

The Impact of Task Complexity on Iranian EFL Learners' L2 Reading Comprehension

Malak Ziba Mehrinejad *

MA in TEFL, University of Zanjan, Iran

Seyed Hesamuddin Aliasin

Assistant professor, University of Zanjan, Iran

Abstract

The present study was conducted to compare the effect of dual task instruction with that of single task instruction on reading comprehension. Skehan (1998) argues that the more demanding tasks tap into more attentional resources, the less attention will be available to focus on form. Robinson's (2005) prediction that increasing task complexity along resource-dispersing dimensions will result in worse outcomes matches with Skehan's argument. Sixty intermediate students, majoring in English language and translation studies at the University of Zanjan were selected based on the Nelson English Language Test results. These participants were then randomly divided into three groups: one control group and two experimental groups. The participants in each group read a text, but under different instructions. The participants of the first group were required to read the text and then answer the reading comprehension questions only (single reading comprehension instruction). The participants in the second group were told to read the text and then answer both vocabulary and reading comprehension questions (dual task). The participants of control group received no task instruction. Data analysis results indicated that single task group (reading comprehension task instruction) outperformed the dual task group (both vocabulary and reading comprehension task instruction).

Keywords: dual tasks, single tasks, task complexity, attentional resource, reading comprehension, EFL learners

INTRODUCTION

Researchers believe that a task-based syllabus is a good replacement for a linguistic-based syllabus (Doughty, 1998; Ellis, 2005; Long, 1992; Robinson, 2001; Skehan, 2001; Williams, 1998). In a task-based syllabus, meaning will be emphasized rather than linguistic form. As Ellis (2003) puts it:

A task seeks to engage learners in using language pragmatically rather than displaying language. It seeks to develop L2 proficiency through communicating. Tasks have been employed to make teaching more communicative (pp. 9 & 27).

By the same token, Robinson (2005) argues that "in a task-based syllabus, pedagogical task should be developed and sequenced to increasingly approximate the demands of real-world target task" (p.1). The need for sequencing and grading task in instructional context has given rise to the notion of task complexity. Criteria which should be used for sequencing tasks are more polemical. What features of tasks can be considered in deciding on which tasks should be presented to students first, and which tasks should be presented later? In a task-based syllabus, tasks should be sequenced so that their cognitive and linguistic requirement can be matched to learner's level of development. The ease and difficulty of different tasks which learners can perform depend on three groups of factors (Robinson, 2005). The first set of factors relates to the intrinsic features of task itself. This means how the task is to be processed based on its design and structure as well as what resources learners bring to task performance (see Robinson, 2001a, p.29). Robinson refers to these factors as *task complexity*. There has been an interest among researchers in SLA and applied linguists to explore the influence of task complexity in second/foreign language teaching/learning. This study has been when such effort to investigate the role of task complexity in development of L2 learners' reading comprehension skill.

LITERATURE REVIEW

The theoretical background of the study

A task is an activity in which meaning is primary; there is some sort of relationship to the real world; task completion has some priority; and the assessment of task is in terms of task output (Skehan, 1998). Given this significance of task, scholars have attempted to delineate the factors that can contribute to task complexity in order to offer a convincingly comprehensive model of task complexity. Two important suggested models are elaborated below.

As the two well-established models of task complexity, Skehan and Foster's Limited Attentional Capacity Model (LACM) (Skehan, 1998; Skehan & Foster 1999, 2001) and Robinson's Triadic Componential Framework (TCF) (Robinson 2001a, 2001b) both attempt to delineate the attentional demands of tasks on L2 learners' task performance.

According to the LACM that proposes three components for task complexity (code complexity, cognitive complexity, communicative stress), learners as human beings have limited attentional resources at their disposal. Thus, this limitation causes learners not to be able to completely process all the L2 input that they receive.

According to Robinson's Triadic Componential Framework (TCF) which consists of three major components (task complexity, task conditions, task difficulty), the learner's

attentional resources can be influenced by some sub-components within one of these major components. Such components include variables such as \pm few elements, \pm single task, motivation, confidence, etc. This study has focused on the first major component of the TCF model, i.e., the task complexity component. This component comprises two opposing sub-components: resource-directing versus resource-dispersing variables. More specifically, the study focuses on the \pm single task variable within resource-dispersing sub-component of task complexity. According to Robinson's Cognition Hypothesis, raising task complexity towards resource directing variables can lead to learners' better performance on the respective task, whereas this task complexity increase towards the resource-dispersing variables may result in worse learner performance on the task involved.

Some related findings in empirical studies

There are some empirical studies in the literature that have focused on the role of task complexity in learning L2 skills. Robison and Lim (1993) examined the influence of \pm single task through deploying a one-way interactive direction-giving task in which speakers were asked to give directions from point A to point B on a map to a partner. In the single task condition the route was identified on the map for the speaker, whereas in the dual task condition the route was not identified. They found less fluent production on the route-not-marked map task versus route-marked task.

Kuiken, Mos, and Vedder (2005) found significant relationships between task complexity and proficiency levels of L2 learners. Peters (2007) studied the impact of task complexity (single versus dual task) on some learners of German as a foreign language, focusing on the participants' performance on reading comprehension and vocabulary tests under the influence of task complexity. The results revealed that the group tackling the single task scored better on reading comprehension than the other groups. The researchers in the present study were specifically inspired by Peter's (2007) findings and thus decided to recheck these findings in an Asian context with Iranian EFL learners. Sercu and De wachter (2007) operationalized Single versus Dual task performance for L2 learners in the following way. In the dual task condition learners of Dutch as a second language were asked to focus on both the cultural contents and the vocabulary of a text they were reading (in preparation for a culture and vocabulary test, experimental condition 1). In the single task condition, the learners were asked to focus on either the culture information in the text (in preparation for a culture test, experimental condition 2) or on the vocabulary in the text (in preparation for a vocabulary test, experimental condition 3). They found no significant differences between the vocabulary tests in the three conditions. Also, task condition variable as one of the main components of the TCF model did not appear to function as a good predictor of differences on the post-test for culture either.

In another study, Kuiken and Vedder (2008) investigated some Dutch university students of Italian and French languages, focusing on their performance on two writing tasks by

using prompts of varying degrees of cognitive complexity. The subjects' writing performance was measured in terms of syntactic complexity, lexical variation, and accuracy. The results indicated that manipulation of task complexity affects accuracy but not syntactic complexity and lexical variation. By the same token, Abdollahzadeh and Fard Kashani (2011) explored the effects of task complexity on written narrative production under different task complexity conditions across different proficiency levels of EFL learners. Their finding indicated that task complexity and language proficiency both had a significant effect on the writing accuracy and complexity of the participants, but not on the fluency of their writing production.

Sadeghi Ghahdarijani (2012) studied the effect of task complexity (task condition) on Iranian EFL learners' listening comprehension across the subjects' anxiety and proficiency levels. His results revealed no significant moderating effect for proficiency and anxiety on the relationship between task complexity and listening comprehension. In the same vein, Attarzade and Farahani (2014) explored the impact of task complexity on Iranian EFL learners' listening comprehension across the learners' aptitude. The results of their study indicated that the subjects performed better under simple conditions than complex ones for all task dimensions. Also, the results revealed no significant moderating effect for the subjects' aptitude levels under both simple and complex conditions. Thus, aptitude had no effect on the relationship between task complexity and listening comprehension performance of the subjects.

As mentioned earlier, Within the framework of task-based language learning, the role of task complexity in L2 learners' performance has attracted studies in the realm of SLA research (Abdullazadeh & Fard Kashani, 2011; Gilabert 2005; Robinson 2001b; Yuan & Ellis 2003); In contrast to the other dimensions of task complexity such as \pm planning time (Crookes, 1989; Skehan & Foster, 2001; Ellis 2005) and \pm prior knowledge (G. Brown, 1995; Barry & Lazarte, 1998; Urwin, 1999), few studies have investigated the effects of manipulating \pm single task. The present study examined the effect of single/dual task on reading comprehension of Iranian Intermediate EFL learners, based on Robinson's cognition Hypothesis (Robinson, 2001a, 2001b, 2005, 2007) as compared to Skehan and Foster's Limited Attentional Capacity Model (Skehan, 1996, 1998, Skehan & Foster, 1999, 2001). Thus the researchers sought to find an answer to the following question through the present study: Does task complexity have any effect on Iranian EFL learners' performance on reading comprehension? An elaboration on the design and method of the study is presented below.

METHOD

Research design

This study dealt with one independent variable (task complexity) across two levels (single task instruction versus dual task instruction, that is, \pm single task dimension of task complexity within Robinson's Triadic Componential Framework) and one dependent

variable (reading comprehension). And the proficiency level of the participants was treated as a control variable; the design of the study is experimental.

Participants

The earlier subjects of this study constituted 111 male and female students majoring in English as a foreign language at the University of Zanjan, Iran. Of these, 60 students at the Intermediate level of language proficiency were selected as the participants and then divided into three groups based on the procedure described below.

Instruments

The Nelson English Language Test

The Nelson English Language Test which consisted of 50 multiple-choice items was used to assess the subjects' English language proficiency level. Cronbach's alpha for the reliability of the test was calculated at 0.83, which is indicative of a high internal consistency of the test items.

Vocabulary and Reading Comprehension Tests

The reading comprehension test was taken from IELTS and consisted of thirteen items. The reading text included 825 words. The Cronbach's alpha for the test was 0.79.

The participants were given the researcher-made validated receptive and productive vocabulary tests which were taken from reading text. The productive vocabulary (i.e. words people use) test consisted of translation and fill-in-the-gap items, in which students had to supply an English translation. The receptive vocabulary (i.e. words people understand) test consisted of receptive recall and receptive recognition items. The receptive recall test was a translation test in which the target words were offered in isolation and in sentences as they had occurred in the text. The recognition test was matching test in which the word form had to be matched with its English definition. The Cronbach's alpha for the vocabulary test was calculated at 0.77

Procedure

In order to select the required participants, the researcher administered the Nelson Test to 111 students described above. Then, those who scored one standard deviation above and one standard deviation below the mean score were selected as the participants whose language proficiency level was labeled as the Intermediate. Thus, 60 subjects out of 111 qualified as the participants who entered the study. The participants were randomly divided into three groups, each consisting of 20 subjects.

The first group received only a reading task instruction, i.e. the participants in this group had to read the text knowing that they would be tested on reading comprehension test (single task instruction). The second group members were told that they had to read the text and then attempt both the vocabulary and reading comprehension tests (dual task

instruction). The third group was the control group who had to read the text as well as to attempt the reading comprehension and vocabulary tests. The difference between the second group and the third group lay in the fact that the latter was not treated with task instruction, i.e., they were not task-instructed before attempting the tests. Each group was given a time limit of 15 minutes to do the assigned task.

The participants of the first group took the reading comprehension test. The members of the second and control groups took all the tests namely vocabulary tests as well as the reading comprehension test. They had to complete the vocabulary test, first the productive vocabulary test and then the receptive vocabulary test. After the vocabulary tests, they took the reading comprehension test.

RESULTS

The present study tested the following hypothesis: Iranian EFL learners who receive single task instruction will do better on the reading comprehension test than those who receive dual task instruction, i.e. text comprehension and vocabulary.

To compare the performance of the participants on the Reading Comprehension Test in the groups 1, 2 and 3, a one-way ANOVA analysis was conducted. The results revealed significant differences among the mean scores at $P < .05$ level [$F(2, 57) = 6.58, P = .003$]. Tables 1 and 2 present the descriptive statistics and ANOVA results for the analysis, respectively.

Table 1. Descriptive statistics for reading comprehension test

Group	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
1	20	8.00	2.176	.487	5	11
2	20	6.20	2.353	.526	1	10
3	20	5.60	1.984	.444	3	9
Total	60					

Group 1 (Single Reading Comprehension Task)

Group 2 (Dual task)

Group 3 (Control group)

Table 2. ANOVA results for performance on reading comprehension test

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	62.400	2	31.200	6.58	.003
Within Groups	270.000	57	4.737		
Total	332.400	59			

In order to find out where the exact differences among groups (1, 2, and 3) lie, a post-hoc comparison of Scheffe test was run. As indicated by Table 3 below, group 1 was significantly different from groups 2 and 3. Group 2 (dual task) did not differ significantly from group 3 (control).

Table 3. Scheffe test results for performance on reading comprehension test

Group	Group	Mean Difference (I-J)	Std. Error	Sig.
1	2	1.800(*)	.688	.040
	4	2.400(*)	.688	.004
2	1	-1.800(*)	.688	.040
	4	.600	.688	.686
3	1	-2.400(*)	.688	.004
	2	-.600	.688	.686

* The mean difference is significant at .05 level.

Group 1 (Single Reading Comprehension Task)

Group 2 (Dual task)

Group 3 (Control group)

DISCUSSION

The main objective of this study was to examine the impact of task complexity in terms of single/dual task on reading comprehension. The researcher tried to control the amount of information processing that L2 learner experiences when performing a dual language learning task. Task complexity was used as basis to carry out task instruction. On the one hand, task instruction is treated in terms of cognitive complexity and in terms of cognitive processing in particular, according to Skehan and Foster's (2001) model and, on the other hand, in terms of the resource-dispersing dimension of task complexity within Robinson's (2001a,2005) Triadic Componential Framework. Task instruction consists of two levels of operations: single versus dual tasks. In Robinson's Triadic Componential Framework, dual tasks are considered as cognitively more complex task than single tasks since performing two tasks at the same time will result in dispersion of students' attentional and memory resources (Robinson, 2005). Skehan and Foster (2001) refer to this explanation in their Limited Attentional Capacity Model. According to Robinson, increasing task complexity along resource-dispersing dimension leads to the worse results.

As the findings of this study revealed, the participants in group 1 (Single Reading Comprehension task) outperformed the participants of groups 2 and 3, regarding reading comprehension. The difference between group 1 (Single Reading Comprehension task) and group 2 and 3 was significant at 0.05 level of significance (See Table 3), so it approved the hypothesis that performing a complex task (Dual Task) affects students' reading comprehension performance negatively. In other words, more demanding tasks disperse students' attention and lead to worse results. This finding is in line with Robinson's Triadic Componential Framework that claims performing two tasks at the same time disperses students' attention and therefore leads to worse results. It also partly agrees with Skehan and Foster's (2001) Limited Attentional Capacity Model (LACM), according to which more demanding tasks deploy more attentional resources. The finding of this study is generally in line with the related findings in the literature reviewed above. More

specifically, the finding here reconfirms the findings reached by Peters (2007), as the main source of inspiration for this study.

CONCLUSION

By comparing the results of the reading comprehension instruction as a single task instruction on the one hand, and both vocabulary and reading comprehension instruction as a dual task instruction on the other hand, one can conclude that when the language learners have to deal with just one task at a time instead of a combination of tasks, they can focus on that specific task better and their attention is drawn toward just that task; therefore, they perform better. As a result, task complexity may lead to more dispersion of attention and hence to worse results on reading comprehension; thus, language teachers should select and sequence tasks so that they can facilitate maximum learning. In effect, it is preferable that teachers at intermediate levels direct their students' attention to just reading comprehension and not disperse their attention by assigning additional tasks.

It is recommended that EFL teachers ask their students to focus on only one aspect of language at a time; this is especially beneficial for the elementary and beginner EFL learners whose memory span is not as good as that of advanced EFL learners. The results of this study indicated that directing student's attention on one aspect of language at a time can make the students less tired and, therefore, increase their reading comprehension ability. This result can also be useful to ESP classes, where the main purpose is to increase the reading comprehension ability of EFL learners. Since language learners encounter samples of reading text in such classes, the finding can be applied to such classes to increase their reading comprehension ability.

Future research should take up a process-oriented approach to exploring task complexity; for example, by conducting post-task interviews, think-aloud protocols and administering questionnaires much can be learned from the underlying cognitive processes. This approach not only makes apparent what learners do when task features are manipulated, but also how learners carry out the task. Only \pm single task instruction was investigated in the present study, with the focus being on attention-dispersing elements; however, there are other components within the Triadic Componential Framework (e.g. \pm few elements, \pm no-reasoning demands, etc) can be explored, with the focus being on the attention-directing elements of this model. The present study investigated the effects of task complexity (dual task) on reading comprehension of intermediate language learners. The same research can be performed with beginner or advanced language learners.

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