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The Effect of Task Complexity on EFL Learners' Narrative Writing Task Performance

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Abstract

This study examined the effects of task complexity on written narrative production under different task complexity conditions by EFL learners at different proficiency levels. Task complexity was manipulated along Robinson's (2001b) proposed task complexity dimension of Here-and-Now (simple) vs. There-and-Then (complex) in. Accordingly, three specific measures of the written narratives were targeted, i.e. complexity, accuracy and fluency (CAF). The findings of the study indicated that with respect to complexity and accuracy, the effects of both task complexity and language proficiency were found significant. More complexity and accuracy were found in the complex task with high-proficiency learners. However, no significant effect of task complexity and language proficiency on fluency was found. The pedagogical implications are discussed with reference to the influence of task complexity and language proficiency on text quality.

Key Words: task, complexity, fluency, accuracy, narrative writing.

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Introduction

A central issue in task-based language learning concerns the influence of task complexity on linguistic performance. Several studies have investigated the effect of task complexity on different aspects of linguistic performance at different levels of L2 proficiency (e.g., Robinson 1995; Robinson 2001; Skehan & Foster 1999; Rahimpour 1997; Yuan & Ellis 2003; Gilabert 2005). Most of these studies have focused, however, on oral proficiency. There have only been few studies that have considered the question of how the complexity of a writing task might influence the quality of the text resulting from this task. In the literature on both L1 and L2 writing, it has been suggested that some task types result in lower test scores than others (Hamp-Lyons & Mathias 1994); however, the relationship between task complexity and writing performance is by no means clear. Task complexity "is the result of the attentional, memory, reasoning, and other information processing demands imposed by the structure of the task on the language learner" (Robinson 2001: 28). One pedagogical challenge is then how teachers, dealing with both task complexity and language proficiency variables, can adjust their online pedagogical interventions. Therefore, developing the empirical knowledge base for this difficult pedagogical decision making is no doubt valuable.

The present study was an attempt to examine the effects of task complexity manipulation and language proficiency level on L2 written task performance. A well-known model of task complexity was put to the test, i.e. the 'Triadic Componential Framework' known as 'Cognition Hypothesis' proposed by Robinson (2001). Cognition hypothesis claims that if dimensions of cognitive task complexity belong to different attentional resource pools (e.g., memory and attention), increases in task complexity along the so-called resource-directing variables (e.g., +/- few elements, +/- Here and Now, +/- reasoning demand) lead to higher complexity and greater accuracy of

learner's output. More specifically, the research tries to examine the extent to which complexity, accuracy, and fluency (CAF) of written output by EFL learners at different proficiency levels are influenced by manipulating the complexity of the task. Accordingly, the effect of manipulating complexity of tasks along the resource-directing variable of +/- Here-and-Now on narrative written production in English was examined. The findings of this study can help us indicate how the three dimensions of production (CAF) compete for attention during L2 task performance across two levels of task complexity (Here-and-Now vs. There-and-Then) and two levels of proficiency (High vs. Low), and their possible interactions simultaneously.

Background

The Limited Attentional Capacity Model vs. the Triadic Componential Framework of Task Complexity

The two most influential models of task complexity are the Limited Attentional Capacity Model (Skehan, 1998; Skehan & Foster 1999, 2001) and Triadic Componential Framework (Robinson 2001a, 2001b, 2003). Notwithstanding their similarities, the models make contrasting predictions about the attentional demands of tasks in relation to linguistic performance.

The basic assumption of the Limited Attentional Capacity Model is that attentional resources are limited and that increasing the complexity of tasks reduces a pool of general available attentional capacity. This notion of limited processing capacity on which the Limited Capacity Model is based, is founded on theories on working memory. As their attentional limits are reached, L2 learners will prioritize processing for meaning over processing language form. Moreover, to attend to one aspect of performance (complexity of language, accuracy, fluency) may well mean that other dimensions suffer and a prioritisation of one aspect will hinder development in the other areas. The major claim of the Limited Attentional Capacity

Model, in sum, is that an increase in cognitive task complexity will make learners pay primary attention to the content of the task. As a consequence, the complexity and accuracy of the linguistic output will decrease. In this model three dimensions of task complexity are distinguished (Skehan 1998, Skehan & Foster 1999, 2001): code complexity, cognitive complexity, and communicative stress. Code complexity is concerned with the linguistic demands of the task. Cognitive complexity refers to task content and the structuring of task material. Communicative stress concerns performance conditions. For Skehan, & Foster (1999, 2001) these three dimensions may influence the ways in which learners' attention during a task is likely to be shared and linguistic performance is affected.

A different view on the effect of cognitive task complexity on linguistic output is held by Robinson (1996, 2001a, 2001b, 2003). Robinson predicts that if dimensions of cognitive task complexity belong to different attentional resource pools, increases in task complexity along the so-called resource-directing variables do not degrade linguistic output, but may lead to higher structural complexity and greater accuracy of learner output. Increasing task complexity along the resource-dispersing dimensions, however, does not facilitate development and acquisition of new L2 form-concept mappings, but simply has the effect of depleting the attention available for the task over many specific linguistic aspects of production (Robinson, 1996: 10). Robinson proposes that increases in the cognitive demands of tasks may direct the learners' attentional resources to language form, and input may be processed more deeply and elaborately. This model distinguishes three dimensions which interact to influence task performance and learning: task complexity, task conditions, and task difficulty. Task complexity, corresponding to Skehan and Foster's cognitive complexity dimension, refers to two types of cognitive task features, resource-directing and resource-dispersing variables, which can be manipulated to increase or lessen the cognitive demands made by a task. Task conditions, comparable to Skehan, & Foster's 'communicative stress' category, include participation variables such

as the nature of the task (open/closed, one-way/two-way, convergent/ divergent) and participant variables (same/different gender, extent of familiarity, power and status). Task difficulty, a dimension which is lacking in the Limited Attentional Capacity Model, comprises learners' perceptions of the demands made by the task and is determined by the abilities (intelligence, working memory, language aptitude) and affective responses (anxiety, motivation, confidence) that learners bring to the task. Both the Limited Attentional Capacity Model and the Triadic Componential Framework distinguish a number of dimensions and variables by which task complexity is determined (see Table 1).

Table 1. *The Limited Attentional Capacity Model vs. the Triadic Componential Framework (adapted from Kuiken & Vedder 2007: 264)*

Limited Attentional Capacity Model	**Triadic Componential Framework**
1. Code complexity • Vocabulary load and variety • Redundancy and density 2. Cognitive complexity *Cognitive familiarity* • Familiarity of topic and its predictability • Familiarity of discourse genre • Familiarity of task *Cognitive processing* • Information organization • Amount of computation • Clarity and sufficiency of information given • Information type 3. Communicative stress • *Time limits and pressure* • *Speed of presentation* • *Number of participants* • *Length of text used* • *Type of response* • *Opportunities to control interaction*	1. Task complexity *Resource-directing* • +/-Few elements • +/- Here-and-Now • +/- No reasoning demands *Resource-dispersing* • +/- Planning • +/- Single task • +/- Prior Knowledge 2. Task conditions *Participation variables, e.g.,* • Open/ closed • One-way/ two-way • Convergent/ divergent *Participant variables, e.g.,* • Same/ different gender • Familiar/ unfamiliar • Power/ solidarity 3. Task difficulty *Affective variables, e.g.,* • Motivation • Anxiety • Confidence *Ability variables, e.g.,* • Working memory • Intelligence • Aptitude

Complexity, Accuracy, Fluency (CAF), and Language Proficiency

Following Wolfe-Quintero, Inagaki, & Kim (1998), Larsen-Freeman (2006) states that most of the measures that have been used in developmental studies consist of intuitive operationalizations of complexity, accuracy and fluency. The underlying assumption is that these indices develop in tandem, i.e. as learners become more proficient, they write more fluently, more accurately and the texts they produce are more grammatically and lexically complex.

Kuiken, Mos and Vedder (2005) manipulated task complexity by varying the number of elements to be considered in a writing task. Specifically, they asked Dutch learners of Italian with high and low proficiency levels to write a recommendation letter to a friend about where to visit for a holiday. Five destination choices were given and the participants were required to choose only one based on a varying number of criteria (i.e., three in the simple and six in the complex task). They examined three categories of L2 production measures: syntactic complexity; lexical variation; accuracy. Their results showed that there were no task complexity effects on lexical and syntactic complexity. In contrast, analyses on accuracy data yielded significant interactions between task complexity and proficiency; namely, greater written accuracy was observed when task complexity and proficiency were both high. The low proficiency group was generally unaffected by varying the degree of task complexity. Similarly, Kuiken & Vedder (2007) conducted a study on L2 proficiency in writing among 84 Dutch university students of Italian and 75 students of French. In their study, task complexity was manipulated along two variables of Robinson's Triadic Componential Framework, the number of elements which have to be taken into account and the reasoning demands posed by the task. Accuracy, syntactic complexity and lexical variation measures were used to analyze linguistic performance. Two writing tasks were assigned to the learners in which cognitive complexity was manipulated. Students were grouped

according to their proficiency level as established by their cloze scores. The Italian and French students were divided into low and high proficiency groups. The participants were required to write a letter to a friend regarding the choice of a holiday destination out of five options. In the letter a varying number of requirements had to be taken into account, six in the complex and three in the non-complex condition. A minimum of 150 words was set as the criterion. They found a main effect for task complexity on lexical errors, i.e. both students of Italian and French produced fewer lexical errors in the complex task. This means that the overall increase of accuracy in the complex condition is mainly due to a decrease of lexical errors. The students of Italian used significantly more high frequent words in the complex task (and hence more infrequent words in the noncomplex task), whereas for the students of French they noticed more infrequent words in the complex task. Further, no interaction effect between task complexity and proficiency level was found.

Kuiken & Vedder (2008) conducted another study similar to their study in 2007 in which 91 Dutch university students of Italian and 76 students of French performed two writing tasks with prompts of differing cognitive complexity. The Italian and French students were divided into low- and high-proficiency groups. Linguistic performance was operationalized in terms of syntactic complexity, lexical variation, and accuracy. The study provided support for the Cognition Hypothesis insofar as the written products of the cognitively more demanding task turned out to be more accurate, with significantly lower error ratios per T-unit than those of the cognitively less demanding task. They concluded that (a) with regard to syntactic complexity and lexical variation, hardly any significant differences were found between the complex and non-complex tasks; (b) no interaction of task type and proficiency level could be observed. This result was in contrast with an earlier finding that the effect of task complexity on accuracy measures was stronger for high-proficiency

learners (Kuiken, Mos & Vedder, 2005); and (c) that manipulation of task complexity affects accuracy but not syntactic complexity and lexical variation.

Moreover, Kawauchi (2005) investigated the effect of strategic planning and language proficiency on L2 oral narrative production by Japanese college students. The participants of her study constituted three different proficiency groups: Low EFL, High EFL, and Advanced ESL. Using a within-subject experimental design, she compared L2 oral narrative production under unplanned and planned conditions. Analyses were conducted using four categories of production measures: accuracy; structural complexity; lexical variation; fluency. The main findings of her study were that regarding structural complexity and lexical variation, High EFL learners received the greatest benefits, whereas Low EFL learners gained the most in accuracy terms.

Further, Ishikawa (2006) examined the effects of task complexity and language proficiency on L2 written narrative production based on the analyses of 52 written narratives produced by Japanese high school students under different task complexity conditions. Both low- and high-proficiency groups were formed in each task complexity condition. That is, to investigate the effects of task complexity and proficiency on written task performance, four modes of production metrics were employed as dependent variables: accuracy, structural complexity, lexical complexity and fluency. The results showed that the low-proficiency learners seemed to receive greater benefits when task complexity was manipulated from HERE and NOW (HN) to THERE and THEN (TT). Of particular significance were the consistent results that the four aspects of the low-proficiency learners' performance in the TT condition were by no means inferior to the high-proficiency learners' in the HN condition. Furthermore, the results of the analysis of target-like use of English articles showed that the low-proficiency learners received approximately doubled benefits

compared to the high-proficiency learners when task complexity was manipulated from HN to TT (approximate growths of 12 % vs. 6 %).

The Study

Research Questions

To achieve the objectives of the study, the following two research questions were posed:

1) Do task complexity and language proficiency have any significant effect on the three measures of complexity, accuracy, and fluency of Iranian EFL learners' written narratives?

2) Does the effect of task complexity on written complexity, accuracy, and fluency differ according to the proficiency level of Iranian EFL learners?

Method

Participants

107 Iranian EFL learners from seven classes took part in the study. They were 38 male and 69 female EFL learners at 'Kish Language Institute' in Kashan (one of the major cities of Iran). They met three days per week, and received English instruction for 90 minutes each session. They took an unseen version of the TOEFL test (2004 edition) which was used to measure the English language proficiency of the participants. Those who scored plus and minus one standard deviation above and below the mean were considered to be of high and low language proficiency levels respectively. Accordingly, 32 participants whose scores were plus one standard deviation above the mean constituted the 'High-proficiency' group (HP), and 36 participants whose scores were minus one standard deviation below the mean constituted the 'Low-proficiency' (LP) group of the study. Then, the participants within each group were randomly divided into two separate groups; one group was required to perform the simple task (HN), and the other group the complex task (TT). The

participants in the LP group were divided into two groups of 18. Also, the 32 participants in HP group were divided into two groups of 16. Each group performed on HN and TT tasks. Finally, after data collection, 64 participants' written outputs qualified for data analysis (see Table 2).

Table 2. The Distribution of the Participants in the Four Groups of the Study

Group 1: HP-HN: 16	**Group 2**: HP-TT: 14
Group 3: LP-HN: 17	**Group 4:** LP-TT: 17

Note: *HP-HN= High Proficiency-Here and Now; HP-TT= High Proficiency-There and Then;*
LP-HN= Low Proficiency-Here and Now; LP-TT= Low Proficiency-There and Then

Instrumentation

Cartoon Picture

To meet the objectives of the study, a kind of cartoon picture was needed. Therefore, initially, three cartoon pictures out of the many cartoon pictures available on the net were selected by the researchers. Then, after discussing these three pictures the cartoon picture 'Dr.Krif' was selected as a suitable one for the participants of the study. This narrative-writing task was chosen for a number of reasons. First, various narrative tasks, particularly with regard to the use of cartoon pictures, have been used in other similar studies of task complexity (e.g., Ellis & Yuan, 2004; Ishikawa, 2006) and thus comparison with the results of these studies would be easier. Second, because written narratives are monologic rather than dialogic, they afford a basis for deriving measures of learner performance that are not influenced by interactional variables. Third, as previous studies indicate (e.g., Skehan & Foster, 1999) a way of ensuring that the task

is reasonably demanding on the participants is to select a picture story that requires interpretation on the part of participants.

In the four experimental groups, the participants were presented with the cartoon picture which was a nine-frame picture story (see Appendix A). The participants were required to write a narrative account for the cartoon picture. The cartoon picture was about a man called 'Dr.Krif' who wanted to become rich in his life. He thought that the best way was to visit many patients. So, one day he decided to use a hammer and a nail to carve some stones and make some balls out of them. He colored them white and black and put them all over the city, in parks, in streets, etc. Next day, he had many patients with broken legs…

In this study, considering the possibility of various interpretations on the part of the participants, two sample prompts, different in their tenses (present vs. past), were provided as a guide for writing the narratives (see Appendix B). The reason for using HN and TT tasks could be traced in Robinson (2005):

Tasks which differ along the Here-and-Now/There-and-Then dimension clearly require the participants to distinguish between the temporality of reference (present versus past), and to use distinct deictic expressions (*this*, *that*, *here*, *there*) to indicate immediately present, versus absent objects. As Cromer (1974) and others have noted, this sequence of conceptual and linguistic development takes place in L1 acquisition of English. Children first make reference to the Here-and-Now [simple] and at a later point to the There-and-Then [complex], and a similar sequence of linguistic development has been observed in L2 acquisition (Robinson, 2005: 5).

Through writing the narrative task, one of the proposed task complexity dimensions "Here-and-Now (HN) (simple)" versus "There-and-Then (TT) (complex)" was operationalized. The participants of the two groups of HP-HN and LP-HN were presented

with a prompt in present tense and the participants of the two groups of HP-TT and LP-TT were presented with a prompt in past tense.

Procedure

The cartoon picture was piloted with a group of 12 EFL learners similar to the participants of the study. Based on the results of piloting (a) words and phrases which were difficult for learners were identified; (b) the minimum number of words was found to be 130, so it was set as the acceptable minimum number of words; and finally (c) the minimum and the maximum time needed for writing the narrative were found to be between 20 to 35 minutes, therefore, an average time of 30 minutes was set for the actual writing session.

The writing stage of the study was conducted at two separate sessions: one session for the HN condition and the other one for TT condition. The participants from both high and low proficiency levels in the HN condition viewed the picture story for five minutes; then, they wrote their narrative accounts in 30 minutes based on a prompt written in the present tense. While writing the narratives, they were allowed to view the picture story.

On the other hand, the 32 participants in the TT condition (from HP and LP groups) were allowed to view the picture story for five minutes before writing. Again, they were asked to write the narrative accounts in 30 minutes, based on a prompt written in the past tense and without viewing the picture story while writing (see Appendix B for the prompts in the HN and TT conditions).

In the current study, the participants' narrative accounts were rated in terms of their CAF. Following Wolfe-Quintero et.al (1998) and Polio's (1997) guidelines (see Appendix C), CAF was operationalized as follows: 1. Complexity: the number of clauses per T-unit; 2. Accuracy: the number of error-free T-units per T-unit; and 3. Fluency: the number of words per T-unit.

After all writings were collected and scored by the researchers, for reliability purposes, a second rater who was an English writing specialist rated the written narrative accounts. Therefore, three scores were obtained by each rater as measures of complexity, accuracy, and fluency, respectively. Pearson Product-Moment Correlation between the scoring of the two raters was found to be .92, .87, and .95 for the measures of complexity, accuracy, and fluency, respectively which showed a high degree of inter-rater reliability. Each participant's final score was calculated by averaging the given scores by the two raters.

Results

To investigate the two research questions of the current study, a Multivariate Analysis of Variance (MANOVA) was conducted. Levene's Test for the Equality of Variances confirmed that the error variances of the dependant variables were equal across groups, thus the performances of the four intended groups of the study were comparable.

Table 4. Leven's Test for the Equality of Error Variances

	F	df1	df2	Sig.
Complexity	1.287	3	60	.287
Accuracy	.121	3	60	.948
Fluency	1.174	3	60	.327

The results for the first research question of the study (i.e. whether task complexity and language proficiency have any significant effect on the measure of complexity of Iranian EFL learners' written narratives) are presented in Tables 5 and 6. The mean performances of the high and low proficiency groups across HN and TT tasks are shown in Table 5.

Table 5. Descriptive Statistics on the Complexity Scores across Task Type and Level

Dependent Variable	Task Type	Lg Proficiency	Mean	Std. Deviation	N
Complexity	Simple (HN)	High	1.59	.36	16
		Low	1.26	.23	17
		Total	1.42	.34	33
	Complex (TT)	High	1.78	.30	14
		Low	1.61	.30	17
		Total	1.69	.30	31
	Total	High	1.68	.34	30
		Low	1.43	.31	34
		Total	1.55	.35	64

Regarding the effect of task complexity on written complexity, the participants of the complex task (There-and-Then) outperformed the participants of the simple task (Here-and-Now), as the former produced more complex narrative texts through writing more clauses per T-unit. With respect to the effect of language proficiency on complexity, it was observed that the high proficiency group produced more complex narrative texts by an increase of 1.5 clauses per T-unit.

Table 6. Performance Comparison on the Complexity across Task Type and Level

Dependent Variable	Independent Variables	Mean Difference (I-J)	Std. Error	Sig.
Complexity	**Task Complexity**			
	complex simple	.273	.076	.001*
	Lg Proficiency	.252	.076	.001*
	high low			

The descriptive statistics on the accuracy measure of the written narratives of the two groups across the two task types are presented in Table 7.

Table 7. Descriptive Statistics on the Accuracy Scores across Task Type and Level

Dependent Variable	Task Type	Lg Proficiency	Mean	Std. Deviation	N
Accuracy	Simple (HN)	High	.54	.17	16
		Low	.35	.16	17
		Total	.44	.19	33
	Complex (TT)	High	.70	.16	14
		Low	.65	.17	17
		Total	.67	.17	31
	Total	High	.61	.18	30
		Low	.50	.22	34
		Total	.55	.21	64

A comparison of the performances in terms of accuracy (see Table 8) showed that the participants on the complex task (There-and-Then) outperformed the participants on the simple task (Here-and-Now), as the former wrote more error-free T-units. Further, the effect of language proficiency on written accuracy was significant, i.e. the high-proficiency group outperformed the low-proficiency group in a statistically significant manner.

Table 8. Performance Comparison on the Measure of Accuracy across Task type and level

Dependent Variable	Independent Variables		Mean Difference (I-J)	Std. Error	Sig.
Accuracy	**Task Complexity**				
	complex	simple	.23	.04	.000*
	Lg Proficiency				
	high	low	.12	.04	.006*

A description of the writing fluency scores (see Table 9) showed somewhat similar performances across the variables of the study.

Table 9. Descriptive Statistics on the Fluency scores across Task Type and Level

Dependent Variable	Task Type	Lg Proficiency	Mean	Std. Deviation	N
Fluency	Simple (HN)	High	10.63	2.77	16
		Low	11.25	2.17	17
		Total	10.95	2.46	33
	Complex (TT)	High	11.48	2.22	14
		Low	11.18	2.09	17
		Total	11.31	2.12	31
	Total	High	11.03	2.52	30
		Low	11.21	2.10	34
		Total	11.13	2.29	64

As shown in Table 10, neither task complexity nor language proficiency had any significant effect on the written fluency of participants' narrative productions.

Table 10. Performance Comparison on the Measure of Fluency across Task Type and Level

Dependent Variable	Independent Variables		Mean Difference	Std. Error	Sig.
Fluency	**Task Complexity**				
	complex	simple	.39	.58	.50
	Lg Proficiency				
	high	low	-.15	.58	.79

With respect to the effect of task complexity and language proficiency on written fluency, although no significant effect of task complexity on fluency was observed, the participants of the complex task performed better with the average of 1 more word per T unit (see Table 9). Moreover, Table 9 shows that although both the high-

proficiency and the low-proficiency groups performed very similar to each other in terms of producing words per T-unit, the low-proficiency participants showed a better trend in producing more words per T-unit.

Finally no significant interactions between task complexity and language proficiency, with respect to the three measures of CAF was found (Table 11).

Table 11. The Interactional Effects of Task Type and Level on the Dependant Variables of CAF

Independent Variable	*Dependent Variable*	df	Mean Square	F	Sig.
Task Type*Lg Proficiency	Complexity	1	.102	1.119	.294
	Accuracy	1	.071	2.457	.122
	Fluency	1	3.377	.623	.433

Discussion

In the current study, the effects of task complexity and language proficiency on various aspects of writing performance were investigated.

Regarding the first research question, the ratio of clauses per T-unit (complexity) was significantly higher in the complex condition than in the simple one; on the other hand, the high-proficiency participants produced more complex written narratives and outperformed the low-proficiency participants in a statistically significant manner.

With respect to the accuracy of L2 written narratives, the ratio of error-free T-units per total T-unit (accuracy) was significantly higher in the complex task than in the simple one. Moreover, the high-proficiency participants' written narratives were significantly more accurate than the low-proficiency participants'.

The findings on the two measures of complexity and accuracy confirm Robinson's (2001) Triadic Componential Framework (Cognition Hypothesis) in the sense that an effect of increasing task

complexity on complexity, and accuracy was found. This means that increasing task complexity along resource-directing variables (e.g., ± few elements, ± Here-and-Now, ± no reasoning demands) leads learners to pay more attention to complexity and form in their written outputs. In other words, making a writing task more complex leads to a greater degree of complexity and higher accuracy of the written text.

Both the dependant variables of complexity and accuracy were affected positively by manipulating the complexity of the narrative-writing task. This finding is in line with Robinson's (2007) 'multi-resources' view of attention in that learners' attention could be directed positively to both complexity and accuracy at the same time and without any trade-off effects. To make it clear, the multiple-resources model proposes that learners can access multiple non-interfering cognitive resources simultaneously (e.g., verbal and spatial-figural working memory, working memory used for coordination and supervision, working memory used for storage) and can, therefore, keep focused on both accuracy and complexity while performing a task. The greater the cognitive demands of a task, the more they engage multiple cognitive resources (attention and memory), which lead to more incorporation of forms in the input and modification of problematic forms in the output. Accordingly, the participants performed in a significantly improved fashion in terms of complexity and accuracy on the There-and-Then (complex) task.

Furthermore, the observed increase in the written complexity of narrative outputs in the There-and-Then condition may be ascribable to the increased conceptual activation during the output planning stage, or what Berman & Slobin (1994, cited in Ishikawa, 2006: 208) call "relating events in narrative." In other words, as learners in the TT condition need to memorize and retrieve the storyline and details, and subsequently produce a coherent narrative, they may be pushed to ruminate on the storyline, to infer the relationships between events, and to create larger informational chunks to facilitate memory

encoding, storage and retrieval. This is similar to Bartlett's (1932, cited in Ishikawa, 2006, p.200) conception of "effort after meaning," which helps to establish elaborated semantic representations prior to task performance. Thus, task demands in the TT condition may encourage deeper semantic processing than those in the HN condition, which may establish more elaborated output plans, out of which more complex language can emerge.

As for the role of language proficiency, the results showed that the high proficiency learners received greater benefits in terms of higher accuracy and complexity indices in doing writing tasks than the low-proficiency learners (Wolfe-Quintero et al. 1998; Larsen-Freeman 2006). Similarly, Cummins (1979, cited in Sercu, DeWachter, Peters, Kuiken, & Vedder, 2006) found no significant effect of task complexity for low proficiency participants. It seems likely that for low proficiency participants, who still have to deal with basic formulation processes, even the simple task is already extending their interlanguage to its maximum. As a consequence, the high-proficient participants outperformed the low-proficient participants.

Finally, regarding fluency, no significant effect from the independent variables was found. This does not support Robinson's cognition hypothesis that increasing complexity along There-and-Then condition affects fluency negatively. Robinson (1995) claimed that during TT task performance, learners need to recall the events at the same time that they code the stories propositionally (i.e. at the same time that they access propositional knowledge, organize it, and code it), and establish transitions between events. When narrating displaced events, in the past and without contextual support, learners need to build semantic schema about the whole narrative which is not present before them; therefore, attention is devoted to achieving inter-propositional coherence, which slows down fluency considerably. Moreover, with respect to fluency, the results do not confirm Ishikawa (2006) in that participants produced more words per T-unit in the

complex (TT) task. One explanation for this discrepancy could be that fluency does not require attention in the same way that complexity and accuracy do. In other words, "higher fluency is not the consequence of attention allocation policies, as complexity and accuracy would be, but the consequence of more efficient message planning and faster lexical access and selection" (Gilabert 2005: 332).

Conclusion

The present study investigated the effects of manipulating the resource-directing variable of task complexity [+/- Here-and-Now] and language proficiency on L2 written narrative discourse. The results showed significant effects of increasing task complexity and language proficiency on complexity and accuracy. The overall results seemed compatible with Robinson's Cognition Hypothesis which indicates that not only L2 learner's attentional capacity limits is not a necessary cause of decrements in performance on complex tasks, also it claims that learner's attention could be directed to both complexity and accuracy simultaneously without trade-off effects.

The major finding of this study was that task complexity manipulations and second language proficiency accounted for large but distinctly separate portions of the variance in the qualities of the narratives participants produced in their second language writing task performance. As there were no significant interactions between the two factors, these analyses indicate that task complexity and second language proficiency each makes quite different impacts on the processes and products of writing in a second language.

It can be implied that the complexity of tasks can be manipulated during task design to target some specific dimensions of production. In other words, by manipulating the tasks along certain task complexity variables (e.g., +/- resource-directing, +/- resource dispersing), a significant degree of greater complexity and accuracy or higher fluency may be observed. Moreover, it is safe to propose that

carefully controlling task complexity during task design may contribute to the balanced development of the different dimensions of L2 production (i.e. complexity, accuracy, and fluency).

The results of this study imply that the skills involved in writing are highly complex, and therefore L2 writers need to be proficient in a variety of skills in order to write effectively (Wolfe Quitero et al., 1998, Richards, & Renandya, 2002). In particular, they have to pay attention to the "higher level skills of planning and organizing as well as the lower level skills of spelling, punctuation, word choice, and so on. Accordingly, syllabus designers in their efforts to make the syllabuses (particularly syllabuses for writing courses) more flexible need to include different types of tasks for different higher-level and lower-level skills and sub-skills. Such syllabuses can be of a mainly task-based or task-supported type.

This study presents additional evidence for the view that task complexity manipulation is a useful form of pedagogical practice in motivating the learner to produce more advanced forms of their L2 (Long & Crookes 1992; Robinson 2003, 2007). According to Robinson (2001a), when task complexity is increased along the resource-directing dimensions, the demands on language use can be met by the specific aspects of the linguistic system. Such processes, directing learners' attentional and memory resources to the way the L2 structures and codes concepts, can lead to 'interlanguage development'.

Future studies need to take task-performer variables such as motivation, learner style, and other individual learner differences into account, which may constitute important indicators of task performance. The study of L2 task-based strategies and the choice of strategies when the learner faces various types of task demands should be a point of focus. Such studies would help develop a more comprehensive model of task complexity.

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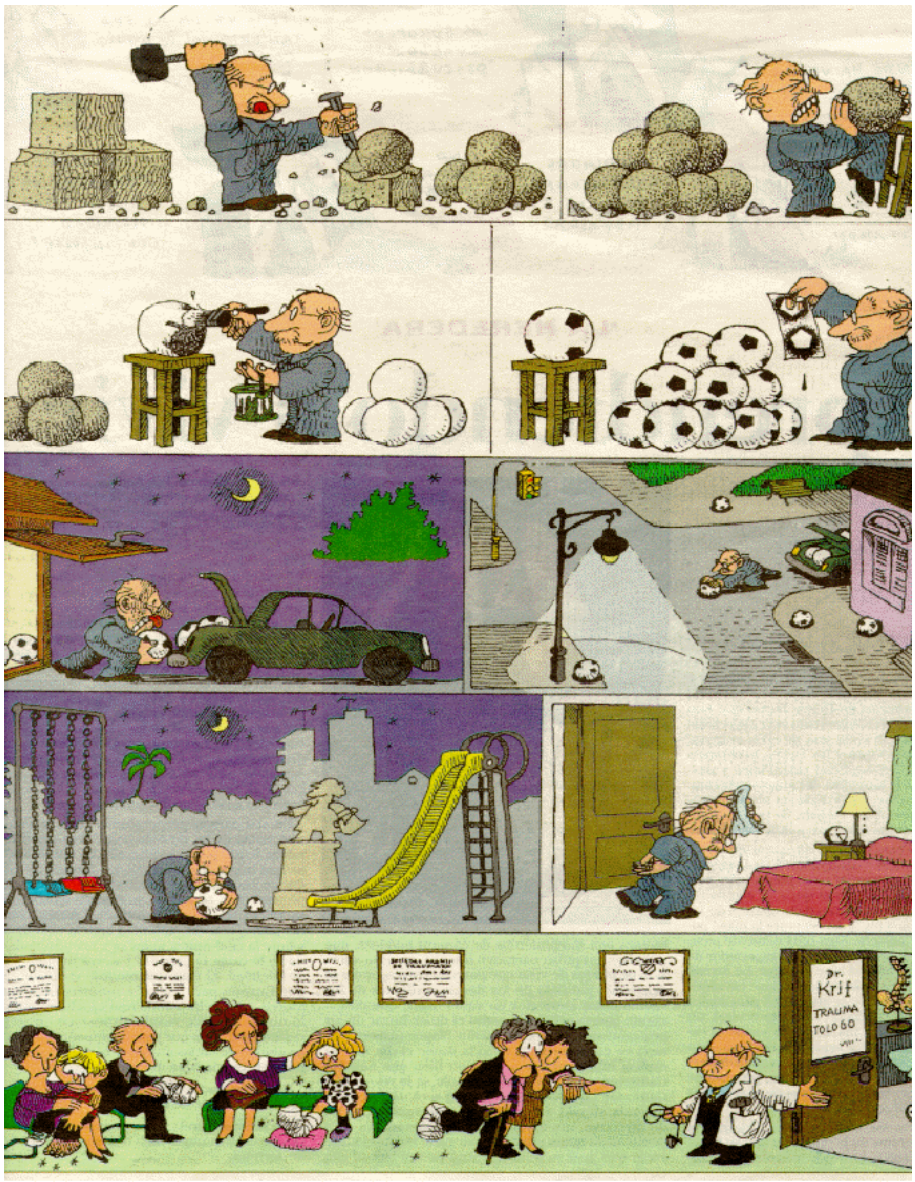
Appendix A: Cartoon Picture
"Dr. Krif"



Appendix B:
Prompts for the HN and TT Conditions, and Vocabularies

Prompt for the HN Condition

Today Dr. Krif is using a hammer and a nail to carve some stones. He wants to sculpt some balls out of stone. He colors them white. Then he uses a pattern to add black color to make them like real balls. Maybe he is doing this for a bad purpose.

Prompt for the TT Condition

Yesterday Dr. Krif was using a hammer and a nail to carve some stones. He wanted to sculpt some balls out of stone. He colored them white. Then he used a pattern to add black color to make them like real balls. Maybe he was doing that for a bad purpose.

Appendix C:
Guidelines for T-units, Clauses, Word Counts, and Errors
Taken From Polio (1997)

T-units

a. A T-unit is defined as an independent clause and all its dependent clauses.

b. Count run-on sentences and comma splices as T-units with an error in the first T-unit.

Ex: My school was in Saudi Arabia, it was the best school there.

T / T

1 error error-free

If several comma-splices occur in a row, count only the last as error-free.

c. For sentence fragments, if the verb or copula is missing, count the sentence as 1-T-unit with an error. If an NP is standing alone, attach it to the preceding or following T-unit as appropriate and count as an error. If a subordinate clause is standing alone, attach it to the preceding or following S and count it as 1 T-unit with an error.

d. When there is a grammatical subject deletion in a coordinate clause, count the entire sentence as 1 T-unit.

Ex: First we went to our school and then went out with our friends.

e. Do not count tag-questions as separate T-units.

f. Count S-nodes with a deleted complementizer as a subordinate clause as in: I believe that A and (that) B= 1 T-unit.

g. But, direct quotes should be counted as:

John said, "A and B"

1 T-unit 1 T-unit

h. Assess the following type of structures on a case-by-case basis:

If A, then B and C.

As a result, A or B.

i. Count T-units in parentheses as individual T-units.

Clauses

a. A clause equals an overt subject and a finite verb. The following are only one clause each:

He left the house and drove away.

He wanted John to leave the house.

b. Only an imperative does not require a subject to be considered a clause.

c. In a sentence that has a subject with only an auxiliary verb, do not count that subject and verb as a separate clause (or as a separate T-unit. (e.g. John likes to ski and Mary does too; John likes to ski, doesn't he?; John is happy and Marry is too)

Error Guidelines

a. Be conservative about counting comma errors; don't count missing commas between clauses or after prepositional phrases. Comma errors related to restrictive/non-restrictive relative clauses *should* be counted.

b. Base tense/reference errors on preceding discourse; don't look at the sentence in isolation.

c. Don't count British usages as errors, (e.g. 'in hospital,' 'at university,' collective nouns as plural).

d. Be lenient about article errors from translation of proper nouns.

e. Don't count errors in capitalization.

f. Count errors that could be made by native speakers (e.g. between you and I)

g. Don't count register errors related to lexical choices (e.g. lots, kids).

h. Disregard an unfinished sentence at the end of the essay.

Word Count

a. Count contractions as one word whether correct or not.

b. Count numbers as one word.

c. Count proper nouns in English and in other languages as they are written.

d. Don't count hyphenated words as single words. (e.g. well-written=2 words)

e. Don't include essay titles in word count.