Chapter Six

Summary of Findings, Discussions and Implications

6.0 Introduction

The studies reported in this thesis investigated the effect of task complexity on second language writing. This chapter summarizes the findings of the empirical studies presented in Chapters Four and Five, and relates them to the theoretical framework presented in Chapters One and Two and the hypotheses formulated in Chapter Three. Section 6.1 begins with a summary of the ongoing debate on attention, task complexity and writing performance. Section 6.2 gives an overview of the empirical investigations and summarizes the results. Section 6.3 discusses the outcome of this research in the light of Robinson’s Cognition Hypothesis (2001). This research focuses on cognitive aspects of task complexity ([-complex] vs. [+complex]) and the interaction of two aspects of task complexity (±complex and ± pre-tasks) factors on second language writing. Section 6.4 elaborates the issue of attention in task performance. Section 6.5 discusses the results of correlation of task complexity and perceptions of task difficulty and critiques the measures used in this research for assessing second language writing.

Three new measures that may be sensitive to complexity manipulations, and also to proficiency differences have been explored in Section 6.6. Though the study focused on performance than acquisition, the implications of such task complexity in affecting proficiency changes in a task-based syllabus have been discussed. Section 6.7 presents the implications of a graded task-based research for L2 pedagogy particularly writing and
writing assessment. Section 6.8 presents the conclusion, limitations of the study and hints at new directions and opens up new avenues for future research.

6.1 Task complexity and second language writing: the debate

From an information-processing perspective, researchers have been interested to see how task modifications can lead to change in fluency, complexity, and accuracy of spoken or written performance. Tasks have been modified along their degree of familiarity (Foster & Skehan 1996; Robinson 2001a); the number of elements (Kuiken & Vedder 2004; Robinson 2001a); single and dual task performance (Niwa 2000); pre-task and on-line planning time allotted (Foster & Skehan 1996; Ortega 1999; Wigglesworth 1997); and their degree of displacement with reference to time (Rahimpour 1997; Iwashita et al. 2001). All these studies focus on the effects of these manipulations on complexity, fluency and accuracy of production to justify the sequencing of tasks in writing/speaking syllabus. However, the effects of such task manipulations on oral and written production are not straightforward and in fact are quite conflicting. The varying effects of task manipulations on task performance have been accounted for by two theoretical positions usually taken in attentional research: that of a ‘limited’ capacity attentional model (Baddeley 2003) and that of Cowan’s (1988, 1993) idea of hierarchical subset relations between memory and attention. These were respectively used by Skehan (1996) and Robinson (1995) in second language research to propose guiding principles for task sequencing and L2 development. The models of second language performance and task sequencing are Skehan’s Limited Attention Hypothesis (1996) and Robinson’s Cognition Hypothesis (2001) respectively.
Both models investigate how manipulations of different task characteristics may affect attentional allocation, as only ‘focused attention’ has the potential to promote L2 development (Schmidt 1990). The ‘cognitive load’ (i.e. cognitive task complexity) controls the amount of attention allocated during task performance. With reference to cognitive load and allocation of attention, two contrasting views (as mentioned earlier) are usually proposed: the idea of limited attentional capacity (Skehan 1996; Skehan & Foster 2001), and the idea of multiple attentional resources (Cognition Hypothesis; Robinson 1995, 2001, 2005).

The Limited Attention Hypothesis, based on a single-pool view of attentional memory, argues that attentional capacity is limited, and there is a limit to the amount of information one can pay attention to in a task. Any increase in cognitive complexity puts the varying dimensions of L2 performance into competition with each other for allocation of available attentional resources. As L2 learners prioritize either meaning or form in solving a task, cognitively complex tasks show trade-off effects. In performing a cognitively complex task, L2 learners focus their attention (consciously or unconsciously) on one of the three dimensions (complexity, accuracy and fluency) and the learners decide whether to focus on form or meaning of the task, thereby necessitating a trade-off. Usually it is ‘meaning’ that is attended to and form is neglected (VanPatten 1990). The aspects that do not or receive little attention therefore fail or are erroneous, resulting in a decline in the overall performance.
In contrast, Robinson (2001) proposed a different view of task complexity and L2 performance. Robinson’s view of resource allocation sides with Wickens’ (1984) multiple resource capacity as opposed to limited capacity. Robinson claims that manipulating task complexity by increasing the cognitive demands of tasks can lead to simultaneous improvements in accuracy and complexity (1995, 2001a, 2001b, 2003, 2007a). The Cognition Hypothesis is based on a multiple-resource view and proposes that learners can concurrently fulfill multiple task demands as long as they draw from different pools of attentional resources (Chapter 2, §2.2.2). This theory includes taxonomy of factors that may influence attentional allocation during task-based L2 performance. The so-called Triadic Componential Framework distinguishes cognitive factors of task complexity from interactive factors of task condition and from learner factors of task difficulty.

The main goal of this thesis was to investigate effects of cognitive task complexity on L2 task performance. In task complexity, the Cognition Hypothesis differentiated between resource-directing and resource-dispersion dimensions. Manipulating task complexity along the resource-directing variables (±elements, ±here-and-now, ±reasoning demands) directs attention to a wide range of functional and linguistic requirements. Increasing complexity along resource-dispersion dimension (e.g., ±planning time, ±prior knowledge, ±single task) reduces attentional and memory resources (a position similar to Skehan’s Limited Attentional Capacity Model). In our study, we examined both these variables and also their interaction.
According to *Cognition Hypothesis* when L2 learners attempt to meet the extra-linguistic cognitive demands of a complex task, they are likely to use more complex linguistic structures and a more varied lexis, thereby raising the linguistic complexity of the performance. L2 learners are thus able to allocate attention to two aspects of the task without any detrimental effect on either, an assertion of the claims of Wickens (1992, 2007). The negative effects of complexity on attentional allocation may be seen, however, only in matters of fluency. In Robinson’s studies (1995, 2001) and other studies based on *Cognition hypothesis*, similar effects were cited. Very few studies had looked into the effects of interaction of resource-directing and resource-dispersing dimensions on L2 performance. One of these few studies, Gilabert (2007) showed positive effects of interaction between resource-directing and resource-dispersion dimensions of task complexity on language performance when complex tasks were given planning time, the learners showed better language performance (complexity, accuracy and fluency).

An aspect often ignored in the Skehan-Robinson debate is how proficiency of learners affects task complexity manipulations. Studies by Wigglesworth (1997) and Kawauchi (2005) have shown that high proficiency learners benefit more from increases in task complexity. In this thesis, apart from the general interest in task complexity and second language writing, the proficiency effects on this relationship were also explored.

A third aspect was to see the correlation between task complexity manipulations (and proficiency) and perceptions of task difficulty. These are two (of the three) factors that Robinson isolated in his Triadic Componential Framework.
6.2 Empirically investigating effects of cognitive task complexity and interaction

Chapters 3, 4, and 5 reported on the empirical studies into task-based L2 performance that form the experimental basis of the present thesis. Referring to the *Cognition Hypothesis*, these studies focused on Robinson’s (2005) claims about effects of cognitive task complexity and interaction. In all studies conducted as part of this research, five measures for linguistic performance: syntactic complexity, syntactic variety, lexical density, lexical variety and accuracy, and three measures for discourse: frequency of reference markers, frequency of linkers and coherence were used.

In **Study 1**, 40 learners wrote four essays on two topics which varied in task complexity in the resource-directed dimension. In Study 1, 20 learners were good argumentators and 20 weak argumentators. Study 1 was confirmed with a wider set of tasks in **Study 2**, which had three sub-studies. **Study 2A** looked at how proficiency of the learners affected task performance when complexity was manipulated along resource directedness dimension. **Study 2B** looked at the interaction of two dimensions of task complexity – [±complex] and [±pre-task planning] – on L2 task performance. **Study 2C** studied the relationship between task complexity and the writers’ perception of task difficulty. By means of a 2×2 design, the experimental investigations manipulated cognitive task complexity as a within-participant factor and interaction as a between-participants factor.
6.3 Results and discussion

6.3.1 Study 1: [-complex] and [+complex] tasks

By means of analysis of variance (ANOVA), statistical analysis was conducted for effects of cognitive task complexity (within-participant) and interaction (between-participants) in L2 writing.

To reiterate, the study specific hypotheses for Study 1 were as follows:

Hypothesis 1: Learners will show an increase in levels of accuracy in writing [+complex] than [-complex] tasks.

Hypothesis 2: Learners will show greater linguistic complexity (syntactic and lexical) in writing [+complex] than [-complex] tasks.

Hypothesis 3: Learners will show better coherence and a greater use of cohesive devices in writing [+complex] than [-complex] tasks.

Table 6.1 will present a graphical summary of these findings. Recall that there was a topic effect, so we report the summary separately for the two topics.

In Table 6.1 on Smoking, both Good Argumentators (GA) and Weak Argumentators (WA) showed a significant increase only in coherence when complexity of task was increased. In the rest of the measures, there was no significant decrease or increase in either groups. Therefore, for Smoking, Hypothesis 1 and Hypothesis 2 were not confirmed but Hypothesis 3 was partially confirmed.
Table 6.1: Performance on complex tasks with respect to simple tasks in Study 1

<table>
<thead>
<tr>
<th>Measure</th>
<th>Smoking Good argumentators</th>
<th>Smoking Weak argumentators</th>
<th>Product description Good argumentators</th>
<th>Product description Weak argumentators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntactic complexity</td>
<td>ns</td>
<td>ns</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Syntactic variety</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Lexical variety</td>
<td>ns</td>
<td>ns</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Lexical density</td>
<td>ns</td>
<td>ns</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Accuracy</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Reference markers</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Linkers</td>
<td>ns</td>
<td>ns</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Coherence</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>1 and 2 not confirmed, 3 partially confirmed</td>
<td>1 not confirmed, 2 partially confirmed</td>
<td>1 not confirmed, 2 partially confirmed</td>
<td>3 partially confirmed</td>
</tr>
</tbody>
</table>

↑significant increase; ↓significant decrease; ns: not significant

In *Product description* task (as shown in Table 6.1), both Good Argumentators and Weak Argumentators showed no significant decrease or increase in accuracy, so Hypothesis 1 was not confirmed. A significant increase in syntactic complexity but not syntactic variety, and a significant decrease in lexical variety and lexical density was seen for *Product description* task. Therefore Hypothesis 2 was confirmed only for syntactic complexity. Though reference markers showed no significant increase or decrease, linkers and coherence showed significant increase on complex tasks. Therefore Hypothesis 3 was partially confirmed. Therefore, *Smoking* (in an informal interview with students), was seen as a less argumentative task, neither Skehan nor Robinson’s hypothesis could be confirmed. However in *Product description* task only the first part of Hypothesis 2 was confirmed. Learners (both GA and WA) used more complex sentences in the complex tasks with respect to simple tasks, with no effect on accuracy, and a detrimental effect on lexical complexity.
With relation to lexical complexity, it will be shown that the measure used in the study may have not been sensitive to task manipulation (Section 6.6).

As shown in Section 2.4, in studies conducted based on the *Cognition Hypothesis*, significant increases in **linguistic complexity** and **accuracy** were found. Robinson (1995) manipulated the tasks on Here-and-Now and There-and-Then which resulted in an increase in complexity and accuracy in L2 performance. In Rahimpour (1997) where narrative tasks were manipulated both at the level of their cognitive complexity (Here-and-Now vs. There-and-Then) and their condition (open vs. closed); closed tasks (+complex) generated higher accuracy. In a previous study (Nair 2008), it was found that accuracy was not affected with increase in complexity on complex (argumentative) tasks. Even though in this study, accuracy records no change unlike in Robinson (1995) and Rahimpour (1997), this study cannot be said to support Skehan’s Limited capacity attentional model, since there is no decrease in accuracy as predicted by Skehan’s model. Therefore Study 1 appears to provide **more support for the Robinson model** rather than the Skehan model. On the new measures used, linkers and coherence recorded a significant increase in complex versions for *Product description* task and only on coherence in *Smoking* task. In an earlier study (Michel 2011), analysis focused first on the overall frequency and occurrence of conjunctions and then five task relevant conjunctions were examined. Results showed an increase in frequency of conjunctions (not in occurrence) in complex tasks in general. However there was neither an increase in frequency nor a use of task specific conjunctions on complex tasks. This was contradictory to Robinson’s and Gilabert’s (2007) predictions that increased cognitive
task complexity focuses the L2 learner’s attention towards task specific structures. This study showed significant increases in all measures on Product description task for complex tasks, thereby providing support to Robinson and Gilabert’s claim. This result can be justified. In writing a description, tight coherence is often not necessary and the sentences can be loosely strung together, the linearity of presentation lends coherence to the text. However, in writing [+complex] task, here argumentative essays, a clear thesis and supporting evidence needs to be put together. This requires overt use of cohesive (particularly linkers) devices to bind together the main claim with evidence, topic shifts and clear markers to indicate and to present the essay in an organized manner. Therefore, a better coherence and more frequent use of cohesive devices are to be expected (and were found) on one topic (Product description) in a [+complex] writing when compared to [-complex] writing. No increases were however found in reference cohesion. Reference cohesion is an aspect of grammatical knowledge, which does not necessarily change with respect to task type or complexity of task. Therefore, it can be said that Hypothesis 3 was partially confirmed.

6.3.2 Study 2A: Proficiency and ±complex tasks

Chapter 5 reported on Study 2A, which used experimental designs similar to Study 1 but improved the reliability of its measures, analyses, and interpretations (based on the findings of this first investigation), by using more task topics (5 topics: Social Networking sites, Movies, Product description, Love Marriage vs. Arranged Marriage; and Globalization). It also looked at language proficiency as an independent variable. 30 learners (15 High proficiency and 15 low proficiency) were selected for the study on the
basis of a proficiency test. Learners performed on 5 simple and 5 complex tasks, which varied on the dimension of resource direction as in Study 1. No task topic effect was seen in Study 2. All written data were examined for syntactic complexity, syntactic variety, lexical variety, lexical density, accuracy, reference makers, linkers and coherence. In the group, a 2x2 design was used, for two levels of task complexity (simple and complex) and two groups (High proficiency and low proficiency) for each of the eight measures. Correlation of task complexity with perception of task difficulty was also conducted (reported in §6.4).

The hypotheses for Study 2A are reiterated here.

Study 2A: Proficiency, task complexity and writing

Hypothesis 4: High proficiency learners will show better performance on all the eight measures than low proficiency learners on [+complex] and [-complex] tasks.

Hypothesis 5: High proficiency learners will show greater linguistic complexity (syntactic and lexical) on [+complex] tasks than low proficiency learners.

Hypothesis 6: High proficiency learners will show better coherence and a greater use of cohesive devices on [+complex] tasks than low proficiency learners.

Table 6.2 gives a summary of the performance of learners in Study 2A on complex tasks in a graphical form.
Table 6.2: Performance on [+complex] tasks with respect to [-complex] tasks in Study 2A

<table>
<thead>
<tr>
<th>Measure</th>
<th>High Proficiency</th>
<th>Low Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntactic complexity</td>
<td>↑</td>
<td>ns</td>
</tr>
<tr>
<td>Syntactic variety</td>
<td>↑</td>
<td>ns</td>
</tr>
<tr>
<td>Lexical variety</td>
<td>ns</td>
<td>↓</td>
</tr>
<tr>
<td>Lexical density</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>ns</td>
<td>↓</td>
</tr>
<tr>
<td>Reference markers</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Linkers</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Coherence</td>
<td>↑</td>
<td></td>
</tr>
<tr>
<td>Hypotheses</td>
<td>4 fully confirmed, 5 partially confirmed, 6 partially confirmed</td>
<td></td>
</tr>
</tbody>
</table>

Significant increase; ↓ significant decrease; ns: not significant

High proficiency learners performed significantly better than low proficiency learners on all tasks and all measures as expected, therefore confirming Hypothesis 4. In high proficiency group, complex tasks showed a significant increase in syntactic complexity, syntactic variety and no difference in lexical density and lexical variety, thereby partially confirming Hypothesis 5. Accuracy, as in Study 1, recorded no significant change. Reference markers and linkers showed no significant increase or decrease, however a significant increase in coherence was seen for [+complex] tasks for both the groups. Therefore, Hypothesis 6 is partially confirmed. The results in high proficiency group were similar to findings in Study 1 (with increase in complexity, syntactic complexity and coherence increases with no difference in accuracy). However the lexical density and lexical variety which decreased in Study 1 recorded no difference in Study 2A in high proficiency learners. These results fully confirm Hypothesis 4 but only partially confirm Hypothesis 5 and 6.

Interestingly, in the low proficiency group, complex tasks showed a significant increase in coherence but a significant decrease in accuracy, lexical density and lexical variety.
While in Study 1, and earlier studies, accuracy remained the same in simple and complex versions, in the lower proficiency group it decreased in complex task – a finding which is similar to findings of Skehan. However, the syntactic complexity, syntactic variety, reference markers and linkers record no difference. This would mean that in handling cognitively complex tasks, neither accuracy nor complexity increases– a finding which ‘appears’ to support Skehan’s model, but in reality it does not. To support Skehan’s model, either the linguistic complexity or accuracy should increase. Going by Schmidt (2001), the complexity would increase (meaning based) rather than accuracy (form based). In Study 2A, we find neither of the two increasing, thereby not providing any support for Skehan’s model (1996).

The results indicate a significant effect of proficiency level with respect to syntactic complexity, syntactic variety, lexical variety, lexical density, accuracy, linkers and coherence. The high proficiency group wrote essays with more complex structures, with more varied structural patterns, and their sentences were more likely to be linked and wrote more coherent texts, when compared with the writing of the low proficiency group. No effect of proficiency was found on the use of reference markers.

During the review of planning time and here-and-now studies, trade-off effects had been hypothesized between different dimensions of production. Skehan and Foster (1997) had shown that gains in complexity are always at the expenses of accuracy. In oral productions, fluency was always at the expense of accuracy (Yuan & Ellis 2003), and the reason given was a competition for attention. However, evidence from the present study
and earlier studies (Table 6.3) show that a focused attention on complexity is not at the expense of accuracy especially for high proficiency learners.

In earlier studies on proficiency and task complexity (cf Table 6.3), the interaction between proficiency and task complexity showed no trade-off effect between complexity and accuracy on complex tasks for high proficiency learners. The trade-off was more prominent in fluency, where it was seen that with increases in task complexity, though complexity and accuracy increased, fluency decreased.

Table 6.3: Performance on [+complex] tasks with respect to [-complex] tasks for high proficiency learners with respect to low proficiency learners in earlier studies

<table>
<thead>
<tr>
<th>Complexity</th>
<th>Syntactic</th>
<th>Lexical</th>
<th>Accuracy</th>
<th>Fluency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kawauchi (2005)</td>
<td>↑</td>
<td>ns</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Kuiken, Mos &amp; Vedder (2005)</td>
<td>↑</td>
<td>ns</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Ishikawa (2006)</td>
<td>↑</td>
<td>↑</td>
<td>ns</td>
<td>↑</td>
</tr>
<tr>
<td>Kuiken &amp; Vedder (2007)</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Kuiken &amp; Vedder (2008)</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Abdollahzadeh &amp; Kashani (2011)</td>
<td>↑</td>
<td>-</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Malicka et al (2012)</td>
<td>↑</td>
<td>-</td>
<td>-</td>
<td>↑</td>
</tr>
</tbody>
</table>

↑ significant increase; ↓ significant decrease; ns: not significant

In this study, high proficiency learners gained in complexity by the increase in task complexity. This study has shown that in high proficiency learners, though complexity increases in complex tasks, there is no significant increase or decrease in accuracy. However, in low proficiency learners, lexical variety, lexical density and accuracy showed significant decrease in [+ complex] tasks. The results clearly suggest that both groups react to task complexity in different ways, and it affects their linguistic
performance differently. Many researchers who believe in a multiple-resources theory also seem to suggest that complexity and accuracy compete for attention. For example, Wickens’ (1984) claims that when two tasks are being carried out simultaneously and draw from the same resource pool, confusion between tasks may lead to poor performance. However, the fact that complexity and accuracy do not seem to compete for attention would necessitate an argument that probably attention to micro level of form (editing, monitoring and error correction) draws from a different resource pool than attention to complexity and variety.

### 6.3.3 Study 2B: Interaction of ±complex and pre-task

In Study 2B, which was done with the same group as Study 2A, Robinson’s dimension of resource-dispersion was used as a variable, and its interaction with resource direction was the focus of the study. Resource-dispersion, which was treated as planning time in Robinson’s studies, was operationalized as the (non) availability of a pre-task, where learners received help in task content and organization. In Study 2B, as in Study 2A, two proficiency groups were used. The correlation (§6.4) of task complexity with perception of task difficulty was also examined.

The hypotheses for Study 2B are as follows:

**Hypothesis 7:** In both groups, when [+complex] tasks are provided with a pre-task, learner writing will show greater linguistic complexity (syntactic and lexical) than when they are provided without pre-tasks.
**Hypothesis 8:** In both groups, when [+complex] tasks are provided with a pre-task, learner writing will show greater coherence and a greater use of cohesive devices than when they are provided without pre-tasks.

**Hypothesis 9:** In both groups, when [-complex] tasks are provided with/without a pre-task, learner writing will show no difference.

Table 6.4 and Table 6.5 give a summary of the performance of learners in Study 2B on the interaction between complex tasks and pre-task.

<table>
<thead>
<tr>
<th>Measure</th>
<th>High Proficiency</th>
<th>Low Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntactic complexity</td>
<td>↑</td>
<td>ns</td>
</tr>
<tr>
<td>Syntactic variety</td>
<td>↓</td>
<td>ns</td>
</tr>
<tr>
<td>Lexical variety</td>
<td>↑</td>
<td>ns</td>
</tr>
<tr>
<td>Lexical density</td>
<td>ns</td>
<td>↑</td>
</tr>
<tr>
<td>Accuracy</td>
<td>ns</td>
<td>↑</td>
</tr>
<tr>
<td>Reference markers</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Linkers</td>
<td>↑</td>
<td>ns</td>
</tr>
<tr>
<td>Coherence</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>7 and 8 partially confirmed</td>
<td>7 and 8 partially confirmed</td>
</tr>
</tbody>
</table>

As in Table 6.4, in high proficiency learners, presence of pre-tasks for [+complex] tasks led to a significant increase in syntactic complexity, lexical variety and linkers and a significant decrease in syntactic variety and coherence and no effects on lexical density, accuracy and reference markers. These results are similar to Study 1 and Study 2A. However in this study, lexical variety increases and coherence drops for high proficiency learners.
In low proficiency learners, presence of pre-tasks in complex tasks, led to a significant increase in accuracy, lexical variety and coherence and a significant decrease in lexical density. Presence of pre-tasks for [+complex] tasks had no significant effects on syntactic complexity, syntactic variety, reference markers and linkers.

The results of this study partially confirm Hypotheses 7 and Hypothesis 8. These results are partially in line with Gilabert’s (2007) study where tasks made simple along planning time but complex along displaced, past time reference, triggered lexically complex language as well as increased attention to form, with only fluency being affected negatively.

In a previous study (Nair 2008), it was found that pre-task availability significantly increased syntactic complexity and lexical variety in complex argumentative tasks than simple narrative tasks. These findings were in line with previous research (Ortega 1999; partially with Gilabert 2007) where cognitively complex tasks benefitted more from planning than complex tasks without planning time. Results for high proficiency learners in Study 2B confirm the same. However in low proficiency learners the results partially confirm to Levkina & Gilabert 2012, where no significant effects on accuracy and syntactic complexity were found.

Let us now look at how [-complex] tasks interact with pre-tasks.
Table 6.5: Interaction between [-complex tasks] and presence of pre-tasks

<table>
<thead>
<tr>
<th>Measure</th>
<th>High Proficiency</th>
<th>Low Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntactic complexity</td>
<td>↑</td>
<td>ns</td>
</tr>
<tr>
<td>Syntactic variety</td>
<td>ns</td>
<td>↓</td>
</tr>
<tr>
<td>Lexical variety</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Lexical density</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Accuracy</td>
<td>ns</td>
<td>ns</td>
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<tr>
<td>Reference markers</td>
<td>ns</td>
<td>ns</td>
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<tr>
<td>Linkers</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Coherence</td>
<td>↓</td>
<td>ns</td>
</tr>
</tbody>
</table>

Hypothesis: 9 fully confirmed 9 fully confirmed

significant increase; significant decrease; ns: not significant

It can be seen (cf Table 6.5) that there was no change in six of the eight measures of writing when [-complex] tasks were provided with pre-tasks, suggesting that the availability of pre-tasks contributes little to writing performance when the task is not complex. Comparing this with trends shown in Table 6.4, in [+complex] condition, availability of pre-tasks bring about significant differences in writing, making it more complex and cohesive in high proficiency, and more lexically varied and accurate in low proficiency. Therefore, Hypotheses 7 and 8 are partially confirmed for both groups of learners. Hypothesis 9 in this study is fully confirmed as six of the eight measures did not show any significant difference when pre-tasks were provided for [-complex] tasks. Also, the two measures on which high proficiency learners showed significant difference (syntactic complexity and coherence) and low proficiency learners (syntactic variety and lexical density) are not the same.

The findings are in league with previous research (Wigglesworth 1997; Kawauchi 2005), where it was found that planned task allowed high proficiency level candidates to produce more complex language (i.e., subordinate clauses) in the more difficult task.
Also the findings for high proficiency learners are partially in line with Robinson’s hypothesis that simultaneous manipulation along (±) resource-directed and resource-dispersion dimensions will lead to complex language.

However simultaneous manipulation was found to have a beneficial effect only on accuracy for [+complex] tasks in low proficiency learners. The reason, it is believed is that learners are predisposed to use planning time (made available here by reduction of cognitive load because of the presence of a pre-task) to pay attention to organize and encode the propositional content rather than search their innate linguistic system to increase accuracy. These findings on complexity and accuracy can be explained by a discussion on the attentional resource available for a task.

In a task which is made simple along resource-dispersing dimension and made complex along resource-directing dimension, a simultaneous focus on complexity and accuracy is possible (only in high proficiency learners). In the complex planned version of our tasks, the complexity of writing increased for high proficiency learners, with no change in accuracy. In case of low proficiency learners, a significant increase in accuracy scores was found, though syntactic complexity decreased (not significant) when pre-tasks were provided.

However, what is of importance in this study is that for Study 1, for high proficiency learners in Study 2A and for high proficiency learners in Study 2B, increases in complexity do not seem to reduce monitoring and thereby accuracy: a strong support for the multiple-resources theory rather than the limited capacity theory of attention. Similar
results were found in a previous research (Nair 2008) where it was found that high proficiency learners showed an increase in complexity without reducing accuracy.

The findings of Study 2A and Study 2B clearly validate the claims of Robinson’s Cognition Hypothesis, though proficiency needs to be taken into account. Findings of these studies show that learners of varying proficiency levels benefit in different ways and that high proficiency learners (as compared to low proficiency learners) benefit more from manipulations in task complexity.

6.4 Task difficulty and task complexity

Robinson (2001), Gilabert (2005) accessed perceptions of task difficulty, anxiety, interest level, motivation and perception of ability in their study. Results of these studies showed that learners rated the complex version of a task to be more difficult overall, and more stressful than the simple version. It was found in these studies that learner’s perception of ability correlated with their fluency in performing the task.

6.4.1 ±complex tasks

Robinson (2001), Gilabert (2005) accessed perceptions of task difficulty, anxiety, interest level, motivation and perception of ability in their study. Results showed that learners rated the complex version of task to be more difficult overall, and more stressful than the simple version. It was found in these studies that learner’s perception of ability correlated with their fluency in performing the task.
In this study, no significant differences were found for low proficiency learners in their perception of ease, stress, confidence and the amount of thinking. However, their perception of interest showed a decrease (p<0.05) in the [+complex] condition. No significant difference in perception of ease, confidence and interest were found for high proficiency learners. The perception of relaxed feeling, significantly (p<0.023*) decreases in [+complex] conditions. However thinking, significantly (p<0.001**) increased in [+complex] tasks.

Therefore, both low and high proficiency learners found [+complex] tasks to be more stressful than [-complex] tasks. For both low and high proficiency learners, confidence in the performance of tasks remained uniform on increasing complexity across resource-directing variable. Across proficiency levels, both interest and thinking variable were found to significantly vary. [+complex] tasks were found to be less interesting and required more thinking than [-complex] tasks across proficiency levels.

6.4.2 ±Pre-tasks with [+complex] tasks

An important question that arises from studies in task Complexity is whether task complexity is the same as task difficulty or not. Robinson, in his Triadic Componential Framework (2001) differentiates between task complexity, task difficulty and task conditions. Task difficulty is determined by learner variables (e.g. confidence, motivation, stress, ease, etc.).

In high proficiency learners, complex tasks were shown to impose greater cognitive demand on learners and therefore were perceived as more difficult (not significant) and
stressful, though generating uniform levels of confidence. They also seemed to generate higher levels of thinking. Complex tasks were found to be less interesting than [-complex] tasks across proficiency levels.

In low proficiency learners it was found that [+complex] tasks were perceived to be more difficult than [-complex] tasks, though the results were not significant. Perception of stress/relaxed feeling follows the same pattern as difficulty. This is because stress is related to not knowing what to say, how best to organize the arguments, their heightened search for words and their familiarity with task content. It was found that the simple tasks (easy) were done in a more relaxed way than complex task (difficult). Learners’ perception of interest did not vary from one condition to another. This is partly similar to Robinson (2001) and Gilabert’s (2007) findings according to which difficulty and stress are significantly higher on more complex version of the task. This partially confirms Hypothesis 10 of this study: Complex tasks will be perceived as more difficult, more stressful, and generating more thinking and less confidence than [-complex] tasks by both groups.

Pre-tasks did not show any significant difference for [+complex] tasks i.e. Condition 1 vs. Condition 3, for both the groups. However for [-complex] tasks, i.e. Condition 2 vs. Condition 4, presence of pre-tasks decreased the difficulty level of the tasks for low proficiency learners. In high proficiency learners, presence of pre-tasks generated more confidence (significant). Contradictory to the hypothesis, tasks in complex tasks (± pre-tasks) were perceived to be easier than [-complex] tasks (± pre-tasks) in both the groups.
Therefore the results only partially confirm Hypothesis 11: [+Complex-PT] tasks will be perceived as more difficult, more stressful, and generating more thinking than [+complex+ PT] which in turn will be seen as more difficult than [-complex-PT] and [-complex+ PT] for both groups.

6.5 Critique of the measures used in the study

In this study Mean T-Unit Length (MTUL) (Hunt 1965) was used to measure syntactic complexity, type-token ratio (Guiraud index), Quirk et al. (2001) to measure syntactic variety, lexical variety was analyzed by different types of words divided by the total number of words, lexical density was analyzed by ratio of different content words to ratio of different functional words, frequency of reference markers and linkers and total number of error-free T-units to calculate accuracy. Coherence was measured on a 5-point Likert scale (Crossley & McNamara 2010). In this section a critically analysis of the production measures is performed to examine which measures were found sensitive in studies on task complexity.

Syntactic Complexity and Syntactic Variety: Mean length of T-units, originally used by Hunt (1965) was used to study syntactic complexity. The measure has then been modified as C nodes per T-unit (Skehan & Foster 1996; Robinson, Ting & Urwin 1995) and S nodes per T-unit (Kawauchi 1998; Rahimpour 1997) by researchers to study speaking and writing respectively. In this study Mean T-unit Length or MTUL was defined as the total number of T-units in a text divided by the total number of words in a text (Hunt, 1965). MTUL is a measure of syntactic complexity of a text and has proved to be a sensitive measure to test effects of task complexity in writing (Kuiken & Vedder
2005, 2007). In a previous study MTUL was found to be a sensitive measure to task complexity and proficiency (Nair 2008).

In this study MTUL was found to increase progressively with proficiency. This proved that with increasing proficiency, sentences tend to become more complex, and more ideas get packed into sentences. In the study of task complexity, it is expected that resource-directing tasks which were argumentative required learners to move to a syntactic mode, and necessitated the use of complex sentences, like *I believe..., I think..., I am of the opinion that...* and logical interpropositional coherence markers like *because... this is because..., the reason..., moreover...* This would definitely increase the number of words used in a T-unit. In keeping with this line of argument, it was found that [+complex] argumentative tasks did raise the MTUL score. This research found that MTUL was sensitive to record the differences in linguistic complexity of task performance, when cognitive complexity of a task increased. MTUL increased for [+complex] and for high proficiency learners (in comparison with [-complex] and low proficiency learners).

A new measure, syntactic variety was designed to parallel lexical variety to see whether syntactic variety affected by task complexity. Quirk et al. (2001) classification of verb patterns was used to calculate a type-token ratio (Guiraud’s index) for these patterns. A previous study (Nair 2008) showed that learners at lower proficiency levels tend to use the ‘be’ forms (*is, am, are, was, were*) and use simple transitive verbs more than verbs which have a sentence (for e.g. *I believe the food is good*), or a participle as a complement (*You can stay in a room decorated with flowers*). This led us to believe that with increasing proficiency, the choice of verb patterns also increases and tasks which are
more complex, would necessitate the use of more complex verb patterns. However, this assumption was not borne out by the study. Unlike syntactic complexity, syntactic variety did not prove to be sensitive measure to study effect of task manipulations on linguistic performance. Though in high proficiency and low proficiency comparisons, it was found that high proficiency learners used syntactically more varied constructions than low proficiency learners, with task manipulations, it did not show a ‘consistent’ increase with [+complex], or [+complex –pre-tasks]. Therefore syntactic variety proved to be a sensitive measure for proficiency, but not task manipulation.

Lexical Variety and Density: Two measures, Lexical variety and Lexical density, were used to measure lexical sophistication of second language writing in this study. Lexical variety was studied by dividing the total number of different words (frequency of both content and function words) in the text by the total number of words in the text. Lexical density was calculated by dividing the ratio of content words in the text (Noun, Verb, Adjective and Adverb) to the ratio of function words in the text. When a task is deemed difficult/complex, the information is repeatedly processed and the less activated words get a chance to be activated and used. This goes into increasing the variety of words used in the writing. In earlier studies (Rahimpour 1997; Kuiken & Vedder 2005, 2007), lexical complexity proved to be a sensitive measure and was found to increase with increase in task complexity.

Both lexical variety and lexical density measures were sensitive to proficiency. Lexical density and lexical variety significantly increase for high proficiency learners as compared to low proficiency learners. However, this study again showed inconsistent
results for these measures for studying effects of task complexity on production. In Study 1, no significant difference was found in the good argumentator group, and a decrease was found for weak argumentator group (§4.4.3). In Study 2A, no significant difference for high proficiency and a decrease for low proficiency (§5.2) was found. In Study 2B an increase was seen for (+complex+ pre-task) in high proficiency and low proficiency (§5.3).

**Accuracy:** In the present study it was found that the accuracy measures showed no difference between ±pre-task condition or ±resource-directed condition. This could be explained by critically analyzing the measure used for the study. In the study, accuracy was measured as ratio of the error free T-units to the total number of T-units in the written texts. This meant that all T-units with at least one error were removed from the count. Such a measure did not distinguish between T-units with lesser errors and T-units with many errors. For example, Indian learners often overuse (at times underuse) the definite article and wrongly use prepositions. The accuracy measure used did not distinguish such errors from more grave ones like subject-verb agreement, argument structure errors and morphological errors. It was therefore felt that *a more sensitive measure should have been used to capture accuracy of production*, rather than the commonly used accuracy measure, i.e. error free T-units.

**Discourse and Coherence:** Two new measures were used in this study to measure cohesion of second language writing: Reference Markers and conjunctive cohesion/linkers. It was analyzed by calculating the frequency of reference markers and linkers. Coherence was analyzed by taking sum (of points on 7 coherence themes – structure,
clarity, topic sentence, etc.– selected on the basis of essay rating rubric (Crossley & McNamara, 2010)) after assigning points on a 5 point Likert scale (5-highest and 1-lowest).

*Both reference markers and linkers did not prove to be sensitive measure for proficiency and task manipulation.* In Study 1, there was no significant difference for both the groups for reference markers, (§4.4.3); no significant difference for high proficiency and low proficiency in Study 2A (§5.2.3) and Study 2B (§5.3.2). In Study 1, there was a significant increase in type-token ratio of linkers for both the groups (§4.4.3); no significant difference for high proficiency and low proficiency in Study 2A (§5.2.3); increased for (+complex+ pre-task) in high proficiency and no significance for low proficiency in Study 2B (§5.3.2). In an earlier study (Michel 2011), results showed an increase in frequency of conjunctions (not in occurrence) for complex tasks in general. However, the present analysis on the frequency of reference markers and linkers is not able to detect such a difference.

*Coherence proved to be a sensitive measure, both in proficiency and task manipulation.* Coherence in general was higher in higher proficiency writing than lower proficiency writing. Also, for complex tasks, coherence was higher than [-complex] tasks, for both groups, when only resource-directedness was manipulated. However, when both resource-directedness and resource-dispersion variable were manipulated, i.e., in planned complex tasks coherence was found to be significantly low in high proficiency learners.
6.6 Implications for Task-Based Research

Let us now look at the implications of the three studies that formed a part of this dissertation for task-based research.

6.6.1 Task complexity and interlanguage development

The concept of ‘task’ has become an important element in syllabus design, classroom teaching and learner assessment ever since Task Based Language Teaching (TBLT) was introduced. In a task-based curriculum, a task need neither be too simple nor be too complex (Nunan 1989). With the developing interlanguage, the tasks need to become gradually complex, so that the task pushes the learners to move from one interlanguage stage to the next. The TBLT subsumes Swain’s idea of comprehensible output (1985) which claimed that by producing language in communicative contexts, a learner moves from one stage to the next. Also, in performing a task, the meaning (semantic processing) needs to get a form (syntactic processing) thereby pushing the boundaries of learner’s grammatical/ discoursal knowledge.

The kind of tasks that learner perform, lead them to push their output and test their hypothesis. Complex tasks (tasks with high cognitive load) provide these opportunities. The cognitive load of tasks will be matched by cognitive effort made by the learners in performing the tasks. When the cognitive demands imposed by tasks can be met by learners, the effort to communicate will push the learners to the limits of their current resources, and beyond, stimulating language development (Robinson 1995). This has been argued by Krashen in his book, The Input Hypothesis (1985) (that learners acquire
language best by understanding input that is slightly beyond their current level of competence (i+1). Thus being pushed in output is desirable, and it involves some effort on the learner to analyze the unused or new linguistic forms, thereby leading to interlanguage development.

However, when cognitive load of a task is ‘way above’ the resources available to a learner, the increased cognitive complexity have detrimental effects– by lowering overall task performance in terms of complexity, accuracy and fluency. Therefore, gradually increasing task complexity (while grading tasks) is necessary in a task-based syllabus so that there is a uniform distribution of cognitive load. When learners are repeatedly exposed to tasks which are complex (in a small quantity), the structures that are to be used in the task (complexity and accuracy) become automaticized, and release attentional capacity to meet other aspects of the task. Automaticization is possible only when learners see patterns in language and language use, and this enables them to organize information and store them as chunks in the long-Term Memory. When information is processed, sorted and stored in the long-term memory, the stored information is better able to scaffold the learning of new information. Thus old information uses up less working memory space, and requires less cognitive effort. Less load on the Working Memory, results in a higher activation of less accessed linguistic forms and their consequent use (Robinson 1995).

Not only input and output, but other variables like motivation, confidence, anxiety, etc. also play a key role in acquisition (Dornyei & Otto 1998). Low motivation and high anxiety can combine to raise the affective filter and form a ‘mental block’ preventing...
comprehensible input from being used for acquisition (Krashen 1985). With the developing interlanguage, the tasks need to become gradually complex, so that the task pushes the learners to move from one interlanguage stage to the next. Also, being pushed in output is desirable, and it involves some effort on the learner to analyze the unused or new linguistic forms, thereby leading to interlanguage development. Therefore, task sequencing holds major significance in interlanguage development and language learning.

6.6.2 Implications for task sequencing

This research presented fresh evidence that resource-directing tasks (which looked at reasoning demands) were ‘simple’ (and perceived as easy) and +resource-directing tasks were ‘complex’ and perceived to be difficult by both high proficiency and low proficiency learners. Also, these simple and complex tasks had differential effects on linguistic performance, thereby justifying that tasks can be sequenced along these lines.

A second contribution to the issue of task sequencing was to find how ‘complex’ tasks could be scaffolded for learners. To recall, four conditions: [+complex, -pre-task], [+complex, +pre-task], [-complex, -pre-task], [-complex, +pre-task] were studied in Study 2B. Evidence from Study 2B clearly shows that pre-tasks have beneficial effects for tasks for both the groups. Though a clear sequence need not be propagated using all the four conditions, The conditions can be sequentially organized into two ways, in both pre-tasks need to be presented before the main task. This sequence is supported by learner performance. In effect, this sequence simply translates into presentation of simple tasks first with guidance in language, content and organization and next, without
guidance (if the learners are able to show similar performance without guidance, then the structures to be used have been automaticized and it is time for a more complex task to be presented). Similarly a complex task can be presented, first with guidance in language, content and organization and then without guidance. Again, when the structures are automaticized, a more complex task is presented. This model of task presentation that this study presents, lends support to Vygotsky’s (1978) Zone of proximal development in learning, and Krashen’s (1985) i+1 in language development.

### 6.6.3 Implications for writing assessment

Having spoken about the implications of this study for task sequencing and syllabus design, the implications on writing assessment are explored. In usual practices writing is assessed holistically (with a global measure) or with relation to the analytic scale of language, content and organization (on a scale of 1 to 5). The study conducted reinforces the need for more objective measures (of complexity, accuracy and organization) in writing assessment along with analytic measures.

However a word of caution is necessary here. The objective measures work well when individual scripts are compared, but may not be easy to compute in a test condition, where a writing item usually has ten or fifteen marks allotted to it. Therefore, a scheme for complexity index (syntactic complexity and lexical complexity) needs to be worked out for a particular task before objective measures can be used. For this index, large scale writing assessments need to be undertaken to arrive at a valid scale. For instance, from this study, a tentative scale could be:
MTUL  |  14 to 16  |  High Proficiency  
11 to 13  |  Medium Proficiency  
8 to 10  |  Low Proficiency  
LD  |  2 to 3  |  High Proficiency  
1 to 2  |  Medium Proficiency  
0 to 1  |  Low Proficiency  
LV  |  0.50 to 0.54  |  High Proficiency  
0.45 to 0.49  |  Medium Proficiency  
0.40 to 0.44  |  Low Proficiency  

These are only illustrative figures, but such scales would require similar studies for validation.

**6.6.4 Implications for teaching of writing**

The *Cognition Hypothesis* has clear implications for classroom instruction because the conceptual and linguistic requirements a task requires would encourage task selection in the classroom for teaching. It will also help learners understand what aspects are being focused when a task which is based on a particular dimension is taught. This will help teachers in understanding what to focus on and how to focus on different aspects. The results from the studies in this thesis show that different proficiency learners require different kinds of scaffolds and teaching. Increasing complexity along resource-directed dimension led to an increase in syntactic complexity, syntactic variety and coherence. Accuracy, however, did not drop. Therefore high proficiency learners can work on complex tasks without showing trade-off effects on other measures. This however does not work for low proficiency learners where accuracy may drop for complex tasks.
6.7 Limitations of the Study and Future Research

Inevitably, there are some limitations to the study. They have mainly to do with the task conditions and the controlling of intervening variables.

- **Controlling of intervening variables:** The study primarily dealt with the analysis of two cognitive variables (resource-directed and resource-dispersion) and some intervening variables were inadvertently not taken into account. Variables that can be manipulated in a task-based syllabus were the primary focus. However, other learner factors that could affect the task performance, such as learner’s inclination to write, and their background knowledge about task themes to some extent (topic effect in Study 1 where the two tasks were not equally argumentative) were not taken into account.

- As the resource-directed dimension in this task required argumentation, it is important to look at the argumentative ability of learners before administering such tasks. In Study 1, it was found that only the learners who understood the prompts and demands of such argumentative tasks, wrote in an argumentative manner. Since the results vary on perception of this complexity, it is an important factor and should be taken into account, before conducting similar experiments.

- Guiraud’s index was not used for calculating lexical variety and lexical density, so a longer text could have led to differences in lexical variety and lexical density. Lexical frequency profile (Laufer 1995) would have been a good tool to measure lexical sophistication at low proficiency and high proficiency levels.

- Malvern and Richards (1997) argue that the D-value is a valid measure of lexical diversity because it does not depend on the length of the sample, and it uses all
the words produced by the participants (Jarvis 2002). It would have been a good measure since it would have taken all the words used.

- Only the changes in overall accuracy of learners were examined rather than what kind of errors were made on increases in task complexity.
- Task-specific reference markers and linkers should have been studied in particular rather than studying them in general.

Let us now look at the future research that can be conducted in this area. As tasks are used to facilitate language development (SL development), so it should be interesting to see how task complexity helps in acquisition. As tasks are a vital part of language instruction, so the sequencing decisions of task administration and syllabus design on other factors (besides the three conditions specified here) can be researched. It would be interesting to see how different kinds of tasks interact with task complexity and how it helps in learning. We know that grading of tasks according to Cognition Hypothesis helps second language learners. It would be interesting to know if L1 users show this trend (effects of task complexity in L1) as well and whether there is a difference between the two or not. Research on the effectiveness of Cognition Hypothesis in other fields as in other languages is also required. It would be interesting to study the kind of errors made when task complexity is increased. It would also be interesting to see how use of specific measures relevant to task type show differences in language production. A topic effect was found in Study 1. It was also found that learners performed better on one topic than the other. It would be interesting to see how this simultaneous manipulation effect is realised across various skills and various topics.
Given the multitude of findings in this domain, and their potential value to enhance L2 education, further synthesis may benefit both researchers and practitioners in the field of language teaching and learning.

### 6.8 Concluding remarks

In the concluding remarks it can be said that task complexity affects production in predictable ways. This is one of the strongest conclusions that can be reached from this study that modifying task complexity has specific effects on the complexity and variety of written production. Complex tasks require or push learners to use more complex and varied language, though accuracy may not necessarily show a change. The findings of the research clearly validate the claims of Robinson’s *Cognition Hypothesis*, though proficiency needs to be taken into account when such effects are used in task grading and sequencing. The findings of this research show that learners of varying proficiency levels benefit in different ways and that high proficiency learners (as compared to low proficiency learners) benefit more from manipulations in task complexity.

The second conclusion that can be reached from the results of this study conducted is that proficiency is an important variable and needs to be controlled in such experimentation. In comparing the high and the low proficiency learners, it was found that in [+complex] versions both groups show better coherence than in non-complex tasks. Syntactic complexity and variety increases only for high proficiency groups. In case of the low proficiency groups, a significant decrease in lexical density and lexical variety in [+complex] tasks was found when compared to the [-complex] tasks. Accuracy shows a
significant difference in the groups with a trade-off between complexity and accuracy for low proficiency learners in resource-dispersion dimension. While the results on syntactic complexity, syntactic variety, and accuracy in high proficiency learners support Robinson’s model of attention and task complexity, the findings on accuracy, lexical density and lexical variety in low proficiency learners lend partial support to Skehan’s model of limited attentional memory.

Another important conclusion was how the effects of resource directedness in language performance is influenced by other factors like resource-dispersion. In this study it was found that simultaneous manipulation of task complexity along resource-directed ( [+complex] tasks) and resource-dispersion dimension (+pre-task) is beneficial for learners. Pre-task frees attentional resources to meet the cognitive challenges of a complex task.

Task complexity is a good construct to be used in sequencing tasks in a task-based syllabus. This is proved through the results of task difficulty and production. The responses on the affective questionnaire that task complexity matches learner perceptions of task difficulty and Perception of stress, difficulty and lack of confidence increases as tasks are made more complex, the interest however, remains the same for simple and complex tasks.

Finally, the last conclusion of this study is in favour of a multiple-resources theory to attention, suggesting that complexity and accuracy are not in competition in task performance especially for high proficiency learners. The results of Study 1 and Study
2A (high proficiency learners) clearly show that learners are simultaneously able to focus on both complexity and accuracy and therefore these draw on different resource pools and are not in completion with each other, a claim in favour of multiple-resources theory of attention. However, in low proficiency learners, it was found that accuracy decreases when task complexity increases, however there was no change in syntactic complexity, though a drop in lexical complexity was noticed. Therefore, it cannot be conclusively proved that low proficiency learners show a trade-off between complexity and accuracy.