

Second Language Task Complexity

Researching the Cognition Hypothesis
of language learning and performance

Edited by
Peter Robinson

Task-Based Language Teaching

2

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Second Language Task Complexity

Task-Based Language Teaching: Issues, Research and Practice (TBLT)

Task-Based Language Teaching (TBLT) is an educational framework for the theory and practice of teaching second or foreign languages. The TBLT book series is devoted to the dissemination of TBLT issues and practices, and to fostering improved understanding and communication across the various clines of TBLT work.

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Volume 2

Second Language Task Complexity. Researching the Cognition Hypothesis
of language learning and performance

Edited by Peter Robinson

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Peter Robinson

Series editors' preface to Volume 2

With this, the second volume in the series *Task-Based Language Teaching: Issues, Research, and Practice*, we are happy to feature a cutting-edge collection of theoretical-empirical work on the Cognition Hypothesis of task-based language learning. Dating to the mid-1990s, though with antecedents in earlier observations of task-based interaction and second language acquisition, one of the major, and steadily increasing, areas of interest in task-based research has been the possibility that task design may interact with human cognitive response in creating distinct opportunities for language learning. It is very appealing to think that the considered adjustment of the features and conditions of tasks might lead to predictable effects on language production, participant interaction, attention and awareness, feedback, uptake, affect, and so on. With reliable frameworks for estimating task-related cognitive complexity, and the specification of likely effects on language performance and opportunities for learning, teachers, syllabus designers, and testers would be provided with a critically valuable tool for selecting, sequencing, and implementing task-based curriculum, pedagogy, and assessment. And indeed, early work at this interface showed rather clearly that adjusting aspects of tasks – planning time, presence or absence of task stimuli, number and type of elements or interlocutors – did seem to affect what learners did, said, and potentially learned, as a result of their engaging in certain kinds of pedagogic tasks.

However, the devil is in the details, and the viability of such task-complexity frameworks was quickly challenged as soon as we began to ask: which aspects of tasks are predictably related to what cognitive responses for what types of learners under what performance conditions and leading to precisely what language production and acquisition outcomes? Luckily, in the 1990s several major thinkers within the field, Peter Robinson and Peter Skehan chief among them, took it upon themselves to not only launch long-term research agendas investigating exactly these questions, but also to delve into contemporary developments in cognitive psychology and thereby found rigorous and well-informed theoretical accounts for the kinds of phenomena being observed. Over the intervening two decades, cognitive approaches to researching and explaining task-based language learning have been, without doubt, the major focus of task-based research. This work has clearly impacted the theoretical status quo, in that we have robust (if competing) hypotheses about the cognitive complexity of tasks and their relationship with language production and learning, and these hypotheses are beginning to receive systematic testing in a variety of research settings and languages. Furthermore, the work has produced enough in the way of trustworthy observations to begin to be translated into educational practice, in the form of task sequencing

decisions in language materials, pilot syllabi for diverse learning contexts, and frameworks for modeling certain kinds of language test performance. Nevertheless, considerable work remains to be done if the objective is to create a fully functional theory of cognitive task complexity, language production, and language learning, which then may be applied judiciously in educational design and practice.

Edited by Peter Robinson, the creator of the Cognition Hypothesis of task-based language learning, the current volume accomplishes important advances in several of these dimensions. Robinson's introductory chapter cogently reviews the theoretical foundations of this approach to cognitive task complexity, providing important and insightful updates on parallel developments in thinking about tasks and learning from other disciplines. In addition, Robinson provides very clear explanations and examples for the basic assumptions of his hypothesis and the triadic framework of task complexity, conditions, and difficulty, leading to specific predictions about how adjusting task complexity may influence language production and opportunities for learning. Two additional chapters in the first part of the book sketch out interesting and well-argued approaches to tasks and L2 speech production as well as the measurement of language accuracy in learner performance. The remaining nine chapters all present empirical studies of various aspects of the Cognition Hypothesis, with part two looking into the influence of mode of L2 production on apparent task complexity effects, part three addressing the effects of differentiating task complexity on learner interaction and acquisition, and part four presenting new research into learner individual differences and the relationship with task complexity and performance.

Taken together, these collected chapters present a formidable advance in our theoretical and empirical understandings of key phenomena in task-based language learning. To their credit, the contributors turn a critical eye to their own theoretical assumptions, and the findings do not all necessarily support the hypothesized predictions. However, they do all shed new light on fundamental characteristics of pedagogic tasks typical to many communicative and task-based classrooms. As such, they push even further the boundaries of what we now know about cognitive aspects of task design, and they may enable much more detailed translation of theoretical ideas into implications for practice. It is, therefore, perhaps not overly ambitious to suggest that a next phase in this particular research agenda would turn to the reality-embedded investigation of cognitive task complexity as one aspect of TBLT educational design and implementation, in intact classrooms, across diverse educational contexts, and on the kind of time scale that defines educational syllabi. Certainly, it will be only through such ecologically valid research that the ultimate contribution of these important ideas – in interaction with the variety of other factors at play in long-term and otherwise complex language teaching and learning – will be realized. We look forward to featuring such work in a future volume of this series. The development of an empirically grounded TBLT is a complex and long term project, for which this volume is a welcome and challenging contribution.

John M. Norris, Martin Bygate, Kris Van den Branden

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PART 1

**Cognition, task complexity, language
learning, and performance**

Theoretical and methodological issues

CHAPTER 1

Second language task complexity, the Cognition Hypothesis, language learning, and performance

Peter Robinson

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This chapter provides an overview of pedagogic and theoretical issues that have motivated recent research into second language task complexity. The first two sections describe how procedures for task analysis, and decisions about task complexity, can be accommodated in task-based language teaching program design. The third section describes a componential framework for analysing task demands. This framework distinguishes between cognitive factors contributing to Task Complexity, interactive factors involved in performing tasks under various Task Conditions, and the learner factors affecting perceptions of Task Difficulty. The fourth section describes five ancillary predictions the Cognition Hypothesis makes about how increasing task complexity leads to measurable increases in task-based learning and performance. The final sections describe how studies of these predictions have typically been measured, to date, and a rationale for investigating the effects on task-based learning of individual differences in learners' cognitive abilities and affective dispositions. The chapter concludes by briefly summarising the organization of the chapters in this book and the empirical findings they report.

Introduction: Task analysis, task characteristics and task complexity

The chapters in this volume are all concerned with researching the effects of the complexity of second language (L2) tasks and with drawing conclusions about the extent to which varying the complexity of tasks affects language learning and performance in measurable ways. Each of the empirical studies of the effects of task complexity operationalises one or more of the characteristics listed in a componential taxonomy, the Triadic Componential Framework (TCF, see Figure 1), which is described in detail in the following sections of this chapter. Each study also weighs evidence for and against some of the theoretical claims of the Cognition Hypothesis: for example, that complex tasks should promote more accurate and complex, though less fluent, language than

simpler counterpart tasks, and that complex tasks promote more interaction, greater attention to, uptake and learning of information provided in the input to task performance than simpler tasks (Robinson, 2001a, 2001b, 2003b, 2005a). These claims, rationales for them, and descriptions of some of the measures typically used to date in empirical research into task complexity are also described in more detail in later sections of this chapter. In light of the findings they report, implications are drawn from the various empirical studies in this book concerning the basic pedagogic claim of the Cognition Hypothesis, that tasks should be sequenced for learners from simple to complex in order to promote success in performing complex tasks in the L2, as well as opportunities for further L2 learning and interlanguage development.

Task analysis and task-based program design

Two important aims of the research described in this book are to deepen our understanding of how task characteristics can affect the second language acquisition (SLA) *processes* involved in learning while attempting to meet the challenges certain tasks set, as well as our understanding of how task demands can affect *variation* in the quality and quantity of L2 speech and writing produced during task performance. Such information will be important to accommodate in broad cognitive-interactionist theories of SLA (e.g., Ortega, 2007), and important too for test-designers concerned to elicit levels of L2 performance that most accurately characterize learners levels of proficiency (e.g., Iwashita, Elder, & McNamara, 2001). For example, researchers exploring the potential benefits for SLA processes of the opportunities for interaction that task-based language teaching provide (e.g., Mackey, 2007; Mackey & Gass, 2006), generally agree on the following:

- Tasks provide a context for *negotiating* and *comprehending* the meaning of language provided in task input, or used by a partner performing the same task.
- Tasks provide opportunities for *uptake of* (implicit or explicit) *corrective feedback* on a participant's production, by a partner, or by a teacher.
- Tasks provide opportunities for *incorporation of premodified input*, containing 'positive evidence' of forms likely to be important to communicative success, and which may previously have been unknown or poorly controlled.
- Tasks provide opportunities for *noticing the gap* between a participant's production and input provided, and for *metalinguistic reflection* on the form of output.

However, it is likely that the *cognitive* demands of *pedagogic tasks* that provide these opportunities for learning during interaction will also affect the extent to which learners capitalize on them. The Cognition Hypothesis makes claims about how the cognitive complexity of tasks affects the extent of interaction, and the learning that accrues from it, when performing tasks individually, or in a sequence of progressively more cognitively complex tasks.

Although they are not often performed in interaction with others, *language testing tasks* (e.g., those aimed at gauging the extent of a learner's achievement in a language program, or the level of proficiency of an L2 user) also need to accommodate differences between the complexity of parallel versions of tasks designed to meet these purposes, so as to ensure comparability of findings across a population using multiple versions of these tasks. With regard to achievement, it is important that the level of complexity of the testing task be consistent across versions of it, and with regard to proficiency, it is important that the demands of testing tasks be incrementally increased in some principled way, so as to distinguish between more and less proficient populations of L2 users.

The main pedagogic aim of the Cognition Hypothesis, however, is not to provide a metric to enable language testers to ensure the comparability of tasks used to measure achievement, or to adjust differences in task demands so as to measure different levels of proficiency more distinctly – rather it aims to provide a rationale for how to *sequence* tasks in such a way as to lead to learning, and to different levels of L2 performance in language programs.

Within the context of Task-Based Language Teaching (TBLT) program delivery (e.g., Skehan, 2003; Van den Branden, 2006; Van den Branden, Bygate, & Norris, 2009) it is essential that we understand the nature of the tasks that learners will be performing, in order to design instruction that will support learning, across sequences of tasks, and within the time programs allocate for performing them. Task analysis is probably the most important part of instructional design, for L2 learners, as it is for other learner populations with other learning targets, as has long been argued:

If I were faced with the problem of improving training, I should not look for much help from the well known learning principles like reinforcement, distribution of practice, response familiarity, and so on. I should look instead to the technique of task analysis, and the principles of component task achievement, intratask transfer, and the sequencing of subtask learning to find those ideas of greatest usefulness in the design of effective learning. (Gagne, 1962, p. 90)

Partly prompted by Gagne's thoughts on instructional design (e.g., Gagne, 1977) there are now a number of different approaches to analyzing tasks in order to identify characteristics that can be most useful in promoting learning (see Hoffman & Militello, 2009; Jonassen, Tessmer, & Hannum, 1999). These have been adopted by instructional designers in a wide variety of content domains, such as programs of instruction for trainee air traffic controllers (Wickens, Mavor & McGee, 1997) or management trainees (McGrath & Tschan, 2004), and these different approaches to task analysis are most often used at different stages of program development and delivery of task-based instruction.

In behavior descriptive approaches to analyzing and classifying tasks, categories of tasks are based on observation (both participant and non-participant) and descriptions (which may be elicited by structured, or unstructured interviews from job performers, supervisors, and so on) of what people actually *do* while performing a task – including the typical patterns of interaction participants engage in, the use they make of resources such as media tools, and the time tasks typically take to complete.

Task complexity (Cognitive factors)	Task condition (Interactive factors)	Task difficulty (Learner factors)
(Classification criteria: cognitive demands)	(Classification criteria: interactional demands)	(Classification criteria: ability requirements)
(Classification procedure: information-theoretic analyses)	(Classification procedure: behavior descriptive analyses)	(Classification procedure: ability assessment analyses)
Sub categories:	Sub categories:	Sub categories:
a. resource-directing variables making cognitive/conceptual demands	a. participation variables making interactional demands	a. ability variables and task relevant resource differentials
± here and now (Gilbert, 2007)	± open solution (Lambert & Engler, 2007)	h/l working memory (Mackey et al., 2002)
± few elements (Kuiken et al., 2005)	± one way flow (Pica et al., 1993)	h/l reasoning (Stanovitch, 1999)
± spatial reasoning (Becker & Carroll, 1997)	± convergent solutions (Duff, 1986)	h/l task-switching (Monsell, 2003)
± causal reasoning (Robinson, 2005a)	± few participants (Crookes, 1986)	h/l aptitude (Robinson, 2005b)
± intentional reasoning (Ishikawa, 2008)	± few contributions needed (McGrath, 1984)	h/l field independence (Skehan, 1998)
± perspective-taking (MacWhinney, 1999)	± negotiation not needed (Gass & Varonis, 1985)	h/l mind-reading (Langston et al., 2002)
b. resource-dispersing variables making performative/procedural demands	b. participant variables making interactant demands	b. affective variables and task relevant state-trait differentials
± planning time (Skehan, 1998)	± same proficiency (Yule & MacDonald, 1990)	h/l openness (Costa & Macrae, 1985)
± prior knowledge (Urwin, 1999)	± same gender (Pica et al., 1991)	h/l control of emotion (Mayer et al., 2000)
± single task (Robinson et al., 1995)	± familiar (Plough & Gass, 1993)	h/l task motivation (Dörnyei, 2002)
± task structure (Skehan & Foster, 1999)	± shared content knowledge (Pica et al., 1993)	l/h anxiety (MacIntyre & Gardner, 1994)
± few steps (Fleishman & Quaintance, 1984)	± equal status and role (Yule & MacDonald, 1990)	h/l willingness to communicate (MacIntyre, 2002)
± interdependency of steps (Romiszowski, 2004)	± shared cultural knowledge (Brindley, 1987)	h/l self-efficacy (Bandura, 1997)