginatively” (Kennedy, 1987; cited in Paul, 1993a, p.44) so that people are equipped with the skills necessary for dealing with issues resulting from the change in the global environment.

Since then, the development of critical thinking among students has gained momentum across all levels of education in the United States (Facione, 1990a; Paul, 1993a). According to Paul, the influence of the critical thinking movement has stretched from North America to Europe and beyond. The increasing enthusiasm for critical thinking led to a search for a more refined understanding, including definition and measurement, of the concept. One of the most representative examples of such endeavors was the “Delphi Report” of critical thinking (Facione, 1990a). With an interest in the critical thinking movement and its implications for the philosophy of education, the American Philosophical Association invited Facione to conduct a systematic investigation of the state of affairs of critical thinking and its assessment. Between early 1988 and late 1989, Facione formed an interactive panel of critical thinking experts to conceptualize critical thinking and to make recommendations pertaining to critical thinking instruction and assessment. The results of this investigation formed the basis of the “Delphi Report”, which has become a cornerstone of critical thinking research.

### *(2) The two-dimensional conceptualization of critical thinking*

The “Delphi Report” is important in pinpointing a conceptualization of critical thinking and recommended guidance for critical thinking instruction and assessment based on the consensus of 46 critical thinking experts across different disciplines such as philosophy, education, psychology, and science (Facione,



1990a). In terms of the conceptualization of critical thinking, the panel of experts agreed that in addition to general cognitive or intellectual skills and competencies, critical thinking should also include a dispositional aspect, reflecting the motivation to use the necessary cognitive skills in judging what to believe or do (Facione, 1990a). The two-dimensional conceptualization of critical thinking has also been adopted in definitions by different critical thinking theorists such as Ennis (1987, 1993), Halpern (1996, 1998), Paul (1993b), McPeck (1990a), and Siegel (1988).

Different terminologies and framing have been used in definitions of critical thinking due to the different disciplinary insights gained by theorists in their respective area of expertise. For instance, both Ennis (Education) and Paul (Philosophy) were members of the Delphi panel, but their respective conceptualizations of critical thinking and descriptions of cognitive skills and dispositions are not exactly the same as those presented in the Delphi Report. Nevertheless, these definitions tend to be very similar to one another, and overlaps between definitions can be identified (Halpern, 1993; Tsui, 2006). Even with researchers who were not involved in the Delphi panel, their definitions of critical thinking appeared to be quite similar to those presented in the Delphi report (e.g., Halpern, 1996). For the purpose of comparison, Table 1.1 lists three definitions of critical thinking formulated by Ennis (1987), Facione (i.e., the Delphi Report, 1990a), and Paul (1993) along with those of a well-cited theorist who was not involved in the Delphi panel (Halpern, 1996).

Table 1.1: *Summary of four common definitions of critical thinking.*

General definitions	
Ennis (1987)	Critical thinking is reasonable reflective thinking that is focused on deciding what to believe or do
Facione (1990a)	We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. CT is essential as a tool of inquiry
Halpern (1996)	Critical thinking is the use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is used to describe thinking that is purposeful, reasoned, and goal directed – the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions when the thinker is using skills that are thoughtful and effective for the particular context and type of thinking task
Paul (1993b)	Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action

*Cognitive skills.* The four general definitions posited critical thinking as a tool for achieving certain purposes, especially the purposes of decision-making and problem-solving. For example, Paul (1993b) put critical thinking as “a guide to belief and action”, Ennis (1987) suggested that critical thinking is “focused on deciding what to believe or do”, and Halpern summarized that critical thinking is “the use of those cognitive skills or strategies that increase the probability of a desirable outcome”. These statements point out that critical thinking is a kind of purposeful thinking with the goal of using different cognitive skills to make decisions, judgments and solve problems.

As shown in Table 1.2, the descriptions of the cognitive skills involved in critical thinking vary from definition to definition. However, they are essentially about the cognitive strategies required in information processing and reasoning.

Giving and seeking reasons is an essential component of critical thinking (see also Siegel, 1988), and this is achieved through the use of cognitive skills such as argument analysis and evaluation. These cognitive skills have also been referred to as higher-order thinking skills to differentiate them from other cognitive skills such as quantitative skills or verbal skills, which are considered to be lower-order thinking skills (Halpern, 1998; Tsui, 2006).

According to Halpern (1998), higher-order thinking skills are characterized by three features: 1) high level of complexity; 2) requiring judgment, analysis, and synthesis; and 3) not being applied in a rote or mechanical manner. In contrast, lower-order thinking skills, such as computational arithmetic, involve “rote application of well-learned rules with little concern for context or other variables that would affect the outcome” (Halpern, 1998, p.451). The differentiation between higher-order and lower-order thinking skills is also reflected in Bloom’s taxonomy of educational objectives in the cognitive domain (Bloom, 1956; see also Anderson & Krathwohl, 2001), where the upper end of the taxonomy is viewed as encompassing critical thinking skills such as analyzing or evaluating, while the bottom end constitutes basic cognitive skills such as recalling and understanding (Tsui, 2006).

Table 1.2: *Summary of four taxonomies of cognitive skills.*

Skills	
Ennis (1987)	<ol style="list-style-type: none"> <li>1. Focusing on a question</li> <li>2. Analyzing argument</li> <li>3. Asking and answering questions of clarification and/or challenge</li> <li>4. Judging the credibility of a source</li> <li>5. Observing and judging observation reports; criteria</li> <li>6. Deducing, and judging deductions</li> <li>7. Inducing and judging inductions</li> <li>8. Making value judgment</li> <li>9. Defining terms and judging definitions</li> <li>10. Identifying assumptions</li> <li>11. Deciding on an action</li> <li>12. Interacting with others</li> </ol>
Facione (1990a)	<ol style="list-style-type: none"> <li>1. Interpretation: categorization, decoding significance, and clarifying meaning</li> <li>2. Analysis: examining ideas, identifying arguments, and analyzing arguments</li> <li>3. Evaluation: assessing claims and assessing arguments</li> <li>4. Inference: querying evidence, conjecturing alternatives, and drawing conclusions</li> <li>5. Explanation: stating results, justifying procedures, and presenting arguments</li> <li>6. Self-regulation: self-examination and self-correction</li> </ol>
Halpern (1996)	<ol style="list-style-type: none"> <li>1. Verbal reasoning skills</li> <li>2. Argument analysis skills</li> <li>3. Skills in thinking as hypothesis testing</li> <li>4. Likelihood and uncertainty</li> <li>5. Decision-making and problem-solving skills</li> </ol>
Paul (1993b)	<ol style="list-style-type: none"> <li>1. Conceptualizing</li> <li>2. Applying</li> <li>3. Analyzing</li> <li>4. Synthesizing</li> <li>5. Evaluating</li> </ol>

Pascarella and Terenzini (2005) offered a list of cognitive skills drawn from different definitions of critical thinking that can be used to summarize the different skills involved in the cognitive skills dimension:

identify central issues and assumptions in an argument, recognize important relationships, make correct references from the data, deduce conclusions from information or data provided, interpret whether conclusions are

warranted based on given data, evaluate evidence or authority, make self-corrections, and solve problems (p. 156).

Assessment of the above critical thinking skills has mainly been achieved by means of standardized instruments such as the Watson-Glaser Critical Thinking Appraisal (WGCTA; Watson & Glaser, 1980, 1994), the California Critical Thinking Skills Test (CCTST; Facione, 1990b), and the Cornell Critical Thinking Test (CCTT; Ennis, Millman & Tornko, 1985), along with other more recent instruments such as the Halpern Critical Thinking Assessment Using Everyday Situations (HCTAES; Halpern, 2006). Adoption of test items from various instruments (e.g., Cheung, Rudowicz, Kwan, & Yue, 2002), or measures designed to tackle specific research questions (e.g., effect of cognitive biases in critical thinking: Macpherson & Stanovich, 2007) have also been used to assess an individual's abilities in using different cognitive skills in critical thinking.

*Critical thinking dispositions.* Critical thinking dispositions have been described differently by the four theorists (see Table 1.3)<sup>1</sup>. It should be noted that some of the “dispositions” listed by these theorists are actually related more to a person's habits in *behaving* in certain ways. For example, items such as “habitual use of plans and the suppression of impulsive activity” (Halpern, 1996), “seek reasons” and “use and mention credible sources” (Ennis, 1987) are apparently related to behaviors. This interrelatedness between behaviors and dispositions could lead to difficulties in clearly identifying the exact nature of critical thinking dispositions.

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<sup>1</sup> In personality psychology, *disposition* refers to “the raw material for the development of personality” (Allport, 1955), which suggests a certain genetic component in personality. However, the term has been commonly employed by the theorists of critical thinking to refer to a personal tendency in engaging in critical thinking, which does not carry the connotation of inheritance.

Table 1.3: *Summary of four taxonomies of critical thinking dispositions.*

Dispositions	
Ennis (1987)	<ol style="list-style-type: none"> <li>1. Seek a clear statement of the thesis or question</li> <li>2. Seek reasons</li> <li>3. Try to be well informed</li> <li>4. Use and mention credible sources</li> <li>5. Take into account the total situation</li> <li>6. Try to remain relevant to the point</li> <li>7. Keep in mind the original and/ or basic concern</li> <li>8. Look for alternatives</li> <li>9. Be open-minded</li> <li>10. Take a position (or change a position) when the evidence and reasons are sufficient to do so</li> <li>11. Seek as much precision as the subject permits</li> <li>12. Deal in an orderly manner with the parts of a complex whole</li> <li>13. Use one's critical thinking abilities</li> <li>14. Be sensitive to the feelings, level of knowledge, and degree of sophistication of others</li> </ol>
Facione (1990)	<ol style="list-style-type: none"> <li>1. Inquisitiveness with regard to a wide range of issues</li> <li>2. Concern to become and remain generally well-informed</li> <li>3. Alertness to opportunities to use critical thinking</li> <li>4. Trust in the processes of reasoned inquiry</li> <li>5. Self-confidence in one's own ability to reason</li> <li>6. Open-mindedness regarding divergent world views</li> <li>7. Flexibility in considering alternatives and opinions</li> <li>8. Understanding of the opinions of other people</li> <li>9. Fair-mindedness in appraising reasoning</li> <li>10. Honesty in facing one's own biases, prejudices, stereotypes, egocentric or sociocentric tendencies</li> <li>11. Prudence in suspending, making or altering judgments</li> <li>12. Willingness to reconsider an revise views where honest reflection suggests that change is warranted</li> <li>13. Clarity in stating the question or concern</li> <li>14. Orderliness in working with complexity</li> <li>15. Diligence in seeking relevant information</li> <li>16. Reasonableness in selecting and applying criteria</li> <li>17. Care in focusing attention on the concern at hand</li> <li>18. Persistence though difficulties are encountered</li> <li>19. Precision to the degree permitted by the subject and the circumstance</li> </ol>
Halpern (1996)	<ol style="list-style-type: none"> <li>1. Willingness to engage in and persist at a complex task</li> <li>2. Habitual use of plans and the suppression of impulsive activity</li> <li>3. Flexibility or open-mindedness</li> <li>4. Willingness to abandon nonproductive strategies in an attempt to self-correct</li> <li>5. An awareness of the social realities that need to be overcome so that thoughts can become actions</li> </ol>
Paul (1993b)	<ol style="list-style-type: none"> <li>1. Being responsive to variable subject matter, issues, and purposes</li> <li>2. Intellectually committed to use critical thinking skills and abilities to guide behavior</li> </ol>

According to Facione, Facione, and Giancarlo (1997, 2000), critical thinking dispositions describe one's "habit of mind" and motivation to employ one's critical thinking abilities in any situation. Similarly, Halpern (1999) proposed that critical thinking dispositions are related to one's attitude and willingness to apply critical thinking when it is needed. It therefore seems reasonable to conceptualize critical thinking dispositions as an individual's tendency and motivation to use different critical thinking skills when needed.

Four major common dispositions can be identified across the four definitions of critical thinking, which are summarized as follows: 1) open-mindedness to different perspectives or information; 2) flexibility in considering different alternatives and taking positions according to evidence; 3) persistence in engaging in critical thinking despite difficulties; and 4) awareness and responsiveness to a variety of issues or opportunities that require the use of critical thinking. These are the major dispositions that have been either directly or indirectly included in some or all of the above four sets of definition.

In contrast to the measurement of critical thinking skills, the availability of standardized instruments for assessing critical thinking dispositions is currently limited. Based on the findings from the Delphi Report, Facione and Facione (1992) developed the California Critical Thinking Disposition Inventory (CCTDI) which was specifically designed to capture an individual's tendencies and motivations in using critical thinking (Facione et al., 1997, 2000). Other measures such as the Need for Cognition Scale (NFC; Cacioppo & Petty, 1982; in Taube, 1997) and the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1993; in Stupnisky et al., 2008) have also been

used as general measure to capture an individual's motivation for using critical thinking.

*(3) Summary of the definition of critical thinking*

Although there have been different attempts in defining critical thinking, considerable overlap across those different definitions can be observed (Halpern, 1993; Tsui, 2006). In fact, the aforementioned theorists have been critical of their definitions of critical thinking, so that changes and modifications of those definitions have been continuously noted in the literature (e.g., Ennis, 1991; Halpern, 2007). These changes and modifications have tended to converge over time, partly because of the mutual influences on the conceptualization between theorists (see Ennis, 1991). While there is still no unanimous definition of critical thinking, the overlaps between different conceptualizations point to an overall direction that can be used to guide meaningful discussion and research.

To summarize, critical thinking can be understood as the purposeful use of various cognitive strategies in an attempt to make a decision, judgment, or to solve a problem. It consists of a cognitive skills dimension and a dispositional dimension. The cognitive skills dimension is comprised of higher-order thinking skills essential for information processing and reasoning. The disposition of the person who performs critical thinking is also important. A critical thinker should be open-minded, flexible, and persistent whilst engaging in critical thinking and be aware and responsive to different situations where critical thinking is needed. This definition of critical thinking is employed in the present thesis to guide the investigation on how critical thinking is influenced by culture.



## *1.2. Critical thinking and international education*

In addition to the increasing emphasis on the intellectual abilities of university graduates, the rapid changes in the global environment also have important implications for education per se. As Crossley (2000) suggested, it has become more difficult to understand education in a context without reference to the external influences of different global forces. One of the most significant changes is the increasing internationalization in higher education (Green, 1999). This increasing cultural diversity of students has important implications to the endorsement of critical thinking as an educational ideal and the actual teaching and learning practices of critical thinking in higher education. These issues need to be addressed through careful investigation of the influence of culture on critical thinking in higher education. For example, questions such as how culture may be related to current instructional practices of critical thinking in university courses are important to be examined.

### *1.2.1. Current trend in international education*

There has been a growing prevalence of international education, and the trend has been dominated by a large number of students originating from Asia traveling to English-speaking countries for tertiary education. In 2007, approximately over 3.0 million tertiary students enrolled outside their country of citizenship (OECD, 2009). About 48.2% of the international tertiary students who are enrolled in the OECD countries or the partner economies originated from Asia, where students from China form the largest group of international students (16.3%), followed by India (6.2%), Korea (4.4%), and Japan (2.3%).

In terms of destination countries, English-speaking countries such as the United States, the United Kingdom, Canada, Australia, and New Zealand have

been popular destination countries for international students because the language of instruction is widely spoken and read (OECD, 2009). Among these countries, Australia and New Zealand show the highest proportion of Asian students in their international or foreign student populations (79.7% and 68.6%, respectively).

### *1.2.2. Emerging issues in international classrooms*

The increasing number of Asian students in Western anglophone university classrooms has posed challenges to educators because of differences between Asian students' original culture of learning and the Western educational culture. Crossley (2000) pointed out that many attempts in transferring Western educational theory and practice to other cultural contexts failed because of a lack of consideration of cultural differences. On the other hand, Volet (1999) also highlighted that some of the learning aspects of Asian students may not be appropriately transferred to Western educational contexts. The differences in teaching and learning between these cultures have led to many discussions and debates about the appropriate pedagogy for Asian students in international classrooms.

Volet (1999) acutely pointed out that the judgment of whether certain learning aspects of Asian students have appropriately transferred across cultures is highly subjective to the person who makes the judgment and dependent on the context of focus. In the context of international education, the judgment depends on one's perception about the congruence between students' learning-related cognitions, emotions, motivations, and behaviors and the expectations of the host cultural-educational context. If the students' characteristics are perceived to match perfectly with those of the host cultural-educational context, the transfer of learning process is suggested to be appropriate. Otherwise, the transfer is not

appropriate. It would then be essential to identify the reason behind the incongruence so that adaptation from the students or the host cultural-educational context would be made to facilitate teaching and learning in international education.

According to Volet (1999), different educational context has its own unique culture of learning. The culture of learning consists of “some explicit but also many tacit rules and expectations which provide subjective criteria for evaluating what are appropriate learning behaviors in that context”. Instructors and teachers who are acquainted with the rules and expectations prevalent in the West have developed a tacit set of standard about which teaching or learning practice is appropriate in the Western contexts. In fact, this tacit set of standards of judgments has led to many inaccurate interpretations and stereotypical accounts of Asian students’ learning. The inaccurate interpretations and stereotypical accounts have been critically challenged as employing a ‘deficit’ model to evaluate Asian students (Cheng, 2000; Clark & Gieve, 2006; Volet & Renshaw, 1996). It is also evident that the implicit standard of judgment has also led to misinterpretation about Asian students’ critical thinking ability, which needs to be addressed through investigation of the influence of culture on students’ actual critical thinking ability in higher education.

### *1.2.3. Critical thinking and Asian international students*

Asian international students are often perceived to show more difficulties in engaging in critical thinking in the context of international education. For example, a qualitative study in Australia indicated that academic staff experienced in teaching international students reported to be dissatisfied with the international students’ poor critical thinking and analytical skills (Robertson, Line,

Jones, & Thomas, 2000). This is consistent with Paton's (2005) observation that academics in Australia often express that Asian students do not naturally partake critical thinking. In the United States, Lee and Carrasquillo (2006) found that professors in a college perceived their Korean students as having difficulty in expressing critical thinking. These kinds of comments appear to suggest that Asian students showed deficiency in the ability to think critically (Kumaravadivelu, 2003).

The perceptions of Asian students lacking in critical thinking are not due to a lack of cognizance about cultural influence on critical thinking among academic staff in Western universities. Quite the contrary: there has been research showing that academic staff are aware of the possible influence of culture on university students' practice of critical thinking (e.g., Halx & Reybold, 2005). However, this awareness does not guarantee an accurate interpretation of cultural influences on critical thinking. It has been suggested that many of the comments made about Asian students' learning, including those related to the practice of critical thinking, reflect misinterpretations or even stereotypes of Asian culture held by teaching professionals in Western cultures (e.g., Cheng, 2000; Kumaravadivelu, 2003). To ensure that the concept of *culture* is correctly used as an explanation for any perceived unfamiliarity in intercultural classrooms, it is necessary to examine which cultural variable results in differences in the engagement in and expression of critical thinking between students of different cultural backgrounds.

### *1.3. Cultural considerations*

The influence of culture on education has mostly been investigated along two lines of research (Salili & Hoosain, 2007). The first concerns the examination of existing educational theories and concepts in different cultural contexts to

explore their relevance to different sociocultural environments. For example, certain well-established Western educational concepts such as intelligence and achievement motivation have been challenged for their applicability to non-Western cultures (e.g., Li, 2002; Yang & Sternberg, 1997). The second area of research focuses on the investigation of effective teaching and learning strategies for culturally diverse students. For instance, Deakins (2009) demonstrated that a research-based teaching approach that encourages students to ask questions and engage in discussion could help to develop students' higher order thinking skills and intercultural competence in a multicultural classroom.

Both types of research are important for understanding the appropriateness and applicability of existing education theories and practices outside their original cultures of development. They have also generated knowledge about the potential pitfalls and solutions related to the use of culture in explaining perceived incongruences between characteristics of the students and expectations and norms in the cultural-educational context (Volet, 1999). This knowledge is particularly relevant to understand the influence of culture on critical thinking in international education.

### *1.3.1. Definition of culture*

In education research, culture is usually defined as a system of shared meanings among a group of individuals, which includes shared knowledge, beliefs, values, and behavioral norms (Merriam, 2007; Salili & Hoosain, 2007; see also Rohner, 1984; Triandis & Brislin, 1984). Defining culture as such suggests that cultures are differentiable from one another according to the common views and understandings *shared* by members within each group. The concept could be applied to areas other than national culture, such as racial,

ethnic, language, or religious group (Frisby, 1998), although most cross-cultural research is based on comparison between nations (Smith & Bond, 1999).

One of the challenges involved in the study of culture and cultural differences is determining the relationship between observable behaviors and unobservable inner cognitive systems (Frisby, 1998). Shared meanings, norms, expectations or values are cognitive phenomena that cannot be known through one's senses, so observable behaviors are used as indicators of the unobservable "culture". While many human social behaviors are closely linked to culture, it is impossible either to determine the causal relationship or to draw a sharp line between the two (Jahoda, 1984). Despite the close relationship, observed differences in behavioral manifestations may not be a sufficient indicator of cultural variation (Rohner, 1984). Observed differences in behaviors across cultures may indicate differences in cultural meanings, but the same meaning may also manifest through different patterns of behaviors in different cultures. Therefore, both behavioral manifestations and their underlying meanings are essential for a complete understanding of cultural similarities and differences (Smith & Bond, 1999).

Another feature shared by the common definitions of culture is the transmission of shared meanings, which is an important topic in education. The dynamic nature of culture enables both transmission and modification of cultural meanings. Increasing connectedness and information flows between people of different cultural backgrounds modifies an individual's ways of understanding, processing information, making judgments and reasoning (Salili & Hoosain, 2007). Students and teachers of different cultural backgrounds might influence each other in their respective learning and teaching approaches in an international

education environment. For example, Volet and Renshaw (1995) observed that at the start of the first year of university study, South-East Asian international students held completely different conceptualizations of learning goals than their local counterparts in an Australian university. During the semester, the conceptualizations of both samples underwent changes and converged, and the conceptualizations of learning goals held by these two groups of students became virtually identical at the end of the semester. These results also indicated that the immediate intercultural learning environment can influence students' inner cognitive systems and outward behaviors, which might further complicate interpretations of the relationship between behavioral manifestations and culture.

### *1.3.2. East and West*

Cross-cultural research is needed to understand the influence of culture on education. However, cross-cultural research in education often involves a dichotomized view of culture. Hau and Ho (2008) noted that dichotomies such as East-West and individualistic-collectivistic orientation (Hofstede, 1983) are some of the commonly adopted dimensions for capturing cultural variations in the field of education. The dichotomy of Western versus non-Western has been the most popular approach, in which Western ideas are often treated as the reference point for comparison (Miriam, 2007). Among all possible Western versus non-Western dichotomies, the Asian-Western comparison has drawn much research attention (Li, 2003a) because of the current trend in international education as described above. The present thesis also focuses on the dichotomy of Asian versus Western for examining the cultural influence on critical thinking in higher education.

Similar to many concepts in psychology, a lot of educational concepts available in the literature were developed in the West, where “the West” usually

refers to countries or regions such as North America, Western Europe, Australia, and New Zealand (Merriam, 2007; Salili & Hoosain, 2007). This might also explain the use of Western culture as anchor for comparison because Western ideas denote the more familiar aspects of the research literature (Merriam, 2007). However, a dichotomizing approach may not be adequate to describe all possible cultural variations around the world (Hau & Ho, 2008). It may also risk downplaying the significance of non-Western ideas in education (Merriam, 2007).

Furthermore, with the use of Western ideas as standard, Asian students' ways of learning are often interpreted in terms of a "deficit model" (Clark & Gieve, 2006; Volet & Renshaw, 1996), which often leads to a stereotypical account of the teaching and learning practices in Asian cultures (Cheng, 2000; Kumaravadivelu, 2003). This can be demonstrated by "the paradox of the Asian learners" (Biggs, 1994, 1996a, b), which is a classic example of cross-cultural comparison between Asian and Western education.

### *1.3.3. The paradox of the Asian learners*

"The paradox of the Asian learners" (Biggs, 1994, 1996a, b) demonstrates how Asian students' learning may be misunderstood with the use of Western standards. The paradox suggests that Asian students have often been found to outperform their Western counterparts in academic achievements in different national and international research, although Asian educational practices have been evaluated as unfavorable to good learning outcomes according to Western standards (Biggs, 1994, 1996a, b; Kember, 1996; Watkins & Biggs, 2001). In Asian cultures such as China, Hong Kong, Taiwan, Singapore, Japan, and Korea, the learning environments are usually marked by large class size (usually over 40), authoritarian teaching, expository methods, and examination-driven learning,



which are all considered counterproductive to good learning outcomes by Western standards (Biggs, 1994, 1996a, b; Watkins & Biggs, 2001). In addition, Asian learners are usually perceived as silent, passive and compliant rote-learners who rely on memorization, which is also expected to lead to low quality learning outcomes (Biggs, 1994, 1996a, b; Cheng, 2000; Kember, 1996). The observed outstanding academic performance among Asian students is therefore viewed as paradoxical based on Western standards.

Different theories and concepts have been put forth to explain the paradox in which three interrelated areas warrant particular attention: 1) achievement motivation (e.g., Salili, 1996); 2) learning approaches (e.g., Biggs, 1994; Kember, 1996); and 3) classroom communication styles and behaviors (e.g., Biggs, 1994; Biggs & Watkins, 1996).

*(1) Achievement motivation*

Achievement motivation denotes a person's tendency to learn and achieve in the academic setting. Salili (1996) suggested that Asian students' achievement motivation is influenced by the cultural value of collectivism. Within collectivistic culture, there is a stronger emphasis on the needs, interests, and goals of the group than those of the individual. Under such a context, academic achievement is both associated with the personal success of the student and the pride of the family and membership group (Yang & Yu, 1988; cited in Yu, 1996). Because academic success of Asian students is considered part of the family accomplishment, the families tend to be more involved in the students' learning, which then facilitates the students' academic achievement.

Salili (1996) pointed out that child-rearing practices in Asian countries place a lot of emphasis on the values of hard work and academic achievement, so

children are often socialized from an early age to work hard and excel in education. Although ability and effort are considered important to academic success in both Asian and Western cultures, the two elements are perceived differently by students of the two cultural backgrounds (Holloway, 1988). For Western students, ability and effort are perceived to be complementary in determining academic achievement, whereas for Asian students, the two are positively related and ability can be promoted by exerting more effort (Hau & Salili, 1996).

In Asia, teaching and learning are by and large exam-driven so that many classroom activities are structured around the goal of succeeding in examinations (Biggs & Watkins, 2001). The focus on exams in educational practices further reinforces performance orientation and motivation to achieve in examinations among Asian students. Consistent with these observations, a meta-analysis of academic motivation revealed that in societies where individuals are socialized to conform to group norms and duties, to emphasize social relationships, and to work hard to promote the eminence of the group, its members tend to show high motivation to socially demonstrate successful performance (Dekker & Fischer, 2008). In terms of explaining “the paradox”, Asian students might be more motivated to put effort in studying to achieve better examination results despite the apparently unfavorable learning environments.

### *(2) Learning approaches*

Another aspect of the “paradox of the Asian learners” relates to the perceived low-level, rote-based learning strategies of Asian learners (Biggs, 1994, 1996a, b; Watkins & Biggs, 2001). Learning approaches can be broadly categorized into surface and deep approaches (Biggs, Kember, & Leung, 2001).

The surface learning approach is linked to the use of rote learning and memorization, and has been associated with poor learning outcomes; whereas the deep learning approach is related to the strategies of understanding meaning and has been associated with good learning outcomes (Watkins & Reghi, 1991). It has been commonly suggested by Western teaching professionals that Asian learners are oriented to the surface learning approach so that they tend to rote memorize facts, formulae, and rules rather than engaging in in-depth understanding of knowledge and information.

While the common stereotype holds that Asian students prefer the surface approach over the deep approach, empirical research has shown that Asian students are actually similar to their Western counterparts in terms of preferences for these different learning approaches (e.g., Kember & Gow, 1991). Furthermore, Kember (1996) proposed that Asian students may simultaneously employ both surface and deep learning approaches in an attempt to use memorization to achieve understanding. Without knowing the intention behind the outward signs of mechanical learning, a Western observer might misunderstand that Asian students adopt only the surface approach. A recent study showed that university students in Hong Kong scored higher on both deep and surface approaches of learning than their counterparts in Australia, suggesting that the simultaneous adoption of both approaches is likely among Asian students (Leung, Ginns, & Kember, 2008).

### *(3) Communication styles*

Perceived differences in students' learning approaches are reinforced by students' patterns of communication styles and behaviors (Biggs, 1994, 1996a, b; Biggs & Watkins, 1996). Asian students are often perceived as passive, compliant,

uncritical, rarely asking questions or volunteering answers, and unwilling to make public critiques (Biggs, 1994; 1996a, b; Cheng, 2000). One reason behind these perceptions is related to the cross-cultural differences in the preferred modes of classroom communication. In Western cultures, there is an increasing emphasis on the student-centered, discussion-based, interactive mode of classroom interaction in which active student participation is considered as the key to learning (Ho, Holmes, & Cooper, 2004). As a result, Asian students' communication styles and behaviors that do not match this ideal would be considered as impeding the learning process.

Ho et al. (2004) identified three commonly discussed areas of cross-cultural differences in communication that significantly influence social interactions within the classroom. These include: a) direct/indirect styles of communication; b) formal/ informal styles of communication; and c) use of nonverbal communication.

*Direct/indirect styles of communication.* Preference for a direct style of communication leads an individual to use language that is straight to the point and explicit in conveying ideas. In contrast, people who are more concerned about preservation of social face and interpersonal harmony tend to use less direct and more allusive language in communication (Ho et al., 2004; see also Smith & Bond, 1998). It has been argued that a direct style of communication is more commonly adopted in the Western cultures while an indirect style of communication is more prevalent in the Asian cultures (Ho et al., 2004). Because of the concerns of preserving social face (Ting-Toomey & Kurogi, 1998) and interpersonal harmony (Gabrenya & Hwang, 1996), Asian students are more likely to employ indirect strategies in classroom communication than their

Western counterparts (Holmes, 2008). In an international classroom setting where direct communication is preferred, Western teachers might perceive Asian students who employ indirect communication strategies as elusive, unmotivated to learn, or unintelligent (Ho et al., 2004).

*Formal/informal styles of communication.* Role expectations in the teacher-student relationship also have an important impact on how classroom interaction is carried out (Li, 2005). In traditional Asian cultures, the teacher's role is conceived of as a knowledge transmitter and an authority, and the student's role is a knowledge receiver and an audience, which then overlays a hierarchical structure on the teacher-student relationship (Li, 2005). In such a hierarchical teacher-student relationship, students are expected to be respectful and use formal language in communicating to their teachers (Ho et al., 2004; Zhang, 2005). In contrast, the teacher-student relationship in modern Western cultures tends to be less hierarchical so that communication between teacher and student is less formal (Holmes, 2004). For example, it is quite common for students in Western universities to address their teachers by the teachers' first names, but the same behavior is considered inappropriate for the teacher-student relationship in Asian cultures (Ho et al., 2004).

*Use of nonverbal communication.* Communication consists of both verbal and nonverbal components. Cross-cultural differences in nonverbal communication have often led to misinterpretation of students' behaviors in the classroom (Ho et al., 2004). Past research has shown that silence is perceived to be related to intelligence and thinking by Asian samples (Harklau, 1994; Kim, 2002), but talking is viewed as important to one's thinking by Western samples (Giles, Coupland, & Wiemann, 1992; Kim, 2002). Recent research has

additionally shown that Asian and Westerners are different in terms of eye gaze displays when thinking (McCarthy, Lee, Itakura, & Muir, 2008). It was found that in situations where participants were aware of being observed, Canadian participants looked up when they were thinking. But if they knew that they could not be seen, they looked down when they were thinking. In contrast, Japanese participants looked down when they were thinking regardless of whether they were aware of being observed or not (McCarthy et al., 2008). These differences in nonverbal behaviors could easily lead to inaccurate inferences about Asian students' cognitive engagement and learning in an intercultural classroom.

#### *1.3.4. Confucian and Socratic philosophies and implications for education*

Tweed and Lehman (2002) discussed Confucian and Socratic traditions as an explanatory framework for the Asian-Western differences noted in education literature. They traced the Asian and Western educational cultures back to two philosophical systems—Confucianism and ancient Greek philosophy—which were developed based on the teachings of Confucius and Socrates respectively. Their effects on education are suggested to continue through modern days (Hammond & Gao, 2002).

According to Tweed and Lehman (2002), Socrates was known for his tendencies in questioning his own and others' beliefs, as well as constantly evaluating his own and others' knowledge. He valued self-generated knowledge and especially encouraged the search for knowledge and reasoning. Within the Socratic-oriented framework, the ideal of education for both teachers and learners is to search for self-generated knowledge, which involves rational justification for one's beliefs. Overt questioning and argumentation were highly valued in the process of searching for and generating knowledge. To seek for true knowledge,

one must question and evaluate his/her own and others' beliefs and knowledge through public debate and argumentation.

On the other hand, with the focus of educating person to serve society, Confucius emphasized effortful learning with the goal of achieving self-perfection in morality and behavioral reform among individuals (see also Lee, 1996; Li, 2003b). While Socrates emphasized generating knowledge from within the self and modifying the self-generated knowledge through debating with others, Confucius believed that learning is achieved through collective means, especially learning from other individuals who demonstrate exemplars of virtue (that is, *ren* and *junzi*; Li, 2003b). Therefore, Confucius encouraged students to be respectful and to preserve social harmony with others in the learning process.

The framework offers plausible explanations for some of the observed Asian-Western differences in the recent education literature. For example, the epistemological emphasis on self-generated knowledge might be related to the importance of independence, personal freedom and objective thought in the West (Merriam, 2007), whereas the focus on effortful learning for achieving behavioral reform in Confucianism might partly explain the apparently stronger emphasis on effort over ability in Asian cultures (Hau & Salili, 1996).

Tweed and Lehman (2002) also related the framework to the observed cross-cultural differences in learning behaviors between Asian and Western students. According to Tweed and Lehman, questioning and debate were valued as a way to generate and refine knowledge within the Socratic system, but similar behaviors might be cautioned as disrespectful and disrupting social harmony so that overt questioning was not encouraged in the Confucian system. The interpretation sounds plausible, but has been challenged for ignoring the fact that

Confucius' teaching was mostly achieved by answering the questions raised by his students as documented in the *Analects* (Li, 2003b). Nevertheless, it should be acknowledged that both Tweed and Lehman (2002, 2003) and Li (2003b) suggested that the original Confucius teaching encouraged questioning from students. But in order to show respect to others, Asian students are often socialized to listen attentively and ask questions only *after* they have understood others. This approach of delayed questioning in the Confucian system is different from the approach of spontaneous questioning as in the Socratic system.

With reference to the Confucian and Socratic influences on education, Hammond and Gao (2002) pointed out that Confucian and Socratic educational practices were both student-centered, discussion-based, and interactive at the beginning. In both systems, learners were required to construct knowledge through dialogical and interactive discussion with the teachers. However, through the historical development of the East and the West, education has become reserved for a small group of privileged people in society and the educational practices and teacher-learner relationship has been embedded within a hierarchical structure. It was then that the educational practices became teacher-centered and emphasized top-down transmission of knowledge and memorization in both cultures. According to Hammond and Gao (2002), it was only recently that the West moved back to the more interactive mode of education, while the Asian education culture still remained largely teacher-centered and reliant on one-way teachers' transmission of knowledge. Interestingly, this proposed change in the West coincided with the development of the Critical Thinking Movement in North America, which is marked by an emphasis on the revival of the 'Socratic style' of education (Paul, 1993a).



Although Confucian and Socratic philosophies offer plausible explanations to some of the observed differences between Asian and Western educational values and practices, there is risk of incorrect interpretation of observed students' behaviors in terms of these philosophical teachings (Cheng, 2000). These challenges are also akin to the cultural issues related to critical thinking in international education.

#### *1.3.5. Pivotal issues of critical thinking in international education*

In the international education literature, many of the comments about Asian students lacking the abilities to think critically are based on the observed behaviors of students. Asian students seldom engage in classroom behaviors such as volunteering questions and answers in class, expressing opinions, critiquing the instructors or textbooks, challenging other's ideas, and participating actively in classroom discussion. Such behavioral pattern has often been interpreted negatively by teaching professionals in the West (see Biggs, 1994, 1996a, b). This list of classroom behaviors is also associated with the concept of critical thinking in Western cultures (Paul, 1993a; Tweed & Lehman, 2002). Other than these classroom-specific public displays, general self-expression, debate and argumentation, and direct styles of verbal and written communication are usually interpreted as indicators of one's critical thinking in Western educational cultures (Atkinson, 1997; Durkin, 2008a, b; Ennis, 1998; Fox, 1994). By observing these behaviors, Western teaching professionals evaluate whether students have critical thinking skills or if they are motivated to think critically.

It is important to highlight that the above list of behavioral manifestations have not been explicitly discussed in the formal definition of critical thinking. Although some of the critical thinking dispositions offered by theorists may be

related to the behavior of questions-asking (e.g., “seek reason”, Ennis, 1987; “inquisitiveness”, Facione, 1990), behavioral manifestations have not been specifically discussed in the formal definition of critical thinking. The above list of behaviors expected in the practice of critical thinking appear to be tacitly shared and used to make judgment about students’ critical thinking by educators in the West.

These implicit behavioral norms have important implications for two interrelated issues concerning critical thinking in international education (Volet, 1999). First, Asian students’ pattern of classroom behaviors does not match with the normative expectations in Western educational-cultural contexts, which has become the basis of the suggestion that Asian students lack critical thinking (e.g., Robertson et al., 2000; Lee and Carrasquillo, 2006). Second, the perceived incongruence between Asian students’ behaviors and the expectations in the West has led to a debate about the appropriateness of critical thinking instructions to students of non-Western cultural backgrounds (Atkinson, 1997, 1998; Davidson, 1998; Ennis, 1998; Gieve, 1998). These issues are of fundamental importance to the endorsement and the actual teaching and learning practices of critical thinking in international education.

*(1) The perception that Asian students lack critical thinking*

Asian students’ passivity, silence, and reticence have been interpreted as a lack of critical thinking. Although the same behavioral pattern such as not asking questions or not volunteering answers in the class can also be observed among some Western students in an international classroom (Kumaravadivelu, 2003), there is no specific discussion regarding this observation in terms of the characteristics of Western culture. In contrast, the behaviors observed among

Asian students are often attributed to the Confucian values of being respectful to authorities or preserving social harmony (see Cheng, 2000). While Confucian values might be plausible explanations, making these attributions without empirically testing the exact relationship between those aspects of culture and behaviors only reinforces a stereotypical account of Asian students (Cheng, 2000; Kumaravadivelu, 2003).

In fact, relating Confucian philosophy to a lack of critical thinking is likely to be a misconception (Cheng, 2000). Kim (2003) argued that without explicit discussion about rational thinking or logical reasoning, Confucius encouraged two kinds of reflective thinking among learners: 1) reflection on materials of knowledge to synthesize, systemize, and integrate the raw materials into a whole; and 2) reflection on oneself to ensure that such synthesis, systemization, and integration proceed in an open-minded, fair, and autonomous way (Kim, 2003). By encouraging students to examine arguments and formulate counter-arguments with open-mindedness and flexibility, Confucius was essentially an advocate of critical thinking in education (see also Hammond & Gao, 2002).

Considering the fact that Asian education has been influenced by Confucian philosophy and Western education has been influenced by Socratic philosophy (Hammond & Gao, 2002; Tweed & Lehman, 2002), it can be argued that both Asian and Western educational cultures do emphasize the development of learners' critical thinking. The difference between the two systems may be more related to the behavioral expectations in critical thinking as a consequence of the apparently stronger emphasis on other social values such as preservation of social harmony and respect to authorities in Confucian philosophy. However, in terms of the educational emphasis on the cognitive development of critical thinking, the

two educational cultures may actually be quite similar. Therefore, it is illogical to argue that Asian students have not been prepared to practice critical thinking in their home educational culture, which results in their apparent lack of critical thinking in international classrooms.

In terms of Asian students' silence, Kim (2002) showed that there are cross-cultural differences in the relationship between talking and thinking, which suggested an alternative explanation to the silence of Asian students. In one of the experiments, Kim (2002) found that Asian Americans' performance in a cognitive test was significantly impaired by thinking aloud (i.e., talking out loud the thought process), whereas European American's performance in the test was similar with or without talking aloud. Also consistent with previous research findings on beliefs about talking (Giles et al., 1992), Kim (2002) found that Asian Americans tended to believe less in the idea that talking helps thinking than did their European American counterparts. Rather than being respectful to the authorities or lacking critical thinking, Asian students might remain silent in the classroom simply because they are cognitively engaged.

Chiu (2008) also identified three types of silence observed among Asian students, which can be classified as: 1) no-idea silence, which occurred when the student indeed did not know how to think; 2) germinating silence, which occurred when the student was thinking (similar to the idea of Kim, 2002); and 3) conflict-avoiding silence, which occurred when students was trying to avoid interpersonal confrontation. This differentiation between different kinds of silence further supported the idea that silence or absence of behaviors such as self-expression or overt questioning in class does not necessarily indicate that Asian students do not engagement in critical thinking.

*(2) Appropriateness of critical thinking instructions*

Atkinson (1997) argued that the behavioral norms inherent in critical thinking are unconsciously learnt by individuals through being socialized in cultural systems which favor and value critical thinking as a virtue. The enactment of those behaviors might marginalize individuals of non-Western cultural backgrounds who have not been socialized in the same way. For example, American middle-class children are often socialized and trained to express themselves heuristically and creatively by the use of language, but Asian children are usually taught to value silence over vigorous debate and talking out loud. Because of these differences in socialization processes, Atkinson (1997) proposed that the instruction of critical thinking should be abandoned altogether, and alternative approaches of cognitive instructions should be applied to cater for the different behavioral norms assumed in the cultural backgrounds of the students.

Ennis (1998) also pointed out that critical thinking instruction in Western cultures always involved a feature which he labeled as the direct approach, which was “the attempt to get students to state their conclusion clearly at the outset, and then to defend it methodically, ending with a summary that repeats the conclusion” (p. 26). Ennis argued that this direct approach may not be the accepted way of instruction for certain non-Western cultures in which an indirect approach of instruction is usually endorsed. For example, “asking authorities for reasons and seeking alternatives and being open to them” (Ennis, 1998, p.19) could potentially conflict with the principles and practices of some cultures. The use of direct instructional strategies would then appear conflicting to students of those cultural backgrounds. Nevertheless, Ennis (1998) suggested that critical

thinking should still be promoted, especially in situations where people needed to learn to work with the direct approach.

Other critics also showed disagreement to Atkinson's (1997) suggestion of replacing critical thinking instruction with other approaches of cognitive instruction (Davidson, 1998; Gieve, 1998). In general, they argued that while certain aspects of critical thinking might indeed be more relevant and common in Western cultures, it does not necessarily preclude students of non-Western cultural backgrounds from learning to think critically.

Gieve (1998) observed that Malaysian university students in Britain reported that they found the demand of critical thinking high in university, but the perceived high demand of critical thinking did not reduce these students' ability to learn. More importantly, even if the mode of instruction differed from what the students had experienced in their home cultures, it did not undermine the value of critical thinking (Gieve, 1998). Davidson (1998) also acknowledged that critical thinking might be less practiced in some cultures, but critical thinking is still essential to be learnt at a higher level of academic discourse. A similar position was also endorsed by Fox (1994), who asserted that critical thinking should be taught to students of different cultural backgrounds, especially in view of the changing demands of the social reality around the world.

It needs to be highlighted that the debate about the appropriateness of critical thinking instruction has mainly been focused on whether critical thinking instruction should be applied in international classroom. However, the more fundamental question underlying this issue seems to be about whether critical thinking can be considered a useful tool to be acquired by students of different cultural backgrounds. If critical thinking instruction is actually something useful,

and students can be benefited from it, there is no strong point to argue that critical thinking instruction is not appropriate in international education. However, if the educational practice of critical thinking indeed marginalize some students in a destructive way and no adaptation can be made either by the students or the host instructional context to facilitate the education process (Volet, 1999), then critical thinking instruction may then be considered *inappropriate* in international classroom.

*(3) The need of cross-cultural research*

The above two issues regarding: 1) the perception that Asian students lack critical thinking; and 2) the appropriateness of critical thinking instructions are both resulted from the perceived incongruence between Asian students' behaviors and the implicit behavioral expectations inherent in the practice of critical thinking in Western cultural-educational contexts (Volet, 1999).

There have been attempts to explain Asian students' behavioral pattern with cultural variables such as Confucian values of preserving social harmony and showing respect to authorities and the socialization process in Asian cultures. Under those perspectives, culture is treated as a rigid determinant of Asian students' ability, motivation, and practice of critical thinking which can hardly be changed (Kubota, 1999). Such conceptualization about the influence of culture might result in the adoption of a 'deficit model' in understanding Asian students (Clark & Gieve, 2006), which in turn leads to inaccurate conclusions about whether Asian students can think critically and whether critical thinking instruction is appropriate to these students.

A deterministic view of culture may have exaggerated the influence of Confucian values on Asian students' practice of critical thinking. As argued

above, both Confucian and Socratic philosophies actually advocate the practice of critical thinking among learners. Nevertheless, the discussion about critical thinking and culture has mainly been based on the observed behavioral manifestations of students in an international education context so that there is a perception that Asian students do not practice critical thinking. It has been common in education and applied linguistics research that the observed behaviors of Asian students in Western classrooms have been described in terms of Confucian cultural traditions as if the influence of Confucianism is fixedly and homogeneously shared by every Asian student (Clark & Gieve, 2006). This practice has been called the 'large culture' approach in understanding the cultural influence on Asian student's behaviors (Clark & Gieve, 2006). Although culture has been defined as a system of shared meanings (e.g., Rohner, 1984), an individual's level of 'sharedness' of different characteristics can vary within a given cultural group. The 'large culture' approach might sometimes exaggerate the influence of culture on an individual and neglect the dynamic nature of culture (Clark & Gieve, 2006).

To circumvent the shortfall of the usual 'large culture' approach, Clark and Gieve (2006) proposed a 'small culture' approach in education research, in which researcher "tries to understand, interpret, and represent the actual learners with whom we come into contact, learners who are contextualized by, and who create context in, classrooms in contact situations" (p.63). With the focus directed back onto the individual learners, culture is viewed as a factor influencing an individual's characteristics through the cultural socialization process without assuming it a determinant of one's nature. In addition, it takes into account the malleability of students' behaviors and cognition, which might be influenced by



the different cultural contexts in which they have been socialized (Clark & Gieve, 2006).

In the realm of cross-cultural psychology, it has long been acknowledged that when observed cross-cultural differences are attributed to a cultural explanation without empirical justification, the interpretation could be misleading. This phenomenon is referred to as the cultural attribution fallacy (Matsumoto & Yoo, 2006). This fallacy could be addressed by linking the observed differences to measured cultural variables, where the test of hypothesized cultural explanations to observed cross-cultural differences is referred to as the unpackaging approach (e.g., Bond, 1998, 2009; Fischer, 2009; Matsumoto & Yoo, 2006; Singelis, 2000).

Unpackaging refers to the process of using measured cultural differences to explain observed behavioral or psychological differences between two or more cultural groups, with the aim that at the end of the process no variance of the target variables would be left to be explained by the variable *culture* (Poortinga & van de Vijver, 1987). The process is driven by an interest to understand how certain socialization processes result in the variance in the target behaviors across cultural groups (Bond, 2009). In this unpackaging process, it is necessary to find out the potential explanatory variables that systematically vary across the cultures of consideration and relate them to the variable of interest. The explanatory variables would then be tested if they could account for the cross-cultural variation in the target variables (Poortinga & Van de Vijver, 1987; Singelis, 2000). This approach could also be adopted in education research to empirically test the exact influence of culture-related explanatory variables on student's

behaviors without making assumptions about the relationship between the observed differences and their cultural backgrounds<sup>2</sup>.

The perceived lack of critical thinking among Asian students and the debate about the appropriateness of critical thinking instruction have only been based on the perceived incongruence between Asian students' behaviors and the behavioral expectations of critical thinking held by educators in the West (Volet, 1999). However, behavioral manifestations may not fully represent students' inner cognitive processes such as thinking. Moreover, there also appears a tendency to misuse Confucian philosophy to explain the perceived lack of critical thinking among Asian students in the international education literature. Carefully designed cross-cultural research is needed to address the influence of culture on critical thinking in international education before definite conclusion can be drawn regarding these two issues about critical thinking in international education.

#### *1.4. Cross-cultural research on critical thinking in higher education*

The perceived incongruence between Asian students' behaviors and the expectations of educators in the West has led to the perception that Asian students lack critical thinking abilities and the debate on the appropriateness of critical thinking instruction. Rather than arguing that the perceptions held by educators in the West reflect a stereotypical view about Asian students' critical thinking (Cheng, 2000; Kumaravadivelu, 2003), understanding whether the educational practice of critical thinking is actually suitable to students of different cultural

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<sup>2</sup> It should be noted that such unpacking approach usually involves using individual-level measure of culture to test if the measure mediate the observed cross-cultural difference (Matsumoto & Yoo, 2006). The use of individual-level measure of explanatory variables might conceptually challenge the definition of culture as a shared meaning system (Fischer, 2009). However, in terms of explaining observed cross-cultural differences when limited number of cultural groups is involved in the research question (e.g., studies in international education), the unpacking approach would be useful to empirically examine the exact mechanisms behind the observed differences as in the 'small culture' approach (Clark & Gieve, 2006).

backgrounds would be more important. This understanding requires detailed examination of the actual influence of culture on the endorsement of and the teaching and learning practices of critical thinking

In view of the fact that many previous attempts in explaining the two key issues in terms of cultural variables fall short of overgeneralizing the influence of culture, especially the influence of Confucian values (e.g., Cheng, 2000; Clark & Gieve, 2006), it is important to empirically examine the influence of culture on critical thinking in international education by means of carefully designed cross-cultural research. Findings from previous cross-cultural research on different aspects of critical thinking have offered interesting insights to part of this puzzle.

#### *1.4.1. Cross-cultural research on conceptions of critical thinking*

Howe (2004) compared Canadian and Japanese teachers' conceptions of critical thinking. Using a list of definers of critical thinking, Howe observed that Canadian teachers tend to relate critical thinking to cognitive definers such as higher-order thinking, evaluating assumptions, and rational thinking; whereas Japanese teachers tend more to associate critical thinking with affective definers such as being consistent, objective, and fair. Apart from observing cross-cultural differences in the tendency to emphasize different aspects of critical thinking, Howe (2004) noted that most teachers surveyed, regardless of their cultural backgrounds, value teaching of critical thinking as an important educational goal although it has been an implicit and tacit part of their actual teaching practices.

Jones (2005) examined the conceptions of critical thinking among Chinese-speaking international and English-speaking local students in an Australian university. She found that despite cultural and linguistic differences, both groups of students hold similar concepts of critical thinking which involve both

dispositions and cognitive skills dimensions. The two groups were also similar to each other in terms of the concern about maintaining interpersonal harmony in writing a comment to their peers, which indicates that concerns about interpersonal harmony might not be a value exclusive to Asian cultures. Also noteworthy is that the research took place after both groups of students participated in a learning project that aimed to facilitate students' critical thinking, which Jones (2005) suggested showed that student's conception of critical thinking can be similarly influenced by the structure of learning tasks regardless of their cultural backgrounds.

Howe's (2004) research showed that critical thinking may be held as an educational ideal in both Asian and Western cultures, in spite of the cross-cultural difference in the relative emphasis on different aspects of the concept. On the other hand, Jones' (2005) study indicated that there can be a higher level of similarity in the conceptions of critical thinking between Asian and Western samples when the same cultural and educational context is being considered. In general, the concept of critical thinking seems to be present in both Asian and Western cultural contexts, and the concept can be understood similarly by members of these two cultural backgrounds. It seems that there is no strong reason to speculate that Asian students are not capable to practice critical thinking because they hold a different conception about critical thinking. It also seems improper to suggest that critical thinking instruction is not appropriate to Asian students because they have different ideas about the concept.

#### *1.4.2. Cross-cultural research on critical thinking skills and dispositions*

Cross-cultural research on university students' critical thinking skills and dispositions may offer more direct evidence to argue for the two issues regarding

critical thinking in international students. Disproportionate to the number of instruments available for assessing the two aspects of critical thinking, there have been more cross-cultural comparisons on critical thinking dispositions than critical thinking skills between Asian and Western samples. In most of the cross-cultural studies on critical thinking dispositions, the California Critical Thinking Disposition Inventory (CCTDI; Facione & Facione, 1992) was employed to compare the two groups. For example, McBride, Xiang, Wittenburg, and Shen (2002) compared the dispositional aspect of critical thinking of preservice teachers in the USA and China. They found that the American sample scored significantly higher on the scale than their Chinese counterparts, indicating that the American sample might be more motivated to use critical thinking than the Chinese sample. This finding coincided with another study comparing critical thinking dispositions between Hong Kong Chinese and Australian nursing students, in which the Hong Kong Chinese sample was found to score significantly lower on the CCTDI than their Australian counterparts (Tiwari, Avery & Lai, 2003).

Nevertheless, a closer look at the subscale scores reveals that the Chinese and Western samples being examined showed both similarities and differences in critical thinking dispositions. In McBride et al.'s (2002) study, it was found that the American sample tended to be more confident in their reasoning than the Chinese sample, but the two samples were not significantly different from each other in their desires to provide good reasoning and evidence in solving problems. In Tiwari et al.'s (2003) study, the Australian and the Hong Kong Chinese samples were similar in terms of their confidence in reasoning, but the Australian sample was shown to be more open-minded to new ideas.

These results indicate that there could be both similarities and differences between Asian and Western samples in terms of critical thinking dispositions. To explain the observed differences, McBride et al. (2002) pointed to disparities in cultural values such as preservation of social harmony and saving social faces prevalent in the Chinese culture, which they consider to have reduced the tendencies and motivations of the Chinese samples to display critical thinking confidently. As suggested by Facione et al. (1997, 2000), critical thinking dispositions reflect an individual's motivation to use critical thinking. Those factors that influence one's enactment of critical thinking could be related to one's motivation in showing critical thinking. However, it should be highlighted that these speculations require further empirical examination of the link between cultural values and critical thinking dispositions. On the other hand, Tiwari et al. (2003) have acknowledged that the cultural values such as Confucian educational values may not fully explain the cross-cultural differences observed. Instead, they have suggested that the instructional practices of the educational institutions might offer closer explanations to the observed cross-cultural similarities and differences (Tiwari et al., 2003).

Tiwari et al.'s (2003) suggestion highlighted that institutional contexts might have important influence on university students' critical thinking. The educational ideals and practices of critical thinking in different institutions may have more proximate impact on students' critical thinking than other broader cultural variables. For example, the institutional expectations of students' development of critical thinking influence how courses are structured and what instructional strategies are employed. The instructional practices of critical thinking may offer a different reinforcement structure to students' engagement in critical thinking.

As in the case of the “paradox of the Asian learners”, because Asian teachers and schools generally emphasize a lot on achievement in examinations, students were more motivated to work hard to achieve academically (e.g., Biggs, 1994, 1996a, b; Kember, 1996; Salili, 1996). Along the same line of thought, it is possible that universities that place a lot of emphasis on students’ development of critical thinking might influence on students’ practice of critical thinking in general. In the case of Tiwari et al.’s (2003) study, the observed differences in critical thinking dispositions may possibly be more related to characteristics of the institutions rather than that of the cultures.

Even if it is the case that Asian students tend to show lower level of critical thinking dispositions than their Western counterparts, the difference can be ameliorated by means of education. A longitudinal study in Korea revealed that a sample of nursing students showed significant improvement in their scoring on the CCTDI over the four years of nursing training (Shin, Lee, Ha, & Kim, 2006). These results suggest that it is possible to develop critical thinking dispositions through education. Therefore, cross-cultural differences in critical thinking dispositions may not be a good reason to justify the suggestion that critical thinking instruction is not appropriate for Asian students. If critical thinking is really an important skill to learn in university educations, educational efforts should instead be made to cultivate students’ critical thinking dispositions.

In contrast to critical thinking dispositions, there is currently limited research on Asian-Western comparisons of critical thinking skills in the literature. The only exception would be a series of studies on the correlates of critical thinking skills among Hong Kong Chinese and American university students (Hau et al., 2006; Ku et al., 2006). Using the Halpern Critical Thinking Assessment using

Everyday Situations (HCTAES; Halpern, 2006), Hau et al. (2006) showed that the Hong Kong Chinese sample scored significantly higher on the test than the American sample, and the authors argued that it was because the Hong Kong Chinese sample was recruited from a more selective institution than that of the American sample. This result might be used as a counterargument to the suggestion about Asian students' lack of critical thinking. However, caution is needed in interpreting these results in terms of culture due to the confounding influence of the different institutional practices and the lack of other cultural variables for explaining the observed differences.

#### *1.4.3. Focus on cross-cultural comparison on critical thinking skills*

Despite the fact that cognitive skills have been the major focus of research and education of critical thinking (e.g., Halpern, 1998; Tsui, 1999), relatively little is known about the Asian-Western difference in this dimension of critical thinking. Hau et al. (2006) showed some interesting findings, but the results might have been complicated by the differences in the institutional contexts which undermined its relevance in addressing the two issues related to critical thinking in international education.

In view of the fact that behavioral manifestations in classrooms cannot be used as a reliable indicator of students' actual thinking (e.g., Kim, 2002), it is considered a better way to assess the students' critical thinking skills by means of standardized instruments. Students of Asian and Western cultural backgrounds who are studying in the same international education context can be assessed and compared in terms of their critical thinking skills. Any difference observed in the comparison can be used to provide an empirical account to the perception that Asian student lack critical thinking.



Information about Asian-Western differences in critical thinking skills is vitally important as critical thinking instructions have predominantly focused on skills development (Baron, 1987; Halpern, 1998, 1999). In fact, it has been the skill aspect of critical thinking that has drawn so much attention from educators and employers (ten Dam & Volman, 2004). Cross-cultural comparison on critical thinking skills between Asian and Western students is of direct relevance about the appropriateness of critical thinking instructions in international education. Depending on the explanatory variable identified, adaptation from the students or the host cultural-educational context would be needed in order to facilitate the teaching and learning of critical thinking (Volet, 1999). Cross-cultural research examining the use of critical thinking skills of Asian and Western students in the academic context is an important step to understand how culture affects the educational practice of critical thinking. Therefore, the present research will focus on the skill aspect of critical thinking to serve as an initial step to fill the gap in the literature.

In order to accurately understand the influence of culture on university students' critical thinking skills, it is important to identify the potential explanatory variables which can be used to unpackage any observed cross-cultural difference (Poortinga & van de Vijver, 1987). Although cultural variables such as Confucian social values offer plausible explanations for observed cross-cultural differences in terms of behavioral manifestations and perhaps dispositions of critical thinking, the applicability of the same variables to differences in critical thinking skills is questionable. Critical thinking skills relate to the effective use of the right cognitive strategies to reason and process

information, so cultural values in academic learning or goals of education might not be sufficient to account for any observed difference in this dimension.

Regarding the nature of critical thinking skills in the context of international education, two factors might potentially be related to the cross-cultural difference in critical thinking skills between Asian and Western students, namely: 1) cognitive styles; and 2) language ability. These variables will be described in more details in the subsequent studies related to the comparison in critical thinking skills between Asian and Western students, but an overview about their relationship to Asian-Western difference in critical thinking skills is outlined below.

Recent research on culture and cognition has identified systematic differences between Asian and Westerners in their preferences for different cognitive styles (Peng & Nisbett, 1999; Nisbett, Peng, Choi, & Norenzayan, 2001). These differences in cognitive styles were shown to be conducive to observed differences in the preferred modes of reasoning between Asian and Western samples (Norenzayan, Smith, Kim, & Nisbett, 2002). It is possible that these differences in cognitive styles might also be related to cross-cultural differences in critical thinking skills. If the difference in cognitive styles indeed explains the cross-cultural differences in critical thinking skills, the appropriateness of critical thinking instructions in international education might be undermined as the practices of critical thinking might marginalize the preferred cognitive styles of Asian students (Atkinson, 1997).

The expression of critical thinking relate mostly to the use of language in expressing one's ideas, including asking questions and expressing opinions. The ability to use a language might have important influence on one's practice of

critical thinking (e.g., Cheng, 2000; Paton, 2005). Previous research has also shown that there is a significant positive correlation between language ability and critical thinking skills (e.g., Clifford, Boufal & Kurtz, 2004; Halpern, 2006; Taube, 1997). It is logical to speculate that differences in language ability may be related to the cross-cultural difference in critical thinking skills between Asian and Western students.

### *1.5. The present thesis*

The present thesis aims to understand the influence of culture on the increasing emphasis of critical thinking in higher education. It is evident that there is a need of cross-cultural research to address the two key issues about critical thinking in international education, namely, the perception that Asian students lack critical thinking and the debate about the appropriateness of critical thinking instruction in international classroom. Addressing these two issues also helps to answer the more fundamental question of whether critical thinking can be considered as a useful tool to be acquired by students in international education.

Examination of the two key issues requires proper understanding of the possible influences of the cultural contexts on students' practice of critical thinking (Clark & Gieve, 2006). The key issues are also related to the congruence between the students' cognitive, motivational, emotional, and behavioral capacity and the expectations in the host cultural-educational context (Volet, 1999). In terms of the teaching and learning of critical thinking skills, it is about showing how Asian students' cognitive capacity in critical thinking match with the expectations of critical thinking in the host cultural-educational learning environment.

New Zealand university education provides an interesting case to address the above issues because of its cultural diversity in the university student population (see also section 1.2.1 in this chapter). In the past 20 years, the growth in Asian population has been the highest among all immigrating ethnicities in New Zealand (Friesen, 2008). Also in the educational context, a high proportion of students coming from Asian regions have been noted. In 2009, around 27,000 international students study at the tertiary level in New Zealand, most of who were from Asian countries such as China, Korea, and Japan (the three countries alone made up about 50% of all international students' enrolment; New Zealand Ministry of Education, 2009). On the other hand, previous research has suggested that the educational practice in New Zealand is characterized by an emphasis on the Socratic approach of learning, which is also associated with the practice of critical thinking (Campbell & Li, 2008). The students' cultural composition and the Socratic educational traditions in New Zealand offer an interesting avenue to investigate the possible influence of culture in terms of the endorsement of and teaching and learning practices of critical thinking in higher education.

In contrast to the Socratic educational tradition in New Zealand, the education system in Asia is suggested to be under the influence of Confucian philosophy (Hammond & Gao, 2002; Tweed & Lehman, 2002). As argued before, both philosophical traditions advocate the cognitive development of critical thinking among learners. Howe's (2004) study showed that teachers in both Japan and Canada endorse the value of teaching critical thinking to their students. It seems that educational contexts which have been influenced by Confucian philosophy might similarly endorse the value of students' development of critical thinking as those having been influenced by Socratic philosophy. Therefore, it

may be illogical to suggest that Asian students cannot practice critical thinking because of the influence of Confucian philosophy on education.

Institutional influences on the instructional contexts could have immediate influence on university students' practice of critical thinking (Tiwari et al., 2003). To improve our understanding about the influence of culture on critical thinking education, it seems necessary to first understand how culture influences on the institutional contexts. In view of that Asian international students in New Zealand would have been influenced by the educational contexts in both Asia and New Zealand, it is necessary to understand first how cultural traditions in terms of critical thinking are actually manifested in the instructional contexts in the two educational cultures. A brief estimate of the possible influences of both Asian and New Zealand cultural-educational contexts on Asian international students' practice of critical thinking can also be obtained through comparing the institutional contexts in the two cultures (Chapter 2).

Then it comes to the question of how the cultural-educational contexts influence on university students' practice of critical thinking. This question is best to be addressed from the students' perspective. After all, the suggestion of Asian students' lack of critical thinking has been based on the Western educators' perceived incongruence between Asian students' behaviors and the behavioral expectations inherent in the practice of critical thinking. Volet (1999) acutely pointed out that the judgment about whether certain learning process has been appropriately transferred is subjective to the ones who make the judgment. Asian international students who have experienced both Asian and Western cultural-educational contexts provide the best source of information about their perceived congruence between their cognitions, motivations, and behaviors related to

critical thinking and the host instructional setting. This information would be more important for educators to decide whether Asian students actually lack critical thinking and the appropriateness of critical thinking instruction in international education.

Jones' (2005) study demonstrated that both Chinese-speaking international students and English-speaking local students in Australia hold similar conceptions about critical thinking. Durkin (2008a, b) also found that even though there is incongruence between Asian students' behavioral pattern and the behavioral expectation in the host instructional context, these students would adapt to the behavioral norms by incorporating their own cultural values to the behavioral practice of critical thinking. These findings highlighted that Confucian cultural values do not necessarily determine Asian students' practice of critical thinking as commonly suggested in the international education and applied linguistics literature. Through examining the general conception of and experiences in practicing critical thinking among Asian international and New Zealand European students, the exact influences of Asian and New Zealand cultural-educational contexts on students' practice of critical thinking can then be revealed (Chapter 3).

Cognitive skills have been the major focus of research and education of critical thinking (Baron, 1987; Halpern, 1998, 1999). As previously suggested, the best way to directly address the two key issues about critical thinking in international education would be a comparison of the assessed critical thinking skills between Asian and Western students. It is also important to identify the possible explanatory variables to any observed difference in the observed skills, so that the necessary adaptation from either the students or the host instructional

context can be made to facilitate the teaching and learning of critical thinking skills. Through comparing the critical thinking skills between Asian and New Zealand European students and examining the reasons behind any observed difference, the perception of Asian students' lack of critical thinking and the issue regarding the appropriateness of teaching critical thinking skills in international education can then be addressed with empirical evidence (Chapter 4).

The debate about the appropriateness of critical thinking instruction has been largely focused on whether critical thinking should be taught to non-Western students because they appear to show a different preference in acting and thinking (e.g., Atkinson, 1997; Ennis, 1998; Gieve, 1998). Apart from examining the cognitive capacity of the students, the question actually needs to be addressed in terms of whether current instructions that are supposed to develop students' critical thinking can similarly elicit the students' potential in applying critical thinking regardless of their cultural backgrounds. In other words, an appropriate critical thinking instruction seems to be the one that enables students to practice critical thinking despite the possible influences of different cultural-educational contexts on the students (Chapter 5).

In sum, four sets of studies are presented in this thesis to address the following questions:

Chapter 2: How does culture influence on the educational contexts in terms of the instruction of critical thinking?

Chapter 3: How do different cultural-educational contexts influence on the university students' conceptualization and practice of critical thinking?

Chapter 4: How does culture influence on university students' critical thinking skills?

Chapter 5: How does culture influence on university students' practice of critical thinking skills in current critical thinking instruction?

The findings in the present research are used to shed light on the two key issues of critical thinking in international education, which can then be used to address the fundamental question about whether critical thinking can be considered a useful tool to be acquired by students of different cultural backgrounds (Chapter 6). Through addressing the issues of critical thinking in international education, the present thesis aims to enrich our understanding about the influence of culture on the teaching and learning of critical thinking in higher education.



## CHAPTER 2

### Comparison of the University Courses between Hong Kong and New Zealand

#### *2.1. Introduction*

The two key issues regarding critical thinking in international education, that is: 1) the perception that Asian students lack critical thinking; and 2) the appropriateness of critical thinking instruction in international education, have been resulted from a perceived incongruence between Asian students' behavioral pattern and the behavioral expectations in critical thinking in the Western cultures. To examine these issues with reference to critical thinking skills, it is important to know how Asian students' cognitive capacity in critical thinking match with the expectations of students' cognitive development in critical thinking in the host instructional context (Volet, 1999).

Institutional influences on the instructional contexts might have immediate influence on university students' practice of critical thinking (Tiwari et al., 2003). It is important to have a primary understanding about the instructional contexts of Asia and Western educational cultures for examining the exact influence of culture on the educational practice of critical thinking. An instructional context consists of elements such as the instruction and support provided by the teacher and the norms and expectations inherent in the setting (Marini & Genereux, 1995). The norms and expectations regarding learning behaviors are suggested to be different between Asian and Western cultures (Tweed & Lehman, 2002). Based on the perceived behavioral norms in Asian and Western cultures, it is also commonly assumed that critical thinking instruction is more prevalent in Western classrooms than Asian classrooms (e.g., Norenzayan et al., 2002). Nevertheless,

although Confucian and Socratic traditions may have different influence on students' learning behaviors, it should be noted that Confucian philosophy actually encourages the development of critical thinking among learners (Kim, 2002). In terms of the expectation of students' cognitive development to think critically, Socratic education system and Confucian education system may actually be not much different from each other.

Nevertheless, the available cross-cultural research on teaching professionals' conceptions of critical thinking and critical thinking dispositions seems to suggest that the commonly assumed difference in critical thinking instruction between Asian and Western educational cultures may be valid. Regarding the conceptions of critical thinking, Howe (2004) found that Canadian teachers tend to focus more on cognitive skills when defining critical thinking, whereas Japanese teachers emphasize more on individual characteristics of critical thinker. In terms of critical thinking dispositions, McBride et al. (2002) reported that American preservice teachers are more motivated to use critical thinking than Chinese preservice teachers. These findings showed that Asian and Western teaching professionals might hold different attitudes and ideas towards critical thinking. These differences in critical thinking dispositions and conceptions might then influence on their teaching practices in relation to cultivation of critical thinking among students. Specifically, because teachers in Asian cultures seemed to show lower level of emphasis on critical thinking skills (Howe, 2004) and lower level of motivation in using critical thinking (McBride et al., 2002), Asian styles of teaching might also tend to show lower level of endorsement of critical thinking instructional practices.

However, it should be highlighted that there has not yet been any systematic

comparison in terms of the current instructional practices of critical thinking between Asian and Western cultures, so it is rather difficult to ascertain if the supposed East-West similarities and differences are valid. Many of the documented differences between Asian and Western education have been focused on the learning behaviors of students, which may not sufficiently reflect the actual instructional practices directed to the development of critical thinking among students. In addition, the increasing convergence in educational policies and practices in higher education across countries (Green, 1999) could have diminished the differences between Asian and Western cultures in terms of critical thinking instructional practices.

To understand how critical thinking instruction is implemented in the current university curricula, it is important to identify the expectations of students' cognitive development in terms of critical thinking and how courses are structured according to these expectations. Expected learning outcomes of students show the importance of critical thinking as an educational ideal, whereas course structures reveal the actual educational practices of development of critical thinking. Both pieces of information could be simultaneously obtained from university course syllabi.

University course syllabi are documents which are usually distributed to the students at the beginning of a course, conveying important information including course objectives and course content to the students. Course objectives reflect the educational values or teaching staff's expectations of the students associated with the courses, whereas descriptions of course content and assessment reveal the actual teaching practices in accordance to those objectives. This information sets the tone and expresses key values of the educational institution as well as

indicating what is expected of the student. These documents are also objective indicators of the values conveyed to students and provide a non-intrusive method for investigating the educational expectations and teaching practices of critical thinking. Comparison on the university course syllabi is expected to shed light on the similarities and differences between Asian and Western instructional contexts, which can then serve to improve our understanding of the exact influence of culture on the practice of critical thinking in education.

As suggested in Chapter 1, the present research is focused on the cognitive skills aspect of critical thinking. Therefore, this investigation of university course syllabi is also focused on critical thinking skills development. In relation to the development of critical thinking skills as course objectives, Bloom's (1956) taxonomy of educational objectives in the cognitive domain offers a useful guideline for evaluating cognitive development in terms of critical thinking (Tsui, 2006). The revised Bloom's taxonomy (Anderson & Krathwohl, 2001) consists of a progressive hierarchy of six levels, namely, *remember*, *understand*, *apply*, *analyze*, *evaluate*, and *create*, with *remember* marking the end of the lower-order skills while *create* marking the other end of the higher-order cognitive skills. Figure 2.1 illustrates the details of these different levels of cognitive skills and their associated examples.

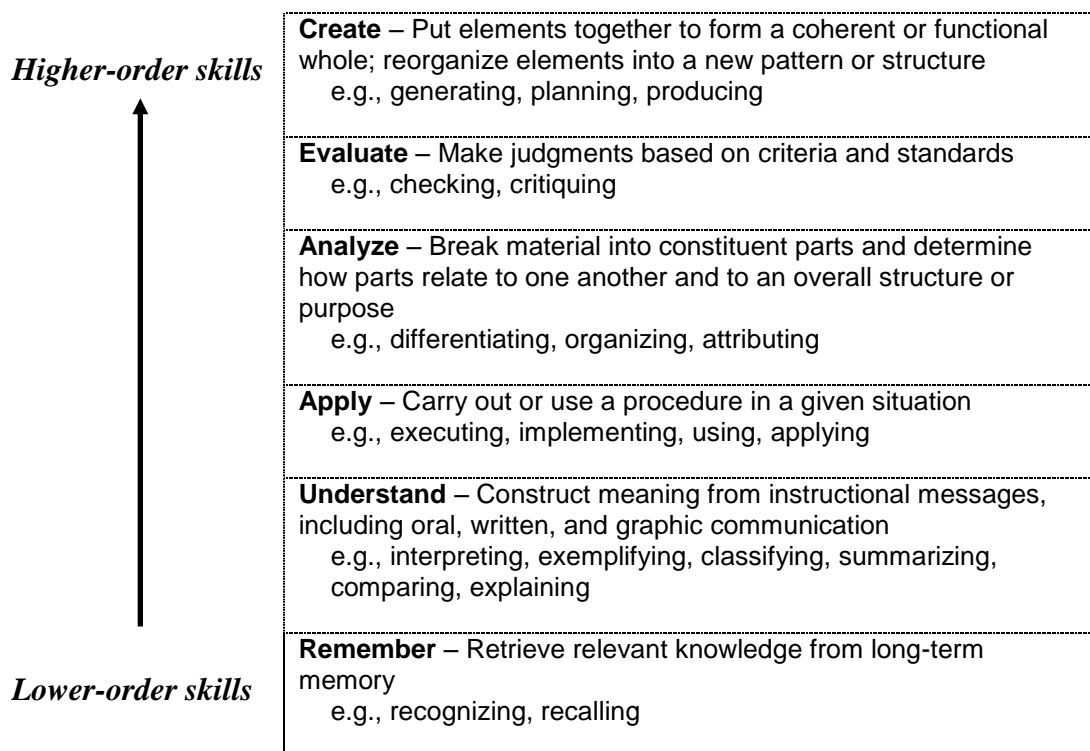


Figure 2.1: Anderson and Krathwohl's (2001) revised Bloom's (1956) taxonomy of cognitive processes and related examples.

At the 'remember' level, students are required to be able to recall the knowledge they learnt. At the next level of 'understand', the students should be able to do a little more, such as paraphrasing, defining, and so on. Beyond these skills, students should be able to take information of an abstract nature and use it in concrete situations at the level of 'apply'. At the level of 'analyze', students are expected to be able to break down an argument into its constituent parts, and discerning the relationships among them. Students should be able to make judgments about the value of different materials or methods at the level of *evaluate*. And finally, at the level of 'create', students should be able to put together many different elements or parts to form a new pattern or structure.

The upper three levels of Bloom's (1956) taxonomy, that is, the levels of *analyze*, *evaluate*, and *create*, have usually been associated with the cognitive

skills of critical thinking (Tsui, 2006). On the other hand, the lower three levels of *remember*, *understand*, and *apply* are more related to the acquisition and retainment of knowledge and information. For courses that place higher expectation on the development of critical thinking skills, it is reasonable to expect that terms related to the upper three levels of Bloom's (1956) taxonomy would be used more often as course objectives in the course syllabi.

The avenue for identifying critical thinking related educational practices is the assessment criteria of students' academic performance. Assessment is an essential component of a course because it offers opportunities to the students to show what they learnt, and it can also be used as a means to promote transfer of knowledge. In a review of three common assessment methods including coursework assessment, multiple-choice tests and essay responses examinations, De Vita (2002a, b) suggested that with appropriate design and implementation, all three assessment methods could be used to assess and enhance students' critical thinking ability. However, multiple-choice tests have often been implemented in such a way that turns assessment into a mere recalling activity or even turning courses into "memory Olympics" (2002b, p. 36). On the other hand, essay examinations usually require students to write in speed, which might in turn limit their ability to think critically while answering the questions (De Vita, 2002a, b). In view of these critiques to multiple-choice tests and essay examinations, Yorke, Bridges, and Woolf (2000) proposed that coursework may be a better assessment method than tests and examinations, as it allows more time and flexibility for students to explore thoughts, crystallize ideas, and express their ideas freely, which in turn encourage students to engage in higher level of thinking. Courses that emphasize training of critical thinking skills might tend to rely more on

coursework than tests and examinations in the assessment of students' learning.

This study is designed to analyze course syllabi collected from universities in New Zealand and Hong Kong. The two cultures share a common historical past as both were British colonies and have similar educational systems. Hong Kong had been a British colony for about 100 years until its handover to the People's Republic of China in 1997. On the other hand, New Zealand became fully independent from British rule in 1947. English is the medium of instruction in the universities in both regions and the university systems have been modeled on the British system.

Despite the background of British influence, previous studies showed that Hong Kong educational system resembled more Chinese traditions than Western practices, such as the emphases on efforts over abilities, rote instruction, one-way teaching from teachers to students, and preservation of harmony in classroom (e.g., Hau & Salili, 1996; Lee, 1999; Watkins & Biggs, 2001). Similar to many other Asian cultures, the educational practices in Hong Kong is suggested to be under the influence of Confucian values which emphasizes preserving social harmony and showing respect to knowledge and authority (e.g., Luk, Fullgrabe, & Li, 1999; Yang, Zheng, & Li, 2006). In terms of the educational context of Hong Kong, Biggs and Watkins (2001) concluded that:

the Hong Kong educational system is in values and traditions very "Chinese", despite the overlay of British superstructures, the Western rhetoric and initiatives in the many reforms sought by Education Commission reports over recent years, and the Western content and methods of teacher education" (p. 288).

With this similar British colonial background as a backdrop, any differences

observed in the educational objectives and practices in relation to critical thinking between these two cultures may be attributed to the more fundamental differences in the instructional contexts between an Asian (i.e., Hong Kong) and a Western (i.e., New Zealand) cultures. It is expected that the instructional contexts between both cultures would not be significantly different in the expectations of students' cognitive development in critical thinking because of the endorsement of critical thinking in both Socratic and Confucian traditions. In terms of instructional practices, the courses in New Zealand are expected to include more coursework assessment to cultivate critical thinking with the student-centered and interactive education approach (Campbell & Li, 2008). In contrast, because the education style in Hong Kong is still pretty much influenced by the traditional culture which is marked by the teacher-centered, one-way teaching, and exam driven approach of instruction, it is expected that courses in Hong Kong include more test/exam assessment. Through comparing the university course syllabi between Hong Kong and New Zealand, the present study reveals the characteristics of the current instructional contexts in both Asian and New Zealand educational cultures, which could improve our further understanding about the exact influence of culture on students' practice of critical thinking in higher education.

## *2.2. Method*

### *2.2.1. Psychology Course Syllabi*

A total of 130 (65 from New Zealand, 65 from Hong Kong) undergraduate psychology course syllabi were collected via the Internet from the websites of six public universities. These included three universities in New Zealand and three universities in Hong Kong, where psychology courses were offered to undergraduate students. All course syllabi were written in English which is the



medium of instruction of the universities in both cultures.

Cultivation of critical thinking has been considered an important part of psychology curricula (Yanchar, Slife, & Warne, 2008), yet it was also acknowledged that there is variation in the extent to which critical thinking is actually fostered in the discipline (Sternberg, Roediger, & Halpern, 2007). This feature of the discipline makes it an ideal target for comparing the importance and practices of critical thinking education across different cultures.

The data consisted of course syllabi from the year of 2004 to 2007, with over 70% of the syllabi stemming from the period between 2006 and 2007. Over 90% of the courses lasted for one single term, except 12 one-year courses from a university in New Zealand. There is no reason to speculate that the span of a course would influence the educational objectives or the assessment schedule as stated in the course syllabi, therefore, those 12 course syllabi were retained in the subsequent analyses.

The course syllabi obtained from both New Zealand and Hong Kong consisted of courses with similar nature. A preliminary examination on the nature of the courses revealed that the sampled courses from both New Zealand and Hong Kong could be classified into five broad categories, namely: general psychology, cognitive/physiological psychology, developmental/social psychology, clinical/organizational/applied psychology, and research methodology.

The levels of the courses were specified by all respective universities except one from Hong Kong, where the levels were associated with the prerequisites of the courses and year of study of the students. Level one consisted of courses without any specific prerequisite which were designed for students in the

beginning year, while courses at the higher levels would set certain requirements to the students before they were able to take the course. For the course syllabi of that particular university which did not specify the course level, either level one or level two were assigned to the courses in relation to their specification of prerequisites.

### 2.2.2. *Coding Strategies*

*Course objectives.* Most of the collected course syllabi included a general description of the course, an assessment schedule, and a course schedule. For some of the course syllabi, there were also detailed descriptions about the requirement of the assignments and/or a list of required or suggested readings. As the main goal of this research was to find out information about the course objectives and course assessment in the two cultures, only the sections which include general descriptions of the course and the assessment schedule were examined. The sections with general descriptions of the courses were usually named under the titles of ‘course objectives’, ‘course descriptions’, or ‘course content’, and they were examined for number of words and phrases which described the expected outcome or learning goals of students.

The expected outcomes of the courses were coded using Anderson and Krathwohl’s (2001) revised version of Bloom’s taxonomy of educational objectives in terms of cognitive processes. The frequency of occurrence of words used to describe the three lower levels in the taxonomy was counted as *terms describing knowledge development*, while the frequency of occurrence of words used to describe the three upper levels in the taxonomy was counted to represent *terms describing critical thinking skills development*. Some course objectives did not explicitly use words listed in the Bloom’s (1956) taxonomy to describe the

kind of cognitive skills that were expected to develop among the students. For example, phrases such as ‘provide an introduction of ... to the students’ or ‘to develop students as a critical consumer of psychological research findings’ might be used in the course objectives. In such case, the phrase would be counted as one occasion of either *terms describing knowledge development* (e.g., ‘to provide an introduction of ...’) or *terms describing critical thinking skills development* (e.g., ‘to develop students as a critical consumer of...’).

During the coding process, it was found that a number of course syllabi explicitly described the development of critical thinking as part of the course objectives. Since such description is directly relevant to the present research focus, a separate category named *explicit description of critical thinking* was added in the coding scheme. Frequency of appearance of the term ‘critical thinking’ and phrases such as ‘to think critically’ in each course syllabi was counted under this category.

Because the coding process required judgments made by the rater, inter-rater agreement was calculated to assess for any potential rater effect on the variables. Three course syllabi from each university, that is, a total of 18 course syllabi were randomly drawn from the sample and coded for *terms describing knowledge development*, *terms describing critical thinking skills development*, and *explicit description of critical thinking* by another independent rater using the coding scheme as outlined above. Intraclass correlation coefficients of the three variables were 0.82, 0.85, and 1.0 respectively; suggesting that the coding of the two raters were relatively similar and therefore the effect of rater should be reasonably small on the three variables (Shrout & Fleiss, 1979).

*Assessment schedule.* The percentage of contribution to overall course

grade by different assessment components were coded from the assessment schedule. These components were then classified into two major categories, namely, *assessment by coursework* and *assessment by examinations/tests*. These two categories together contributed 100% of the overall course grade of every course considered.

### 2.2.3. Analytical Approach

According to Hsieh and Shannon (2005), content analysis of textual materials that starts with identifying and quantifying the appearance of words could be referred to as manifest content analysis. The present study of course syllabi focused on analyzing the frequency of occurrence of words or phrases related to critical thinking or knowledge development, so it could be classified into this category of content analysis. Unlike the other approaches of content analysis, manifest content analysis is essentially quantitative in nature. Quantitative data analysis techniques such as analysis of variance (ANOVA), independent-sample t-tests or chi-square tests were used to examine the similarities and differences on each respective variable between the two cultures.

### 2.3. Results

To adjust for the effect of the length of course description on the variables of interest, the number of *terms describing knowledge development* and *terms describing critical thinking skills development* were divided by the total number of words of the course description in each course syllabus. The length of the course descriptions under consideration ranged from 17 to 698 words in the current sample, with an average of 121.35 words ( $SD = 100.89$ ). The mean number of words of the course descriptions from New Zealand was 159.57 words ( $SD = 118.25$ ), while that of Hong Kong was 83.14 words ( $SD = 59.72$ ).

### 2.3.1. Course Objectives

*Terms describing knowledge development.* ANOVA on the adjusted *term describing knowledge development* showed that culture has a significant main effect on the variable ( $F[1,122] = 8.13, p < .01$ ), while the effect of level of the course ( $F[3,122] = 0.09, p = .96$ ) and the interaction between culture and level ( $F[3,122] = 0.09, p = .96$ ) were not significant. Course syllabi in Hong Kong (adjusted mean = 0.045) were found to include significantly more *terms describing knowledge development* than those in New Zealand (adjusted mean = 0.027).

*Terms describing critical thinking skills development.* The ANOVA results showed that the effect of culture ( $F[1,122] = 0.00, p = .99$ ), level of the course ( $F[3,122] = 0.98, p = .41$ ), and their interaction term ( $F[3,122] = 1.09, p = .36$ ) were all not significant on this dependent variable.

*Explicit description of critical thinking.* For courses which explicitly mentioned the term critical thinking as educational objectives, most of them mentioned the term only once, with only one course syllabus from New Zealand mentioned the term twice in the course description. A chi-square test showed that there is a significant difference in the number of courses with explicit description of critical thinking between the two cultures ( $\chi^2[1, N = 130] = 9.12, p < .01$ ), with more New Zealand courses (13 out of 65) including the term critical thinking as an educational objective than Hong Kong courses (two out of 65).

### 2.3.2. Assessment Schedule

The variables *assessment by coursework* and *assessment by examinations/tests* were complimentary to each other as they added up to contribute 100% of the overall course grade. Therefore, in order to avoid

redundant information, only the results of *assessment by coursework* are reported below.

*Assessment by coursework across cultures and levels of courses.* The main effect of culture was not significant ( $F[1,116] = 0.59, p = .44$ ) on *assessment by coursework*, but the effect of level of courses ( $F[3,116] = 7.71, p < .001$ ) and that of the interaction ( $F[3,116] = 3.23, p < .05$ ) were significant. In general, it was found that as the level of courses increased, the contribution of *assessment by coursework* increased. This pattern is similar in both New Zealand and Hong Kong, with the contribution of *assessment by coursework* being smaller in level 1 courses (New Zealand: 31% of overall course grades; Hong Kong: 35% of overall course grades) but larger in the level 4 courses (78.9% in New Zealand versus 70% in Hong Kong). However, slight variations were observed in the level 2 and level 3 courses, with a larger difference observed in the level 2 courses (29.5% in New Zealand versus 55.6% in Hong Kong) than in the level 3 courses (47.6% in New Zealand versus 44.9% in Hong Kong), which produced this significant interaction term. This pattern of level 2 and level 3 courses may be due to the unclear assignment of course levels of one university in Hong Kong. However, a further ANOVA analysis excluding these course syllabi revealed that the results remained the same, with the main effect of culture being non-significant ( $F[1,98] = 0.69, p = .41$ ), but the main effect of level ( $F[3,98] = 6.90, p < .01$ ) and the interaction effect were still significant,  $F[3,98] = 4.37, p < .01$ . Similar pattern of level 2 and level 3 courses was also observed, with larger difference observed in the level 2 courses (29.5% in New Zealand versus 64.6% in Hong Kong) than in the level 3 courses (47.6% in New Zealand versus 44.9% in Hong Kong).

*Assessment by coursework and course objectives.* Correlation analysis between educational objectives and assessment methods showed that neither type of educational objectives (i.e., *terms describing knowledge development* and *terms describing critical thinking skills development*) was significantly related to assessment by coursework. Specifically, *terms describing critical thinking skills development* did not significantly correlate with the percentage of assessment by coursework (total sample:  $r(122) = .12, p = .19$ ; New Zealand sample:  $r(58) = .12, p = .36$ ; Hong Kong sample:  $r(62) = .12, p = .36$ ), which did not show support for the idea that critical thinking skills development mentioned in course outlines would be positively related to assessment by coursework. An independent-sample t-test showed that there was no significant difference on the weighting of coursework between courses with and without explicit description of critical thinking as objectives,  $t(122) = -0.99, p = .33$ .

A closer look at the types of coursework revealed that there were five major kinds of coursework, including essay, laboratory exercises (such as writing lab reports, setting up experiments), research related projects (for example, doing surveys and writing up research reports), presentation of a research project in a seminar, and finally, lecture/ tutorial/ laboratory participation. New Zealand and Hong Kong were not significantly different from each other in terms of using assessment methods such as essay ( $\chi^2[1, N = 130] = 0.49, p = .48$ ), lab exercises ( $\chi^2[1, N = 130] = 3.21, p = .07$ ), research related projects ( $\chi^2[1, N = 130] = 2.55, p = .11$ ), and presentation ( $\chi^2[1, N = 130] = 0.04, p = .85$ ). However, significant difference was observed in assessment by lecture/ tutorial/ laboratory participation ( $\chi^2[1, N = 130] = 35.20, p < .001$ ), with more courses in Hong Kong (35 courses comparing with four in New Zealand) including this method of

assessment.

In relation to the courses with explicit descriptions of critical thinking as course objectives, the chi-square analyses revealed that none of these kinds of coursework were related to whether a course explicitly stated critical thinking as course objectives or not: essay:  $\chi^2(1, N = 130) = 2.45, p = .12$ ; lab exercises:  $\chi^2(1, N = 130) = 0, p = 1.00$ ; research related projects:  $\chi^2(1, N = 130) = 0.56, p = .45$ ; presentations:  $\chi^2(1, N = 130) = 0.81, p = .37$ ; and participation:  $\chi^2(1, N = 130) = 2.24, p = .13$ .

#### *2.4. Discussion*

To compare the instructional contexts between Asian and Western cultures, this study investigated the educational objectives and assessment schedule in the psychology course syllabi from the universities in Hong Kong and New Zealand. Both educational systems in New Zealand and Hong Kong have been influenced by the British system. In contrast to the Socratic approach of education in New Zealand (Campbell & Li, 2008), the educational system in Hong Kong has been more influenced by Chinese traditional cultural and educational values (Biggs & Watkins, 2001). It was expected that the instructional contexts between the two cultures would be similar in terms of the expectations on the cognitive development of students but different in terms of the instructional practices as a result of the influences of different cultural traditions.

The results indicated interesting similarities and differences in the educational expectations and practices in the instructional contexts between the two cultures. First, as originally expected, the instructional contexts in both cultures were found to place similar emphasis on the development of higher-order cognitive skills that are considered relevant to the practice of critical thinking



(Tsui, 2006). However, it was shown that university courses in Hong Kong were found to emphasize more on knowledge development than those in New Zealand. More important, courses in New Zealand were found to be more explicit in terms of emphasizing critical thinking as an educational goal. Second, contrary to the original expectation, the use of coursework assessment was not found to relate to the educational emphasis on the development of critical thinking. In addition, the instructional contexts in both cultures were actually not very different from each other in terms of the general use of coursework versus examination as assessment. However, significantly more courses in Hong Kong include assessment by means of lecture/ tutorial/ laboratory participation.

#### *2.4.1. Expectations of cognitive development*

The present study showed that universities in Hong Kong emphasize more knowledge development, whereas those in New Zealand emphasize critical thinking as course objectives more explicitly, which appears consistent with the common views about the two cultural traditions of education. Despite the British influence on educational structure and the fact that many university instructors in Hong Kong have been trained in other Western countries such as the United States or the United Kingdom, the educational system is still embedded within a Chinese context, where the deep-rooted traditional Chinese values, beliefs and norms might continue influencing the focus of education (Biggs & Watkins, 2001). For example, achievement in examinations play a very important role in determining students' progression on the academic ladder in Hong Kong educational system (Watkins & Biggs, 2001), which might induce a strong emphasis on knowledge acquisition and retainment for the sake of passing examinations. Such emphasis on knowledge development might have been

carried through from schools to universities under the same cultural context, which resulted in the observed cross-cultural differences in knowledge development at the university level.

On the other hand, courses in New Zealand were found to show relatively stronger explicit emphasis on critical thinking development than those in Hong Kong. These findings reflected that the educational expectations of students' development in critical thinking may be more explicitly valued in Western institutions than Asian institutions. In fact, given that the concept of critical thinking has been mainly theorized and developed in the West, it is therefore not surprising that Western institutions would show more explicit endorsement of critical thinking as an educational objective than Asian institutions. It would be important to highlight that, however, the instructional contexts in both Hong Kong and New Zealand has similarly endorsed higher-order cognitive skills as educational objectives. Therefore, although instructional context in Asia may show less explicit emphasis on critical thinking in education, the expectation of students' development in critical-thinking related skills may be similar in both Asian and Western instructional contexts.

#### *2.4.2. Instructional practices*

The correlation between coursework assessment and the educational objective of developing critical thinking skills was not significant, and the chi-square analyses also revealed that there was no significant relationship between coursework assessment and explicit description of critical thinking as course objective. Therefore based on the current findings, it is not possible to conclude that university course instructors tend to use coursework as a means to enhance the teaching of critical thinking as proposed by Yorke et al. (2000). However,

given the significant relationship between coursework assessment and the level of courses in both cultures, it is reasonable to speculate that coursework assessment may be used to fulfill certain demands as prescribed in higher-level courses. Further research with more sophisticated designs will be needed to address the question of the functions of coursework assessment within different educational cultures.

In terms of course structure as indicated by the assessment criteria, no significant cross-cultural difference was observed in the contribution of coursework assessment to the overall course grades, which also means that there is no difference in the contribution of examination/ tests assessment to course grades between New Zealand and Hong Kong. The result does not support the original prediction which stated that courses in Hong Kong would rely more on examinations in assessment and courses in New Zealand would rely more on coursework assessment.

Another interesting finding in coursework assessment relates to the nature of the coursework. Five kinds of coursework, namely, essay, laboratory exercises, research related projects, presentation, and participation were identified in the university courses from both New Zealand and Hong Kong. The former four kinds of coursework were utilized to a similar extent in both cultures, but significantly more university courses in Hong Kong included assessment by lecture/ tutorial/ laboratory participation. Courses in Hong Kong encouraged students' participation in class by making it one of the assessment items, which could be explained by a feature of Hong Kong classroom that is very different from the Western context. S. Chan (1999) pointed out that Chinese students were generally less spontaneous and more conforming to their teachers. They were also

quiet in class and were not encouraged to question or challenge teachers. Such style of learning was cultivated when the students were young, and was carried through to the students' learning approach in universities, where more active interaction and discussion in the classroom is actually encouraged and desirable (Lee, 1999). As a result, more university courses in Hong Kong are structured to encourage students' participation in classes by making it part of the assessment of the course, whereas it is not necessary in the New Zealand classrooms as students are generally proactive to participate in the class (Campbell & Li, 2008).

The present study revealed that differences in the instructional contexts regarding the educational expectations on critical thinking and knowledge development exist between two Asian and Western cultures. However, more systematic and sophisticated investigation on the tertiary curricula is necessary. For instance, the current investigation focused only on psychology courses, future research would be needed to extend the focus to other non-psychology courses, so that better understanding of the overall situation of critical thinking instruction in universities can be obtained. It would also be desirable to examine students' development in critical thinking skills and dispositions in relation to the use of different assessment methods in the course, so that more definite conclusion could be drawn on whether the use of a particular assessment method is more helpful in the development of critical thinking than another. In light of the fact that examinations/ tests are still very common forms of assessment in university courses, it will be worthwhile to investigate how different formats of tests (for instance, open-ended versus multiple-choice) may affect the learning outcome of the students. It is also possible to study how examination/ test questions can be better structured and written to help the development of students' critical thinking

ability (e.g., Morrison & Free, 2001).

### *2.5. Summary*

The present study indicated that the instructional contexts in Asia and the West are still influenced by the respective cultural traditions as suggested in the previous literature (Hammond & Gao, 2002; Tweed & Lehman, 2002). More importantly, the findings offered an initial idea about the possible influences of Asian and Western cultural-educational contexts on university students' practice of critical thinking. The next chapter presents a study which investigated the general conception of and experience in the practice of critical thinking among university students. The actual influence of cultural-educational contexts on students' practice of critical thinking has been examined in more details.

## CHAPTER 3

### **Comparison of the Conceptions of Critical Thinking between Chinese International and New Zealand European Postgraduate Students**

#### *3. 1. Introduction*

To fully understand the two key issues related to Asian international students' critical thinking, it is necessary to have a comprehensive understanding about the influences of the cultural-educational contexts on students' practice of critical thinking. While the findings in Chapter 2 offered a brief description about the characteristics of the cultural-educational contexts in Asia and New Zealand, it is not known how exactly these contextual characteristics might influence students' practice of critical thinking. For example, how students might conceptualize about critical thinking while being socialized in a cultural-educational context that explicitly emphasizes on the development of critical thinking among students? How students might actually express their critical thinking when they have been socialized in an instructional context that tutorial participation needs to be encouraged through formal assessment? The influence of cultural-educational contexts on students' practice of critical thinking needs to be addressed in order to gain a more comprehensive understanding about the influence of culture on critical thinking in higher education.

The perceived incongruence between Asian students' behavioral pattern and the behavioral expectations in the cultural-educational context has led Western educators to interpret Asian students lack the ability to think critically (Kumaravadivelu, 2003). This perception has also served as the basis to argue that critical thinking instruction may not be appropriate in international education (Atkinson, 1997). However, these arguments have mostly been examined from

the perspective of the educators. Students who are experiencing the influences of the international education context may in fact be a better source of information about the congruence between the characteristics of the students and that of the international education context. This student's perspective about the perceived influence of culture on their practice of critical thinking may be more helpful to evaluate the appropriateness of critical thinking instruction in international education.

Through examining the students' conception of critical thinking, it is expected to reveal the possible influences of cultural-educational contexts on university students' practice of critical thinking. Previous cross-cultural study on students' conception of critical thinking has shown that Chinese-speaking international and English-speaking Australian university students conceptualize critical thinking similarly despite their cultural and linguistic differences (Jones, 2005). Apart from that, the Chinese-speaking international students reported having experienced difficulties in the Australian teaching/learning context in terms of different teaching practices, which they try to adapt by seeking cues of the expectation in the Australian academic context. Another interesting finding was that both Chinese and Australian students concern about preserving social harmony when they needed to write a critical comment to their peers. Jones' study exemplified how the influences of cultural-educational context on students' practice of critical thinking may be revealed through cross-cultural investigation on students' conception of critical thinking.

The aim of the present study is to explore and compare the general conceptions of critical thinking between Chinese international and New Zealand European postgraduate students in the New Zealand context. Chinese students

formed the largest group of Asian international students in New Zealand (OECD, 2009; New Zealand Ministry of Education, 2008). In addition, Chinese international students may originate from different Asian countries and regions, so they can provide a more comprehensive view about the Asian cultural-educational context in general. Therefore, they were chosen in the present study to offer the Asian students' perspective in the present study. The study was exploratory in nature so no specific a priori hypotheses were made. However, based on the findings in previous research (e.g., Jones, 2005) and the findings in Chapter 2 about the characteristics of Asian and Western cultural-educational contexts, it was expected that similarities in the conceptualization of critical thinking and differences in the practice of critical thinking would be observed between the two samples.

The design of the study was guided by three major research questions: 1) How is the concept of critical thinking understood by Chinese international and New Zealand European postgraduate students? 2) How is the concept related to the cultural backgrounds of these two samples? 3) What are the similarities and/or differences in the conception of critical thinking between the two groups?

Qualitative research design was considered ideal for investigation of how a concept is understood, as it allows more room for the participants to express their original ideas than does the quantitative approach. To maximize the possibility of extracting information relevant to the cultures considered, individual interviews were conducted to address the above research questions. Postgraduate students were chosen as the target group of investigation because they would be able to provide a comprehensive view about their experiences of critical thinking instruction in university education. In addition, it is logical to assume that



postgraduate level of training offered the students higher level of exposure to issues related to critical thinking and therefore they would be more able to articulate their ideas about the concept and the relevant experiences than would undergraduate students.

### *3.2. Method*

#### *3.2.1. Participants*

Ten postgraduate students were recruited through advertising and snowballing in New Zealand. Five of the participants identified themselves as Chinese, and the remaining five participants identified themselves as New Zealand European. The participants were either enrolled in a master's or a doctorate program. To maximize the possibility of extracting information relevant to the Asian context from the Chinese participants, only Chinese students who had finished their undergraduate studies in an Asian country or region were recruited. Table 3.1 summarizes the profile of the two postgraduate student samples involved. Both samples were composed of participants with comparable demographics and disciplines of study.

Table 3.1: Profiles of the postgraduate student samples

ID	Gender	Age	Program of study	Language used in the interview	Undergraduate study in	Length of stay in New Zealand
<b>Chinese sample</b>						
C1	Male	29	Master in Applied Finance	Chinese	Mainland China	12 months
C2	Male	27	PhD in Computer Science	Chinese	Malaysia	12 months
C3	Female	33	PhD in Psychology	English	Singapore	9 months
C4	Female	26	Master in International Relations	Chinese	Mainland China	10 months
C5	Female	30	PhD in Marketing	Chinese	Taiwan	42 months <sup>3</sup>
<b>New Zealand European sample</b>						
N1	Male	32	Master in Management	English	New Zealand	-
N2	Female	44	PhD in Public Policy Management	English	New Zealand	-
N3	Male	28	PhD in Psychology	English	New Zealand	-
N4	Female	23	Master in Psychology	English	New Zealand	-
N5	Male	27	Master in Physics	English	New Zealand	-

### 3.2.2. Interview schedule and procedure

In-depth, semi-structured, audio-recorded interviews were conducted with the postgraduate students described above. The interview schedule consisted of seven questions, including general questions about the concept of critical thinking, questions about critical thinking in relation to the participant's culture, and questions about the importance of critical thinking in university education. Table 3.2 shows the complete list of guiding questions in the interview schedule. These guiding questions were aimed to serve as a guideline for the interviewer to elicit responses about critical thinking from the participants, so instead of adhering to a fixed structure, the interview schedule was developed with open-ended questions,

<sup>3</sup> The participant had finished a three-year masters program in a private institution in New Zealand about four years ago. Most of the students in that institution originated from Asian countries or regions. After that, she returned to Taiwan to work for four years before commencing her PhD study in New Zealand. Although she had more exposure to New Zealand culture than the other Chinese participants, her data were included because her experience in New Zealand did not show to influence her ability to present information specific to the context of Taiwan.

with prompts and follow-up questions employed as probes wherever it was appropriate.

Table 3.2: List of guiding questions included in the interview schedule

Questions
1. What are you studying for your postgraduate program at ____ (name of university)? (Chinese group also: how long have you been studying in New Zealand?)
2. What image or thought comes to your mind when critical thinking is being mentioned or talked about?
3. When would you use critical thinking? Under what situations have you used critical thinking?
4. How do you show critical thinking? If you are working on a task, when and how do you know that you are using critical thinking? How do you know if others are using critical thinking?
5. When thinking about Chinese (for Chinese group)/ New Zealanders (for New Zealand group), what is critical thinking for them?
6. What characterizes somebody who thinks critically in ____ (name of Asian region; for Chinese group)/ New Zealand (for New Zealand group)?
7. How do you compare Chinese students with New Zealand students (for Chinese group)/ New Zealand students with Chinese students (for New Zealand group) in terms of their critical thinking?
8. How important is it to learn about critical thinking in university? And why?

To ensure breadth and depth in the responses, interviews were conducted in either Chinese or English based on the preferences of the participants. The possibility of using the preferred language in the interviews would better enable participants to articulate their actual ideas, especially in cases where the participants were not confident in using English as a second language. Moreover, it may be easier for Chinese participants to convey indigenous ideas related to critical thinking in natural language. This flexibility of the medium of interviews is deemed acceptable as the data were aimed to be analyzed using a semantic approach of thematic analysis. According to Braun and Clarke (2006), the semantic data-analytic approach involved identifying themes within the explicit or surface meanings of the data, and then patterns in semantic content were

interpreted in terms of their broader meanings and implications. Anything that was beyond what the participants had said (for example, subtle meanings underlying particular language usage) would not be interpreted, so the choice of language was not expected to influence the interpretation of data.

In the interviews that were conducted with Chinese language, the participants occasionally used English words or phrases to aid their expressions, especially on topics in relation to their experiences in New Zealand. Also interesting to note is some of the Chinese participants were not aware of the Chinese translation of the term “critical thinking” (*Pi Pan Si Wei*), albeit they were all able to understand and talk about their ideas in relation to the English term. In such cases, the term “critical thinking” was used to refer to the concept throughout the interview even though Chinese was used as the major language in the interview. Although different languages had been used, all interviews were conducted by the same bilingual interviewer to ensure consistency across the data.

Ethical approval for this study was granted by the School of Psychology Human Ethics Committee at the university. The interviews lasted between 25 and 55 minutes and were conducted either at the participants’ offices or at the university research facility. Prior to the beginning of all interviews, informed consent was obtained from the participants. Upon completion of the interviews, participants were given \$20 grocery voucher as token of appreciation. They were also offered the opportunity to gain access to a version of the completed report of this study via email.

The interviews were transcribed verbatim. Prior to the actual analysis, all transcripts were read through once to provide a sense of the data-set as a whole. Thematic analysis was then conducted on the transcripts following the procedures

outlined by Braun and Clarke (2006). As the focus of the present study was to examine how the concept of critical thinking was understood by students of Chinese and New Zealand European cultural backgrounds, themes were identified by recognizing patterns in semantic content pertinent to the conception of critical thinking and its relationship with culture. Using the semantic approach, themes were identified within the surface descriptions of the data and interpreted in relation to previous literature of critical thinking and its relationship with culture (Braun & Clarke, 2006).

### *3.3. Results*

Three broad categories of themes related to the concept of critical thinking were identified, namely, conceptions of critical thinking, application and cultivation of critical thinking, and expression and promotion of critical thinking.

#### *3.3.1. Conceptions of critical thinking*

The conceptions of critical thinking of the current samples of postgraduate students appeared consistent with how critical thinking has been presented in the literature (e.g., Ennis, 1987, 1991; Halpern, 1996, 1998; Paul, 1993b). The general question of “what is critical thinking” elicited responses that can be classified into three related categories, namely, 1) critical thinking is purposeful and is used to produce or achieve an outcome; 2) critical thinking is to see things beyond face value and adopt alternative perspectives; and 3) critical thinking is effortful and a habit of mind. In addition, critical thinkers were seen as intelligent, knowledgeable, educated, and open-minded, a pattern which appears consistent with the ideas about the nature (Chapter 1, Section 1.1.1) and content of critical thinking (Chapter 1, Section 1.1.2) in the literature. Figure 3.1 depicts the themes under this category.

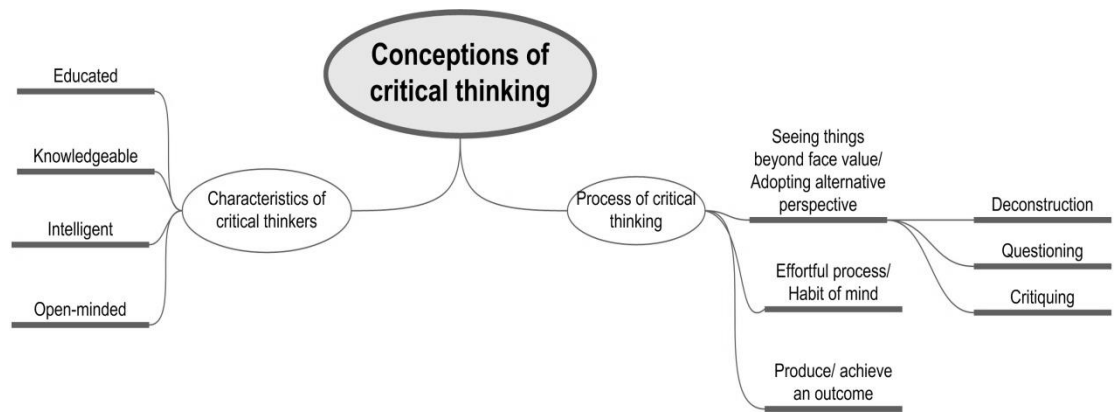


Figure 3.1: Concept map of the category “Conceptions of critical thinking”.

*Critical thinking is used to produce or achieve an outcome.* Similar to the definitions of critical thinking as a form of purposeful thinking in the literature (e.g., Halpern, 1998; Paul, 1993b), the participants from both samples agreed that critical thinking is used for achieving certain purposes or outcomes. Depending on the nature of the tasks, problems, or situations, the kind of outcomes achieved through critical thinking may be different. These included relatively more tangible outcomes such as “a different invention” (C2), “designing a product” (N5), “a better piece of writing” (N4), and “a creative proposal for clients” (C1) or some more abstract outcomes such as “making a final judgment” (N3) and “creating a concept that fits better to the context” (C5).

Achieving certain purposes appeared to be an important element of critical thinking, otherwise the efforts spent is futile. Paul (1993b) stated that: “Good thinking is thinking that does the job we set for it. It is thinking that accomplishes the purpose of thinking”. Similar ideas were also notable from both samples of postgraduate students:

In reality, critical thinking comes up with ideas, and how to actualize the ideas is even more important. If we only think critically, and then come up with some ideas, and then we forget about them, it would not be of any good to the real world and it’s not ideal. (C2)

It's also, I guess, weighing up what they're saying to come to some kind of conclusion, even if that conclusion might not be certain. It's not just generating both sides of the argument. It's putting them together to come to further the ideas. (N3)

The process of achieving an outcome through critical thinking requires creativity. Many participants perceived that critical thinking and creative thinking are interrelated (N1, C1, C2, N4, C5), especially in the case of using critical thinking to make sense of information and then come up with a solution to a problem or an outcome. As suggested in Chapter 1, while critical thinking and creative thinking are conceptually distinct from each other, they are interdependent in terms of application. This view is similar to Paul's (1993b) argument that "the creative dimension of thinking is best fostered by joining it with the critical dimension". Similar ideas were put forth by participants from both samples, showing that critical thinking and creative thinking cannot be easily distinguished from one another:

Critical thinking must be a kind of rational thinking. That means you have to consider the background information of a problem or an issue. You can then organize all the information through critical thinking, and based on this organization of information you will be able to produce a creative outcome. (C1)

Critical thinking would be identifying maybe the weak points, and the applicable points from those frameworks [...] and creative thought is being able to take, envision 5 or 6 frameworks may be at the same time, and, and see the linkages between the parts which you're going to use for this particular case. So, one without the other isn't possible (N1)

*Critical thinking is to see things beyond face value and adopt alternative perspectives.* Both samples of postgraduate students possessed similar conceptions about the nature of critical thinking. They offered general ideas about the cognitive processes while engaging in critical thinking. Many participants suggested that critical thinking was about seeing things beyond the face value and

adopting alternative perspectives when they process information that is presented to them, which was very similar to the findings in a previous study conducted with undergraduate students in New Zealand (Phillips & Bond, 2004). According to the present samples of participants, critical thinking was achieved through critiquing, questioning, and deconstructing information, with critiquing and questioning being the most common strategies used by all participants. Similar to the findings in Phillips and Bond's (2004) study, while the participants did not give the same labels to the cognitive skills as those in the literature, they were suggesting skills that were essential to think critically. For example:

Skills in identifying assumptions in an argument (Ennis, 1987) or argument analysis (Ennis, 1987; Facione, 1990a; Halpern, 1996):

If someone is suggesting that they are trying to think critically, then they are trying to... involve challenging the taken for granted assumptions [...] pull apart and challenge what are the underlying assumptions that someone is using to make a claim. (N2)

I would emphasize more on the term "critical" of critical thinking, that is to say, no matter what is brought to you, you cannot simply accept it as truth. You need to critique it meticulously, and then find out its logical flaws or its mismatch with the reality. (C4)

Skills in interpreting whether conclusions are warranted based on given data (Pascarella & Terenzini, 2005), or verbal reasoning (Halpern, 1996):

So in a way it's like you're critiquing the current policies and guidelines and um, and trying to fit your findings in with that. So it's kind of like a big process, you're not taking anything at face value. (N4)

[...] to be critical about things that are presented to you. So it's not just accepting things at face value, but thinking more about questioning... more about the validity of what you are hearing, what you're saying... (C3)

Skills in making judgments and problem-solving (Ennis, 1987; Halpern, 1996; Pascarella & Terenzini, 2005):



So it's a more in-depth thought process, it involves this kind of... there's a judgment aspect to it I guess. (N3)

There are many different angles to view a problem [...] through critical thinking we can make sense of these different angles in order to help to solve the problem (C1)

Critiquing and questioning are not limited to information that is presented to the critical thinkers. Critical thinking also involves critiquing and questioning one's own ideas and thoughts, especially when one is using critical thinking to work on a task, an idea which is very close to Facione's (1990a) idea of the skills of "self-examination and self-correction":

I suppose trying to apply it [critical thinking] when I've actually tried to write something myself, and then to step away from my work and treat it as if some stranger had written it, and attack my own work. (N2)

When I read my own writing now, I would be able to tell where I need modification before submitting it to my supervisor. (C4)

The major goal of questioning and critiquing information from the others is to seek reasons behind arguments (Ennis, 1987; Siegel, 1988). At the same time, these questions and critiques were required to be well-reasoned so that they can be qualified as critical thinking (Ennis, 1987, 1991). Similar ideas were iterated by the current samples of postgraduate students:

Rather than jumping up and down and waving their hands and saying I'm right because I'm right, they'll [critical thinkers] actually put some points up to either back up their statement or counteract what anyone else is saying. (N5)

When I hear somebody says something, I would ask "Is he logical? Do I agree with his arguments?" And if I agree with his argument, I would ask myself "What is my reason?" or if I don't agree, "Why don't I agree?" (C5)

*Critical thinking is an effortful process and a habit of mind.* Participants from both samples also pointed out that engaging in critical thinking is an effortful process (Halpern, 1996, 1998). Critical thinking tasks such as analyzing

a complex argument require deliberate use of mental effort (Halpern, 1998). Through continuous use of mental power to think critically, a person would gain expertise in critical thinking in such a way that the process becomes a habit of mind (Halpern, 1996; Paul, 1993b) which might sometimes come automatically to critical thinkers.

I feel that critical thinking is something mentally demanding [...] I might have used critical thinking unconsciously in everyday life [...] I think it's something that if you use it often, it will be internalized as something that makes you different as a person. (C1)

My original degree is in politics, so it's mostly sort of theory, and so that's probably a long ingrained habit of trying to figure out what's not being said... (N2)

In order to sustain the investment of mental efforts in deliberate thinking, Halpern (1998) argued that a critical thinker needed to be willing to engage in the process without giving up prematurely despite its effortful nature. A desire to make justified and sound arguments could be a source of motivation to persist in such a process:

I think it takes a lot of energy to think critically. You know like cos I don't want to just come out and make a statement that's not based on anything and that you can't justify or argue, so it takes a lot of energy to think critically. (N4)

*Characteristics of critical thinkers.* Participants from both samples tended to view critical thinkers as those who are educated, knowledgeable, and intelligent. It appeared that critical thinking was associated with other concepts of human intellectual competence such as content knowledge (e.g., Perkins, 1987) and intelligence (e.g., Halpern, 2007)

So people who have been to university, or are just quite talented so not necessarily been to university but you know, do quite a bit of reading and that kind of thing. (N3)

She's a person who cannot live without books. I think that knowledge is very important to the quality of thought of a person. (C4)

I think it definitely takes a degree of intelligence to think critically [...] I think it takes, like, education, I think, um I'm not sure whether it comes naturally to the majority of people, so I think it's something that is definitely encouraged at like university. (N4)

Possessing certain level of knowledge on a topic appeared to be an essential prerequisite for the process of critical thinking. In daily practice, it seemed content knowledge is needed for carrying out critical thinking (Perkins, 1987). However, it should be noted that it was the requirement of a task which determined the kinds of knowledge needed. It was not the same as suggesting that content knowledge determined the nature of critical thinking (McPeck, 1990a).

I feel definitely more comfortable thinking, like expressing my critical thinking when it's something that I feel I know a lot about or have read quite a lot about, yeah, because almost it's like you can't justify that opinion (N4)

I think I am still enriching my database of information, knowledge, in these areas, and then one day, I would be capable to critique, to criticize other people's sayings. (C5)

The knowledge required for critical thinking should encompass opinions or arguments devised from many different or even opposite perspectives. A comprehensive database of knowledge for critical thinking would require active acquisition of wide range of information, which is comparable to what Ennis (1987) called "try to be well informed" or Facione's (1990a) "inquisitiveness with regard to a wide range of issue" in terms of critical thinking dispositions. A comprehensive understanding of different perspectives would enable well-reasoned conclusions to be drawn:

Usually you'd hope if someone is against maybe some popular opinion, well whatever, whatever's going on, that they have um researched both sides, which is usually what's happened, and they have um thought about both sides of it, and got their, got a number of different sources. (N5)

Open-mindedness towards different perspectives or alternative ideas is necessary for a person to obtain a broad range of information. Open-mindedness towards different critiques and opinions in terms of one's own ideas or arguments is also essential characteristic of a critical thinker (Ennis, 1987; Facione, 1990a). As opposed to being rigid and narrow-minded, being open-minded requires the willingness to accept and incorporate divergent points of views raised by the others into one's own ideas or arguments:

I think if you're going to critique others you have to be open to critique, yeah certainly. You have to be more, ah, inclusive, as opposed to divisive [...] I suppose if you're a critical thinker and you take in critique then you have to include the person that's saying it and that way you're inclusive, I'd say. Divisive would be the opposite of that, like oh I don't believe your choice, your choice is crap, my choice is better, that would be divisive. (N1)

I find that if some people are very rigid and they are very narrow, sometimes I just find that they are very narrow in their thinking. [...] And believing in one thing is fine, but not even willing to consider or concede that other thoughts, that other opinions, have merit, then I think that to me is *not* critical thinking. (C3)

Therefore, critical thinkers should not only have the capabilities to critique and question self and others, but also be prepared for critiques and questions from other perspectives and be ready to incorporate these alternative ideas into their thinking. This is a view consistent with the critical thinking dispositions proposed by theorists such as Ennis (1987, 1991), Facione (1990a) and Halpern (1998).

### *3.3.2. Application and cultivation of critical thinking*

Themes that are related to the application and cultivation of critical thinking were also identified in the present study. These included (1) negative consequences resulting from inappropriate use of critical thinking; (2) institutional and familial influences on the cultivation of critical thinking; and (3)

disciplinary-specific application of critical thinking (see Figure 3.2). Also important to note is that these themes could be identified in the data from both samples, which indicated a considerable level of cross-cultural similarity in the understanding of critical thinking at the applied level.

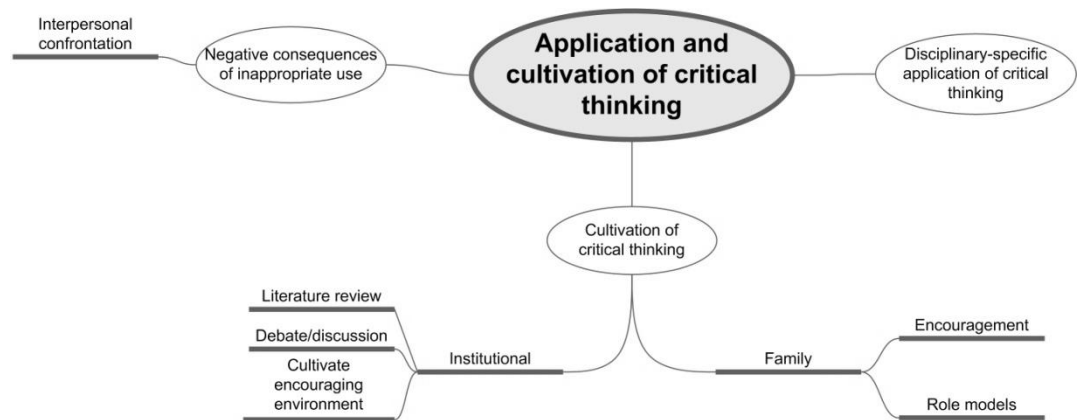


Figure 3.2: Concept map of the category “Application and cultivation of critical thinking”.

*Institutional and familial influences on the cultivation of critical thinking.*

All participants in the present study agreed that it was very important to cultivate critical thinking among university students, because “without critical thinking, one cannot work properly on future job tasks” (C1), and possessing critical thinking skills “then we will have more healthy workplaces but also a lot more innovation” (N2). These ideas are quite similar to those raised by other education theorists (e.g., ten Dam & Volman, 2004). Other than these pragmatic reasons, critical thinking is essential skill for university students also because critical thinking “can improve performance in research” (C2), and more generally speaking, “there is a right and wrong answer but there’s a lot of leeway in between, and critical thinking can help us either head further one way or further the other” (N5).

Critical thinking was even seen as what differentiates a well-educated person from a less educated one, which coincided with the emphasis on critical thinking as the major reason of higher education (e.g. Halpern, 1999; Paul, 1993a):

So now many people have studied in the universities, but you still have the feeling that they are just like an illiterate person. So where is the difference? The difference is in critical thinking. So what does it mean to be a literate person? If a literate person still acts like a rowdy and thinks random ideas, this is just a bit what-do-you-call-it. (C1)

There were some methods and ideas that the participants found quite useful in cultivating university students' critical thinking. For example, having the students to write a literature review in essays (N1, C4) or involving a comparison of different theories during the discussions in tutorials (N4) are some possible means to help develop university students' critical thinking. Some of the participants suggested that cultivation of critical thinking may even start as early as high school level. Nevertheless, there also seemed to be a minimum level of education required for critical thinking training because of the students' needs to accumulate sufficient content knowledge and information and to develop sufficient mental capacity for the critical thinking process:

In school, I do not agree with that students at that stage should be taught 100% of critical thinking, I think I will only agree with 50% of training of critical thinking [...] for the remaining 50%, the students should really listen to the teachers' teaching [...] Knowledge and critical thinking are equally important at that stage. (C2)

I think critical thinking is something that is quite mentally demanding. [...] it's not until you get slightly older that you have, your cognitive abilities have developed enough for most people to be able to do it efficiently. (N3)

Regardless when the best time or which the best way might be to cultivate critical thinking, the participants were generally concerned about establishing an

encouraging environment for students to engage in critical thinking. It is especially important to avoid unnecessary intimidations to students in critical discussions and argumentations:

[...] and I suppose also like being, if you were the teacher you'd want to control it so that it's, it sort of lies to the...and that people aren't afraid to talk their point of view. Yeah, I think that's, that would be important. (N1)

If the teacher could accept the students' independent thinking, this would help cultivate the students' critical thinking. If the teacher do not accept the students' independent thought, and just criticize the student that "you are being disrespectful to me", then it would not help to cultivate critical thinking among students. (C2)

Moreover, an encouraging environment is not only about avoiding unnecessary intimidation to the students, but also providing positive reinforcement to the students to engage in critical thinking:

If you are in an environment that encourages critical thinking then that's going to be fostered and then you're probably going to be more comfortable expressing yourself that way. (N4)

The teachers won't necessarily demand us to change, but they would require us to have our independent thoughts. So they won't necessarily say if they agree with our ideas or not, they would just encourage us to think. (C5)

The key to establish an encouraging environment that supports critical thinking is to build a relationship of trust between the parties involved. A trusting relationship would be useful to reduce the level of anxiety and to increase the level of perceived supportiveness when a student engages in critical thinking and expresses his/ her ideas. The idea of a trusting relationship was best illustrated by a participant's past experiences at work where she tried to encourage critical thinking among the colleagues:

So I think as long as you can, you know, have good dynamics within the team where there's trust and respect and I mean yes there are boundaries about how you critique, you

know, you don't put people down. But I think if you can get that going then yes you can have collective teamwork and good critique. (N2)

While it seems commonsensical that university education has important effect on critical thinking development, the responses of the current samples of postgraduate students illustrated that family also plays a significant role in cultivating one's habit in thinking critically. Family can influence on one's thinking by providing role models of critical thinking:

Critical thinking is cultivated through silent transforming influence from the others. [...] If the children go home and if they have elders in their family like some uncles or aunties who are well-educated thinkers, or even their own parents, then I think they would have better chance to acquire critical thinking than the others. (C1)

I suppose my parents are extremely well-educated [...] so they sort of have been encouraged to be outspoken [...] so you know growing up in that kind of environment we were really encouraged to question things, um, and my younger brother for example, he's incredibly critical... (N4)

Apart from providing role models, family exert influence on one's thinking by offering encouragement, guidance and even coaching about the critical ways to think and acquire knowledge and information.

I think the major reason behind is that her parents are both highly educated persons. They were the first-generation university graduates after the Cultural Revolution. So I think they both guided her a lot on her education and developed her knowledge. (C4)

I certainly know with my step-daughter and her boyfriend, [...] they hadn't done very well in their exams, and they weren't enjoying their courses. And we had many conversations about that [...] And so, I think this year they are trying [...] they're just being introduced to this critical stuff, and I think they're starting to learn that being curious...(N2)

The notion of family influences on critical thinking development is interesting in that most of the discussion surrounding cultivation of critical thinking in the literature has been focused on instructional strategies or institutional influences



(e.g. Halpern, 1998; ten Dam & Volman, 2004; Tsui, 2002, 2006). The present findings indicated that cultivation of critical thinking did not necessarily take place only in an institutional setting. Family could influence on one's development of critical thinking by providing role models and encouraging the use of critical thinking. These familial influences also appeared to be fundamental to develop one's habits in critical thinking since a young age.

*Negative consequences resulting from inappropriate use of critical thinking.*

Although critical thinking has predominantly been considered as a favorable outcome in the education literature, the concept might be evaluated from a less favorable perspective. The idea that negative consequences could be resulted from being too critical or overusing critical thinking has rarely been mentioned in the literature. Some participants suggested that these negative consequences included cynical world views and even interpersonal confrontation. It was interesting to note that these concerns arose from both Chinese and New Zealand European students:

I really think that critical thinking is a two-edged sword. It means that it has some good aspects, but the bad ones are also obvious [...] Overusing critical thinking would make your life become inflexible, and overusing may also prompt you to react to everything with a hostile attitude. I think that excessive use of critical thinking is in fact a reflection of one's hostile attitude. (C4)

I really don't like confrontation and I think, you can give feedback, and like constructive, somewhat critical feedback to someone, but the way in which you communicate that can differ significantly... (N4)

Interpersonal confrontation might lead to discontinuation of constructive and critical discussion on important issues. In face of a potential interpersonal confrontation in situations such as interacting with someone who is less open to alternative opinions or the social context is judged to be inappropriate for

arguments, even a person with critical thoughts or ideas might choose to react with silence instead of continuing the discussion:

If the other person is that kind of person who is not willing to take in criticisms, I may, um... yeah, actually I may not say “I don’t agree with you”, I may just reply “oh yes...”, and then try not to talk about this topic any more. (C5)

In my mind I had like all these arguments formulated and I was thinking, I think yeah being quite critical myself, and coming up with these rebuttals and things but I just didn’t like really express it cos I felt like in that social situation it was kind of inappropriate. (N4)

The comments regarding the negative aspect of critical thinking were consistent with Halpern’s (1998) caution that the word *critical* in *critical thinking* might be used in a pejorative way to describe someone who is always making negative comments or finding faults. Some of the participants from both samples picked up that negative connotation of critical thinking, especially in relation to the “overuse” of critical thinking. Nevertheless, as Halpern (1998) suggested, being *critical* in critical thinking involves evaluation and judgment with the goal of providing useful feedback that serves to improve the thinking process. In this sense, being open-minded and flexible to alternative perspectives are necessary to ameliorate the possible negative effects brought by inappropriate use of critical thinking.

I think it’s necessary to have one’s own thinking, but within the limit of one’s own thinking, we should try to accept the other’s ideas, and then create a concept that would better suit the context. That’s what I think the main purpose of critical thinking is. (C5)

*Disciplinary-specific application of critical thinking.* In the literature of critical thinking, there is a debate about whether critical thinking should be conceptualized as a general set of skills that applies across fields or subjects (Ennis, 1989, 1990) or as a list of skills that vary across fields or subjects under consideration (McPeck, 1990a, b). The responses of the current samples of

postgraduate students suggested that what differentiated across disciplines are not the kinds of critical thinking skills being used, but rather how critical thinking is applied.

As shown in the previous sections, the overall conceptions of critical thinking were similar across participants, that is, it involves seeing things from a variety of perspectives. Through questioning and critiquing, a critical thinker seeks reasons for making or judging an argument. Nevertheless, it should be pointed out that the participants' conceptualization of critical thinking was somehow confined by their respective fields of training. Some participants commented that there seemed to be only few true critical thinkers in their fields of study (C2, N2), and they all referred their uses of critical thinking to their experiences with their research projects or theses. Although the current sample was not large enough to draw firm conclusions, it was interesting to note different patterns in the application of critical thinking between science and social science disciplines. Specifically, there appeared to be a stronger emphasis on invention and design through critical thinking in science (C2, N5), while drawing conclusions, solving problems, making decisions and judgments seemed to be of higher relevance to fields such as management, political science, and psychology. The comment made by a master student in physics might best illustrate this point:

I understand that in, um, some other parts of the university that's probably not going to be the case because they don't have um as much um practical work in, um in their teaching or in their backgrounds. It's kind of hard, I think it really kind of depends on what the, the school or the background is for the way that critical thinking is going to be applied. (N5)

### *3.3.3. Expression and promotion of critical thinking*

The above two sections illustrated how the concept of critical thinking is generally understood by Chinese international and New Zealand European

postgraduate students who study in New Zealand. The conceptions by Chinese and New Zealand European samples were very similar and appeared consistent with the definitions of critical thinking in the literature (Section 3.3.1). The two samples were also similar in their views of the application and cultivation of critical thinking (Section 3.3.2). However, there appeared to be more cross-cultural differences in terms of the expression and promotion of critical thinking as revealed from the responses of the two samples.

In terms of expression of critical thinking, both samples suggested that the average individuals in their own cultures tended to be more reserved about their opinions, with New Zealand European participants comparing themselves with Americans or Europeans whereas Chinese participants comparing themselves with New Zealanders. It was interesting that the two samples were similar in terms of the perceived differences between Chinese and New Zealand European students – both samples perceived that New Zealand European students tend to be more expressive and direct in communicating their own ideas, whereas Chinese students tend to be more quiet and indirect in expressing their ideas in critical discussion.

In terms of promotion of critical thinking, both Chinese and New Zealand European students perceived that the education system in their respective culture have not done well enough to cultivate students' critical thinking. While the New Zealand European participants suggested that the education institutions should do more to encourage the students to engage in critical thinking, the Chinese sample suggested that there are inhibitory influences from family and formal education systems in relation to the expression and practice of critical thinking in the Asian educational culture. Specifically, Chinese participants tended to highlight more

inhibitory forces from family in terms of the engagement of critical thinking. These inhibitions were mostly related to the traditional practices and norms regarding knowledge and education and the ways of handling hierarchical relationships. In contrast, this kind of familial influence on critical thinking was much less obvious among the New Zealand European sample. Figure 5.3 illustrates the concept map of the category of “Expression and promotion of critical thinking”.

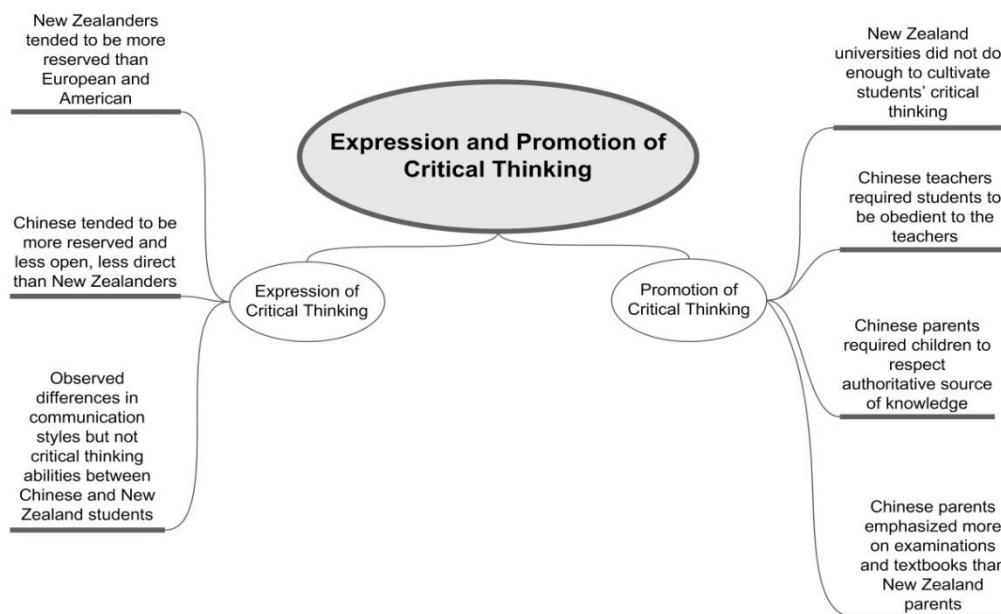


Figure 3.3: Concept map of the category “Expression and promotion of critical thinking”.

*Expression of critical thinking.* With North Americans and Europeans being the target of comparison, it was suggested that New Zealanders tended to be more reserved about their opinions towards controversial issues:

I feel like a lot of New Zealanders in general are quite reserved about their opinions [...]

That’s something in contrast to say like North Americans or Europeans... (N4)

While New Zealanders were perceived to be more reserved about their opinions in contrast to Americans or Europeans, Chinese students were perceived to be more reserved and less open than New Zealand European students. In terms

of the difference between Chinese and New Zealand students, both samples held a relatively consistent view: Chinese students tend to be quieter, more reserved and less likely to voice their questions and critiques than New Zealand European students, especially in face-to-face interaction:

Well certainly in face-to-face engagement my experience would be that the New Zealand born students are perhaps more likely to question what you the tutor are saying to them. Or express a contrary view to that they've been reading. That's in the setting of the tutorial class itself. So yes, I mean they [Chinese students] tend to be a little bit more quieter and a little bit more reserved and a little bit harder to draw out in a classroom setting. (N2)

The observed cross-cultural difference was actually not confined to a class or tutorial setting. In everyday discussions, Chinese students were also found to be more reserved about their opinions and less expressive than their New Zealand European counterparts.

Frankly, when I interact with the Chinese students here, I don't know if they have critical thinking or not. They may have, but they won't express it. But I have had quite a few debates with Kiwi students, for example, on certain issues. They are very willing to express their thoughts, and they are ready to let you know how they think. But Chinese students, if I talk about A, even if they think that B is correct, they would choose to remain silent. So I don't know if Chinese students have critical thinking. They may have, but I haven't found out. I don't know, cos they haven't expressed. (C4)

This perceived difference between the two groups of students appeared consistent with the observations made by Western teaching professionals in the education literature (e.g., Robertson et al., 2000; Lee & Carrasquillo, 2006). The general tendency of Chinese students to be more reserved and quiet in face-to-face interaction might be related to the traditional value of preserving interpersonal harmony (e.g., Yang et al., 2006). While it is possible for anyone to react with silence in view of a potential interpersonal confrontation (e.g. the responses of

participants N4, C5 in the previous section), the traditional values of preserving harmony and respecting authorities are more emphasized in the Chinese culture. Chinese students who have been socialized with these traditional values would be more likely to observe quietness, non-questioning and non-critiquing behaviors among Chinese students in face-to-face interaction.

This pattern of cross-cultural difference in face-to-face interaction was also evident in one of the Chinese participant's personal experiences of interacting with New Zealand European students:

I think that they [Kiwi students]... I find that they are more ready to express their own ideas or thoughts, and I tend more to listen to what the others say. I would think carefully inside myself, and only after being able to confirm my responses I would then talk about my own thoughts and ideas. Kiwi students, on the other hand, it's like as soon as you say something, they will be able to respond spontaneously. (C5)

As shown by these comments, Chinese students tended to appear less expressive, less spontaneous, and less direct in communication compared with New Zealand European students, but it did not necessarily mean that they were less capable in critical thinking than their New Zealand counterparts. As Gieve (1998) suggested, "debate can be played out within the minds of listeners also, but only when the terms of the debate, the questions are laid out; individuals cannot all be silent" (p. 128). Chinese students might need the time of silence to mature their thoughts before verbalizing their ideas. This was also relevant to Kim's (2002) research findings about the cross-cultural difference in the relationship between talking and thinking, where Asian tended to relate talking less to thinking than their Western counterparts. Chiu (2008) also suggested that Asian students might remain silent for different reasons such as avoiding conflicts or germinating ideas,

therefore it would be difficult to rely on the apparent silence to make reliable evaluation about Asian students' engagement in critical thinking.

Interestingly, many of the participants suggested that they did not find much difference between Chinese and New Zealand students in terms of their abilities to think critically, especially if the form of expression was not face-to-face verbal interaction:

From the written work I couldn't say that there was a cultural difference that I observed. Whereas in the face-to-face interaction there was that more, certainly my impression is more reserved, more deferential to the authority figure of the tutor. (N2)

*Promotion of critical thinking.* All postgraduate students agreed that it was important to cultivate critical thinking at university level of education. Nevertheless, both samples of postgraduate students were in general dissatisfied with the current educational efforts invested in the cultivation of critical thinking abilities among the university students in their respective cultures. The New Zealand European participants perceived that the universities in New Zealand had not done enough in cultivating students' critical thinking:

I think it's extremely important, and I don't believe that... that at certainly the undergraduate level we don't do it anywhere near enough. Even at postgraduate level we don't. (N1)

I don't think that we're educated very well in critical thinking actually [...] It scares the hell out of me that people would come out of university with no critical thinking. I mean, it's scared me for a long time actually [laugh]. (N2)

Nevertheless, another participant also noted that the educational culture in New Zealand has shown increasing emphasis on encouraging the cultivation of critical thinking among students within the school system. Moreover, the society could be considered as supportive to critical thoughts and their expressions in general:



I think like now in the school system it [critical thinking] is encouraged, within even primary school and high school people are given independent projects or assignments and group work and that helps foster in a way critical thinking [...] now that people are encouraged to ask questions and to explore things on their own so I think it is encouraged, and I think within society being able to express your opinions is absolutely fine and encouraged in general as well (N4)

These observations appear to be consistent with the findings in Chapter 2 about the characteristics of the instructional context in New Zealand. It has been shown that the university courses in New Zealand tend more to explicitly describe critical thinking as a course objective than those in Hong Kong. The value of critical thinking seems to be more explicitly endorsed in the cultural-educational environment in New Zealand than that in Asia.

On the other hand, the Chinese participants also indicated that they were not satisfied with the education systems in their home cultures in terms of cultivation of critical thinking. However, the major source of dissatisfaction was different from that of the New Zealand European participants. While the New Zealand European sample stated that the institutions ‘had not done enough’, the Chinese sample highlighted that there might be certain traditional ideas and practices inherent in the education systems inhibiting students’ development of the abilities to think critically. These ideas and practices included showing respect to teachers by being obedient:

Because we are always asked to listen to what the teachers said, if we do not obey, we would be considered as being disrespectful to the teachers. These ideas directly kill critical thinking. (C2)

Requiring students to obey the teachers could possibly limit the students’ motivations to question, to critique, and to see things from alternative perspectives. The strong emphasis on achievement in examinations and the

teacher-centered instructional practices in the university classrooms were also considered to have detrimental effect to the development of critical thinking among university students:

In Taiwan, most of the university courses still emphasize on the traditional or Asian kind of teaching style, which is essentially the teacher talks on the stage and the students listen. We are assessed predominantly by examinations. Even if we need to submit some kind of reports, most of them are finished according to the theories taught in the textbooks. So there is less emphasis on our own thinking. (C5)

This comment indicated that there is not a definite relationship between the forms of assessment and the educational emphasis on cultivation of critical thinking, because the actual content and design of the assessment methods are actually what matter in helping students to develop critical thinking. This idea may help to explain the non-significant relationship between assessment methods and course objectives in the university courses as observed in Chapter 2.

While participants from both samples suggested that family could positively influence on one's development in critical thinking by providing role models and an encouraging environment (see Section 3.3.2), it was found that family might also inhibit one's expression of and engagement in critical thinking. This is especially the case in traditional Chinese families. For example, high level of expectation of academic achievement among Asian parents was suggested to have negative effect on students' development of critical thinking:

Because the parents insist that you should get A-grade – no matter what, you should get A-grade. Only if the parents are aware of that critical thinking cannot be developed through achievement in formal education and that it needs to be encouraged and cultivated, there would then be chances of improvement (C2)

It was interesting to note that these observations about the Chinese parents were echoed by a comment made by a New Zealand European participant who

speculated that the New Zealand parents tend “not to be so hard on the textbooks” in contrast to the Asian parents (N5). Therefore, it seemed that cross-cultural differences in parents’ expectations on students’ academic achievement had played a significant role in the development of students’ critical thinking.

Moreover, traditional Chinese culture valued showing respect to authorities, for example, elders in a family, teachers, or even the knowledge presented in textbooks. These values would be reinforced through family socialization process and in turn inhibited a person from engaging in critical thinking especially in terms of challenging or critiquing the ideas of authorities:

I think that, when I was in Taiwan, it was especially so with my family. They would require me to listen to the others. If you have your own opinions... they might think that... especially if those are authorities, like elders in the family or teachers in the school, or even a saying from a book, they would say, “Look, it’s written so in the book... You see, you teachers also say so... and you see who and who also said so! You should follow their instructions and you should obey what they say” (C5)

Therefore, it is also likely that students’ learning behaviors in terms of critiquing and questioning existing ideas are at least partially influenced by being socialized in a culture which encouraged those practices. As Gow, Balla, Kember, and Hau (1996) suggested, “Chinese learning approaches is a function of socialization processes and the learning context” (p.109) but rather than any inherent characteristics of Chinese students. The differences in the expression of critical thinking between Chinese and New Zealand European students might be resulted from the cultural socialization processes in terms of promotion of critical thinking instead of a difference in the abilities to think critically.

### *3.4. Discussion*

Based on this analysis, Chinese international and New Zealand European postgraduate students seemed to hold similar views about the purposes of critical thinking, the kinds of cognitive skills involved, and the characteristics of critical thinkers. Their understandings were also comparable with the formal definitions of critical thinking available in the literature.

Interestingly, the ways in which the students described critical thinking were similar to those identified in a previous study conducted in New Zealand (Phillips & Bond, 2004). Without using technical terms such as argument analysis, verbal reasoning or open-mindedness, which is prevalent in the literature of critical thinking, the responses of the students essentially pointed out that critical thinking involves the use of various cognitive skills with appropriate attitudes in order to achieve different purposes.

#### *3.4.1. General conception of critical thinking*

The findings of the present study showed that Chinese postgraduate students of Asian cultural backgrounds were not any less articulate than their New Zealand European counterparts about the concept of critical thinking. While differences could be observed across individuals, for instance, the application of critical thinking on disciplinary-specific matters, there was no substantial difference in the general conception of critical thinking that could be attributed to the cultural backgrounds of the participants.

Juxtaposing the present findings to the results of Jones' (2005) study, the findings showed that Chinese international students hold similar conception about critical thinking as their Western counterparts. In contrast to Jones' (2005) case-study in which the students' perceptions regarding a particular critical thinking

learning project were examined, the present study has demonstrated that Chinese and Western samples were comparable in terms of general conception of critical thinking, indicating a cultural universal understanding of critical thinking might be possible.

Despite the deliberate selection of Chinese international students who had finished their undergraduate study in Asian region to maximize the possibility of extracting information relevant to the Asian context, it can be argued that their conceptions of critical thinking might have been somehow influenced by the New Zealand culture during their stay for their postgraduate studies so that cross-cultural similarity was observed. For instance, many of the Chinese participants were not aware of the Chinese translation of the term *critical thinking*. However, even it is the case, the present findings would indicate that Asian students are adaptive to the conventions of different educational cultures (see also Durkin 2008a, b; Jones, 2005). As Durkin (2008a) suggested, learning to think critically in an academic context is a learning journey applicable to every student. Even though the traditional cultural conventions held by Chinese or other Asian students may have positioned them at a different starting point than their Western counterparts in the learning journey, every learner would eventually achieve more or less similarly based on the requirement of the educational context.

#### *3.4.2. Comparison between Chinese and New Zealand European students*

In addition to the conceptions of critical thinking, the present study highlighted themes related to the application, cultivation, expression, and promotion of critical thinking, in which both cross-cultural similarities and differences were observed between the responses from the two samples.

Regardless of their cultural backgrounds, all postgraduate students in the present study agreed that critical thinking was an important aspect of university education (see also Howe, 2004). While certain instructional strategies such as essays-writing and group discussion were suggested to be useful in cultivating students' critical thinking, the participants highlighted the importance of establishing an encouraging environment in which students would feel safe and supported to engage in and express critical thinking.

In general, both samples of postgraduate students perceived that the most significant cross-cultural difference between Chinese and New Zealand European students lay in the expression of critical thinking. In fact, expression of critical thinking has been the major source of perceived cross-cultural difference in critical thinking between Asian and Western students in the literature (e.g., Lee & Carrasquillo, 2006; Robertson et al., 2000). It is interesting to note that some of the respondents suggested that apart from the perceived differences in expression of critical thinking, Chinese and New Zealand European university students may not be very much different from each other in their abilities to think critically.

Both samples of participants suggested that Chinese students tend to be more reserved and less expressive in contrast to their New Zealand counterparts. However, it has been shown that the observed behavioral difference could not simply be attributed to the cultural value of preservation of social harmony. As evident from the responses of the participants from both samples, in response to a potential interpersonal confrontation while engaging in critical thinking related activities, the behavioral option of silence or non-reaction might be chosen by anyone independent of their cultural backgrounds. Chinese students might be more likely to have been socialized in a culture which emphasizes preserving

social harmony so that they may be more likely to choose to react with silence in response to perceived interpersonal conflicts. It should be noted, however, that the emphasis on social harmony is only one of the many possible reasons behind Chinese students' silence (Chiu, 2008). As shown by the responses of the Chinese international postgraduate students, silence might indicate that the students are actually maturing their ideas through thinking critically in their minds. .

#### *3.4.3. Comparison between Asian and New Zealand sociocultural and educational contexts*

The New Zealand European participants in the present study perceived that the university education system in New Zealand was not doing enough in cultivating students' critical thinking ability. While the Chinese participants were also not satisfied with the universities in their home cultures, their focus was related more to the traditional education styles and practices which were suggested to inhibit students' development of critical thinking. The practices of teacher-centered instructions and the requirement of obedience to authority figures were particularly considered detrimental to the development of students' critical thinking. These observations about the inhibitory influences from the educational contexts offered plausible explanations to the observed differences in behavioral expression of critical thinking between Chinese and New Zealand European students.

Another interesting theme identified in the present study was the familial influence on cultivation of critical thinking, which has been less discussed in the mainstream literature of critical thinking. Nevertheless, in the field of developmental psychology, recent research has begun to investigate the relationship between children's social experience and development of critical

thinking, where parenting practice has been found to have important influence (see Heyman, 2008). In terms of the present study, as shown by the responses from both samples, family education indeed play a significant role in cultivating one's abilities and habits to think critically through providing role models and coaching to the children. On the other hand, it was also found that certain traditional ideas and concepts held by Asian families might not be favorable to the development of critical thinking. For example, traditional Asian parents might put a lot of emphasis on students' academic achievement in examinations. The emphasis on examinations might prompt students to engage in "non-questioning and non-critiquing" approach of learning which in turn inhibit the development of critical thinking. It is also common for the Asian parents to assume that textbooks, teachers, and other elders are authoritative sources of knowledge which should be obeyed by children. They might actively prevent their children from questioning and critiquing these seemingly authoritative sources of information. In contrast, this kind of child-rearing practices was not as evident from the responses of the New Zealand European sample.

Previous education research has demonstrated that child-rearing practices and structure of educational context have significant influence on students' achievement motivation and learning approaches (Gow et al., 1996; Kember & Gow, 1991; Salili, 1996). In terms of the development of critical thinking among students, child-rearing practices and structure of educational context also seemed to play a significant role. However, due to the exploratory nature of the present study, the present findings would better serve as indicating a possible cross-cultural pattern about the influence of child-rearing processes and structure of educational context on the cultivation of critical thinking. Further research



specifically designed for examining the influences of different socialization processes on cultivation of critical thinking would be needed before drawing any definite conclusion.

### *3.5. Summary*

The findings in the present study offered insights about how the Asian and New Zealand cultural-educational contexts influence on university students' practice of critical thinking. The responses from the Chinese international students indicated that while it is not appropriate to equate certain traditional cultural values or conventions with the observed behavioral differences between Chinese and New Zealand European students, being socialized in a culture which endorses those traditional values and practices might somehow inhibit their expression of and engagement in critical thinking.

It may be true that Asian students tend to appear more obedient in contrast to their Western counterparts. However, the Chinese participants were suggesting parents and teachers' requirement of students' obedience might prevent students from practicing critical thinking in some situations. But students' obedient behaviors do not necessarily equate to a lack of critical thinking abilities. It is evident that the Chinese participants in the present study were capable to critically evaluate their experiences of critical thinking in their home cultures, even though they might appear as being obedient to authority.

As suggested by the participants in the present study, although Chinese students and New Zealand European students are different from each other in terms of behavioral expression of critical thinking, the two groups might not be very much different in the abilities to think critically. This speculation has been tested with two parallel studies presented in the next chapter.

## CHAPTER 4

### **Comparison of the Critical Thinking Skills between Asian and New Zealand European Undergraduate Students**

#### *4.1. Introduction*

Previous research has shown that behavioral expression related to critical thinking cannot be used reliably to reflect the actual thinking of Asian students (Chiu, 2008; Kim, 2002). It has been suggested that the two key issues about critical thinking in international education, namely, the perception that Asian students lack critical thinking and the appropriateness of critical thinking instruction, would best be addressed through comparison on the actual critical thinking skills between Asian and Western students. The findings of such comparisons are expected to shed light on the two issues by providing empirical evidence of cross-cultural difference in measured critical thinking skills.

Concerning the cross-cultural difference in critical thinking skills, a study indicated interesting difference between Hong Kong Chinese and American university student samples (Hau et al., 2006). It was shown that the Hong Kong Chinese sample performed significantly better in a standardized measure of critical thinking skills than their American counterparts. Nevertheless, Hau et al. (2006) cautioned that the institution involved in Hong Kong is more selective in recruitment than the one in America, which might have set a different baseline for comparison between the two samples. In fact, to address the two issues regarding critical thinking in international education, it is considered more appropriate to provide evidence that is drawn from the context of international education.

In relation to the context of international education, the postgraduate students in the last study suggested that there might not be cross-cultural

difference in the ability to think critically, but the behavioral patterns of Chinese and New Zealand European students seemed to suggest a difference in expression. Nevertheless, at this point of writing, there has not yet been any published research on measured difference in critical thinking skills between Chinese/ Asian and New Zealand European students to verify these observations made by the postgraduate students. In fact, although many alternative explanations have been identified to understand Asian students' silence, reticence, and non-questioning and non-critiquing learning behaviors (Chapter 1, Section 1.3.5; Chapter 3), it does not rule out the possibility that these behaviors might indeed reflect a lack of critical thinking. As suggested by Chiu (2008), one type of silence of Asian students is 'no-idea silence', which occurs when the student does not know how to think. In this case, Asian students being less expressive and more reserved in communication might really indicate a lack of critical thinking abilities.

Therefore, it is evident that there is the need to empirically examine the perceived lack of critical thinking among Asian students by means of cross-cultural comparison on critical thinking skills. Based on the available cross-cultural evidence, it is difficult to ascertain how Asian and Western students differ from each other in measured critical thinking skills. However, in the cross-cultural psychology and educational psychology literature, there are two lines of theories that seem to support the contention that Western students may perform better in critical thinking skills test than their Asian counterparts in the context of international education. The first area concerns the cross-cultural differences in cognitive styles (Peng & Nisbett, 1999; Nisbett et al., 2001), and the second area relates to the language ability of the students (e.g., Cheng, 2000; Paton, 2005).

#### *4.1.1. Cognitive styles*

With a focus on the influence of culture on individual's ways of reasoning about contradictory information, Peng and Nisbett (1999) drew on the paradigm of dialectical thinking in which they contrasted the ways of such reasoning between Chinese and Westerners. According to this paradigm, Chinese dialectical thinking had been formed and shaped by Taoism which was a branch of philosophical systems in ancient Chinese culture (Peng, Spencer-Rodgers, & Nian, 2006). In contrast to the influence of Confucianism, Taoism was suggested to be influential to Chinese lay people's thinking and reasoning (Peng et al., 2006). According to Peng and Nisbett (1999), Chinese dialectical thinking is characterized by three related principles: 1) the principle of change – which holds that reality is dynamic and changeable process; 2) the principle of contradiction – which states that reality is full of contradiction and opposing propositions may exist in the same object or event; and 3) the principle of relationship or holism – which holds that nothing is isolated and independent, instead everything in life and nature is related. Peng and Nisbett (1999) suggested that the three principles were related in such a way that “it is because of change that contradiction becomes inevitable; it is because change and contradiction are inevitable that it is meaningless to discuss the individual part without considering its relationships with other parts” (p.743). Under the influence of these three principles, Chinese, compared with Westerners, tended to perceive more changes, are more tolerant to contradictions, and perceive things as more interrelated.

In contrast, under the Aristotelian influence, Western thinking and reasoning were dominated by the rules of formal logic (Peng & Nisbett, 1999; Peng et al., 2006). According to Peng and Nisbett (1999), Western thinking emphasized three

different principles: 1) the law of identity – which holds that everything must be identical with itself; 2) the law of noncontradiction – which states that no statement can be both true and false, or contradictory statements cannot both be true; and 3) the law of the excluded middle – which expresses that any statement is either true or false. Peng and Nisbett (1999) maintained that these laws were not congruent with the principles of Chinese dialectical thinking so that Westerners whose thinking was based on these laws would be less tolerant to contradiction than their Chinese counterparts.

Through a set of experiments, Peng and Nisbett (1999) demonstrated that: 1) Chinese students preferred proverbs which contained apparent contradictions more than did their European-American counterparts; 2) Chinese students were less likely to take side in real-life social conflicts but more likely to choose a compromising resolution strategy than the European-American students; 3) Chinese students preferred arguments which based on the principle of holism while American students preferred arguments that relied on the law of noncontradiction; and 4) American students showed more polarized opinion after reading two seemingly contradictory accounts of the same issue whereas Chinese students would seek for an account which could accommodate both sides of the issue. Based on these findings, Peng and Nisbett (1999) argued that Chinese tended to be more tolerant of contradictory information in reasoning than their Western counterparts.

Their assertion of the differences between the two cultural groups had nevertheless been challenged (S. F. Chan, 2000; Ho, 2000; Y. T. Lee, 2000; Wong, 2006). One of the major criticisms concerned the argument that the three principles described as particular to Chinese dialectical thinking were not

congruent with formal logical rules. Such statement implied that “the laws of formal logic are not universal but culture specific [...] Also implied is that Chinese dialectical thinking is ridden with logical fallacies” (Ho, 2000, p. 1065). The comparison between Chinese dialectical thinking and formal logic was considered confusing because the former was more related to a way of lay thinking whereas the latter was better understood as a scholastic standard for reasoning (Ho, 2000). Such comparison might be misleading by implying that Chinese dialectical thinking was contradictory to some of the principles involved in formal logic. Another challenge was about the suggested culture-specificity of dialectical thinking about contradiction (Lee, 2000). Paradoxical thinking or dialectical reasoning about contradiction and changes may be culturally universal but not specific to Chinese or Asian culture. Lee (2000) highlighted that some Western philosophers such as Heraclites, Kant, Hegel, Marx, Engels, and Nietzsche were also known for their dialectical thinking and reasoning about contradictions. Therefore, the apparently dichotomized view of cultural preferences in thinking would have overlooked the possibility of cultural universality in cognitive styles.

In response to these critiques, Peng and Nisbett (2000) maintained that they were not suggesting that Chinese thinkers are not capable in logical thinking, but “that they rely on heuristics in everyday life, which prompt them to seek the middle way between extremes and leave them less concerned by contradiction than are Westerners” (p. 1067). Nisbett, Peng, and colleagues (Nisbett, Peng, et al., 2001) later supplemented that the principles underling Chinese dialectical thinking are actually not something novel to Western epistemology and metaphysics, but empirical findings such as those presented by Peng and Nisbett

(1999) showed that Westerners rely less on those principles but more on the fundamental principles of formal logic so that they would be more likely to resolve contradictions through formal logic than their Chinese counterparts.

Extrapolating from the basis of the three principles of Chinese dialectical thinking and the findings in Peng and Nisbett (1999), Nisbett et al. (2001) further proposed that the basic cognitive processes between Westerners and East Asians differed from each other in terms of analytic versus holistic cognition. According to these authors, East Asians' cognition is a holistic mode of thought, which is characterized by 1) the tendency to pay attention to the field as a whole rather than on specific object (e.g., Ji, Peng, & Nisbett, 2000); 2) the tendency to perceive more changes in everyday-life events (e.g., Ji, Nisbett, & Su, 2001); 3) the reliance on dialectical reasoning about contradiction (e.g., Peng & Nisbett, 1999); and 4) the tendency to attribute complex causalities from the field in explaining events (i.e., tend to make more situational attribution than dispositional attribution; e.g., Morris & Peng, 1994). In contrast, Westerners' analytic mode of thought is marked by 1) paying attention primarily to the object; 2) perceiving less changes; 3) using rules, including formal logical rules, to reason about contradiction; and 4) inclining to attribute causes from the object rather than the field (i.e., tend to make more dispositional attribution than situational attribution).

Based on the idea of analytic versus holistic cognition, Norenzayan, Smith, Kim, and Nisbett (2002) suggested that Westerners and East Asian showed different preference for formal and intuitive reasoning. They found that Westerners are more likely to use formal logical rules in reasoning, whereas East Asians use more intuitive and experience-based reasoning when there is a conflict

between intuitive and formal reasoning strategies. In one of their experiments, European American and Korean students were presented with a set of arguments and asked to evaluate whether or not a conclusion followed logically from the premises for each argument. When faced with a conclusion that logically followed the arguments but was intuitively nonbelievable, Korean students tended to make more mistakes in judging the conclusion as invalid than the American students, indicating that they relied more on their own experience but less on formal logical rules in deductive reasoning than their American counterparts. Norenzayan et al. (2002) speculated that the pedagogical emphasis on critical thinking in Western classrooms as opposed to the experience-based approach in Asian classrooms might be a reason behind the different modes of thinking in the two cultural systems. These research findings have been extended to the study of the normative values of intuitive versus analytical reasoning between Asian and Western cultures, where Asian participants were found to rate intuitive reasoning as more important than analytic reasoning in contrast to their Western counterparts (Buchtel & Norenzayan, 2008).

In sum, these theories of Asian-Western differences in cognition and the associated experimental studies suggested that dialectical thinking or analytic versus holistic cognition might be negatively related to critical thinking. A preference or tendency for dialectical thinking may prompt Asians students to seek a “middle-way” instead of taking side by means of formal logic in face of apparent contradictions more than do their Western counterparts (Peng & Nisbett, 1999, 2000). Because of the propensity in engaging in holistic over analytic cognition, Asian students may also tend to favor intuitive reasoning over formal analytical reasoning (Buchtel & Norenzayan, 2008; Norenzayan et al., 2002).



These preferences for different modes of reasoning may result in that Western students perform better in critical thinking skills test than Asian students.

#### *4.1.2. Language ability*

Another plausible factor that may affect students' critical thinking skills relates to the language ability of the students. Behavioral manifestations of critical thinking, such as critical debate, argumentation, or even writing an argumentative essay, require the appropriate use of language. For example, Elder and Paul (2006) suggested that there was a strong connection between the ability to think well and the ability to write well. They suggested that educated person "routinely use tools of critical thinking in learning. In doing so, they improve their ability to write as they deepen their knowledge base and reasoning skills through writing" (p. 38). The relationship between critical thinking and language ability have also been demonstrated by the significant positive correlation between language ability and critical thinking skills in previous research (e.g., Clifford et al., 2004; Halpern, 2006; Hau, Ho, & Ku, 2006; Taube, 1995).

In relation to the context of international education, Paton (2005) argued that the perceptions of Asian students do not partake in critical thinking could possibly be due to the students' difficulty in using English as a second language in the academic discourse. He suggested that both English-speaking and non-English-speaking students, independent of their cultural backgrounds, would need to develop their critical thinking skills as part of the academic training. However, Asian international students need to develop these thinking skills along with their English proficiency which is usually at a lower level comparing with their local counterparts, and the extra requirement of developing English proficiency might

cause cognitive overload among these students so that they might do less well in expressing their critical thinking in academic tasks.

In fact, the use of a second language has been shown to have detrimental effect on one's performance in thinking related tasks. Takano and Noda (1993) observed that native-Japanese speakers who had to use English as their second language to work on a linguistic task performed less well in a concurrent calculation task than they would in using Japanese on the linguistic task. The same deteriorating effect was also found among native-English speakers who had to use Japanese on the linguistic task. In light of these findings, Takano and Noda (1993) suggested that the use of a foreign language would cause temporary decline of thinking ability as a result of heavier cognitive processing load.

Cognitive load theory (CLT; Paas, Renkl, & Sweller, 2003) offers an interesting perspective to understand the argument of increased cognitive loads for second language users in engaging in various cognitive tasks. CLT proposes a human cognitive architecture that consists of a limited working memory and a virtually unlimited long-term memory. According to the CLT, all conscious cognitive process occurs in the working memory. However, the amount of information that the working memory can handle is very limited. On the other hand, vast amount of information can be stored in the long-term memory in the form of schemas which incorporate many pieces of information into one single unit with a specific function. These schemas could be brought from long-term memory to working memory for processing. As such, the working memory can process information at the schema level so that virtually a larger amount of information can be processed.

Applying the CLT to understand the scenario of non-English-speaking students in solving mathematical problems in English, Campbell, Adams, and Davis (2007) illustrated that cognitive overload may have been resulted for these students. While only limited amount of information could be stored and processed in the working memory, the verbal component of the mathematical problems could have been reduced to the form of schemas for native English-speaking students so that relatively more working memory was available for solving the problems. As for non-English-speaking learners, however, the verbal component of the question could not yet be processed at the schema level. Some of the working memory would still be required for processing information related to the language and structure of the word problems. In such case, cognitive overload would be more likely among non-English-speaking problem solvers which might then impair their performance in the cognitive tasks.

Takano and Noda (1993) argued that the negative effect of using second language in thinking abilities was “expected to disappear when the proficiency level of a foreign language reaches that of a native language” (p.446). With reference to the CLT, it means that when the use of second language has become part of the schemas, cognitive overload would be less likely for second language users so that relatively more working memory would be available for processing other cognitive tasks.

#### *4.2. The pilot study*

A pilot study was set up to provide an initial account of the difference in critical thinking skills between Chinese and New Zealand European students. Based on the assumption that the observed behavioral expression might reflect in part the actual critical thinking abilities of the students and that differences in

cognitive styles and language ability are related to critical thinking, it was hypothesized that Chinese students might perform less well in critical thinking skills in contrast to their New Zealand European counterparts (Hypothesis 1).

In this pilot test, critical thinking skills were assessed by a recently developed instrument, the Halpern Critical Thinking Assessment using Everyday Situations (HCTAES; Halpern, 2006). The roles of cognitive styles and language ability in explaining the cross-cultural differences in critical thinking skills were also explored. Individuals within each cultural context vary in terms of their propensity to engage in different cognitive styles or language ability. Therefore, dialectical thinking, analytic versus holistic cognition and language ability were treated as individual difference variables that show variability across cultural contexts and were used to explain any observed cross-cultural differences in the HCTAES (Matsumoto & Yoo, 2006).

Most of the research on dialectical thinking or analytic versus holistic cognition has been conducted with an experimental approach, in which Asian and Western samples were contrasted to show differences in their preferences for different forms of arguments (e.g., Peng & Nisbett, 1999) or different modes of reasoning (e.g., Norenzayan et al., 2002). Recently, self-report measures that aim to capture individual differences in the preferences for dialectical thinking and analytic versus holistic cognition have been developed (Choi, Koo, & Choi, 2007; Spencer-Rodgers, Srivastava, & Peng, 2001). These measures enable the assessment of individual student's tendency in engaging in these different thinking styles. It was expected that Chinese students would prefer dialectical thinking and holistic mode of cognition over the analytic mode of thinking more

so than would New Zealand European students, which result in cross-cultural difference in critical thinking skills between the two samples (Hypothesis 2).

English language ability was measured by self-report proficiency in English, which was assumed to capture an individual's familiarity with the use of the language and thereby indicate the associated cognitive load created by one's English language ability. Self-report rating technique has been commonly used and has been shown to be valid, reliable, and unintrusive measure of an individual's perceived cognitive load involved in tasks such as reading or writing in a language (Pass, Tuovinen, Tabbers, & van Gerven, 2003). It was expected that self-report English language proficiency explains the putative cross-cultural difference in critical thinking skills between Chinese and New Zealand European student samples (Hypothesis 3).

#### *4.3. Method*

##### *4.3.1. Participants*

Seventy students at a university in New Zealand participated in the study. Twenty-four students identified themselves as ethnically Chinese, 35 as New Zealand European, and 11 participants were of other ethnic identities such as New Zealand Maori and Samoan. Given the research focus on Asian and New Zealand European students, only the data from the Chinese and New Zealand European students were included for analysis. Among the 59 students included, there were 47 female, 11 male, and one unidentified. The average age of the participants was 21.95 years ( $SD = 1.99$ ).

#### 4.3.2. Procedures and Materials

All participants were instructed to complete a set of instruments described below. All data were collected anonymously. Ethics approval for the study was granted by the School of Psychology Human Ethics Committee at the university.

*Halpern Critical Thinking Assessment using Everyday Situations (HCTAES)*. The HCTAES (Halpern, 2006) is an instrument designed for assessing critical thinking skills on five dimensions, namely, verbal reasoning skills, argument analysis skills, skills in thinking as hypothesis testing, using likelihood and uncertainty, and decision making and problem solving skills, which are the five important college-level critical thinking skills based on Halpern's (1998) conceptualization. The test consists of 25 everyday-life scenarios, each of which includes one open-ended item and one close-ended item. As the HCTAES is copyrighted material, the full version of the test cannot be attached in this thesis. However, the structure of the test items can be illustrated by the following hypothetical item presented in Ku (2009):

*Scenario:* Results from a recent study indicated that female adolescents who perceive themselves as being unpopular among peers are more likely to be overweight. The researchers suggested that running social skills training programs for female adolescents who are overweight would help solve their weight problems.

*Open-ended question:* Based on this information, would you support this idea as a way of solving overweight problems for female adolescents? Type "yes" or "no" and explain why or why not.

*Close-ended question:* Based on this information, which of the following is the best answer? (*Four choices provided*)

*Sample choice:* Social skills training will probably reduce overweight problems among female adolescents because the researchers found that girls who perceive themselves as being unpopular among peers are more likely to be overweight. (Ku, 2009, p. 74)

According to the information in the test manual, the HCTAES was shown to correlate positively with the Arlin Test of Formal Reasoning (Arlin, 1984) within a high-school student sample and a college student sample ( $r = .32$  in both samples). The Arlin Test is a test of formal reasoning based on Piaget's model of cognitive development. In addition, the HCTAES was found to have a positive correlation (about .60) with the Analytic subtest of the Graduate Record Exam, showing convergent validity with other tests which measured related cognitive abilities.

The whole test takes about 90 minutes to finish. Because of the need to include other measures while keeping the test time reasonably brief for the participants, only the close-ended portion of the test was used. The use of both open-ended and close-ended portions together was intended for educational and training purpose. However, the close-ended portion alone is deemed to be sufficient for a brief assessment of the critical thinking ability of the samples, which was intended to show if test-takers would be able to use the required skill when they are provided with more clues in the close-ended items (Halpern, 2006).

Therefore in the final test, there were altogether 25 close-ended scenario-based items, with five items tapping each skill category. In addition to the more common multiple-choice format which involves choosing the best answer among a number of alternatives (nine items), there were also items requiring the testees to give ratings on different options pertinent to a particular scenario (seven items),

to choose multiple correct answers among a number of alternatives (five items), and to identify the nature of a list of statements (four items). Given the diversified response formats of the items, the final score was calculated using the standardized scores of every item so to even the contribution of each item to the final total score. A similar procedure was employed by Hau, Ho, Lai, Ku, and Hui (2008).

*Dialectical Thinking and Analytic Versus Holistic Cognition.* At this point of writing, there are two published self-report measures of individual differences in dialectical thinking (Spencer-Rodgers et al., 2001) and analytic versus holistic cognition (Choi et al., 2007) in the cross-cultural psychology literature.

The Dialectical Self Scale (DSS) was designed to capture individual differences in dialectical thinking mainly in relation to tolerance for contradiction and readiness for change (Peng and Nisbett, 1999; Spencer-Rodgers et al., 2001). The scale was intended for measuring dialectical thinking in the domain of self-perception, and therefore its usefulness in predicting thinking, affect, and behavior in other domains is not certain (Spencer-Rodgers et al., 2001). Nevertheless, it has been demonstrated useful in explaining cross-cultural differences in psychological well-being (Spencer-Rodgers et al., 2004) and response styles (Hamamura, Heine, & Paulhus, 2008) between Asian and Western samples. The 32-item scale was constructed using a 7-point format with higher score indicating higher level of dialectical self-concept. Sample items included “When I hear two sides of an argument, I often agree with both”, “I often find that my beliefs and attitudes will change under different contexts”. A complete list of the items is attached in Appendix A. Cronbach’s alpha of the DSS was .78 in the Chinese sample and .71 in the New Zealand European sample.



The Analysis-Holism Scale (AHS; Choi et al., 2007) was more recently developed in an attempt to capture individual differences in the tendency of analytic versus holistic cognition. The scale was developed according to the four principles of analytic versus holistic cognition (Nisbett et al., 2001). A 7-point Likert scale format was employed in the scale, with higher score indicating stronger tendency for holistic thinking. The 24-item scale was shown to demonstrate reasonable psychometric reliability and validity, with construct validity shown by Korean students scoring significantly higher on the AHS than American students in the original study (Choi et al., 2007). Although the scale has not yet been utilized in other research, it was included in the present research to explore its usefulness in understanding the influence of cultural difference in cognitive styles on critical thinking skills performance. Sample items included “When disagreement exists among people, they should search for ways to compromise and embrace everyone’s opinions”, “It is more important to pay attention to the whole than its parts”. A complete list of the items is attached in Appendix B. Cronbach’s alpha of the AHS was .71 in the Chinese sample and .74 in the New Zealand European sample.

*Perceived English Language Proficiency.* The participants were asked to rate their proficiency in English on a 7-point scale on two items including “How proficient are you in reading in English” and “How proficient are you in writing in English”, with higher scores indicating higher level of proficiency. The correlation between these items was .82 ( $p < .01$ ) in the Chinese sample and .92 ( $p < .01$ ) in the New Zealand European sample. The scores on these items were averaged to provide an estimate of the participants’ perceived proficiency in English.

All scales were administered in English because English is the medium of instruction in the New Zealand tertiary education system. Entry requirements of the universities in New Zealand included providing evidence of the students' English language proficiency, either in the form of the New Zealand Bursary Examination or standardized international English proficiency tests such as the International English Language Testing System (IELTS) or the Test of English as a Foreign Language (TOEFL). To meet the admission requirement of the undergraduate programs of the universities in New Zealand, students are required to achieve minimally a 'C' grade in English in the New Zealand Bursary Examination, an overall band of 6 (where 9 represents the highest band labeled as expert user) in the IELTS, or a score of 550 (where the highest possible score is 677) in the paper-based test of TOEFL. Therefore, it was considered appropriate to assume that all participants possess a reasonable level of English proficiency to take part, and no participant from either sample reported difficulty in understanding the instructions or the test items. Participants were allowed as much time as they needed to finish the instruments, and the average time required for completing the session was about one hour.

#### *4.3.3. Analytical Strategy*

One of the goals of this pilot test was to identify the relevant factors that may possibly account for the hypothesized cross-cultural difference in critical thinking skills between Chinese and New Zealand European students. To examine whether perceived English language proficiency, the DSS, and the AHS explains the relationship between culture (cultural backgrounds of the students) and critical thinking skills, mediation analysis was used (MacKinnon, Fairchild, & Fritz, 2007). In testing the mediation hypotheses, the procedures advanced by Preacher and

Hayes (2004, 2008) on testing indirect effects were used instead of the more commonly adopted Baron and Kenny's (1986) causal-step procedures with regressions or Structural Equation Modeling (SEM).

According to Preacher and Hayes (2004), the method described by Baron and Kenny (1986) is likely to suffer from low statistical power, especially in small samples (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). For example, the Baron and Kenny procedure requires significance of the X – Y relation. However, the coefficient may be nonsignificant due to low statistical power even though a nonzero effect in the population is in fact present. In this situation, mediation model cannot be tested based on the Baron and Kenny's procedures, which then results in a Type II error. Instead, Preacher and Hayes (2004) suggested that testing the significance of the indirect effect between X and Y through the mediator requires one fewer hypothesis test, which reduces the likelihood of Type II error in mediation analysis. The Sobel test (Sobel, 1982) has been commonly used for testing significance of indirect effect (MacKinnon et al., 2002). However, the test requires the indirect effect to be normally distributed which is rarely the case in small samples (Preacher & Hayes, 2004). To circumvent the problem associated with small sample sizes, Preacher and Hayes (2004) put forward the bootstrapping approach which makes no assumption about the sampling distribution of the estimates of effects.

Bootstrapping involves repeatedly sampling from the data set with replacement and estimate the indirect effect in each resampled data set (Preacher & Hayes, 2004). An approximation of the sampling distribution of the indirect effect will be built by repeating the resampling process for thousands of times and then be used to construct confidence intervals for the indirect effect. The procedures of

testing indirect effects with bootstrapping have been extended to multiple mediator models, with syntaxes and macros being offered for related analysis in common statistical software such as SPSS, SAS, and LISREL (Preacher & Hayes, 2008). The bootstrapping procedure generates estimates of the total effect of X on Y, the direct effect of X on Y after entering the list of mediators, the indirect effects of X on Y via the list of mediators, and the specific indirect effects of X on Y via each particular mediator. The total indirect effect of X on Y is the sum of all specific indirect effects and is equal to the difference between total and direct effects.

The SPSS macro offered by Preacher and Hayes (2008) was used in the present analysis. Each of the total and specific indirect effects generated through the procedure were assessed by three 95% bootstrap confidence intervals (CIs), namely, the percentile, the bias-corrected (BC), and the bias-corrected and accelerated (BCa) intervals. An indirect effect is shown to be significantly different from zero at 95% confidence if zero is not included in the range of CIs.

#### *4.4. Results*

##### *4.4.1. Preliminary analysis*

Table 4.1 shows the descriptive statistics of the four variables under consideration. Based on the HCTAES total score, significant difference in critical thinking skills was noted between the two samples ( $t[57] = -5.78, p < .01$ ), with New Zealand European students performing better than the Chinese students in the test. This result primarily showed that there was in fact difference in an objective measure of critical thinking skills between Chinese students and New Zealand European students.

Table 4.1: Means and standard deviations of the HCTAES, perceived English language proficiency, the DSS, and the AHS of the two samples

	Chinese		New Zealand European	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
HCTAES (standardized score)	-1.26	1.70	0.87	1.13
Perceived English Language Proficiency	4.58	1.10	6.71	0.61
DSS	4.00	0.52	3.87	0.46
AHS	4.68	0.48	4.84	0.46

The two samples were also significantly different from each other in terms of their perceived proficiency in English ( $t[32.73] = -8.63, p < .01$ )<sup>4</sup>, again with New Zealand European students scoring significantly higher than the Chinese sample. However, the two samples did not significantly differ from each other on the DSS ( $t[55] = 1.25, p = .22$ ) and the AHS ( $t[57] = -1.30, p = .20$ ).

#### 4.4.2. Mediation between culture and critical thinking skills

Multiple mediation analysis was conducted following the procedures suggested in Preacher and Hayes (2008). The three self-report variables (i.e., perceived English language proficiency, the DSS and the AHS scores) were tested as mediators of the relationship between culture and critical thinking skills. Gender was controlled for in the analysis. Chinese was coded as 0 and New Zealand European was coded as 1 in the variable *culture*.

The total effect of culture on critical thinking skills was significant  $\beta = 2.15, SE = 0.39, p < .001$ . The partial effect of gender on critical thinking skills was not significant ( $\beta = 0.036, SE = 0.45, p = .94$ ), indicating that there is no significant gender effect on the objective measure of critical thinking skills. With

<sup>4</sup>Levene's Test for Equality of Variances of the two samples was significant for perceived proficiency in English and therefore, a t-value with adjusted degrees of freedom is reported here.

consideration of the three mediators in the model, the direct effect of culture on critical thinking skills became statistically nonsignificant,  $\beta = 0.84$ ,  $SE = 0.57$ ,  $p = .15$ . Using the logic of Baron and Kenny's (1986) causal-step procedures, the results showed that the effect of culture on critical thinking skills had been mediated by the three self-report variables considered.

Table 4.2 summarizes the result of the bootstrapped mediation analysis of the total and specific indirect effects as well as contrasts between the specific indirect effects. As zero is not contained in the confidence intervals of the total indirect effect, the total indirect effect was significantly different from zero, indicating that the relationship between culture and critical thinking skills was mediated by at least some of the proposed mediators. Among all the specific indirect effects examined, only that of perceived English language proficiency was significantly different from zero at 95% confidence, indicating that perceived English language proficiency is the only significant mediator among the three self-report variables. Pairwise contrasts between the specific indirect effects revealed that the specific indirect effect of perceived English language proficiency was significantly different from that of the DSS as well as that of the AHS, while the contrast between the DSS and the AHS was not significant, showing that perceived English language proficiency was likely to be a more important, and the only statistically significant, mediator among the three variables being considered.

Table 4.2: Mediation of the effect of culture on critical thinking skills through perceived English language proficiency, the DSS score, and the AHS score

		Bootstrapping results for indirect effects					
		Percentile 95% CI		BC 95% CI		BCa 95% CI	
Point Estimate		Lower	Upper	Lower	Upper	Lower	Upper
Indirect Effects							
English	<b>1.16</b>	0.51	2.16	0.47	2.09	0.43	2.00
DSS	0.07	-0.10	0.33	-0.06	0.42	-0.06	0.42
AHS	0.09	-0.05	0.29	-0.02	0.38	-0.02	0.38
TOTAL	<b>1.32</b>	0.62	2.33	0.58	2.24	0.53	2.19
Contrasts							
English vs. DSS	<b>1.08</b>	0.44	2.10	0.41	2.03	0.36	1.96
English vs. AHS	<b>1.07</b>	0.39	2.10	0.34	1.99	0.28	1.89
DSS vs. AHS	-0.02	-0.33	0.32	-0.33	0.31	-0.32	0.33

Note. 5,000 bootstrap samples; significant indirect effects or contrasts in bold.

#### 4.5. Summary of the pilot study

The primary goal of this pilot study was to test if there was actual difference in terms of critical thinking skills between Chinese and New Zealand European university student samples. It was shown that the New Zealand European sample performed better in an objective measure of critical thinking skills than the Chinese sample, therefore Hypothesis 1 was not rejected. Another objective of this study was to explore the roles of preferences in thinking styles and language ability in accounting for the observed cross-cultural differences. Consistent with the original prediction, it was found that the two samples of students significantly differed from each other in their perceived English language proficiency, which could then account for the observed difference in critical thinking skills (Hypothesis 3). However, the two groups of students did not significantly differ

from each other in terms of dialectical thinking style or holistic thinking tendency, and the thinking styles did not mediate the cultural difference in critical thinking skills either (Hypothesis 2).

#### *4.5.1. English language ability*

Perceived English language proficiency was found to account for the observed difference in critical thinking skills measured by the HCTAES, indicating that differential language ability played a significant role in explaining the cross-cultural differences in critical thinking skills. Previous research showed that language ability is significantly positively related to critical thinking skills, at least within the Western samples (e.g., Clifford et al., 2004; Halpern, 2006; Taube, 1995). The present findings suggested the possibility that the cognitive load in performing critical thinking related tasks in English could have been higher for Chinese students than their English-speaking counterparts, which resulted in reduced performance in critical thinking skills assessment among the Chinese students.

#### *4.5.2. Dialectical thinking and analytic-holistic thinking style*

Contrary to the hypotheses, the Chinese students and the New Zealand European students were not significantly different from each other in their preferences for dialectical thinking as measured by the DSS or analytic versus holistic cognition as measured by the AHS. With the help of advanced procedures for testing indirect effects (Preacher & Hayes, 2008), the two variables were able to be tested for their abilities in mediating the effects of culture on critical thinking skills despite the nonsignificant independent sample t-test results. Nonetheless, it was shown that the two variables did not account for the cross-cultural difference in critical thinking skills.



#### *4.6. The major study*

The pilot study demonstrated how the cross-cultural differences in critical thinking skills could be unpacked by perceived English language proficiency without making assumptions about the individuals' language ability based only on their cultural backgrounds. These findings also indicated that a 'small culture' approach could be effective for understanding the influence of culture on students' academic behaviors and performance (Clark & Gieve, 2006). Within the Chinese students sample examined in the pilot study, there might be students who used English as their primary language rather than a second language. The usual 'large culture' approach, which typically characterized Chinese students as second language user of English would have neglected the variance brought by the "atypical" Chinese students. With the 'small culture' approach, this variance among the Chinese students could also be taken into account in the formulation without exaggerating the effects of culture.

Another challenge faced by the usual 'large culture' approach is the neglect of the dynamic nature of culture (Clark & Gieve, 2006). Students who study in a different cultural context than their original ones not only bring with them the cultural packages from home, but also experience the impact of the socialization experiences in the host culture. Their usual ideas and behaviors in learning might be altered in the processes of interacting with the teachers, the schoolmates, and the structure of instructions and assessments prevalent in the new educational context (e.g., Volet & Renshaw, 1995).

In the pilot study, although perceived English language proficiency was used as a measure of the students' cognitive load related to English language processing, the results obtained might be interpreted in two alternative ways.

Apart from indicating a student's actual English language ability, perceived English language proficiency might also reflect how well the student adapted to the local English-speaking environment. Previous research has shown that Asian students in New Zealand considered inadequate English language ability as something preventing them from effectively communicating with lecturers and other students, completing assignments or examinations, and socializing with domestic students (Campbell & Li, 2008; Ward & Masgoret, 2004). It can be argued that perceived English language proficiency may not only reflect a student's *actual* English language proficiency, but also reveal his/ her efficacy in communicating with the people and the system in the English-speaking host culture. These two factors might contribute differently to students' performance in a critical thinking skills assessment.

To further analyze the factors that may be related to the observed difference in critical thinking skills, another sample of Asian and New Zealand European university students were assessed with a different standardized instrument of critical thinking skills (the WGCTA-SF; Watson & Glaser, 1994). Based on the findings in the pilot study, it was expected that New Zealand European students would perform better in the test than would their Asian counterparts (Hypothesis 4), and perceived English language proficiency would account for the observed difference (Hypothesis 5).

In addition to replicating the findings obtained in the pilot study, the present study was also aimed to examine other factors that may be related to the observed differences in critical thinking skills. In view of the two possible interpretations related to perceived English language proficiency, the present study included measures of actual English language proficiency and orientation towards New

Zealand culture. Furthermore, cognitive styles in terms of dialectical thinking and analytic versus holistic cognition were again examined.

#### *4.6.1. Actual English language ability*

English language ability comprises of various aspects such as knowledge of vocabularies and grammatical structures. Among these different aspects, the acquisition of sufficient vocabulary has been suggested to be of great importance for effective verbal communication of non-native English learners (Li, 2005). Without sufficient English vocabulary, it would be difficult for students who used English as a second or foreign language to communicate effectively in English with the other people. It could also be expected that insufficient vocabulary would create more difficulties for anyone who attempted to engage in critical thinking on questions or issues presented in English. On the other hand, previous linguistics research had shown that knowledge of vocabulary could serve as a reliable indicator of non-native English learners' overall proficiency in English (Zareva, Schwanenflugel, & Nikolova, 2005). Therefore, it was considered appropriate to include an objective test of English vocabularies to assess the students' actual English language proficiency and see how it might be related to their critical thinking skills. It was expected that Asian students would score lower on the vocabulary test than their New Zealand European counterparts, which would in turn explain the cross-cultural differences in critical thinking skills between the two samples (Hypothesis 6).

#### *4.6.2. Cultural adoption of the behavioral norms in New Zealand*

University education in New Zealand is characterized by a stronger explicit emphasis on critical thinking than that in Asia (Chapter 2). Similar to other Western cultures such as the United Kingdom (Durkin, 2008a, b), the pedagogical

practices in New Zealand are featured by the norms of questioning, criticizing, arguing, and debating (Campbell & Li, 2008). In Chapter 3, it was observed that the sociocultural and educational context of New Zealand is generally more supportive to the expression of and engagement in critical thinking than that in Asia. It appears logical to suggest that students who are more accustomed to the cultural conventions of New Zealand may be more ready to engage in the process of critical thinking than the ones who are less familiar with those conventions.

If it is the case, adoption of the conventions of New Zealand may then be associated with the difference in critical thinking skills between Asian and New Zealand European student samples. It was hypothesized that New Zealand European students would be more accustomed to the behavioral conventions in New Zealand than their Asian counterparts, which explained the observed differences in critical thinking skills performance between the two samples (Hypothesis 7).

#### *4.6.3. Cognitive styles*

In the pilot study, the DSS and the AHS scores did not account for the observed difference in critical thinking skills between the Chinese and New Zealand European samples. Although the unpacking approach is useful for examining the mechanisms behind the cross-cultural difference in critical thinking skills (Matsumoto & Yoo, 2006), it involves an assumption that the proposed mediator is related to critical thinking skills to the same extent in both groups. The results regarding the DSS and the AHS in the pilot study could be due to a different relationship between dialectical thinking and critical thinking in the two cultural groups. Dialectical thinking and analytic versus holistic cognition are suggested to reflect different philosophical traditions in the East and the West

(Peng & Nisbett, 1999; Nisbett et al., 2001). These thinking styles might be qualitatively different and may not relate to critical thinking in one or the other group. Such qualitative differences in their functioning would then prevent thinking styles to account for cross-cultural differences in critical thinking.

Therefore, apart from testing the mediating roles of the DSS and the AHS on the relationship between culture and critical thinking skills, these two scales were included in the present study to further examine for their relationship with critical thinking skills. The findings would have important implications for the conceptualization of dialectical thinking across cultural groups.

#### *4.6.4. Controlling for the effect of general intellectual competence*

Another modification of the present study was the consideration of the effect of general intellectual competence on critical thinking skills test performance. Although critical thinking skills and intelligence are distinct concepts of human intellectual competence and are measured by different kinds of instruments (Chapter 1), they are both conceptually (Halpern, 2007) and empirically related (Clifford et al., 2004; Taube, 1995). Critical thinking skills are more closely related to the abilities in using different cognitive strategies, whereas intelligence is more closely associated with the basic mental power of an individual (Perkins, 1987). In practice, the use of cognitive strategies undoubtedly requires a certain level of mental capacity, but the effect of mental capacity may complicate our understanding about the “pure” tactical aspect of intellectual competence which has been the focus of critical thinking instruction (Halpern, 2007). It would be important understand how critical thinking *skills* are exactly related to culture and the other variables of interest, regardless of the students’

basal general intellectual competence. Therefore, the effect of general intellectual competence was controlled for in the present analysis.

#### *4.7. Method*

##### *4.7.1. Participants*

A total of one hundred and seventy-three students were recruited at a university in New Zealand. Among these participants 50 identified themselves as ethnically Asian, 100 identified as ethnically New Zealand European, 21 of other ethnicities, including New Zealand Maori, Samoan, African, and mixed ethnicities (e.g., European and Chinese), and two missing data. Because the major focus of this research was on the comparison between Asian and New Zealand European students, the data from those of the other ethnicities were not included in the subsequent analysis. The majority of the Asian sample consisted of Chinese (84%), with the rest being Indian (4%), Japanese (2%), Malay (2%), Sri Lankan (4%) and Vietnamese (4%). This pattern closely resembled the actual situation of international education in New Zealand, where Chinese migrant or international students form the majority of Asian students (New Zealand Ministry of Education, 2008). The average age of the final sample of 150 participants was 21.40 years ( $SD = 6.12$ ), with 42 male, 107 female and one unidentified gender.

##### *4.7.2. Materials*

The following instruments were administered to the participants. English version of the instruments was used.

*Watson-Glaser Critical Thinking Appraisal Short Form (WGCTA-SF)*. The WGCTA was designed to measure critical thinking skills along five dimensions, namely, inferences, recognition of assumptions, deduction, interpretation, and evaluations of argument. The short form version with 40 items was employed in

this study (Watson & Glaser, 1994; 2006). The WGCTA-SF was derived by shortening the original 80-item Form A of the WGCTA (Watson & Glaser, 1980) in an attempt to reduce the administration time from about an hour to about 30 minutes, plus another five to ten minutes to read the instructions and sample questions. Reliability of the test was shown by a Cronbach's alpha of .81 based on a sample of 1,608 participants in the original development of the short form and alphas between .66 and .85 in the other studies reported in the Manual. Validity of the test was demonstrated by the significant correlation between test scores and criterion-related measures such as effectiveness in clinical decision making (Shin, 1998) and cognitive problem-solving skills (Spector, Schneider, Vance, & Hazlett, 2000).

The WGCTA-SF comprises of five subscales each measures one dimension of critical thinking skills. In each subscale, directions and sample questions were provided in front of the actual test items. All participants were instructed to read carefully before answering the questions. In the Test Manual, it was recommended that the total score of these subscales would be more reliable than the individual subscale score as measure of one specific critical thinking skill. A meta-analytic review on the psychometric properties of the WGCTA also suggested that it would be better to treat the scale as a measure of general critical thinking competency and not to interpret the subscales individually (Bernard et al., 2008). This suggestion was based on the principal component analysis of the subscale means of the original versions of WGCTA (Watson & Glaser, 1980), which yielded a one-factor solution. In view of the empirical evidence and also for the sake of parsimony, only the total score of WGCTA-SF was interpreted in the present study.

*Shipley Institute of Living Scale (SILS)*. First developed by Shipley in 1940, the SILS was intended for assessing general intelligence in adults and adolescents. The revised version by Zachary (1991) was employed in this study. It consisted of a 40-item vocabulary test and a 20-item abstraction test. In the vocabulary test, participants were asked to choose among four alternative words that mean the same or nearly the same to a specific target word. In the abstraction test, a logical sequence was presented and the participants were required to complete the sequence by filling in the appropriate numbers or letters. Although the test scores could be used together to estimate IQ scores based on other more popular intelligence testing instruments such as the Wechsler Adult Intelligence Scale – Revised (WAIS-R; Wechsler, 1981) by means of sophisticated conversion procedures (e.g., Paulson & Lin, 1970; Zachary, Paulson, & Gorsuch, 1985), the raw scores of each test were used as measures of the participants' actual proficiency in English (vocabulary score) and general intellectual competence (abstraction score).

According to the Test Manual, test-retest reliability coefficients of the SILS ranged from .60 to .82 for the total scores, and internal consistency for the total score was .92, suggesting that the SILS appears to be a reliable measure. Validity of the test was demonstrated by its high correlation with other popular intelligence tests. For example, the correlation between the SILS total score and the WAIS ranged from .73 to .90 across 11 studies, and that between the SILS and WAIS-R intelligence was .74.

*Dialectical Self Scale (DSS)*. The same instrument employed in the pilot study was used. Cronbach's alpha of the DSS was .65 in the Asian sample and .78 in the New Zealand European sample.



*Analysis-Holism Scale (AHS).* The same instrument used in the pilot study was used. Cronbach's alpha of the AHS was .81 in the Asian sample and .67 in the New Zealand European sample.

*Cultural adoption of the behavioral norms in New Zealand.* The Behavioral Acculturation Scale (BACS-16) was a 16-item scale developed by Groenvynck, Beirens, Arends-Toth, and Fontaine (2006) to measure two independent dimensions of acculturation, namely, cultural maintenance and cultural adoption. The term *acculturation* is used to describe the cultural change that a person undergoes during cross-cultural transitions (Ward, 1996). Based on the two-dimensional model of acculturation proposed by Berry (1980, 1997), the BACS-16 was designed to capture an individual's cultural change in terms of the actual knowledge, actions, and behaviors in respective to their home and host cultures. In essence, the scale consists of eight pairs of item. Within each pair, one item focuses on the individual's home culture and belongs to the cultural maintenance subscale, while the other item focuses on the host culture and belongs to the cultural adoption subscale.

In the present study, eight items from the cultural adoption subscale were chosen to capture the participants' adoption of the behavioral norms in New Zealand (please refer to Appendix C for the complete list of items). All participants were instructed to rate the items concerning their knowledge of and behaviors within New Zealand culture using a 6-point Likert scale, ranging from fully disagree (1) to fully agree (6). Sample items included: "I know the New Zealand culture and traditions well" and "I live according to rules that apply in the New Zealand culture". Cronbach's alpha was .87 in the Asian sample and .86 in the New Zealand European sample.

*Perceived English Language Proficiency (English)*. The participants were asked to rate their perceived proficiency in English on the two items used in the pilot test. The correlation between the two items was .93 ( $p < .001$ ) in the Asian sample and .76 ( $p < .001$ ) in the New Zealand European sample. The scores on those items were averaged to provide an estimate of the participants' perceived proficiency in reading and writing English.

#### 4.7.3. Procedures

Ethics approval for the study was granted by the School of Psychology Human Ethics Committee at the university. Participants were recruited through two means. Eighty-seven students in the current sample took part in this study as partial fulfillment of the requirement of an introductory psychology course. The rest of the participants were recruited through advertising on campus, among which 39 participants were recruited through advertising in the management school at the university as a part of the school's accreditation project, and the remaining 24 participants were recruited by advertising and snowballing on campus. Since the participants recruited through advertising were on voluntary basis, in order to increase the response rate, an incentive of a grocery voucher of NZ\$10 was given upon the completion of the instruments. The top scorers in the tests were also awarded with cash prizes, where the top three scorers were awarded NZ\$80, NZ\$60, and NZ\$40, respectively. The average time required to complete the session was about an hour, but participants were allowed as much time as they needed to finish all the instruments.

To test for the possible effect of different recruitment methods on the variables of interest, a MANCOVA analysis was conducted on the measured variables, with recruitment method as the independent variable (advertising

versus psychology course) and cultural group (Asian versus New Zealand European) as the covariate. Cultural group was included as covariate to correct for the initial imbalance of the cultural groups recruited through each method, as a relatively higher proportion of New Zealand European participants were recruited through the psychology course (82.8%) than through advertising (44.4%),  $\chi^2(1, N = 150) = 2.41, p < .01$ . The results of the MANCOVA analysis indicated that methods of recruitment did not have significant effect on the variables of interest,  $F(7,123) = .75, p = .63$ . Table 4.3 summarizes the results of the between-subject tests of each variable.

Table 4.3: Summary of the effects of methods of recruitment on each target variable after controlling for the effect of culture

	<i>F</i>	<i>p</i>
WGCTA total	.17	.68
SILS vocabulary test	.05	.83
SILS abstraction test	1.60	.21
DSS	.10	.76
AHS	1.99	.16
Cultural adoption	.18	.68
Perceived English Language Proficiency	.05	.83

#### *4.7.4. Analytical Strategy*

Similar to the approach taken in the pilot study, the mediation hypotheses were tested using the approach advanced by Preacher and Hayes (2008). In addition, to examine if the strength of the correlations between different variables differed across samples, moderation analysis was used (Baron & Kenny, 1986). Multiple regression analyses were conducted and the resulting estimates from the

regression model were imported to the internet version of Modgraph (Jose, 2008) for plotting the interaction effects.

#### 4.8. Results

##### 4.8.1. Preliminary Analysis

Table 4.4 shows the descriptive statistics of the target variables in the Asian and New Zealand European samples. It was observed that the New Zealand European sample scored higher on all variables except the DSS. Independent sample t-tests on the variables revealed that the differences between the two samples were statistically significant in terms of the WGCTA score, the SILS vocabulary score, cultural adoption, and perceived English language proficiency. The differences observed in the other variables were not statistically significant.

Table 4.4: Descriptive statistics and independent sample t-test results of the target variables

	Asian		New Zealand European		<i>t</i> -test
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
WGCTA total	24.56	4.94	27.68	6.28	-3.31***
SILS vocabulary test	23.24	5.22	29.85	4.45	-8.01***
SILS abstraction test	15.82	3.36	16.46	2.19	-1.22
DSS	3.97	0.47	3.91	0.56	.65
AHS	4.72	0.72	4.80	0.42	-.75
Cultural adoption	3.91	1.04	5.30	0.67	-8.47***
Perceived English Language Proficiency	4.64	1.41	6.68	0.61	-9.81***

Note. \*\*\* $p < .001$ .

Further examining on the cross-cultural difference in WGCTA score with SILS abstraction score as covariate indicated that the two samples were still significantly different from each other in terms of critical thinking skills ( $F [1, 144] = 7.78, p < .01$ ) even when general intellectual competence was taken into consideration.

#### 4.8.2. Mediation between culture and critical thinking skills

Similar to the pilot study, multiple mediation analysis was conducted using the procedures proposed by Preacher and Hayes (2008). Asian was coded as 0 and New Zealand European was coded as 1 in the variable *culture*. The variable of SILS abstraction score was included as a covariate to control for the effect of general intellectual competence on critical thinking skills. Gender was also controlled for in the analysis.

The total effect of culture on the WGCTA score was significant ( $\beta = 3.17, SE = 0.97, p < .01$ ). The partial effect of gender on the WGCTA was not significant ( $\beta = 0.37, SE = 1.01, p = .71$ ), indicating that there was no significant gender effect on critical thinking skills as measured by the WGCTA. However, the partial effect of SILS abstraction score was significant ( $\beta = 0.60, SE = 0.18, p < .01$ ), suggesting that general intellectual competence was positively related to critical thinking skills. After taking into account the mediators, the direct effect of culture on critical thinking skills became statistically nonsignificant,  $\beta = 0.74, SE = 1.45, p = .61$ . According to Baron and Kenny's (1986) procedures, the results showed that the five proposed variables mediated the effect of culture on critical thinking skills.

Table 4.5 summarizes the results of the bootstrapped mediation analysis of the total and specific indirect effects as well as contrasts between the specific

indirect effects. Consistent with the observation on the difference between the total effect and the direct effect of culture on critical thinking, zero was not contained in the confidence intervals of the total indirect effect, which showed that the total indirect effect was significantly different from zero. In other words, the relationship between culture and critical thinking skills was mediated by at least some of the proposed mediators.

Inspection of the CIs of the proposed mediators revealed that only the specific indirect effect of SILS vocabulary was significantly different from zero, indicating that it mediated the relationship between culture and critical thinking skills. Tests of contrasts between the specific indirect effects suggested that the specific indirect effect of SILS vocabulary was significantly different from those of the other variables except that of perceived English language proficiency, which created a paradox as the specific indirect effect of perceived English language proficiency was not significantly different from zero. According to Preacher and Hayes (2008), this kind of situation may occur “when one of the specific indirect effects involved in the contrast is not sufficiently far from zero” (p. 886). Nevertheless, the result was reasonable because both SILS vocabulary and perceived English language proficiency were conceptually related to English language ability, which might lead to nonsignificance in the contrast.

Table 4.5: Mediation of the effect of culture on critical thinking skills through SILS vocabulary score, the DSS, the AHS, cultural adoption, and perceived English language proficiency

Bootstrapping results for indirect effects							
Point Estimate		Percentile 95% CI		BC 95% CI		BCa 95% CI	
		Lower	Upper	Lower	Upper	Lower	Upper
Indirect Effects							
SILS vocabulary	<b>2.48</b>	1.03	4.11	1.00	4.07	0.99	4.04
DSS	0.02	-0.17	0.26	-0.10	0.37	-0.10	0.38
AHS	-0.05	-0.36	0.19	-0.53	0.10	-0.55	0.09
Cultural adoption	-1.12	-2.87	0.16	-2.84	0.19	-2.79	0.20
Perceived English	1.11	-0.72	3.37	-0.76	3.31	-0.79	3.26
TOTAL	<b>2.43</b>	0.40	4.77	0.30	4.67	0.26	4.61
Contrasts							
SILS vocabulary vs. Perceived English	1.37	-1.47	4.04	-1.39	4.13	-1.42	4.09
SILS vocabulary vs. cultural adoption	<b>3.60</b>	1.74	5.91	1.66	5.83	1.65	5.82
SILS vocabulary vs. DSS	<b>2.46</b>	1.02	4.07	0.98	4.04	0.97	4.02
SILS vocabulary vs. AHS	<b>2.53</b>	1.04	4.17	1.00	4.15	0.98	4.13
Perceived English vs. cultural adoption	2.23	-0.33	5.63	-0.41	5.51	-0.47	5.42
Perceived English vs. DSS	1.09	-0.76	3.38	-0.82	3.31	-0.87	3.28
Perceived English vs. AHS	1.16	-0.71	3.46	-0.76	3.39	-0.79	3.34
Cultural adoption vs. DSS	-1.14	-2.87	0.12	-2.86	0.12	-2.81	0.17
Cultural adoption vs. AHS	-1.07	-2.84	0.26	-2.76	0.31	-2.72	0.33
DSS vs. AHS	0.07	-0.22	0.44	-0.17	0.54	-0.16	0.57

Note. 5,000 bootstrap samples; significant indirect effects or contrasts in bold.

#### 4.8.3. The relationship between DSS and WGCTA across cultures

Table 4.6 shows the correlation matrices among the variables in the two samples. Similar correlation pattern between the three test scores was observed in both ethnic groups, where WGCTA was both positively related to SILS vocabulary score and SILS abstraction score, and the two SILS scores were moderately positively related to one another. These patterns were consistent with

those in previous research on the relationship between critical thinking, verbal abilities, and intelligence (Clifford et al., 2004; Taube, 1997).

Table 4.6: Correlation among the variables in the two samples

	WGCTA	SILS vocabulary	SILS abstraction	DSS	AHS	Cultural adoption
SILS vocabulary	(.45**) .41**	-				
SILS abstraction	(.52**) .35**	(.28*) .46**	-			
DSS	(.32*) -.12	(.15) .02	(.23) -.01	-		
AHS	(-.01) -.06	(.08) -.03	(.05) .09	(.10) .21	-	
Cultural adoption	(.04) -.13	(.24 <sup>a</sup> ) -.06	(.10) -.11	(-.10) .14	(.17) .19	-
Perceived English Proficiency	(.24 <sup>a</sup> ) .08	(.35*) .11	(-.01) .34**	(-.17) .06	(.17) -.08	(.60**) (.09)

*Note.* <sup>a</sup>  $p = .09$ ; \* $p < .05$ ; \*\* $p < .01$ ; Numbers in parentheses are correlations in the Asian sample,  $n = 49$ ; Numbers without parentheses are correlations in the New Zealand European sample,  $n = 84$ ; reduced sample size due to listwise deletion.

It is worth to note that within the Asian sample, perceived English language proficiency was significantly related to both SILS vocabulary score and cultural adoption, indicating that perceived English language proficiency could be interpreted both in terms of actual English language ability and behavioral adoption of New Zealand culture as suggested. The correlation between SILS vocabulary score and cultural adoption was marginally significant in the Asian sample ( $p = .09$ ), suggesting that cultural adoption and actual English language ability might also be related.

Interestingly, dialectical self-concept was found to be significantly positively related to WGCTA score in the Asian sample, whereas its correlation



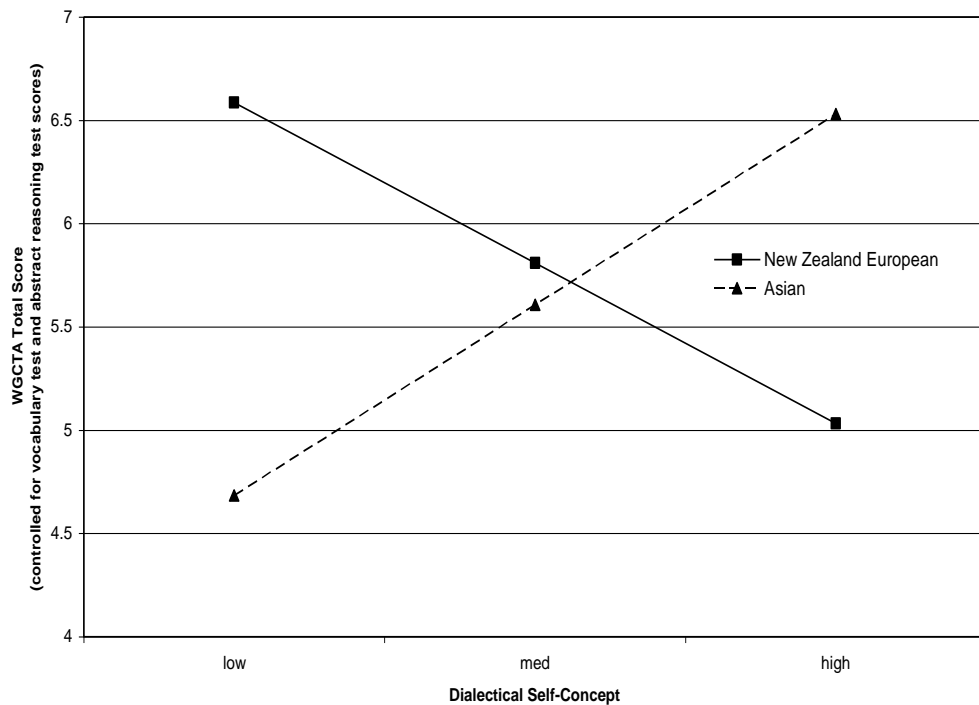
with the WGCTA was not significant in the New Zealand European sample. The correlation pattern suggested that the relationship between dialectical self-concept and critical thinking might vary as a function of culture. Moderation analyses using multiple regressions (Baron & Kenny, 1986) was then conducted to reveal if there was systematic cultural difference in the way that dialectical self-concept relates to critical thinking skills. The regression analyses was conducted with the two SILS test scores being controlled for in the first block of the regression to remove the effects of English language proficiency and general intellectual competence on the WGCTA total score. The results of the regression analyses are reported in Table 4.7. The interaction between culture and dialectical self-concept was marginally significant ( $p = .08$ ), indicating a trend of cultural difference in the relationship between dialectical self-concept and critical thinking skills. It was likely that if the sample size was larger, the effect would become statistically significant because of higher statistical power.

Table 4.7: Regression analyses testing the moderating effect of culture on the relationship between dialectical self-concept and critical thinking skills

<i>Steps</i>	$\beta$	<i>t</i>	$\Delta R^2$	<i>F</i> Change
1. <i>SILS abstraction</i>	.27	3.56**	.30	30.49**
<i>SILS vocabulary</i>	.39	5.20**		
2. <i>SILS abstraction</i>	.27	3.61**	.004	.72
<i>SILS vocabulary</i>	.39	5.21**		
<i>DSS</i>	-.06	-.85		
3. <i>SILS abstraction</i>	.27	3.58**	.00	.01
<i>SILS vocabulary</i>	.39	4.27**		
<i>DSS</i>	-.06	-.84		
<i>Culture</i>	.01	.08		
4. <i>SILS abstraction</i>	.26	3.35**	.02	3.07 <sup>a</sup>
<i>SILS vocabulary</i>	.39	4.29**		
<i>DSS</i>	.15	1.10		
<i>Culture</i>	.02	.18		
<i>DSS X Culture</i>	-.25	-1.75 <sup>a</sup>		

*Note.* <sup>a</sup> $p = .08$ ; \*\* $p < .01$ ; culture was dummy coded as “Asian students = 0” and “New Zealand European students = 1”; DSS was mean centered (Aiken & West, 1991).

Figure 4.1 depicts the interaction between dialectical self-concept and culture. It showed that dialectical self-concept was positively related to critical thinking skills in the Asian sample, but the relationship between the two variables was negative in the New Zealand European sample.



*Figure 4.1: Visual Depiction of the Interaction Between Dialectical Self-Concept and Culture on the WGCTA Total Score After Controlling for the SILS Vocabulary Test and Abstract Reasoning Test Scores.*

#### 4.9. Discussion

The present study replicated the findings in the pilot study by showing that New Zealand European students performed better in a critical thinking skills test than Asian students, even after controlling for the effect of general intellectual competence. This finding showed support to Hypothesis 4. It was found that the students' actual English proficiency (Hypothesis 6), but not perceived English language proficiency (Hypothesis 5), explained the observed cross-cultural differences.

Contrary to the original hypothesis, cultural adoption could not account for the observed difference in critical thinking skills (Hypothesis 7). The results regarding dialectical thinking and holistic thinking styles were similar to those in the pilot study, that is, no cross-cultural difference was found in terms of

cognitive styles between the two samples and cognitive styles did not explain the cross-cultural difference in critical thinking skills. Further examination on the relationship between dialectical self-concept and critical thinking skills revealed that the two were positively related to each other in the Asian sample, but a negative relationship was found in the New Zealand European sample. This finding is suggestive to a possible cultural difference in cognitive process.

The present research confirms with objective assessments the observed differences in behavioral expression of critical thinking, which cannot be simply discounted as cultural stereotypes of Asian students (e.g., Cheng, 2000; Kumaravadivelu, 2003). The results demonstrated that English language ability, but not cultural differences in cognitive styles or cultural adoption, explained the difference. It should also be noted that a significant cross-cultural difference was not observed in the SILS abstraction test. This finding suggests that Asian students and Western students are not different from each other in terms of general intellectual functioning. Therefore, the difference in critical thinking performance among students of Asian background appears to be more of a language ability issue rather than a cultural issue.

#### *4.9.1. English language ability*

In the pilot study, perceived English language proficiency was shown to account for the cross-cultural difference in critical thinking skills between Chinese and New Zealand European student samples. In the major study, although the specific indirect effect of perceived English language proficiency was not significant, it was found that the specific indirect effect of the SILS vocabulary score was significant, indicating that English language proficiency is an important factor in explaining the observed difference in critical thinking skills

between the two samples. Moreover, the specific indirect effect of the SILS vocabulary test score was significantly different from those of the other proposed mediators except that of perceived English language proficiency, suggesting that perceived English language proficiency might actually play a role similar to that of actual English proficiency in the major study.

According to the CLT, cognitive load can be reduced by forming schemas in the long-term memory that can be brought to the working memory for cognitive processing (Paas et al., 2003). Increased proficiency in the English language resembles formation of schemas about the language in the long-term memory so that less cognitive load will be created by processing information in the language. The same principle may apply to every student regardless of their cultural background. The implication is that if the critical thinking task requires information processing in the English language, students (be they from the New Zealand European or Asian cultural backgrounds) who are proficient in the language would be able to spare relatively more cognitive capacity in the working memory for the critical thinking tasks. Otherwise, students with lower level of English language proficiency would need to spend a proportion of the already limited working memory in processing information about the language and thereby reduce their mental capacity for the critical thinking tasks.

Critical thinking skills such as verbal reasoning and argument analysis obviously demand a certain level of language ability of an individual. Even the mere acts of reading a scenario or understanding a problem presented in words require certain level of verbal abilities. While it seems impossible to avoid the involvement of language in practicing critical thinking, it would be important for educators to structure critical thinking related tasks or questions in such a way

that the required cognitive load of language ability would be kept at a reasonable level for all students. For example, overuse of jargon or culture-specific slang or words should be avoided in designing questions or instructions that aim at cultivating critical thinking among every student in university courses. If the use of such language is deemed necessary, it would be important to explain fully and familiarize the students with the related usage of the language.

Another possible solution relates to the framework proposed by Campbell et al. (2007) for mathematical instruction for second-language learners. One element of the framework includes structuring a problem statement in a way that students may infer meanings for certain unfamiliar words using the context of the problem. That involves a lot of effort in structuring the problem but close coordination between university teaching professionals and teachers who teach English as a second language (i.e., ESL teachers) will help identify the areas of concern and the appropriate solutions.

The present investigation has been focused on the written form of English language. However, it is expected that similar findings would be replicated with other forms of critical thinking tasks (e.g., critical debate and argumentation) and proficiency in speaking and listening English language. In fact, the present findings offer an alternative explanation to the Asian students' lower level of expression of critical thinking in classroom. Although all students had to pass an internationally recognized English language proficiency test, without sufficient English language ability, and the confidence in using the language, Asian students could be discouraged from overtly expressing their critical thinking even if they are willing to do so (Paton, 2005).

#### *4.9.2. Cultural adoption of the behavioral norms in New Zealand*

Cultural adoption did not explain the observed cross-cultural difference in critical thinking skills, which showed that the engagement in New Zealand cultural norms and practices was not what made a difference in the critical thinking skills between Asian and New Zealand European students. While it is possible that adoption of the behavioral norms in New Zealand might influence on an individual's behavioral expressions of critical thinking, the present findings indicated that it did not have much to do with the students' abilities in using cognitive strategies to think critically.

Nevertheless, in the Asian sample, it was found that the correlation between cultural adoption and SILS vocabulary score was marginally significant, and that between cultural adoption and perceived English language proficiency was moderate in strength, indicating that cultural adoption might have a positive influence on Asian students' actual and perceived efficacy in English language proficiency. Although the results were only correlational, it can be suggested that adoption of the behavioral norms in New Zealand might be a way to help Asian students to be more confident in using their English language proficiency, which might in turn reduce the observed difference in critical thinking skills. Some of the behavioral items such as listening to New Zealand music and listening to or watching the New Zealand news might be considered as the means to improve students English language proficiency. However, it should be highlighted that this suggestion is not meant to encourage cultural imperialism in the context of international education. Instead, it is to make use of different strategies to help students to acquire the language skills required in the practice of critical thinking in higher education.

#### *4.9.3. Dialectical thinking and analytic versus holistic cognition*

It was interesting that the DSS and the AHS did not significantly correlate with each other in both Asian and New Zealand European samples (Table 4.5). While the DSS has been satisfactorily used in previous research to explain cross-cultural differences in psychological well-being (Spencer-Rodgers et al., 2004) and responses styles (Hamamura et al., 2008), the AHS is a more recent endeavor in capturing individual differences in terms of analytic versus holistic cognition, and therefore the inclusion of the scale in the present investigation has been exploratory in nature. The two scales are supposed to capture individual differences in the thinking style that is suggested to be prevalent in the Asian culture (Nisbett et al., 2001; Peng & Nisbett, 1999), but the nonsignificant correlation between the two measures failed to show convergent validity of the scales. One possible explanation is that the DSS was designed to capture dialectical thinking which is mainly focused on tolerance to contradiction and readiness for change (Peng & Nisbett, 1999; Spencer-Rodgers et al., 2001), whereas the AHS was attempted to capture also the individual differences in terms of attention to the field and attribution of causality (Choi et al., 2007; Nisbett et al., 2001). The broader focus of the AHS could have differentiated itself from the relatively more focused DSS in terms of measuring individual differences in cognitive styles.

Dialectical thinking as measured by the DSS did not mediate the observed difference in critical thinking skills in the present investigation. In the subsequent examination of the relationship between the DSS and the WGCTA scores, it was found that the relationship between the two variables was negative only in the New Zealand European sample but was positive in the Asian sample. The



difference in the correlations between dialectical thinking and critical thinking in the two samples might explain why the DSS did not mediate the effect of culture on critical thinking skills. It should be highlighted that, however, the interaction effect was only marginally significant. The result would better be treated as indicating a possible cultural difference in cognitive processes.

In a Western culture such as New Zealand, the principles involved in dialectical thinking might indeed be interpreted as incongruent to the formal logical rules which have been commonly endorsed as the preferred mode of thinking (Peng & Nisbett, 1999). In this case, it is reasonable to find the principles of dialectical thinking showing a negative relationship with critical thinking skills performance, because it might be considered illogical for a critical thinker to endorse the principles of dialectical thinking. On the other hand, it would be possible that the endorsement of the principles involved in dialectical thinking was deemed as reflecting an individual's wisdom or intellectual capacities in Asian cultures (see also Buchtel & Norenzayan, 2008). Therefore, critical thinkers who are skillful in the use of different cognitive strategies might show preference for the principles of dialectical thinking, which resulted in the positive relationship between the DSS and the WGCTA scores.

Although the major focus of the present study is not on the theories of dialectical thinking or analytic versus holistic cognition, the present findings have indicated some interesting pattern regarding the relationship between these cognitive styles and actual cognitive tasks such as critical thinking. It is believed that further examination of the concept of dialectical thinking and refinement of its measurement would be beneficial to understand the practical implication of the

concept to areas such as designing cognitive instruction for students who preferred different cognitive styles.

#### *4.10. Summary*

In relation to the two key issues about critical thinking in international education, the findings in this study showed that: 1) Asian students perform less well than their Western counterparts in two objective measures of critical thinking, but 2) the difference is explained by English language ability but not other cultural variables that may be relevant in an international education context. While the observed difference seems to suggest that Asian students appear not as good as their Western counterparts in terms of critical thinking skills, the difference is related more to language ability rather than some “culturally-determined” factors.

These results also have important implication to the second issue about the appropriateness of critical thinking instruction. As critical thinking skills have been the major focus of critical thinking instruction (e.g., Halpern, 1998, 1999), the present findings actually indicate that critical thinking skills are not something inapplicable to Asian students. In fact, the positive relationship between measured critical thinking skills and dialectical thinking also seemed to suggest that the practice of critical thinking skills does not necessarily marginalize the preferred thinking style in Asian culture. Given that the difference in critical thinking skills is explained by English language ability, it seems reasonable to suggest that the effectiveness of critical thinking instruction in international education can be improved by paying attention to the language issue such as helping students with lower English language proficiency and using simpler language in structuring course materials.

## CHAPTER 5

### The Relationship between

### Critical Thinking Skills and Academic Performance

#### *5.1. Introduction*

In relation to the concern about the appropriateness of critical thinking instruction in international education, most of the discussion in the literature has been focused on whether critical thinking instruction should be applied in international education. However, a more meaningful question about the appropriateness issue would be whether existing critical thinking instruction enables students to practice critical thinking despite the possible influences of different cultural-educational contexts on the students.

Despite the differences in the instructional contexts (Chapter 2) and the socialization processes in relation to critical thinking (Chapter 3), the practice of critical thinking in education is valued by teachers and students of both Asian and Western cultural backgrounds (Chapter 3; see also Howe, 2004). Although significant difference in critical thinking skills was observed between Asian and New Zealand European students, the difference was explained by English language ability, which suggested that the difference in critical thinking skills can be reduced through more careful instructional design with consideration of the language issue (Chapter 4). All these findings seemed to suggest that critical thinking instruction should be and can be applied to both Asian and Western students. On the other hand, it is also important to examine how existing critical thinking instruction is promoting the application of critical thinking by students of different cultural backgrounds. If courses that aim to develop students' critical thinking can only promote the use of critical thinking in one group of students but

not the other, the instructional practices of these courses may then be considered inappropriate in international education.

In a study that examined the correlation between critical thinking skills and students' grade point average (GPA) among both Hong Kong Chinese and American university students (Ku et al., 2006), it was found that the correlation was not significant in both samples. Nevertheless, previous research in the United States demonstrated that students' critical thinking skills measured by standardized instruments were positively related to their academic achievement in courses which expect the application of critical thinking by students (nursing course, Bowles, 2000; research methodology course, Collins & Onwuegbuzie, 2000). These findings suggested that academic outcomes in courses that are focused on the development of critical thinking are likely to reflect the students' critical thinking skills (Bowles, 2000; Collins & Onwuegbuzie, 2000), whereas academic outcomes that are composed of results from any course (i.e., courses that have varied emphasis on the development of critical thinking) might not reflect the critical thinking ability of the students (Ku et al., 2006). Students' critical thinking skills can be expected to reflect in their academic performance in course assessments which have been focused on the development of critical thinking. If this expectation can be applied equally to students of both Asian and Western cultural backgrounds, it seems reasonable to suggest that critical thinking instruction is appropriate in international education.

In the context of New Zealand where the educational practices are characterized by the Socratic approach, Asian international students reported that one of their difficulties in studying was their lack of knowledge about the academic conventions such as writing literature reviews, critical reviews and

essays, and research proposals (Campbell & Li, 2008). In addition, Asian students also reported more difficulties in academic tasks such as making oral presentation, writing assignments, and taking tests and exams (Berno & Ward, 2002; Ward & Masgoret, 2004). As these assessment methods are often associated with the use of a more direct and overt approach in written and verbal communication (e.g., Atkinson, 1997; Ennis, 1998; Fox, 1994), it is possible that Asian students' reported difficulties in these tasks are at least partly related to the different preference or habit in communication (Chapter 1, Section 1.3.3). If the students' use of critical thinking skills is cultivated and assessed by means of these kinds of tasks or assignments, Asian students might find it harder to express their critical thinking skills as required in the course, even though they may be skilled in critical thinking. Consequently, the relationship between critical thinking skills and academic performance might be weaker among Asian students. If this is the case, university courses that employ these kinds of assessments to develop students' critical thinking may be considered inappropriate to Asian students.

Apart from different communication styles, Asian students' reported difficulties in terms of academic assessment were suggested to relate to their lack of knowledge about the academic conventions in New Zealand (Campbell & Li, 2008). The implication is that students who are more familiar with the academic conventions in New Zealand would find it less difficult to meet the requirement of the tasks and easier to express their critical thinking in academic assessments.

Familiarity of the New Zealand academic convention might be indicated by a person's adoption of New Zealand cultural norms. It is logical to suggest that students who are more familiar with the New Zealand culture would also be more familiar with the academic convention in New Zealand. Although adoption of

New Zealand culture was not shown to relate to the observed difference in critical thinking skills between Asian and New Zealand European students (Chapter 4), cultural adoption may be related to students' academic performance in the university context of New Zealand. Furthermore, it is possible that students who show higher level of adoption of New Zealand culture would be more able to express their critical thinking skills according to the academic conventions of the university courses, so that the relationship between critical thinking skills and academic performance would be stronger among these students. In contrast, students who show lower level of adoption of New Zealand culture might be less likely to express their critical thinking skills according to the requirement of the course, and therefore the relationship between critical thinking skills and academic performance would be weaker among these students.

Based on the above arguments, four hypotheses have been developed in terms of critical thinking skills, academic performance, and the relationship between the two variables among the Asian and New Zealand European students in New Zealand:

Hypothesis 1: Students' critical thinking skills would be positively related to their academic performance in university courses which emphasize the development of critical thinking among students.

Hypothesis 2: As a result of the positive relationship between critical thinking skills and academic performance, and given that Asian students reported experiencing academic difficulties in New Zealand, Asian students would perform less well in a course where the use of critical thinking is encouraged through assessment.

Hypothesis 3: The relationship between critical thinking skills and academic performance would be weaker among Asian students than New Zealand European students.

Hypothesis 4: The relationship between critical thinking skills and academic performance would be weaker among students who show lower level of adoption of New Zealand culture than those who show higher level of cultural adoption.

Hypotheses 3 and 4 appear to overlap with one another because Asian students have been found to show lower level of adoption of New Zealand culture than their New Zealand European counterparts (Chapter 4). However, from the ‘small culture’ perspective in understanding students’ behaviors (Clark & Gieve, 2006), it is necessary to acknowledge the existence of individual differences in terms of cultural adoption within each of the respective samples. Without making assumptions about the level of cultural adoption based on the cultural backgrounds of the students and then using the variable as an explanation for any observed cross-cultural difference, the level of cultural adoption should be assessed in both samples as an individual difference variable. The effects of this variable and its interaction with the students’ cultural backgrounds may then be examined in terms of the relationship between critical thinking skills and academic performance. It is expected that this approach would enable a more precise understanding about the influence of cultural backgrounds and cultural adoption on the relationship between critical thinking skills and academic performance.

Following the approach taken in Chapter 4, the effect of general intellectual competence would be controlled for in the analysis. Previous research showed

that students' pre-course knowledge about academic vocabulary was significantly related to the students' performance in the final examinations (Turner and Williams, 2007). In addition, students' actual English language proficiency was also found to be significantly related to their critical thinking skills performance (Chapter 4). It is likely that a student's English language proficiency may moderate the relationship between critical thinking skills and academic performance. To have a clearer picture about the influences of culture and cultural adoption, the effect of English language ability would also be controlled for in the analysis to ensure that any effects observed could be directly interpreted in terms of critical thinking skills and academic performance.

## *5.2. Method*

### *5.2.1. Participants*

One hundred and ninety-five students were recruited from an introductory management course at a public university in New Zealand. The sample composed of 110 New Zealand European students, 52 Asian students, and 33 other ethnicities. The other ethnicities involved were similar to those reported in the previous chapter, including New Zealand Maori, African, Fijian, Iranian, and mixed ethnicities. Their data were not included in the current analysis because the major focus of this research was on New Zealand European and Asian student samples. The majority of the Asian sample comprised of Chinese (53.8%), followed by Indian (15.4%), Vietnamese (9.6%), Filipino (7.7%), and Thai (3.8%), with the rest being Cambodian, Indonesian, Japanese, Korean, and Sri Lankan. This pattern was generally similar to the situation of international education in New Zealand (New Zealand Ministry of Education, 2008). The



average age of the final sample of 162 student participants was 18.87 years ( $SD = 2.65$ ), with 82 male and 80 female.

### *5.2.2. The introductory management course*

The course under investigation was an introductory management course which explicitly emphasizes the development of critical thinking skills in the course objective. The course outline stated that the major objective of the course was to give an introduction of the trends, issues and challenges of the business environment in New Zealand, and students were expected to develop and apply their critical thinking in the course.

The assessment criteria were designed with the aim of developing students' critical thinking through the assignments and final examination. The assessment included a journal of the student's personal experience of a business topic (20% of final course grades), essays with critical discussion (40% of final course grades), a final examination which required critical discussion on issues related to business development (30% of final course grades), and satisfactory completion of an essay writing and referencing course (10% of final course grades). With this explicit emphasis of critical thinking in the course objectives and assessment schedule, the course offered an interesting avenue for testing the present research hypotheses.

### *5.2.3. Materials and Procedures*

*Critical thinking test and other measures.* The same set of instruments used in the major study in Chapter 4 was administered to the participants. These included the Watson-Glaser Critical Thinking Appraisal Short Form (WGCTA-SF) and the Shipley Institute of Living Scale (SILS). The students' level of adoption of the behavioral norms in New Zealand was again assessed by the eight

items adopted from the Behavioral Acculturation Scale (BACS-16). Cronbach's alpha of the 8-item cultural adoption scale was .85 in the Asian sample and .86 in the New Zealand European sample.

The Dialectical Self Scale (DSS) and the Analysis-Holism Scale (AHS) were also administered in this study. However, because these variables were not related to the research focus of the present study, these scales would not be further discussed in the following sections.

Perceived English language proficiency was again assessed by the two items used in Chapter 4. The correlation between the two items was .91 ( $p < .001$ ) in the Asian sample and .75 ( $p < .001$ ) in the New Zealand European sample.

*Academic performance.* The final course grades of the participants in the introductory management course were obtained with approval from the management school as a part of the school's accreditation project. The literal grades were transformed into a continuous numeric variable using this conversion system: E = 1, D = 2, C = 3, C+ = 4, B- = 5, B = 6, B+ = 7, A- = 8, A = 9, A+ = 10. According to the grading system of the university, grade C or above denotes a pass in the course (i.e., achievement of 50% of the course grades).

Ethics approval for the accreditation project was granted to the management school by the university's Human Ethics Committee. Students were recruited through advertising in the course with a course population of 1,155, and their participation was on a voluntary basis. To increase the response rate, an incentive of a NZ\$10 grocery voucher was given upon completion of the instruments, and the top scorers were also awarded with cash prizes, where the top three scorers were awarded NZ\$150, NZ\$120, and NZ\$100, respectively.. The average time

required to complete the session was approximately an hour, but participants were allowed as much time as they needed to finish all the instruments.

### 5.3. Results

#### 5.3.1. Preliminary Analysis

Table 5.1 shows the descriptive statistics of the target variables in the Asian and New Zealand European student samples. The two samples were significant different from each other on the WGCTA, the SILS vocabulary test score, cultural adoption, and perceived English language proficiency. New Zealand European students scored higher on these variables than did the Asian students. In terms of academic performance, the difference between the two samples was marginally significant, suggesting a trend that New Zealand European students performed slightly better in the course than did their Asian counterparts. Nevertheless, the two samples did not significantly differ from each other in their SILS abstraction test score, showing that Asian students and New Zealand European students were not significantly different in terms of their general intellectual competence.

Table 5.1: Descriptive statistics and independent sample t-tests of target variables

	Asian		New Zealand European		<i>t</i> -test
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Course grade	5.92	1.68	6.41	1.53	-1.83 <sup>a</sup>
WGCTA total	23.55	6.31	26.47	6.08	-2.72**
SILS vocabulary test	25.00	6.41	28.39	3.70	-3.54***
SILS abstraction test	16.46	2.62	16.60	2.29	-.33
Cultural adoption	4.50	0.92	5.22	0.67	-4.94***
Perceived English proficiency	5.68	1.31	6.56	0.74	-4.47***

Note. <sup>a</sup>  $p = .07$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

### 5.3.2. *Relationship between target variables*

Table 5.2 shows the correlation among the target variables in the two samples. Similar to the observation in Chapter 4, the WGCTA was significantly correlated with SILS vocabulary and SILS abstraction test scores, indicating that critical thinking abilities measured in the WGCTA were positively related to one's language ability and general intellectual functioning. The correlation between course grade and the WGCTA score was positive in both samples, although that in the Asian sample was only marginally significant.

Students' course grades were significantly correlated with SILS abstraction test score in both samples, indicating that general intellectual competence had positive influence on the students' academic achievement. The correlation between course grades and SILS vocabulary score was only significant in the Asian sample, but statistical analysis using Fisher z-transformation revealed that the difference in the correlation coefficients between the two samples was not significant,  $z = 1.49$ ,  $p = .14$ . The correlations between course grades and the other variables were not significant.

Table 5.2: Correlation among the variables in both samples

	Course grade	WGCTA	SILS vocabulary	SILS abstraction	Cultural adoption
WGCTA	(.26 <sup>a</sup> ) .34**	-			
SILS vocabulary	(.44**) .19	(.50**) .44**	-		
SILS abstraction	(.32*) .30**	(.37*) .30**	(.38**) .28**	-	
Cultural adoption	(.18) .14	(.10) -.14	(.25) -.07	(-.12) -.03	-
Perceived English proficiency	(.19) .19	(.15) .01	(.59**) .28**	(.26) .07	(.49**) .15

Note. <sup>a</sup>  $p = .08$ ; \* $p < .05$ ; \*\* $p < .01$ ; Numbers in parentheses are correlations in the Asian sample,  $n = 46$ ; Numbers without parentheses are correlations in the New Zealand European sample,  $n = 85$ ; listwise deletion.

*Moderation Analysis.* Moderation analysis using multiple regressions (Baron & Kenny, 1986) was conducted to examine the effects of critical thinking skills, adaptation to New Zealand culture, students' cultural backgrounds, and their interactions on course grades. To control for the effects of English language ability, general intellectual functioning and gender, SILS vocabulary score, perceived English language proficiency, SILS abstraction score, and gender were entered in the first block of the regression analysis. The results of the regression analyses are present in Table 5.3.

Table 5.3: Regression analyses testing the effects of critical thinking skills, cultural adoption, culture, and their interaction terms on quantified course grades.

	<i>Steps</i>	B	<i>t</i>	$\Delta R^2$	<i>F Change</i>
1.	SILS vocabulary	.22	2.15*	.15	5.67***
	SILS abstraction	.23	2.60**		
	Perceived English proficiency	.06	0.65		
	Gender	-.07	-0.83		
2.	SILS vocabulary	.13	1.15	.05	2.59 <sup>a</sup>
	SILS abstraction	.20	2.31*		
	Perceived English proficiency	.02	0.23		
	Gender	-.08	-0.94		
	WGCTA	.20	2.11*		
	Cultural adoption	.17	1.79 <sup>b</sup>		
	Culture	-.02	-0.25		
3.	SILS vocabulary	.17	1.49		
	SILS abstraction	.19	2.08*		
	Perceived English proficiency	.02	0.19		
	Gender	-.09	-1.08		
	WGCTA	.16	0.98		
	Cultural adoption	.21	1.35		
	Culture	-.02	-0.19		
	WGCTA X Culture	.06	0.39		
	Cultural adoption X Culture	-.01	-0.05		
	Cultural adoption X WGCTA	-.15	1.48		
4.	SILS vocabulary	.17	1.56	.01	2.22
	SILS abstraction	.18	2.00*		
	Perceived English proficiency	.02	0.14		
	Gender	-.08	-0.90		
	WGCTA	.06	0.33		
	Cultural adoption	.13	0.78		
	Culture	.00	0.03		
	WGCTA X Culture	.11	0.71		
	Cultural adoption X Culture	.05	0.36		
	WGCTA X Cultural adoption	-.02	-0.11		
	WGCTA X Cultural adoption X Culture	.19	1.49		

Note. <sup>a</sup>  $p = .06$ ; <sup>b</sup>  $p = .08$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; culture was dummy

coded with “Asian students = 0” and “New Zealand European students = 1”;

WGCTA score and cultural adoption were mean centered (Aiken & West, 1991).

The first step of the regression analysis showed that course grades were significantly predicted by SILS vocabulary score and SILS abstraction score, but the effect of gender was not significant. The effect of perceived English language proficiency was also not significant, showing that the variable may not be as useful as the students' actual English ability in predicting their academic performance. In general, the results indicated that academic performance can be predicted by the students' English language ability and general intellectual competence.

In the second step of the regression analysis, WGCTA score and cultural adoption<sup>5</sup> were both found to significantly predict course grades, indicating that critical thinking skills was positively related to students' academic achievement in the course even after controlling for the effects of English language ability and general intellectual competence. The significant effect of the WGCTA score showed further support to Hypothesis 1. However, the effect of culture was not significant and therefore Hypothesis 2 which stated that Asian students might perform less well in the course was not supported in the regression analysis. It was also interesting to note that the effect of cultural adoption on academic performance was marginally significant, showing that an individual who showed stronger cultural adoption in New Zealand tended to perform better in the course of consideration.

In the subsequent steps of the regression analysis, the effects of all two-way and three-way interaction terms were statistically nonsignificant, indicating that the effect of critical thinking skills on course grades was not moderated by the

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<sup>5</sup> Although the zero-order correlation between cultural adoption and course grade was not significant in the respective samples, it was significant in the overall sample,  $r(131) = .18, p < .05$ . Therefore the significant effect of cultural adoption in the regression equation did not indicate any suppressor effect in the analysis (Maassen & Bakker, 2001).

cultural backgrounds or the level of cultural adoption of the students. Therefore, the results did not show support to Hypotheses 3 and 4 which stated that students' cultural backgrounds or cultural adoption would moderate the relationship between critical thinking skills and academic performance.

#### *5.4. Discussion*

The present study investigated the relationship between critical thinking skills and academic performance and how the relationship varies as a function of the cultural background and the level of cultural adoption of the students in the New Zealand context. The findings showed that there is a significant positive relationship between critical thinking skills and academic performance in an introductory management course, but this relationship did not vary as a function of the students' cultural backgrounds or their level of behavioral adoption of New Zealand culture. The results suggested that the assessments of the course did not appear to favor any particular group of students in terms of their use of critical thinking skills for academic purpose.

##### *5.4.1. Critical thinking skills and academic performance*

As revealed in the independent sample t-test, there was a marginally significant difference in the academic performance between the two samples, where Asian students were found to perform slightly less well in the course than their New Zealand European counterparts. Because Asian students might have experienced more difficulties in terms of the academic conventions and the use of English language in New Zealand (e.g., Campbell & Li, 2008), it was not surprising that their academic performance may be slightly lower than that of their New Zealand European counterparts.



Previous research on the relationship between critical thinking skills and academic performance usually showed a significant positive correlation between the two variables without considering the possible influences of factors such as language ability and general intellectual competence of the students (e.g., Bowles, 2000; Collins & Onwuegbuzie, 2000). The present findings are important in demonstrating that academic performance was still significantly predicted by critical thinking skills after controlling for the effects of the other related cognitive and linguistic abilities. More important, the relationship between critical thinking skills and academic performance did not differ as a function of the cultural background or the level of cultural adoption of the students, suggesting that both Asian and New Zealand European students were able to apply their critical thinking skills similarly in the course assessments.

In terms of the positive relationship between critical thinking skills and academic performance, Williams and Stockdale (2003) showed that students with high critical thinking skills were generally more likely to perform well in any university course regardless of the course structure, whereas students with low critical thinking skills could also achieve good results in courses by putting more efforts in activities such as note-taking and attending extra sessions of lectures or tutorials. In a study which examined the effects of critical thinking skills and study habits on academic performance, it was shown that one's study habits such as note-taking are not related to one's abilities in critical thinking, and both critical thinking skills and note-taking contribute similarly to academic performance (Williams & Worth, 2003). Therefore, even with marginal critical thinking abilities, a student may still engage in study habits such as effective note-taking to compensate for the lower level of critical thinking skills in order to

achieve in the course. Interestingly, Williams and Stockdale (2003) also suggested that because students with low critical thinking skills have performed well in their study, they might even begin to perceive themselves as good thinkers. Therefore, it seemed that structuring a course with the goal of cultivating the students' critical thinking might not only be appropriate to students of both Asian and Western cultural backgrounds, but also desirable to encourage students to develop self-efficacy in engaging in critical thinking.

In the present study, critical thinking skills have been treated as the predictor variable of students' academic outcome in a course. However, the development of critical thinking skills is also an outcome of university education (e.g. Halpern, 1999). The present findings showed that those assessments involved in the course were related to a student's critical thinking skills, but it was not certain about whether or how those assessments promote students' critical thinking skills. A longitudinal design of research would be necessary to understand how different instructional practices might be effective in cultivating students' abilities in critical thinking. For instance, Williams, Oliver, Allin, Winn, and Booher (2003) showed that students scored significantly higher in critical thinking at the end than at the beginning of a psychology course, and it was found that students who scored high on the exams of the course improved significantly more on critical thinking than those who scored low on the exams. The authors suggested that it was an explicit practice and feedback procedure specifically implemented in the course that helped the students to acquire critical thinking through learning from the feedbacks of the instructor. Other instructional design or practices such as group discussion or essays writing that have been suggested

to be useful in cultivating critical thinking (Chapter 3) could also be tested in the future.

#### *5.4.2. Adoption of the behavioral norms in New Zealand*

The effect of cultural adoption on course grades was marginally significant,, indicating a trend that students who showed higher level of adoption of the behavioral norms in New Zealand tended to perform better in the course than those who showed lower level of cultural adoption. The findings appeared logical as the course has been focused on the business context in New Zealand. Higher level of behavioral adoption of New Zealand culture might enhance the students' content knowledge about the business context in New Zealand, which might in turn facilitate their thinking and learning about related issues in the course.

It is also important to note that cultural adoption did not moderate the relationship between critical thinking skills and course grades, suggesting that this variable did not affect students' use of critical thinking skills in the course. This finding showed that although a small part of the course outcome might be predicted by one's level of cultural adoption, both Asian and New Zealand European students can similarly apply their critical thinking skills in the course regardless of their behavioral adoption of and familiarity with New Zealand culture.

#### *5.4.3. Implications for critical thinking instruction*

It can be seen that students' use of critical thinking skills in a course with a focus on critical thinking was not influenced by their cultural backgrounds or their levels of cultural adoption. The debate about the appropriateness of critical thinking instruction appeared to be less an issue about the current "Western" instructional approach being unfair to Asian students but more about what else

can be done to cultivate critical thinking among university students regardless of their cultural backgrounds.

The studies in the previous chapter revealed that English language proficiency is an important factor to consider in relation to critical thinking among students of a diverse cultural background. It has been suggested that one way to improve the existing educational practices in relation to critical thinking is to carefully design course materials with reference to students' language ability (Chapter 4). The management course in the present study also offered an interesting example by showing the inclusion of a training course which was targeted to help students with their writing and referencing skills. Although there was no data available to examine the overall usefulness of that particular writing course on students' final course grades or performance in the various assignments and exams, it is possible that the training might help students (regardless of their cultural backgrounds) to get familiar with academic conventions such as essays writing and literature review (Campbell & Li, 2008). According to the cognitive load theory (Paas et al., 2003), these efforts might help to develop schemas about academic language use and skills, and thereby reduce the cognitive load of students in engaging in critical thinking for academic purpose.

### *5.5. Summary*

The present study showed that critical thinking skills are positively related to the academic achievement of university students regardless of their cultural backgrounds and cultural adoption of New Zealand. Both Asian and New Zealand European students were able to apply their critical thinking skills similarly in a university course which emphasize on the development of critical thinking among students. Based on the findings, it is suggested that the existing direct approach of

educational practices common in Western university settings seemed to be equally applicable to both Asian and Western students. Further research endeavor could be focused more on the design of instructional strategies that help to develop the critical thinking skills among students of diverse cultural background.

## Chapter 6

### Critical Thinking in Higher Education and Beyond

Learning without thought is labor lost; thought without learning is perilous.

Confucius, the Analects

The aim of this thesis was to examine the influence of culture on the teaching and learning of critical thinking in higher education. The research is informed by two issues related to critical thinking in international education, namely, the perception that Asian students lack critical thinking; and the appropriateness of critical thinking instruction. With this in mind, the present research examined: 1) the possible influence of culture on the instructional contexts between Hong Kong and New Zealand (Chapter 2); 2) the extent to which cultural-educational contexts affect Asian and New Zealand European university students' conceptualization and practice of critical thinking (Chapter 3); 3) to what degree culture affects university students' critical thinking skills (Chapter 4); and 4) the influence of culture on university students' application of critical thinking skills in an academic context (Chapter 5).

The studies presented in Chapter 2 and 3 showed that the structure of educational and sociocultural context could have important implications for the development of critical thinking among university students. Specifically, the instructional context in Asia was found to show less explicit emphasis on critical thinking (Chapter 2) but more inhibition to students' engagement in critical thinking than in New Zealand (Chapter 3). Specifically, the inhibitory factors included teachers' expectations of students' obedience and exam-driven pedagogy. Educational expectations and practices are further reinforced by Asian parents who encourage their children to show respect to authority figures by obedience and to achieve high marks in examinations. These educational

ideologies and practices were suggested to discourage Asian students from expressing and engaging in critical thinking. In contrast, the educational and sociocultural context in New Zealand appeared to be more supportive to students' engagement in critical thinking.

Despite these differences in the educational and sociocultural contexts, Asian students and New Zealand European students were found to hold similar conceptions about critical thinking (Chapter 3). Moreover, the differences in educational and sociocultural contexts did not appear to be related to differences in critical thinking skills between Asian and New Zealand European students. As shown in Chapter 4, although Asian university students were found to perform less well than their New Zealand European counterparts in standardized measures of critical thinking skills, the difference was explained by individual differences in English language proficiency rather than differences in cognitive styles or behavioral adoption of New Zealand culture. In Chapter 5, it was further shown that the relationship between critical thinking skills and academic performance did not differ between Asian and New Zealand European student samples, suggesting that the application of critical thinking skills for academic purposes does not appear to be influenced by the cultural backgrounds of the students.

In general, the findings in the present research demonstrated that culture influences the practice of critical thinking in education. Cultural traditions seem to exert influence on the educational and sociocultural contexts, which may either facilitate or inhibit students' practice of critical thinking. However, when it comes to actual critical thinking skills and its application in the academic context, culture does not show much influence on students' practice of critical thinking. Therefore, taking a deterministic view of the influence of culture on the

educational practice of critical thinking seems to be problematic (see also Cheng, 2000; Clark & Gieve, 2006).

### *6.1. The relationship between culture and critical thinking*

The major contribution of the present research is the empirical examination of the influence of culture on critical thinking through carefully designed cross-cultural research. The findings in the four cross-cultural studies provided important empirical evidence for understanding the two pivotal issues concerning critical thinking in international education. Apart from the two pivotal issues, these findings also shed light on other important issues regarding the influence of culture on the teaching and learning of critical thinking which deserve further attention.

#### *6.1.1. The cultural issues related to critical thinking in international education*

As suggested in Chapter 1, the perception that Asian students lack critical thinking has been rooted in the perceived incongruence between the behavioral pattern of Asian students and behavioral expectations in Western classrooms (Cheng, 2000; Kumaravadivelu, 2003). Because behaviors such as overt questioning, critiquing, critical debate, and argumentation are seen as indicators of one's critical thinking in the Western cultures, Western instructors might interpret the absence or delay of these behaviors among Asian students as a lack of critical thinking. Moreover, Confucian values of showing respect to authorities and maintaining social relationships have offered plausible explanations to Asian students' apparent silence and passivity, so that the association between Asian cultural traditions and a lack of critical thinking has been reinforced and used as a



taken-for-granted assumption to challenge the usefulness of critical thinking instruction in international education (e.g., Atkinson, 1997).

Previous research has shown that the relationship between behavioral manifestations and thinking varies between Asian and Western cultures (e.g., Kim, 2002; McCarthy et al., 2008), and that there can be a number of reasons behind Asian students' silence other than Confucian values such as showing respect to authorities or maintaining interpersonal harmony (Chiu, 2008). Interpreting students' abilities in critical thinking based *only* on their behavioral manifestations is problematic. Prior to the present research, there have been different theoretical attempts to argue that the actual reasons behind the perceived lack of critical thinking among Asian students could be related to factors other than culture or cultural traditions (Cheng, 2000; Kumaravadivelu, 2003; Paton, 2005). However, as Ten Dam and Volman (2004) suggested, empirical investigation on the exact influence of culture on critical thinking has been lacking. The present research is therefore important, as it is one of the first initiatives to empirically investigate how culture influences the teaching and learning practices of critical thinking.

The present findings showed that the observations made by teaching professionals do not necessarily represent only cultural stereotypes of Asian culture. There are indeed differences observed in the socialization process regarding critical thinking between Asia and New Zealand (Chapter 2 & Chapter 3). In addition, both Chinese international and New Zealand European postgraduate students reported observations about the behavioral differences between Asian and New Zealand European university students that are similar to those documented in the international education literature (Chapter 3). However,

the observed differences in critical thinking skills between the two student samples were explained by English language proficiency (Chapter 4). Therefore, the perception of Asian students' lack of critical thinking seems to be more precisely a perceived difference in behavioral manifestations of critical thinking rather than a difference in critical thinking skills or abilities after considering the factor of English language ability.

To further demonstrate whether Confucian values indeed impede students' critical thinking performance, a subsequent analysis using the data from the studies presented in Chapter 4 and Chapter 5 was conducted. Dividing the Asian sample into Confucian and non-Confucian Asian cultures using Biggs' (1994) definition of Confucian-heritage culture<sup>6</sup>, comparisons were made on all target variables in the present research. Results of this subsequent analysis are shown in Appendix D. It was found that students from Confucian and non-Confucian Asian cultures are not significantly different from each other in critical thinking, although both groups scored significantly lower on the WGCTA than the New Zealand European sample. This additional analysis provides further empirical evidence that Confucian values cannot be the culprit of Asian students' apparent lack of critical thinking as implicated in previous international education literature.

The attribution of the perceived lack of critical thinking abilities among Asian students to cultural influence is likely inaccurate; Asian students do not seem to lack the ability to think critically. Furthermore, existing critical thinking instruction seems to be appropriate to Asian students. The results in Chapter 5

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<sup>6</sup> Biggs (1994) suggested that the education systems in Asian cultures such as China, Hong Kong, Singapore, Japan, Taiwan, and Korea have been substantially influenced by Confucian values. These cultures are usually identified as Confucian-heritage culture (CHC) in the international education literature.

showed that the relationship between critical thinking skills and academic performance is not significantly different between Asian and New Zealand European student samples, suggesting that both groups of students can similarly apply their critical thinking skills in a course that aims to develop students' critical thinking. This finding suggests that the instruction has appropriately enabled both Asian and Western students to apply their skills as required in the academic context. One may argue that the course being investigated included only written form of assessments and there could be differences in the relationship between critical thinking and course grades which are derived by assessment with verbal communication (e.g., contribution to group discussion). However, even if this is the case, Durkin's (2008a, b) research has shown that Asian students are able to adapt to critical thinking behavioral norms while retaining the values of preserving social harmony in critical debate and argumentation. The existing approach of critical thinking instruction prevalent in the Western culture therefore does not seem to be at odds to Asian students and can be applied in international education.

It is of little doubt that critical thinking is an important skill to be acquired by university students. The value of critical thinking postulated by educators and theorists (e.g., Halpern, 1999; Pithers & Soden, 2000) has now been reiterated by postgraduate students in the present research (Chapter 3). The next question to be asked about critical thinking instruction seems to be how to improve its effectiveness in the international classroom. Addressing this question will require more in-depth understanding about the influence of culture on critical thinking in education. Some of the present findings have shed light on this issue.

### *6.1.2. The other possible influence of culture on the teaching and learning of critical thinking*

Apart from addressing the major issues of interest, the present research has also identified other interesting aspects regarding the possible influence of culture on the teaching and learning of critical thinking. In Chapter 3, the Chinese international and New Zealand European postgraduate participants indicated certain intriguing educational and sociocultural influences on the practice of critical thinking in their respective cultures. While university has been commonly considered as an important venue for cultivating students' critical thinking, it is interesting that family has also been suggested to have significant impact on the development of students' abilities and habits in critical thinking.

Recent developmental psychology research has indicated a significant positive relationship between young children's social experiences with adults and their ability to think critically about statements made by other people (Heyman, 2008). One of the major influences of these social experiences is that children may be more motivated to engage in critical thinking if they are convinced of the value to do so (Kuhn, 1999). A more recent study has shown that social experiences are influential to university students' perceived sense of importance of critical thinking (Celuch, Black, & Warthan, 2009). Students who believe that engagement in critical thinking is endorsed by their work-related supervisors, parents, and friends tend to see critical thinking as important.

The present research has shown that there seem to be more inhibitory influences on students' engagement in critical thinking in the educational and sociocultural context in Asia than that in New Zealand (Chapter 3). However, it is not certain how those inhibitory forces might impact on Asian students' perceived

value of critical thinking in general. It is intriguing to observe that despite the inhibitory influences in the sociocultural context, Asian students seem to similarly value the practice of critical thinking as their New Zealand European counterparts (Chapter 3). Research in intergenerational value transmission may possibly be applied to understand this issue (e.g., Boehnke, 2001). Examination of the perceived value of critical thinking of students and their parents would be useful for understanding the influence of different cultural socialization processes on the practice of critical thinking, thereby identifying possible strategies to facilitate critical thinking instruction in relation to the influence of different socialization experiences on students.

In addition, as a consequence of the increasing internationalization in higher education (Green, 1999), it can be expected that more and more Asian parents, teachers or instructors will finish their professional training in another culture and possibly be influenced by the educational values and practices in the host culture. The impact of these different educational values and practices of critical thinking on the education system in Asia will also be an interesting topic for future investigation.

### *6.2. Implications of the present research*

The present research highlighted that Asian and Western students differ in their behavioral manifestations of critical thinking (Chapter 3), but the two samples are not significantly different from each other in terms of critical thinking skills after controlling for the effects of English language proficiency (Chapter 4). While the findings support the contention that behavioral manifestations do not necessarily indicate a person's actual engagement in critical thinking, the exact relationship between behavioral manifestations and critical

thinking skills is not certain. In addition, although the results in Chapter 5 showed that the relationship between course grades and critical thinking skills does not differ between Asian and Western student samples, it is still not clear which instructional strategies may be best applied in an intercultural classroom. Again, these issues require consideration of the behavioral norms inherent in critical thinking in education.

#### *6.2.1. Behavioral expressions, cognitive skills, and critical thinking dispositions*

The two research questions were induced by the perceived behavioral differences of Asian students in the international education literature. It seems inevitable for teaching professionals to interpret students' thinking by means of observing their behavioral manifestations in the classroom. With this in mind, a logical extension of the present research would examine the exact relationship between critical thinking skills and behavioral manifestations of critical thinking, and to investigate how culture might influence that relationship. As suggested by Chiu (2008), Asian students' silence can be explained by many different factors, which include indicating an actual lack of thoughts and ideas, germinating ideas, or avoiding interpersonal conflicts. Examining the relationship between critical thinking skills and behavioral manifestations would enable a better understanding of the influence of culture on the practice of critical thinking in international education.

It is possible that critical thinking dispositions might play a role in the relationship between critical thinking skills and behavioral manifestations. As Facione et al. (1997, 2000) suggested, critical thinking dispositions are related to a person's habitual ways of and motivations for using critical thinking. It is likely

that critical thinking dispositions moderate the relationship between critical thinking skills and behavioral manifestations. On the other hand, Facione et al. (2000) demonstrated that the correlation between critical thinking skills (measured by the California Critical Thinking Skills Test; CCTST) and critical thinking dispositions (measured by the California Critical Thinking Disposition Inventory; CCTDI) ranged from .09 to .41 across different student samples, showing that the relationship between the two variables could not be consistently established. While critical thinking was defined in terms of both skills and dispositions, there seemed to be difficulty in empirically relating the two aspects. An investigation which relates cognitive skills, critical thinking dispositions and behavioral manifestations might also bridge the gap between cognitive skills and critical thinking dispositions, and improve our understanding about how these variables and the links between them are possibly influenced by culture.

An important first step in such future investigations would be reexamination of the behavioral norms assumed in the notion of critical thinking. While overt questioning and critiquing are necessary in the communication of critical thinking, there were concerns about these behaviors might have been taken to an extreme and distorted the Socratic system (Tweed & Lehman, 2002, p. 97). This extreme and distorted form of overt questioning and critiquing is what seems to contradict such values as being respectful to others and preservation of social harmony that are seen as the essence of Confucian philosophy. As shown in Chapter 3, postgraduate students from both Asian and New Zealand European cultures agreed that questioning and critiquing were needed to communicate critical thoughts. On the other hand, the concern for social harmony was not something specific to students from the Asian culture; individuals in the West also treasured

mutual respect and harmony in interpersonal interaction, even though those values might take a less central role in Western cultural heritage (Chapter 3; Jones, 2005). Tweed and Lehman's (2002) suggestion of a more flexible approach of learning is interesting in that such an approach might incorporate the different concerns and practices prevalent in different cultural systems.

Durkin's (2008a, b) research offered further insights on this suggested flexible learning approach. It was found that East Asian students adapted to the British academic convention of critical debate and argumentation by means of the *Middle Way*, in which the students incorporated the values of being respectful and preserving social harmony while engaging in debate and argumentation in the academic discourse. Durkin (2008b) further suggested that teaching professionals in the West "could also develop their own Middle Way that does not lose the "quest for truth" (p. 51) by integrating caring and empathetic emphases in instruction. The integration of the search for truth and concern for interpersonal propriety might be essential in designing critical thinking instruction that could be applied to students of diverse cultural backgrounds. To summarize, a more clearly defined set of behavioral norms that considered interpersonal concerns would be needed for further meaningful investigation of the relationship between critical thinking skills and behavioral expressions and how such a relationship could be applied to critical thinking instruction in international education.

#### *6.2.2. Critical thinking instruction*

Before further examining the behavioral norms inherent in the practice of critical thinking and the relationship among behavioral expressions, cognitive skills and critical thinking dispositions, there are other steps that can be taken to enhance the cultural sensitivity of existing critical thinking instructions. As



behavioral expressions of critical thinking are very much related to one's abilities in effective communication of ideas, it would be important to incorporate the training of interpersonal communication into critical thinking instruction. In addition to skills, such as research and inquiry and information literacy, communication has been considered as one of the five most important skills to be acquired by university graduates (Barrie, 2004). The ability to think well does not guarantee one's ability to communicate effectively. Students are trained with excellent critical thinking skills in order to solve problems or make decisions; if they do not know how to present their ideas appropriately, the efforts spent in critical thinking would be futile. While it is important to consider the language ability of students (Chapter 4), the manners and methods involved in proper communication of their critical thoughts should also be made explicit to every student, regardless of their cultural backgrounds. Only in this way will university graduates be equipped with the necessary skills to better communicate their thinking to others.

In addition to offering communication skills training to students, it might also be important to help university staff involved in international education to become more aware of cross-cultural differences in communication styles and preferences. This is consistent with the suggestion of Durkin (2008b) that teaching professionals could also develop their own "Middle Way" to accommodate Asian students' preferences in communication whilst practicing critical thinking in education. Although it is desirable to encourage students to participate in classroom discussion and debate for the sake of cultivating critical thinking, instructors can try to maintain a respectful and supportive environment

in which everyone would feel comfortable to participate in the discussion (see also Chapter 3).

The advancement of technology could also be used to circumvent some of the challenges involved in face-to-face communication of critical thoughts. With an awareness of the emphasis placed on being respectful to authorities and preserving social harmony in the Asian culture, Chiu (2009) proposed the use of online forums to facilitate students' expression of critical thinking in online discussion. The online approach was shown to encourage students to take initiatives in volunteering opinions and ideas on different discussion topics. Chiu reported that the student participants felt safe and supported to express their own ideas in online discussions, a finding which appeared to be consistent with the idea of building an encouraging environment to facilitate critical thinking among students (Chapter 3). The online discussion facilitator could also provide cognitive modeling to the students by exemplifying the use of various critical thinking skills, which is considered to be an effective way to develop critical thinking among students (see also Yang & Chou, 2008 for the effects of different online instructional strategies on the development of critical thinking skills and dispositions).

In another study which compared the effectiveness of face-to-face discussion and online discussion, it was shown that online discussion allows more time for students to engage in reflective thinking prior to giving opinions or asking questions (Ng & Cheung, 2007). This feature may actually better suit the preferred approach of questioning among Asian students who have been socialized to question or critique after they gain sufficient understanding of the subject matter (e.g., Li, 2003b; Tweed & Lehman, 2002). Therefore, the use of

online discussion forums seemed to offer an interesting avenue to facilitate critical thinking instruction among students who might be different in terms of the propensities in verbalizing their critical thoughts, which can help to ameliorate some of those cultural concerns involved in critical thinking instruction.

### *6.3. Limitations and suggestions for future research*

In the present research, it was demonstrated that students' critical thinking skills predict their academic performance in a course (Chapter 5), but the exact effects of university education on university students' development in critical thinking skills have not been directly addressed. Previous longitudinal studies showed that university students improved their critical thinking skills (Pascarella, 1999) and critical thinking dispositions (Shin et al., 2006) through university education. In addition, it is also not clear what the kinds of instructional strategies are useful in cultivating university students' critical thinking. Chapter 2 showed that the different assessment methods studied did not relate to the educational emphasis on critical thinking as outlined in the course syllabi, but it was not possible to conclude from the data how those assessment strategies may actually be related to the development of critical thinking skills of the students.

The issue of the effectiveness of different instructional strategies is especially important to the design of appropriate critical thinking instruction for an intercultural classroom. Tsui (2002) found that essay writing and class discussion are both effective pedagogy to develop university students' critical thinking. However, how much would students with different language abilities and preferences for different communication styles engage in these activities and also learn about critical thinking through these exercises? Further longitudinal research would be needed to examine the effectiveness of different instructional

strategies in cultivating students' critical thinking, and the effects of culture should also be investigated in the context of international education.

Another potential area of research concerns the possible influence of a culturally diversified context on students' development of critical thinking. The present research has shown that students' cultural adoption of the behavioral norms in New Zealand may not be related to the students' critical thinking skills (Chapter 4). However, previous research has demonstrated that students' cultural diversity experiences in the universities could have a positive influence on their critical thinking skills (Deakins, 2009; Kakai, 2000; Pascarella, Palmer, Moye, & Pierson, 2001), although how these experiences actually impact on students of different cultural backgrounds is not clear. Would cross-cultural experiences be similarly beneficial to both international and local students who study in the same context? How could cross-cultural experiences be used as a means for teaching critical thinking? In view of the increasing prevalence of international education (e.g., OECD, 2009), the issue of increasing cultural diversity in the universities should also be examined to reveal its impact on university students' cognitive development.

#### *6.4. Conclusion*

Critical thinking is one of the most important skills expected of university graduates (Biggs & Tang, 2007). It is vital in preparing students to be capable of processing the vast amount of information now available as a result of technological advancement. However, the endorsement and practice of critical thinking has been challenged for its appropriateness in international education that has also become more popular around the globe. In the New Zealand context, the present research has offered empirical evidence regarding the influence of

culture on critical thinking in international education. It has been shown that despite the possible influence of culture, critical thinking instruction can and should be applied in international education. Further research aiming to improve the effectiveness of critical thinking instruction in international education seems to be an important next step to take with regard to the present investigation.

Apart from the flood of information, the world is also facing a myriad of challenges. New techniques are being developed everyday and different kinds of skills are required for the continuously emerging demands in society. The cultural challenges involved in the notion of critical thinking are also relevant to the other skills and attributes now expected of university students (Barrie, 2004). It is important to keep thinking critically about the impact of culture on education in this continuously changing world.

## REFERENCES

- Aiken, L., & West, S. (1991). *Multiple Regression*. Newbury Park, CA: Sage.
- Allport, G. W. (1955). *Becoming: Basic Considerations for a Psychology of Personality*. New Haven: Yale University Press.
- Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45(2), 357-376.
- Anderson, L., & Krathwohl, D. (Eds.). (2001). *A taxonomy for learning, teaching and assessing: a revision of Bloom's taxonomy of educational objectives*. New York: Longman.
- Arlin, P. K. (1984). *Arlin Test of Formal Reasoning*. East Aurora, NY: Slosson.
- Atkinson, D. (1997). A Critical Approach to Critical Thinking in TESOL. *TESOL Quarterly*, 31(1), 71-94.
- Atkinson, D. (1998). Apprenticing Nonnative Speakers to New Discourse Communities. The Author Responds. *TESOL Quarterly*, 32(1), 133-137.
- Baron, J. B. (1987). Evaluating thinking skills in the classroom. In J. B. Baron & R. J. Sternberg (Eds.), *Teaching Thinking Skills: Theory and Practice*.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Barrie, S. C. (2004). A research-based approach to generic graduate attributes policy. *Higher Education Research & Development*, 23(3), 261-257.

- Bauer, K. W., & Liang, Q. (2003). The effect of personality and precollege characteristics on first-year activities and academic performance. *Journal of College Student Development, 44*(3), 277-290.
- Bernard, R., Zhang, D., Abrami, P., Sicol, F., Borokhovski, E., & Surkes, M. (2008). Exploring the structure of the Watson-Glaser Critical Thinking Appraisal: One scale or many subscales? *Thinking Skills and Creativity, 3*, 15-22.
- Berno, T., & Ward, C. (2002). *Cross-cultural and Educational Adaptation of Asian Students in New Zealand* (End of Year Project Report). Wellington, New Zealand: Asia 2000 Foundation.
- Berry, J. W. (1980). Acculturation as varieties of adaptation. In A. M. Padilla (Ed.), *Acculturation: Theory, Models and some new Findings* (pp. 9-25). Boulder: Westview Press.
- Berry, J. W. (1997). Immigration, Acculturation, and Adaptation. *Applied Psychology: An International Review, 46*(1), 5-34.
- Biggs, J. (1994). Asian learners through Western eyes: An astigmatic paradox. *Australian and New Zealand Journal of Vocational Education Research, 2*(2), 40-63.
- Biggs, J. B. (1996a). Western misconception of the Confucian-heritage learning culture. In D. Watkins & J. Biggs (Eds.), *The Chinese learner: Culture, psychological, and contextual influences* (pp. 45-67). Hong Kong: Comparative Education Research Centre & The Australian Council for Educational Research.
- Biggs, J. B. (1996b). Approaches to learning of Asian students: A multiple paradox. In J. Paudey, D. Sinha & D. P. Bhawuk (Eds.), *Asian*

*Contributions to Cross-Cultural Psychology* (pp. 180-199). New Delhi: Sage Publication.

Biggs, J. B., Kember, D., & Leung, D. Y. P. (2001). The revised two factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology*, 71, 133-149.

Biggs, J. B., & Tang, C. (2007). *Teaching for Quality Learning at University: What the Students Does* (3rd ed.). New York, NY: Open University Press.

Biggs, J. B., & Watkins, D. A. (1996). The Chinese learner in retrospect. In D. A. Watkins & J. B. Biggs (Eds.), *The Chinese learner: cultural, psychological and contextual influences* (pp. 269-285). Hong Kong: Comparative Education Research Centre & Australian Council for Educational Research.

Biggs, J. B., & Watkins, D. A. (2001). Insights into Teaching the Chinese Learner. In D. A. Watkins & J. B. Biggs (Eds.), *Teaching the Chinese Learner: Psychological and Pedagogical Perspectives* (pp. 277-300). Hong Kong: Comparative Education Research Centre, The University of Hong Kong.

Bloom, B. S. (1956). *Taxonomy of Educational Objectives*. New York: D. McKay Co.

Boehnke, K. (2001). Parent-offspring value transmission in a societal context: Suggestions for a Utopian research design - with empirical underpinnings. *Journal of Cross-Cultural Psychology*, 32(2), 241-255.

Bond, M. H. (1998). Social psychology across cultures: Two ways forward. In J. G. Adair, D. Belanger & K. L. Dion (Eds.), *Advances in psychological science: Social, personal, and cultural aspects* (Vol. 1, pp. 137-150). Hove, England: Psychology Press.



- Bond, M. H. (2009). Circumnavigating the psychological globe: From yin and yang to starry, starry night. In S. Bekman & A. Aksu-Koç (Eds.), *Perspectives on Human Development, Family, and Culture* (pp. 31-49). Cambridge: Cambridge University Press.
- Bowles, K. (2000). The relationship of critical-thinking skills and the clinical-judgment skills of baccalaureate nursing students. *Journal of Nursing Education, 39*(8), 373-376.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77-101.
- Buchtel, E. E., & Norenzayan, A. (2008). Which should you use, intuition or logic? Cultural differences in injunctive norms about reasoning. *Asian Journal of Social Psychology, 11*, 264-273.
- Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology, 42*, 116-131.
- Campbell, A. E., Adams, V. M., & Davis, G. E. (2007). Cognitive demands and second-language learners: A framework for analyzing mathematics instructional contexts. *Mathematical Thinking and Learning, 9*(1), 3-30.
- Campbell, J., & Li, M. (2008). Asian students' voices: An empirical study of Asian students' learning experiences at a New Zealand university. *Journal of Studies in International Education, 12*(4), 375-396.
- Celuch, K., Black, G., & Warthan, B. (2009). Student self-identity as a critical thinker: The influence of attitudes, attitude strength, and normative beliefs. *Journal of Marketing Education, 31*(1), 31-39.
- Chan, S. (1999). The Chinese learner - a question of style. *Education and Training, 41*, 294-304.

- Chan, S. F. (2000). Formal logic and dialectical thinking are not incongruent. *American Psychologist, 55*, 1063-1064.
- Cheng, X. (2000). Asian students' reticence revisited. *System, 28*, 435-446.
- Cheung, C.-K., Rudowicz, E., Kwan, A. S. F., & Yue, X. D. (2002). Assessing university students' general and specific critical thinking. *College Student Journal, 36*(4), 504-525.
- Chiu, Y. C. J. (2008). Technical and pedagogical support for EFL online interactions. *Journal of Foreign Language Instruction, 2*(1), 83-102.
- Chiu, Y. C. J. (2009). Facilitating Asian students' critical thinking in online discussions. *British Journal of Educational Technology, 40*(1), 42-57.
- Choi, I., Koo, M., & Choi, J. A. (2007). Individual differences in analytic versus holistic thinking. *Personality and Social Psychology Bulletin, 33*(5), 691-705.
- Clark, R., & Gieve, S. N. (2006). On the discursive construction of 'the Chinese learner'. *Language, Culture, and Curriculum, 19*(1), 54-73.
- Clifford, J. S., Boufal, M. M., & Kurtz, J. E. (2004). Personality traits and critical thinking skills in college students: Empirical tests of a two-factor theory. *Assessment, 11*(2), 169-176.
- Collins, K. M., & Onwuegbuzie, A. J. (2000). *Relationship between critical thinking and performance in research methodology courses*. Paper presented at the Annual Meeting of the Mid-South Educational Research Association, Lexington, Kentucky.
- Costa, A. L. (2006). Five themes in a thought-full curriculum. *Thinking Skills and Creativity, 1*, 62-66.

- Crossley, M. (2000). Bridging cultures and traditions in the reconceptualisation of comparative and international education. *Comparative Education*, 36(3), 319-332.
- Davidson, B. W. (1998). Comments on Dwight Atkinson's "A Critical Approach to Critical Thinking in TESOL": A Case for Critical Thinking in the English Language Classroom. *TESOL Quarterly*, 32(1), 119-123.
- De Vita, G. (2002b). Cultural equivalence in assessment. *Teaching Forum*, 50, 36-38.
- De Vita, G. (2002a). Cultural Equivalence in the Assessment of Home and International Business Management Students: a UK exploratory study. *Studies in Higher Education*, 27(2), 221-231.
- Deakins, E. (2009). Helping students value cultural diversity through research-based teaching. *Higher Education Research & Development*, 28(2), 209-226.
- Dekker, S., & Fischer, R. (2008). Cultural differences in academic motivation goals: A meta-analysis across 13 societies. *The Journal of Educational Research*, 102(2), 99-110.
- Durkin, K. (2008a). The adaptation of East Asian masters students to western norms of critical thinking and argumentation in the UK. *Intercultural Education*, 19(1), 15-27.
- Durkin, K. (2008b). The middle way: East Asian master's students' perceptions of critical argumentation in U.K. universities. *Journal of Studies in International Education*, 12(1), 38-55.
- Elder, L., & Paul, R. (2006). Critical thinking... and the art of substantive writing, part II. *Journal of Developmental Education*, 29(3), 38-39.

- Ennis, R. H. (1987). A taxonomy of critical thinking dispositions and abilities. In J. B. Baron & R. J. Sternberg (Eds.), *Teaching Thinking Skills: Theory and Practice* (pp. 9-26). New York, NY: W. H. Freeman and Company.
- Ennis, R. H. (1989). Critical thinking and subject specificity: Clarification and needed research. *Educational Researcher*, 18(3), 4-10.
- Ennis, R. H. (1990). The extent to which critical thinking is subject-specific: Further clarification. *Educational Researcher*, 19(4), 13-16.
- Ennis, R. H. (1991). Critical thinking: A streamlined conception. *Teaching Philosophy*, 14(1), 5-25.
- Ennis, R. H. (1993). Critical thinking assessment. *Theory and Practice*, 32(3), 179-186.
- Ennis, R. H. (1998). Is critical thinking culturally biased? *Teaching Philosophy*, 21(1), 15-33.
- Ennis, R. H., Millman, J., & Tornko, T. N. (1985). *Cornell Critical Thinking Test Manual*. Pacific Grove, CA: Midwest Publications.
- Facione, P. A. (1990a). *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction*. Millbrae, CA: The California Academic Press.
- Facione, P. A. (1990b). *The California Critical Thinking Skills Test and Manual*. Millbrae, CA: The California Academic Press.
- Facione, P. A., & Facione, N. C. (1992). *The California critical thinking dispositions inventory (CCTDI) and the CCTDI test manual*. Milbrae, CA: The California Academic Press.
- Facione, P. A., Facione, N. C., & Giancarlo, C. A. F. (1997). The motivation to think in working and learning. In E. Jones (Ed.), *Preparing competent*

*college graduates: Setting new and higher expectations for student learning* (pp. 67-79). San Francisco, CA: Jossey-Bass Publishers.

Facione, P. A., Facione, N. C., & Giancarlo, C. A. F. (2000). The disposition toward critical thinking: Its character, measurement, and relationship to critical thinking skills. *Informal Logic*, 20(1), 61-84.

Fischer, R. (2009). Where is culture in cross cultural research?: An outline of a multilevel research process for measuring culture as a shared meaning system. *International Journal of Cross Cultural Management*, 9(1), 25-49.

Fox, H. (1994). *Listening to the world: Cultural issues in academic writing*. Urbana, IL: National Council of Teachers of English.

Friesen, W. (2008). *Diverse Auckland: The Face of New Zealand in the 21st Century?* Wellington, New Zealand: Asia New Zealand Foundation.

Frisby, C. L. (1998). Culture and cultural differences. In J. H. Sandoval, C. L. Frisby, K. F. Geisinger, J. D. Scheuneman & J. R. Grenier (Eds.), *Test Interpretation and Diversity: Achieving Equity in Assessment* (pp. 51-73). Washington, DC: American Psychological Association.

Gabrenya, W. K. J., & Hwang, K. K. (1996). Chinese social interaction: Harmony and hierarchy on the good earth. In M. H. Bond (Ed.), *The Handbook of Chinese Psychology* (pp. 309-321). Hong Kong: Oxford University Press.

Gieve, S. (1998). Comments on Dwight Atkinson's "A Critical Approach to Critical Thinking in TESOL": A Case for Critical Thinking in the English Language Classroom. A Reader Reacts. *TESOL Quarterly*, 32(1), 123-129.

Giles, H., Coupland, N., & Wiemann, J. M. (1992). "Talk is cheap... but my word is my bond": Beliefs about talk. In K. Bolton & H. Kwok (Eds.),

*Sociolinguistics Today: Eastern and Western Perspectives*. London: Routledge.

Glassner, A., & Schwarz, B. B. (2007). What stands and develops between creative and critical thinking? Argumentation? *Thinking Skills and Creativity*, 2, 10-18.

Gow, L., Balla, J., Kember, D., & Hau, K. T. (1996). The learning approaches of Chinese people: A function of socialization processes and the context of learning? In M. H. Bond (Ed.), *The Handbook of Chinese Psychology* (pp. 109-123). Hong Kong: Oxford University Press.

Green, A. (1999). Education and globalization in Europe and East Asia: Convergent and divergent trends. *Journal of Education Policy*, 14(1), 55-71.

Groenvynck, H., Beirens, K., Arends- Tóth, J. V., & Fontaine, J. J. R. (2006). Factorial Validity of the Behavioral Acculturation Scale: Evidence for a Bi-Factorial Model. Ghent University, Belgium and Tilburg University, The Netherlands.

Halpern, D. (1993). Assessing the effectiveness of critical thinking instruction. *Journal of General Education*, 42, 238-254.

Halpern, D. F. (1996). *Thought and knowledge: An introduction to critical thinking* (3rd ed.). Mahwah, NJ: Erlbaum.

Halpern, D. F. (1998). Teaching critical thinking for transfer across domains: Dispositions, skills, structure training, and metacognitive monitoring. *American Psychologist*, 53(4), 449-455.

- Halpern, D. F. (1999). Teaching for Critical Thinking: Helping College Students Develop the Skills and Dispositions of a Critical Thinker. *New Directions for Teaching and Learning*, 80, 69-74.
- Halpern, D. F. (2006). Halpern Critical Thinking Assessment Using Everyday Situations: Background and Scoring Standards. Unpublished Manuscript. Claremont McKenna College.
- Halpern, D. F. (2007). The nature and nurture of critical thinking. In R. J. Sternberg, H. L. I. Roediger & D. F. Halpern (Eds.), *Critical thinking in psychology* (pp. 1-14). New York: Cambridge University Press.
- Halx, M. D., & Reybold, L. E. (2005). A pedagogy of force: Faculty perspectives of critical thinking capacity in undergraduate students. *The Journal of General Education*, 54(4), 293-315.
- Hamamura, T., Heine, S. J., & Paulhus, D. L. (2008). Cultural differences in response styles: The role of dialectical thinking. *Personality and Individual Differences*, 44, 932-942.
- Hammond, S. C., & Gao, H. (2002). Pan Gu's paradigm: Chinese education's return to holistic communication in learning. In X. Lu, W. Jia & D. R. Heisey (Eds.), *Chinese Communication Studies* (pp. 227-244). Westport, Connecticut: Ablex.
- Harklau, L. (1994). ESL versus mainstream classes: Contrasting L2 learning environments. *TESOL Quarterly*, 28, 241-272.
- Hartman, H., & Sternberg, R. J. (1993). A broad BACEIS for improving thinking. *Instructional Science*, 21, 401-425.
- Hau, K. T., Halpern, D., Marin-Burkhart, L., Ho, I. T., Ku, K. Y. L., Chan, N. M., et al. (2006, April). *Chinese and United States students' critical thinking:*

- Cross-cultural validation of a critical thinking assessment.* Paper presented at the American Educational Research Association Annual Meeting, San Francisco, CA.
- Hau, K. T., & Ho, I. T. (2008). Editorial: Insights from research on Asian students' achievement motivation. *International Journal of Psychology, 43*(5), 865-869.
- Hau, K. T., Ho, I. T., & Ku, K. Y. L. (2006). *Predicting Chinese Students' Critical Thinking Performance: Critical Thinking Self-concept, Verbal Ability, Personality, and Need for Cognition.* Paper presented at the 4th International Biennial SELF Research Conference, Ann Arbor, Michigan.
- Hau, K. T., Ho, I. T., Lai, Y., Ku, K. Y. L., & Hui, N. H. H. (2008). *Chinese Students' Critical Thinking: Validation of the Factorial Structure of a Critical Thinking Assessment.* Paper presented at the American Educational Research Association Annual Meeting, New York, NY.
- Hau, K. T., & Salili, F. (1996). Prediction of academic performance among Chinese students: Effort can compensate for lack of ability. *Organizational Behavior and Human Decision Processes, 65*, 83-94.
- Heyman, G. D. (2008). Children's critical thinking when learning from others. *Current Directions in Psychological Science, 17*(5), 344-347.
- Ho, D. Y. F. (2000). Dialectical thinking: Neither Eastern nor Western. *American Psychologist, 55*, 1064-1065.
- Ho, E., Holmes, P., & Cooper, J. (2004). *Review and Evaluation of International Literature on Managing Cultural Diversity in the Classroom.* Wellington, New Zealand: Ministry of Education and Education New Zealand.



- Hofstede, G. (1983). Dimensions of national cultures in fifty countries and three regions. In J. Deregowski, S. Dzuirawiec & R. Annis (Eds.), *Expiscations in Cross-cultural Psychology* (pp. 335-355). Lisse, Netherlands: Swets and Zeitlinger.
- Holloway, S. D. (1988). Concepts of ability and effort in Japan and the United States. *Review of Educational Research*, 58, 327-345.
- Holmes, P. (2008). Foregrounding Harmony: Chinese International Students' Voices in Communication with Their New Zealand Peers. *China Media Research*, 4(4), 102-110.
- Howe, E. R. (2004). Canadian and Japanese teachers' conceptions of critical thinking: a comparative study. *Teachers and Teaching: Theory and Practice*, 10(5), 505-525.
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277-1288.
- Jahoda, G. (1984). Do we need a concept of culture? *Journal of Cross-Cultural Psychology*, 15, 139-151.
- Jensen, A. R. (1998). *The g factor: The science of mental ability*. New York: Praeger.
- Ji, L.-J., Nisbett, R. E., & Su, Y. (2001). Culture, change, and prediction. *Psychological Science*, 12(6), 450-456.
- Ji, L.-J., Peng, K., & Nisbett, R. E. (2000). Culture, control, and perception of relationships in the environment. *Journal of Personality and Social Psychology*, 78(5), 943-955.

- Jones, A. (2005). Culture and context: critical thinking and student learning in introductory macroeconomics. *Studies in Higher Education, 30*(3), 339-354.
- Jose, P. E. (2008). ModGraph-I: A programme to compute cell means for the graphical display of moderational analyses: The internet version, Version 2.0. Victoria University of Wellington, Wellington, New Zealand. Retrieved May 28, 2009, from <http://www.victoria.ac.nz/psyc/staff/paul-jose-files/modgraph/modgraph.php>
- Kakai, H. (2000). The use of cross-cultural studies and experiences as a way of fostering critical thinking dispositions among college students. *The Journal of General Education, 49*(2), 110-131.
- Kember, D. (1996). The intention to both memorise and understand: Another approach to learning? *Higher Education, 31*, 341-354.
- Kember, D., & Gow, L. (1991). A challenge to the anecdotal stereotype of the Asian student. *Studies in Higher Education, 16*(2), 117-128.
- Kim, H.-K. (2003). Critical thinking, learning, and Confucius: A positive assessment *Journal of Philosophy of Education, 37*(1), 71-87.
- Kim, H. S. (2002). We talk, therefore we think? A cultural analysis of the effect of talking on thinking. *Journal of Personality and Social Psychology, 83*, 828-842.
- Ku, K. Y. L. (2009). Assessing students' critical thinking performance: Urging for measurements using multi-response format. *Thinking Skills and Creativity, 4*, 70-76.
- Ku, K. Y. L., Chan, N.-M., Lun, V. M.-C., Halpern, D. F., Marin-Burkhart, L., Hau, K.-T., et al. (2006, April). *Chinese and U.S. Undergraduates'*

*Critical Thinking Skills: Academic and Dispositional Predictors*. Paper presented at the American Educational Research Association Annual Meeting, San Francisco, USA.

Kubota, R. (1999). Japanese culture constructed by discourses: Implications for applied linguistics research and ELT. *TESOL Quarterly*, 33, 9-35.

Kuhn, D. (1999). A Developmental Model of Critical Thinking. *Educational Researcher*, 28, 16-26.

Kumaravadivelu, B. (2003). Problematizing cultural stereotypes in TESOL. *TESOL Quarterly*, 37(4), 709-719.

Lee, C. (1999). Learning through tutorial discussion and learners' culture: Some preliminary observations from the views of Hong Kong Chinese tertiary students. *Language, Culture, and Curriculum*, 12(3), 255-264.

Lee, K. S., & Carrasquillo, A. (2006). Korean college students in United States: Perceptions of professors and students. *College Student Journal*, 40(2), 442-456.

Lee, W. O. (1996). The cultural context for Chinese learners: Conceptions of learning in the Confucian tradition. In D. Watkins & J. Biggs (Eds.), *The Chinese Learner: Cultural, Psychological, and Contextual Influences* (pp. 25-41). Hong Kong: Comparative Education Research Centre, University of Hong Kong.

Lee, Y. -T. (2000). What is missing in Chinese-Western dialectical thinking? *American Psychologist*, 55, 1065-1066.

Leung, D. Y. P., Ginns, P., & Kember, D. (2008). Examining the Cultural Specificity of Approaches To Learning in Universities in Hong Kong and Sydney. *Journal of Cross-Cultural Psychology*, 39, 251-266.

- Li, J. (2002). Learning models in different cultures. *New Directions for Child and Adolescent Development*, 96, 45-63.
- Li, J. (2003a). U.S. and Chinese cultural beliefs about learning. *Journal of Educational Psychology*, 95(2), 258-267.
- Li, J. (2003b). The Core of Confucian Learning. *American Psychologist*, 58, 146-147.
- Li, M. (2005). Communicating effectively with Chinese students in EFL/ESL classrooms. In P. Robertson, R. Ellis & P. Nation (Eds.), *English Language Learning in the Asian Context* (pp. 75-100). Tortola, British Virgin Islands: Asian EFL Journal Press.
- Luk, S., Fullgrabe, L., & Li, S. (1999). Managing Direct Selling Activities in China: A Cultural Explanation. *Journal of Business Research*, 45, 257-266.
- Maassen, G. H., & Bakker, A. B. (2001). Suppressor variables in path models: Definitions and interpretations. *Sociological Methods & Research*, 30(2), 241-270.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation Analysis. *Annual Review of Psychology*, 58, 593-614.
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A Comparison of Methods to Test Mediation and Other Intervening Variable Effects. *Psychological Methods*, 7(1), 83-104.
- Macpherson, R., & Stanovich, K. E. (2007). Cognitive ability, thinking dispositions, and instructional set as predictors of critical thinking. *Learning and Individual Differences*, 17, 115-127.

- Marini, A., & Genereux, R. (1995). The challenge of teaching for transfer. In A. McKeough, J. Lupart, & A. Marini, *Teaching for transfer: Fostering generalization in learning* (pp. 1-20). Mahway, NJ: Hove.
- Matsumoto, D., & Yoo, S. H. (2006). Toward a new generation of cross-cultural research. *Perspectives on Psychological Science, 1*(3), 234-250.
- McBride, R. E., Xiang, P., Wittenburg, D., & Shen, J. (2002). An analysis of preservice teachers' dispositions toward critical thinking: a cross-cultural perspective. *Asia-Pacific Journal of Teacher Education, 30*(2), 131-140.
- McCarthy, A., Lee, K., Itakura, S., & Muir, D. W. (2008). Gaze display when thinking depends on culture and context. *Journal of Cross-Cultural Psychology, 39*(6), 716-729.
- McPeck, J. E. (1981). *Critical thinking and education*. New York, NY: St. Martin's.
- McPeck, J. E. (1990b). Critical thinking and subject specificity: A reply to Ennis. *Educational Researcher, 19*(4), 10-12.
- McPeck, J. E. (1990a). *Teaching critical thinking: Dialogue and dialectic*. New York: NY: Routledge.
- Merriam, S. B. (Ed.). (2007). *Non-Western Perspectives on Learning and Knowing*. Malabar, FL: Krieger Publishing Company.
- Moore, T. (2004). The critical thinking debate: How general are general thinking skills? *Higher Education Research and Development, 23*(1), 3-18.
- Morris, M. W., & Peng, K. (1994). Culture and cause: American and Chinese Attributions for social and physical events. *Journal of Personality and Social Psychology, 67*(6), 949-971.

- Morrison, S., & Free, K. W. (2001). Writing Multiple-Choice Test Items That Promote and Measure Critical Thinking. *Journal of Nursing Education*, 40(1), 17-24.
- New Zealand Ministry of Education. (2009). *Export Education Levy Key Statistics for January to August 2003-2009*. Retrieved February 25, 2010, from [http://www.educationcounts.govt.nz/statistics/international\\_education/export\\_education\\_levy\\_statistics/29650/29680/63650](http://www.educationcounts.govt.nz/statistics/international_education/export_education_levy_statistics/29650/29680/63650)
- Ng, C. S. L., & Cheung, W. S. (2007). Comparing face to face, tutor led discussion and online discussion in the classroom. *Australian Journal of Educational Technology*, 23(4), 455-469.
- Nickerson, R. S., Perkins, D., & Smith, E. E. (1985). *Teaching thinking*. Hillsdale, NJ: Erlbaum Associates.
- Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, 108(2), 291-310.
- Norenzayan, A., Smith, E. E., Kim, B. J., & Nisbett, R. E. (2002). Cultural preferences for formal versus intuitive reasoning. *Cognitive Science*, 26, 653-684.
- OECD. (2009). *Education at a Glance 2009: OECD Indicators*. Retrieved February 25, 2010, from <http://www.oecd.org/dataoecd/41/25/43636332.pdf>

- Paas, F., Tuovinen, J. E., Tabbers, H., & Van Gerven, P. W. M. (2003). Cognitive load measurement as a means to advance cognitive load theory. *Educational Psychologist, 38*(1), 63-71.
- Pascarella, E. T. (1999). The development of critical thinking: Does college make a difference? *Journal of College Student Development, 40*(5), 562-569.
- Pascarella, E. T., Palmer, B., Moye, M., & Pierson, C. T. (2001). Do diversity experiences influence the development of critical thinking. *Journal of College Student Development, 42*(3), 257-271.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How College Affects Students: A Third Decade of Research* (Vol. 2). San Francisco, CA: Jossey-Bass.
- Paton, M. (2005). Is critical analysis foreign to Chinese students? In E. Manalo & G. Wong-Toi (Eds.), *Communication skills in university education: The international dimension* (pp. 1-11). Auckland, New Zealand: Pearson Education New Zealand.
- Paul, R. W. (1987). Dialogical thinking: Critical thought essential to the acquisition of rational knowledge and passions. In J. B. Baron & R. J. Sternberg (Eds.), *Teaching Thinking Skills: Theory and Practice* (pp. 127-148). New York, NY: W. H. Freeman and Company.
- Paul, R. W. (1993a). *Critical Thinking: What Every Person Needs to Survive in a Rapidly Changing World*. Santa Rosa, CA: Foundation for Critical Thinking.
- Paul, R. W. (1993b). The logic of creative and critical thinking. *American Behavioral Scientist, 37*(1), 21-39.
- Paulson, M. J., & Lin, T. (1970). Predicting WAIS IQ from Shipley-Hartford scores. *Journal of Clinical Psychology, 26*, 453-461.

- Peng, K., & Nisbett, R. E. (1999). Culture, dialectics, and reasoning about contradiction. *American Psychologist, 54*(9), 741-754.
- Peng, K., & Nisbett, R. E. (2000). Dialectical responses to questions about dialectical thinking. *American Psychologist, 55*, 1067-1068.
- Peng, K., Spencer-Rodgers, J., & Nian, Z. (2006). Naïve dialecticism and the Tao of Chinese thought. In U. Kim, G. Yang & K. K. Hwang (Eds.), *Indigenous and cultural psychology: Understanding people in context* (pp. 247-262). New York: Springer Science & Business Media.
- Perkins, D. N. (1987). Thinking Frames: An Integrative Perspective on Teaching Cognitive Skills. In J. B. Baron & R. J. Sternberg (Eds.), *Teaching Thinking Skills: Theory and Practice* (pp. 41-61). New York, NY: W. H. Freeman and Company.
- Perkins, D. N. (1990). The nature and nurture of creativity. In B. F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 415-443). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Phillips, V., & Bond, C. (2004). Undergraduates' experiences of critical thinking. *Higher Education Research & Development, 23*(3), 277-294.
- Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement, 53*(3), 801-813.
- Pithers, R. T., & Soden, R. (2000). Critical thinking in education: a review. *Educational Research, 42*(3), 237-249.



- Poortinga, Y. H., & van de Vijver, F. J. R. (1987). Explaining cross-cultural differences: Bias analysis and beyond. *Journal of Cross-Cultural Psychology, 18*(3), 259-282.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*, 717-731.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891.
- Renaud, R. D., & Murray, H. G. (2008). A comparison of a subject-specific and a general measure of critical thinking. *Thinking Skills and Creativity, 3*, 85-93.
- Robertson, M., Line, M., Jones, S., & Thomas, S. (2000). International students, learning environments and perceptions: A case study using the Delphi technique. *Higher Education Research & Development, 19*(1), 89-102.
- Rohner, R. P. (1984). Toward a conception of culture for cross-cultural psychology. *Journal of Cross-Cultural Psychology, 15*(2), 111-138.
- Rushton, J. P. (1995). *Race, evolution, and behavior*. New Brunswick, NJ: Transaction.
- Salili, F. (1996). Learning and motivation: An Asian perspective. *Psychology and Developing Societies, 8*, 55-81.
- Salili, F., & Hoosain, R. (2007). Culture, motivation, and learning: A multicultural perspective. In F. Salili & R. Hoosain (Eds.), *Culture, Motivation, and Learning: A Multicultural Perspective* (pp. 3-16). Charlotte, NC: Information Age Publishing, Inc.

- Shin, K. R. (1998). Critical thinking ability and clinical decision-making skills among senior nursing students in associate and baccalaureate. *Journal of Advanced Nursing*, 27, 414-418.
- Shin, K. R., Lee, J. H., Ha, J. Y., & Kim, K. H. (2006). Critical thinking dispositions in baccalaureate nursing students. *Journal of Advanced Nursing*, 56(2), 182-189.
- Shipley, W. C. (1940). A self-administering scale for measuring intellectual impairment and deterioration. *Journal of Psychology*, 9, 371-377.
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlation: Uses in assessing rater reliability. *Psychological Bulletin*, 86(2), 420-428.
- Siegel, H. (1988). *Educating Reason: Rationality, Critical Thinking, and Education*. London: Routledge.
- Singelis, T. M. (2000). Some thoughts on the future of cross-cultural social psychology. *Journal of Cross-Cultural Psychology*, 31(1), 76-91.
- Smith, P. B., & Bond, M. H. (1998). *Social Psychology Across Cultures*. Boston: Allyn & Bacon.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp. 290-312). San Francisco: Jossey-Bass.
- Spector, P. E., Schneider, J. R., Vance, C. A., & Hazlett, S. A. (2000). The Relation of Cognitive Ability and Personality Traits to Assessment Center Performance. *Journal of Applied Social Psychology*, 30(7), 1474-1491.
- Spencer-Rodgers, J., Peng, K., Wang, L., & Hou, Y. (2004). Dialectical self-esteem and East-West differences in psychological well-being. *Personality and Social Psychology Bulletin*, 30(11), 1416-1432.

- Spencer-Rodgers, J., Srivastava, S., & Peng, K. (2001). The dialectical self scale. Unpublished data. Berkeley: University of California.
- Sternberg, R. J. (2001). What is the common thread of creativity? It's dialectical relation to intelligence and wisdom. *American Psychologist*, *56*(4), 360-362.
- Sternberg, R. J., Roediger, H. L. I., & Halpern, D. (Eds.). (2007). New York, NY: Cambridge University Press.
- Stupnisky, R. H., Renaud, R. D., Daniels, L. M., Haynes, T. L., & Perry, R. P. (2008). The Interrelation of First-Year College Students' Critical Thinking Disposition, Perceived Academic Control, and Academic Achievement. *Research in Higher Education*, *49*, 513-530.
- Takano, Y., & Noda, A. (1993). A Temporary Decline of Thinking Ability During Foreign Language Processing. *Journal of Cross-Cultural Psychology*, *24*(4), 445-462.
- Taube, K. T. (1997). Critical thinking ability and disposition as factors of performance on a written critical thinking test. *The Journal of General Education*, *46*, 129-164.
- Ten Dam, G., & Volman, M. (2004). Critical thinking as a citizenship competence: teaching strategies. *Learning and Instruction*, *14*, 359-379.
- Terenzini, P. T., Springer, L., Pascarella, E. T., & Nora, A. (1995). Influences affecting the development of students' critical thinking skills. *Research in Higher Education*, *36*(1), 23-39.
- Ting-Toomey, S., & Kurogi, A. (1998). Facework competence in intercultural conflict: An updated face-negotiation theory. *International Journal of Intercultural Relations*, *22*, 187-225.

- Tiwary, A., Avery, A., & Lai, P. (2003). Critical thinking disposition of Hong Kong Chinese and Australian nursing students. *Journal of Advanced Nursing, 44*(3), 298-307.
- Triandis, H. C., & Brislin, R. W. (1984). Cross-cultural psychology. *American Psychologist, 39*(9), 1006-1016.
- Tsui, L. (1999). Courses and instruction affecting critical thinking. *Research in Higher Education, 40*, 185-200.
- Tsui, L. (2002). Fostering critical thinking through effective pedagogy: Evidence from four institutional case studies *The Journal of Higher Education, 73*, 740-763.
- Tsui, L. (2006). Cultivating critical thinking: Insights from an elite liberal arts college. *The Journal of General Education, 55*(2), 200-227.
- Turner, H., & Williams, R. L. (2007). Vocabulary development and performance on multiple-choice exams in large entry-level courses. *Journal of College Reading and Learning, 37*(2), 64-81.
- Tweed, R. G., & Lehman, D. R. (2002). Learning considered within a cultural context: Confucian and Socratic Approaches. *American Psychologist, 57*(2), 89-99.
- Tweed, R. G., & Lehman, D. R. (2003). Confucian and Socratic Learning. *American Psychologist, 58*, 148-149.
- U. S. National Education Goals Panel. (1991). *The national education goals report*. Washington, DC: U.S. Government Printing Office.
- Volet, S. E. (1999). Learning across cultures: Appropriateness of knowledge transfer. *International Journal of Educational Research, 31*, 625-643.

- Volet, S. E., & Renshaw, P. D. (1995). Cross-cultural differences in university students' goals and perceptions of study settings for achieving their own goals. *Higher Education, 40*, 407-433.
- Volet, S. E., & Renshaw, P. D. (1996). Chinese students at an Australian university: Adaptability and continuity. In D. Watkins & J. Biggs (Eds.), *Learning theories and approaches to learning research: A cross-cultural perspective* (pp. 205-220). Hong Kong: Comparative Education Research Centre.
- Ward, C. (1996). Acculturation. In D. Landis & R. S. Bhagat (Eds.), *Handbook of Intercultural Training* (2 ed., pp. 124-147). Thousand Oaks, CA: Sage.
- Ward, C., & Masgoret, A. (2004). *The experiences of international students in New Zealand: Report on the results of the national survey*. Retrieved July 18, 2009. from <http://www.educationcounts.govt.nz/publications/international/14700>.
- Watkins, D., & Reghi, M. (1991). The-Asian-learner-as-a-rote-learner stereotype: Myth or reality? *Educational Psychology, 11*(1), 21-34.
- Watkins, D. A., & Biggs, J. B. (2001). The Paradox of the Chinese Learner and Beyond. In D. A. Watkins & J. B. Biggs (Eds.), *Teaching the Chinese Learner: Psychological and Pedagogical Perspectives* (pp. 3-23). Hong Kong: Comparative Education Research Centre, The University of Hong Kong.
- Watson, G., & Glaser, E. M. (1980). *Watson-Glaser Critical Thinking Appraisal: Forms A and B*. San Antonio, TX: The Psychological Corporation.
- Watson, G., & Glaser, E. M. (1994). *Watson-Glaser Critical Thinking Appraisal, Form S manual*. San Antonio, TX: The Psychological Corporation.

- Watson, G., & Glaser, E. M. (2006). *Watson-Glaser Critical Thinking Appraisal-Short Form Manual*. San Antonio, TX: Harcourt Assessment.
- Wechsler, D. (1981). *Manual for the Wechsler Adult Intelligence Scale-Revised*. New York: Psychological Corporation.
- Williams, R. L., Oliver, R., Allin, J. L., Winn, B., & Booher, C. S. (2003). Psychological critical thinking as a course predictor and outcome variable. *Teaching of Psychology, 30*(3), 220-223.
- Williams, R. L., & Stockdale, S. L. (2003). High-performing students with low critical thinking skills. *The Journal of General Education, 52*(3), 199-225.
- Williams, R. L., & Worth, S. L. (2003). Thinking skills and work habits: Contributors to course performance. *The Journal of General Education, 51*(3), 200-227.
- Wong, W. (2006). Understanding dialectical thinking from a cultural-historical perspective. *Philosophical Psychology, 19*(2), 239-260.
- Yanchar, S. C., Slife, B. D., & Warne, R. (2008). Critical thinking as disciplinary practice. *Review of General Psychology, 12*(3), 265-281.
- Yang, B., Zheng, W., & Li, M. (2006). Confucian view of learning and implications for developing human resources. *Advances in Developing Human Resources, 8*(3), 346-354.
- Yang, S. Y., & Sternberg, R. J. (1997). Taiwanese Chinese people's conceptions of intelligence. *Intelligence, 25*(1), 21-36.
- Yang, Y.-T. C., & Chou, H.-A. (2008). Beyond critical thinking skills: Investigating the relationship between critical thinking skills and dispositions through different online instructional strategies. *British Journal of Educational Technology, 39*(4), 666-684.

- Yorke, M., Bridges, P., & Woolf, H. (2000). Mark Distributions and Marking Practices in UK Higher Education. *Active Learning in Higher Education*, 1(1), 7-27.
- Yu, A. B. (1996). Ultimate life concerns, self and Chinese achievement motivation. In M. H. Bond (Ed.), *Handbook of Chinese Psychology* (pp. 227-246). Hong Kong Oxford University Press.
- Zachary, R. A. (1991). *Shipley Institute of Living Scale Revised Manual*. Los Angeles, CA: Western Psychological Services.
- Zachary, R. A., Paulson, M. J., & Gorsuch, R. (1985). Estimating WAIS IQ from the Shipley Institute of Living Scale using continuously adjusted age norms. *Journal of Clinical Psychology*, 41(6), 820-831.
- Zareva, A., Schwanenflugel, P., & Nikolova, Y. (2005). Relationship between lexical competence and language proficiency: Variable sensitivity. *Studies in Second Language Acquisition*, 27, 567-595.
- Zhang, Q. (2005). Immediacy, humor, power distance, and classroom communication apprehension in Chinese college classrooms. *Communication Quarterly*, 53(1), 109-124.

## APPENDIX A: Dialectical Self Scale

Listed below are statements about your thoughts, feelings, and behaviours. Select the number that best matches your agreement or disagreement with each statement. There is no right or wrong answer.

1-----2-----3-----4-----5-----6-----7  
Strongly disagree                      Neither agree                      Strongly agree  
(SD)                                      Nor disagree (N)                                      (SA)

1. I am the same around my family as I am around my friends.
2. When I hear two sides of an argument, I often agree with both.
3. I believe my habits are hard to change.
4. I believe my personality will stay the same all of my life.
5. I often change the way I am, depending on who I am with.
6. I often find that things will contradict each other.
7. If I've made up my mind about something, I stick to it.
8. I have a definite set of beliefs, which guide my behaviour at all times.
9. I have a strong sense of who I am and don't change my views when others disagree with me.
10. The way I behave usually has more to do with immediate circumstances than with my personal preferences.
11. My outward behaviours reflect my true thoughts and feelings.
12. I sometimes believe two things that contradict each other.
13. I often find that my beliefs and attitudes will change under different contexts.
14. I find that my values and beliefs will change depending on who I am with.
15. My world is full of contradictions that cannot be resolved.
16. I am constantly changing and am different from one time to the next.
17. I usually behave according to my principles.
18. I prefer to compromise than to hold on to a set of beliefs.
19. I can never know for certain that any one thing is true.
20. If there are two opposing sides to an argument, they cannot both be right.
21. My core beliefs don't change much over time.
22. Believing two things that contradict each other is illogical.
23. I sometimes find that I am a different person by the evening than I was in the morning.
24. I find that if I look hard enough, I can figure out which side of a controversial issue is right.
25. For most important issues, there is one right answer.
26. I find that my world is relatively stable and consistent.
27. When two sides disagree, the truth is always somewhere in the middle.
28. When I am solving a problem, I focus on finding the truth.
29. If I think I am right, I am willing to fight to the end.
30. I have a hard time making up my mind about controversial issues.
31. When two of my friends disagree, I usually have a hard time deciding which of them is right.
32. There are always two sides to everything, depending on how you look at it.



## APPENDIX B: Analysis-Holism Scale

Listed below are statements about your thoughts, feelings, and behaviours. Select the number that best matches your agreement or disagreement with each statement. There is no right or wrong answer.

1-----2-----3-----4-----5-----6-----7  
Strongly disagree                      Neither agree                      Strongly agree  
(SD)                                      Nor disagree (N)                                      (SA)

1. Everything in the universe is somehow related to each other.
2. It is more desirable to take the middle ground than go to extremes.
3. Every phenomenon in the world moves in predictable directions.
4. The whole, rather than its parts, should be considered in order to understand a phenomenon.
5. Nothing is unrelated.
6. When disagreement exists among people, they should search for ways to compromise and embrace everyone's opinions.
7. A person who is currently living a successful life will continue to stay successful.
8. It is more important to pay attention to the whole than its parts.
9. Everything in the world is intertwined in a causal relationship.
10. It is more important to find a point of compromise than to debate who is right/wrong, when one's opinions conflict with other's opinions.
11. An individual who is currently honest will stay honest in the future.
12. The whole is greater than the sum of its parts.
13. Even a small change in any element of the universe can lead to significant alterations in other elements.
14. It is desirable to be in harmony, rather than in discord, with others of different opinions than one's own.
15. If an event is moving toward a certain direction, it will continue to move toward that direction.
16. It is more important to pay attention to the whole context rather than the details.
17. Any phenomenon has numerous numbers of causes, although some of the causes are not known.
18. Choosing a middle ground in an argument should be avoided.
19. Current situations can change at any time.
20. It is not possible to understand the parts without considering the whole picture.
21. Any phenomenon entails a numerous number of consequences, although some of them may not be known.
22. We should avoid going to extremes.
23. Future events are predictable based on present situations.
24. We should consider the situation a person is faced with, as well as his/her personality, in order to understand one's behaviour.

## APPENDIX C: Behavioral Acculturation Scale

Below, you'll find some questions about your experiences with two different cultures. On the one hand the culture of NZ and on the other hand the culture of the country where your grand-parents, your parents or yourself were born or raised.

Which country (other than NZ) did your parents or grand-parents come from? Choose the country you feel most connected with if some of your parents and grand-parents came from different countries.

(a) \_\_\_\_\_

Which mother tongue (other than English) did your grand-parents, parents (or yourself) speak in the country of origin which you selected above? If they spoke more than one language, please select the language you feel most connected with. If the mother tongue is still English, just put 'English' in the space below, and leave item 1 blank.

(b) \_\_\_\_\_

		Fully disagree	Disagree	Rather disagree	Rather agree	Agree	Fully agree
1.	I can easily talk in (b) about something I experienced.	1	2	3	4	5	6
2.	I know the NZ culture and traditions well.	1	2	3	4	5	6
3.	I can easily find my way in the society of (a).	1	2	3	4	5	6
4.	I listen to NZ music.	1	2	3	4	5	6
5.	I listen to or watch the news from (a).	1	2	3	4	5	6
6.	I eat meals that are typical for NZ.	1	2	3	4	5	6
7.	I live according to rules that apply in the culture of (a).	1	2	3	4	5	6
8.	I have many social contacts with New Zealander.	1	2	3	4	5	6
9.	I can easily talk in English about something I experienced.	1	2	3	4	5	6
10.	I know the culture and traditions of (a) well.	1	2	3	4	5	6
11.	I can easily find my way in the NZ society.	1	2	3	4	5	6
12.	I listen to music from (a).	1	2	3	4	5	6
13.	I listen to or watch the NZ news.	1	2	3	4	5	6
14.	I eat meals that are typical for (a).	1	2	3	4	5	6
15.	I live according to rules that apply in the NZ culture.	1	2	3	4	5	6
16.	I have many social contacts with people originating from (a).	1	2	3	4	5	6

**APPENDIX D: Supplementary comparison between Confucian Asian, non-Confucian Asian, and New Zealand European samples**

Descriptive statistics:

	Non-Confucian (N=24)		Confucian (N=70)		New Zealand (N=169)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
WGCTA total	21.92	6.37	24.79	5.11	27.11	6.18
SILS vocabulary test	25.63	5.40	24.29	5.38	29.36	4.13
SILS abstraction test	14.83	4.17	16.43	2.48	16.47	2.37
DSS	3.91	0.41	4.05	0.46	3.94	0.55
Cultural adoption	4.69	0.84	4.11	1.02	5.25	0.68
Perceived English Language Proficiency	6.02	1.12	4.91	1.47	6.64	0.66

Multiple comparisons between samples:

	Culture		Mean difference (I-J)	Standard error
	I	J		
WGCTA total	Non-Confucian	Confucian	-2.87	1.40
	Non-Confucian	New Zealand	-5.20*	1.29
	New Zealand	Confucian	2.33*	0.84
SILS vocabulary test	Non-Confucian	Confucian	1.34	1.09
	Non-Confucian	New Zealand	-3.74*	1.01
	New Zealand	Confucian	5.08*	0.66
SILS abstraction test	Non-Confucian	Confucian	-1.60*	0.62
	Non-Confucian	New Zealand	-1.63*	0.57
	New Zealand	Confucian	0.04	0.37
DSS	Non-Confucian	Confucian	-0.14	0.12
	Non-Confucian	New Zealand	-0.03	0.11
	New Zealand	Confucian	-0.11	0.07
Cultural adoption	Non-Confucian	Confucian	0.58*	0.19
	Non-Confucian	New Zealand	-0.56*	0.17
	New Zealand	Confucian	1.14*	0.11
Perceived English language proficiency	Non-Confucian	Confucian	1.11*	0.23
	Non-Confucian	New Zealand	-0.62*	0.21
	New Zealand	Confucian	1.73*	0.14

Note. \* $p < .05$ .