COGNITIVE PSYCHOLOGY AND TASK-BASED LANGUAGE LEARNING

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Abstract

'Task-based language teaching' is currently much discussed as an approach to second language teaching. This paper addresses the issue of how the system of the language is internalized in task-based learning. First it looks at what is meant when people describe an approach as 'task-based' This serves to highlight two major dimensions, which are then discussed in relation to task-based learning. The paper goes on to look at three strands in cognitive psychology which are relevant to helping us understand how the language system is internalized in task-based learning. Finally, it suggests some pedagogical conclusions.

Introduction

In recent years, teachers everywhere have sought ways to make the classroom more student-centred and investigated ways in which students can play more active roles in discovering and processing knowledge. This desire is reflected in several approaches which are currently gaining in popularity, such as cooperative and collaborative learning (Crandall, 1999; Kessler, 1992), experiential learning (Kohonen, 1992; Kohonen et al., 2001), task-based learning (Bygate, Skehan, and Swain, 2001, Willis, 1996), problem-based learning

(Woods, 1994) and case-based learning (Jackson, 2002). Underlying these approaches is a desire to involve students in some kind of purposeful interaction with information, objects and/or ideas, often in groups, in order to develop their skills and knowledge. There is evidence that these forms of learning are also supported by the students themselves (Littlewood, 2001a).

In the field of language teaching, the approach which is currently most often discussed in this respect is 'task-based teaching', which is one particular development within the broader 'communicative approach' This paper addresses the issue of how the system of the language is internalized in task-based learning. First it looks at what is meant when people describe an approach as 'task-based' This serves to highlight two major dimensions, which are then discussed in relation to task-based learning. The paper goes on to look at three strands in cognitive psychology which are relevant to helping us understand how grammar is internalized in task-based learning. Finally, it suggests some pedagogical conclusions.

'Task-based' - What does it Mean?

The notion of 'task' is defined in a variety of different ways and can be taken to mean almost anything that involves learners in active and purposeful engagement with a piece of work. Here I will present three points along a continuum of meanings that are often found nowadays. The main dimension in this continuum is the extent to which the notion of task either (a) includes any learning activity which stimulates the learners' active and purposeful involvement or (b) is reserved for activities which involve purposeful communication.

1 At one end of the continuum, Breen (1987· 23) defines a learning task as 'any structural language learning endeavour which has a particular objective, appropriate content, a specified working procedure, and a range of outcomes for those who undertake the task' This definition is broad enough to include a range of learning activities 'from the simple and brief exercise type to more complex and lengthy activities such as group problem-solving or simulations and decision-making' The emphasis in his notion of task – and indeed in the article in which he presents it – is on the need to provide space for the learners' own active contributions and to allow for a range of outcomes, rather than on the exact internal profile of the tasks. More recently, Williams and Burden ((1997 168) offer a similar broad definition when they define a task as 'any activity that learners engage in to further the process of learning a language'

Estaire and Zanon (1994: 13-20) also adopt a broad definition but differentiate two main categories of task: (a) *communication tasks*, in which the 'learner's attention is focused on meaning rather than form'

and (b) *enabling tasks*, in which the 'main focus is on linguistic aspects (grammar, vocabulary, pronunciation, functions, discourse) rather than on meaning' As we will see below, this corresponds to the distinction to which many other writers attach the terms (a) 'tasks' and (b) 'exercises'

2. Moving along the continuum, Rivers (1991 262) is typical of a number of writers who use the term in a sense that is not tightly defined but is clearly oriented towards tasks that involve using language for purposeful communication rather than those which focus on language itself. Thus, in discussing the insights that can be drawn from current models of information-processing, she writes how students learn by 'performing rules (and) creating meanings through their use' This means using language 'to perform functions in activities, *tasks*, or discussion' (my emphasis). Stern (1992: 196) writes about tasks in a similar way In the context of discussing 'communicative exercises', he writes about how they provide 'opportunities for relatively realistic language use, focusing the learner's attention on a *task*, problem, activity, or topic, and not on a particular language point' (my emphasis).

3. At the other end of the continuum, an increasing number of writers restrict the notion of task to *only* those activities which require the learners to engage in purposeful communication through the language. For example, Skehan (1998. 95) states that a task must have the following features:

- meaning is primary;
- there is some communication problem to solve;
- there is some sort of relationship to real-world activities,
- task completion has some priority;
- the assessment of the task is in terms of outcome.

Skehan's definition is adopted also by Ellis (2000: 196), who uses the term 'exercise' for learning activities in which 'there is no obvious communicative goal to be achieved' Nunan (1999: 25), too, considers that 'the essential difference between a task and an exercise is that a task has a nonlinguistic outcome, while an exercise has a linguistic outcome' The same distinction is made in many official curriculum frameworks. For example, the *Key Learning Area Curriculum Guide for English Language Education* in Hong Kong (Curriculum Development Council, 2002. 24) states that 'through the use of tasks. learners are provided with purposeful contexts where they can learn

and use English (i.e. the language skills, vocabulary, and grammar items and structures they have learnt) for meaningful communication'. In 'exercises', on the other hand, '[learners] focus upon and practise specific elements of knowledge, skills and strategies needed for the task' (Curriculum Development Council, 1999· 44).

Although Ellis (2000: 195) argues that this restriction of the term 'task' to activities that involve communication now reflects 'a broad consensus among researchers and educators', it is by no means intrinsic to the meaning of the term in its general usage and I do not propose to adopt it here. Rather, I propose to take the term 'task' in the broader definition of Williams and Burden (1997 168) as 'any activity that learners engage in to further the process of learning a language'. Under this broader definition, the degree to which the learners focus on communication (rather than form) becomes not a defining characteristic of tasks but a *key dimension* along which tasks can be analysed and categorised.

Two Dimensions in Task-based Learning

In order to conceptualise the ways in which task-based learning can support the learning of grammar, we can draw insights from the positions discussed in the previous section and focus on two dimensions which underlie all of them. These two dimensions are represented diagrammatically in Figure 1

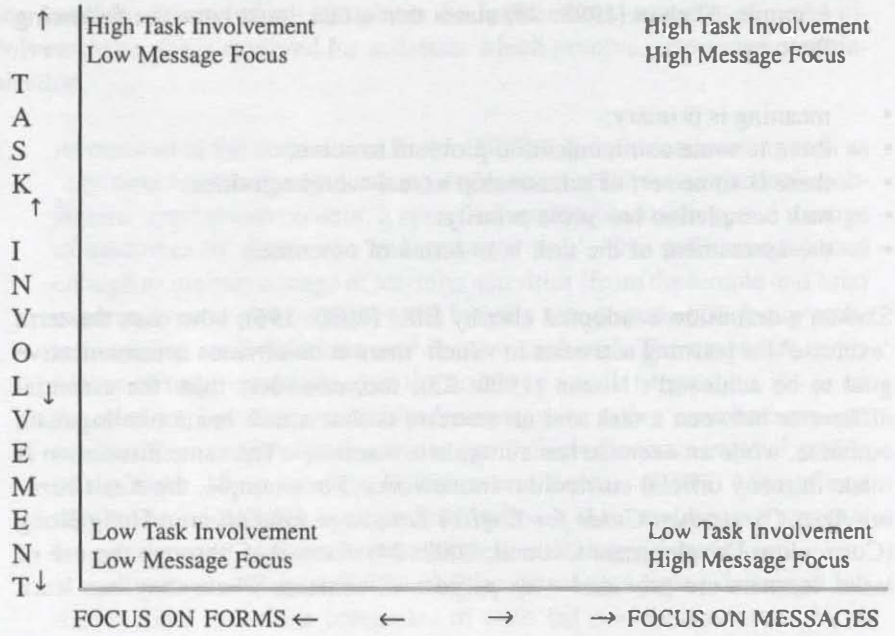

Figure 1 Two Dimensions in Task-based Foreign Language Learning

Dimension 1: Task Involvement

The first dimension, which was emphasised by Breen in the article quoted earlier, is the learners' active personal involvement or 'mind-engagement' (Prabhu, 1987) with the task, whatever the nature of that task may be. To clarify the nature of this involvement and the conditions for encouraging it, we can draw on general psychological and educational principles. For example, with particular reference to research into cooperative interaction, Hertz-Lazarowitz et al. (1992: 265) propose two key principles:

- Design the task so that it is challenging and personally relevant to group members
- Structure the task in ways such that each individual's contribution is identifiable.

In the language teaching literature, considerable attention is currently given to other conditions that favour learner involvement, including the affective climate of the classroom and group dynamics (see for example Arnold, 1999; Tudor, 2001).

Dimension 2: Focus on Forms and Focus on Messages

The second dimension is specific to foreign language learning and teaching. It concerns the relationship of different tasks to the communicative goals of language learning. It is along this dimension that we differentiate between tasks which focus on language forms (such as grammatical exercises) and tasks which focus on the messages that are communicated (such as problem-solving and content-learning).

In Figure 2, this dimension is divided into five sections. The labels across the top describe the categories with reference to how they relate to the goal of language teaching, namely, communication. In terms of the distinction between 'exercises' and 'tasks' cited above, the diagram would correspond to a progression from clearly defined 'exercises' to clearly defined 'tasks', passing though middle categories in which there is a balance between focus on forms and focus on messages.

At the lefthand side of the diagramme (in column 1) are those activities in which there is the strongest focus on forms and the least strong focus on messages, such as uncontextualized grammar exercises. These are here called 'non-communicative learning' As we move further right into column 2, in 'pre-communicative language practice' the main focus is still on forms. However, the activity requires learners also to pay some attention to meanings, without actually conveying new messages to anyone. Examples would include the familiar 'question-and-answer' practice in which the teacher asks

questions about, for example, the classroom situation or a picture. As we move again towards the right (into column 3) we come to activities in which learners still work with a predictable range of language but use it to convey messages (here called 'communicative language practice'). These would include simple information-gap activities or surveys. Moving still further to the right (into column 4) we pass into 'structured communication', in which the learners focus mainly on communicating messages but the teacher has carefully structured the situation to ensure that they can cope with it with their existing resources, including perhaps what they have recently used in more form-focussed work. This category would include more complex information-exchange activities or structured role-playing tasks. At the extreme righthand side of the continuum (in section 5) is 'authentic communication' This category includes activities in which there is the strongest focus on the communication of messages and the language forms are correspondingly unpredictable, such as using language for discussion, problem-solving and content-based tasks. Such tasks may develop into larger scale projects which contribute to students' personal and interpersonal development. (More detailed examples of these activities can be found in Littlewood, 2003).

The various types of activity lie along a continuum and there are no distinct boundaries between the categories. Also, the categories are an idealisation in that different learners will inevitably have different focuses within the same activity. Indeed, the same learner is likely to shift focus in the course of a single activity, according to the extent to which he or she is able to draw on language which has already been incorporated into automatic procedures.

Cognitive Psychology: Two Strands

When we investigate the cognitive principles that are relevant to task-based language learning, there are three strands within cognitive psychology that provide us with useful insights. The first of these strands gives an account of how learning takes place through social interaction and how language is acquired in the context of social and cognitive development. The second strand is concerned more specifically with how knowledge comes to be represented in the mind and how it becomes available as a basis for skilled performance. The third is concerned with how knowledge is represented in the brain and revised in response to experience. This section will look briefly at each in turn.

Strand 1: Language in The Context of Social and Cognitive Development

The first strand – often called a 'sociocultural' approach to learning – dates back to the work of Vygotsky (1962, 1978.) The main focus has been on

Focus on forms ← → **Focus on messages**

Non-communicative learning	Pre-communicative language practice	Communicative language practice	Structured communication	Authentic communication
Focusing on the structures of language, how they are formed and what they mean, e.g. through exercises, "discovery" and awareness-raising activities	Practising language with some attention to meaning but not communicating new messages to others, e.g. in "question-and-answer" practice	Practising language in a context where it communicates new information, e.g. in information gap activities or "personalised" questions	Using language to communicate in situations which elicit pre-learnt language but with some unpredictability, e.g. in structured role-play and simple problem-solving	Using language to communicate in situations where the meanings are unpredictable, e.g. in creative role-play, more complex problem-solving and discussion

Figure 2: From Focus on Forms to Focus on Messages

exploring how concepts and language are acquired by children in the context of social interaction. In the words of Bruner and Haste (1987 1), through social interaction 'a child acquires a framework for interpreting experience, and learns how to negotiate meaning in a manner congruent with the requirements of the culture'. Adults and older children play an important role in this process by 'scaffolding' the child's development through means such as correcting the child's utterances, guiding the child's problem-solving efforts, responding to the child's commentary and offering suggestions for action. The effect of this scaffolding is to enable children to pass through what Vygotsky (1978) calls their 'zone of proximal development', which he describes as 'the distance between the actual developmental level and the level of potential development ... under adult guidance or in collaboration with more capable peers'

An important aspect of development that takes place though social interaction is, of course, the development of language. Concepts and language develop together in social interaction, one influencing the other (see for example Bruner, 1990). As with conceptual development, adults and more competent children play an important role in scaffolding the child's language development. They provide a 'communicative support system' (Lloyd, 1990) which performs functions such as directing children's attention to relevant features, simplifying information and helping children organise it, defining terms, storing items in memory, reminding and prompting children, monitoring them and generally supporting them through praise and interest.

This strand in cognitive psychology directs its attention in the first instance to the child's first acquisition of concepts and language. More recently, however, the same ideas have excited considerable interest in the context of *second* language learning and teaching. Researchers have attempted to show how in second language learning, too, social interaction provides the substantive means by which learning occurs and how scaffolding (either by the teacher or by other learners) enables learners to move forwards though their zone of proximal development. They have shown, for example, how learners who help each other during interaction may, together, produce language that neither could produce alone. They have also shown how language items which learners produce on one occasion with the help of scaffolding may subsequently be incorporated into their independent discourse (see for example Ellis, 2000, contributions to Lantolf, 2000, and the survey chapter in Mitchell and Myles, 1999).

Strand 2: Internal Representations of Language and Their Conversion into Skilled Language Use

The first strand in cognitive psychology focuses mainly on the social and conceptual conditions that facilitate the development of language. The second

strand – often called an 'information-processing' approach – focuses on the actual cognitive mechanisms by which language is internalised and becomes available for communication. Two conceptual models offer especially valuable insights: Anderson's (1983, 1993) distinction between declarative and procedural memory (see also Anderson and Lebiere, 1998) and Schneider and Shiffrin's (1977) distinction between controlled and automatic processing (see also Schneider et al., 1984). The first of these models is described in accessible terms in Johnson (1996) and the second in McLaughlin (1987). Both models are also discussed in Mitchell and Myles (1998) and, with more technical detail, DeKeyser (2001).

Underlying both models is the notion that skilled performance consists of carrying out complex sequences of cognitive plans. Many of these plans are low-level and occur spontaneously in skilled performance. Others are high-level and require conscious attention. In using a language, low-level plans normally include the choice of words and the application of grammatical rules. High-level plans include formulating ideas and intentions. Both models offer an account of how elements of language move from a state where they can be used only with conscious attention to a state where they can be used automatically.

In Anderson's model, when items exist in declarative memory, they can only be used as a basis for performance by means of calling them into working memory and assembling the plans for performance 'on the spot' Procedural memory, on the other hand, contains actual plans for performance, which can be used directly, by-passing working memory. Since working memory has limited capacity, performance can only occur fluently if a high proportion of the lower-level plans come directly from procedural memory Working memory is then free to attend to higher-level operations, which by their nature have to be created anew to suit the immediate context. This relationship is shown diagrammatically in Figure 3·

In this account, learning is of two main kinds.

- new items enter declarative memory, from which they can be used for performance provided there is enough space in working memory to process them and assemble plans;
- through repeated use, plans can become 'proceduralised' and used directly as a basis for performance.

Schneider and Shiffrin's model carries a similar message. When plans are initially learnt, they require 'controlled processing', which involves conscious attention. Through practice, they become available for 'automatic processing', that is, they can be used spontaneously and do not require attention. Since attentive capacity is limited, fluent performance depends on the automatic

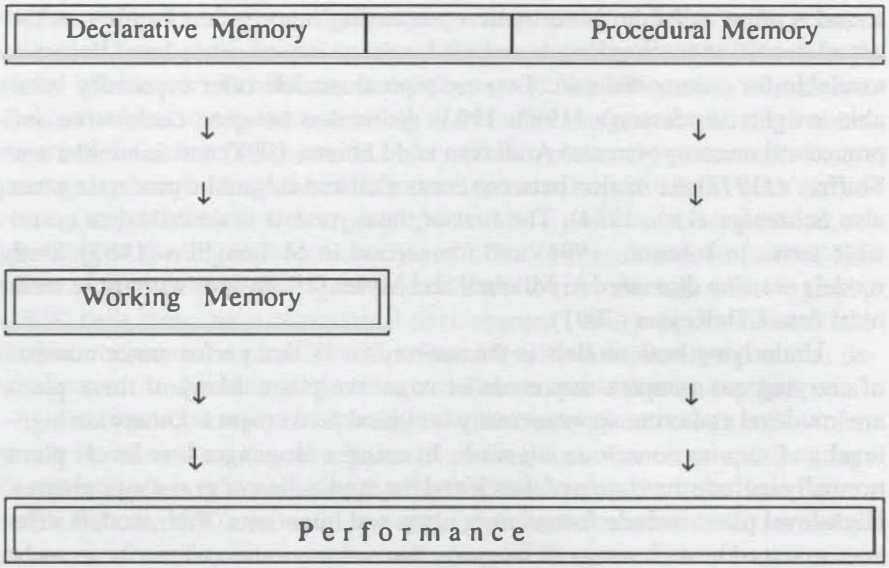

Figure 3: Anderson's Model of Information-processing (diagrammatic presentation by present author)

processing of a high proportion of lower-level plans. We can represent this in a diagram similar to the one above:

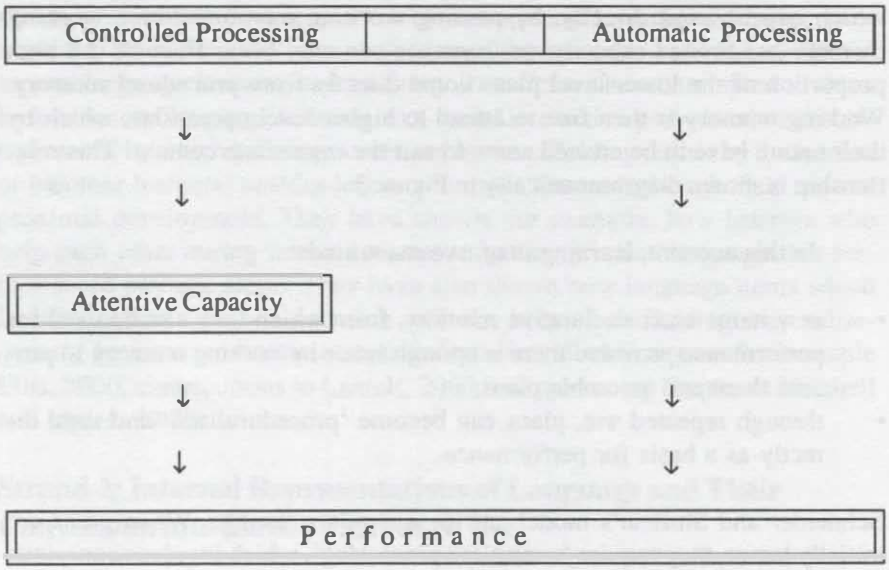

Figure 4: Schneider and Shiffrin's Model of Information-processing (diagrammatic presentation by the present author)

In this account, too, there are two main kinds of learning:

- the initial learning of plans which can be used for performance, but only with controlled processing though conscious attention,
- the automatization of plans through practice, so that they can be used spontaneously with automatic processing.

Information-processing models cannot offer complete explanations for language learning, since they do not offer accounts of the spontaneous language learning processes which take place in natural settings, including the social settings discussed by Bruner and his colleagues. Carroll (1986) has suggested that this problem can be overcome by defining language learning in a minimal way as 'noticing regularities' with varying degrees of attention.

Strand 3: Schemas and Neural Networks

The third strand, like the second, is oriented towards internal representations of knowledge. However, knowledge is not conceived in terms of mental rules or plans, but in terms of neural units and connections between these units in the brain. Hence the term usually applied to the most recent developments in this strand. 'connectionism' Each neural unit receives signals from various sources (including the external environment as well as other units in the network) as input. The input from a particular source may be positive (serving to excite the receiving unit) or negative (serving to inhibit it). The receiving unit combines these signals and, once it is activated beyond its threshold, produces signals itself which, again, may be transmitted to other units as input and/or to the external environment. The connection between any two units may be of varying strength or 'weight'. This weight determines the degree to which the output-producing unit influences the input-receiving unit.

From a connectionist perspective, learning consists in changing the connection weights between units and thus changing the ways in which units are likely to affect each other. Thus, as Strauss and Quinn (1997 52) put it, 'learning leads to neural changes that determine the pathways through which activation spreads and the eventual interpretation and response that is evoked in someone by a given event or thing'

There is a clear explanation of connectionist models, first in non-technical and then in more formal terms, in Chapter 3 of Strauss and Quinn (1997). A more technical account can also be found in Broeder and Plunkett (1994), where a number of experiments related to second language learning are described.

Cognitive Psychology and Task-based Language Learning

Finally I should like to refer back to Figure 2 and use some of the insights from cognitive psychology to clarify the two dimensions which were highlighted there. How can these insights help us to remain as high as possible on the vertical axis of task-involvement? How can they help us to use the horizontal dimension effectively, so that this involvement leads learners towards the goal of communicative ability in the new language?

Task Involvement

The first prerequisite for any form of task-based learning is that the learners' level of personal involvement in the learning situation should be as high as possible. It is particularly the first strand in cognitive psychology that provides us with insights about the conditions that favour such involvement.

Active Participation

Research in cognitive psychology reinforces the message that learning is dependent on active participation in the experiences encountered. A major thrust in current discussions about language teaching is concerned with exploring ways of encouraging such active participation through, for example, experiential learning (Kohonen, 1992; Kohonen et al. 2001) and the development of autonomy (Benson 2001, Little 1991). For developing the cognitive frameworks that underlie behaviour, mental participation is the most crucial element. For some learners, however, physical participation in overt activity may act as an essential support (a form of 'scaffolding') for mental participation.

Interactive Learning

Cognitive psychology emphasises that learning occurs through the interaction of learners with their social environment. This social environment is embodied not only in other persons who are physically present but also in the written and spoken texts that learners encounter.

The importance of interaction in facilitating learning is a recurrent theme in discussions of the conditions for second language learning (see for example Van Lier, 1996) and also in discussions of classroom methods for developing creative communication skills (e.g. Legutke and Thomas, 1991, Rivers, 1987). In these discussions, too, the value of cooperative learning in groups is emphasised, both for its effects on language learning and for its wider educational implications (c.f. Dörnyei and Malderez, 1999; Kessler, 1992; Littlewood, 2001b).

Space for Personal Contributions

Implicit in the need for learners to participate actively in their interactions (both with other persons and with texts) is that they should be able to contribute their own ideas, feelings and choices. Classroom interaction needs to create space for these contributions and not simply provide a framework for the teacher-dominance that has so often been observed in classrooms (c.f. Arnold, 1999; Wright, 1987). For this to occur, not only must the interactions themselves open up opportunities for the learners to contribute, but also the climate in the classroom must create confidence and support the learners' readiness to contribute.

Opportunities for learners to make personal contributions can exist at a range of levels. At a simple level, learners may simply have opportunities to express their own selves in activities which are otherwise teacher-controlled. At more complex levels, they may be involved in the actual design of their own learning programmes, e.g. in ways described by contributors to Breen and Littlejohn (2000).

Relevance to Learners' Present Framework of Interests

If learners are to engage their mental frameworks with the learning opportunities they encounter, these experiences must be relevant to their present framework of interests. Two kinds of relevance are important. The first is overt relevance to the reasons why learners wish to acquire the foreign language. This kind of relevance has been addressed by communicative syllabus designers when they have carried out objective analyses of, for example, the situations in which learners will need to use the language and the skills they will need to perform. The second is a deeper kind of relevance to the learners' own personalities, which leads them to respond at an authentic, personal level to the interactions and other experiences they encounter in the classroom. Many learners need to perceive the first kind of relevance in order to believe in the practical value of what they are doing. However, it is the second kind of relevance that is essential for stimulating learners to engage with the language and thus to internalise it as a means for expressing their own selves and relating to their world.

Scaffolding

A basic theme within the first strand of cognitive psychology is that development is not purely a matter of spontaneous growth but is 'scaffolded' by adults and more competent peers. An important question is the extent to which (or circumstances in which) learners obtain the benefits of scaffolding not

only by interacting with more competent performers but also by interacting with other learners of the same or lower competence. For some functions (e.g. providing affective support and helping to hold items in memory) one would expect positive answers to the question, whilst for others (e.g. monitoring and directing attention to relevant features) this might not be the case. Further investigations along the lines of those in Lantolf (2000) should help us to clarify the functions that different kinds of peer communication can perform in foreign language learning and what other kinds of support (e.g. from the teacher or materials) are needed to make it effective.

The Cognitive Network for Language Forms and Meanings

The insights derived from the first strand in cognitive psychology are related mainly to the social conditions in which language development takes place. Those from the second and third strands are related mainly to the cognitive network into which language enters. They are especially relevant in helping us to understand the horizontal axis on the diagram introduced earlier, namely, the continuum from form-focussed to meaning-focussed work.

Conscious and Subconscious Aspects of Learning

Within the models offered by the second and third strands of cognitive psychology, we can go some way towards resolving one of the central issues in language teaching, namely, how conscious and subconscious aspects of learning are related in the learners' mind. The notions of 'declarative memory' (in Anderson's model) and 'controlled processing' (in Schneider and Shiffrin's) assign a clear and positive role to conscious modes of learning such as word memorization and grammar exercises. The learning which takes place in these modes can be used for communication, but only when there is enough space in working memory (or enough spare attentive capacity) to assemble the relevant cognitive plans in the course of the performance itself. Through repeated use or exposure, subconscious learning processes move items and plans into the domain of procedural memory (or automatic processing), where they are available for spontaneous use. In the connectionist framework, both conscious and subconscious aspects of learning help to modify the connections between units and thus to develop the neural network that underlies language use.

Relating Different Kinds of Tasks

Within the information-processing and connectionist frameworks, we can conceive a dynamic relationship between tasks from different parts of the con-

tinuum from focus-on-form to focus-on-message. They help us to conceptualize the various ways in which different kinds of task enable learners to internalize new language into a network which also contains the meanings that are expressed through the language.

By assigning a role to activities from all parts of the continuum from focus-on-form to focus-on-meaning, information-processing and connectionist models remind us that interactive, cooperative learning need not be reserved for communication tasks. The principle of building up frameworks of knowledge through interaction extends also to language-oriented work. In this way tasks from different parts of the continuum can be encompassed in a common framework of cognitive learning principles, which can help us to integrate tasks of all kinds into a coherent approach to foreign language learning and teaching.

Conclusion

In this paper we have seen how the notion of task is variously interpreted in language-teaching discussions. I have suggested that it can usefully be defined in terms of two main dimensions: the degree of task-involvement and the continuum from focus-on-form to focus-on-message. Insights which help us towards a better understanding of these two dimensions can be drawn from three important strands in cognitive psychology. With more refinement and research, these strands might help us further to improve our approach to the use of tasks to support the internalisation of the second language system.

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