Metacognition and Second Language Learning [1]

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0. Introduction

Under the strong influence of Krashen's second language acquisition theory, a large number of studies have been conducted to examine the factors that make input comprehensible so that input becomes intake (Chaudron, C. 1983, Chaudron, C. and J. C. Rechards. 1986,   Henrichsen, L. E.   1984,,   Kelch, D. 1985, etc.). But the   view on   which these studies   are based   is primarily teacher-oriented. What they failed to take account of was learners' own contribution to the learning process. It is obvious that learners do not only sit down and absorb what teachers present in an uniform way. There are complicated inner processes in the course of their learning, through which each learner actively manipulates his/her resources and contributes to   the language learning enterprise.

The studies on learner strategies attempt to explore such individually various systems of learning in order to give students a feedback which respects and makes the most of each individual's learning style. With the recent development of research,   learner strategies have been classified into three categories; metacognitive, cognitive, and socio-affective (O'Malley et al. 1985a, Chamot 1987), which is notable for serving as a good foundation for future research on learner strategies (Skehan 1989). This paper focuses on the metacognitive strategy, which has recently received a great amount of attention in the field of pedagogy, to get an insight into the usefulness of this notion in the second language learning context.

1. Metacognition

First of all it is necessary to explore the basic concept of metacognition. Metacognition broadly refers to "cognition about cognition", while cognition refers to those mental operations such as memory, attention, comprehension, learning, conjecture etc.

A rather lengthy quotation from Flavell(1976), one of the scholars who contributed to establishing this notion in the field of applied science, would give us the well established definition with some clarifying examples.

"Metacognition" refers to one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g., the
learning-relevant properties of information or data. For example, I am

engaging in metacognition (metamemory, metalearning, metalanguage, or
whatever) if I notice that I am having more trouble learning A than B; if
it strikes me that I should double check C before accepting it as a fact;
if it occurs to me that I had better scrutinize each and every alternative
in any multiple-choice type task situation before deciding which is the
best one; if I become aware that I am not sure what the experimenter
really wants me to do; if I sense that I had better make a note of D
because I may forget it; if I think to ask some one about E to see if I
have it right. Such examples could be multiplied endlessly. In any kind
of cognitive transaction with the human or nonhuman environment, a variety
of information processing activities may go on. Metacognition refers among
other things, to the active monitoring and consequent regulation and
orchestration of these processes in relation to the cognitive objects or
data on which they bear, usually in the service of some concrete goal or
objective. (p.232) (emphasis added)

As shown by the parts underlined, two phases are identified in metacognition:
conscious knowledge about one's own cognitive operation and the strategic
regulation of these cognitive processes. Metacognition is a higher level
executive system which reflects upon our mental operations and makes them work
in a harmonious way.
    To elaborate, Flavell (1979, 1981) presented four classes of elements whose
actions and interactions would affect cognitive behavior. Those are
metacognitive knowledge, metacognitive experiences, cognitive goals (or tasks),
and cognitive actions (or strategies).
    Metacognitive knowledge refers to one's recognition of the world both
inside and outside of oneself. Flavell describes three variables of knowledge
in it; person, task, and strategy. The person variable is the knowledge about
the nature of oneself and other people as a cognitive processor (e.g. I can
learn things better in reading than listening (intraindividual differences);
One of the friends can do this job better than the others (interindividual
differences); We can understand a well organized passage more easily than a
badly organized one (universals of cognition)). The task variable includes
such subcategories as knowledge of the nature of the task (how difficult or
easy it is) and the information available in pursuing the task (the quality
and quantityof usable information). The strategy variable is the knowledge
about the various degrees of effectiveness of alternative strategies in
achieving the goals. These three variables can work both independently and in
interaction or in combination with one another. For example, I (rather than my
friend) could adopt strategy A (rather than B) in task X (rather than Y).
According to Flavell, most metacognitive knowledge actually concerns such
interactions or combinations and develops through one's awareness of them.
    Metacognitive experiences refer to the feeling or sensing one has in one's
cognitive processing about one's achievement. They concern persons, tasks,
goals, situations, strategies or some previous metacognitive experiences.

They occur at any time before or after a cognitive enterprise. For example, you may feel how well you will do in the coming task or how well you did in the previous task. It also occurs in the on-line cognitive operation which can be brief or lengthy in duration, simple or complex in content. For example, you may have only a momentary sense of puzzlement in the course of your reading or that sense of puzzlement may stay longer with you. In the former case, you can ignorethe sense, while in the latter you may stop and consult your reference book. Thus metacognitive experience could alter your strategy or could change your goals. Metacognitive experience can also give feedback to metacognitive knowledge, which results in formulation or reformulation of metacognitive knowledge by adding to it or deleting it or revising it.

Cognitive goals are the tacit or explicit objectives that instigate and maintain the cognitive enterprise. They are enormously heterogeneous in nature. Cognitive actions are those various activities undertaken to achieve the goals.

Our cognitive processing is orchestrated in the light of or in the interplay with those four elements through such mental operations as selecting strategies, planning, monitoring, and modifying strategies (Donna-Lynn et al. 1984). A brief illustration will suffice to summarize its operation: We start with a self-imposed or externally imposed goal and adopt a certain kind of strategy based on your knowledge of interaction (planning, selecting). You may get some kind of feeling how well you are doing (monitoring). According to the quality of this metacognitive experience, you may modify your metacognitive knowledge, which then adjust your actual action to achieve your goal. Or you may avandon the first goal and establish a new one and start again with alternative strategies (modifying).

When we process the necessary information without difficulty, we are not usually aware of this regulatory system. However, such smooth metacognitive orchestration cannot always be guaranteed. Many investigations have reported that children display a lot of metacognitive deficit. These findings pushed metacognition into a central issue in pedagogical science since the late 1960s (Yussen, 1985).

In his extensive review of comprehension monitoring (one of the typical metacognitive phenomena), Wagoner (1983) concludes that, although there may be some inconsistencies among various studies, developmental and proficiency differences do appear in comprehension monitoring in the sense of knowledge about strategic behavior and of the kinds of behaviors reported and of the apparent maturity of strategies used. In the task of finding inadequacy in text, for example, younger children don't find the text incomprehensible even when they are told that the text has inconsistency in it. Or even if they do they couldn't pick up the problem spot or they attribute incomprehensibility to themselves instead of the text. In the feeling-of-knowing paradigm which includes performance prediction or recall readiness etc., children have shown inability to monitor their own comprehension or memory state correctly. Children often give optimistic prediction about their readiness of recall, which turns out to be very poor comprehension.

Brown (1981) summarises the area of children's metacognitive deficit under four categories: knowing when you know, knowing what you know, knowing what you need to know, knowing the utility of active intervention. Grasping one's own mental state is crucial to choose appropriate strategies toward the goal. Much research has revealed that such metacognition is not routinely undertaken by children. Children develop metacognitive skills in the course of maturing. If they can't do it by themselves, some kind of teacher intervention would be necessary (Loper and Murphy 1985, Cullen 1985).

2. Significance of metacognition in language learning

In the previous section, we surveyed what metacognition consists of and how it works. Further we saw metacognitive deficit is related to poor learning performance. Then what is the significance of metacognition or training of metacognition in second language learning ? Two points will be discussed in relation to this question.

Metacognition is an important factor in the transfer of skills (use of the same strategy in different areas). For example, just as monitoring one's own state of comprehension in the course of reading and listening is important, we should monitor our speech and composition in the process of speaking and writing and evaluate its quality and its effectiveness. That is we should become the audience/reader of our own speech/composition. Clearly setting up the goal facilitates the performance in any skill area. Planning our cognitive activity and selecting relevant strategies beforehand would save our energy and help us do more work regardless of the task. Thus metacognition works across various task areas or transsituationally. This indicates, conversely, that training of metacognitive aspects should be included in each skill instruction (Day et al. 1984). If one metacognitive strategy is acquired in one task, it could be transferred to another area. Metacognition could also help learners transfer cognitive strategies from one area to another making a judgment when to apply which skill in the light of the kinds of tasks and situations. For examples, using translation may be helpful in understanding a complex written text when one has enough time but it may disturb the comprehension if it is an on-line listening task. As appeared in O'Malley et al.'s review (1985b) various strategies including specific cognitive strategies could be transferred to different areas through metacognitive function. Thus metacognition regulates transfer of strategies in the sense that metacognitive strategies themselves can be applied to various areas and that metacognition controls appropriate transfer of cognitive strategies.

Secondly metacognition is a critical factor in maintaining one's own learning. Only those who have learned "how to learn" could continue their learning path to a higher level without a teacher's assistance. Of course acquiring metacognitive regulation is not the only factor for being self-regulatory independent learners [2], but it is definitely among the crucial factors. It would not be too much to say that, as language learning should continue after learners finished school curriculum, the final goal of

language teachers is to bring up independent learners who can manipulate their own learning. "Students without metacognitive approaches are essentially learners without direction or opportunity to review their progress, accomplishments, and future learning directions" (O'Malley et al. 1985b:561). Therefore the metacognitive aspect of learning should be given proper treatment in language pedagogy.

3. Metacognition in second language research
     Although we have considered the components of metacognition and its importance in language learning, it still remains as abstract notion. Metacognition is embodied in the form of strategy in second language research. This section will examine metacognitive strategies which have appeared in the literature in order to get a more concrete view of metacognition. We will also survey the outcomes of the research dealing with metacognitive aspects of second language learners.

3.1 Metacognitive strategy
     O'Malley et al. (1985a, b) and Chamot (1987) provide a clear contrast between metacognitive and cognitive strategies. We will first look at their definition through Chamot (ibid: 72) [3].

     ..... metacognitive strategies involve thinking about the learning process, planning for learning, monitoring of learning while it is taking place, and self-evaluation of learning after the learning activity. Metacognitive strategies can be applied to different types of learning tasks. Cognitive strategies involve manipulation or transformation of the material to be learned; in other words, the learner interacts directly with what is to be learned. Cognitive strategies can vary in the amount of learner interaction or transformation involved; greater involvement is thought to result in increased learning .

     Based on the interview of 70 high school students about nine specific language learning activities such as pronunciation, oral drills, grammar exercises or vocabulary, O'Malley et al. (1985a) withdrew 26 learner strategies and classified them into metacognitive, cognitive, and social mediation strategies. The metacognitive strategy includes strategies such as advance organizers, directed attention, selective attention, self-management, advance preparation, self-monitoring, delayed production, self-evaluation, and self-reinforcement. The cognitive strategy includes repetition, resourcing, directed physical response, translation, grouping,, note-taking, deduction, recombination, imagery, auditory representation, key word, contextualization, elaboration, transfer, inferencing, question for clarification. There was only one strategy, cooperation, included in social mediation strategy.
     Although we should not take this classification as absolute[4], this kind of well elaborated list helps our understanding of the components of

metacognitive strategy. Metacognitive strategies are those which function as setting guidelines for learning and cognitive strategies are those which interact directly with the material in the framework made by the metacognitive strategies.

3.2 Research in metacognition

In her research through a questionnaire, Bialystok (1981) raised the first basic question concerning the methodology of strategy research -- whether learners are aware of their own strategies. She drew a positive answer to it. Learners could understand the strategy description on the questionnaire and give proper assessment of their own use of each strategy. She reported that monitoring had more effect on older (therefore more advanced) learners' performance (grade 10 vs. grade 12).

O'Malley et al(1985a) examined learning strategies of second language learners of high school age by means of student interview, teacher interview, and observation. (Their strategy classification is introduced in the previous section) The students were both in novice and intermediate level. First of all, comparing the number of strategy reported, they concluded that student interviewis the best method of extracting strategies. Secondly, they found that although the patterns of strategy use were nearly comparable for novice and intermediate students, some differences between them exist both in metacognitive and cognitive strategy. Self-monitoring was used by intermediate students more than beginners. Cognitive strategies like translation and imagery and elaboration, which are relatively less demanding in the sense that they require less cognitive manipulation, were preferred by beginners, while contextualization which needs more complex mental operation was used more by intermediate learners. Comparing those differences between novice and intermediate learners, it seems that the difference between them is greater in cognitive strategy than metacognitive strategy. It was also shown that metacognitive strategies were used in the combination of cognitive strategies.

O'Malley et al. (1989) examined the difference of strategy use between effective and ineffective high school second language learners in listening comprehension through think-aloud protocol analysis. Three strategies were identified as differentiating good from poor learners ; elaboration, inferencing, and self-monitoring, one of which (monitoring) is one of the typical metacognitive strategies.

O'Malley et al. (1985b) reported an experimetal study on the effect of metacognitive training on the intermediate-level high school ESL students. They made three groups, each of which was provided with different kinds of training in normal classroom activity. One group called the metacognitive group received training on three kinds of strategy; metacognitive, cognitive, and socio-affective. Another group called the cognitive group received training on cognitiveand socio-affective strategies. A control group received no training. The score of post-test in the tasks of listening and speaking were compared. Effect of metacognitive training was obtained moderately on

listening and clearly on speaking. Further analysis of the result raised the
following points; Task difficulty strongly affects the usefulness of strategy.
Little evidence of the transfer of metacognitive strategy was obtained.
Transfer of strategy is extremely sensitive, so continued prompts and
structured directions would be necessary until the strategies become
autonomous. Although the numbers of strategy and task included in this study
were limited and the result obtained was not completely clear-cut, it showed
the effect of strategy training, especially that of metacognitive strategy, in
a classroom setting.

The studies cited above were mainly concerned the strategies used in the
process of language learning. While Wenden(1986) examined a different aspect
of metacognition of ESL learners. She investigated ESL learners' metacognitive
knowledge which she defined as "the relatively stable and statable information
that human thinkers have about their own cognitive processes and those of
others" (p. 197). As a result of the analysis of verbal report, she recognized
five dimensions of knowledge about language learning:

- language (designating)
- language proficiency (diagnosing)
- outcome of strategies (evaluating)
- personal factors (self-analysing)
- beliefs about how best to approach language learning (theorizing)

These categories can be taken as a further elabolation of Flavell's three
dimensions (person, task, strategy) in the language learning field.

As this brief review indicates, the metacognitive aspect of second language
learning has come to be a field of interest. Metacognition has begun to be
recognized as an important factor to be deliberately included in second
language pedagogy.

However, metacognition is a new-comer that appeared in 1980s in this field
(Skehan 1989). Most of the research is still in the stage of identifying each
strategy or component of metacognition in second langauge learning. As Skehan
(ibid.) correctly pointed out, the research framework of metacognition is
typically research-then-theory type. In this climate of research, a series of
O'Malley et al.'s work seems to be the beginning of systematicity in
this area. Therefore, even though some interesting results have been collected
in the use and effectiveness of metacognitive strategy, a lot more research is
necessary including more variety of strategies and wider range of learners.
It would be too early to make any conclusion about metacognitive strategy in
second language learning, but some tentative statements could be drawn from
these studies. To summarizse; first of all, learners can reflect and describe
their own use of strategy. This raises a optimistic view of trainability of
metacognitive strategies (Bialystok, 1981). Secondly, the metacognitive
strategy can be included in the systematic classification of learner
strategies and can be further sybcategorized (planning, monitoring,

evaluation). Metacognitive knowledge about second language learning can be also analyzed into subcategories (Wenden 1986). Such analyzability is a prerequisite of a further development of a theory and research in metacognitive strategies. Thirdly metacognitive strategies work in combination with cognitive strategies. A close examination of O'Malley et al. (1985a)'s classification of learner strategies would reveals that metacognitive strategies are those which facilitate systematic task performance, in other words, metacognitive strategies serve to make a mental framework in which each cognitive strategy operate to achieve goals. Fourthly it was shown that intermediate learners tend to use more metacognitive strategies than beginners. Especially the study revealed that monitoring was used more by intermediate learners. This indicates, quite naturally, the relationship between proficiency level and metacognitive ability. Although we should not draw an easy cause-effect solution in this relationship (e.g. those who have metacognitive ability can achieve higher proficiency or those whose achievement is high can obtain metacognitive ability), at least we could suggest that metacognitive training should have a positive effect on second language learning. Finally the studies have shown that use of strategy (both metacpgnitive and cognitive) depends on the complexity of the task. Too demanding tasks hinder strategy application. This implies pedagogically that in the process of strategy training instructors should carefully choose the task which allow learners to be aware of themselves and to control their learning enterprise.

There are still huge areas remaining for future investigation. Effective combination of strategies is one of them, including such factors as task, situation, and learner level. rainability of metacognitive strategies need to be investigated in a more varied setting. Transferability of metacognitive strategies among various skill areas is a very attractive and also necessary factor for future research. Also we should keep in mind that knowing does not always guarantee actual use. How knowledge is transmitted into actual performance need to be discussed. Finally research methods which depend on learners' self-reflection such as questionnaire, interview, or think- aloud should be paid careful attention. Researchers who use these methodology need to be conscious about the limitations as well as benefits of them (see Wenden 1986).

4. Conclusion

In this final section, two points will be made about the perspective of metacognition in the field of second language learning.

First, metacognition could be a key concept to integrate various learner strategies into a consistent theory. Metacognition itself is a broad notion. It is even defined as "general process of thinking" (Smith 1988) and often referred to as a fuzzy concept (Day et al 1985, Flavell 1981, Yussen 1985). Metacognitive strategies work transsituationally, which implies that it is a general, therefore weak strategy. The nature of metacognitive strategy makes a

sharp contrast to cognitive strategy, which can show a specific effect in a specific field. Why then does this kind of general weak strategy get so much attention these days ? Probably because we began to realize that however strongeach cognitive strategy is, they can't produce a satisfactory mental operation without a higher level regulatory system. Some concept which integrates various strategies and explains the smooth mental enterprise of successful learners is awaited.

Secondly, the field of second language learning is one in which metacognitive training can be applied. There is a firm assumption in the view which claims the importance of metacognition in language learning. It regards language learning as one of the general learning processes and gives reliance to consciousness and self-control in the success. Regardless of whether such a view completely ignores the autonomy of language acquisition which is supposed to be governed by some uncontrollable universal factors, it is not counter-intuitive to claim that language learning shares some conscious controllable process with general learning. The field to which we might apply metacognitive training is huge. Second language instruction is no doubt one of them.

Notes
1) The author doesn't make clear distinction between foreign language learning and second language learning in this paper. Rather the term second language learning would connote school setting.
2) See Dickinson (1987) for the other characteristics of an independent learner.
3) Both O'Malley et al. and Chamot base their definition on Brown and Palincsar (1982). Therefore their definition are very similar.
4) For example, Chamot (1987) classifies "Question for clarification" in socioaffective strategy (the equivalent of social mediation strategy) instead of cognitive strategy. Yussen (1985) states that metacognitive strategy by nature admits open definition, identifying prototypical phenomena, thus expanding further with progress of research. Therefore this categorization should be regarded as a precious starting point for further elaboration.

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