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The Effects of Planning Time and the Number of Elements on EFL Learners' Speaking Performance*

Jin-Young Song**
Chung-Ang University
Jin-Hwa Lee
Chung-Ang University

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According to Robinson's Triadic Componential Framework, task complexity is affected by resource-directing factors and resource-dispersing factors, which are claimed to have differential effects on L2 learners' task performance. In order to test this claim, this study investigated Korean middle school students' English speaking performance on a giving-direction task whose complexity was manipulated in terms of [±few elements] (i.e., a resource-directing variable) and [±planning time] (i.e., a resource-dispersing variable). A total of 30 second grade middle school students were divided into three groups and each group performed one of the following three tasks: [+few elements, +planning time] task, [+few elements, -planning time] task, and [-few elements, +planning time] task. The participants' speech output was analyzed in terms of fluency, complexity, and accuracy of English. Their retrospective perception on the task was also examined in order to check whether it is affected by task complexity. The results showed that [-few elements] yielded more accurate and complex language, while [+planning time] led to more fluent language, lending support to Robinson's claim. It was also found that task complexity did not affect the learners' perception on the task. The learners in the groups presented a similar level of positive evaluation on the task.

**[Task-Based Language Teaching (TBLT)/task complexity/planning time/
과제기반교수법/과제복잡도/준비시간]**

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** First author: Jin-Young Song, Corresponding author: Jin-Hwa Lee

I. INTRODUCTION

In designing TBLT lessons, it is an urgent problem for language teachers and curriculum developers to select a certain type of task out of a number of tasks and control it delicately so that it can elicit optimal educational efficacy (M. H. Kim, 2014). This work demands full understanding not only about task types but also about the complexity of the task (Long & Norris, 2000). This is because the complexity of the task affects the learners' L2 output in terms of the fluency, complexity, and accuracy of their interlanguage.

To manipulate task complexity, there needs to be an operational taxonomy that helps to classify factors determining the complexity of a task. Robinson (2011) suggests Triadic Componential Framework (TCF) in attempting to "provide such a taxonomy that can be used across a wide variety of instructional settings" (p. 12). In the TCF, task complexity is affected by two types of cognitive factors: resource-directing and resource-dispersing factors. Resource-directing factors make cognitive and conceptual demands on cognitive resources such as attention and memory in relation to particular language code. On the other hand, resource-dispersing factors make performative and procedural demands without necessarily directing learners' cognitive resources to language code. Robinson argues that to increase task complexity along the two types of factors affects learners' production in different but measurable ways.

Guided by this theoretical framework and motivated by pedagogical purposes to provide guidelines for task design and choice, this study investigated the respective effects of the two cognitive factors on L2 learners' speaking performance. The number of elements to process in a task (i.e., [±few elements]) and the availability of planning time before performing a task (i.e., [±planning time]) were chosen as a resource-directing factor and a resource-dispersing factor, respectively. A speaking task was manipulated in terms of the two factors into three versions, which were administered to Korean middle school students. Their performance was analyzed in terms of fluency, complexity, and accuracy of English. This study addressed the following research questions:

1) Does task complexity affect EFL learners' speaking performance in terms of English fluency, complexity, and accuracy? If so, what are the relative effects of [±few elements] (i.e., a resource-directing factor) and [±planning time] (i.e., a resource-dispersing factor)?
2) Does task complexity affect EFL learners' perception on the task?

II. LITERATURE REVIEW

1. Task Complexity

In L2 learning and teaching, it is important to choose tasks which are appropriate to L2 learners' proficiency. They should be manageable but at the same time not too easy enough to pacify L2 learners' motivation. They should be challenging but not intimidating enough to discourage their participation. Task complexity can guide such a choice of tasks.

The concept of task complexity has often been used interchangeably with the concept of task difficulty. For instance, Brown, Hudson, Norris, & Bonk (1984) claimed that tasks get more difficult when they get more complex. Prabhu (1987) further presented the relative difficulty of different types of tasks. According to him, opinion gap tasks which require logical thinking are more difficult than reasoning tasks, which in turn are more difficult than information gap tasks. He argued that less proficient learners should deal with less difficult tasks such as information gap tasks, while opinion gap tasks are more appropriate for advanced level learners.

In contrast, Robinson (2001a) distinguished task complexity from task difficulty by dividing task characteristics into three categories: task complexity, condition, and difficulty. Table 1 illustrates the three categories and their subcategories.

TABLE 1

Triadic Component Framework (adapted from Robinson, 2011)

Task complexity (cognitive factors)	Task condition (interactive factors)	Task difficulty (learner factors)
a) Resource-directing	a) Participation variables	a) Affective variables
[±few elements]	[±open solution]	[H/L working memory]
[±here-and-now]	[±one way flow]	[H/L reasoning ability]
[±spatial reasoning]	[±convergent solution]	[H/L task-switching]
[±causal reasoning]	[±few participants]	[H/L aptitude]
[±intentional reasoning]	[±few contributions needed]	[H/L field independence]
[±prospective-taking]	[±negotiation not needed]	[H/L mind-reading]
b) Resource-depleting	b) Participant variables	b) Ability variables
[±planning]	[±same proficiency]	[H/L openness]
[±single task]	[±same gender]	[H/L control of emotion]
[±prior knowledge]	[±familiar]	[H/L task motivation]
[±task structure]	[±shared content knowledge]	[H/L processing anxiety]
[±few steps]	[±equal status and role]	[H/L willingness to communicate]
[±independency of steps]	[±shared cultural knowledge]	[H/L self-efficacy]

Task complexity is inherent features of tasks which are determined by cognitive demands which tasks make on attention, memory, and other information processing resources. Since it is imposed by task design and structure, task complexity is relatively

fixed and predictable. Task complexity is affected by two categories of factors: resource-directing and resource-dispersing factors. Resource-directing factors make learners direct their attention and efforts to particular language features. For instance, when a task requires reasoning to solve a problem (i.e., [+reasoning]), learners may need to pay attention to logical connectors to identify relationship between sentences. This task can be considered more complex than a task which simply demands information transfer (i.e., [-reasoning]). Task complexity is also affected by factors which disperse cognitive resources. For instance, when a task should be performed without planning time (i.e., [-planning]), learners have to process various aspects all at a time, which demands greater cognitive resources than a task provided with planning time (i.e., [+planning time]).

Task complexity, although relatively fixed and invariant, is realized in different ways in individual learners' performance. This is because of various factors learners bring to a task such as affective variables (e.g., motivation, anxiety, and confidence) and ability variables (e.g., aptitude, proficiency, and intelligence). Task difficulty concerns how learners with different abilities perceive the demands of tasks.

Finally, task condition refers to the interactive environments where tasks are performed. This is influenced by the direction of information flow or convergence of task goals (i.e., participation variables) or the ways pairs or groups are formed and organized for task performance (i.e., participant variables).

With this distinction between task complexity and difficulty as a basis, Robinson (2001a) argued "most learner factors implicated in decisions about task difficulty can only be diagnosed *in situ* and in process, so cannot be anticipated in advance of implementation of a syllabus" (p. 291). In contrast, he suggested, the dimension of task complexity can be prospectively manipulated by changing task design and structure. This idea has yielded a lot of research on the influence of task complexity on L2 learners' task performance (Brindley, 1987; E. Chun, 2004; Crookes, 1989; Ellis, 1987; Foster & Skehan, 1996; Y. J. Kim, 2009; H. Lee, M. Oh, & Y. Shin, 2007; Mehnert, 1998; Michel, Kuiken, & Vedder, 2007; M. Oh & H. Lee, 2012; Ortega, 1999; Robinson, 1995, 2001b, 2003; M. Shin, 2011; Skehan, 1998; Skehan & Foster, 1997; Q. Wang & J. H. Lee, 2014; Wigglesworth, 1997; Yuan & Ellis, 2003).

2. The Effects of Task Complexity on L2 Performance

Skehan (1998) suggests that in selecting or designing tasks, there is a trade-off between cognitive processing and focus on form, which occurs particularly between complexity and accuracy. That is, cognitively less demanding tasks leave learners spare attentional capacity which they can use to focus on form, while cognitively demanding tasks prevent learners from paying attention to language form and content at the same time. Skehan defines the

trade-off effect as "favoring accuracy at the expense of complexity, and vice versa" (p. 167).

Opposing to Skehan's (1998) view, Robinson proposes that complex tasks elicit better L2 production in terms of both accuracy and complexity (2001a, 2003, 2011). According to his Cognition Hypothesis, increasing task complexity promotes learners' accuracy and complexity of L2 production by pushing them to meet greater cognitive demands of tasks. Yet, Robinson predicts differential effects of increasing complexity along resource-directing dimensions and resource-dispersing dimensions: While increased task complexity along resource-dispersing dimensions will result in decrease in fluency, complexity, and accuracy of L2 production, increased task complexity along resource-directing dimensions will lead to decrease only in fluency while promoting complexity and accuracy. It should be noted that Robinson and Skehan are in agreement on the former claim but they disagree upon the latter prediction (Robinson, 2011).

The controversy surrounding the influence of task complexity on L2 production has yielded a number of studies. Among various resource-dispersing factors, the effects of [± planning time] have been most widely investigated. A task without planning time is considered more complex than a task with planning time. Overall, studies have consistently showed that planning time facilitates fluency. L2 learners tended to produce faster speech with reduced amounts of pauses, false starts, repetitions, and hesitations when they were provided with planning time (Foster & Skehan, 1996; Mehnert, 1998; Ortega, 1999; Yuan & Ellis, 2003). Researchers also found that in planned production, L2 learners' performance became lexically, morphologically and syntactically more complex (Crookes, 1989; Foster & Skehan, 1996; Mehnert, 1998; Ortega, 1999; Yuan & Ellis, 2003).

As far as accuracy is concerned, however, the results are less congruent. While Crookes (1989) did not find any significant influence of pre-task planning on accuracy, some researchers reported that planning positively affects L2 learners' accuracy. For instance, Mehnert (1998) investigated the effects of different amounts of planning time on L2 speech performance and found that that accuracy of speech improved under a one-minute planning condition while complexity of speech was significantly higher under a ten-minute planning condition. Ortega (1999) also showed that planning before performing an L2 Spanish speaking task promoted focus on form by facilitating learners' conscious attention to formal and systemic aspects of the language which are needed to accomplish a particular task. Yuan and Ellis (2003) compared the relative effects of pre-task and on-line planning on L2 oral production. The results showed that pre-task planning enhanced grammatical complexity while on-line planning positively influenced accuracy and grammatical complexity. The pre-task planners also produced more fluent and lexically varied language than the on-line planners. Based on the results, the researchers maintained that the participants tended to use the given planning time for content and organization and only

later they tended to focus on accuracy of their output.

The effects of planning time on L2 task performance have been widely investigated by Korean researchers as well. Again, their results were overall inconsistent. H. Lee et al., (2007) showed that [+planning time] enhanced Korean university students' speaking accuracy and fluency in their English narrative task but J. Park (2013) found no significant effects of task planning on Korean EFL learners' composition. To explain why and how task planning affects L2 task performance, Q. Wang and J. H. Lee (2014) further investigated Korean university EFL learners' cognitive processes during pre-task planning and speaking task performance, and their influence on the subsequent task performance. Similar to previous studies, the learners mainly focused on building ideas for the task during pre-task planning and increasing fluency during task performance. Attention to language forms was scarce, and even when some learners were conscious of the importance of accuracy, this did not lead to greater accuracy, indicating that accuracy is less susceptible to attentional control than fluency.

Overall, the previous studies indicate that to allow planning time before task performance may facilitate fluency and complexity in L2 production but its effect on accuracy is still questionable. This means that in order to promote L2 learners' accuracy during task performance, alternative or additional task design features need to be considered. This is why we need to turn to resource-directing factors.

Robinson (2001b) investigated the influence of [±few elements], one of the resource-directing factors, on L2 performance. He developed two versions of a map task by manipulating the number of elements to process. Learners showed lower fluency but greater lexical variety on the task with more elements (i.e., the complex task), as he predicted in his Cognition Hypothesis. However, unlike his prediction, structural complexity and accuracy were not different between the two tasks. More supportive evidence was provided by Michel et al. (2007). They manipulated a task in terms of [±few elements] for the task complexity and [one-way/two-way] for task condition. The results showed that the increased task complexity lowered fluency but improved accuracy in the participants' production. A significant effect was also observed in lexical complexity. Based on the results, the researchers concluded that increasing cognitive demands of a task induced greater accuracy, slightly higher complexity, and lower fluency.

A similar study was conducted by M. Oh (2009) and M. Oh and H. Lee (2012) with Korean EFL learners. It was found that the complex task involving more elements to process triggered more complex language production regardless of task condition. Accuracy, on the other hand, was better in two-way condition, which implies that accuracy was not the effect of task internal complexity but it was the effect of task condition, which is external to task content or complexity. Similar results were obtained by Y. S. Kim (2011) who manipulated task complexity in term of [±few elements], [±here and now] and [±no

reasoning], and investigated their effects on Korean university students' written output. It was shown that task complexity enhanced the participants' fluency only.

Put together, the previous studies on the effects of [±few elements] showed that when learners have to process more elements and thereby utilize greater cognitive resources, their fluency decreased. However, their results on accuracy and complexity manifested inconsistent patterns. This requires more research on the influence of resource-directing factors on L2 production. In addition, given that resource-dispersing factors and resource-directing factors had differential effects on L2 production in the previous studies, it is necessary to investigate their combined effects so as to explore complementary use of the two types of factors in designing tasks.

III. RESEARCH METHOD

1. Participants

The participants were 30 second grade students of a public middle school in Seoul, Korea. All of them received over 80 out of 100 points in their final English grade in the previous semester, and belonged to the top 30% of the second grade students in their school. Their final English grade consisted of mid-term test (30%), final test (30%), participation (5%), listening test (20%), and speaking test (15%). This study intentionally recruited a relatively high level of students because a certain level of English speaking ability was required to perform a map task.

The students were divided into three groups with ten students for each. More detailed information on the participants is presented in Table 2.

TABLE 2

Participants of the Study

		Group A	Group B	Group C
Number		10	10	10
Gender	Male	5	5	5
	Female	5	5	5
English score	*M*	86.35	85.69	87.26
	SD	2.04	2.01	1.83

Each group consisted of five girls and five boys. The mean English scores of the three groups ranged from 85.69 and 87.26. However, according to an ANOVA, this difference was not statistically significant. (F =1.613, p=.218).

2. Tasks and Measures

To elicit L2 learners' speech, this study used a map-based giving-direction task. The participants were asked to provide directions from the starting point to the destination which were marked on a map. The task was presented in one of three versions by manipulating its complexity along [±few elements] (i.e., resource-directing factor) and [±planning time] (i.e., resource-dispersing factor) (Appendix A). The factor of [±few elements] was manipulated by changing the number of the buildings and streets included in a map. The factor of [±planning time] was manipulated by availability of two minutes of pre-task planning time. Various combinations of the two factors yielded three task versions presented in Table 3.[1]

TABLE 3

Three Versions of a Task

	Task A (for Group A)	Task B (for Group B)	Task C (for Group C)
Few elements	+	+	-
Planning time	+	-	+

Task A was presented with a map including relatively a few elements and two minutes of planning time (i.e., [+few elements, +planning time]). The same simple map was used for Task B but without planning time (i.e., [+few elements, -planning time]). Task C used a more complicated map which includes many buildings and streets, and was given two minutes of planning time (i.e., [-few elements, +planning time]). The time limit for completing the speaking task was three minutes for all the groups.

According to Robinsons' TCF, the complexity of Task A is considered the lowest. Cognition Hypothesis further predicts that when compared with Task A, Task B whose complexity was increased along a resource-dispersing dimension will lead to decrease in fluency, complexity and accuracy, while Task C whose complexity was increased along a resource-directing dimension will lead to decrease in fluency but increase in complexity and accuracy.

The participants' perception of the task was also measured by a retrospective questionnaire which consisted of 12 four-point Likert scale items and one open-ended item (Appendix B). Items were regarding difficulty (Q1, Q4, Q6), clarity (Q2, Q5), familiarity (Q7, Q8) of the task, interest in the task (Q9), appropriateness of a speaking time (Q3) and a planning time (Q10), the need of planning (Q11, Q12), and what they did during

[1] The condition of [-few elements, -planning time] was not included in this study because this is the most complex task according to TCF and thus is least likely to be used in L2 classroom.

planning time (Q13).

3. Procedures

Before the main study, a pilot study was conducted with six participants in order to check the appropriateness of task difficulty, time for planning and speech, and materials used in the experiment. It was found that the number of elements in the two versions of maps (i.e., [+few elements] and [-few elements]) was not distinctive enough. Thus, more names of the buildings were added in the complex map for Task C.

The experiment was carried over individually in a quiet room. After listening to a brief explanation about the task, the students received task materials consisting of instructions and a map to refer to. The students in [+planning time] groups (i.e., Groups A and C) were given two minutes of planning time before performing a task, while those in [-planning time] began a task right away. They produced a monologue speech for three minutes, which were all audio-recorded. Immediately after task performance, the questionnaire on the participants' perception of the task was conducted.

4. Data Analysis

The recorded task production was transcribed and analyzed in terms of task completion, fluency, complexity, and accuracy. If a participant was successful in describing how to get to the destination, his or her performance was marked as 'complete'. On the other hand, in case a participant failed to finish the speech, or he or she completed the task but arrived at the wrong destination, his or her performance was marked as 'incomplete.'

Fluency was measured by four aspects: speech rate, the number of pauses, a total pause length, and hesitation phenomena. Speech rate was calculated by counting the number of syllables per 10 seconds while excluding repeated words and fillers. The number of pauses and a total pause length were also counted to see how naturally the participants responded with proper flow. Hesitation phenomena were measured by the number of fillers, false starts, repetitions, and replacements of lexical items.

To measure the *complexity* of the learners' interlanguage, three types of analyses were conducted: type-token ratio, the number of clauses, and the number of prepositional phrases. Type-token ratio counts the total number of different words divided by the total number of words. This study also measured the total number of clauses and the number of prepositional phrases. The latter was particularly chosen based on the finding of the pilot study that the participants rarely produced complicated structures such as subordinate clauses but they used a number of prepositional phrases such as "at the corner."

The measurement of *accuracy* consisted of analyses of three measures: the number of

self-corrections, the percentage of error-free clauses, and the percentage of incomplete clauses. The number of self-corrections was chosen because it indicates the extent to which a learner is oriented towards accuracy (Ellis & Barkhuizen, 2009). The percentage of error-free clauses was calculated by counting the number of error-free clauses divided by the total number of clauses. Incomplete clauses were also counted because they were one of the most frequent errors observed in the pilot study. An example of a learner's speech output and its analysis in terms of fluency, complexity, and accuracy are provided in Appendix C.

To secure the reliability of the analyses, two raters independently analyzed the transcripts of six participants' speech (20% of the data). They agreed on 85% of their analyses. After discussion, some parts of the data were reanalyzed and they reached 100% of agreement. The remaining data were analyzed by the first rater.

The results of language analyses were subjected to a series of ANOVAs in order to check the effects of task complexity on language fluency, complexity, and accuracy. Post-hoc analyses using Scheffé were also conducted whenever needed. SPSS 20.0 was employed for these statistical analyses and an alpha level was set at $p<.05$. The survey questionnaires were analyzed by using Microsoft Office Excel 2007 in order to figure out the tendency of the participants' responses.

IV. RESULTS

All the participants, except one in Group B (given no planning time), succeeded in completing the task in the given time of three minutes. They, regardless of task complexity, could provide directions to the destination to an understandable level. Yet, their fluency, complexity, and accuracy of English were different depending on the task they performed, as shown below.

1. The Effects of Task Complexity on English Fluency

Cognition Hypothesis predicts that increased task complexity would lead to decrease in fluency. If this is right, Group A's fluency should be higher than that of Groups B and C. In measuring fluency of the participants' task production, this study employed four criteria: speech rate, the number of pauses, a total pause length, and hesitation phenomena. Table 4 presents the results of the four fluency measures in the three groups.

In speech rate, Group B showed the lowest speech rate (9.20 syllables per 10 seconds) while Groups A and C showed similarly higher speech rates (13.80 and 14.27, respectively). This means that Group B spoke relatively slowly compared to the other two groups.

The results associated with pauses during speaking showed a similar pattern. Group B made the most frequent (5.60) and the longest (17.10 seconds) pauses among the three groups. Groups A and C made a similar number (3.60 and 3.30 respectively) and length (4.60 and 5.05 seconds respectively) of pauses.

TABLE 4

Three Groups' English Fluency

		Group A	Group B	Group C	*M*
Speech rate (# of syllables/10 seconds)	*M*	13.80	9.20	14.27	12.42
	SD	6.95	5.60	7.87	2.80
# of pauses	*M*	3.60	5.60	3.30	4.17
	SD	3.03	3.40	2.75	1.25
Total pause length	*M*	4.60	17.10	5.05	8.92
	SD	5.40	12.28	3.59	7.09
Hesitation (# of fillers, false starts, repetitions, replacements)	*M*	2.40	4.60	2.10	3.03
	SD	2.63	5.70	1.60	1.37

Hesitation phenomena were measured by the number of fillers, false starts, repetitions and replacements in this study. The most frequent hesitation phenomena observed in the participants' speech were fillers and repetitions, as illustrated in (1).

(1) A9's hesitation phenomena

Uh, firs, go, go straight four blocks, and turn, turn right … um, go, go straight hal, half (0.5) blocks and it, it is (1.0) on your left.

(*Note*. ____: filler; ~~~~: false start; ____: repetition; ( ): pause)

Again, Group B made the highest number of hesitation phenomena (4.60) while Groups A and C showed a similar number of hesitation phenomena (2.40 and 2.10, respectively).

In order to check whether the group differences in Table 4 are statistically significant, an ANOVA was conducted on each fluency measure. The results are presented in Table 5.

TABLE 5

Results of ANOVAs on Three Groups' English Fluency Measures

	df	*SS*	*MS*	*F*	*p*
Speech rate	2	155.593	77.796	1.649	.211
# of pauses	2	31.267	15.633	1.656	.210
Total pause length	2	1009.850	504.925	7.854	.002*
Hesitation	2	37.267	18.633	1.332	.281

* $p<0.05$

A significant difference was observed only in a total pause length (F=7.854, p=.002).

Post-hoc analyses revealed that the difference was from between Group B and the other two groups. There was no significant difference between Groups A and C.

Overall, the results on fluency showed that Group B's fluency was lower than that of Groups A and C. It should be noted that Group B was different from Groups A and C in that they were not given planning time before performing a task. This indicates that [±planning time] affected the participants' fluency. In the absence of planning time, the participants in Group B may have needed to construct content while speaking at the same time and this may have resulted in longer pauses and less fluent speech. In contrast, task complexity manipulated by [±few elements] did not make a significant difference in the participants' fluency, as shown in a similar performance between Groups A and C.

2. The Effects of Task Complexity on English Complexity

Table 6 presents the language complexity of three groups in terms of type-token ratio, the number of clauses, and the number of prepositional phrases. Type-token ratio presents lexical diversity and its higher percentage means more varied use of lexical items. Groups A and C who were given planning time showed higher percentages (65.60% and 63.01% respectively) than Group B (55.80%) who had no planning time.

TABLE 6

Three Groups' English Complexity

		Group A	Group B	Group C	*M*
Type-token ratio (%)	*M*	65.60	55.80	63.01	61.47
	SD	13.95	14.59	13.38	5.08
# of clauses	*M*	5.30	5.80	5.70	5.60
	SD	1.57	1.69	2.06	0.26
# of prepositional phrases	*M*	1.40	0.90	2.70	1.67
	SD	1.07	0.99	1.16	0.93

In terms of the number of clauses, the participants in the three groups performed similarly by producing 5.3, 5.8, and 5.7 clauses, respectively. It suggests that the different levels of task complexity did not affect the number of clauses the participants produced.

The participants in this study rarely produced complicated structures such as subordinate clauses. The only exception was observed in Group C. He made his speech more complex by using subordinate clauses and also showed variety in his use of vocabulary as demonstrated in (2).

(2) C1's use of a subordinate clause

If you will go community center, // go straight one block //… Then you will see city

hospital // the community center is next to the city hospital.
(*Note*. //: end of clauses)

It was prepositional clauses that were more frequently produced by the participants in this study probably due to the nature of the direction-giving task. As shown in (3), prepositional phrases increase language complexity.

(3) C1's use of prepositional phrases
Go straight two blocks **on Long Street** // and you can see the central park **on your left**…
(*Note*. //: end of clauses)

Yet, the number of prepositional phrases was different across the groups. The students in Group C produced the highest number of prepositional phrases (2.70), which was followed by Group A (1.40) and then Group B (0.90).

The results of ANOVAs in Table 7 show that among the three measures of language complexity, only the number of prepositional clauses had a statistically significant difference between the groups (F=7.424, p=0.003).

TABLE 7
Results of ANOVAs on Three Groups' English Complexity Measures

	df	*SS*	*MS*	*F*	*p*
Type-token ratio (%)	2	509.093	254.546	1.302	.288
# of clauses	2	1.400	.700	.220	.804
# of prepositional phrases	2	17.267	8.633	7.424	.003*

* $p<0.05$

It was found from post-hoc analyses that the group difference came from Group C and the other two groups. In other words, the participants in Group C produced significantly more prepositional clauses than the other two groups. Given that Group C was different from Groups A and B in terms of the number of elements to process on the map, this result indicates that increased task complexity by [-few elements] led to increased language complexity, particularly in the use of prepositional clauses. Furthermore, given that there was no significant difference between Groups A and B, the availability of planning time seems to play little role on English complexity.

3. The Effects of Task Complexity on English Accuracy

Table 8 shows the descriptive statistics of three measures of language accuracy: the

number of self-corrections, the percentage of error-free clauses, and the percentage of incomplete clauses. Self-correction was made by only a few participants: one in Group A, three in Group B, and one in Group C. Regardless of task complexity, the participants in this study either did not or simply could not correct errors by themselves.

When it comes to the error-free clauses, Group C showed a notably high percentage, compared to the other two groups. Their percentage of error-free clauses was 80.54% and this means that Group C mostly used grammatical clauses. In contrast, Groups A and B showed 45.80% and 58% of accuracy in the use of clauses.

TABLE 8

Three Groups' English Accuracy

		Group A	Group B	Group C	*M*
# of self-corrections	*M*	0.10	0.30	0.10	0.17
	SD	0.32	0.48	0.32	0.12
% of error-free clauses	*M*	45.80	58.00	80.54	61.45
	SD	25.89	30.34	21.88	17.62
% of incomplete clauses	*M*	28.10	23.10	18.02	23.07
	SD	22.17	34.49	21.66	5.04

The percentage of incomplete clauses showed the reverse pattern of the percentage of error-free clauses. Group C that made the most error-free clauses contained the least number of incomplete clauses while Group A that made the least error-free clauses produced the highest percentage of incomplete clauses, as in (4).

(4) A6's incomplete clauses
… go straight, **at the**, // it's on your left.
(*Note*. //: end of clauses)

According to ANOVAs, the observed group differences were statistically significant only in the percentage of error-free clauses, as shown in Table 9.

TABLE 9

Results of ANOVAs on Three Groups' English Accuracy Measures

	df	*SS*	*MS*	*F*	*p*
# of self-corrections	2	.267	.133	.923	.409
% of error-free clauses	2	6205.925	3102.962	4.497	.021*
% of incomplete clauses	2	512.075	256.037	.357	.703

** $p<0.05$*

Post-hoc analyses on the percentage of error-free clauses showed that only the difference

between Groups A and C was significant (p=.023). This means that Group C used significantly more error-free clauses than Group A. It should be noted that the tasks presented to the two groups were different in terms of the amount of elements to process. Thus, it can be concluded that increased task complexity by [-few elements] resulted in the reduced errors in the learners' speaking production. At the same time, it should be noted that there was no significant difference between Groups B and C. This seems to suggest that the lack of planning time in Group B contributed to increase in language accuracy to some degree, which may have canceled the significance of its difference from Group C.

4. Learners' Perception on the Task

Table 10 presents the results of the three groups' responses to the retrospective questionnaire on the task they performed.

TABLE 10

Participants' Perception on the Task

Categories	Group A	Group B	Group C	*M*
Difficulty of the task (Q1, Q4, Q6)	2.9	3.0	2.9	2.9
Clarity of the task (Q2, Q5)	3.6	3.4	3.5	3.5
Appropriateness of a speaking time (Q3)	3.4	3.7	3.7	3.6
Appropriateness of a planning time (Q10)	3.8	N/A	3.5	3.7
Familiarity of the task (Q7, Q8)	3.4	3.3	3.4	3.4
Interest in the task (Q9)	3.0	3.0	3.3	3.1
Need of planning time (Q11, Q12)	3.3	N/A	3.3	3.3

The mean score for each category ranged from 2.9 to 3.7 out of 4, which means that the participants were overall positive on the characteristics of the task including its difficulty, clarity, familiarity, and interest, and appropriateness and necessity of a planning time. Furthermore, no prominent differences were found among the three groups. The mean differences between the groups were only 0.05 to 0.3. This indicates that the learners' perception of the task was not responsive to the task complexity. Even when they performed a more complex task, their perception on the task was not more negative than that of the other groups who performed less complex tasks.

A further question was asked of Groups A and C on what they did during planning time. Regardless of group, the students tended to consider providing precise information on the route most important. Only after they spent time deciding what to say, they started to consider how to say focusing on the linguistic features including vocabulary and language structures.

V. DISCUSSION AND CONCLUSION

This study was set out to explore the effects of task complexity on L2 learners' fluency, complexity, and accuracy in speech production. In particular, guided by Robinson's (2001a) TCF and Cognition Hypothesis, this study investigated the respective effects of [±few elements] (i.e., a resource-directing variable) and [±planning time] (i.e., a resource-dispersing variable) on Korean middle school students' giving-direction task performance. The findings of this study are as follows.

First of all, this study confirmed that task complexity affects L2 learners' speech production, as argued by L2 researchers (Robinson, 2001a, 2011; Skehan, 1998). Yet, its effect was different across fluency, complexity, and accuracy. In terms of language fluency, Group B that performed the task with [+few elements, -planning time] showed less fluent speech with longer pauses than the other two groups that had two minutes of pre-task planning time, while there was no significant difference between Groups A and C. On the other hand, as far as language complexity is concerned, Group C that dealt with [-few elements, +planning time] task produced significantly more prepositional phrases than the other two groups that performed [+few elements] task. A similar pattern was observed in language accuracy as well. Group C's use of error-free clauses was significantly higher than that of Group A, although not better than that of Group B.

These results shed lights on the second research question on the respective effects of a resource-directing variable and a resource-directing variable. In this study, [±planning time] (i.e., a resource-dispersing factor) affected L2 learners' fluency. In Group B, the lack of planning time increased task complexity, which in turn resulted in longer pauses and decrease in fluency. This is in line with previous findings on the effect of planning time on L2 performance (Foster & Skehan, 1996; Mehnert, 1998; Ortega, 1999; Yuan & Ellis, 2003). They consistently reported that to provide L2 learners with planning time facilitates L2 fluency, although they were more controversial over the effects of planning time on complexity or accuracy. Indeed, this result is somewhat predictable. When L2 learners are allowed time to plan before performing a task, they can construct content to talk about and linguistic features to realize the content in advance. This is exactly what L2 learners in previous studies (S. Park, 2009; Q. Wang & J. H. Lee, 2014) and the participants in this study reported they did during planning time. In contrast, when L2 learners are not given planning time, they have to build content and search for linguistic forms such as lexical items and sentence structures while speaking at the same time. Naturally, they need more frequent and longer pauses with more hesitation phenomena.

Another interesting finding in this study is that despite its negative effect on L2 fluency, [-planning time] in Task B facilitated language accuracy to some degree. Group B's accuracy was not significantly higher than that of Group A that performed the least

complex task, but at the same time it was not significantly lower than that of Group C that performed another complex task involving [-few elements]. This is rather surprising given that the learners in Group B had to figure out content and form at the same time while speaking. However, a similar finding has been reported in previous studies. For instance, Ortega (1999) found that advanced-level L2 Spanish learners showed higher accuracy in the use of the noun-modifier agreement when they were provided with planning time.

It should be noted, however, that L2 accuracy was more strongly affected by [-few elements] (i.e., a resource-directing factor) than [-planning time]. A significant difference in the use of error-free clauses was obtained only between Group C performing [-few elements, +planning time] task and Group A performing [+few elements, +planning time] task. The effect of [±few elements] was also evident in language complexity. Group C made significantly more prepositional phrases than the other two groups that performed [+few elements] task. Put together, these results suggest that increased task complexity by [-few elements] facilitated accuracy and complexity in L2 speech. This lends support to Robinson's (2011) claim that the more complex a task is along resource-directing dimensions, the more accurate and complex production learners are likely to make. In the process of dealing with more complex tasks which require more focused attention to language features, L2 learners may use more cognitive resources, which may in turn promote L2 complexity and accuracy, as shown in this study. On the other hand, Skehan's (1998) claim on a trade-off between accuracy and complexity was not born out in this study. Group C showed better performance in both complexity and accuracy than Group A.

To summarize, the results of this study show that two different variables of task complexity affect different parts of L2 learners' interlanguage. While a resource-dispersing factor affects L2 fluency, a resource-directing factor has significant effects on L2 complexity and accuracy.

Finally, L2 learners' retrospective perception on the task was not different depending on task complexity. The learners in all the three groups perceived their task just appropriate in terms of difficulty, clarity, familiarity, interest and speaking time. Notable is that the learners in Groups B and C who performed a more complex task than Group A still showed equally positive perception on their task. Pedagogically this is quite stimulating because this indicates that we can manipulate task complexity and thereby facilitate learners' interlanguage without necessarily intimidating the learners.

When implementing TBLT in L2 teaching, it is highly important to understand characteristics of a task and their influence on L2 performance to be able to design and choose suitable types of task for a target population. On this matter, the findings of this study can make a significant contribution. Given that [±planning time] and [±few elements] have differential effects on L2 learners' interlanguage, material developers and teachers need to choose appropriate variables in manipulating task complexity to the level

and goal of L2 learners. If the focus of a class is on promoting learners' accuracy and complexity, it is advisable to increase task complexity by adding more elements to process. In case a class aims to increase learners' fluency in L2, it would be more effective to allow planning time before performing a task.

This study still contains some limitations. It investigated only one variable in each category determining task complexity and thus it is not yet adequate to generalize the effects of the two variables to all resource-dispersing and resource-directing variables. This limitation derives some suggestions for future studies. In order to strengthen the claims of the study it is necessary to investigate the effects of other variables affecting task complexity such as [±single task] along resource-dispersing dimensions and [±here and now] along resource-directing dimensions.

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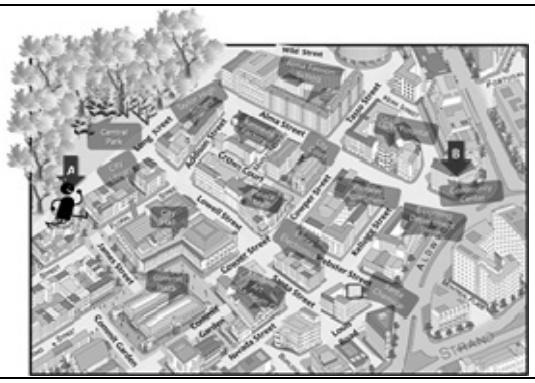
APPENDIX

A. Three Versions of a Speaking Task

<table>
<tr><td><Task A>
Please tell me how to get to the Community Center. You have 2 minutes to prepare and plan for your speech and 3 minutes to speak.</td><td rowspan="2">  </td></tr>
<tr><td><Task B>
Please tell me how to get to the Community Center. You have 3 minutes to speak.</td></tr>
<tr><td><Task C>
Please tell me how to get to the Community Center. You have 2 minutes to prepare and plan for your speech and 3 minutes to speak. You have to mention the names of streets and buildings more than once</td><td>  </td></tr>
</table>

B. Questionnaires on the Task

* Following questions are about today's speaking activity. Circle your opinion. (1- Strongly disagree / 2- disagree / 3- agree / 4- strongly agree)	
1. The speaking activity was easy.	1 2 3 4
2. The map was clear enough to distinguish.	1 2 3 4
3. The given time for speaking was enough.	1 2 3 4
4. I didn't hesitate while speaking.	1 2 3 4
5. I could easily recognize the map.	1 2 3 4
6. I do not know all the words that I needed.	1 2 3 4
7. I have learned how to read maps in English before.	1 2 3 4
8. I have done a similar type of speaking activity.	1 2 3 4
9. The speaking activity was interesting.	1 2 3 4
10. The given planning time was enough.	1 2 3 4
11. I think the planning time was necessary.	1 2 3 4
12. It might be more difficult to say if there was no planning time.	1 2 3 4
13. I _____ during the planning time.	

C. A Learner's Speech Sample and Data Analysis

Uh… (2.0) you go Emerson street (2.0), and (3.0), turn, turn left, and, and, (19.0) ah, turn left at the corner Eco[wrong] *street, and turn right (2.0) at Bryant street, (1.0) go straight, (1.0) and, turn left, and Seal*[wrong]*, (5.0) what is this, (87.0) you go Emers, Emerson street and turn left and go straight, (4.0) go straight four block and turn right at the corner, you, (1.0) you can, you go Webster, Webster street, (1.0) uh, (4.0) and turn left at the corner and (2.0) turn right (1.0) at the corner.* (Group A, Student #1)

(1) fluency
speech rate: 4.06 (73 syllables / 180 seconds)
# of pauses: 15
total pause length: 135 secs
# of hesitation phenomena: 10

(2) complexity
type-token ratio: 28.13% (18/64)
# of clauses: 14
# of prepositional phrases: 5

(3) accuracy
# of self-correction: 1
% of error-free clauses: 64.3% (9/14)
% of incomplete clauses: 14.3% (2/14)

Examples in: English
Applicable Languages: English
Applicable Levels: Secondary

Jin-Young Song
Department of English Education
Chung-Ang University
84 Heukseok-ro Dongjak-gu Seoul
Tel: 010-2426-1072
Email: jsong.elt@gmail.com

Jin-Hwa Lee
Department of English Education
Chung-Ang University
84 Heukseok-ro Dongjak-gu Seoul
Tel: (02) 820-5400
Email: jinhlee@cau.ac.kr

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