A Possible Approach to Interlanguage Variability:
Some Considerations in Cognitive Demands of Tasks

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This paper examines ‘cognitive demands’ of tasks as a possible cause of interlanguage(IL) variability. It begins with the definition of cognitive demands, and goes on to investigate their influence on cognitive operations involved in speech production. It will be suggested that the level of cognitive demands may be one of the external determinants of the learner’s variable use of linguistic knowledge. This paper then identifies and examines several elements of cognitive demands, while simultaneously seeking to establish an analytic frame for assessing pedagogic tasks in terms of these demands. Such aspects as the degree of abstractions which tasks require the learner to make, and the range of meanings which tasks allow the learner to express, will be discussed. Finally, this paper specifies the danger inherent in ‘unrestrained’ forms of task-based approaches to second language(L2) teaching, and then suggests that regulating cognitive demands may be one way of evading that danger.

1. Introduction

Current SLA research has come out of the closet of the controlled environment, and begun to operate within a framework which acknowledges the role of context. Consequently, it has been recognized that SLA is not simply an incremental process by which one linguistic rule is added to another, but that the learner’s use of linguistic knowledge can synchronically vary according to contexts. That is, even if a certain L2 rule has been, in some way, introduced to the learner’s IL system and she can utilize that rule in a particular context, the same rule may not necessarily be accessed in all other contexts where it is required. This paper aims to suggest one way of accounting for such variability, or in other words, it seeks to specify what makes access to linguistic knowledge easy or difficult.

Empirical-data-based studies in IL variability (e.g. Ellis 1987ab, Tarone 1985) work at a ‘micro’ level, and attempt to elucidate the correlation between particular IL forms and isolated
features of the contexts in which those rules are used. This paper, however, investigates IL variability at a more ‘macro’ level, and traces its source to ‘cognitive demands’ of the tasks which L2 learners transact. Cognitive demands of a task are the demands which the task makes on the human information processing capacity in constructing the underlying meanings that need to be expressed for the achievement of that task. Thus, this paper, in accordance with the current trend in SLA studies (e.g. Crookes 1986, Long 1989), initially posits ‘task’ as a relevant unit of analysis, and examines the nature of cognitive loads in creating particular meanings for the successful implementation of tasks, and their influence on the language produced to convey those meanings.

2. Time pressure and cognitive demands

Skehan’s study (1991:22), although not oriented towards IL variability, proffers an important hypothesis concerning this phenomenon.

... the more attention that is required in this domain [i.e. in the construction of the underlying meanings that need to be expressed], the less attention can be devoted to the formal elements of the message.

By examining the time constraints of the speech production process, this hypothesis can be attested and further developed to explain IL variability.

Faerch, Haastrup and Phillipson(1984) define the speech production process as follows:

- specifying the speech act that one intends to perform
- planning the modality of the act
- planning the textual structure of the act
- selecting the appropriate referential content
- selecting an appropriate syntactic and lexical form for the act
- converting the words into phonetic form

Quite apart from the question of the plausibility of this representation, one can at least recognize that, at the planning phase, heavy loads are placed on cognitive capacity to simultaneously process multiplex sources of information. Further, as some of the recent studies (e.g. Beattie 1980, Holmes 1984) indicate, the speaker usually starts planning the next unit before actually having finished uttering the preceding unit: execution and planning occur simultaneously. Thus, it is no mean feat to keep talking continuously or to sustain conversation under real-time pressure.

As a rule, the native speaker performs such feats without difficulty. However, given the
limited capacity of human information processing, real-time pressure may have an unfavourable influence upon the performance of L2 learners who have not yet “automatized” the control of many structural rules (Bialystok 1988). Evidence exists to underpin this assumption. Crookes (1989), for instance, found that, in performing the same task, his subjects produced syntactically more complex language and used forms higher in developmental sequence in ‘planned’ discourse (i.e. when given time for planning prior to expression) than in ‘unplanned’ discourse (i.e. when given no time for planning). Further, Ellis (1987b) reports that his subjects displayed consistently higher accuracy levels with some morphemes (i.e. past-tense markers) in planned discourse than in unplanned discourse.

These findings can also be interpreted as implying that, in the ‘normal’ speech production process, ‘meaning’ is given preference over ‘form’, and the learner’s cognitive resources can be devoted to the construction of meaning even at the cost of formal features of the message. This is indeed a natural tendency given that grammatically inaccurate utterances can be communicatively effective when there is contextual support available.

Thus, Skehan’s proposal can be applied to the explanation of IL variability. That is, if a task requires more cognitive resources to be devoted to the construction of meaning, then less cognitive resources will be left for attention to formal features of utterances, and hence access to linguistic knowledge becomes relatively difficult. On the other hand, if a task requires less cognitive resources to be deployed in handling these non-linguistic demands, then more cognitive resources can be used to pay attention to the form, and therefore access becomes relatively easy. In this view, it may be suggested that cognitive demands of tasks are one of the external causes of IL variability.

3. Elements of cognitive demands

Cognitive operations involved in constructing meaning are indeed multifarious, and the learner, in any communication situation, must face a complex interaction of manifold cognitive demands. This section, then, identifies several elements of cognitive demands, and specifies the conditions which may determine the level of the demands.

(1) Conceptual distance

One determinant of the level of cognitive demands may be the ‘conceptual distance’ between the information immediately available to the learner and the meaning that needs to be expressed. The greater the distance is, the higher the degree of abstractions that need to be made in order to bridge the gap between available information and intended meaning, with more cognitive resources required to do so.

The notion of the “language-perception distance”, proposed by Blank, Rose and Berlin (1978), may be one criterion for assessing the conceptual distance. To examine the language-
perception distance, consider two questions which are assumed by Blank, Rose and Berlin to represent the ‘closest’ and ‘most remote’ ends of the continuum. Suppose that a learner is shown a picture of two animals (e.g. a tiger and a giraffe) and asked the following questions orally.

Q.A What are the names of these animals?
Q.B What is the same about both of them?

Blank, Rose and Berlin explain that although both questions deal with the material in front of the learner, different relationships are involved between what is perceptually salient in the picture and the language used to answer these questions. In the former, there is an almost one-to-one correspondence between what the learner sees and says, while in the latter, the learner must think of a verbal response which is appropriate to the two different objects but not immediately evident in either, and so the language used no longer maintains a tight relationship to the perception. Obviously, as the distance between perception and language widens, cognitive operations must increase to successfully make abstractions removed from the ‘here and now’, until, at the point of greatest separation, the learner is required to evaluate perception and arrive at levels of judgement and reasoning which are based on, but necessarily go beyond, the perceptually salient features of the situation.

The conceptual distance is, however, not only related to the information which is externally available to the learner, but also involves the learner’s internal information. Suppose again that a learner is asked the following questions orally.

Q.C When did you go to New York?
Q.D How did you find the city?

To answer Q.C, the learner has only to retrieve a simple piece of factual knowledge from long-term memory and convert it into language (e.g. “I went there in 1989.”), with minimal use of cognitive resources. To answer Q.D, however, given that there is no longer such a ready-made solution in mind, active cognitive operation needs to be employed, not only in selecting pieces of relevant information, but also in evaluating and integrating those pieces into a coherent expression of the impression or opinion of the city. Thus, the conceptual distance concerns both the internal and external information immediately available to the learner at a given moment.

The overall conceptual distance entailed by pedagogic tasks can be assessed in the same way. For instance, in some ‘information-gap’ activities, learners use language only to exchange discrete and simple pieces of information initially possessed by them or already made salient in the text. In such cases the most required of each learner is to analyze the situation, select the information which needs to be transmitted, and plug it into discourse. There is little need for
abstraction. On the other hand, in some ‘problem-solving’ activities (e.g. a group of learners working out a teacher’s timetable based on given class timetables), learners need to use language not only to exchange the immediately available information but also to predict, reflect on, and synthesize ideas and relationships. There is greater need for abstraction. Thus, in assessing a task’s level of cognitive demands, due consideration should be given both to the quantity and quality of the immediately available information, and to the extent to which the task draws each learner into making abstractions which are distanced from the information.

(2) Range of ‘expressible’ meanings

The level of cognitive demands may also be related to the range of meanings that can be expressed in a situation. If the situation allows a wide range of expressible meanings, the learner may need to deploy more cognitive resources in deciding what to actually express. For instance, in free conversation and debates, there is usually no objective criterion for assessing outcomes right or wrong, or in other words, there is no clear model of what should be expressed in each situation. The learner in such cases needs to individually decide ‘what to say’.

On the other hand, there are some tasks whose structure partially determines the meaning that needs to be expressed at each moment. For instance, when a learner is asked to communicate her own daily routines, she is usually clear about which information has already been transmitted and which information is required next. There is less need to puzzle over what to say. Further, this task also provides the learner with another kind of support in selecting the meaning to be expressed; the learner can develop her account chronologically (e.g. “I usually get up at 7 o’clock, and at 8 ....”). Thus, a task can in various ways narrow the range of expressible meanings, and assist the learner in deciding what to say.

It can then be suggested that, in terms of the range of expressible meanings, the “open task” where there is no predetermined correct solution may be more demanding than the “closed task” where there is a single correct solution (Long 1989). In an open task, as the learners initially know that there is a wide or even infinite range of solutions available, the discussion can evolve in many ways, allowing a wider range of meanings to be expressed in each situation. In a closed task, however, as the learners are aware (at least, are expected to be aware) of the problem being solved at each moment, the situation is less likely to allow so wide a range of expressible meanings.

It is not clear, however, that all learners perceive this kind of external constraint as actual support. In fact, some learners on some occasions may feel more comfortable when they can express what they want to express freely. Further, it is unlikely that all learners are equally sensitive to what they are expected to express on each occasion. Thus, careful observation should be made of the ways in which various aspects of the task assist the learner in selecting the meaning to be expressed, and of how the support is actually perceived and utilized by her.
(3) Level of referential demands

Another element of cognitive demands concerns the amount of discoursal connectedness which the learner is to maintain in a task. Discoursal connectedness requires effort; to sustain textual cohesiveness while maintaining a clear distinction between the protagonists and/or objects in the speech, active cognitive operations must be involved in attending to this need. Fakhri(1984), for instance, found that her subjects made variable use of the pro-drop rule according to their perceived need to keep the reference clear. Further, Tarone(1985) reports that referential demands produced a favourable effect on the accuracy level of the morphological structures which her subjects used to attend to these demands (i.e. articles and direct-object pronouns). The demands even over-rode the normal pattern of "style-shifting" (i.e. more accurate in the "careful" style and less in the "vernacular"). It is indeed natural that the learner's attention is drawn to different aspects of her speech according to her perception of what is more important for successful communication, thereby sacrificing the less important when there is any internal or external constraint which does not allow the learner to attend to that aspect (e.g. lack of automaticity and time pressure). What then influences the level of referential demands? It is obvious that the level can be greatly affected by the mode and length of the discourse which the learner needs to produce in a task. For instance, tasks which require the learner to control the discourse for an extended period are likely to be more demanding in referential terms than tasks which simply elicit single, unconnected sentences. In the latter there is no cohesiveness to be established beyond the sentence level.

The level of referential demands is also related to the number and characteristics of the participants and/or objects which the learner is to deal with in her speech. Brown and Yule (1983) provide an interesting example of this phenomenon within a narrative mode of discourse. When a learner is asked to tell a story about a man, a woman, and a dog, it is easy to identify these three individuals as long as she can control the lexical terms, 'man', 'woman' and 'dog', or more conveniently 'he', 'she' and 'it'. However, the task becomes immediately complicated if it is a story about two women. Now the learner may need to refer to these two individuals as 'the old woman' and 'the young woman' or 'the woman with long hair' and 'the woman with glasses'. And once the learner distinguishes them in this way, she needs to be consistent in her use of those lexical expressions throughout her speech.

Finally, it should be stressed that referential demands are cognitive rather than linguistic. Given that success in maintaining a consistent distinction among referents largely depends on the ability to select their distinguishing features, it is not a matter of simply knowing language forms. Thus, referential demands, it may be suggested, are one of the factors which influence a task's level of cognitive demands.
4. Cognitive demands and cognitive familiarity

It should be clear from previous sections that cognitive demands concern the extent to which active cognitive operation is involved in doing a task. Imagine a learner confronted with one of the tasks from the Cobuilt Course, Book 1 (Willis and Willis 1988). [See Appendix] In performing this task, the learner may, at first, have to set up the background to the story (e.g. “Are the faces in the text the same person’s?” “If not, what is the relationship between the protagonists?”). As the text indicates little logical connection between the pictures, she also needs to look for a way of linking them coherently. Further, if the learner decides that the faces are of different people, she may need to contrive some device to maintain clear reference to the protagonists in her story. Thus, this task is by no means easy in cognitive terms, and therefore, active thinking needs to be involved in achieving the task.

In contrast, “cognitive familiarity concerns how easily a task can be completed by drawing on no more than existing schematic knowledge” (Skehan 1991:23). While cognitive load concerns the situation where active cognitive operation is required to compensate for the lack of schematic knowledge, “cognitive familiarity emphasizes the way in which a task can be solved by using a ‘canned’ solution” (Skehan 1991:23). For instance, if the learner is asked to tell the same story again just after the performance of the above task, now that she has much of schematic knowledge related to this task (e.g. task procedure, story line and ways of maintaining clear reference), she will be able to transact the task with less use of cognitive resources for ‘meaning’, and with more opportunity to devote attention to ‘form’.

As indicated by this example, cognitive familiarity is related to various aspects of the task. For instance, a topic entailing a high need for abstraction may nevertheless be handled well if it is one the learner often deals with. On the other hand, a topic which does not require such a high level of abstraction may not be easily coped with if it is one the learner rarely deals with. By the same token, a procedurally complicated task may even be performed with ease if the learner is already accustomed to the same kind of procedure.

Further, given that some part of schematic knowledge is cultural-specific, the learner’s familiarity with L2 culture should also be taken into account. For instance, a great number of L2-specific cultural assumptions which are often presupposed in texts may make it difficult for the learner to deal with those texts. In fact, learners usually find it more difficult to deal with texts saturated with strong stereotypes which reflect L2 culture (e.g. cartoons) than to deal with texts conveying more general information (e.g. maps). Similarly, the learner may find it difficult to talk over the phone or to extract necessary information from help-wanted advertisements if she is unfamiliar with underlying L2-specific rhetorical conventions. However, a task becomes less demanding, as the learner becomes familiar with all or any of these aspects related to that task.

Thus, the actual level of a task’s cognitive demands can only be properly assessed with due consideration of the learner’s familiarity with various aspects of the task; if we wish to reduce
that level, we can do so by providing the learner with more schematic knowledge concerning these aspects before she actually performs that task.

5. Implications

The discussion developed in previous sections is largely speculative, and the analytic frame proposed for assessing cognitive demands is clearly a set of hypotheses whose internal organization and composition need further research to validate them. However, given that the factors suggested to influence the level of cognitive demands are likely candidates for manipulation in task-based approaches to L2 teaching, studies in cognitive demands not only add precision to our understanding of IL phenomena, but also have implications for the effective implementation of those approaches.

The danger inherent in ‘unrestrained’ forms of task-based approaches has become clearer in current L2 pedagogy. That is, the learner as language user is primarily concerned with succeeding in communication, and may achieve this without using IL-stretching approaches to language processing. Widdowson (1989:131), for instance, suggests that “grammatical competence is not necessarily inferred from use, and so use is itself constricted”. Skehan (1991:12) posits a psychological origin to this suggestion. He explains that when required to keep up with the general speed of conversation, the learner tends to engage in a “memory-driven lexical mode of communication” which does not require much on-line processing, and produces utterances by drawing on ready-made chunks, not by constructing each chunk independently on the basis of a rule system. If this is the case, simply engaging the learner in ‘uncontrolled’ tasks may not be the best circumstance for ‘well-balanced’ L2 development. Such performance-oriented learning may well facilitate the development of fluency and skills to achieve communicative effectiveness, by using improvisatory strategies to handle communication under real-time pressure. However, if the learner always relies on those strategies while simultaneously by-passing the underlying language system and maintaining successful communication, she may not perceive the need for revising and extending her IL system. We must look for ways of counterbalancing this tendency without distorting the nature of language as a means for communication.

Crookes (1989) suggests such a way on the basis of the aforementioned research finding with regard to availability of planning time and the language the learner produces. That is, he recommends teachers (and material designers) to consider systematically building planning opportunities for at least some tasks into their lessons. Indeed, the evidence that, when given time for planning, the learner takes linguistic risks and incorporates more ambitious language into her utterances, indicates that providing planning opportunities may be one way of allowing the learner to pay more attention to language structures.

However, given that the learner by-passes the underlying language system because of her limited capacity for on-line processing, we can also consider reducing cognitive demands of
tasks so that the tasks require less on-line processing. In fact, precise observation of the learner’s mental operations helps us to recognize that providing any kind of planning opportunities prior to a task has the same impact as reducing its cognitive demands; in the former, the learner uses the given opportunities to internally establish more schematic knowledge related to the task, while in the latter, the learner obtains more schematic knowledge from various external sources (e.g., through supplementary pre-task work or discussion). Such pedagogic contrivance will allow the learner to devote more cognitive resources to the formal features of her utterances, and therefore, she may be able to access the linguistic knowledge which she could not access otherwise. Given more opportunities to utilize and test her knowledge, the learner may more quickly consolidate that knowledge in her IL system, and more readily perceive the need for restructuring it when necessary.

There seems, however, to have been no research directly oriented towards the influence of cognitive demands on the learner’s performance, or the criterion for assessing when such contrivance is necessary. At present, it is up to classroom teachers to pitch cognitive demands of tasks at the right level so that tasks can discharge a mediating function between the development of fluency and communicative effectiveness, and that of the underlying IL system. Valid research in this domain is awaited.

Bibliography


**Appendix**

Can you make up a story to fit these pictures? You can put them in any order you like.