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Exploring the Relationships between L2 Learners' Critical Thinking and Self-Regulating Capacities and English Grammar and Reading Abilities

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Abstract

This study reports preliminary findings of a larger project on the relationship between students' thinking skills and academic achievement in higher education in Japan. This part of the project especially concerns the relationship between L2 learners' critical thinking and self-regulation capacities and English grammar and reading abilities. More specifically, using the data collected from a group of Japanese college students learning English, it examines the extent to which their critical thinking and L2 learning self-regulating capacities correlate with their English grammar and reading abilities. In addition, it examines to what extent critical thinking and self-regulated learning abilities relate to each other, i.e., whether they converge or diverge as traits, both of which concern L2 learning. The findings reveal that critical thinking and self-regulation are distinct cognitive traits. Also, critical thinking and self-regulation capacities contributed differentially to L2 grammar and reading abilities: Critical thinking contributed to L2 English grammar and reading abilities, while self-regulation contributed mainly to L2 English grammar. It did not present significance in predicting L2 English reading.

INTRODUCTION

Critical thinking skills are considered vital to living in a rapidly changing, global society. In recent years, they have gained popularity not only in business but in education, emphasizing the importance of life-long learning (Green, 2015).

In particular, people living in a democracy are required to make independent and sound decisions about personal and civic affairs, and their critical thinking skills should guide them

to good decisions not only for themselves but for the entire community to which they belong (Beyer, 1995). Despite the importance of critical thinking as a goal of life and education, its definitions have been elusive, and consensus has not been reached on why and how to teach critical thinking in school settings.

Critical thinking: Definitions

Since Socrates first introduced the concept of critical thinking more than 2,400 years ago (Fisher, 2001), many have attempted to define it. However, not a single definition has successfully captured its complex and field-specific nature, not to mention its conflicting account as state versus trait.

One may see critical thinking as the cognitive ability to think clearly and logically in its simplest definition. Alternatively, as defined by Paul and Elder (2006), it may be viewed “as the art of analyzing and evaluating thinking” to improve thinking. The most comprehensive, yet too long to follow, is probably the one from the Delphi Report (Facione, 1990), produced by an authoritative panel of 46 experts on the subject in the American Philosophical Association:

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. As such, CT is a liberating force in education and a powerful resource in one’s personal and civic life. While not synonymous with good thinking, CT is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex

matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. (Facione, 1990)

While comprehensive, this extended definition of critical thinking does not help researchers operationalize their study of critical thinking and how it relates to other cognitive and non-cognitive human capacities. Likewise, it does not serve educators as an efficient means for educators to teach critical thinking to their students and incorporate it in developing their educational programs, curricula, and materials. Although studies on critical thinking have grown out of a philosophical approach to the mind and thought as such, recent years have seen a strong influence from cognitive and educational psychology on scientific inquiry and the development of critical thinking as an educational goal.

For educators, too, an operational definition of critical thinking was imperative so that they can study it scientifically along with the development of learners' other cognitive skills and their academic achievements. For example, critical thinking is a key reference for teachers to foster in their classrooms so that their learners can grow and survive in the ever-changing and complex societies in which they are situated.

Developing critical thinking has taken the top pedagogical priority in American higher education (Paul, 2004), especially because educators believe higher education should aim to prepare students for life-long learning, and so they need to develop their critical thinking skills (Green, 2015). For Dewey (1910), a philosopher, psychologist, and educator, critical thinking was an educational goal as such. He argued critical thinking (i.e., reflective thinking as he called it) was “an active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of the grounds which support it and the furthest conclusions to which it ends” (Dewey, 1910, p. 6).

Following Dewey, many other researchers and educators have seen critical thinking as “reflective and reasonable thinking” (Ennis, 1985) or “thinking that facilitates good judgment” (Lipman, 1988). This view emphasizes the role of critical thinking as an individual capacity that involves higher-order thinking skills such as interpretation, analysis, evaluation, and metacognition or self-regulation (Davies & Barnett, 2015). This skills-based view of critical thinking is substantial in that it offers a componential view of critical thinking that helps educators materialize it as specific teaching and learning objectives. For example, Paul and Elder (2008) defined critical thinking as “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” (p. 58). A definition of critical thinking such as Paul and Elder’s helps researchers operationalize their research targets and teachers set their educational goals and objectives in their classroom implementation.

Self-regulated capacity and learning

Unlike critical thinking, much research has been dedicated to self-regulation in educational psychology (Tseng et al., 2006; Zimmerman & Schunk, 2001, 2011). Self-regulated learning provides a conceptual framework to understand the cognitive, motivational, and emotional aspects of learning. In particular, a social-cognitive perspective defines self-regulated learning as context-specific processes employed cyclically to achieve personal learning goals. These processes involve a multitude of metacognitive knowledge and skills and affective and behavioral processes. In self-regulated learning, learners also need to build and apply self-efficacy to control such processes (Zimmerman, 2000).

Dörnyei and Ryan (2015) defined self-regulation as “a dynamic construct that connects strategic capacity, intent, and learning behavior” (p. 169). Therefore, learners with more

substantial self-regulatory capacity are more active, resourceful, and effective in academic performance (Zimmerman & Schunk, 2011). Likewise, those with a higher sense of self-regulation can motivate themselves better and overcome inner and outer learning obstacles more easily (Pintrich, 1999). They proactively apply self-regulatory strategies to control their thoughts and behaviors so that they can achieve their intended goals (Zimmerman, 2011).

Critical thinking, self-regulation, and L2 learning

In L2 education, numerous research has demonstrated that cognition and language development are closely related (Dörnyei & Ryan, 2015; Oxford, 2017). In particular, thinking skills such as metacognition and self-regulation promote L2 proficiency, and studies have examined the systematic relationship between such skills and L2 reading, grammar, writing, and vocabulary (Azadi et al., 2015; Jackson & Park, 2020).

Nevertheless, teaching thinking skills along with L2 skills has not become a common practice owing to such thinking skills being limited to metacognition and self-regulation (Ku, 2009). With its limited definition in L2 education, the relationship between critical thinking and L2 learning has not been thoroughly examined. At best, critical thinking has been viewed as equivalent to metacognition or part of it. Likewise, the relationship between critical thinking and self-regulation capacities has not been empirically researched, making it difficult to understand its role in L2 learning.

Therefore, this study examines the relationship between critical thinking, self-regulation, and L2 learning with two research questions (RQ). It reports its preliminary findings as part of a larger project on the relationship between students' thinking skills and academic achievement in higher education in Japan.

Research Questions (RQ)

- RQ1: Are critical thinking and self-regulation convergent or discriminant as cognitive traits in relation to L2 learning?
- RQ2: To what extent do critical thinking and self-regulation capacities contribute to L2 grammar and reading abilities?

METHODS

Participants

Fifty-four first-year students at a university in Japan participated in this study. They were of low- to high-intermediate English proficiency. Fifteen students were male, and the rest female. Their ages ranged from 18 to 23. They were all liberal arts majors at the time of this study. All the students except two sat a TOEFL exam in June and took a test to assess their problem-solving skills in the same month. The data from the two students who did not take the TOEFL exam were removed *listwise* from the analysis.

Instruments

The two test instruments other than the TOEFL exam include a test of problem-solving skills and self-regulated learning capacity. The assessment for problem-solving skills named GPS-Academic is a commercially available test designed to assess examinees' cognitive and affective factors. The assessment assesses the problem-solving skills in terms of critical, creative, and collaborative thinking skills, and the construct of each skill is numerically defined. However, in this study, only the scores of the critical thinking section were used for the analyses.

Another research instrument employed in this study concerned learners' self-regulation capacity. The modified version of Tseng et al.'s (2006) self-regulation instrument was adapted. Out of the original 20 statements translated into Japanese, those 15 statements that exhibited

high corrected item-total correlations were selected and included in the final version of the instrument. The Likert scale of each statement ranged from *completely disagree* (1), *sometimes disagree* (2), *slightly disagree* (3), *slightly agree* (4), *sometimes agree* (5), and *completely agree* (6).

The original instrument was designed to assess self-regulation capacity in terms of emotion control, environment control, commitment control, metacognition control, and satiation control. However, in this study, the composite score of each participant was used for the analyses.

The TOEFL exam that the students were required to take included three sections: listening, grammar, and reading. For the research purposes of the study, the scores of the grammar and reading sections were entered into the analyses.

Procedures

Students were informed about taking the GPS-Academic problem-solving test in June before leaving for a 2-week study tour. The test was delivered on the Internet, and the students were assigned an account to access the test site. They took the test at their convenience using their own PC. They first had to respond to the questions concerning critical, creative, and collaborative thinking skills. They were then required to complete the self-regulation instrument. A total of 54 students completed the entire test, but the responses from two students were deleted *listwise* from the subsequent analyses because their TOEFL scores were not available.

Excel and EQS 6.1 (Bentler, 2003) were employed for the data analysis. Excel was used for data management and EQS for path analysis. The parameters were estimated for the model, and the relationship was identified between the variables of cognitive capacities and L2 skills.

RESULTS AND DISCUSSIONS

Table 1 shows the descriptive statistics by test variables. The central tendency and dispersion measures of each variable indicate that the data are mostly normal, additionally confirmed by the two distribution indices of kurtosis and skewness. All the kurtosis and skewness values for the four variables are centered around 0, showing that their distributions are mostly normal at the individual variable level.

Table 1. Descriptive Statistics by Test Variables ($N=52$)

Variables	Mean	Median	<i>SD</i>	Min-Max	<i>Kurt.</i>	<i>Skew.</i>
Critical Thinking	47.77	47.63	11.73	18.12-69.76	-0.04	-0.31
Self-regulation	2.60	2.57	0.78	1.2-4.4	-0.33	0.11
L2 Grammar	43.63	43.50	5.65	31-57	0.03	0.13
L2 Reading	45.96	47.00	6.07	31-57	0.22	-0.60

Figure 1 shows the four variables path model. Critical thinking and self-regulation variables are correlated, and each variable predicts either grammar or reading ability variables. As such, the model can help identify to what extent each predictor variable contributes to explaining the predicted variables of grammar and reading, respectively, and, in comparison with each other.

The model fit indices of CFI and RMSEA indicate that the fit is marginal with lower than the desired value of CFI 0.9 and a barely acceptable value of RMSEA (lower than or equal to 0.8). Such marginal fit indices may have resulted from a small sample size used for the analysis and require caution in interpreting the results.

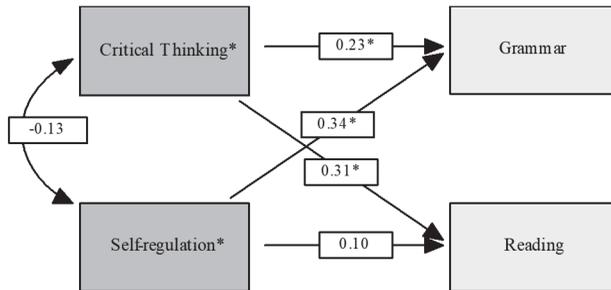


Figure 1. Path Model of Cognitive Variables to L2 Skills ($\chi^2 = 6.12$, $df=1$, $p=0.02$, $CFI=0.85$, $RMSEA=0.08$)

The results of the path analysis enable interpretations concerning the relationship between the specified variables in the model in response to the two research questions (RQ):

- RQ1: Are critical thinking and self-regulation convergent or discriminant as cognitive traits in relation to L2 learning?
- RQ2: To what extent do critical thinking and self-regulation capacities contribute to L2 grammar and reading abilities?

For RQ1, the small and non-significant correlation coefficient of -0.13 between the two variables of critical thinking and self-regulation indicates that they are divergent, measuring the considerably different aspects of cognitive capacity. It is a somewhat unexpected finding that metacognition control is part of self-regulation, and the test instrument is designed as such. Many researchers (Dwyer et al., 2014; Halonen, 1995; Kuhn & Dean, 2004; Schunk, 2008) have claimed that critical thinking is an aspect of metacognition. For instance, the self-regulation instruction employed in this study included four items to assess metacognitive

control.

The four path coefficients from the predictor to the predicted variables reveal an interesting differential relationship concerning RQ2. Critical thinking meaningfully predicted L2 grammar and reading abilities, while self-regulation predicted grammar but not reading. This finding requires further validation, especially with a larger sample size.

Nonetheless, it is interesting that the two cognitive variables predict L2 skills differently, as such differential effects may suggest implications in L2 classrooms. The introduction of critical thinking in the L2 classroom may help enhance students' grammar and reading, while self-regulation may help develop only grammar.

CONCLUSION

This study, part of a larger research project, examined the relationship between the four variables of critical thinking and self-regulation capacities and L2 grammar and reading abilities. The findings revealed that critical thinking and self-regulation are discriminant traits involving the different aspects of cognitive processes. As such, their contributions to L2 grammar and reading were not consistent.

However, these findings call for a more in-depth investigation into which individual components that construct critical thinking and self-regulation capacities relate to L2 abilities and to what extent. Such an investigation is underway with a larger sample size and with the more precise definitions of critical thinking and self-regulation and their components.

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