Roles of Noticing in English Language Learning : A Literature Review

英語学習における気づきの役割 －文献概説－

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1. Background

Whether learning is driven consciously or unconsciously has been a controversial topic for second language (L2) researchers. The first researcher that introduced the research findings of psychology into the studies of second language acquisition (SLA) is Schmidt (1990), who claims that what is noticed becomes intake which is necessary for L2 learning. He hypothesizes that noticing is a necessary condition for L2 learning. Although noticing is generally considered to be a necessary component for L2 learning, opinions differ as to whether it is indispensable for L2 learning or not. There are quite a few researchers who believe that conscious understanding of the target language (TL) system is necessary if learners are to use linguistic forms correctly and appropriately. For example, Peters (1998) has proposed that in every domain of language learning, learners must attend to and notice any source of variation that matters. On the other hand, however, there are also quite a few researchers who believe that language learning is essentially unconscious. Krashen (1985) is one of the researchers who belong to this group and has asserted that conscious learning is of little use in actual language production and comprehension. Gregg (1984) also assumes that most L2 learning is unconscious.

It is plausible that both conscious learning and unconscious learning surely exist and that they both contribute to L2 learning respectively. Although the existence of unconscious learning cannot be denied completely, conscious learning, or attended learning, is assumed to have a role of greater consequence in L2 learning. It should be noted that paying attention to form is facilitative and necessary if learners are to learn redundant grammatical forms and to acquire the ability to produce them correctly.

This paper will first review attention, consciousness and noticing to elucidate the relationship between them. It will then review the Noticing Hypothesis. Although it is a fascinating hypothesis for L2 researchers and teachers, it has also drawn criticism from some researchers (for example, Tomlin & Villa, 1994; Truscott, 1998). It is necessary to review the details of their criticism and to confirm the validity of the hypothesis. Then, focus-on-form activities, in which attention-drawing devices are employed to facilitate L2 learning, will be reviewed. It is finally suggested that L2 learning is mainly driven by what learners pay attention to and notice in TL input.

2. Attention, Consciousness and Noticing

2.1 Attention

Attention (voluntary or involuntary) to the material to be learned is considered to be crucial in L2 learning.

Attention is the ability a person has to concentrate on some things while ignoring others. Subsystems of attention include alertness (an overall readiness to deal with incoming stimuli), orientation (the direction of attentional resources to certain types of stimuli), detection (cognitive registration of a particular stimulus) and inhibition (deliberately ignoring some stimuli). In SLA theory, it has been proposed that nothing can be learned from input without it being the object of some level of attention. It is agreed that the ability to direct and focus cognitive activities on specific stimuli for a period of time is necessary for L2 learning. What is controversial is whether such discernment must be conscious or not.

As the concept of attention is necessary for understanding nearly every aspect of L2 learning, the author will provide basic information concerning attention. The basic assumptions on attention are: It is limited, it is selective, it is partially subject to voluntary control, it controls access to consciousness and it is essential for learning. Each of them will be discussed in some detail to understand what attention is.

2.1.1 Attention Is Limited

The classic view of attention is that it has limited capacity (Kahneman, 1973) and this view has been employed by many in SLA. Within this general view, Wickens (1989) has assumed that the limited capacity of attention includes specific resource pools for specific modalities (visual, auditory, vocal and manual). It means that attention-demanding activities can be carried out at the same time more efficiently if they exercise different modalities than if they make use of the same modality. Each resource pool had been assumed to have limited capacity, which was proved by Miyamoto (1998) empirically. It is generally known that there are two different ways in which humans analyze and process language as part of comprehension and learning. One is known as top-down processing and the other is known as bottom-up processing. They are assumed to make use of the same modality as they are both concerned with language understanding. Miyamoto (1998) showed empirically that there was a trade-off between top-down processing and bottom-up processing. When one exercises with higher efficiency, the other is likely to become less efficient.

2.1.2 Attention Is Selective

As there is limited supply of attention and it must be shared by any activity that requires it, attention must be strategically allocated. In most L2 learning context, the meaning of messages is the most important (VanPatten, 1990). This is why limited attentional resources are directed first to lexical items. In most L2 learning context, understanding meaning is important and lexical items usually carry message meaning. This explains why attentional resources are directed to communicatively redundant formal aspects of language later (Lee, Cadierno, Glass & VanPatten, 1997). Some researchers consider that being selective is the basic function of attention and place more importance on selection than other characteristics. Bialystok (1994), for example, has emphasized that being selective rather than being limited is the primary characteristic of attention.

2.1.3 Attention Is Subject to Voluntary Control

One of the important functions of teaching is to help learners focus their attention on linguistic forms in input. If it is possible to control the focus of attention, L2 teachers can guide their learners to pay attention to different

aspects of the TL in class. They can tell their learners to pay attention to different aspects, such as pronunciation, lexical items, syntax, discourse structuring and so on (Hulstijn & Hulstijn, 1984). There is of course an involuntary form of attention as well. For example, it sometimes happens that one cannot help attending to a loud noise whether one wants to or not. While involuntary attention is controlled by outside events and beyond one's will, voluntary attention can be directed to a certain part by an inner intention.

2.1.4 Attention Controls Access to Consciousness

One of the roles of attention is to control access to consciousness. Attention is viewed as the mechanism responsible for access to awareness (Baars, 1996). Attention selects stimuli and the selected stimuli are represented in conscious awareness. Selection is the mechanism that moves information from one stage of processing to the subsequent stage. Selection is based on competition and all stimuli compete for access to consciousness. Only strongly activated stimuli enter consciousness and are subject to further processing while other stimuli remain unconscious and are lost. Attention is in charge of the process and thus controls access to awareness.

2.1.5 Attention Is Essential for Learning

It is generally agreed in psychology that there is little if any learning without attention. While unattended stimuli are kept in short-term memory for only a few seconds and not available for future use, attended stimuli stay in long-term memory and are available for future use. Carr and Curran (1994), for example, regard attention to be responsible for making input available for further mental processing. Gass (1988) considers that an attended part gets processed to be comprehended and in turn is converted into intake.

3. Consciousness

The term *consciousness* is used to refer to personal recognition of both stimuli in input and of one's own mental processes. Schmidt (1990, 1995) divided consciousness into three categories: Consciousness as awareness, consciousness as intention and consciousness as knowledge. The first category is thought to have three levels: Perception, noticing and understanding. What should be noted here is that perception does not necessarily accompany subjective awareness.

The term *detection* is worth a mention here. As discussed in 2.1, it is one of the subsystems of attention. The term is used to refer to cognitive registration of a particular stimulus without subjective awareness (Richards & Schmidt, 2002). What is important here is whether detection is enough to bring about learning or not. Tomlin and Villa (1994), for example, argue that detection is the necessary and sufficient condition for further processing and learning. They assume that L2 learning is possible without noticing. It can be considered that they use the term *detection* to refer to the term *perception* in Schmidt's term. Both of them occur at a subliminal level. The Noticing Hypothesis (see 4.2 for further details), on the other hand, claims that consciousness at the level of noticing is necessary for L2 learning. Figure 1 illustrates the relationship between the three levels of

consciousness and detection.

Consciousness as knowledge	
Consciousness as intention	
Consciousness as awareness	Understanding
	Noticing (Focal awareness)
	Perception/Detection

Figure 1 Three levels of consciousness and detection

Consciousness-raising toward form has been regarded to be meaningful in L2 learning and various activities have been proposed. Exposure to a material with some aspects highlighted, inferring grammatical rules from examples, comparing two or more different ways of saying something and observing differences between learners' own linguistic realization and its counterpart in model input all constitute consciousness-raising activities. These techniques are intended to avoid inefficiency of learning which tends to occur in a context where L2 learners are primarily concerned with meaning.

Attempts by adults to learn an L2 incidentally through communicative interaction are considered to be only partially successful. Concerning this issue, Skehan (2002) has observed that "In the pre-critical period phase, there is inexorable involvement of a language learning system on exposure to primary linguistic data, whereas this no longer occurs in such an obligatory way in post-critical period phase" (p.87). This explains why adult learners cannot learn an L2 as successfully as children in naturalistic environments. It should be stressed that raising consciousness toward form is indispensable for adult learners to develop their interlanguage (IL) system efficiently.

4. Noticing and the Noticing Hypothesis

4.1 Noticing

Noticing is to assign significance to some aspect of form relative to others. It is considered to be one degree of awareness. It refers to private experience which is brought about by drawing learners' selective attention to a certain linguistic form. Schmidt (1990) argues that noticing is necessary for input to become intake, that is, necessary for L2 learning. Schmidt (2001) further defines that the minimum requirement of noticing is to pay attention to key grammatical elements in input with greater than a threshold level of subjective awareness (that is, reportable subsequent to the experience). Noticing is thus "subjective correlate" (Schmidt, 2001, p.5) of attention. There are several terms for what Schmidt calls noticing. They are, for example, "focal awareness" (Atkinson & Shiffrin, 1968), "episodic awareness" (Allport, 1979) and "apperceived input" (Gass, 1988). What these terms have in common is that they all identify the level at which stimuli are subjectively experienced. That is, noticing can be seen as learners' detection with subjective awareness plus rehearsal in short-term memory

(Robinson, 1995).

4.2 The Noticing Hypothesis

Schmidt's Noticing Hypothesis comes from his own experiences as a learner of Portuguese. While learning Portuguese, he realized that certain linguistic forms began to enter his own IL system only when he noticed them. Drawing on psychological learning theories, he has hypothesized that L 2 learners can not begin to acquire a linguistic form until they become aware of it in input.

The Noticing Hypothesis claims that SLA is largely driven by what learners pay attention to and notice in TL input and what they understand the significance of noticed input to be (Doughty, 2003). The basic claim is that input does not become intake for L2 learning unless it is noticed, that is, consciously registered. It should be noted here that there are three types of noticing: Noticing a hole, noticing a form and noticing the gap (Swain, 2000).

Schmidt and Frota (1986) first emphasized the importance of noticing in L2 learning. They have claimed that if a learner is to learn and use a particular type of verbal form, it is not enough for it to have been taught and drilled in class and that it is also not enough for the form to appear in input. They have argued that conscious awareness of what is present in input, or noticing, is necessary for a learner to be able to use it. They have reported the results of a diary study in which there are so many instances of L2 use matching the learners' reports of what was noticed while interacting with native speakers. This can be taken to support the hypothesis that there is no L2 learning without noticing. Making diary entries requires not only noticing but also reflexive self-awareness (awareness that one has noticed). Schmidt (1990) discusses the evidence from his own learning of Portuguese in support of the hypothesis that intake is the subset of input that is attended to and noticed. When meaning-processing predominates, form becomes optional which often loses out to meaning. Schmidt (1990, 1995, 2001) has emphasized the importance of noticing and argued that L2 learners need to direct attention to some aspects of input. Aspects of form which need to be developed have to be noticed consciously.

Learning is closely related to memory. It has been established empirically that memory requires attention and awareness. Cherry (1953) is a classic study into the cognitive system's ability to deal with competing auditory input. The result suggests that while an attended material is processed into long-term memory, an unattended material is kept in short-term memory for a short period and lost unless an opportunity to selectively attend to and notice the material is given.

4.3 A Critique of the Noticing Hypothesis

Schmidt argues that noticing and/or a higher level of awareness than noticing are facilitative for L2 learning. It should be made clear that he has not claimed that noticing is necessary and sufficient for L2 learning.

Since it was proposed, the Noticing Hypothesis has attracted SLA researchers' attention and received both support and objections. This section is primarily concerned with theoretical objections to the hypothesis. The objections can be divided into three broad groups.

The first objection is concerned with the role of awareness in L2 learning. The basic claim is that attention without subjective awareness can lead to learning. That is, unconscious learning is possible. In this paper,

unconscious learning is equated with learning without subjective awareness. It should be emphasized here that it is different from learning without intention and learning without explicit metalinguistic knowledge. As people can learn things without intending to, learning without intention is possible. Learning without metalinguistic knowledge is also possible since it is clear that nobody has complete metalinguistic knowledge on the TL. Whether learning without subjective awareness is possible or not is an issue of interest.

Concerning this issue, Tomlin and Villa (1994) have argued that detected information can be registered in memory and that detection is enough for L2 learning. While noticing is a conscious experience, detection occurs at a subliminal level. Detected stimuli include noticed stimuli. As Robinson (2003) has pointed out, the experiments by Marcel (1983) appear to show that detected, but not noticed, stimuli are kept in memory. As Schmidt (1995) has acutely pointed out, however, detection is not enough to bring about learning of new knowledge. As the experiments by Marcel (1983) employed lexical items which the participants already knew, the findings cannot be used as evidence suggesting that detection, which does not accompany subjective awareness, contributes to learning of new linguistic knowledge.

Although people sometimes pick up subliminal signals they already know, there is no evidence as yet that new information can be picked up in such a manner. It should be concluded that subliminal language learning is extremely unlikely. “In consciousness research, it is commonly accepted that some level of attention is required to be able to notice something, and that noticing is crucial in obtaining new information or uptake” (de Bot, Lowie & Verspoor, 2005, p.8). While detection brings about the activation of existing knowledge, it does not lead L2 learners to gain new knowledge on the TL. Consciousness at the level of noticing enables L2 learners to learn new knowledge on the TL.

The second objection to the hypothesis is concerned with a methodological issue. It should be admitted that it is difficult to measure consciousness precisely. Although Schmidt (1990) has operationally defined noticing as the availability for verbal report, this operationalization is not subtle enough to measure noticing objectively. As awareness is usually momentary, the method to require learners to verbalize the contents of awareness cannot grasp what they have noticed completely. What learners can report can be susceptible to various factors such as individual differences and salience of linguistic forms. Some learners are better at verbalizing the contents of awareness than others and some noticed linguistic forms are easier to put into words than others (Jourdenais, 2001; Schmidt, 2001). Although it is evident that methodological improvements are required to evaluate noticing precisely, making use of learners’ verbal report as evidence of noticing is the best way available as now.

The third objection to the hypothesis is quite harsh. Truscott (1998), for example, has stated that “The foundations of the Noticing Hypothesis are weak. Cognitive research does not support the claim that conscious awareness of the information is necessary or helpful” (p.110). Carroll (1999) has basically agreed with Truscott (1998) in that the Noticing Hypothesis lacks a property theory. To quote Gregg (2001), “A property theory deals with the instantiation within a given system of various properties of that system” (p.156). According to Cummins (1983, p.15), it is intended to answer “In virtue of what does system S have property Y?” Both Truscott and Carroll consider that the Noticing Hypothesis has not explained how L2 knowledge is instantiated in L2 learners’ mind.

Although their claim may be true, it is not a valid objection to the Noticing Hypothesis. The hypothesis is

not intended to explain that from the beginning. It simply claims that paying selective attention, or noticing, facilitates L2 learning and that unattended learning is limited in scope and relevance for SLA. Schmidt (2001) describes what must be noticed as “elements of the surface structure of utterances in the input － instances of language, rather than any abstract rules or principles of which such instances may be exemplars” (p.5). If learners notice linguistic forms in input, the noticed forms are likely to receive further processing for comprehension and as a result, desirable IL development can be expected.

It is necessary to note here that Truscott agrees that noticing is necessary for the acquisition of metalinguistic knowledge, which represents the ability to talk about language. It is assumed to help L2 learners reflect on how a lexical item should be used in a sentence. It is also true that metalinguistic knowledge can be used to make output correct and more comprehensible.

Although opinions vary as to how metalinguistic knowledge contributes to L2 learning, it is generally agreed that: (1) Metalinguistic knowledge helps learners pay selective attention to linguistic forms in input, (2) Metalinguistic knowledge helps learners establish clear relationship between form, meaning and function, (3) Metalinguistic knowledge has the potential of accelerating the development of IL system and (4) Metalinguistic knowledge makes learners more sensitive to their grammatical mistakes (Douhty & Williams, 1998; R. Ellis, 1997; Norris & Ortega, 2000; Terrel, 1991).

Although it still leaves a lot to be elucidated whether noticing actually promotes IL development, it is generally accepted that noticing linguistic forms such as phonology, grammar, vocabulary and discourse structuring is necessary to bring about other cognitive processes such as comprehension and integration (Doughty, 2001; R. Ellis, 1997; Gass, 1997; Skehan, 1998). Noticing is the first stage in SLA processing stages (Gass, 1988; Skehan, 2002) and the claim made by the Noticing Hypothesis has been empirically supported.

5. Focus on Form

5. 1 Background

There has been a lively debate as to whether the processes which drive forward an IL system are implicit or explicit. In the former case, learners would process linguistic data, and without their conscious effort, IL change would occur. In the latter, it is assumed that the involvement of learners and their focused attention would facilitate speed and perhaps nature of learning.

Several researchers (Doughty & Williams, 1998; Long, 1991; Sharwood-Smith, 1991, 1993) have suggested pedagogies which require L2 learners to pay attention to form during meaning-based activities. The results of those attempts have been successful in encouraging learners to achieve high levels of grammatical accuracy.

5.2 Focus on Form, Focus on Forms and Focus on Meaning

Long (1988, 1991) has distinguished between focus on forms and focus on form. While individual language elements such as verb endings and agreement features are taught directly in the former, the latter is defined as a brief allocation of attention to a linguistic form as the need for this arises incidentally during meaning-

based activities (Muranoi, 2006). As Doughty and Williams (1998) have stated, "…focus on form entails a prerequisite engagement in meaning before attention to linguistic features can be expected to be effective" (p.3). Swain (1998) has pointed out that it is insufficient to teach grammatical forms out of context. In focus-on-forms classes, grammatical forms are considered to be paradigms to be rehearsed and memorized. It seems that direct instruction in grammar does not take SLA processing stages into consideration.

Gass (1988) has proposed five stages whereby learners convert input into output: Apperceived input, comprehended input, intake, integration and output. Similarly, Skehan (2002) has proposed four SLA processing stages: Noticing, patterning, controlling and lexicalizing. They both consider that TL knowledge is not acquired as one. Different parts of linguistic knowledge are at a different point on the sequence. While some linguistic forms may have already reached the lexicalizing stage, other linguistic forms may not have been noticed yet. Learners gradually deepen their TL knowledge by analyzing noticed input, making generalizations, achieving extensions and gaining control of form. As a result, their IL system is restructured gradually. Teaching grammatical rules directly out of context has not been successful because it tries to offer TL knowledge as one without taking the processing stages into consideration. It is necessary to note that learners' interaction with language data changes at different stages of development. It is important to take where learners are in their L2 learning process into consideration.

Another possible reason why direct instruction in grammar is not effective is that it does not promote form-meaning-function mapping which is considered to be necessary for L2 learning. Teaching grammatical rules directly out of context does not provide learners with opportunities to understand the relationship between form, meaning and function. Pedagogical Grammar Hypothesis (Corder, 1973) regards grammatical rules not as objects of learning to be memorized but as what aids learners in developing grammatical competence. Being exposed to explicit grammatical knowledge is not enough for learners to develop grammatical competence (Rutherford & Sharwood-Smith, 1988).

Focus on meaning emphasizes the interaction of meaning and does not take formal elements seriously. Classes where learners are primarily concerned with getting their meaning across do not provide all that is needed for the development of targetlike proficiency (Swain, 1985). In those classes, learners are likely to "become fluent without becoming equally accurate" (Byrd, 2005, p.553). Research in French immersion classes reveals that even advanced learners often get their meaning across with non-targetlike expressions (Harley, 1992; Harley & Swain, 1984).

Research in French immersion classes suggests that it is unlikely that learners attend to less salient formal elements even when they have attentional resources to spare. It is probable that they may never attend to purely formal, functionally redundant forms unless some form of instructional intervention forces them to do so (Long & Robinson, 1998).

Compared with focus on forms and focus on meaning, focus on form, in which learners are encouraged to attend to form during meaning-based activities, has the potential to help learners develop both grammatical accuracy and the ability to use the TL. Hulstijn (2001, 2003) has claimed that learners acquire vocabulary and grammar when they process each linguistic form deeply. That is, when learners are deeply involved with linguistic forms, the forms are likely to be incorporated into their IL system. Quality of information processing

plays an important role in L2 learning. Focus-on-form activities, in which learners attend to form according to their needs during meaning-based activities, are considered to encourage learners to process linguistic forms deeply.

5.3 Four Features of Focus on Form

Focus on form has been started to reexamine ways in which grammatical accuracy is achieved within communicative language teaching framework. Long and Robinson (1998) have stated that "…during an otherwise meaning-focused classroom lesson, focus on form often consists of an occasional shift of attention to linguistic code features ― by the teacher and/or one or more students ― triggered by perceived problems with comprehension or production" (p.23). This definition suggests that focus on form includes the following four features:

(1) An overall emphasis is put on the interaction of meaning.
(2) Learners occasionally shift their attention from meaning to form.
(3) Language is treated as an object rather than as a tool for communication.
(4) Perceiving problems trigger learners to shift their attention from meaning to form.

Focus on form is assumed to bring about desirable IL development because it provides learners with opportunities where they process form, meaning and function simultaneously (Doughty, 2001). As discussed above, focus-on-form activities engage learners in deeper processing of linguistic forms.

5.4 Effects of Focus on Form on L2 Learning

Norris and Ortega's (2000) meta-analysis of various L2 instructional types is informative. They have chosen 49 studies from the published applied SLA literature and attempted to determine which type of instruction results in better learning. They have operationalized the constructs of L2 instruction and proposed five instructional types: Explicit, implicit, focus on meaning, focus on form and focus on forms.

They have compared the 49 studies and clarified relative effectiveness of implicit and explicit types of instruction and relative effectiveness of attention to meaning, form-meaning connections or forms. The results are as follows: Explicit focus on form > Explicit focus on forms > Implicit focus on form > Implicit focus on forms.

Muranoi (2000) tried to clarify the effect of interaction enhancement on the improvement of learners' article use. In his study, in response to targetlike use, the instructor repeated learners' output, which helped learners confirm their hypothesis. In response to non-targetlike output, the instructor requested repetition, and if necessary, recast learners' output. Through this technique, the learners increased accuracy in article use.

Psychologists generally agree that new knowledge that is processed more elaborately is more likely to be retained than that which is processed less elaborately (R. Ellis, 1999; Hulstijn, 2001). It is generally agreed that focus-on-form activities provide learners with opportunities to process input more elaborately and to establish a stronger form-meaning-function relationship.

The studies which attempted to clarify the impact of focus-on-form activities on L2 learning have brought about the following results (Doughty & Williams, 1998; Williams, 2005):

(1) Focus-on-form instruction which helps learners understand form-meaning-function relationship promotes L2 learning under certain circumstances. It especially encourages learners to notice less salient linguistic forms in input.
(2) Explicit grammar instruction is effective when it is implemented during focus-on-form instruction.
(3) Focus-on-form instruction which involves negotiation of meaning promotes L2 learning when learners' psycholinguistic readiness matches the instruction.
(4) Focus-on-form instruction which requires learners' output encourages learners to notice a hole and to notice the gap between IL and TL form.

Focus-on-form instruction promotes L2 learning because it promotes cognitive processes which have important roles in L2 learning. The instruction channels attention and brings into awareness what otherwise would have been missed. Noticing, form-meaning-function mapping, hypothesis testing and automatization of currently held linguistic knowledge are promoted through focus-on-form activities.

6. Noticing in English Language Education

Various L2 learning models have been proposed (for example, N. Ellis, 2001; R. Ellis, 1997; Gass, 1997; Johnson, 1996; VanPatten, 1996). They all assume that learners' interaction with input data changes at different stages of development. At which stage learners are in the L2 learning process determines how they interact with language data. The process begins with input. All the models agree that input is necessary for the process to begin. The availability of input, however, is not sufficient for L2 learning. It is necessary for learners to take in data in the input and process it. In order for this to happen, learners must attend to input.

Although some studies indicate the possibility of some unattended learning, this appears limited in scope and relevance for L2 learning. This paper assumes that attended learning, or learning with awareness, is far superior and that attention is necessary for all aspects of L2 learning. L2 learning is mainly driven by what learners pay attention to in TL input. The centrality of attention in L2 learning cannot be denied. It should be concluded that learning is largely a side effect of attended processing. As Logan, Taylor and Etherton (1996) have acutely pointed out, people learn about the things they attend to and do not learn much about the things they do not attend to. There have been no studies which support the marginality of noticing in L2 learning. Although detection brings about automatic and unaware activation of existing knowledge, it does not encourage learners to learn new L2 knowledge.

Subliminal perception studies have shown evidence for the cognitive registration of stimuli without subjective awareness (Schmidt, 1990, 1995). They have shown that unattended information is registered in implicit memory. What should be emphasized here is that new information is not gained in that way. That is, people cannot take

in new knowledge unless it is registered consciously. What these studies show is that previously well-learned information which is present in long-term memory can be cognitively activated without subjective awareness. The vast majority of these studies, however, do not show that new knowledge is taken in without conscious registration. Although people sometimes pick up subliminal signals they already know, there is no evidence as yet that new information can be picked up in such a manner. It should be concluded that subliminal language learning is extremely unlikely.

The results of experimental laboratory studies of SLA which have attempted to clarify the effects of different conditions of exposure to input on L2 learning suggest that noticing is necessary for L2 learning (see de Graaff, 1997; N. Ellis, 1993; Hulstijn, 1997; Williams, 1999 for overviews). Attention to input, awareness and intention to learn have been employed as independent variables in the studies. The results are: (1) Attention to input is necessary for SLA, (2) Awareness is facilitative and likely necessary too (though difficult to assess) and (3) Intention to learn ― while necessary in many aspects of vocabulary acquisition ― is not necessary for grammar acquisition. These results can be interpreted to support the centrality of noticing in L2 learning.

Snow (1987, 1994) regards noticing the gap as one of the important abilities which jointly influence L2 learning, with which this paper agrees. Although children can reproduce a correct form offered by adults in naturalistic environments during oral interaction, adult L2 learners cannot be expected to notice the gap successfully in naturalistic environments. Salthouse (1996) has proposed that declines in processing speed across the lifespan can explain why adult L2 learners cannot learn a language as successfully as children in naturalistic environments. Processing speed is considered to contribute to the ability to notice the gap. For focus-on-form activities to facilitate such noticing for adult L2 learners, more explicit techniques should be adopted. As learners do not attend to less salient or less meaningful linguistic forms when they are engaged in meaning-based activities, a deliberate technique is required to draw learners' attention to them.

It is reasonable to conclude that leading L2 learners to pay deliberate attention to less salient or redundant aspects of L2 input is a practical necessity to bring about desirable IL development. One cannot deny the centrality of noticing and the marginality of implicit learning in L2 learning. Noticing contributes to L2 learning by provoking other important cognitive processes which are likely to promote IL development.

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