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International Comparisons of Critical Thinking: Correcting Myths about Asian Students

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One of the most important academic skills university students are expected to demonstrate is critical thinking. There is, however, a widespread view that, as a result of their cultural and educational backgrounds, students from east Asia find critical thinking particularly challenging. This paper critically examines this contention. It begins by analysing existing research on three broad themes: (1) cultural attitudes and dispositions towards critical thinking; (2) international comparisons of scores on critical thinking tests; (3) the impact of L1 and L2 use on academic performance. It also presents data from a study conducted by the author comparing the performance of Japanese students on a critical thinking task in their L1 and L2. It finds that, contrary to the accepted wisdom, there is little objective evidence to suggest Asian students are deficient in critical thinking in the broad sense of the term, either in disposition or ability. The lack of critical thinking skills apparently displayed by these students in Western contexts can largely be blamed on the issue of language proficiency. This finding has implications for academic skill courses in both EFL and ESL settings.

Keywords: critical thinking, international education, Asia, cross-cultural comparison

Salah satu kemampuan akademik mahasiswa yang paling penting saat ini adalah berpikir kritis (critical thinking / CT). Namun ada anggapan bahwa karena latar belakang budaya dan pendidikan, siswa Asia Timur mengalami kendala. Artikel ini secara kritis mengevaluasi anggapan ini, yang dilakukan dalam tiga tahap: (1) sikap budaya terhadap CT; (2) perbandingan skor international dari tes CT; (3) pengaruh L1 (bahasa pertama) dan L2 (bahasa kedua) terhadap performa akademi. Artikel ini juga melaporkan studi yang dilakukan oleh penulis dengan membandingkan performa siswa di Jepang dalam hal tugas CT dalam bahasa pertama dan kedua mereka. Studi ini membuktikan bahwa kurangnya kemampuan CT mahasiswa siswa Asia hanya sedikit. Dibandingnya dengan jonteks Barat, kemampuan CT siswa Asia disebabkan kurangnya kemampuan bahasa kedua. Penemuan ini berimplikasi terhadap kuliah keterampilan akademik dalam kontek pendidikan bahasa Inggris.

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INTRODUCTION

This paper is concerned with the widespread belief that, as a result of their cultural and educational backgrounds, Asian students are unsuited to the practice of critical thinking, which is deemed crucial in higher education around the world. Egege and Kutieleh (2004) argue, for example, that Asian students "are generally perceived to be non-critical in their approach to academic texts and are considered to lack an understanding of the requirements of analysis and critique" (p. 78). Gieve (1998) says that inculcating Asian students into Western classrooms "may require a wholesale reorientation of students' cultural norms, values, beliefs, and attitudes" (p. 128). Moore (2011) observes that the "simple binary of critical and non-critical educational cultures persists as a powerful image in our universities" (p. 12).

For such a bold and all-encompassing claim, one would assume there to be strong concrete evidence to support it. After all, the essence of critical thinking is the basing of beliefs on verifiable evidence rather than convention or hearsay. Why, then, does the title of this paper refer to such claims as 'myths'? A myth may be regarded as a belief or story that is not supported by confirmed fact or historical evidence. In order to verify whether Asian students do in fact fare poorly in critical thinking compared to their peers in other parts of the world, it is not enough to rely on unconfirmed opinion or anecdote. The opinions quoted above come from academics working within English-speaking universities, who will likely only encounter Asian students in a second language setting. To make an objective judgement, it is imperative that we evaluate students in their first language, since L2 has been shown to have a significantly negative effect on academic performance (Takano & Noda, 1993; Clerehan, 1995; Manalo & Uesaka, 2012; Rear, 2017). Only by making international comparisons of students working in their L1 can claims about critical thinking be either confirmed or rejected.

This paper aims to make such a comparison by examining three kinds of study related to critical thinking assessment: comparisons of cultural attitudes and dispositions towards critical thinking; comparisons of scores on critical thinking tests or those closely related to them; and comparisons of academic performance by students working in their L1 and their L2. First, however, we must define what is meant by critical thinking, for it is only through an understanding of what critical thinking entails that we can begin to make sense of the comparative studies to follow.

CONCEPTUALISATIONS OF CRITICAL THINKING

The importance of critical thinking has been recognised for more than a century, but during the past few decades it has come to be emphasised as a key goal of education throughout many parts of the world. There are two major schools of thought when it comes to defining and conceptualising the term: the philosophical approach and the educational approach. The philosophical approach defines the qualities and characteristic of thinkers or thinking in an idealised form, what Paul (1992) referred to as "perfections of thought" (p. 9). Commonly cited definitions include:

> Reflective and reasonable thinking that is focused on deciding what to believe or do (Ennis, 1985, p. 45); thinking that is purposeful, reasoned and goal directed – the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions (Halpern, 996, p. 116); thinking that is goal-directed and purposive, thinking aimed

> at forming a judgement, where the thinking itself meets standards of adequacy and accuracy (Bailin et al, 1999, p. 287).

The educational approach focuses more on behaviours of critical thinking, seeking methods by which such behaviours may be taught to students to help them become better thinkers. Typically researchers working under his tradition attempt to map out taxonomies of skills or procedures that thinkers apply when performing tasks (Bloom, 1956; Ennis, 1987; Facione, 1990; Anderson & Krathwohl, 2001). Facione's Delphi Expert Consensus Definition of Critical Thinking, for example, listed six broad categories of interpretation, analysis, evaluation, inference, explanation, and self-regulation, which encompass sub-skills including clarifying meaning, examining ideas, assessing claims, drawing conclusions, stating results, justifying procedures, presenting arguments, and self-examination (Facione, 1990). Ennis (1987), meanwhile, included twelve skills: focusing on a question, analysing arguments, asking and answering questions of clarification, judging the credibility of a source, observing and judging observation reports, making and judging deductions, making and judging inductions, making value judgements, defining terms, identifying assumptions, deciding on an action, and interacting with others.

Both the philosophical and the educational approach also include lists of attitudes or dispositions that people require in order to be successful critical thinkers. Evidence suggests that dispositions are distinct from abilities – that is, people may possess critical thinking faculties but lack the disposition to use them (Facione, 2000). There is broad agreement on what kinds of dispositions are required, with some of the most commonly cited traits being flexibility, inquisitiveness, fair-mindedness, open-mindedness, and the desire to be well-informed (Bailin et al., 1999; Facione, 2000). Paul and Nosich (1991), for example, include: independence of thought, fairmindedness, intellectual humility, intellectual courage, intellectual perseverance, intellectual integrity, curiosity, confidence in reason, the willingness to see objections, and entering sympathetically into another's point of view.

Two significant points emerge from the definitions above. First is the broad range of skills covered by critical thinking. They include not only skills of argumentation (such as analysing arguments, making deductions and inductions, and identifying assumptions) but also those of problem solving and decision making. This places the practice of critical thinking not only in language-intensive academic tasks such as essay writing but also activities such as experimentation and engineering. Indeed, the importance of critical thinking is recognised in almost every academic field, including engineering, science and medicine. Siller (2001) argues that the "development of students' abilities to think critically about engineering problems and design projects is an important educational objective" (p. 108), while Scott and Markert (1994) note that "generally, it is held that medical education trains students to use critical thinking skills in active problem solving regarding patient care" (p. 920). This is significant because if Asian learners do lack critical thinking skills and/or the disposition to use them, we should expect to see their performance in the sciences to be lower on average than students internationally. This is something we can check as comparative data is available. The OECD conducts annual assessments of 15 year-old pupils in 72 different countries in maths, literacy, science and problem solving. The results of those assessments will be discussed below.

The second significant point is the importance placed on collaboration and empathy within conceptualisations of critical thinking. While we might associate critical thinking with dissecting arguments and winning debates, there is actually a stronger emphasis on fairmindedness, flexibility and intellectual humility. Facione's list of dispositions, for instance, includes 'open-mindedness regarding divergent world views' and 'understanding of the opinions of other people' (Facione, 2000). This collaborative aspect of critical thinking comes into significance when we examine studies related to the dispositions of Asian learners and their relation to critical thinking.

CRITICAL THINKING DISPOSITIONS AND ASIAN LEARNERS

Gieve's argument that teaching critical thinking to Asian students "may require a wholesale reorientation of students' cultural norms, values, beliefs, and attitudes" (Gieve, 1998, p. 128) suggests that the cultural values of Asian students are fundamentally incompatible with the requirements of critical thinking. Atkinson (1997) also stated this view, arguing that critical thinking is a social practice learned through the pores through long exposure to Western cultural norms. In Asian cultures, children are socialised from a very young age into the "twin normative social values of empathy and conformity," making critical thought virtually a betrayal of their Confucian social heritage (Atkinson, 1997, p. 80). Ballard and Clanchy (1991, p. 15) credit Confucius with the words "I do not invent, but transmit," and argue that this signals an approach in Asia toward 'conserving' rather than 'extending' knowledge.

If such cultural norms still hold sway, one would expect to find Asian learners to hold markedly negative views towards the principles of critical thinking, particularly notions such as challenging or distrusting authority. In fact, however, research into critical thinking dispositions has revealed few differences between learners in Asia and those in other countries. Paton (2011) conducted interviews with Chinese students at a university in Australia and found that they had distinctly positive views about critical thinking. They rejected conformism and rote learning and displayed a strong sense of individuality. Paton's conclusion was that "the depth and variety of thought shown in the students' responses indicate a remarkable level of critical thinking, which would seem to belie the strident claims by those such as Atkinson (1997) that critical thinking is the preserve of Western culture" (p. 36). In a study of 'independent and interdependent self-construals', concepts commonly used in cross-cultural psychology, Manalo et al. (2013) compared views on critical thinking between students in Japan and New Zealand. They hypothesised that the psychological need among students in Japan to 'fit in with relevant others' might lead to differences in how critical thinking was perceived. In fact, however, the researchers found "no differences … between the groups on reported critical thinking use" (Manalo et al. 2013, p. 121). Jones (2005) also found that Western and Chinese students had similar views about critical thinking, with Westerners displaying comparable concerns about maintaining personal harmony with their peers. Required to critique the work on peer students, the Chinese learners were found to be just as critical as their Australian counterparts.

Most other studies of critical thinking dispositions have been based on the California Critical Thinking Dispositions Inventory (CCTDI), devised by Facione (1990) and colleagues. A study by McBride et al. (2002) compared a small sample of university students in China and the US, finding that while the American students outscored the Chinese participants on

maturity and self-confidence, the two groups achieved similar scores on truth-seeking and inquisitiveness. Scores on the other sub-traits were not recorded due to reliability issues. Yeh and Chen (2005) tested 126 nursing students in Taiwan and found that they generally had a positive disposition towards CT. A study by Tiwari et al. (2003) of nursing students in Hong Kong, however, found the opposite. Other studies of mainland Chinese students, such as those by He, Zhang, and Zhao (2006) and Luo and Yang (2001) cannot really be judged since they suffer from significant reliability and validity issues (Tian & Low, 2011).

There is, on the whole, a distinct lack of evidence to suggest that Asian learners have a negative attitude towards critical thinking or that there are significant differences in dispositions between them and their Western peers. We must bear in mind, of course, that the comments made by Atkinson (1997) and Gieve (1998) were made more than twenty years ago. The stereotypes about Asian cultural attitudes toward critical thinking have persisted since that time, but there is evidence to suggest that these stereotypes do not match the modern reality. The discourse of many institutions of higher education in Asia, such as in mission statements and graduate competencies, is not dissimilar to that within Western universities. The largest university in Japan, Nihon University, for example, challenges its students to "discover problems by yourself, to gather, analyse and sort through necessary information, and, by enlisting the help of those around you, to find solutions" (Nihon University, homepage). The number of Asian, particularly Chinese, students travelling to study at overseas universities has also decreased dramatically in recent years, and this is likely to have produced a change in educational discourse in the region.

If critical thinking dispositions seem to differ little between Asian and Western learners, how about critical thinking skills and abilities? In the next section, the results of international comparative studies will be examined to see whether there is empirical proof that students from Asia have a comparative lack of critical thinking skills.

CRITICAL THINKING SKILLS AND ASIAN LEARNERS

There have been very few studies directly comparing the critical thinking skills (as opposed to dispositions) of Asian students with those from other parts of the world in their first language. In fact in a comprehensive review of comparative critical thinking studies, Tian and Low (2011) were able to find no studies that tested the critical thinking skills of mainland Chinese students. A recent study conducted at Stanford University, however, did test mainland Chinese, Russian and US freshmen on science and engineering programmes with the Halpern Critical Thinking Assessment using Everyday Situations (Halpern, 2007b). The researchers found that the Chinese students had critical thinking skills that were two or three years *ahead* of their counterparts in Russia and the United States, significantly outscoring them on the ability to identify assumptions, test hypotheses and draw relationships between variables (Hernandez, 2016). The same HCTAES test was used to compare Chinese students in Hong Kong with those in the United States, with the Chinese students again significantly outscoring their peers in the US (Hau et al, 2006). In this case, however, the results were compromised by the fact that the sample of Chinese students was drawn from a more selective institution than that of the United States.

The weakness of the study by Hau at al. actually hints at an important point when it comes to performance in critical thinking. Studies have shown a strong link between scores on

critical thinking tests and other academic performance markers, such as SAT scores, A-level results, and grade point averages (Nickerson, Perkins & Smith, 1985; Halpern, 2007a). The OECD's large-scale international comparison of academic performance has also indicated a strong correlation between performance in problem solving and scores in maths, science and reading. Critical thinking ability cannot, then, be easily separated from other academic skills. As a consequence, if Asian learners are weak in critical thinking, we would expect their performance in other academic tests to suffer as well. Is this the case?

In fact, when it comes to the results of the OECD tests, pupils from Asian countries far surpass those from other nations in every category. In 2014, for example, Asian students occupied the top five places in reading, the top four places in science and the top seven places in mathematics (headed by China and Singapore). They also scored highest on a newly-developed problem solving test, whose parameters come close to the conceptualisations of critical thinking outlined above. Pupils from Singapore and Korea came out on top, followed by Japan and China. The test assesses the ability to devise strategies for tackling unfamiliar problems, such as working out the quickest travel time across a city or dealing with a new digital device. Those pupils who excelled in the test were described by the OECD as "quick learners, highly inquisitive and able to solve unstructured problems in unfamiliar contexts" (OECD, 2014, p. 44). The Financial Times, in an article entitled 'Countries that excel at problem-solving encourage critical thinking', observed that "critics of Asian education systems attribute their success in maths and science to rote learning…. But the OECD's assessment suggests that schools in east Asia are developing thinking skills as a well as providing a solid grounding in core subjects" (Vasagar, 2014).

So, what are we to make of these results? If there is little or no empirical evidence that Asian learners lack either critical thinking dispositions or skills compared to Western students and that, in fact, the opposite appears to be true, why is the image of Asian students as weak in critical thinking so prevalent? In the next section, two major reasons will be posited: the impact of using a second language on academic performance; and the relative lack of experience many Asian learners have with essay writing.

LANGUAGE PROFICIENCY AND ESSAY WRITING

Most of the complaints about Asian learners emanate from educators in English-speaking universities, which have been taking on an increasing number of overseas students, mainly from countries such as China and Korea. As a result, any apparent weakness in academic performance from these students must be weighted by the fact they are carrying out their studies in a second language. There is a wealth of evidence pointing out the negative impact L2 has on academic performance, including critical thinking.

A study by Clerehan (1995), for example, compared the note-taking skills of L1 and L2 students in Australia and found that the L2 students' notes were much less detailed than those of the L1 students. Attributing this to language proficiency, she concluded that students studying in a second language are at a "huge disadvantage" (Clerehan, 1995, p. 145). A lower proficiency in L2 has also been found to limit the ability of students to use diagrams when explaining information (Manalo & Uesaka, 2012) and also to inhibit performance on calculation tasks (Takano & Noda, 1993). In terms of critical thinking itself, Chinese students scored significantly higher on the Watson Glaser Critical Thinking Appraisal when they did

the test in their native language than in English (Floyd, 2011). Manalo, Watanabe and Sheppard (2013) gained a similar result with tests on Japanese students, while in a large-scale study of Chinese students at an Australian university, Lun, Fischer and Ward (2010) concluded that: "Asian students' apparent lack of critical thinking is a consequence of the need to use English as a second language in academic discourse. Without sufficient English proficiency and/or enough confidence in using the language, Asian students are discouraged from overtly expressing their critical thinking in classrooms even if they want to do so" (p. 614).

More recently, a study by Rear (2017) compared the performance of two classes of Japanese students in an academic debate, with one class conducting the debate in Japanese (L1) and the other in English (L2). Although the L2 students had TOEFL scores sufficiently high to enter Western universities, their performances were found to be significantly inferior to the L1 students. Despite a preparation period of several weeks, the opening arguments of the L2 students lacked both depth and sophistication compared to those of the L1. They cited fewer references and, when using English language sources, tended to choose those with lower levels of reliability, such as online opinion pieces and blogs, perhaps because they were shorter and easier to read. They also found it difficult to assimilate the arguments of their opponents in order to formulate attack speeches, and lacked the confidence and speed of thought to provide an effective rebuttal of their opponents' attacks. Rear concluded: "While the purpose of the study was not to compare the skills of Asian and Western students, the debates conducted in Japanese were evaluated relatively highly by Western tertiary-level educators, who were purposefully kept unaware of the parameters of the study. This suggests that many of the problems faced by Asian students overseas may be attributable to the handicap of language" (p. 14).

The significance of the, admittedly, rather limited study lies in the fact that the task the students were required to perform was similar in character to the kind they would have to carry out at an overseas university, involving seeking out reliable sources, collecting relevant information and synthesising it into a clear, logical argument. These are the kind of skills required for essay writing, the staple task of non-scientific disciplines. This contrasts with the standardised critical thinking tests, such as the Halpern Critical Thinking Assessment using Everyday Situations (Halpern, 2007b) used in most studies, which, although providing easily measurable outcomes, rely on multiple-choice and short-answer items that do not accurately mirror real-life academic tasks.

The studies cited in this section illustrate the negative effect of using a second language on academic performance. Researchers have explained the reason for this through the concept of 'cognitive overload' (Paas et al., 2003), which refers to the limited amount of information that can be stored and processed in the working memory. Language processing uses up considerable resources of working memory, and consequently there may not be sufficient remaining for effectively carrying out critical thinking (Cook, 1993; Koda, 2005; Campbell et al., 2007).

In academic tasks such as essay writing, class discussions and debates, the degree of linguistic demands made on the learner is extremely high, involving the reading and assimilation of a large amount of complex academic text, the synthesis of this into a coherent argument, and the presentation of that argument in a sophisticated and original form. It is hardly surprising that many foreign students should find it difficult to display high levels of critical

thinking in their work. This is particularly true for learners of an Asian language background, since these languages differ substantially from English. The Foreign Service Institute of the US State Department ranks Mandarin, Cantonese, Japanese and Korean as the most difficult languages for English speakers to learn, suggesting the reverse is true also. Thus the amount of cognitive processing involved for Asian learners using English is likely to be significantly higher than for learners of other, more closely related language groups. This may help to explain why Asian students appear to find it more challenging to display high levels of critical thinking compared to international students from other nations.

CONCLUSION

This paper has attempted to challenge the widespread view that Asian learners are culturally and educationally unsuited to the practice of critical thinking. This view, which has largely emanated from educators teaching Asian learners at English-speaking universities, has suffered from a lack of empirical evidence proving its foundations. The basis of this paper, therefore, is an extensive review of empirical studies comparing Asian learners with those from other cultural backgrounds. These studies covered three major angles of research: cultural attitudes and dispositions towards critical thinking; international comparisons of scores on critical thinking and other academic tests; the impact of L1 and L2 use on academic performance.

It has found that, contrary to the prevailing view, there is little evidence showing that Asian learners are indeed deficient in critical thinking, as it is commonly defined, in comparison to those in other parts of the world; if anything, empirical studies have shown them to be superior. On the issue of dispositions, very few differences have been found between Asian students and those from other cultures. In critical thinking tests conducted in their first language, Asian learners have significantly outperformed other learners; likewise for other academic assessments in literacy, mathematics, science and problem solving. The difficulty comes when academic tasks are performed in a second language. The use of L2 has been shown to have a significantly negative effect on academic performance, and this simple fact explains many of the problems Asian students are perceived to have with critical thinking.

Many of the complaints about Asian learners come from the liberal arts, in which essay writing is the primary form of assessment. Essays, of course, make heavy linguistic demands, which helps to explain why, as international students, Asian learners appear to have particular difficulties with them. At the same time, however, there is evidence to suggest that Asian students have, on the whole, less experience with essay writing than students from other countries (Shaheen, 2016). Mulvey (2016), for example, reported that out of 300 students surveyed over six years in two universities in Japan, not a single student had written an argumentative essay in either Japanese or English at high school. Tian (2008), meanwhile, found that Chinese graduate students in the UK had difficulty adjusting to the writing demands of their new courses. Concepts such as referencing and plagiarism were somewhat unfamiliar to them, and they were unused to the need for large amounts of reading.

Tian (2008) found, however, that the students showed an eagerness to adapt to the expectations of their new learning environment, and this is the key point. A lack of experience with essay writing should not be equated with an unwillingness or inability to employ critical thinking. It is simply a lack of experience, which can be slowly but steadily improved over time. Dismissing Asian learners as uncritical, therefore, is not only misleading, it is also

unproductive. It risks creating the impression, both to the learners themselves and within the institution as a whole, that Asian students cannot achieve the same academic success as their non-Asian peers, which has obvious implications for the objectivity of teaching and assessment. Of course, they should be taught critical thinking, just as all students should, but it should be done from a standpoint of positivity, respect and inclusion. It is hoped that this short paper may go some way in helping to correcting some myths about Asian students and their learning.

References

Anderson, L., & Krathwohl, D. (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy of educational objectives.* New York: Longman.

Atkinson, D. (1997). A critical approach to critical thinking in TESOL. *TESOL Quarterly* 31(1), 71-94.

Bailin, S., Case, R., Coombs, J. R., & Daniels, L. B. (1999). Conceptualizing critical thinking. *Journal of Curriculum Studies, 31*(3), 285–302.

Ballard, B. & Clanchy, J. (1991). *Teaching students from overseas: A brief guide for lecturers and supervisors.* Melbourne: Longman Cheshire.

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

Campbell, A., Adams, V., & Davis, G. (2007). Cognitive demands and second-language learners: A framework for analyzing mathematics instructional contexts. *Mathematical Thinking and Learning* 9(1), 3-30.

Clerehan, R. (1995). Taking it down: Notetaking practices of L1 and L2 students. *English for Specific Purposes*, *14*, 137-155.

Cook, V. (1993). *Linguistics and second language acquisition.* London: Macmillan.

Egege, S. & Kutieleh, S. (2004). Critical thinking: Teaching foreign notions to foreign students. *International Education Journal*, *4*(4), 75-85.

Ennis, R. H. (1985). A logical basis for measuring critical thinking skills. *Educational Leadership, 43*(2), 44–48.

Ennis, R. (1987). A taxonomy of critical thinking dispositions and abilities. In J. Baron & R.J. Sternberg (Eds.), *Teaching thinking skills: Theory and practice* (pp. 9-26). New York, NY: W. H.
Freeman and Company.

Facione, P. (1990). *Critical thinking: A statement of expert consensus – The Delphi Report*. California: California Academic Press.

Facione, P. A. (2000). The disposition toward critical thinking: Its character, measurement, and relation to critical thinking skill. *Informal Logic, 20*(1), 61–84.

Gieve, S. (1998). Comments on Dwight Atkinson's 'A critical approach to critical thinking in TESOL. *TESOL Quarterly, 32*(1), 123-129.

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

Halpern, D. (2007a). The nature and nurture of critical thinking. In R.J. Sternberg, H. Roediger & D.

Halpern (Eds.), *Critical thinking in psychology* (pp.1-14). New York: Cambridge University Press.

Halpern, D. (2007b). *Halpern critical thinking assessment using everyday situations: Background and scoring standards*. Claremont, CA: Claremont McKenna College.

Hau, K. T., Halpern, D., Marin-Burkhart, L., Ho, I. T., Ku, K. Y. L. & Chan, N. M. (2006, April). Chinese and United States Students' critical thinking: Cross-cultural validation of a critical thinking assessment. Paper presented at American Educational Research Association Annual Meeting, San Francisco.

He, H., Zhang, Y.M., & Zhao, Y.Q. (2006). [A survey of critical thinking ability in college students]. Chinese Nursing Research, 20(3), 775–776.

Hernandez, J. (2016). Study finds Chinese students excel at critical thinking. Until college. *New York Times*, 30 July. Retrieved from https://www.nytimes.com

Jones, A. (2005). Culture and context: Critical thinking and student learning in introductory macroeconomics. *Studies in Higher Education* 30(3), 339-354.

Koda, K. (2005). *Insights into second language reading.* Cambridge: Cambridge University Press.

Lun, V., Fischer, R. & Ward, C. (2010). Exploring cultural differences in critical thinking: Is it about my thinking style or is it the language I speak? *Learning and Individual Differences* 20, 604-616.

Luo, Q.X., & Yang, X.H. (2001). [Revision for CCTDI (Chinese version)]. Psychological Development and Education, 3, 47–51.

Manalo, E., Kusumi, T., Koyasu, M., Michita, Y. & Tanaka, Y. (2013). To what extent do culture-related factors influence university students' critical thinking use? *Thinking Skills and Creativity* 10, 121-132.

Manalo, E., Watanabe, K. & Sheppard, C. (2013, August). Do language structure or language proficiency affect critical evaluation? Paper presented at 35th Annual Conference of the Cognitive Science Society, Berlin, Germany.

Manalo, E., & Uesaka, Y. (2012). Elucidating the mechanism of spontaneous diagram use in explanations: How cognitive processing of text and diagrammatic representations is influenced by individual and task-related factors. *Lecture Notes in Artificial Intelligence*, *7352*, 35–50.

McBride, R., 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.

Moore, T. (2011). *Critical thinking and language: The challenge of generic skills and disciplinary discourse*. London: Bloomsbury.

Mulvey, B. (2016). Writing instruction: What is being taught in Japanese high schools, why, and why it matters. *The Language Teacher* 40(3), 3-8.

Nickerson, R., Perkins, D., & Smith, E. (1985). *Teaching thinking*. Hillsdale, NJ: Erlbaum Associates.

OECD (2014) PISA 2012 results: creative problem solving. OECD (http://www.oecd.org).

Paas, F., Renkl, A. & Sweller, J. (2003). Cognitive load theory and instructional design: Recent developments. *Educational Psychologist* 38, 63-71.

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. (1992). Critical thinking: What, why, and how? *New Directions for Community Colleges, 1992*(77), 3–24.

Paul, R. & Nosich, G. (1991). A proposal for the national assessment of higher-order thinking. Paper commissioned by the U.S. Department of Education Office of Educational Research and Improvement National Center for Education Statistics.

Rear, D. (2017). The language deficit: A comparison of the critical thinking skills of Asian students in first and second language contexts. *Asian-Pacific Journal of Second and Foreign Language Education, 2*(13), 1-15.

Scott, J. & Markert, R. (1994). Relationship between critical thinking skills and success in pre-clinical courses. *Academic Medicine* 69, 920-924.

Shaheen, N. (2016). International students' critical thinking-related problem areas: UK university teachers' perspectives. *Journal of Research in International Education* 15(1), 18-31.

Siller, T. (2001). Sustainability and critical thinking in civil engineering curriculum. *Journal of Professional Issues in Engineering Education and Practice 127*(3), 104-108.

Takano, Y., & Noda, A. (1993). A temporary decline of thinking ability during foreign language processing. *Journal of Cross-Cultural Psychology*, *24*(4), 445-462.

Tian, J. (2008). The influence of undergraduate learning contexts on Chinese graduate students' argumentation and critical thinking in writing (Unpublished PhD thesis). University of York,
York.

Tian, J. & Low, G. (2011). Critical thinking and Chinese university students: a review of the evidence. *Language, Culture and Communication* 24(1), 61-76.

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.

Vasagar, J. (2014, May 20). Countries that excel at problem-solving encourage critical thinking. *Financial Times*. Retrieved from https://www.ft.com/content/e512db9c-c643-11e3-ba0e-00144feabdc0

Yeh, M.-L., & Chen, H. (2005). Effects of an educational program with interactive videodisc systems in improving critical thinking dispositions for RN-BSN students in Taiwan. *International Journal of Nursing Studies*, 42(3), 333–340.