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INCREASING TASK COMPLEXITY AND SECOND LANGUAGE ORAL PRODUCTION

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ABSTRACT

This article presents the findings of a classroom study conducted to find the effects of task complexity among the Arts undergraduates of the University of Jaffna. Twenty two sophomores took part in the study. They accomplished a task of describing a silent video clip. The simple task was to describe the video clip while watching it where they have to tap their interlanguage online. They were expected to use present tense with the contextual support of the video clip (here and now), which was simple and the complex one was to describe the video clip after watching (there and then) where the contextual support was removed. Here they were expected to use the past tense with no contextual support. A pretest - posttest design was used to measure the performance of the participants in the study. The results 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 the deprivation of contextual support, the results revealed an increase in accuracy and with no difference in syntactic complexity. There was a negative impact on fluency.

***KEY WORDS**: tasks, complexity, resource directing, fluency.*

1. INTRODUCTION

The past few decades have witnessed 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); Long, (1985); 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 & Lapkin, (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.

This large amount of research carried out on TBLT and especially task complexity led to the synthesis of research systematically and meta-analysis. This in turn led TBLT itself as a domain of scientific study. González-Lloret and Ortega (2014) comments on this emerging trend in the following way: "Task-based teaching is a burgeoning research area within instructed second language acquisition" (p. 15). In the arena of theoretical and empirical investigations on TBLT the scope of issues that have been explored by researchers has become very wide. Interaction, production, and development have occupied a major place within this wide scope. 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 propsed 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, which includes papers, articles, book chapters and books. This emerging cognitive aspect of tasks ignited a number of studies which focused mainly on the three dimensions of performance: complexity, accuracy, fluency and task difficulty and complexity. Next section will discuss this concept task complexity.

2. LITERATURE REVIEW

2.1Task 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 (2001) 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 complexity is used interchangeably with difficulty by Skehan); 2) Cognitive familiarity which includes familiarity of topic and its predictability familiarity 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 their cognitive complexity. Robinson (2007) proposed a Triadic Componential Framework (TCF) for task design, which is outlined in table 2.1.

Table 2.1: 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	Sub categories: a) participation variables making interactional demands	Sub categories: a) ability variables and task relevant resource differentials
+/- here and now	+/- open solution	h/l working memory
+/- few elements	+/- one way flow	h/l reasoning
-/+ spatial reasoning	+/- convergent solution	h/l task-switching
-/+ causal reasoning	+/- few participants	h/l aptitude
-/+ intentional reasoning	+/- few contributions needed	h/l field independence
-/+ perspective-taking	+/- negotiation not needed	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".

+/- here and now feature is operationalised as the availability of contextual support in the present and +/- there and then as devoid of contextual support for a past event.

2.2 Complexity, Accuracy and Fluency (CAF)

These three dimensions of performance are capacities, Skehan and Foster (1999). Complexity is the capacity to use complex sentences with subordinate clauses; accuracy refers to the error free performance and fluency denotes the ability to use language in real time.

2.3 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 (1995). 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.

2.4 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 predictions of the on L2 language production in the case 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.

2.5 Previous studies on +/- here and now element

Robinson (1995) studied the effects of manipulating Here-and-Now on three different narratives. The participants were asked to narrate the story while they were watching a silent comic video clip. The participants were

expected to use the present tense to describe what was going on the video clip. In the second instance they were asked to narrate the same after watching the video clip. They had no access to the video clip while telling the story. The former is here and now and the latter there and then. The results showed more accurate and lexically complex speech production while there was dysfluency as the complexity increased.

Rahimpour (1999) conducted a similar study to that of Robinson's (1995) but a condition variable (open vs. closed) was also included in the study. Rahimpour's results revealed that the speech production of the participants who performed the most complex tasks was significantly less fluent and accurate while there was no significant difference in the complexity.

The effects of manipulating complexity on L2 learners' fluency, complexity, and accuracy were also investigated by Iwashita, McNamara, & Elder (2001). The study was different in design to the above reported two. They had four dimensions with+/- and eight levels of complexity which included +/- here and now element also. Their results showed no significant differences between effects of simple and complex versions of tasks but for accuracy. They found higher levels of accuracy in There-and-Then version.

Research on complexity along +/- here and now elements is rare and the results of those carried out are inconclusive. Further, no research has yet been conducted in the Sri Lankan context. This situation warrants this study to find out the effects of complexity along +/- here and now elements on the oral production of Jaffna University Arts undergraduates.

2.6 Research question

RQ: Does +/- here and now element of task complexity affect the CAF dimensions of oral production?

3. METHODOLOGY

3.1 Participants

The participants were twenty two sophomores from the Faculty of Management Studies and Commerce of the University of Jaffna. There were 300 students in six groups of 50 students. Out of these total 300students, students who scored minimum marks of 45-49 to get a pass average in the speaking test conducted by the class teachers as in-course assessment were first selected. There were 87 who fell under this category. From among these students 22 were randomly selected. There was equal number of female and male students.

3.2 The design

This study was conducted during the normal lecture hours using Pre test Post Test model. The in-course assessment speaking test was used as the first pre-test (PRE). The participants were first given instruction what they had to do. They were asked to narrate what was going on in the video clip while they were watching. The video clip titled paper man (available at https://www.youtube.com/watch?v=HSxJkKiHXbw) was a silent clip produced by Walt Disney and its length was 5minutes and 14 seconds. This narration was considered as the first post test, that is performing a simple task. The production of the participants was audio recorded using mobile phone recorders. This was considered as the first post test (PT1).

During the next class session the same participants were asked to narrate what they watched during the previous session. This narration was considered as the second post test (PT2). The performances were recorded as it was done in the previous session. The recordings were transcribed and analysed. Paired samples t-tests were performed employing the SPSS version 20.

3.3 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.

4. RESULTS AND DISCUSSION

4.1 Results

The research question asked if the manipulation of task complexity along the +/- here and now dimension affected the oral production of the second language learners. With the aim of finding answer to the research question the study was designed and results obtained. The results are given below.

Table 4.1 below summarises 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 1 in 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.

Table: 4.1 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		22	0.14	0.03	.287
	PT_1_COM	1.02	-0.06	22	0.04	0.01	
Pair 1	PRE_AC	30.73		22	4.29	0.91	.780
	PT_1_AC	30.82	0.09	22	4.33	0.92	
Pair 1	PRE_FL	60.36		22	3.32	0.71	.000
	PT_1_FL	65.32	4.96	22	3.46	0.74	
Pair 1	PRE_COM	1.08		22	0.14	0.03	.160
	PT_2_COM	1.04	-0.04	22	0.05	0.01	

Pair 1	PRE_AC PT_2_AC	30.73 29.41	-1.32	22 22	4.29 4.22	0.91 0.90	.021
Pair 1	PRE_FL - PT_2_FL	60.36 59.68	-0.68	22 22	3.32 3.90	0.71 0.83	.380

COM= complexity AC= accuracy FL= fluency p value< 0.05

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: 4.2 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 PT_2_COM	1.05 1.04	0.01	22 22	0.04 0.05	0.01 0.01	0.435
Pair 1	PT_1_AC PT_2_AC	30.82 29.41	1.41	22 22	4.33 4.22	0.92 0.90	.023
Pair 1	PT_1_FL PT_2_FL	65.32 59.68	5.64	22 22	3.46 3.90	0.74 0.83	.000

COM= complexity AC= accuracy FL= fluency p value< 0.05

4.2 Discussion

In light of the Robinson's Cognition Hypothesis, the increase in task complexity, in this study the increase in number of elements, should result in increased complexity and or accuracy while there will be a reduction in fluency (the higher the complexity the greater the production complexity and accuracy while the less the fluency. The discussion which follows is based on Robinson's Cognition Hypothesis. 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 not in conformity with Robinson's Cognition Hypothesis. This is true in the case of accuracy. Accuracy has not improved significantly as the sig. (two tailed) value was .780. This does not agree with Robinson's Cognition Hypothesis either. 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. (two tailed) value was .000 at p<05 level. This is in conformity with Robinson's Cognition Hypothesis.

When the comparison of pretest and post test 2 is considered, there is a change in the trend. This comparison tested the effect of increased task complexity on the L2 oral production. Whereas increase in complexity is concerned, there is no statistically significant difference in the t-test results as the sig. (two tailed) value was .160 at p<.05. This does not confirm Robinson's Cognition Hypothesis which states that the more the task complexity the greater the L2 complexity. This is true of fluency too. The sig. (two tailed) value was .380 at p<.05. This is not statistically significant. This is in contradiction to Robinson's Cognition Hypothesis. 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 and in conformity with Robinson's Cognition Hypothesis. 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. The change in accuracy confirms Robinson's Cognition Hypothesis. However, the change in complexity is not statistically significant as the t value is .435. This in contradiction to Robinson's Cognition Hypothesis. What is interesting here is the complex task, as posited by Robinson's Cognition Hypothesis has caused dysfluency 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.

5. CONCLUSION

Based on the above results and discussion it can be concluded that the increase in task complexity 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. In this study Robinson's Cognition Hypothesis is partially confirmed.

The implication of these findings is that the ESL teachers have to use simple task to enhance the oral fluency of the Arts 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.

Since the finding of this study is inconclusive, that is the task complexity did not commensurate with the complexity of the L2 production as posited by Robinson's Cognition Hypothesis, on the effect of increase in task complexity on the complexity of the performance, further studies need to be carried out to confirm this finding.

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