Cognitive and interactive aspects of task-based performance in Dutch as a second language
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English summary

This thesis investigates the effects of cognitive task complexity and interaction on oral performance of Turkish and Moroccan second language (L2) learners of Dutch within the task-based framework.

Chapter 1: Theoretical framework

Chapter 1 presents the theoretical framework of the studies at hand. It starts with a general discussion of the task-based approach to L2-research and focuses on its cognitive strand. There follows an in-dept discussion of the Cognition Hypothesis by Robinson (2001a, b, 2003b, 2005) as this book investigates some of Robinson's claims. It first explains the notions of cognitive capacity and attentional allocation during task performance. Afterwards, this chapter highlights two factors of task design that, according to Robinson, affect attentional allocation during task-based L2-performance: cognitive factors of task complexity and interactive factors of task condition (cf. the Triadic Componential Framework on p. 23).

The Cognition Hypothesis claims that so-called 'resource-directing' factors of task complexity focus the attention of L2-learners on the language form (Robinson 2001a, b, 2003b, 2005). Accordingly, a complex task which, for example, asks to give a description of many elements, will need more different lexical items and complex syntactic structures than a task with only a few elements, where simpler structures may suffice. In a simple task, the sentences 'the left one' may be enough while a complex task with many elements may need descriptions of the form: 'the one in the corner next to the other one, which is round'. Robinson therefore predicts that a cognitively complex task will push L2-learners to use linguistically complex structures and a wide vocabulary. As the learners’ attention is focused on language, also accuracy may benefit such that L2-learners will make fewer mistakes. It may be though, that these complex processes make task performance less fluent than upon cognitively simple tasks.

Also interactive tasks may focus the learner’s attention to form. In interaction understanding is crucial. Therefore, L2-learners will be specifically focused on the linguistic code, which results in a higher accuracy. Due to turn-taking and interactional moves there will be fewer opportunities to build complex syntactic structures or search for specific lexical items. Accordingly, linguistic complexity will be lower in interactive tasks than in monologic settings, where L2-learners act on their own. Again, the heightened attention to form will decrease fluency in interactive tasks.
An intriguing claim of the Cognition Hypothesis concerns combined effects of cognitive task complexity and interaction. What happens, if L2-learners act in pairs on cognitively complex tasks? Robinson predicts that both factors (cognitive task complexity and interaction) push task performance so that the accuracy may increase while fluency decreases when task performance is compared to simple interactive tasks or any task in a monologic setting. Robinson expects complex tasks to result in more interactional moves than simple tasks. As a result linguistic complexity will be low in complex interactive tasks.

These are the claims that are under investigation in the present book. Furthermore, this chapter discusses the measures of task performance that are widely used in task-based research. The traditional measures of production, that is linguistic complexity, accuracy and fluency (in short CAF-measures), are under discussion recently (e.g., Housen and Kuiken 2009). Especially, in light of the current discussion about the added value of task-specific measures (Cadierno and Robinson 2009, Robinson and Gilabert 2007) the present studies tries to give some further insights.

The first chapter finishes with a review of earlier work on effects of cognitive task complexity and interaction on task-based performance of L2-learners. The focus lies on open issues that form the basis of the current research. For example, it highlights the fact that up to now hardly any research has been undertaken into task-based performance of native (L1) speakers.

Chapter 2: The studies in this book

The second chapter explains in detail the empirical work that is presented in this book. This chapter formulates the research questions and hypotheses (see table 2.1 on p. 39 and the explanations on p. 40). It focuses on the actual variables that are manipulated in this book: the resource-directing cognitive factor of task complexity ‘± few elements’ and the interactive factor of task condition ‘one-way versus two-way flow of information’ that is transformed into the factor ‘± monologic’ in the work at hand.

The hypotheses follow Robinson’s Cognition Hypothesis as explained above but they make slightly different predictions concerning the effects of interaction, and consequently also about the combined effect of task complexity and interaction. The present studies take an alternative view on interaction as they integrate insights form psycholinguistic research, that is the Alignment Hypothesis (Costa et al. 2008, Pickering and Garrod 2004) and task-based research by Tavakoli and Foster (2008). Based on this work this thesis proposes that dialogic tasks may be cognitively less complex than monologic tasks. Assuming dialogues to be less complex than monologues would mean that, on the one hand, one may expect the L2-learners’ accuracy and fluency to increase in interaction. On the other hand, alignment and routinization may make interactive tasks structurally and lexically less complex. Moreover, it is assumed that the effects of interaction are larger than those of increased cognitive task complexity so that in complex interactive tasks fluency will be increased (in contrast to Robinson’s predictions).
Contributing to the discussion about task-specific measures of performance, this thesis predicts that a specific measure, i.e., the use of conjunctions in cognitively simple versus complex tasks, will be affected by task complexity such that a complex task will increase the frequency and occurrence of conjunctions. With respect to L1-speakers, no effects of task complexity are expected – L1-production is highly automatic. However, interaction may similarly affect task performance by natives and second language learners.

The remainder of this chapter gives a detailed description of the method and design of the empirical studies presented in chapters 3, 4, and 5. Finally, this chapter explains how the studies grew from one to the other and why there may be some changes and extensions (for example with respect to the measures) concerning the design of the different empirical chapters.

Chapter 3: The influence of complexity in monologic versus dialogic tasks in Dutch L2 (Study 1)

Chapter 3 gives the details of a first empirical investigation into effects of cognitive task complexity and interaction on L2-learners’ speech performance. 46 highly educated L2-learners of Dutch participated in the study. They all were of Turkish and Moroccan origin and at an intermediate level of their L2 Dutch. They acted on cognitively simple and complex tasks where they were asked to give an advice about an electronic device. Following the Cognition Hypothesis task complexity was manipulated as the resource-directing factor ± few elements. That is, the simple task showed two devices and the complex task six devices respectively (see Appendix A.4). Half of the participants acted on their own in the monologic condition the other half acted in pairs in the dialogic condition.

The 92 monologic and dialogic speech samples were transcribed and coded for 12 measures of linguistic complexity, accuracy, and fluency (see Table 3.3, p. 55). An analysis of variance (ANOVA) tested for effects of task complexity and interaction, both on their own and in combination. The results showed, as predicted, a higher linguistic complexity (with respect to one lexical measure), a higher accuracy (with respect to the total number of errors), and a lower fluency (as measured by syllables per minute). All effects were visible on one measure for each CAF-construct (in total three out of twelve measures). All other measures did not yield significant results.

Interaction showed a statistically significant effect for both syntactic measures but none of the lexical measures of linguistic complexity (monologues were syntactically more complex than dialogues). Dialogues compared to monologues yielded more accurate (by means of three accuracy measures) and fluent speech (by means of all fluency measures, that is monologues generated slower speech with more pauses than dialogues).

\(^2\)N.B. As the empirical chapters 3, 4, and 5 have been or will be published as individual papers outside the context of this book there is only limited space in the chapters itself to report all background information. This fact also caused some overlap in their content, especially when reviewing the theoretical framework or when explaining the design of the experimental investigations.
There was one significant combined effect of cognitive task complexity by interaction. That is, the increasing effect of a complex task in monologues disappeared in the dialogic condition.

The discussion explains that these data are partially in line with the claims of the Cognition Hypothesis. However, the confirmation may be not so strong as it was visible on three out of twelve measures only. Moreover, no combined effects were found that confirm Robinson’s claims. In contrast, interaction shows the expected increasing effects on accuracy and decreasing effects on (syntactic) complexity. There was an unexpected pushing effect on fluency.

As this is the first empirical investigation that systematically looked at (combined) effects of task complexity and interaction, this chapter calls for new experimental studies that may generate a more conclusive picture with respect to these two factors. The conclusion furthermore asks for task-based investigations that include baseline data of native speakers.

Chapter 4: Effects of task complexity and interaction on L2-performance (Study 2a)

The fourth chapter describes a second empirical study that investigates effects of task complexity and interaction with 64 Turkish and Moroccan intermediate L2-learners of Dutch and 44 native speakers of Dutch. All participants were highly educated.

As the tasks of the first study sometimes failed at generating enough output, two new task were designed (the ‘study’ and the ‘dating’ task, see Appendix B.4). Participants were asked to find the best combination of two persons (a study pair in the study task and a love couple in the dating task). The difference in task complexity was increased as the simple task gave the opportunity to build four combinations whereas the complex task asked for a decision among nine possible pairs. Again, all participants acted on a simple and a complex task. One half performed both task on their own as a monologue, the other half acted in pairs in the dialogue.

The 216 speech samples were transcribed and coded for measures of linguistic complexity, accuracy, and fluency. As some of the measures of study 1 suffered from methodological problems (e.g., co-linearity and redundancy), some new measures were taken. There were two measures of syntactic and one of lexical complexity respectively. Accuracy was accounted for by morphosyntactic, lexical, and determiner errors. The data were coded for speed, pausing, and breakdown fluency.

The statistical analysis included separate ANOVAs for each CAF-construct and for each language group (L2 versus L1). Results reveal in both language groups one single significant effect of task complexity. That is, complex task yielded a higher lexical complexity. No other measures were significantly affected. L2-learners did not show any combined effects either. For the native speakers task complexity had no effect in monologues, but in dialogues a more complex task slowed them down.

Effects of interaction were large in both language groups (for example, see Table 4.7 on p. 81).
In dialogues, L2-learners are syntactically less complex but lexically more complex. They are more accurate and more fluent with respect to all accuracy and fluency measures. L1-speakers showed similar effects but their effect sizes were smaller and not all measures were affected. Interestingly, interactive tasks made them more accurate too and (in contrast to L2-learners) they were lexically less complex in dialogues.

This study did not yield confirming effects for Robinson’s Cognition Hypothesis (see the summarizing Table 4.12 on p. 86). Only one out of ten measures was affected by cognitive task complexity. However, this increase of lexical complexity may be accounted for by the extra amount of speech or by the task input. As L1-speakers show a similar effect, the conclusion may be that a complex task, manipulated by means of the factor ± few elements does not qualitatively influence task performance. It seems that there is a quantitative effect only: complex tasks yield more speech and, therefore, show a larger lexical complexity.

Interaction shows a completely different picture. Dialogues improve the accuracy, lexical complexity, and fluency of L2-learners. Only syntactic complexity may be decreased by a dialogic task condition. As L1-speakers show similar effects, this seems to be a robust finding. The fact that L1-speakers show a large decrease of syntactic complexity and a decrease of lexical complexity too, may allow the conclusion that a low linguistic complexity be a ‘natural byproduct’ of interaction.

The discussion suggests that these findings may be explained by the Alignment Hypothesis (Costa et al. 2008, Pickering and Garrod 2004) and the work of Tavakoli and Foster (2008) that proposes dialogues to be cognitively simpler than monologues such that they give L2-learners more attentional capacity for the language code. As a result, L2-learners make fewer errors in dialogues than in monologues. Furthermore, dialogues may give two learners the opportunity to benefit from each other by copying vocabulary items and help each other out at pauses in order to increase fluency.

These are important insights, in particular for language testing. It seems that L2-learners show more of their competences when they act in pairs than when they work on their own. Monologues, however, give the opportunity to build complex syntactic structures.

Finally, this study highlights the added value of including a native speaker baseline in task-based research. The interpretation of the L2-data gained a lot from the comparison with L1-data.

Chapter 5: The use of conjunctions in cognitively simple versus complex L2-tasks (Study 2b)

Chapter 5 reviews a more elaborate analysis of the data generated by study 2. In a reaction to critiques of the Cognition Hypothesis, Robinson claimed that the current global measures of linguistic complexity, accuracy, and fluency, may not be sensitive enough for differences in cognitive task complexity. Robinson and Gilabert (2007), therefore, call for task specific measures. Measures that are
specifically investigating the structures induced by a task may show the predicted effects of cognitive task complexity.

In order to test this claim, this study investigated the data of the L1-speakers and L2-learners of the dating and study task of study 2. This time the focus was on a task specific measure. As these are argumentative tasks, you may expect complex tasks to induce a higher amount of reasoning. Reasoning may be marked by lexical elements like conjunctions. This investigation, therefore, tested the data for the frequency (the number of conjunctions per 100 words) and occurrence (the number of conjunctions that was used at least once per performance) of a total of 28 conjunctions. Five specifically task relevant conjunctions, that were expected to be in particular evoked by the argumentative tasks at hand, were investigated in more detail: Dutch ‘want’, ‘omdat’ (both meaning English ‘because’), ‘daarom’, ‘daardoor’ (both translate into English ‘therefore’), and ‘als... dan’ (English ‘if... then’). Again, the analysis looked at the frequency and occurrence of these specifically task relevant conjunctions.

The statistical analysis focused on effects of task complexity because conjunctions are not considered to be specific with respect to the factor interaction. Results of multivariate ANOVAs showed no effects of task complexity – neither for the frequency nor the occurrence of conjunctions. A Wilcoxon Signed Ranks test that investigated the five specifically task relevant conjunctions did not yield any significant results that would support the hypothesis. In both language groups there was one exception only. Complex tasks generated a significantly lower use of one specifically task relevant conjunction than simple tasks with respect to ‘omdat’ for L2-learners and ‘daarom’ for L1-speakers.

The discussion critically reviews the measures used in the current study and discusses the pros and cons of global CAF-measures versus task specific measures. This chapter gives no support to Robinson’s claims that specific measures have an added value above global CAF-measures. The global and task specific measures point towards the same direction. Apparently, cognitively complex tasks that are manipulated by means of the resource-directing factor ± few elements may not affect attentional allocation during task-based performance so that L2-learners (or L1-speakers) are pushed towards a qualitatively different language use. This conclusion may hold for both, global CAF-measures (as reported in chapter 4) and for task-specific measures of task performance.

This study, therefore, suggests to, rather than using specific measures, focus on measures of communicative adequacy (as in de Jong et al. 2007, Kuiken et al. 2010). Another more favorable approach may be to interpret L2-performance in light of L1-speakers’ baseline data – as has been done in the studies at hand.

Chapter 6: Summary, discussion, and practical implications

The final chapter summarizes the empirical work as presented in chapters 3, 4, and 5. It discusses the data in light of the theoretical framework given in chapter 1 and puts it in relation to the hypotheses
formulated in chapter 2.

Table 6.1 on p. 123 gives an overview of the results of the empirical work. In sum, there are three measures out of twelve in study 1, one measure out of ten in study 2a, and none of the task specific measures of study 2b that give support to the Cognition Hypothesis. This holds with respect to effects of cognitive task complexity on its own as well as for task complexity and interaction in combination. Therefore, the present work does not support Robinson's theory.

Together, this leads to the conclusion that the factor ± few elements, as manipulated in the present dissertation, hardly affects attentional allocation in L2-learners (and L1-speakers) during task-based performance. The discussion highlights several possible explanations for these results. First, it may be that the only robust effect found (an increase in lexical complexity) is based on the longer speech samples or the input material of the complex tasks. Second, it may be that earlier work that found confirming results for the Cognition Hypothesis suffers of a confound of the two factors ± few elements and ± reasoning demands. Third, there seems to be a circularity when trying to define task complexity (Norris and Ortega 2009a). Fourth, the data do not support Skehan's model of Limited Attentional Capacity either (Skehan 1996).

The present studies largely support the hypothesis concerning effects of interaction, that is a manipulation of the factor ± monologic. In both study 1 and study 2a, interactive tasks generate a higher accuracy and fluency, but a lower syntactic complexity. In study 2a, also lexical complexity decreases from monologic to dialogic tasks. With the exception of lexical complexity, L1-speakers mirror this behavior.

Accordingly, monologic tasks give the opportunity to build complex syntactic structures, while dialogues give L2-learners the chance to profit from each other. In the end, dialogues may let them show more of their competencies concerning lexical complexity, accuracy, and fluency.

The discussion reviews possible explanations. It may be that the factor ± monologic affects attentional allocation of L2-learners. The Alignment Hypothesis (Costa et al. 2008, Pickering and Garrod 2004) states that dialogues are cognitively simpler as they allow priming and alignment so that speakers need less cognitive capacity (i.e., attention) for the underlying speech production processes. Tavakoli and Foster (2008) predict that in dialogues interactants may benefit from planning time during the speaking partner's turn so that again, dialogues generate more attention for the language form. Finally, it seems that the factor ± monologic apart from the interactive aspects that are predicted by the Cognition Hypothesis (Robinson 2005) and the Interaction Hypothesis (Long 1989) also cognitive aspects of task performance may be affected by this factor. See Table 6.2 on p. 135 for a summary of this discussion.

Concerning the measures of task performance, the discussion highlights the value of global CAF-measures. In the present studies these global constructs yield the same information as task specific measures. Furthermore, the added value of L1-baseline data is discussed.

Finally, this chapter names some practical implications of the research at hand. Focusing on the two
factors ± few elements and ± monologic there are at least two important insights. First, even though a higher cognitive complexity by means of a higher number of elements did not result in the predicted effects on accuracy, they did not harm task performance either. As a complex task may be more challenging than a simple task, this research gives the advice to use tasks with many elements that may ask for reasoning. The present studies show that L2-learners produce more speech on complex tasks, which increases the opportunity for uptake and intake of task relevant information.

Second, it seems that during monologic tasks L2-learners generate more complex syntactic structures, while all other linguistic aspects (lexical complexity, accuracy, and fluency) may be pushed during dialogic tasks. It is important to be aware of these differences. Especially in a testing context, where L2-learners mostly act on their own, this research may indicate that a dialogic testing setting possibly would be more favorable. It seems that L2-learners are able to show more of their competences when they act in pairs.

For the L2-classroom the studies at hand suggest that tasks can be systematically manipulated by the factors ± few elements and ± monologic – generating cycles of simple to complex and monologic to dialogic tasks. Different aspects of task performance may benefit from the various settings. Concerning dialogic tasks it is important to consider the interactive and the cognitive sides of this manipulation.

Conclusion

To sum up, the studies in this dissertation give no support for the Cognition Hypothesis (Robinson 2005) with respect to the factor ± few elements. The task-based performances of L2-learners and L1-speakers showed hardly any effects of a more focused attention to form induced by a higher number of elements and a related higher cognitive complexity.

With respect to the factor ± monologic the present studies have shown that interactive tasks lead L2-learners to increase their lexical complexity, accuracy, and fluency, while monologic tasks yield more complex syntactic structures. It may be that this is based on more attention to form in interactive tasks. Importantly, the factor ± monologic influences interactive and cognitive aspects of task-based performance in a second language.