2015 年度

修士学位請求論文要旨

The Relationships between Working Memory Capacity and L2 Oral Production under Pre-

planning and Online Planning Conditions

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Abstract

Task-based language instruction (TBLT) has been widely applied in both ESL and EFL

context since 1980s. TBLT emphasizes the importance of real language use in the classroom.

In Japan, the New Course of Study declared by MEXT (the ministry of Education, Culture,

Sports, Science and Technology) emphasized the potential role of task-based instruction in

promoting what they can do with language. The roles of planning played in task-based

performance has become a popular field for both researchers and teachers because it reflects

both theoretical and practical significance. Planning is important for current theory of L2

acquisition with regard to information processing, what's more, planning is crucial for

classroom practice as to its straightforward role in language production.

Planning can be divided into two types, pre-planning and online planning. Pre-planning

refers to a preparation by considering the content and how to express it before performing the

task. Online planning refers to a preparation during performing the task. Usually, the effects

of planning on task performance is reflected in terms of the performance of accuracy, fluency,

and complexity. Several studies indicated that pre-planning helped to enhance fluency and

complexity (Foster, 1996; Mehnert, 1998; Ortega, 1999; Yuan & Ellis, 1993). Pre-planning

effects on accuracy were diverse and the results varied according to task designs, task

conditions. The effects of online planning on task performance were obvious with regard to

accuracy and complexity but not fluency.

Various results reflecting the multiplied roles of planning infer the necessity of further studies on the investigation of variables which influence planning. Such kinds of variables include learner's individual differences, proficiency, types of planning and length of planning time, to name a few. In this study, one aspect of variables was explored, that is working memory capacity, for the reason there are fewer previous studies, compared with other variables such as the length of planning time and working memory is an important concept when researching information processing. Only two studies which investigated how working memory influence planning but their findings were slightly different because different task design and working memory test were utilized.

The history of research on working memory was much longer in the field of SLA. The definition of working memory emphasized that it is the system for temporarily storing and processing information while performing higher rank cognitive tasks. The most influential model of working memory was proposed by Baddely and Hitch (1974). There are three important elements, Phonological loop, the visuo-spatial sketchpad, a central executive (Juffs & Harrington, 2011). It has been acknowledged that working memory capacity is limited in nature which can predict individual differences in language learning. The assumption is that higher WM will lead to more successful learning. In the literature, most studies address the role of working memory in L2 processing of morpho-syntax. As for L2

speaking, O'Brien, Segalowiz, Collentine, and Freed (2006) reported that phonological working memory was found to correlate with oral fluency.

In this study, nineteen Japanese learners of English from X University in the same department attended to working memory task and two narrative tasks. They first completed a reading span test proposed by Osaka and Osaka (1992) which is specialized in exploring working memory capacity in terms of information storage and processing. Two narrative tasks selected from pre-1 level of the *STEP Test* were used for the task. The task instructions were conducted in Japanese, all the participants were given the same prompts. The participants performed the tasks in an empty classroom with only the researcher present. In pre-planning condition, time for preparation and completion was 10 and 5 minutes respectively. The preparation time was standardized in the previous studies. They were allowed to make written notes on a piece of paper in English, but were instructed not to attempt to write everything they would say. They also were told that the paper would be removed when they made their oral production. In online condition, 30 seconds was given to see the pictures and no time limitation for completion.

L2 oral performance was measured in terms of fluency, accuracy, and complexity in this study. Most of the general measurements of the three triad. Speed fluency and breakdown fluency were measured. The fluency measures using pauses were not used in this study because a specialized tool was necessary for strict measurement. The proportion of error-free

clauses was only used to measure accuracy in this study because least disputation of accuracy measurements. An AS-unit (Analysis of Speech) is a measure of the linguistic complexity of sentences which was often used in some previous studies. The definition of AS-unit is "a single speaker's utterance consisting of an independent clause, or sub-clausal unit, together with any subordinate clause(s) associated with either" (Foster, Tonkyn, & Wigglesworth, 2000, p. 365). Only syntactic complexity was measured by AS-unit length, the number of subordinated clauses, and the number of clause of AS-unit.

The results were not totally in accord with previous studies to some extent. Significant correlations between working memory and accuracy were found in both pre-planning and online planning conditions. Only pre-planning condition found moderate correlations between working memory and complexity and no correlations between working memory capacity and fluency were found in both two conditions. To sum up, the participants seemed to have the capacity to attend to more than one aspect of language features simultaneously.

The most distinct findings compared with previous studies placed in fluency part. It was possibly due to the notion that proficiency affects L2 fluency. As restricted by the sample size, proficiency was not seriously considered in this study. In addition, the relations between working memory capacity and proficiency were not clear in the literature. As for complexity and accuracy, it has been proved that working memory plays a crucial role. Theoretical base includes *Cognitive Hypothesis* (Skehan, 1998)*,* and the model of speech (Levelt, 1989).

Skehan's *Cognitive Hypothesis* is an influential theory to implement task-based approach.

The most fundamental assumption is that learners use either an exemplar-based system or a

rule-based system. Exemplar-based system is based on "the operation of a redundant memory

system in which there are multiple representations of the same lexical elements" (Skehan,

1998, p.89). It is characterized as accumulation of ready-made formulaic chunks (Ellis,

2005). It emphasizes the meaning. On the contrary, rule-based system is "parsimoniously and

elegant organized, with rules being compactly structured" (Skehan, 1998, p.88). It "leads to

the development of an open, form-oriented system" (Skehan, 1998, P.89). Complex language

can be produced if the rule-based system functions effectively, but why working memory

correlated with complex L2 production can only be found in pre-planning condition? It may

possibly due to task difficulty which is reflected by learner's perception towards the task. In

online condition, task was different with the one in pre-planning condition, and some

participants' comments reflected that they have fewer similar experience of the story and

almost all their attention was focused on how to produce accurate expression. Another

possible reason was that when time for preparing was limited and in an online way, the

participants might get more nervous than in pre-planning condition, which made complex

production impossible although some of the participants had higher working memory.

Levelt's speech model (1989) is another theory which can illustrate the significant

relationship between working memory and accuracy found in this study, it is a widely

accepted theory to illustrate how language is produced. It consists of autonomous processing

stages: *conceptualization*, *formulation*, and *articulation*. As for illustration of accurate

speech, *Formulator* takes responsibilities for it. First, preverbal message requires

grammatical encoding, which consists of procedures for lemmas and of procedures for

syntactic building (Levelt, 1989). The lemma is stored in speaker's mental lexicon, and its

lexical item contains meaning or sense. Once the meaning of a lemma matches part of the

preverbal message, syntactic building starts to be activated. When all the lemmas and

syntactic building have done, a 'surface structure – an ordered string of lemmas grouped in

phrases and sub-phrases of various kinds' (Levelt, 1989, p.11) is produced. It is assumed that

maintaining pre-message and matching it with appropriate linguistic structure would be

determined by working memory. But why accuracy related with working memory in both

conditions? The possible answer may be hidden in the cultural background of English

education in Japan. Grammar-based instruction which "focuses on linguistic form and on the

controlled production of grammatically correct linguistic structures in the L2" (Housen &

Kuiken, 2009, p.461) seems to have a marked impact on Japanese L2 learners' perception of

successful L2 speech. It may be likely to lead to accuracy-oriented language learning among

Japanese learners. When they performed demanding tasks which required controlled

processing, they had to give up controlling some of the language features. Their orientation

would determine which aspect of language was the most important and it reflected the

outcome of L2 oral production. In the case of Japanese participants, they were afraid of making humiliating errors, and as a result, they overused the self-monitoring process. As stated by Levelt (1989), monitoring requires working memory. Minoring one aspect of language too much may lead to overuse of working memory on it. Therefore, it can explain why accuracy was correlated with working memory in both conditions.

To sum up, in this study, it can be said that working memory capacity is an important individual variable which determines the quality of planning in the context of task-based performance. Participants with higher working memory capacity were more likely to produce more complex and accurate L2 even slight differences in proficiency. Further studies are needed to deal with some limitation of this study including sample size, scoring of working memory task, full measurements of three triad. It is more important to explore whether working memory capacity also have impact on some after-task activities such as task repetition because task repetition provides learners with a second chance to process information especially for those with lower working memory capacity.