



How might language affect critical thinking performance?



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ABSTRACT

This study examined whether language structure or language proficiency might affect students' critical thinking performance. Previous research has claimed that many non-Western students struggle with the demands of demonstrating critical thought. Two language-related causes have been suggested: one concerning structural limitations in the non-Western students' first language, and the other concerning their second language proficiency. In Study 1 described here, reports written by 110 Japanese second year university students, who had received instruction in academic discourse for critical evaluation (which is one aspect of critical thinking), were analyzed for use of evaluative statements. No disadvantage was found for use of the Japanese language, which is considered as having a more indirect structure that may make critical evaluation more difficult. Measurements of language proficiency in English and Japanese, however, were found to correlate with production of evaluative statements in those respective languages suggesting that language proficiency could affect critical evaluation use. In Study 2, the same task was given to 43 first year students who had not yet received the same instruction. Analysis revealed similar patterns in their written work but at a lower level, suggesting that the second year students had benefitted from the skills instruction. Furthermore, unlike the second year students, the first year students evidenced no correlations between their language proficiency scores and their production of evaluative statements, suggesting that proficiency on its own is inadequate: students need instruction on the specific language forms and structures to use to demonstrate critical thinking in their written work.

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1. Introduction

In modern societies, the ability to evaluate the credibility of information that one encounters is an essential skill, especially considering the proliferation of unvetted information through the Internet and other forms of mass media (e.g., Glassner, Weinstock, & Neuman, 2005; Thomm & Bromme, 2011). However, educational development of critical thinking skills, which includes critical evaluation, is not a straightforward matter. There are, for example, disagreements about appropriate methods for critical thinking skills instruction and assessment, and various individual and situational factors are believed to influence the development and use of such skills (e.g., Davies, 2006; Halpern, 1998; Ku, 2009; Manalo, Kusumi, Koyasu, Michita, & Tanaka, 2013, 2015; Ten Dam & Volman, 2004). One of the main areas of contention is whether cultural background contributes to differences in critical thinking performance (e.g., Ennis, 1998; Manalo et al., 2013, 2015). Some authors, for example, have portrayed Asian students as being deficient in critical thinking compared to Western students (e.g., Atkinson,

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1997; Fox, 1994), and it has been found that many instructors at the tertiary level subscribe to such a view (e.g., Lee & Carrasquillo, 2006; Robertson, Line, Jones, & Thomas, 2000).

Two language-related explanations have been proposed for the apparent differences in critical thinking performance manifested by students from different cultural backgrounds. One of those explanations concerns the structure of the student's native language (L1). This explanation posits that, due to their structure, some languages may present constraints in the ease with which certain thinking skills can be undertaken or expressed. This explanation is sometimes referred to as the "Sapir-Whorf hypothesis" or the "linguistic relativity hypothesis" (see, e.g., Au, 1983; Hill & Mannheim, 1992; Hockett, 1954; Whorf, 1956). An example of a claim of this kind is Bloom's (1981) proposal that counterfactual thinking (i.e., thinking about what might have been, contrary to facts) may be more difficult in Chinese compared to English.

Some observations of linguistic differences, such as "indirectness" being a feature more prevalent in some languages, particularly Asian languages (e.g., Kong, 2005), would appear to support the idea that language structure could affect the ease with which certain modes of thinking could be undertaken or expressed. In a study by Itakura and Tsui (2011), for example, evidence was found that book reviewers use different strategies to convey critical evaluation when writing in Japanese compared to English: in Japanese, criticism is usually indirectly conveyed and is frequently preceded by an apology. Previous studies, however, have failed to provide convincing evidence that language structures could actually impose constraints in what users of the language can communicate. Although the earlier-mentioned study by Bloom (1981) claimed to have found evidence for such constraints where counterfactual thinking in the Chinese language is concerned, subsequent investigations failed to replicate or support Bloom's results (Au, 1983; Liu, 1985; Takano, 1989; Vorster & Schuring, 1989). Even where the weaker version of the linguistic relativity hypothesis is concerned (i.e., that language can merely influence people's thought patterns, rather than constrain their thought processes), the findings of the few studies that claim to have found supporting evidence (e.g., Boroditsky, 2001) have not been replicated in subsequent independent investigations (e.g., Chen, 2007; January & Kako, 2007; Tse & Altarriba, 2008).

The other language-related explanation for the apparent culture-based differences in critical thinking performance concerns students' second language proficiency (e.g., Floyd, 2011; Lun, Fischer, & Ward, 2010; Paton, 2005). This explanation is based on the observation that the students who are usually reported as having lower levels of critical thinking competence are international students in English speaking countries. It suggests that, because most of those students have to use a second language (L2, which is usually English) in their host environment, and they may lack adequate proficiency in that L2, they would likely manifest lower competence when performing tasks that require use of that L2. Tasks that are likely to get affected include cognitive tasks like critical thinking.

One way of understanding this possible influence of language proficiency on critical thinking performance is in terms of cognitive cost (i.e., the mental resources cost associated with task performance). Language processing entails the use of cognitive resources in working memory (Baddeley, 1986, 1998), and lower proficiency in a language would require the use of more resources. Thinking critically would likewise require the use of working memory resources. There are, however, limited resources available in working memory (Baddeley, 1986, 1998) and, if a considerable amount of those resources has already been expended on utilizing a language in which proficiency is low, there may not be adequate resources remaining for the satisfactory execution of critical thinking.

The negative impact of the higher cognitive cost entailed in using a language in which proficiency is low, on the execution of other cognitive tasks, has been demonstrated in previous research. Takano and Noda (1993, 1995) showed that the use of a foreign language detrimentally affects performance in concurrently undertaken non-linguistic tasks like arithmetic calculation and mental imagery, and Manalo and Uesaka (2012, 2014) reported evidence indicating that students' lower proficiency in an L2 limits their ability to use diagrams when explaining information in that L2. Where critical thinking is concerned, both Lun et al. (2010) and Floyd (2011) reported indications that lower proficiency levels in English could detrimentally affect Asian students' performance in critical thinking tests administered in English. However, neither of those studies used appropriate, objective measures of L2 proficiency to reliably confirm the connection between L2 proficiency and critical thinking skills performance.

1.1. Overview of the present study

The present study examined whether there might be evidence to support either or both (i) the language structure explanation, and/or (ii) the language proficiency explanation, in students' manifestation of critical thinking in their written work. The study was not intended to be a comprehensive test of the language structure hypothesis: it examined only whether, in the written work of Japanese university students, there might be observable differences in the presence of critical thinking qualities depending on the language used, Japanese or English. Critical thinking was operationalized as students' use of evaluative statements. This decision was based on the fact that use of evaluative statements comprises a salient expression of critical evaluation, which in turn is central to the notion of critical thinking application (e.g., Fisher & Scriven's, 1997, p. 21, definition of critical thinking as "skilled and active interpretation and *evaluation*" of observations and communications, information and argumentation" – italics added).

In the present study, Japanese was deemed an appropriate language to examine because, like a number of other Asian languages, it employs patterns of expression that make it more indirect and inductive compared to English (e.g., Itakura & Tsui, 2011; Scollon & Wong-Scollon, 1991). Evaluation, however, requires precision and directness in conveying judgments about the quality or value of the subject being referred to. Thus, structural features of the Japanese language could make

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