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Analyzing the Effect of Repetition on Korean EFL Readers' Mental Representations While Reading Narrative Passages

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Abstract

The main purpose of the present study was to investigate the processing changes in constructing three levels of mental representations while reading fully versus partially overlapping narrative passages by Korean EFL learners. This study employed the Resource Allocation Approach (Lorch & Myers, 1990) as a theoretical framework. Results showed that the full repetition significantly facilitated the construction of the surface form and the textbase, whereas the partial repetition promoted the development of the situation model.

Keywords: repetition, narrative, processing changes, resource allocation, situation model.

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Studies on repetition in reading have been extensively conducted in the field of Repeated Reading (RR)—reading the same text several times. Despite numerous and well-accepted theoretical and empirical support for the repeated reading in the behavioral/cognitive scientific literature (e.g., Ardoin, Eckert, & Cole, 2008), and educational literature (e.g., Gorsuch & Taguchi, 2010), little has been known about what processing changes are actually induced while repeatedly reading the same text in real time, particularly for EFL readers.

Of theoretical relevance to studies in repetition is Narrow Reading (NR)—reading similar texts on the same theme with some linguistic variations. NR involves partial repetition, whereas RR involves full repetition. This differing degree of repetition enables the testing of a theoretically important issue. According to Raney's (2003) context-dependent representation model, repetition effects (i.e., gains in *reading rate* and/or *comprehension* from repetition) are determined by the degree of overlap between passages in question. It is expected that the full repetition tends to trigger a greater reduction in reading time on surface form and/or textbase processing, and to induce a greater increase in reading time on situation model processing compared to the partial repetition. This hypothesis, however, has not been strictly tested due to the methodological shortcomings.

Previous studies primarily employed crude measures for processing changes such as overall passage reading time and/or off-line general comprehension questions, which may not be sensitive enough to examine how different reading processes are affected by repetition in a different manner. So, a possibly more systematic examination of effects of repetition on different reading processes involves looking into the processing changes in each of the three levels of processing (i.e., surface, textbase and situation) respectively, instead of overall

reading time; this three-level separation of reading processes is predicated upon the most widely accepted theoretical model of discourse comprehension (van Dijk &Kintsch, 1983).

The current study aims to fill the aforementioned research gaps given its significance, by investigating the processing changes in three levels of mental representations during full repetition versus partial repetition for Korean EFL readers. Specifically, this study employs van Dijk and Kintsch's (1983) discourse comprehension model as the theoretical framework and the resource allocation approach as the methodological framework

Methodological Framework of the Current Study

The current study employs the resource allocation approach (e.g., Graesser, Hoffman & Clark, 1980; Radvansky, Zwaan, Curiel & Copeland, 2001). One of the assumptions of this approach is that reading time reflects cognitive effort or processing load during text processing. However, reading time *per se* are simultaneously affected by various reading processes. That is, sentence reading times are regressed on a number of textual variables that are important in constructing mental representations at the surface, textbase and situation level. For the current study, a total of 15 variables were selected and coded on each sentence for surface form, textbase, and situation model respectively.

Method

Research Design

The independent variables of the study include reading trials (first, second, or third) as a within-subjects factor and reading proficiency (advanced or intermediate) and reading condition (Repeated Reading or Narrow Reading) as between-subjects factors. In addition, there are 14 textual variables reflecting different levels of mental representations (see Table 3.1 for the overview of the textual variables included in the study): number of syllables, mean log word frequency, mean length of clause (MLC), dependent clauses per clause (DC/C), coordinate phrases per clause (CP/C), and complex nouns per clause (CN/C) for surface form, number of new arguments, number of propositions and argument overlap for textbase, and five situational (dis)continuities for situation model, i.e., temporal, spatial, goal-related, causal, and entity-related continuity. Sentence reading times collected for each participant are the dependent variable of the study.

Participants, Materials and Procedure

A total of 91 Korean EFL readers of intermediate (CEFR B1) and advanced (C1) proficiency levels were randomly assigned either to the full repetition (FR = RR) or partial repetition (PR = NR) condition. They completed four sessions, each session involving reading three texts. The entire session was identical for both intermediate and advanced readers, and for both PR and FP groups except that those in the PR condition read four text sets, each consisting of *three different versions* of a story (i.e., versions 1, 2, 3 of the four stories), whereas those in the FR condition solely read the version 3 of each story three times (i.e., version 3 of each story three times).The titles of the original passages are “The Mouse, the Bird, and the Sausage”, “Old Sultan”, “Queen Bee” and “The Turnip”. The reading ease of the 12 texts ranged from 78 to 84.1 (M = 81.9), grade level from 7.1 to 7.3 (M = 7.2), the total number of sentences from 30 to 58 (M = 41.7), the total number of words from 637 to

1166 (*M* = 883.8), mean words per sentence from 19.23 to 22.92 (*M* = 21.4), mean syllables per word from 1.18 to 1.29 (*M* = 1.22).

The sentence reading times collected for each participant were submitted to a multiple regression analysis, including the 15 textual variables. The standardized regression coefficients (or beta weights) for each participant were collected. Then, three composite variables were constructed, each representing the construct of surface form, textbase, and situation model processing by averaging the *z* scores of the features at each level respectively. The composite scores were subjected to three-way mixed ANOVA, in which the reading trials (1, 2, 3) were used as a within-subjects factor, and the reading proficiency (advanced vs. intermediate) and reading condition (full vs. partial repetition) were used as between-subjectsfactors.

Results

Effects of proficiency, Condition and Trial on Processing Resource Allocation to Surface Form

A 3-way mixed analysis of variance (ANOVA) was conducted with proficiency (intermediate, advanced) and condition (NR, RR) as between-subjects factors, and trials (1,2,3) as a within-subjects factor. Main effects of proficiency were not statistically significant (p = .853). This means that processing resource allocation to surface form was not significantly different between L2 intermediate and advanced readers.

There was a significant two-way interaction of trial and condition(p = .002); which means that the effects of trial varied between the conditions. Therefore, in order to closely look into the two-way interaction between reading trial and condition, simple effects, rather than the main effects, of trial and condition were analyzed. The analyses of simple effects showed that the processing resources allotted to surface form substantially decreased from the initial trial to the second trial (p = .000) while readers allocated as many resources on the third reading as on the second (p = 1.000). On the other hand, those in the RR condition allocated a consistently decreasing amount of processing resources to surface form on each reading (all ps = .000). Particularly, the difference between the conditions on the third reading was statistically significant (p = .023).

Effects of Proficiency, Condition and Trial on Resource Allocation to Textbase Processing

A three-way mixed ANOVA showed that main effects of proficiency were not statistically significant (p = .830). This suggests that overall resource allocation to textbase processing did not substantially differ between the intermediate and advanced readers. The main effects of condition and of trial were found statistically significant (both ps< .05). However, two-way

interaction effects of trial and condition were statistically significant (p = .000), which implies that the patterns of resource allocation with repetition was also modified by condition.Thus, simple effects of each of these variables were examined, instead of their main effects.The analyses demonstrated that for NR, L2 readers did not curtail their resource allocation to textbase processing on the second reading. Instead, the resources put into textbase processing substantially increased on the second reading (p = .000) before plummeting on the third reading (p = .000). On the other hand, those in RR allocated similar amount of resources to textbase processing over three trials (all ps> .05) although resources were slightly reduced from the first to the second in the mean scores.

Effects of Proficiency, Condition, and Trial on Resource Allocation to Situation Model Processing

Given their significant interaction effects, the effects of these three variables need to be interpreted in the context of the other variable(s) in the form of the simple effects.A two-way interaction of trial and proficiency was statistically significant (p = .034), which indicates that resource allocation patterns by trial were different between proficiency levels. The simple effects were examined. Intermediate readers allocated similar amount of resources to situation model processing over three trials (all ps> .05) whereas advanced readers significantly decreased resource allocation from the second to the third reading (p = .015). Also, differences between the proficiency levels were significant on the first and second readings (ps< .05). However, this difference is not significant on the third reading (p = .575).

Two-way interaction effects of trial and condition were also found significant (p = .002). This suggests that resource allocation patterns to situation model processing by trial were different between the conditions. Therefore, simple effects were analyzed and showed

how the extent to which L2 readers allocated processing resources to the situation model on each reading was different by condition. While those in the NR condition overall allocated high amount of resources for the situation model processing on all three trials (*p*s> .05), those in the RR condition had a considerable reduction in resource allocation, particularly on the third reading (p = .028).Also, resource allocation to situation model did not differ between the conditions initially (p = .846). However, those in the NR condition put significantly more resources to situation model processing than those in the RR on the second (p = .041) and the third (p = .000).

The simple effects of condition were statistically significant for intermediate readers (p = .001) whereas insignificant for advanced readers (p = .245). This means that intermediate readers were heavily reliant on the condition regarding their resource allocation to situation model processing; When they were reading in the NR condition, they allocated great amount of resources; however, in the RR condition, their overall resource allocation was near zero. On the other hand, overall resource allocation did not substantially vary between the conditions for advanced readers; this means that they allocated many resources to situation model processing regardless of the conditions.

Summary of the Findings and Discussion

Overall resource allocation to surface form processing was not considerably different between proficiency levels. Also, in the RR condition, the readers allocated a decreasing amount of resources with each repetition whereas those in the NR condition reduced resources from the first to the second trial but devoted as many resources on the third reading as on the second reading.

As for textbase processing, overall resource allocation was not significantly different between the proficiency levels. Those in the RR condition consistently allocated low levels of resources to textbase processing over the three readings while those in the NR condition more than doubled resource allocation from the first to the second reading, followed by a substantial reduction on the third.

Resource allocation to situation model was significantly greater for advanced than intermediate readers on the first and second readings but not on the third. While those in the NR condition allocated many resources over the three trials, those in the RR condition had a considerable reduction in resource allocation to situation model processing over the trials. The trend of greater resources allocated in the NR than the RR condition was shared by both intermediate and advanced readers. However also note that intermediate readers allocated significantly greater amount of resources in the NR condition whereas they hardly allocated resources to the RR condition, while advanced readers allocated high levels of resources to situation model processing both in the NR and RR conditions.

The current dissertation projects several theoretical and pedagogical implications for L2 reading. Repetition is a widely used technique in L2 classrooms to foster reading comprehension; this study extends the existing research base by showing that the beneficial effects of FR on resource redistribution to situation model processing are exclusively limited

to advanced readers while its positive effects on faster processing and its consequential automatization of lower-level processes are observed for both groups of readers. For balanced development of lower-level and higher-level skills, readers, particularly of lower proficiency levels, may benefit from reading a series of similar texts with slight linguistic variation (as in the NR condition). This study also suggests that the two theoretical models (i.e., the Automaticity Theory [Laberge & Samuels, 1974] and the context-dependent representation model [Raney, 2003]) commonly invoked for explaining the repetition effects be revisited.

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