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MANIPULATION OF TASK COMPLEXITY AND L2 ORAL PRODUCTION

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Abstract

This paper presents the findings of a study conducted to find the effects of manipulating task complexity on the Second Language (L2) oral production among the Business Administration undergraduates of the University of Jaffna during their first semester in 2016. Twenty seniors took part in the study. They accomplished two tasks of different complexity levels. The tasks were models of activities a receptionist perform at hotels. The simple task was to describe the different room options offered by the hotel to choose from. In the complex version, the participants reallocated the customers due to some unavoidable circumstance. They had to make decision based on the client and hotel profiles available regarding these. A pretest - posttest design was used to measure the performance of the participants in the study. The results of paired samples t-tests showed a significant increase in fluency while accuracy and syntactic and lexical complexity did not show any significant difference, after the performance of the simple task. With the increase in complexity of the task through number of elements involved and the addition of reasoning demands, the results revealed an increase in accuracy and with no difference in syntactic complexity. There was a negative impact on fluency.

Key Words: Communicative competence, Tasks, Complexity, Elements, Reasoning Demands

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Introduction

General introduction

As far as the language used in the tourism industry is concerned, hotel reservation is an inevitable component. Usually, there will be a dialogue between the tourists (customers) and the receptionist. As a customer one has to check for the availability of rooms and the facilities one expects have to be matched while as a receptionist one has to persuade a customer through answering all the queries from the customer, solve such problems like malfunctioning of equipment, answering requests for directions from the hotel to some important tourism spots, and completing the information needed in the check-in form. Hence it is necessary to develop the communicative competence of the undergraduates who are prospective employees of the tourism industry.

Past few decades have provided a large amount of research findings that was in favour of using tasks to improve the communicative competence of Second Language Learners. This is a new direction in the process of Second Language Teaching and Learning. The development of Task-Based Language Teaching (TBLT) has shed a lot of light in this field. The crux of TBLT is the tasks. The large amount of research done in the field of TBLT and the quantity of publications stand as evidence to the upward trend in using TBLT. Breen, (1989); Bygate, Skehan & Swain, (2001); Crookes, (1986); Ellis, (2003); Nunan, (2004); Prabhu, (1987); Richards, Platt & Weber, (1985); Robinson, (1995) and Skehan, (1996) are some of the large number of scholars who have studied the potential of pedagogic tasks that will lead the learners to real condition performance in L2. TBLT has a strong foundation on both theory and findings from psycholinguistic research. The Interaction Hypothesis of Long, (1996), the Pushed Output Hypothesis of Swain, (1985) and Swain & Lampkin, (1995), which advance conversational interaction as a facilitator of second language acquisition and the noticing hypothesis of Schmidt (1990), which posits that meaningful opportunities to notice and become aware endorse the use of pedagogical tasks.

Early studies that is, during the 1980s were mostly on interactive dimensions of tasks which were thought to serve as vehicles for production; this paradigm shifted towards the other end of the spectrum-the cognitive dimension. Two of the most influential scholars of the cognitive string of research are Peter Skehan and Peter Robinson. Skehan proposed the *Trade-off Hypothesis* and Robinson the *Cognition Hypothesis*. Though

both these hypotheses share many aspects they differ in several ways. However, these two sparked a lot of scholarly work on task complexity. This emerging cognitive aspect of tasks ignited a number of studies which focused mainly on the three dimensions of performance: complexity, accuracy, fluency and also task difficulty and complexity. Next section will discuss the concept task complexity.

Literature Review

Task complexity and task difficulty

Scholars have used task difficulty and task complexity almost interchangeably and the scope of potential influences on them is argued to be wide, including cognitive, affective, linguistic, interactional, experiential and many other factors, Robinson (2001a:29). However, Robinson (2001a) differentiates three dimensions of tasks: complexity, condition and difficulty.

The attempts made earlier to characterise task difficulty were largely speculative. Candlin (1987) proposed a set of criteria by which task difficulty could be arrived at. The criteria are: 1) *cognitive load* 2) *communicative stress*; 3) *particularity and generalisability*; 4) *code complexity and interpretative density*; 5) *process continuity*.

Prabhu (1987) comments on complexity as:
There may be a case for moving generally from information gap to reasoning gap to opinion gap as learners progress in their language acquisition, though genuine opinion gap activity is likely to be feasible only at very advanced stages ... tasks within a given sequence were ordered by a common sense of increasing complexity, the latter tasks being either inclusive of the earlier ones or involving larger amounts of information, or an extension of the kind of reasoning done earlier (p.64)

Ellis (2003:351) believes that task complexity is the extent to which a particular task is inherently easy or difficult. Task complexity consists of three different dimensions: *code complexity, cognitive complexity,* and *context dependency.*

Skehan & Foster (2001) posit "Task difficulty has to do with the amount of attention the task demands from the participants. Difficult tasks require more attention than easy tasks." (p.196). According to Skehan (1998) task dimensions are dived into three broad categories which in turn are subdivided as 1) *Code complexity* which includes linguistic complexity and variety, vocabulary load and variety, redundancy and density (here

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complexity is used interchangeably with difficulty by Skehan); 2) *Cognitive familiarity which includes* familiarity of topic and its predictability, *f*amiliarity of discourse genre, familiarity of task, information organisation, amount of computation, clarity and sufficiency of information given and information type; 3) Communicative stress which includes time limits and time pressure, speed of presentation, number of participants, length of texts used, type of response and opportunities to control interaction. Skehan, (1998) believes that task complexity (difficulty) can be manipulated during task design to obtain the desired elicitation of learner language.

Robinson (2001a) while distinguishing between task difficulty and task complexity includes a third dimension; task condition. In Robinson's (2001a) view:
Task complexity is the result of the attentional, memory, reasoning, and other information processing demands imposed by the structure of the task to the language learner. These differences in information processing demands, resulting from design characteristics, are relatively fixed and invariant (p.29).
According to Robinson designing a task to be simple or complex along different dimensions will influence whether and how trade-offs will be made. He further posits that increasing the cognitive complexity of tasks "will facilitate the 'means' of language learning and therefore lead to a transition in the learner's "knowledge states" (Robinson, 2001b, p. 301). Thus, the Cognition Hypothesis places a strong emphasis on the need for tasks to be designed and sequenced for learners on the basis of increasing cognitive complexity. Robinson (2007) proposed a Triadic Componential Framework (TCF) for task design, which is outlined in table 1.1.

Table 1.1: Robinson's (2007) Triadic Componential Framework

Task complexity (Cognitive factors)	**Task Condition** (Interactive factors)	**Task difficulty** (Learner factors)
(Classification criteria: cognitive demands)	(Classification criteria: interactional demands)	(Classification criteria: ability requirements)
Sub categories: a) resource -directing variables making cognitive/conceptual demands +/- here and now +/- few elements -/+ spatial reasoning -/+ causal reasoning -/+ intentional reasoning -/+ perspective-taking	Sub categories: a) participation variables making interactional demands +/- open solution +/- one way flow +/- convergent solution +/- few participants +/- few contributions needed +/- negotiation not needed	Sub categories: a) ability variables and task relevant resource differentials h/l working memory h/l reasoning h/l task-switching h/l aptitude h/l field independence h/l mind-reading

This framework distinguishes three dimensions which interact to influence task performance and learning. Three components of TCF are: Task complexity, task conditions and task difficulty. According to Robison (2001a) the dimensions of complexity are design features of tasks which can be manipulated to increase or decrease the cognitive demands tasks make on the learner while they are performing the task. As this study is based on the resource directing variables, only those will be discussed below.

The resource-directing variables which "make greater resource demand, but lead learners to use specific features of the language code" (p. 4) are '+/- here-and-now ' refers to "whether the task requires reference to events happening now, in a mutually shared context" (here-and-now) vs. to events that occurred in the past, elsewhere; (there-and-then); '+/- few elements ' refers to "few, easily distinguished, vs. many similar elements"; +/- spatial reasoning refers to "spatial location where easily identifiable and mutually known landmarks can be used vs. reference to location without this support"; +/- causal reasoning refers to "simple information transmission vs. reasoning about causal events and relationships between them"; +/- intentional reasoning refers to simple information transmission vs. reasoning about other peoples' intentions, beliefs, and desires and relationships between them"; and +/- perspective taking refers to "whether the task requires the speaker/listener to take just one first-person perspective on an event or multiple second and third person perspectives".

Skehan's Limitted Attention Hypothesis (Trade-off Hypothesis)

Skehan (1996) proposes that when the conditions of task are complex, a speaker's performance will be more fluent while there will be a trade-off between complexity and accuracy. Skehan based his model proposal on the single-resource model developed by Van Patten (1985). According to Van Patten (1999), "while humans may indeed direct conscious attention to form in and of itself, the question is not whether they can do this; the question is whether or not they can do this while they process input for meaning" (p. 288). What Van Patten posits is there is a single pool of attention, which is limited in humans, is available and the dimensions compete for this finite volume of attention; this results in trade-off between CAF.

Robinson's Cognition Hypothesis

Wickens' (2002) Multiple Attentional Resource Model, which in turn is based on Navon & Gopher's, (1979) Multiple Resource Theory forms the basis for Robinson's Cognition Hypothesis. Broadly speaking, the latter is concerned with the relative interference which occurs between two tasks if these are done in a simultaneous fashion in terms of the attention devoted to each of these tasks.

What Cognition Hypothesis essentially claims is:

"increasing the cognitive demands of tasks contributing to their relative complexity along certain dimensions will (a) push learners to greater accuracy and complexity of L2 production in order to meet the consequently greater functional/communicative demands they place on the learner and (b) promote heightened attention to and memory for input, so increasing learning from the input, and incorporation of forms made salient in the input, as well as (c) longer term retention of input; and that (d) performing simple to complex sequences will also lead to automaticity and efficient scheduling of the components of complex L2 task performance" (Robinson, 2003, pp. 47-48).

As far as the resource-directing variables are concerned, Robinson (2001b, 2003, 2005, 2007), proposing Cognition Hypothesis argues that task complexity negatively affects fluency; however, it promotes accuracy and complexity. Manipulating the dimensions of tasks (e.g. the number of elements) will draw attentional and memory resources to the accomplishment of the task and as a result more accurate and more complex speech will be produced; while, fluency tend to be negatively affected. Moreover, increased task complexity will effect increase in the use of comprehension checks and clarification requests where the interactive tasks are concerned compared to monologic tasks.

Reasoning demands and Number of elements

Reasoning demands

The amount of energy a task requires from the learners thinking ability and the reasoning effort the learners put on the task while accomplishing it is the reasoning demand. Reasoning can be divided into three: spatial reasoning, causal reasoning and intentional reasoning (Robinson & Gilabert, 2007, p. 165).

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Number of elements

Number of elements refers to the different components of a task such as different landmarks in a map and the occurrence of them. For instance if a map task has only a few places to be used in the production compared to many turns, street signs and buildings are to be used, the former contains few elements whereas the latter more. Robinson states that "tasks requiring a few clearly different elements to be distinguished from each other (e.g., trees, apples and clouds) are easier than tasks requiring many similar elements to be distinguished (e.g., cars in a traffic jam, buildings and streets on a map)" (Robinson, 2001, p. 38).

Previous studies

Studies that investigated the effects of +/- number of elements and +/- reasoning are limited in number. One such study was carried out by Kuiken and Vedder (2007). 84 Dutch learners of Italian and 75 Dutch learners of French took part in the study. They were grouped into two equal groups which completed both simple and complex tasks. The participants wrote letters which persuaded their friend to choose holiday resorts. In the complex version of the task they had to decide between bed and breakfast places in Italy; in the simple version they chose resort places in other countries. The performance of these participants were analysed in relation to accuracy, syntactic complexity and lexical variation. The results showed that complex tasks elicited more accurate responses compared to simple tasks. With regard to syntactic complexity and lexical variation the results were mixed.

Ishikawa (2008, 2011) used three tasks: no reasoning task, simple task, and complex task. Whereas the "no reasoning" task demanded the participants only to describe relations among people, involving no reasoning demands, in both simple and complex task conditions the participants were expected to add intentions to others in a situation in which human relationships changed in the workplace. In the simple task, 2 section members were involved in the change, and in the complex task 4 members were involved. Regarding the operationalization of complexity, the simple and complex tasks, as opposed to the control or "no reasoning" task, required the participants to

successfully understand the psychological and other mental states which brought about a change in relationships between people. Increased intentional demands induced more repair fluency behavior and an increase in favor of the complex task condition was observed in all the other dimensions.

The analyses carried out in this study were complemented by those in the study by Ishikawa (2011), which enquired about task difficulty, as measured by responses to an affective variables questionnaire, and the correlation between this subjective perception and performance in the L2. As cognitive complexity increased, a greater number of negative and positive correlations could be observed between the different questionnaire items importantly indicating that the more complex tasks get, the more important learner predictions of task difficulty become.

Kim and Ventura (2011) used four different tasks related to university life: describing events at a university festival, hosting an American friend, sharing an experience from university orientation, and preparing for a mayoral election campaign. Each task had three complexity levels: “simple”, “complex” and “+complex”. In the simple task the participants were only required to exchange information, in the complex task they were asked to take a decision, and in the +complex task they had to take a decision bearing in mind certain considerations (elements). However, no information was provided regarding the exact difference in the number of considerations between the complex and the +complex task. The development of past tense morphology was higher in the complex task compared to simple one. However, there was statistically significant difference between complex and +complex tasks.

The inconclusive results of the previous studies and the fact no other studies have been undertaken in the Sri Lankan context warrant the present study.

Research question

Does simultaneous manipulation of +/- reasoning demands and +/- elements of L2 tasks affect the oral production?

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Methodology

Participants

40 seniors from the Faculty of Management Studies and Commerce of the University of Jaffna, Sri Lanka took part in the study. However, the data collected from 20 actual participants, hereafter referred to as *participants*, only were used as the other 20 functioned merely as the partners (customers) needed to accomplish the experimental task. The participants were lower intermediate in proficiency. Their proficiency level was decided based on the grades they obtained during their last semester examination in ESL. These participants managed to get the minimum marks to get a pass grade 'C' (41 - 45 marks). Out of the twenty, 12 were females and 8 males and they belong to the age group 22-23 years. 14 of the participants spoke Tamil as their mother tongue and 6 Sinhala.

The design

The participants described the different room options offered by the hotel to choose from. This is the simple version of the task. In the complex version, they have to reallocate the customers due to some unavoidable circumstance. They had to make decision based on the client and hotel profiles regarding these. The in-course assessment speaking test was used as the first pre-test (PRE). The production of the participants during the performance of both tasks were recorded using voice recorders. The recording during the completion of the simple version of the task was considered as the post-test 1 scores and the second recording as the post-test 2. The recordinge were transcribed and analysed.

Measuring performance

Measurement of performance was done following Rasakumaran (2016). The three dimensions of L2proficiency -complexity, accuracy, and fluency - were measured in this study to see if there was difference.

Complexity is used in this study in the sense linguisitic (grammatical) complexity. Different units of analyses are used to analyse the language production: T-units, C-units, and AS-units. The term T-units derived from the phrase 'minimal terminable unit'. A C-

Unit refers to clause unit and an AS Unit refers to Analysis of Speech Unit. Hunt (1965) introduced the concept of T-Unit. T-Unit is defined as a main clause (independent clause) including all subordinate clauses (dependent clause) or other constructions that go with it (extensions and expansions). Hunt's construct established a yardstick for measuring syntactic development. This study uses mean length of T-Unit (MLTU) as a unit of analysis. MLTU is the average number of words per T-Unit. It was measured as the number of clauses per T-Unit.

Housen & Kuiken, (2009) define accuracy as "the ability to produce error-free speech". According to Ellis (2005) accuracy is "the ability of the speaker to avoid errors in performance, possibly reflecting higher levels of control in the language as well as a conservative orientation". In the current study, following Crespo, (2011) accuracy was measured by calculating the number of errors per 100 words. All errors in syntax, morphology, and lexical choice were taken into consideration.

Based on Mochizuki & Ortega, (2008) fluency was measured as the average number of words produced per minute.

Results and discussion

Results

Table 4.1 below provides the summary of the descriptive statistics of the three tests: Pre Test, Post Test 1 and Post Test 2 and the sig. (2-tailed) values of the paired samples t-test. As Table 4.1 shows there was a mean difference of 0.06 in complexity of the participants' production between the pretest and post test 1in this study. The t-test results show the significance (2 tailed) as 0.287 in this case. These were 0.09 and 0.780 & 4.96 and 0.000 for accuracy and fluency respectively. The mean differences between the pretest and post test 2 in complexity, accuracy and fluency are 0.04, 1.32 and 0.68 respectively. The 2-tailed significance values as per the above three components are .160, .021 and .380 respectively.

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Table: 3.1 Results summary of Paired Samples T-Tests between Pre Test and Post Test 1&2

		Mean (M)	M Dif. PT-PRE	N	Std. Deviation	Std. Error (M)	Sig(2 tailed)
Pair 1	PRE_COM	1.08		20	0.14	0.03	.287
	PT_1_COM	1.02	-0.06	20	0.04	0.01	
Pair 1	PRE_AC	30.73		20	4.29	0.91	.780
	PT_1_AC	30.82	0.09	20	4.33	0.92	
Pair 1	PRE_FL	60.36		20	3.32	0.71	.000
	PT_1_FL	65.32	4.96	20	3.46	0.74	
Pair 1	PRE_COM	1.08		20	0.14	0.03	.160
	PT_2_COM	1.04	-0.04	20	0.05	0.01	
Pair 1	PRE_AC	30.73		20	4.29	0.91	.021
	PT_2_AC	29.41	-1.32	20	4.22	0.90	
Pair 1	PRE_FL -	60.36		20	3.32	0.71	.380
	PT_2_FL	59.68	-0.68	20	3.90	0.83	

Table 4.2 below shows the results summary of Paired Samples T-Tests between Post Test 1 and Post Test 2. According to this table the mean differences between these two tests in the performances of the participants along the complexity, accuracy and fluency dimensions are 0.01, 1.41 and 5.64 respectively while the respective sig. (2 tailed) values are 0.435, 0.023 and 0.000.

Table: 3.2 Results summary of Paired Samples T-Tests between Post Test 1 and Post Test 2

		Mean(M)	M Dif. PT1-PT2	N	Std. Deviation	Std. Error Mean	Sig(2-tailed)
Pair 1	PT_1_COM	1.05		20	0.04	0.01	0.435
	PT_2_COM	1.04	0.01	20	0.05	0.01	
Pair 1	PT_1_AC	30.82		20	4.33	0.92	.023
	PT_2_AC	29.41	1.41	20	4.22	0.90	
Pair 1	PT_1_FL	65.32		20	3.46	0.74	.000
	PT_2_FL	59.68	5.64	20	3.90	0.83	

Discussion

According to the results shown in Table 4.1, the mean difference in complexity between the pre tests and post test1 is 0.06 and it is not statistically significant at p<.05 as the result was .287. This is true in the case of accuracy. Accuracy has not improved significantly as the sig.(2 tailed) value was .780. However, fluency has increased significantly. The mean difference between the two tests was 4.96 and the t-test results reveal that it is statistically highly significant as the sig.(2 tailed) value was .000 at p<05 level.

When the comparison of pretest and post test 2 is considered, there is a change in the trend. Whereas increase in complexity is concerned, there is no statistically significant difference in the t-test results as the sig. (t tailed) value was .160 at p<.05. This is true of fluency too. The sig. (t tailed) value was .380 at p<.05. This is not statistically significant. However, the increase in accuracy shows a significant difference of .021 at p05. This is, though not as high as the difference in the fluency between pre test and post test 1, statistically significant.

The results of the comparison between the two post tests reveal a different trend. The changes in accuracy and fluency are statistically significant as they are .023 and .000 respectively at p05. However, the change in complexity is not statistically significant as the t value is .435. What is interesting here is the complex task has caused a decrease in fluency among the participants. There was a gain in fluency after performing the simple task but it has been lost by the increase in complexity. Accuracy, which was not seemed to have been affected by performing a simple task, has been enhanced through doing a complex task.

Conclusion

Based on the above results and discussion it can be concluded that increasing task complexity by manipulating +/- reasoning demands and +/- elements does affect the accuracy and fluency dimensions of speech production. This is in conformity to Robinson's Cognitive Hypothesis. Further, according to the Cognitive Hypothesis complexity dimension of production should also have been affected by the increase in

task complexity. The results of this study do not show any significant changes in complexity. This contradicts Cognitive Hypothesis. The research question of the study has been answered positively with regard to fluency and accuracy dimensions while it is negative along complexity dimension.

The implication of these findings is that the ESL teachers have to use simple task to enhance the oral fluency of the Business Administration undergraduates. As fluency is reduced when task complexity is increased care should be taken before increasing the task complexity. It is better if manipulation of task complexity is postponed until a certain level of fluency is acquired by the learners. Since fluency and accuracy are more important than complexity, incremental increase in task complexity may help the learners to produce quality output.

The finding of this study is inconclusive on the effect of increase in task complexity with regard to the complexity of the performance; further studies need to be carried out to confirm the results.

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