A COGNITIVE PERSPECTIVE ON SECOND LANGUAGE ACQUISITION PROCESS

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Abstract: Second language acquisition (SLA) has been one of the central topics in cognitive science. Various theories regarding the SLA process have evolved and have been a subject of debate over the years. With a critical review of the competing theories of cognition and language development, this paper examines the differences between L1 and L2 acquisitional processes and then proposes a model of SLA process from a cognitive information-processing perspective. The pedagogic implications of this model are also discussed.

Key words: SLA, L1 acquisition, cognition, information-processing
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INTRODUCTION

Studies of second language acquisition (SLA) are often viewed as based on first language acquisition research. In fact, people used to explain phenomena in SLA with instances and theories derived from research in first language acquisition. However, there is now a general consensus in the field of SLA that besides similarities, there exist important biological and cognitive differences between L1 and L2 acquisition.

In attempting to advance a general theory of SLA, Bialystok (1994) described three approaches to the study of language acquisition, i.e. neurolinguistic, linguistic, and psycholinguistic. In Bialystok's opinion, while the neurolinguistic approach is most successful at explaining the acquisitional process of the phonological system, the linguistic and psycholinguistic approaches provide the best account of the acquisition of the syntactic and lexical systems, respectively. Each of the three approaches has something to offer in the formation of a general theory of language acquisition. The three approaches outlined by Bialystok to the study of SLA presents a convincing case for the elucidation of language acquisitional processes. However, I would argue in the present paper that the SLA process is cognitive in nature, and an explanation lacking a cognitive aspect would not likely be adequate. At this juncture, I believe contemporary cognitive psychology, which emphasizes information processing and cognitive abilities and serves as a feeder discipline to SLA, has an important part to play in explaining the SLA process.

In this discussion, I will first give a critical review of the competing theories on cognition and language development, and then by outlining the differences between L1 and L2 acquisition, I attempt to discuss the SLA process from a cognitive information-processing perspective, which I hope would give one more dimension towards a more lucid explanation of SLA.

COGNITION AND LANGUAGE DEVELOPMENT

Second language acquisition has been one of the central topics in cognitive theory. Each theory of cognition has competed to explain the various phenomena in SLA, which has been a subject of considerable controversy over the years. Cognition may be defined as "understanding our experiences through mental processes such as perception, recall, and reasoning" (McLaughlin, 1998, p.95) and it is believed to provide intriguing insights into the development of language. Owens (1996) identified four major theories representing a range of possible relationships between cognition and language. They are: cognitive determinism, linguistic determinism, interchanging roles and independent theory.

Cognitive determinism is primarily represent-

ed by the work of Jean Piaget. To Piaget, cognition is one kind of biological achievement. Biology and cognition interact inherently as the individual organism changes its behavior in response to its changing experiences and maturation. A person's language development is primarily determined by the development of one's cognition. In other words, language is secondary to thought and serves to express thought. In contrast to cognitive determinism, linguistic determinism asserts that language plays a dominant role in influencing thought. Known as Sapir-Whorf hypothesis, this theory holds that an individual's conceptual categorization of the world is determined wholly or partly by the structure and vocabulary of one's native language. This hypothetical position is not accepted by most linguists, and some have rightly pointed out that the hypothesis "speaks less to the beginnings of language than to the cultural influences on language". (McLanghlin, 1998, p.105) The theory of interchanging roles is derived from the work of Vygotsky, who maintains that cognition and language develop initially on separate tracks until at the age of about two. Before two years of age, children do not require language to express thought and early language is not based on thought, which is perhaps composed of visual and auditory imagery. Then from two years of age onwards, the two domains seem to converge, intertwine, and become interdependent. Children begin to use language to express thought and to reason through cognitive problems. On the other hand, children's language develops through the gradual maturation of cognition. In this manner, two domains facilitate the development of one another as they interchange roles.

While the above three theories recognize the interdependence between cognition and the development of language to some varying degrees, the fourth theory contends that there is no relationship between cognition and language, and that the two domains develop and function separately (Wilson & Keil, 1999). The most well-known advocate of this theory is Noam Chomsky. He holds that language is an innate, species-specific capacity of humans, and that there exists a language acquisition device which is an innate, genetically programmed mental mechanism designed uniquely for the acquisition of language.

Each of the above four theories views the issue from one specific perspective and all give us plenty of food for thought. However, it is now generally agreed that cognition at some stage and at some level is intrinsically intertwined with language development. People's understanding of themselves and of the environment is what they talk about. And as they talk about themselves and the physical world around them, their cognition develops(Zhao, 2000). I argue that this is especially the case with SLA if we consider the fact that L2 learners are usually adults whose cognitive abilities and resources are much more developed and mature than L1 learners. A different theory or combination of theories may be needed for young L2 learners who acquire language in bilingual environments.

A COGNITIVE INFORMATION-PROCESSING APPROACH TO SLA

In order to elucidate the cognitive processes involved in SLA, it seems necessary and logical to first discuss some distinguishing characteristics of L2 acquisition. In comparing first and second language acquisition, Bialystok correctly pointed out that "it is the balance between these biological and cognitive influences on development that distinguishes between first and second language learning."(Brown, et al., 1994, p.135) In L1 acquisition, most of the variance in language development is left to the innate biological factors with a decrease in importance from phonology, to syntax, to semantics. In L2 acquisition, on the other hand, intentional learning becomes all the more important and there is obviously an increased scope for cognitive intervention. While it can certainly be said that adults learning a second language enjoy some cognitive advantages, we should also be aware of the possible disadvantages implicated in these advantages.

Firstly, language is extremely complicated, yet it is acquired without much apparent effort by L1 children on the basis of an often very limited and impoverished input. They learn by imitation, and by trial and error although their level of understanding could be poor. So it can be said that any normal person can speak at least one language without any explicit training. However, this is not the case with SLA. L2 learners are of-

ten TRAINED in a certain way and they are often very conscious about their learning. They learn better if they know the WHY, WHAT and HOW of their learning. This could be an obvious advantage. Secondly, learning a second language which is often non-cognate in nature does not mean learning new labels for existing cognitive models. These models, derived from a shared culture, are extremely constitutive of our understanding of the environment in which we live, shaping our schematic mental representations of typical situations, events and persons. Moreover, L1 children usually have a different cognitive world. The words and concepts in the minds of children often have a narrower meaning and usage than they have in the minds of L2 adults. So second language learning entails the possible construction of new cognitive models or the modification of old ones. It is therefore of great importance to distinguish the possibly different cognitive processes existing between mother tongue and the target language. This is especially relevant when it comes to the cultural and societal elements of the target language which will undoubtedly exert a great impact on learners' cognition. The third point concerns a person's declarative knowledge (Anderson, 1983; 1985). This type of knowledge, which is often referred to as schemas or frames when used in artificial intelligence, is represented in long-term memory in terms of abstract meaning rather than precise replication of specific events or language-specific texts. Schemas help us to understand new information when they are activated by information introduced into working memory. This type of knowledge can apparently aid acquisition, but it can also impede the acquisition process, since L2 learners' internalized schemas from their mother tongue could be very different from those of the target language.

All these attributes will be reflected in the development of L2 learners' interlanguage. Based on the above discussion of the characteristics of SLA and drawing on Skehan's model of language acquisition (1998), I propose the following model of SLA from the perspective of information processing and cognition.

Noticing is a psychological construct proposed by Schmidt (1990). In Schmidt's opinion, only the input that is noticed by learners becomes available for processing in memory. No-

ticed input enters working memory, which then activates and interacts with our declarative knowledge in long-term memory to produce meaning for intake. In the meantime, noticing and intake are influenced by various L2 learner factors including their aptitude, need and interest, motivation and their general processing capabilities. There are of course other variables like sociolinguistic factors. They are not discussed here due to the limited scope of this paper. In the context of SLA, intake is necessarily influenced by learners' native language, which results in L1 transfer. In this process, L2 learners' interlanguage is constructed and is used to produce spoken and written output.
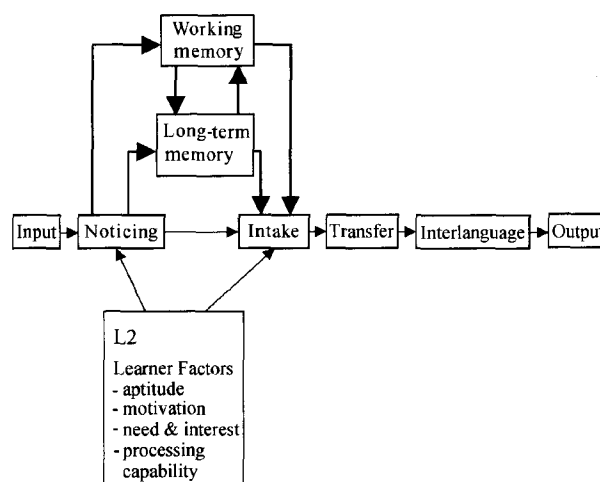

Fig. 1   A cognitive information-processing approach to SLA

This diagram takes into consideration L2 learners' observable input and output. But more importantly, it lays emphasis on learners' internal cognitive process in acquiring a second language. Output is not viewed as an exact replication of input. In the process of acquiring a second language, L2 learners seem to be actively involved in constructing rules to guide their output using available resources.

CONCLUSIONS

The cognitive information-processing model of SLA may prove very valuable because it not only lends theoretical support to some accepted teaching approaches in the field of ESL but has wider implications to SLA pedagogy in general.

In SLA, much effort should be placed on developing learners' procedural knowledge (Anderson, 1983; 1985), that is, learners' cognitive ability to perform various mental procedures, for example, learners' ability to understand and generate language to solve certain problems. In order to enable learners to use language to do things, teachers should make sure that their input goes through the next step of "noticing" in terms of frequency and salience. Learners' capacity to process resources should also be taken into consideration when designing pedagogic tasks aiming to enable learners to be effective communicators.

In teaching receptive and productive skills, activities aimed to activate background information are highly recommended. However, it should be cautioned that a mere execution of some activities like pre-reading or pre-listening exercises are not adequate. Learners should not only be made aware of the aim of the activities of this type but be sensitive to the discrepancies of cognitive processes existing between L2 learners and native speakers of the language. They should also be trained to use input-processing strategies since they are often more competent in terms of metalinguistic and metacognitive abilities.

As evident from the first language acquisition, the effectiveness of language development is closely associated with learners' intrinsic motivation to learn. A child learns when there is a need or an interest. This is especially true of the process of SLA. Learners' needs lead to the relevance of their learning, and relevance adds to learners' motivation and interests. It can probably be said that personal relevance is quite an inherent and determining factor in the development and functioning of the learners' cognition and language. In this respect, ELT in general can benefit a great deal from the practices in ESP (English for specific purposes). In order to ensure the cost-effectiveness and the overall success of one particular ESP course, needs analysis including an ongoing analysis is of prime concern to ESP practitioners (Hutchinson & Waters,

1987). Needs in ESP are restricted in nature since they are perceived as valid to one specific course. However, in a general English course, the issues of needs are generally not dealt with seriously. What interests teachers and students alike is the end-product of a course specified by a syllabus. Language acquisition depends for its motivation on satisfying learners' felt needs, which are in essence always relative to individual learners. In order to facilitate second language acquisition, I argue that learners' needs and interests, and the relevance of any course to the learner, should be the guiding principles in making and implementing any pedagogic decisions.

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