

ORIGINAL ARTICLE

Open Access



The effects of planning time on complexity, accuracy, fluency, and lexical variety in L2 descriptive writing

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Abstract

This study investigates the effects of pre-task planning and online planning on L2 writing production (complexity, accuracy, fluency, and lexical variety). Seventy-eight intermediate EFL learners were randomly divided into three groups ($n^{1/3}$ 26): pre-task planning, online planning, and no planning. Participants were required to write a description elicited through a pictorial task. Analysis of the descriptions and the results of a series of one-way ANOVA showed that the participants who completed the task under the pre-task planning condition composed more fluent texts. However, those who conducted the task under the no planning condition wrote more lexically varied texts. In addition, the participants who completed the task under the online planning condition outperformed those who worked with the task under the pre-task planning condition in the case of lexical variety. This study proposes the trade-off effect between fluency and lexical variety. The findings also reveal that choosing suitable task-based implementational conditions can help L2 writers improve the complexity, accuracy, fluency, and lexical variety of their textual products. Finally, the implementational conditions for pre-task and online planning should be equally available for L2 writers if they want to present their actual output.

Keywords: Pre-task planning, Online planning, Complexity, Accuracy, Fluency, Lexical variety

Introduction

In recent years there has been increasing interest in examining differential effects of planning time conditions on complexity, accuracy, and fluency (henceforth CAF) in English as a second language (ESL)/English as a foreign language (EFL) contexts. Previous research has revealed that the impact of task design features (e.g. structured, less structured, and unstructured tasks) and implementational conditions (e.g. planning time conditions) induces second language (L2) learners to direct their attention to different dimensions of language performance (Ellis and Yuan, 2004; Tavakoli and Skehan, 2005; Markee and Kunitz, 2013; Ong, 2014; Ahmadian, Tavakoli, and Vahid Dastjerdi, 2015). Although extensive studies have investigated the nature and effects of task design features and implementational conditions on the CAF triad, there are still inconsistent findings. In particular, planning time for L2 writing is often perceived to have different influences on its product (Ellis, 2009; Ahmadian, Tavakoli, and Vahid

Dastjerdi, 2015). The present study seeks to provide deeper insights into the differential effects of planning time conditions (pre-task and online planning) on L2 descriptive writing. Moreover, it aims to shed some light on the growing discourse of whether and to what extent pre-task and online planning influence the product of a writing task. More importantly, due to the importance of lexis in input and output (Maftoon and Sharif Haratmeh, 2013), this study considers lexical variety an independent dimension of writing performance rather than evaluate it as a sub-dimension of complexity. Additionally, the issue of modality, which is considered an indispensable component of task performance, has garnered little attention in task-based planning studies. A plethora of literature exists investigating the effects of planning time conditions on the CAF triad in speaking tasks and supporting their effects on different dimensions of language performance (Ortega, 1999; Skehan and Foster, 1999; Yuan and Ellis, 2003; Ahmadian and Tavakoli, 2011). However, a paucity of literature exists regarding the influences of planning time conditions on complexity, accuracy and fluency in writing tasks, particularly in an EFL context. This study strives to address the current gaps in planning research by exploring how pre-task and online planning might influence intermediate EFL learners' textual performance as measured along the dimensions of complexity, accuracy, fluency, and lexical variety.

Theoretical framework

A growing body of research has explored the influences of planning time conditions on L2 performance (Foster and Skehan, 1996; Skehan and Foster, 1997, 1999; Wendel, 1997; Mehnert, 1998; Skehan, 1998a, 2009; Ortega, 1999; Yuan and Ellis, 2003; Ellis and Yuan, 2004; Sangarun, 2005; Tavakoli and Skehan, 2005; Ellis, 2005, 2009; Gilabert, 2007; Ahmadian, 2012; Markee and Kunitz, 2013; Ong, 2014). These studies show that when students are afforded the opportunity to formulate their ideas and have some forethought and preparation, they can direct their attention to fluency and complexity and show an improvement on these two dimensions of language performance. The studies also reveal that when students plan a task in advance, they channel their attention to form a conceptual plan of what they intend to compose rather than formulate a linguistic plan in detail. However, inconsistent findings have been reported for accuracy. Whereas Ellis (1987) found pre-task planning contributed to more accurate production of the past tense of English regular verbs in oral narrations; Wendel (1997) did not find any significant effect on accuracy in Japanese EFL students' narrative output. Moreover, Ortega (1999) reported that pre-task planning ameliorated the complex use of noun modifiers but it did not improve accuracy in the use of articles in Spanish. In general, the studies indicate that pre-task planning enables students to have some forethought and effectively utilize their attentional resources. This type of planning results in an improvement of fluency and complexity, however, it does not necessarily have a positive influence on accurate language use.

Although extensive research has examined the effects of pre-task planning on the CAF triad, limited research has considered the effects of online planning. Online planning, as suits the name, points to learners using the time available while carrying out the task "to regroup and to plan on the fly" (Skehan, 2007:57). It provides learners with sufficient time to do mental work on their performance conceptually and/or formally while performing a task (Ahmadian et al., 2015). Online planning encourages learners

to plan their oral or written discourse within the task performance. It can be further divided into 'pressured' and 'careful'. Pressured online planning concerns task performers completing the task within a designated span of time, whereas careful online planning deals with those performers who have sufficient time at their disposal for task performance, and thus, might carefully revise their written output 'online'. Butterworth (1980:159) also posited that "online planning include both macro- and micro- planning, the former dealing with long range semantic organization of a sizable chunk of speech and the latter concerning with purely local functions, like marking clause boundaries and selecting words." Unlike pre-task planning, which essentially requires consciousness, online planning usually happens subconsciously. Foster (1999) asserted that when students are provided with the opportunity to perform a task with little mental preparedness, they carefully formulate the message and monitor their production. Therefore, it appears to result in greater accuracy.

Many task-based planning studies implicitly or explicitly rely on some basic principles of information processing theory. Huitt (2003) states that many cognitive psychologists agree with some fundamental principles within the information processing theory. One of the principles deals with the assumption that individuals possess limited attentional capacity whereby the amount of information they are able to attend to at a certain point in time is limited in critical ways. According to this assumption, "when there are two or more mental activities that need focal attention, it is not possible to allocate equal attentional resources to all of them simultaneously" (Ahmadian et al., 2015). This assumption provides a strong ground for the Trade-off Hypothesis, which leads our predictions in regards to the results of manipulating implementational variables and task design characteristics (Skehan, 1998b, 2009b; Foster and Skehan, 1996). According to the Trade-off Hypothesis, when task performers are carrying out a task, they cannot concurrently attend to all dimensions of language performance— complexity, accuracy, and fluency and that "committing attention to one area, other things being equal, might cause lower performance in others' (Skehan, 2009b:511), unless task performers are supported by manipulating implementational conditions (e.g. the planning time available) or task design characteristics. Ellis (2005) stated that L2 performance is frequently regulated by demands which are competing for attention such that directing attention to one dimension of language performance will be at the expense of another. Although Foster and Skehan (1996) found the trade-off effect between accuracy and complexity, Wendel (1997) saw it between fluency and accuracy. In another investigative attempt, Yuan and Ellis (2003) examined the impacts of planning time conditions on the complexity, accuracy and fluency of L2 learners' oral production. They divided Chinese students of English into three groups and asked them to tell a story based on a series of pictures under three planning conditions. They reported that pre-task planning contributed to both complexity and accuracy, whereas online planning encouraged L2 learners to use a repertoire of their grammatical structures and compose more accurate texts. Yuan and Ellis (2003) also discussed that these planning conditions did not improve fluency and lexical variety. They concluded the trade-off effect was located between fluency and accuracy that corroborated Wendel's (1997) finding, but their results contradicted Skehan and Fosters' (1997) finding, which saw it between accuracy and complexity.

So far, many task-based planning studies have examined the trade-off effect in regards to the CAF triad, however, the lexical area has not been well served. According to

Skehan (2009a), lexis is normally considered one of the main omissions in performance measures of tasks. This important dimension has been assessed neither systematically nor extensively although very few studies to date have tried to incorporate its assessment (Foster and Skehan, 1996; Mehnert, 1998; Robinson, 2001). Skehan (2009b:514) states, “lexis represents a form of complexity that has to be assessed in second language performance if any sort of complete picture is to be achieved.” However, the issue of considering lexis an independent area of language performance or incorporating it into complexity as a sub-dimension is still unresolved.

A large number of studies have examined lexis as a sub-dimension of complexity, but Skehan (2009b) argues there is an intriguing contrast in the connection between lexical sophistication and structural complexity for native and non-native speakers. He further adds, “for native speakers, indeed, complexity may be more unidimensional in that lexical complexity and structural complexity go hand in hand, but for non-native speakers, the two areas do not seem to be integrated so well” (2009b:528). Since there is the contrast in correlation between lexical sophistication and structural complexity for non-native speakers, the present study separates lexis from complexity and considers it a separate dimension of language performance. Lexis is normally assessed by two common measures which are frequently used in the task-based studies: 1) lexical density; and 2) lexical variety. According to Malvern and Richards (2002), the main problem of lexical density is that it is mainly affected by “text length (at least for the sort of text lengths typical in task-based performances) with a negative correlation between text length and type-token ratio of around 0.75” (Skehan and Foster, 2008:10–11). Instead, lexical variety measured by Mean-Segmental Type-Token Ratio (MSTTR) is used to handle this problem and show a measure of lexical density revised for text length.

Taking lexical variety into account as a separate dimension of language performance, it is hard to predict how it competes with other three dimensions of language performance— complexity, accuracy, and fluency in L2 writing. Thus, following the Trade-off Hypothesis, this study tries to fill in the gap by examining lexical variety as a competing dimension of writing performance along with complexity, accuracy, and fluency.

The current study

In light of the foregoing theoretical and empirical discussions, the researcher hypothesizes that opportunity for the provision of planning a task in advance will contribute to developing writing processes, particularly organization and text planning. Hence, students who have sufficient time for pre-task planning are anticipated to show an improvement on fluency and also on complexity. However, pre-task planning is less likely to aid other processes of writing such as formulation, monitoring and revising. As a result, it may have minor effects on accuracy and lexical variety. By contrast, the opportunity for online (within-task) planning will contribute to the formulating, monitoring and revising processes and it is more likely to prioritize accuracy over fluency and complexity. Moreover, due to providing ample time to plan the task, online planning might benefit lexical variety more than pre-task planning. Considering these hypotheses, this study aims to address the following question: What are the effects of

pre-task planning and online planning on complexity, accuracy, fluency, and lexical variety of L2 written performance?

Methods

Design

This study is a single factor between-subjects design. In between-subjects experimental design, the researcher focused on planning time with three conditions: pre-task planning, online planning, and no planning. The participants were randomly divided into three intact groups of equal size such that each group was exposed to one of these conditions. Ninety-three EFL participants were administered a pre-test to ensure participants in the three planning conditions were homogenous in their English proficiency at the outset of the study. The participants in each condition composed descriptive texts via a pictorial task. Their writings were then graded and analysed in terms of complexity, accuracy, fluency, and lexical variety.

Participants

Participants for the present study consisted of 93 undergraduates (35 males and 58 females) who studied English at a university in Iran. Their ages ranged from 20 to 22 years old. The final number of the participants who were allowed to participate in the treatment were 78 students (29 men and 49 women). They were selected for the treatment based on their scores in a standardized English proficiency test. Their scores on the two sections of the proficiency test ranged from 450 to 550 and the writing scores were beyond 3.5. This screening allowed the researcher to have the participants who were homogenous regarding their overall English proficiency. Afterwards, they were randomly placed into three planning groups involving 26 students apiece. In group 1, they were required to perform the descriptive task under the no planning condition (NP). In group 2, they were asked to carry out the descriptive task under the pre-task planning (PTP). In group 3, they were requested to do the descriptive task under the online planning condition (OLP). The gender dynamics of each group were as follows: The no planning group was comprised of 14 males and 12 females, the pre-task planning group was made up of 13 males and 13 females, and the online planning group consisted of 11 males and 15 females.

Pre-test material

The pre-test material was a version of the TOEFL PBT test (adopted from Longman preparation course for the TOEFL test, Phillips, 2004). It consisted of two central sections (structure and written expression and reading comprehension) plus the TWE writing test. The writing section was rated by two native English-speaking evaluators who were proficient at teaching English to non-native speakers at university. They corrected the writings on the basis of the rating scales proposed for intermediate students in Heaton (1990). Inter-rater reliability calculated for each group was beyond .93. Regarding the first two sections, the differences between the sums of test scores for the three planning groups did not reach any significance, which suggests that their English proficiency level was the same (see Table 1).

Table 1 Means and SD for three planning groups along with ANOVA results

	N	Mean	Std. Deviation	ANOVA	Df	Mean square	F	Sig.
No planning	31	39.5897	16.3477					
Pre-task planning	31	39.6053	14.7273	Between Groups	2	2.343	.010	.990
Online planning	31	40.0263	15.3455	Within Groups	90	240.120		
Total	93	39.7391	15.3606	Total	92			

Task

Participants were required to inspect a picture showing a big living room with some furniture and compose a detailed description in English (see Appendix). They were asked to describe in writing what they could see in the picture. Before the participants started writing their texts, some instructions were given in Persian to raise their understanding of the task performance. The picture was utilized as the base for the descriptive task because (a) it could be easily described; (b) it almost lacked culturally-biased points; (c) it showed a spot in which students had already been.

Planning time conditions

Given that the participants in the pre-task planning and no planning conditions had to complete the task within the designated time limit; therefore, a small pilot study was conducted to set the time limit. Twenty-six participants who consisted part of the intended population were randomly selected for the pilot study. They spent between 6 and 10 min to complete a descriptive task. Thus, the researcher decided to set the average time ($M = 8$ min) for the task performance. In the present study, planning time was implemented under three different conditions as follows:

1. No Planning (NP)

In the no planning condition, participants were required to carry out the task after studying the picture for a short duration of time (0.5 min). They were extremely pressured to formulate their ideas and plan their written production. They had to perform the task within the designated time limit as well. Also, to place higher cognitive demands on the part of the participants, they were asked to compose at least 10 sentences to complete the descriptive task within the time limit.

2. Pre-task Planning (PTP)

In this condition, participants were assigned 10 min to prepare for the task and plan their descriptions in advance. Following previously conducted planning studies such as Crookes (1989), Ellis and Yuan (2004), Foster and Skehan (1996), and Wendel (1997), the researcher set the 10-min planning time for the pre-task planning. It is worth mentioning that the duration of planning time in these studies was longer than that of the actual writing time. The participants in this condition were not provided with any guidance for task preparation, however, they were asked to write their notes on separate pieces of paper and these notes were taken away before they began completing the task. The reasons for removing the notes lie in the fact that the language produced within the designated time limit could reflect the actual performance of the participants and also their papers could be used as the data showing how they engaged in the pre-task planning. The notes revealed that 15 out of 26 participants wrote an

outline for the picture, 8 participants noted some words and phrases, and 3 wrote down the first sentence for the picture. In other words, the participants employed the available time in order to plan their descriptions by thinking initially about what they would intend to write and only secondarily how they would wish to write it in English. Similar to the no planning condition, pre-task planners were asked to compose the minimum of 10 sentences within the designated time limit.

3. Online Planning (OLP)

The participants in the online planning condition were given a brief span of time (0.5 min) to look at the picture, but they had as much time as they needed to compose descriptive texts. This ample time allowed them to formulate their ideas and notions, and revise their drafts when performing the task. After the participants completed the task, the researcher recorded the amount of time they used to compose their descriptive texts. This was to ensure that this duration was longer than the elapsed time of pre-task and no planners. Unlike the other two planning conditions, online planners did not feel any pressure to compose at least 10 sentences and had ample time to fulfil the task. Therefore, under the online planning condition participants had almost no time for pre-task planning, but sufficient for online planning. Table 2 depicts the three planning conditions below.

Measurement of the CAF triad and lexical variety

Literature on previously conducted planning research shows that there are different measures to assess the CAF triad and lexical variety. Since the nature of these four dimensions are complex and multidimensional, multiple measures have been used for assessing each dimension of writing performance (Long, 2015). However, using multiple measures does not necessarily provide a true and valid picture of each dimension, but the measures that have been used in different studies should assess different aspects of the dimension in question. Therefore, the following measures were used to assess the four dimensions of L2 written output:

- Complexity measure:
Grammatical complexity: The average T-unit length by counting the number of T-units and dividing them by the total number of words produced.
- Accuracy measure:
Error-free clauses: The percentage of the clauses which were free of errors. All errors which were syntactic, morphological, and lexical were carefully examined.
- Fluency measure:
Number of syllables: The number of syllables within each description, divided by the amount of time used to perform the task and multiplied by 60.

Table 2 Planning time conditions

Planning time conditions		Pre-task planning	Online planning
No planning (NP)	<i>n</i> = 26	<i>0.5 min</i>	<i>Limited</i>
Pre-task planning (PTP)	<i>n</i> = 26	<i>10 min</i>	<i>Limited</i>
Online planning (OLP)	<i>n</i> = 26	<i>0.5 min</i>	<i>Unlimited</i>

N = 78

Table 3 Descriptive statistics and results of ANOVA and Scheffé procedures for time spent on task performance

Independent variables	Means of planning conditions			ANOVA		Location of significance: Scheffé P		
	NP	PTP	OLP	F	P	NP-PTP	NP-OLP	PTP-OLP
Time for task performance	8.00 (2.73)	8.00 (2.73)	12.00 (3.71)	23.94*	.000	1.000	.000	.000

NP No Planning, PTP Pre-task Planning, OLP Online Planning

* $p \leq .05$

- Lexical variety measure:

Mean segmental type-token ratio (MSTTR): Drawing upon the MSTTR introduced by Malvern and Richards (2002), this study measured lexical variety in a way that participants’ descriptions were separated into 40 word segments and the proportion of type tokens in every segment was measured by dividing the sum of different words by the sum of the whole words in the segment.

Data codification

The descriptive writings were segmented and scored based on the measures used for assessing the CAF triad. To make sure the scoring of the written data was conducted reliably, two-thirds of the data were rated by a professional expert colleague. The inter-rater reliability coefficients for all measures were beyond .85 with a mean of .92. The results were subsequently entered into SPSS version 16.0 and calculated utilizing a series of one-way ANOVAs immediately accompanied by post hoc Scheffé’ tests (with the alpha level of .05) where necessary.

Results and discussion

At the beginning, in order to check whether the online planning condition was successfully implemented, the amount of time (minutes) the participants spent on the task was calculated. It was expected that online planners would spend longer time on performing the task as compared to pre-task and no planners and this assumption was confirmed by the descriptive statistics and the results of a one-way ANOVA shown in Table 3.

In the remainder, the present study indicates the results concerning measures of complexity, accuracy, fluency, and lexical variety of L2 written output and considers these results in light of related theoretical and empirical discussions.

Complexity

Tables 4 and 5 present descriptive and inferential statistics for the measure utilized to assess the grammatical complexity of L2 written output. They display that the participants who performed the writing task under the three planning time conditions showed

Table 4 Descriptive analysis for complexity

	NP				PTP				OLP			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
Grammatical complexity	4.6	11.1	8.4	1.5	4.8	17.6	8.4	2.1	4.2	12.1	8.0	1.6
N	26				26				26			

NP No Planning, PTP Pre-task Planning, OLP Online Planning

Table 5 One-way ANOVA for complexity

		Sum of squares	Df	Mean square	F	Sig.
Grammatical complexity	Between groups	3.1	2	1.5	.467	.628
	Within groups	359	90	3.4		
	Total	362.2	92			

almost similar performance in term of grammatical complexity. The participants who completed the descriptive task under the pre-task and no planning conditions produced more complex language than those who carried out the same task under the online planning condition although the differences did not reach significance level. This finding allows us to infer that the complexity of L2 written output is increased by no planning in which learners are pressured to perform the task within the time limit. This result partially disaccords with the predictions made in this study and does not agree with the results of previous planning studies (Ellis and Yuan, 2004; Geng and Ferguson, 2013; Ahmadian et al., 2015); it can be delineated with reference to Skehan’s (1998a) dual system proposal. This argues that under pressured planning time conditions, learners are more likely to utilize their exemplar-based system, which consists of a great deal of available chunks of language and puts lower amounts of cognitive load on the part of learners. In turn, this might result in a reduction in the learners’ productivity and willingness to use newly learned grammatical rules for composing unique sentences. According to Skehan (1998a), the rule-based system contains generative linguistic rules and encourages learners to employ their newly acquired linguistic knowledge, and thus, generate more complex language.

Accuracy

In Tables 6 and 7, the descriptive and inferential statistics show online planners who performed the descriptive task produced more accurate language (M = 14.6) than those who carried it out under the pre-task and no planning conditions (M = 14.4), however, there were no significant differences in accuracy across the three groups. This result suggests online planning improves the accuracy of L2 written output, but this beneficial effect is not so robust that it reaches statistical significance. The participants who performed the descriptive task under the pre-task and no planning conditions had identical performance in accuracy.

This advantage for the online planning condition accentuates the findings of previous studies reviewed in this paper (Foster and Skehan, 1996; Skehan and Foster, 1997; Wendel, 1997; Ellis and Yuan, 2004; Ghavamnia, Tavakoli, and Esteki, 2013, Ahmadian et al., 2015). One reasonable justification to account for the positive influence of online planning on the accuracy of L2 written output is that participants under the online

Table 6 Descriptive analysis for accuracy

	NP				PTP				OLP			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
Descriptive accuracy	1.6	46.0	14.4	9.2	6.5	26.4	14.4	4.8	3.6	60.0	14.6	8.6
Valid N	26				26				26			

NP No Planning, PTP Pre-task Planning, OLP Online Planning

Table 7 One-way ANOVA for accuracy

		Sum of squares	Df	Mean square	F	Sig.
Descriptive accuracy	Between groups	.795	2	.397	.006	.994
	Within groups	6679.4	90	63.6		
	Total	6680.1	92			

planning condition can use their explicit knowledge, and as a result, they are able to show the formulated ideas in the execution stage of written performance. However, participants under the pre-task planning condition are likely to exploit their implicit knowledge of language. This result appears to corroborate Dekeyser’s (2003) argument that when learners are pressured to produce language within a time limit, it would most likely access their implicit knowledge.

Fluency

The results displayed in Tables 8, 9, and 10 concerning the measure of fluency point to significant differences among the three groups. These results reveal that the writing composed by pre-task planners performing the descriptive task is more fluent than those working with the same task under the online and no planning conditions; the difference being statistically significant. In addition, online planners outperformed no planners in terms of fluency, however, the difference between these two groups did not approach significance level.

The results of the present study provide support for the findings of Foster and Skehan (1996), Ellis and Yuan (2004), and Ahmadian et al., (2015) in that it confirms when pre-task planners have more access to processing resources available and allocate their full attention to linking words and expressions to meaning, they are able to compose more fluent texts. In addition, based on Ellis and Yuan’s (2004) argument, it can be stated that pre-task planning favours fluency in two plausible ways: 1) it enables learners to process and plan the text regarding organization and content. The learners who have a clear idea of the type of the text (i.e. descriptive), the identification of the main items, the sequence of the items depicted in the picture, and the organization of the information that should be presented, will find less pressure on working memory within the task; and 2) it might contribute to enhancing L2 learners’ confidence in writing more clearly and efficiently and due to this affective factor, L2 learners might feel less need to involve in extensive monitoring (Ellis and Yuan, 2004). Zimmerman (2000) posited that learners make more revisions when they are writing in their L2 than in their L1; hence, providing pre-task planning might help decrease the number of revisions made in L2 writing. Chenoweth and Hayes (2001) reported that L2 learners with higher proficiency produced more fluent language than less proficient learners;

Table 8 Descriptive analysis for fluency

	NP				PTP				OLP			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
Descriptive fluency	5.2	23.8	15.2	4.6	8.2	36.2	19.2	6.3	4.2	24.2	12.5	4.2
Valid N	26				26				26			

NP No Planning, PTP Pre-task Planning, OLP Online Planning

Table 9 One-way ANOVA for fluency

		Sum of squares	Df	Mean square	F	Sig.
Descriptive fluency	Between Groups	822	2	411	16.277	.000
	Within Groups	2651.4	90	25.2		
	Total	3473.5	92			

thus, pre-task planning might induce L2 learners to compensate for lack of L2 proficiency in the case of fluency.

Lexical variety

In Tables 11, 12, and 13, the descriptive and inferential statistics indicate that under the no planning condition, participants who worked with the descriptive task could produce more lexically varied language than those carrying out the same task under the pre-task and online planning conditions. Differences among the three groups were statistically significant. In addition, online planners had better performance than pre-task planners in the case of lexical variety, but the difference between these two planning groups did not reach statistical significance.

The results of the present study neatly fits with the findings of Ellis and Yuan’s (2004) study in which the two planning groups (i.e. pre-task and online groups) do not improve lexical variety. This might reveal that when L2 learners are granted the opportunity to plan the task in advance, they often switch to prioritizing the quantity of writing composed and the production speed over lexical searches or when they are given an opportunity to plan during the task, some learners give priority to grammatical accuracy and lack sufficient time for lexical searching. Therefore, it can be inferred that lexical variety continues to rise when students are pressured to plan the task immediately and perform it within the designated time limit.

In summary, the results showed that pre-task planning results in greater fluency, but has no marked effects on other three dimensions of L2 textual output—complexity, accuracy, and lexical variety. Online planning, on the other hand, gives rise to improve accuracy and lexical variety, however, the differences are not statistically significant. Rather unexpectedly, no planning creates positive effects on lexical variety and prompts learners to produce language which is lexically varied. Baddeley (1986) found pre-task planning reduces the amount of cognitive load on central executive in working memory and improves the translating process through which the planned text is delivered to verbal schema within the limited time, whereas the opportunity for online planning contributes to formulating, monitoring, and editing internal output prior to composing the text. Therefore, the present study sees the trade-off effect between fluency and lexical variety in that performing a descriptive task under the pre-task

Table 10 Post hoc test for fluency

Dependent variable	(I) Planning condition	(J) Planning condition	Mean (I-J) Difference	Std. error	Sig.
Descriptive fluency	No planning	Pre-task planning	-3.9533	1.2975	.012
	No planning	Online planning	2.7177	1.1695	.072
	Pre-task planning	Online planning	0.6710	1.1695	.000

Table 11 Descriptive analysis for lexical variety

	NP				PTP				OLP			
	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD
Descriptive lexical variety	39.7	85.2	62.9	11.1	25.4	65.9	48.9	10.1	32.3	80.0	58.7	12.4
Valid N	26				26				26			

NP No Planning, PTP Pre-task Planning, OLP Online Planning

planning condition would seem to enable L2 writers to produce language with higher levels of fluency while carrying out the same task under the no planning condition would appear to induce L2 learners to generate language with greater levels of lexical variety.

Conclusion and implications

Over the past decade or so, many second language acquisition (SLA) researchers who involve in psycholinguistic studies have attempted to recognize implementational variables and task design characteristics that might lessen the cognitive load of tasks for L2 learners and direct their attention to various dimensions of language performance in pre-determined ways (Skehan, 1998a). The present study aimed to examine the effects of planning time on the four dimensions of L2 written output—complexity, accuracy, fluency, and lexical variety— in the descriptive task. Unlike other task-based planning studies, this study tried to highlight the key role of modality in L2 planning research and assess lexis as a separate dimension of L2 written output rather than taking it into account as a sub-dimension of complexity or even disregarding it. Skehan (1998a) proposed a three-dimensional performance model rather than the commonly used fluency-accuracy model, however, he did not consider the value of lexical variety an integral dimension of language performance. Skehan (1998a) underestimated the range of lexical items learners are able to use in their oral and written discourse. Therefore, any analysis about the effects of planning time conditions on language performance must be made by pointing to the four dimensions. The researcher proposes an optimal performance model for addressing the issue of language proficiency level: (a) two primary dimensions; fluency and accuracy; and (b) two secondary dimensions; complexity and lexical variety. In this way, evaluations at the intermediate level or lower levels will be made according to the dimensions of fluency and accuracy. Yet, when EFL/ESL learners improve their English proficiency and progress toward upper-intermediate and advanced levels, complexity and lexical variety will come into play and gain the currency. By relying on the results of the present study, teachers can manipulate planning time conditions, sometimes allowing for pre-task planning and sometimes encouraging on-line planning in predictable ways by which L2 learners can present their actual production in a testing situation.

Table 12 One-way ANOVA for lexical variety

		Sum of squares	Df	Mean square	F	Sig.
Descriptive lexical variety	Between groups	3145.7	2	1572.8	11.920	.000
	Within groups	1385.4	90	131.9		
	Total	1700.2	92			

Table 13 Post hoc test for lexical variety

Dependent variable	(I) Planning condition	(J) Planning condition	Mean (I-J) difference	Std. error	Sig.
Descriptive lexical variety	No planning	Pre-task planning	13.9890	2.9660	.000
	No planning	Online planning	4.1855	2.6735	.002
	Pre-task planning	Online planning	-9.8035	2.6735	.298

Since the present study had a quantitative rather than qualitative design, the participants' feelings and perceptions as they were performing the descriptive task were not taken into account. It was the first potential limitation of this study, however, future research can undertake a mixed-methods design to show how participants in different planning time conditions feel about the task and how they take advantage of the planning time (i.e. if they pay attention to the content, form, or organization of the descriptive elements). In addition, given that the cognitive processes of writing are complex, the qualitative analysis of the participants' written output provides strong evidence in favour of interpreting these processes. The second limitation was the measurement of the four dimensions of L2 written output. Since the present study used a specific measure to examine a particular facet of the dimension in question, future planning research can use multiple measures for assessing different facets of the dimension in question. The third limitation was related to the context in which the present study was implemented. This study was conducted with Iranian EFL learners at the intermediate level; hence, the results need to be interpreted with careful caution. The last limitation was carrying out a cross-sectional study over a short period. Needless to say, longitudinal studies can provide deeper insights into how manipulating the planning time conditions might influence L2 written output as measured along the dimensions of complexity, accuracy, fluency, and lexical variety.

Appendix

General instructions (all instructions were given in Persian)

The picture shows a big living room with some furniture. You are asked to describe in English what you see in the picture.

Instructions for each planning group

Group 1: No planning

You have just seen a picture. This picture includes a set of items. Now I would like you to describe this picture in detail in English. Imagine that someone has never seen this picture and this is his or her first time to learn about the items in the picture from you. Please try to describe the picture as detailed as you can. Additionally, you have only 8 min to write at least 10 sentences about the picture. If you want, you can write more than 10 sentences. You can begin like this; "I can see..."

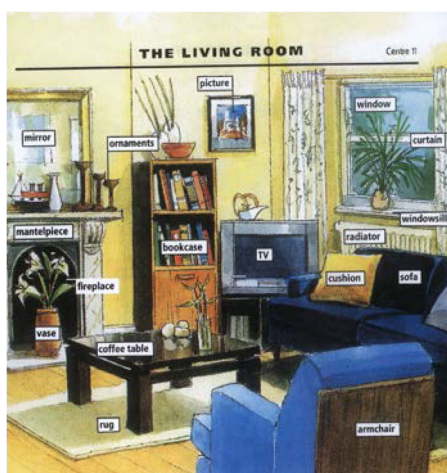
Group 2: Pre-task planning

You have just seen a picture. This picture includes a set of items. Now I would like you to describe this picture in detail in English. Before you begin to write, you have 10 min to plan what you intend to write. Imagine that someone has never seen this picture and this is his or her first time to learn about the items in the picture from you. Please try to describe the picture as detailed as you can. To help you prepare, you are

provided with pieces of paper and a pen to write down your notes. Please do not write a complete sentence either in Persian or in English. You have 8 min to write at least 10 sentences. If you like, you can write more than 10 sentences. You can begin like this; “I can see.....”

Group 3: Online planning

You have just seen a picture. This picture includes a set of items. Now I would like you to describe this picture in detail in English. Imagine that someone has never seen this picture and this is his or her first time to learn about the items in the picture from you. Please try to describe the picture as detailed as you can. You can take as long time as you need while describing the picture. If you write something wrong or something you do not like, you can change and modify them. You can write more than 10 sentences if you like. You can begin like this; “I can see.....”



Competing interests

The author declares that he has no competing interests.

Received: 22 July 2016 Accepted: 7 September 2016

Published online: 21 September 2016

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