

GUEST EDITORS' INTRODUCTION

Jan H. Hulstijn & Richard Schmidt
Vrije Universiteit Amsterdam & The University of Hawai'i at Manoa

Theme

Questions concerning the role of consciousness in second language (L2) learning and learning in general are central to practical concerns in applied linguistics, including the appropriateness of grammar instruction techniques in language pedagogy ranging from attention focusing devices to decontextualized explanations of grammar, as well as to attempts to construct theories of second language acquisition (viz. the strong, weak and non-interface positions taken by various theorists). Questions concerning the role of conscious and unconscious processes in applied linguistics also connect to current discussions in experimental psychology, connectionist modeling, linguistics, and other disciplines of cognitive science, as well as philosophy. However, at the present time, formation of a coherent research program is hampered by terminological vagueness and confusion and lack of agreement on appropriate research paradigms.

Readership

Since questions concerning consciousness are central to practical as well as theoretical concerns, this issue of the AILA Review intends to raise the interest of three types of readers:

- a) theorists, especially those working in the fields of linguistics and cognitive psychology;
- b) empirical researchers investigating L2 learning in laboratory, classroom, or natural settings;
- c) educationalists, especially those working in the field of foreign and second language pedagogy.

Processes of second and foreign language learning and teaching constitute a multifaceted and therefore multidisciplinary domain. Theorists, empirical researchers and educationalists must take notice of new developments in each others' work. The papers in this issue clearly show how each perspective alone does not provide a full account of second language learning: all authors give evidence of the need to combine insights from linguistics, cognitive psychology, and pedagogy and evaluate them against the results from empirical investigations based on data obtained in classroom as well as laboratory settings.

Procedure

Most of the papers in this issue (except those by van Lier and DeKeyser) originate from a symposium on consciousness in second language learning organized by Hulstijn and Schmidt in the framework of the 10th World Congress of the International Association of Applied Linguistics (AILA), held in August 1993 in Amsterdam. The purpose of the symposium as a whole (and this collection of papers) is to show the necessity of combining multiple perspectives on consciousness and explicit grammar teaching and showing to what extent new views can and should be put to the test, thus giving fresh input to a matter of great theoretical and practical importance.

We provided each of the contributors to the symposium and to this issue with the preliminary version of Schmidt's paper and asked them to address one or several of the seven questions to be mentioned below. Schmidt's paper aimed to serve as a terminological and theoretical framework for the remaining papers. We encouraged the contributors to comment on each others' preliminary papers and to include cross-references in the final versions of their texts. We believe that this procedure has led to a collection of papers offering a coherent conception of the

various aspects of consciousness in second language learning, notwithstanding individual differences in focus and perspective. The remainder of this introduction consists of a summary and discussion of the views raised by the contributors in response to our questions.

Question 1. *Can the theoretical concepts relevant to understanding issues concerning the role of consciousness in L2 learning be standardized so that researchers in the field are speaking from a common understanding?*

Following the advice of McLaughlin (1990) to avoid the ambiguous umbrella term "consciousness," Schmidt, in the opening paper proposes instead other terms to distinguish among the following four aspects of consciousness when discussing language learning processes: 1. Consciousness as intentionality. Here we are dealing with the distinction between intentional and incidental L2 learning. 2. Consciousness as attention. The basic claim here is that learning without some form of attention (or noticing or detection) is not possible. 3. Consciousness as awareness. The labels "explicit" and "implicit learning" are recommended to refer to learning on the basis of awareness at the point of learning (explicit learning) or without such awareness (implicit learning). In addition, it is emphasized that explicit and implicit learning (the process of learning) must be distinguished from explicit and implicit knowledge (products of learning) and explicit and implicit instruction (on the part of the teacher). 4. Consciousness as control. Although it could be argued that control and attention are the same from a theoretical perspective, it is useful to separate them to emphasize the contrast between input and output processing. Automatic, fluent output processing (speaking and writing) need not be and normally is not under full conscious control, though this is not by itself evidence for implicit learning (learning without awareness).

The other contributors to this issue all adopt Schmidt's fourfold distinction. DeKeyser adds that even after the adoption of Schmidt's distinctions, none of the dichotomies are perfectly clear-cut. DeKeyser points out, however, that these distinctions do help us avoid conflating different kinds of things, and they help us to avoid making overly simplistic and general claims for a single dissociation between only two kinds of cognitive mechanisms for L2 learning.

Van Lier discusses additional uses of the term consciousness. He points out that the notion of consciousness should not be restricted to the intrapersonal, cognitive perspective but must be extended to an interpersonal, social perspective. This social perspective provides the framework within which experience can be organized, controlled, and evaluated. Consciousness and language are inextricably interconnected; the development of one goes hand in hand with the development of the other. This link with language is further illustrated with four features of "contingent interaction" in language classes, showing opportunities for increasing levels of symmetry in student-teacher interaction. This offers opportunities for awareness-raising work, necessary for students and teachers in taking charge of their educational activities, turning the classroom from a field of activity into a subject of inquiry and promoting deep and lasting changes in educational practices.

Question 2. *How can these constructs be operationalized in laboratory-like settings, naturalistic settings, and classroom/pedagogical settings?*

In their discussion of the operationalization of consciousness, most authors focus on attention or awareness. VanPatten takes a processing perspective on attention (attention as a processing resource) rather than a product orientation. He therefore advocates studying the effect of explicitly provided information on input processing rather than on output processing. In VanPatten's view, a question such as "Does explicit knowledge become implicit knowledge?" is not the right question. A more useful focus is on the role of attention in turning input into intake, which requires that form and meaning in the input be connected. VanPatten proposes the following hypotheses: 1. Learners process meaning before form. 2. Before attending to non meaningful form, informational content must be processed without cost. (DeKeyser comments that, in principle, one could also argue that form must be processed before meaning can be processed.)

Harley reviews a number of classroom studies and points out that many of them did not specify

whether learning was intentional or incidental, what the focus of attention was, what the state of learner awareness was, or whether efforts were made to impose conscious control. Harley attempts a post-hoc analysis of these studies, using the definitions proposed by Schmidt, concluding that in general these studies show that some level of awareness is necessary for L2 learning even for young children learning a foreign language. For further research, Harley suggests that finer distinctions be made and that introspective methods be used to gain insights into the role of awareness at the point of learning.

DeKeyser also reviews a number of classroom studies, as well as some laboratory studies on the acquisition of artificial grammars, reaching the same conclusions as Harley. There is empirical evidence for the effectiveness of explicit learning. He points out that "no classroom studies have demonstrated a long-term effect of implicit learning in the sense of near-perfect rule-governed production." However, the problem with the operationalization of explicit learning through explicit teaching, as DeKeyser rightly observes, is that most studies do not use measurements that are sensitive enough to distinguish between explicit knowledge and implicit knowledge as the result of explicit learning. Hulstijn and De Graaff point out in this respect that implicit knowledge is a theoretical construct, not directly assessable by means of language tests. Fluent, automatic production, however, might be taken as the behavioral correlate of implicit knowledge.

Question 3. *Is it useful to rethink the notions of "acquisition" and "learning" in terms of current psychological models?*

None of the contributors to this issue adhere to a global definition of acquisition and learning as proposed by Krashen (1981, 1982), although VanPatten and Hulstijn and De Graaff acknowledge that Krashen's distinction can be defended with pedagogical arguments. VanPatten points out an inconsistency in Krashen's definitions (Krashen, 1982: 1). Whereas acquisition is referred to as a *process*, learning is referred to as (conscious) *knowledge*. Furthermore, according to VanPatten, Krashen conflates the notions of context and purpose with those of process and product. All contributors appear to agree on Schmidt's proposal that the distinction between explicit and implicit learning offers a better conceptualization than the acquisition-learning distinction. The main reason is, as VanPatten, Ellis and Schmidt point out, that the explicit-implicit learning distinction does not conflate with associated notions (such as intentional-incidental learning, attention, explicit-implicit instruction, control, context and purpose), as the acquisition-learning distinction does.

Question 4. *How relevant are connectionist models for understanding implicit learning?*

Ellis advocates connectionist modeling for the investigation of L2 learning to the extent that L2 learning takes place implicitly. DeKeyser, following Rumelhart (1989), also states that implicit learning mechanisms, as implemented in connectionist models, are particularly efficient for the acquisition of probabilistic generalizations based on similarities to prototypes. Hulstijn and De Graaff make a distinction between rule learning and item learning, referring to the role that connectionist models may play in explaining the latter type of learning (and perhaps even rule learning as well). We conclude that connectionist models are appropriate for modeling implicit learning but that the jury is still out concerning whether they are appropriate for modeling explicit learning or the interaction between explicit and implicit processes.

Question 5. *What are the linguistic dimensions of the problem? What relationships exist between UG and conscious or unconscious learning? What relationships exist between conscious and the negative evidence issue?*

All contributors appear to converge on the position that L2 learning can best be viewed from some kind of interface position. The research agenda for the near future then appears to dictate investigations into the question to what extent fluent, automatic use of L2 knowledge can be attained by implicit learning and to what extent by explicit learning and whether this may vary depending on which aspects of language are concerned. As Ellis points out, language learning is poorly defined because of its numerous facets. Some papers offer suggestions in this respect. Ellis, in his paper on vocabulary acquisition, offers evidence that formal (phonological, ortho-

graphic) features of vocabulary items can be acquired implicitly, because simple attention to the stimulus domain is sufficient for implicit induction of statistical regularities in the input, whereas meaning and the mediational aspects of vocabulary involve explicit learning processes. Schmidt, VanPatten, Harley, and Hulstijn and De Graaff all mention Schwartz's suggestion (1993) that grammar rules falling in the domain of UG can only be acquired implicitly (they "grow"), while most of the lexicon is explicitly learned. From this point of view, one might argue that providing learners with negative evidence in the form of feedback on errors may only be helpful for grammatical features that can be explicitly learned.

DeKeyser remarks that not all rules are created equal. He makes a distinction between categorical and probabilistic rules, hypothesizing that explicit learning is better than implicit learning for simple, categorical rules, whereas implicit learning is at least as good as explicit learning for prototype (probabilistic) rules. Hulstijn and De Graaff put forward hypotheses with respect to nine types of grammatical features, specifying the relative facilitating effect of explicit versus implicit learning. They also make an attempt to tackle the definition of easy versus hard rules without falling into the trap of circularity that arises if one defines easy and hard rules as early and late acquired rules and then claims that acquisition order is determined by rule complexity. Hulstijn and De Graaff try to define complexity solely in cognitive terms and further distinguish complexity from scope and reliability. Reliability is what DeKeyser calls probability and what elsewhere has sometimes been called clear versus fuzzy rules. Hulstijn and De Graaff argue that, other things being equal, explicit instruction has more effect in the case of complex rules than in the case of simple rules and that explicit instruction has more effect in the case of reliable, general regularities than in the case of unreliable, fuzzy ones. What appears to emerge here is a differentiated picture of L2 learning: it is neither a wholesale matter of implicit learning (as Krashen wants it) nor purely a matter of explicit learning. The task ahead is to find out for which grammatical aspects explicit learning can facilitate L2 acquisition. As Harley points out, it is also clear that linguistic criteria alone will not predict how useful metalinguistic information will be, since learner- based conditions on noticeability also apply.

Question 6. *What research methods show the most promise for advancing our understanding of issues in this area?*

Harley argues for a variety of methods, including quasi- experimental designs in classroom setting and the inclusion of self reports in order to obtain insights concerning learning at the point of intake.

Some contributors raise objections against Reber-type studies in which subjects are shown letter strings derived from a finite state grammar, followed by assessment of the degree to which the rules underlying the strings are internalized. VanPatten argues that finite state grammars suffer from three critical deficiencies. They do not contain rules of movement or recursiveness, they do not include surface features such as agreement mapping, morphological forms, inflections or stress patterns, and they are devoid of referential and social meaning. Dismissing artificial language studies using letter strings derived from finite state grammars, however, does not mean that one should object to all artificial language learning studies. On the contrary, various authors view these studies as particularly suitable to address issues that can hardly be reliably investigated in cases of natural language learning. DeKeyser reports the results of a pilot study using Implexan, an artificial (created) linguistic system designed to include such features of natural languages as number, case and gender, with both categorical and probabilistic rules. Hulstijn and De Graaff mention several advantages of laboratory studies. The first is that the language can be brought under control of the researcher. This can be done by using a (partly) artificial language. Second, computers can be used to replace the teacher in order to control both input quantity and input quality, e.g. explicit versus implicit instruction of grammar rules. To obtain results that are both reliable and valid, they argue in favor of a twin approach, combining "artificial" with "natural" experiments.

The papers in this issue also illustrate some of the benefits that can be obtained when useful research paradigms are imported from other fields to the study of L2 acquisition. Artificial grammar learning studies, previously developed within experimental psychology, have now been adapted and used in several L2 learning studies. In addition to the standard L2 paradigm

of test - provide instructional treatment - retest, we also note the productive adaptation to L2 research by VanPatten of divided attention tasks, one of the two basic paradigms for research in psychological studies of attention (the other being the selective learning paradigm), as well as Ellis' use in L2 research of measures of repetition priming, an experimental research tool that has been the basis of most psychological studies of implicit memory.

Question 7. *What are the consequences and implications of the growing recognition of the role of consciousness in learning for L2 instruction?*

One of the consequences of an increased appreciation of the role of consciousness in L2 learning for L2 instruction has already been mentioned: explicit instruction is more likely to facilitate L2 acquisition in the case of some features of language than in others. This is a moderate version of the interface position, according to which explicit knowledge can be instrumental in the acquisition of implicit knowledge. There also seems to be broad agreement among the contributors to this volume that the way in which instruction may work in L2 learning is through its role as a cognitive focusing device for learner attention, a position expressed here by VanPatten and Harley, and elsewhere by R. Ellis (1993). Explicit knowledge may also serve as what Terrell (1991) has called an "advance organizer" that aids the segmentation and comprehension of input, making more of the input available as intake.

According to DeKeyser, it remains to be seen whether feedback on production errors, another form of explicit instruction, may also help learners notice certain formal features in the target language. Monitoring the products of the learner's own speaking and writing products from a formal perspective may feed back into the intake process and hence foster language acquisition, as has been suggested by Swain (1985). However, no agreement exists concerning the effects of monitoring production through error correction.

It should be emphasized that only modest implications for second and foreign language teaching can be drawn from the papers in this issue. As VanPatten points out, there is a great danger when talking about the role of consciousness in second language learning that this will be interpreted as a reactionary call for a return to traditional language teaching methods, with decontextualized grammar explanations followed by intensive drill and an emphasis on error-free production. As Ellis points out in the conclusion to his review of vocabulary learning studies, language learning is a complex activity, and an effective learning environment must cater to all of its aspects. Naturalistic settings provide maximum opportunities for exposure and motivation, but explicit skills are necessary for deep elaborative processing of semantic and conceptual representations. Even if many controlled studies show an overall advantage for explicit over implicit instructional approaches (as shown by DeKeyser's review), Harley emphasizes that classroom based studies that speak directly to the relative merits of experiential instructional approaches and awareness-oriented approaches remain inconclusive. In addition, Van Lier reminds us of the dangers of taking an exclusively cognitive approach to the question of the role of consciousness in learning, as well as the limitations in taking a view of language that views L2 acquisition exclusively as grammar acquisition. It is probably not premature to conclude that extreme exposure-only approaches to language learning are misguided in the light of research findings reported in this issue, but it would be misleading to claim that the research to date unambiguously supports any particular approach to syllabus design (e.g. grammar-based, notional-functional, task-based, learner-centered, experiential) or any specific language teaching method.

Concluding remarks

In organizing the symposium and in collecting and editing subsequently the papers for this issue of the AILA Review, we set ourselves three main goals: - to bring some order to the terminology on issues of consciousness in second language learning; - to show that contributors with different backgrounds and working in different subdomains of second language learning can reach considerable consensus in the use of terminology and conceptual framework and use this conceptual framework to make the relevant extant literature more transparent; - to show how the various dimensions of consciousness can be used to lay out an agenda for future

research that is both theoretically and practically oriented.

We are confident that, thanks to the aid of the contributors to this issue, some progress in pursuit of these goals has been achieved.

References

- Ellis, R. (1993). The structural syllabus and second language acquisition. *TESOL Quarterly*, 27, 91-113.
- Krashen, S. (1981). *Second language acquisition and second language learning*. Oxford: Pergamon Press.
- Krashen, S. (1982). *Principles and practice in second language acquisition*. New York: Pergamon Press.
- McLaughlin, B. (1990). "Conscious" versus "unconscious" learning. *TESOL Quarterly*, 24, 617-634.
- Rumelhart, D.E. (1989). The architecture of mind: A connectionist approach. In M.I. Posner (Ed.), *Foundations of cognitive science* (pp. 133-159). Cambridge: MIT Press.
- Terrell, T. (1991). The role of grammar instruction in a communicative approach. *The Modern Language Journal*, 75, 52-63.
- Schwartz, B.D. (1993). On explicit and negative data effecting and affecting competence and linguistic behavior. *Studies in Second Language Acquisition*, 15, 147-164.
- Swain, M. (1985). Communicative competence: some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235-253). Rowley, MA: Newbury House.

DECONSTRUCTING CONSCIOUSNESS IN SEARCH OF USEFUL DEFINITIONS FOR APPLIED LINGUISTICS

Richard Schmidt
The University of Hawai'i at Manoa

Abstract

The "conscious" vs. "unconscious" controversy is a core issue in both second and foreign language pedagogy and applied linguistics theory, but at the present time there is no generally agreed upon set of constructs and terminology that unifies discussion. It is proposed in this paper that it is possible to standardize somewhat the theoretical concepts that are relevant to understanding the role of conscious and unconscious processes in language learning through reference to four rather different senses of consciousness that are common in everyday usage and surface in some way in technical terminology and as theoretical issues in the study of learning: consciousness as intentionality (the intentional/incidental learning contrast), consciousness as attention (focal attention and "noticing" vs. peripheral attention), consciousness as awareness (the contrasts between explicit/implicit learning and knowledge), and consciousness as control (controlled vs. automatic processing, automaticity, explicit/implicit memory). Avoiding the use of terms like conscious and unconscious as umbrella terms and specifying the precise contrasts (dichotomies or continua) at issue should help to unify discussion, enhance comparability across studies, and improve our understanding of what research results in the field may actually imply about learning. This approach does not solve the "problem" of consciousness simply by specifying clear constructs, since intentionality, attention, awareness and control all have a pronounced phenomenological feel to them. This may not necessarily be a problem, however, since there is reason to suspect (though not, of course, to assume) that consciousness as a subjective phenomenon and language learning may turn out in the end to be intimately connected.

1. Consciousness and applied linguistics theory and practice

The "conscious" versus "unconscious" controversy has always been a core issue in the field of second and foreign language pedagogy. Traditional methods such as grammar translation stress the importance of consciousness in learning. In the traditional view, the job of the teacher is to provide an analysis of the target language, as well as some of the differences between the target and native languages. The learner's task is to learn the rules provided and to practice their application by mapping meanings (often provided in the native language) onto the lexicon and structure of the target language. Conscious knowledge of morphological paradigms and syntactic rules is considered crucial, under the assumption is that such knowledge results eventually in the ability to use the language for communicative purposes (the strong interface position). Errors are considered symptomatic of ignorance, forgetting, lack of attention, or laziness. While defense of the traditional view has been rare in recent years, R. Ellis (1993) has recently recommended the use of grammatical consciousness-raising exercises (based on a structural curriculum) to foster explicit knowledge, to be used as a complement to a functional or task-based syllabus intended to promote implicit knowledge. Ellis' rationale for this combination is based on a weak interface position: explicit declarative knowledge cannot directly become implicit procedural knowledge, but can foster its development through "intake facilitation," causing learners to pay attention to formal features of the input and to notice the gap between these features and those of their interlanguage (Schmidt, 1990; Schmidt & Frota, 1986).

Other pedagogical approaches stress the role of unconscious processes in language learning almost exclusively. The "natural approach" of Krashen and Terrell (1983) is derived from Krashen's distinction between conscious learning and subconscious acquisition and the argument that there is no interface between the two. It follows that instruction should be based on motivated communicative interaction or other exposure to natural input and that rule explanation, drill, and error correction should be eschewed. "Communicative language teaching" (e.g. as promoted by the British Council around the world) is based primarily on educational principles rather than a fully articulated theory of learning, but also stresses the importance of learning through the practice of activities that approximate real communication as closely as possible, assuming that learners gain linguistic form by seeking situational meaning rather than by concentrating consciously on linguistic form.

Still other pedagogical methods embody a variety of intermediate positions. The audio-lingual method de-emphasizes the role of conscious learning by eliminating direct rule explanation (in principle if not always in practice), under the influence of the behaviorist dictum that awareness of stimulus-response contingencies is irrelevant to the establishment of the desired responses. However, audiolingual methodology also derives from the belief that proficiency in a foreign language depends on the gradual internalization of structures that are produced with a great deal of conscious effort in the beginning stages, with spontaneous, unreflecting performance emerging as the end result of extensive drill. The "silent way" also avoids externally provided explanations of rules, while stressing the importance of internal awareness achieved when learners consciously engage with the target language.

Questions concerning the role of conscious and unconscious processes in second language learning are also central to theories of second language acquisition (viz. the strong, weak and non-interface positions taken by various theorists). Recent interest in these issues is evidenced by the proliferation of terms such as "focus on form" vs. "focus on forms" (Long, 1988), "consciousness raising" (Sharwood Smith, 1981; Rutherford, 1987), "input enhancement" (Sharwood Smith, 1991, 1993), "input processing" (VanPatten & Cadierno, 1993), "preliminary intake" and "final intake" (Chaudron, 1985), "uptake" (Allwright, 1984; Slimani, 1992), and "language awareness" (James and Garrett, 1991).

These pedagogical approaches and theoretical constructs in applied linguistics all draw upon notions of conscious and unconscious learning in some sense or another and also connect to current discussions of the role of conscious and unconscious processes in experimental psychology, connectionist modeling, linguistics, philosophy, and other disciplines of cognitive science. But no generally agreed upon sense of what is meant by labels such as "conscious" and "unconscious" or "subconscious" unifies the discussion. These terms are highly ambiguous in everyday language, and conflicts about the role of consciousness and learning in more theoretical discussions often reflect this vagueness and ambiguity, conflating distinct senses of "consciousness," sometimes asking questions involving one of them and answering with evidence appropriate to another (Pinker, 1992). It is tempting to recommend, therefore, that the entire issue of conscious vs. unconscious learning be sidestepped, seeking models and explanations couched in other terms. McLaughlin (1990a) suggests that "conscious" and "unconscious" are pre-scientific terms with too much surplus meaning to be useful and should be abandoned in favor of clearly defined empirical concepts that do not refer to subjective experience. Sharwood Smith, who earlier advocated a pedagogy of "consciousness raising" (1981), now prefers to talk instead of "input-salience-creation" or "input enhancement" (Sharwood Smith, 1991, 1993), safer terms that avoid the "vexed question" of what consciousness is.

Besides the problem of ambiguity, the recommendation to abandon discussion of the role of consciousness in language learning may also reflect broader philosophical beliefs, two of which are widely subscribed to. First, subjective experience is irreducibly a first person phenomenon, whereas progress in science always depends upon taking a third person perspective. As Dennett (1991) has put it, such facts as there may be about internal mental events can never be verified by objective methods and are not the data of science. This was of course the behaviorist view, but it is subscribed to by many who are not behaviorists. Second, although as individuals we may believe that our conscious intentions, thoughts, beliefs, and

attempts at problem solving are causal and determine our actions, the universe is entirely material and humans are no different in essence from other information processing machines. The computer is the dominant metaphor. In this view, subjective consciousness may be one output from the computational machine (no one has been able to specify how this comes about, though see Gazzaniga (1993) and O'Keefe (1985) for some interesting speculations), but consciousness itself is epiphenomenal. It does not cause anything else to happen. This view, often expressed as a rejection of Cartesian dualism, is widespread in philosophy, psychology, and artificial intelligence, and is articulately expressed in the psycholinguistic speculations of Jackendoff (1987).

2. The hall of mirrors problem

Reductionist and eliminativist approaches to the problem of consciousness in learning may work in the end, but only if it is possible to avoid what Hamad (1990, 1991) calls the fallacy of the "hermeneutic hall of mirrors," offering what appears to be a purely functional account but letting the phenomenological flavor slip in by the back door, without admitting or even realizing it. At the very least, the attempt to replace folk-psychological notions of consciousness with scientific, non-subjective terms requires, first, that the new terms are not simply synonyms for consciousness or derived from unanalyzed conceptions of what consciousness is (thus importing the ambiguities of "conscious" and "unconscious" into the new terminology) and, second, that there are agreed upon conceptions of what the new terms mean. At the present time, neither condition has been met in applied linguistics.

Consider first the possibility that alternative terms may be merely synonyms for consciousness, new ways of referring to aspects of subjective experience that have been ostensibly ruled out of consideration. For reasons of space, two examples will have to suffice: the distinction between controlled and automatic processing and the distinction between explicit and implicit knowledge.

Controlled and automatic processing, best known to the field of applied linguistics through the work of Shiffrin and Schneider (1977) in psychology and that of McLaughlin, Rossman, and MacLeod (1983) in applied linguistics, was first defined by Posner and Snyder (1975) as a contrast between processes that are under current conscious control and automatic activation processes that are the result of past learning. Shiffrin and Schneider (as well as McLaughlin et al.) explicitly deny any connection between the constructs of controlled and automatic processing and the conscious/unconscious distinction, but it is not clear that this divorce can be finalized. In attempting to provide an operational definition of the controlled/automatic distinction, Norman and Shallice (1986) point out that "automatic" is ambiguous and may refer to tasks executed without awareness, actions initiated without intent, the way in which attention may be drawn automatically to something, or tasks performed without interfering with other tasks. Three of these criteria refer to subjective experience. Only the last of them makes no reference to factors associated with ordinary notions of consciousness, and Schneider, Dumais, and Shiffrin (1984) point out that neither this criterion nor any other single criterion provides a necessary and sufficient basis for distinguishing the two types of processing.

With respect to the explicit/implicit distinction, Odlin (1986) recommends separating these concepts from the slippery notion of consciousness, but Bialystok (1981a), Sharwood Smith (1981), R. Ellis (1993), and Paradis (in press) all define explicit knowledge as conscious awareness of the formal properties of the target language, verbalizable on demand, contrasted with implicit knowledge, which is intuitive and cannot be introspected or reported. In applied linguistics, only Bialystok (1990, 1993, in press) really succeeds in separating these concepts from definitions based on consciousness, by relabeling the implicit/explicit contrast as a developmental continuum of language analysis and by making it clear that the central issue concerns the ways in which linguistic representations change in the course of development. The ability to articulate structural principles of organization may be one behavioral outcome of the highest level of analysis, but the extent to which representations

are analyzed --not their accessibility to consciousness-- defines the continuum. In separating the notion of explicitness from that of consciousness, Bialystok's views are consistent with those of Chomsky (1980), Karmiloff-Smith (1986), and Clark (1991), all of whom emphasize the importance for native language acquisition of mental representations that are fully explicit but completely unconscious.

If we ask whether the terms that commonly replace discussions of consciousness in applied linguistics discourse are consistently defined in either theory or research methodology, the answer is also that they are not at the present time. Consider the concept of implicit learning. In psychology the basic contrast between explicit and implicit learning is usually seen as a contrast between learning on the basis of awareness (explicit learning) as opposed to implicit learning, learning without awareness (Schmidt, 1990). However, Hulstijn (1989) has described implicit learning in terms of the context and mode of learning (e.g., picking up a second language in naturalistic situations without following a language course or consulting dictionaries) and has operationalized implicit learning experimentally as a treatment in which target structures are not explicitly explained by the experimenter during their presentation, equating explicit learning more with instruction than with learning *per se*. This is very different from the operationalization of the concepts of explicit and implicit learning by Reber (1989), who has carried out many experiments on the learning of miniature artificial grammars. In these experiments, a so-called explicit learning condition has meant neither that the underlying rules of the system are explained to subjects nor that they become aware of them during the course of learning, but rather that they are instructed to try to discover the underlying rules, in contrast to an implicit condition, in which learners are told to memorize examples. Since the subjects in such experiments almost never succeed in discovering the rules of the underlying grammar, Reber's definition of explicit learning does not entail having any conscious knowledge of the rules at all, whereas Hulstijn's operational definition does entail this. To the extent that the meanings of related concepts and labels are established partly by their contrasts with each other, it is also clear that such meanings are not consistent from writer to writer. Using a modification of Bialystok's distinction between the developmental dimensions of analysis (knowledge) and control (access to that knowledge), R. Ellis (1993) argues that explicit knowledge and declarative knowledge (which includes encyclopedic knowledge about the world plus episodic memory of one's past experiences) are not the same, nor are implicit knowledge and procedural knowledge (knowledge of how to do things) the same thing. In contrast, Paradis (in press) makes a primary distinction between explicit and implicit *memory* (assumed to be supported by two distinct neurofunctional systems), but uses terms such as explicit knowledge, metalinguistic knowledge, explicit memory, and declarative memory more or less interchangeably. These are viewed in contrast with another set of terms (implicit knowledge, implicit learning, implicit memory, procedural memory, implicit automatic processes), which are also used quite interchangeably, suggesting either that no important distinctions are to be made between knowledge and memory, explicit and declarative, or implicit and procedural, or at least that the different senses implied by the diversity of terms are inextricably linked.

My purpose so far has been only to show that problems of ambiguity and vagueness do not disappear when notorious slippery notions like conscious and consciousness are replaced with new notions, and that formation of a coherent research program continues to be hampered by terminological confusion. The definition of key constructs is important, because arguments concerning the role of consciousness in language learning may seem more plausible or even obvious depending on how these concepts are defined. For example, if one conceives of explicit knowledge as knowledge that is accessible to consciousness and can be articulated and implicit knowledge as knowledge that is not accessible to consciousness, then the answer to the question of whether learning can ever "become" acquisition may seem obvious. How could knowledge that is accessible to consciousness become inaccessible, unless forgetting is involved? (M. Long, personal communication) On the other hand, if one is concerned more with learning than knowledge and views explicit learning as learning triggered by awareness, then it much more plausible that the end stage of learning, automatic performance that does

not require the on-line mediation of explicit knowledge, may have been built upon a foundation of awareness-assisted processing in earlier stages of development.

3. Standardization of theoretical constructs

It is certainly possible to standardize somewhat the theoretical concepts that are relevant to understanding the role of conscious and unconscious processes in second and foreign language learning, so that researchers in the field speak from a common understanding. I propose that progress can be made if we follow the advice of McLaughlin to avoid using the terms "conscious" and "unconscious" as undifferentiated umbrella terms, specifying precisely the contrasts at issue. It is also important to be alert to the ways in which folk-psychological notions of consciousness continue to be reflected in these terms. An ideal set of terms would make multiple connections: to the subjective experience of language learners; to well established terminology in psychology, linguistics, philosophy, and other disciplines; to current concerns in second language acquisition theory; and to pedagogical theory and practice.

If we begin by considering what we ordinarily mean by the terms "conscious" and "unconscious" in everyday language, it is clear that there are several senses of consciousness that are only peripherally relevant to applied linguistics. One is the notion of state-consciousness (Lycan, 1987), the distinction between being awake, alert, and having mental states such as experiencing pains, perceiving the environment, and so on, as opposed to being unconscious as a result of a blow to the skull (there are intermediate states, such as fugue, dreaming, and hypnotic trances, as well as pathological conditions such as blind-sight that complicate the dichotomy). Other contrasts (dichotomies or continua) referred to by the terms "conscious" and "unconscious" are more applicable to language learning theory and practice, and four basic senses of consciousness are especially relevant: consciousness as intentionality, consciousness as a subjective state arising from the allocation of attention, consciousness as awareness, and consciousness as control. Each of these senses of consciousness is common in everyday use of the term; each also surfaces in some way in technical terminology and as a theoretical issue in the study of learning.

3.1. Consciousness as intentionality

Consciousness is commonly associated in common usage with aims, plans, desires, and deliberateness. One might apologize for an unintended offense by saying that it was done unconsciously, meaning without intent. In philosophical usage, the concept of intentionality is broader, referring not only to desires, but also to beliefs and other propositional attitudes. Philosophically, intentionality is related to the notion of creature-consciousness, the idea that people (and probably some higher animals) are capable of having desires, aims, beliefs, and so on, while stones, planets, and computers are not. Among philosophers, Searle (1983, 1990) has argued most vigorously for the essential connection between propositional attitudes and consciousness (and against the concept of in-principle inaccessible intentionality). Harder and Togeby (1993) have recently claimed that all computer simulations, including both classical serial architecture and more recent connectionist approaches, are inadequate with respect to understanding linguistic pragmatics, because understanding intentions is crucial to understanding pragmatics and machines do not have intentions. Dennett (1987) argues the opposite point of view, that the intentionality of consciousness is a myth and that there is no reason in principle why computers cannot be conscious.

In psychology and in applied linguistics, intentionality is treated in a much more narrow way, closer to ordinary usage. Bialystok (1981b) restricted the definition of the conscious strategy of "practice" to deliberate attempts by a learner to increase exposure to the language out of class, excluding practice in the classroom, over which the learner does not have voluntary control. Hatch (1983) argues that learners intend to learn to only to converse and interact and learn grammar in the process. Krashen also sees intentionality as an important part of the

contrast between voluntary learning and involuntary or unintended acquisition. Krashen and Terrell (1983) refer to the "great paradox of language teaching," the fact that language is best learned when it is being used to transmit messages, not when we are deliberately trying to learn it. Chomsky (1975) has pointed out that first language learners have no "reason" at all for acquiring language; we cannot choose to learn and cannot fail to learn under normal conditions.

In psychology, the contrast between intentional learning and nonintentional or incidental learning has been widely researched. There is no doubt that incidental learning does occur and is commonplace. It seems clear that incidental learning of languages is also commonplace, as when immigrants whose primary motivation is to communicate (not to master the grammar) succeed in internalizing many of the rules and structures of the target language. Krashen (1989) has reviewed the evidence supporting incidental approaches to the teaching of spelling and vocabulary, arguing that extensive reading is as effective as focused study, although intentional subjects generally do somewhat better than incidental subjects in controlled studies. Hulstijn (1992) conducted experimental studies of the incidental learning of second language vocabulary occurring in reading passages, finding clear evidence for incidental learning.

One key issue is whether or not the knowledge gained through incidental learning is represented mentally in a different fashion from knowledge gained through intentional approaches to learning. Evidence from psychological experiments generally suggests that it is not (McLaughlin, 1990a). Dienes, Broadbent, and Berry (1991) found no evidence for either distinct learning modes or different knowledge types in artificial grammar learning based on incidental vs. intentional instructions. However, various theorists in applied linguistics have argued that intentional and incidental learning do result in different knowledge types. Following Lamendella (1977), who proposed that meaning oriented acquisition involves subcortical structures, in particular those parts of the limbic system responsible for drives, desires and motivation, Paradis (in press) argues that incidental acquisition of grammar leads to an implicit competence that is used automatically, while deliberate learning leads only to explicit knowledge that is not available for automatic use.

Paradis' arguments (similar to those of Krashen) suggest that there *may* be a link between incidental learning and other senses in which learning can be said to be unconscious. However, the contrast between intentional and incidental learning remains conceptually distinct from other senses of conscious/unconscious learning, so it is necessary to be clear when this is the dimension being referred to.

Recommendation 1: It is recommended that "incidental learning" replace the use of the umbrella term "unconscious learning" when reporting learning without the intent to learn or the learning of one thing (e.g. grammar) when the learner's primary objective is to do something else (e.g. communicate). It is important not to assume without independent evidence that either the process or the product of such learning is unconscious in any other sense, e.g., that such learning is unaccompanied by attention or awareness or that the knowledge gained cannot be expressed.

3.2. Consciousness as attention

Consciousness is also commonly used in everyday situations to refer to subjective awareness of the objects of focal attention; this comes close to the concept of the flow of consciousness. At any particular time, there are many different environmental stimuli that impinge upon our senses, but we are only conscious of a few of these stimuli (perhaps only one at a time), as the focus on consciousness shifts from one object to another. Psychological theories suggest that consciousness is the product of an attention mechanism (Baars, 1988; Norman & Shallice, 1986; Posner & Rothbart, 1991). This mechanism is partly under voluntary control --we can force ourselves to attend to one stimulus rather than another for at least a short time-- so there is a link between this sense of consciousness and the sense of consciousness as intention, but

attention is not completely under voluntary control (Van der Heijden, 1992). We become attend to and become aware of ("notice") many stimuli without intending to.

It is sometimes argued in applied linguistics that incidental learning, clearly possible, entails or equals unattended learning, which must therefore also be possible. Paradis (in press) speaks of the incidental acquisition of that on which attention is not focused (i.e. grammar). This is a somewhat misleading equation. The incidental learning of linguistic form could take place under any of the following conditions:

- (a) when the primary task requires that attention be allocated to language form, for example, when syntactic form must be processed to derive message meaning;
- (b) when the primary task does not deplete attentional resources and something about the relevant structure attracts a learner's attention, for example when one notices the odd spelling of a new vocabulary word; or
- (c) when the primary task does deplete all attentional resources, but unattended form enters long-term memory nevertheless.

Although unattended stimuli may have subtle but undeniable effects on humans (as in subliminal perception experiments), it is widely argued in psychology that *learning* without attention to what is to be learned (as hypothesized for condition c above) is impossible (Boakes, 1989; Kihlstrom, 1984; Nissen & Bullemer, 1987), or --in applied linguistics terms-- that attention is necessary for the conversion of input to intake (Schmidt, 1990, 1993a, 1993b, in press; Scovel, 1991).

There have been some recent objections to this claim. Curran and Keele (1993) have reported a series of experiments supporting a nonattentional mode of learning sequential patterns through simple associative mechanisms. However, Curran and Keele do not argue that such nonattentional learning is especially powerful (previous experiments by Nissen and Bullemer, 1987, showed that similar but not quite identical patterns could not be learned without attention) and point out that

"when we refer to one form of learning as nonattentional, we do not wish to imply that no attention whatsoever is used on the primary task. Undoubtedly, subjects must in some sense attend to a visual stimulus in order to make a response. ... It is likely that the effect of the secondary task is to degrade attention to the relation between successive events, but whether attention is completely blocked is not crucial." (Curran & Keele, 1993, p. 190)

In other words, sequence learning in these experiments may represent condition (b) as indicated above, rather than condition (c).

Tomlin and Villa (1993) propose the limited resource metaphor of attention that is most familiar to applied linguists is inadequate for understanding the role of attention in language learning and that three components of attention must be recognized: alertness (related to the intention to learn), an overall, general readiness to deal with incoming stimuli; orientation, the specific aligning of attention on a stimulus, i.e. actually attending to a stimulus; and detection, the process which selects or engages a particular specific bit of information. In the model proposed by Tomlin and Villa, detection is necessary before other cognitive processing (storage in memory, hypothesis formation, etc.) can occur. This concept of detection is close (perhaps identical) to what has more traditionally been called focal attention. A key question is whether or not detection or focal attention necessarily entails conscious registration of the contents of focal attention, for example, not only hearing a grammatical marker, but "noticing" it, and whether such noticing is necessary for learning. Velmans (1991) argues that consciousness in this sense is epiphenomenal. Consciousness *appears* to be necessary in a variety of tasks because they require focal-attentive processing and if consciousness is absent, focal attention is absent. Tomlin and Villa argue that detection does not entail conscious registration of what is detected. Schmidt (1990, 1993a, 1993b) has argued that noticing is the necessary and sufficient condition for the conversion of input to intake for learning, on the grounds that all demonstrations of detection without conscious registration (blind-sight, subliminal perception) demonstrate only the processing of what is already known, not learning. However, given the fact that it may be impossible to agree upon an operational definition of noticing that will allow falsifiability of this hypothesis, it may be wiser to

replace zero-point claims (no learning without noticing) with a modified hypothesis that more noticing leads to more learning (Baars, 1988).

Recommendation 2: It is recommended that the term "learning without attention" be reserved for learning that can be shown to have taken place without any allocation of attention, voluntary or involuntary. "Peripheral attention" (in contrast to focal attention) and "unselective learning" (in contrast with "selective learning," Berry & Broadbent, 1984), and "learning under distraction" are all useful terms for referring to learning in which the primary focus of attention is elsewhere.

3.3. *Consciousness as awareness*

A third sense of consciousness, perhaps the most common in ordinary use as well as in psychological and philosophical discussion, is awareness. My desk dictionary defines the first sense of "conscious" as "having an awareness of one's own existence and environment," and defines "aware" as "conscious" or "cognizant."

One problem with this view of consciousness is that one needs to recognize different levels or types of awareness (Battista, 1978; Bowers, 1984; O'Keefe, 1985). For example, we are aware of at some level of all those environmental stimuli to which we attend, so some primary awareness is implied by the preceding discussion concerning the role of attention and noticing in learning. However, the issue of learning without awareness in both psychology and applied linguistics almost always refers to awareness at a higher level, such as awareness of a rule or generalization. In more philosophical discussions also, various commentators distinguish between a lower level consciousness, an "awareness of a string of immediate events that need not and probably does not spill over into the generalized, looking-before-and-after kind of consciousness with which we humans are so familiar" (Bickerton, in press), a type of consciousness probably shared with many organisms (Edelman, 1989), and a higher level of consciousness that includes the ability to know about one's self (self-consciousness) as well as to reason about the contents of primary consciousness, which may (or may not) be a uniquely human attribute (Bickerton, in press; Edelman, 1989; Pinker, 1992).

Within the behaviorist paradigm, the argument about learning without awareness was couched in terms of whether experimental subjects learned to make conditioned responses without any awareness of the relationship between response and reinforcer (in operant conditioning) or whether a stimulus can acquire some influence through association with some other important event even if the subject is never aware of the relationship between the two (in classical conditioning). Although several thorough reviews have concluded that there is no convincing evidence for conditioning without awareness in human subjects (Boakes, 1989; Brewer, 1974; Dawson & Schell, 1987), it is remarkable that this research has had little impact on common beliefs about conditioning. Boakes (1989) reports that many introductory textbooks to psychology continue to confidently assert that conditioning commonly occurs when subjects are not aware of what the experimenter is doing.

Within the cognitive paradigm, the work of Reber (1989, 1992) has been particularly influential. Reber's view is that learning the underlying rules of artificial grammars takes place without awareness and is accomplished without the aid of processes such as the formation and testing of conscious hypotheses (presumed blocked by instructions to simply memorize examples). Instead, an unconscious process of induction results in intuitive knowledge that exceeds what can be expressed by learners. This view is very close to what is commonly asserted in applied linguistics; second language learning is commonly believed to involve induction without awareness, and learners "know" more than they can express. White (1991) has reported the effects of instruction on the learning of adverb placement restrictions in English by native speakers of French, concluding (among other findings) that many students acquired unconscious knowledge of a difference between manner and frequency adverbs, a point not covered in instruction. Green and Hecht (1992) provide evidence that there is a dissociation between conscious rule knowledge and the ability to make grammaticality judgments even with respect to pedagogical rules that are not very abstract when

compared to theoretically grounded analyses and even under a liberal view of what constitutes a correct rule. Green and Hecht also found that some pedagogical rules were relatively easy to learn and apply, including those that referred to easily recognized categories and could be applied mechanically. Rules that were more difficult to learn but for which some intuitive knowledge could be demonstrated involved aspect or other subtle semantic distinctions and rules not governed by the immediate linguistic context. Paradis (in press) cites the case of the subjunctive in French as a paradigm case of implicit learning. A native speaking teacher of French untrained in linguistics, when asked why the subjunctive is used in a particular sentence, will probably reply that she hasn't the slightest idea, that it sounds right but that no reason or rule can be introspected.

One issue related to the role of awareness in learning that is less commonly investigated in psychology but that is particularly important to applied linguists concerns what Klein (1986) has called the matching problem and what others have called the process of "noticing the gap" (R. Ellis, 1993; Krashen, 1983; Schmidt & Frota, 1986). Klein argues that learners must try to compare their own output with that of others, and as soon as a learner is no longer able to detect any discrepancy between the two, learning is at an end. Klein argues that in order to solve the matching problem, learners must somehow step outside of themselves to attain a perspective on their own language performance. Awareness in this case also involves the question of negative evidence, particularly contentious in the field. Schmidt and Frota (1986) advanced the claim that for error correction to have any effect, learners must at least realize that they are being corrected, a condition often not met in natural interaction. Sharwood Smith (1991) argues that negative evidence that is noticed may destabilize the current grammar, but the detection of an anomaly does not lead automatically to a realignment of the internal grammar. White (1991) has reported evidence showing an effect for instruction, including a role for error correction, but this interpretation has been criticized by Schwartz and Gubala-Ryzak (1992), primarily on the basis of learnability theory, specifically, the doctrine that UG cannot make use of negative evidence. White (1992) agreed with this criticism to the extent that negative evidence in the original study probably did not engage UG at all, but did bring about other changes in learner performance. Tomasello and Herron (1989) have reported the results of several studies showing the effectiveness of a particular type of error correction technique and have advanced arguments for a cognitive comparison model of SLA, in which the most important language learning experiences are those in which it is possible for learners to compare and note discrepancies between their own language structures and those of native speakers. Beck and Eubank (1991) have criticized the study partly on methodological grounds and partly on the grounds of learnability arguments, to which Tomasello and Herron (1991) have responded that learnability arguments are restricted to UG-related aspects of language, which were not investigated in their study, and that -- regardless of any logical arguments to the effect that negative evidence can not lead to learning-- the subjects in their study who received negative feedback did learn.

Schwartz (1986, 1993) has claimed that Fodor's (1983) concept of modular, domain-specific input systems that are encapsulated (unaffected by conscious knowledge) supports Krashen's non-interface position (conscious learning and subconscious learning are unrelated) and that both the grammar of a language and the uses of language are acquired unconsciously. On the other hand, those few studies that have actually tried to investigate implicit learning of languages based on careful assessment of what learners are and are not aware of during the process of learning (Alanen, 1992; N. Ellis, 1993; Schmidt & Frota, 1986) have found little clear evidence for any implicit learning. Many claims about the unconscious learning of languages are open to challenge, either because the resulting knowledge is not as abstract as is assumed (assuming the psychological reality of theoretical accounts of competence when this has not been demonstrated) or because learners have more awareness than they are given credit for. However, it must be conceded that studies showing an advantage for explicit learning generally have not found a lasting effect for such learning. Controversy continues whether the effects of awareness on learning, especially awareness conveyed through formal instruction, are peripheral and fragile (Krashen, 1993) or more robust and long lasting (Lightbown & Pienemann, 1993).

Recommendation 3: "Explicit learning" and "implicit learning" are widely used in psychology to distinguish between learning on the basis of awareness at the point of learning and learning without such awareness and these terms can be usefully applied to discussions in applied linguistics. This requires that on-line learner awareness in the process of learning be assessed before claims of implicit learning are advanced.

Recommendation 4: Implicit and explicit *learning* and implicit and explicit *knowledge* are related but distinct concepts that need to be separated. The first set refers to the processes of learning, the second to the end-products of learning (or sometimes to knowledge that is innate and not learned at all).

Recommendation 5: Explicit learning also needs to be distinguished from explicit instruction, e.g. telling subjects the rules in experimental studies or teaching them about a language in classroom settings. One hopes that there is a relationship between what is taught and what is learned, but it is possible for learners to form conscious hypotheses about the target language without being told the rules or forming hypotheses that are different from the teacher's version of a rule, as well as for learners to be taught a rule but not to understand it or be able to make any use of it in the process of learning.

Recommendation 6: Instructed learning needs to be further differentiated in order to distinguish between simple input enhancement techniques that make input more salient and more likely to be attended and explanation, the provision of explicit rules, paradigms, and the like.

3.4. Consciousness as control

A fourth sense of consciousness that plays a role in discussion in applied linguistics is that of control. In everyday language, we are also more likely to say that we did something consciously when we have been effortfully involved in its execution. As White (1980) points out, when we suffer from "highway hypnosis," suddenly "coming to" after several minutes of apparently distracted driving, we commonly say that the spell of driving was done unconsciously because we cannot remember any details of the route traversed, nor can we remember any of our actions. Reason (1984) has described slips of action, errors that seem to happen either because attention is not switched back to a task at some critical decision point or because attention is directed to a routine activity when it would be better to leave the guidance of action on automatic pilot.

Learning a second language is in some respects like learning to drive a car; it has a skill aspect as well as a knowledge aspect. In the early stages, learners are often aware of using mental translation, trying to remember paradigms they have been taught in class, and painfully groping for words and structures to express their intentions. As learning progresses, there is a gradual shift to a stage in which more and more attention is devoted to what one wants to say, with the process of grammaticization becoming more and more automatic. Another aspect of control in language use is evident in code-switching. There are cases in which bilingual speakers control their choice of language (for example, switching to a different language when realizing that a party to a conversation does not understand the current language), but there are other times when learners have no conscious reason for speaking one language rather than another, do not control their switches, and are not even aware of which language they are speaking. This example illustrates that there is a certain amount of overlap between consciousness as control and consciousness as both attention and awareness. It could be argued that control and attention are the same from a theoretical perspective, and I choose to separate them here only to emphasize output processing, especially the question of fluency, rather than input processing as emphasized in the discussion of attention above.

In psychology, skill development is often discussed in terms of procedural knowledge, knowledge of how to do things, as opposed to declarative knowledge, knowledge of facts. One general characteristic of procedural knowledge is that it is seldom open to introspection. Another relevant contrast is that between implicit and explicit memory (Schachter, 1987), which also concerns performance factors rather than competence. Implicit memory refers to the influence on performance of consciously remembered prior experience; implicit memory refers to changes in behavior attributable to some event without conscious recollection of that event. As Reber (1989) has pointed out, demonstrations of the existence of implicit memory does not solve the problem of how such memory systems are established in the first place. The problem of voluntary control in language learning is also separable from the issues of both implicit learning and implicit knowledge. As Bialystok (1993) puts it, the development of knowledge (linguistic competence) is orthogonal to the development of access to that knowledge, even though, developmentally, progress along the two dimensions may happen in parallel. The problem of control in second language learning is essentially the problem of accounting for fluency. In psychology, relevant theories typically come under the rubric of automaticity (Schmidt, 1992).

There are many competing theories proposed to account for the development of automaticity, including the Shiffrin and Schneider (1977) theory of the development from controlled to automatic processing, Anderson's account of the mechanisms responsible for the transition from declarative to procedural knowledge (Anderson, 1983, 1989), the notion of restructuring (Cheng, 1985; McLaughlin, 1990b), recent proposals for the redefinition of automatic as retrieval from memory, in both instance (Logan, 1988) and strength (Schneider & Detweiler, 1988) versions, and chunking theories (Newell, 1990; Newell & Rosenbloom, 1981; Servan-Schreiber & Anderson, 1990). Many of these theories, but not all, posit that spontaneous performance derives from an earlier stage of consciously guided performance.

Recommendation 7: Spontaneous, fluent language performance is unconscious only in the sense that it is accomplished without the conscious retrieval of explicit knowledge that may have been used as an aid to production in earlier, novice stages of development. Automatic use is related to both the familiar notion of procedural knowledge and the psychological construct of "implicit memory" (Schachter, 1987; Ellis, this volume) but is not by itself evidence for implicit learning.

4. Conclusions

If researchers in applied linguistics can keep the distinctions suggested here in mind, the result should be increased clarity in the reporting of research results, as well as enhanced comparability across studies. It is important not to report a study as one of implicit learning, for example, if the learning task or treatment condition actually falls more precisely within the incidental/intentional contrast. Explicit learning should not be assumed simply because explicit instruction has been provided. Claims concerning implicit knowledge (or unconscious explicit knowledge) do not necessarily entail a claim of implicit learning, especially if innate knowledge is seen to be the source of such knowledge (for example, non-parameterized universals within the UG framework). Automatic procedural skill is, by itself, not evidence for either incidental or implicit learning.

The recommendations made here do not solve the hall of mirrors problem. For pragmatic reasons, researchers may choose to work with well defined instructional treatments that are relatively easy to control, such as attention-focusing tasks. However, learning takes place only within the learner, and we would be deceiving ourselves if we thought that talk about attentional systems, for example, solves the problem of subjectivity and eliminates the mind/body problem. Subjectively, there is *something that it is like* to have intentions, to pay attention, to notice, to become aware of a regularity of language, and to understand instruction (Hardcastle, 1993; Nagel, 1974, 1993). However, in spite of our positivistic inclinations, there is nothing to prevent applied linguistics researchers from taking a third-

person perspective on such first-person events. Psychologists do this all the time, when asking subjects what they think they have learned in an experiment or simply asking them to report what they remember from a stimulus list. The problem in applied linguistics has not been over reliance on first-person reports and data, but an almost total neglect of them. Finally, there is no reason to adopt, a priori, the epiphenomenalist stance. Assuming that consciousness is a late evolutionary development, it may be reasonable to assume that the primary processes of learning are those of the cognitive unconscious (Reber, 1992, 1993), but it is equally reasonable to wonder what functions are served by this evolutionary development. One answer that has been proposed is that consciousness is essential for learning (Baars, 1988; Block, 1991). Since language is also a late evolutionary development, there is reason enough to suspect (though not, of course, to assume) that consciousness and language learning may be intimately connected.

References

- Alanen, R. (1992). *Input enhancement and rule presentation in second language acquisition*. Unpublished M.A. thesis, The University of Hawaii at Manoa.
- Allwright, R.L. (1984). Why don't learners learn what teachers teach? The interaction hypothesis. In D.M. Singleton and D.G. Little (Eds.), *Language learning in formal and informal contexts* (pp. 3-18). Dublin: IRAAL.
- Anderson, J.R. (1983). *The architecture of cognition*. Cambridge, MA: Harvard University Press.
- Anderson, J.R. (1989). Practice, working memory, and the ACT* theory of skill acquisition: A comment on Carlson, Sullivan, and Schneider. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 15, 527-530.
- Baars, B.J. (1988). *A cognitive theory of consciousness*. Cambridge: Cambridge University Press.
- Battista, J. (1978). The science of consciousness. In K. Pope and J. Singer (Eds.), *The stream of consciousness: Scientific investigations into the flow of human experience* (pp. 55-87). New York: Plenum Press.
- Beck, M.-L. and L. Eubank. (1991). Acquisition theory and experimental design: A critique of Tomasello and Herron. *Studies in Second Language Acquisition*, 13, 73-76.
- Berry, D.C., & Broadbent, D.E. (1984). On the relationship between task performance and associated verbalizable knowledge. *Quarterly Journal of Experimental Psychology*, 36, 209-31.
- Bialystok, E. (1981a). The role of linguistic knowledge in second language use. *Studies in Second Language Acquisition*, 4, 31-45.
- Bialystok, E. (1981b). The role of conscious strategies in second language proficiency. *Canadian Modern Language Review*, 35, 372-394.
- Bialystok, E. (1990). The dangers of dichotomy: A reply to Hulstijn. *Applied Linguistics*, 11, 46-51.
- Bialystok, E. (1993). Symbolic representation and attentional control in pragmatic competence. In G. Kasper & S. Blum-Kulka (Eds.), *Interlanguage pragmatics* (pp. 43-57). Oxford: Oxford University Press.
- Bialystok, E. (in press). Representation and ways of knowing: Three issues in second language acquisition. In N. Ellis (Ed.), *Implicit and explicit learning of languages*. London: Academic Press.
- Bickerton, D. (In press). *Language and human behavior*. Seattle, WA: University of Washington Press.
- Block, N. (1991). Evidence against epiphenomenalism. *Behavioral and Brain Sciences*, 14, 670-672.
- Boakes, R.A. (1989). How one might find evidence for conditioning in adult humans. In T. Archer and L.-B. Nilsson (Eds.), *Aversion, avoidance, and anxiety: Perspectives on aversively motivated behavior* (pp. 381-402). Hillsdale, NJ: Lawrence Erlbaum.
- Bowers, K. (1984). On being unconsciously influenced and informed. In K. Bowers and D. Meichenbaum (Eds.), *The unconscious reconsidered* (pp. 227-272). New York: Wiley.
- Brewer, W. F. (1974). There is no convincing evidence for operant or classical conditioning in adult humans. In W.B. Weimer & D.S. Palermo (Eds.), *Cognition and the symbolic processes* (pp. 1-42). Hillsdale, NJ: Erlbaum.
- Chaudron, C. (1985). Intake: On models and methods for discovering learners' processing of input. *Studies in Second Language Acquisition*, 7, 1-14.
- Cheng, P.W. (1985). Restructuring versus automaticity: Alternative accounts of skill acquisition. *Psychological Review*, 92, 414-423.
- Chomsky, N. (1975). *Reflections on language*. New York: Pantheon.
- Chomsky, N. (1980). *Rules and representations*. New York: Columbia University Press.
- Clark, A. (1991). In defense of explicit rules. In W. Ramsay, S.P. Stich, and D.E. Rumelhart (Eds.), *Philosophy and connectionist theory* (pp. 115-128). Hillsdale, NJ: Erlbaum.
- Curran, T., & Keele, S.W. (1993). Attentional and nonattentional forms of sequence learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 19, 189-202.
- Dawson, M., & Schell, A. (1987). Human autonomic and skeletal classical conditioning: The role of conscious cognitive factors. In G. Davey (Ed.), *Cognitive processes and Pavlovian conditioning in humans* (pp. 27-55). Chichester: John Wiley and Sons.
- Dennett, D. (1987). *The intentional stance*. Cambridge, MA: MIT Press.
- Dennett, D. (1991). *Consciousness explained*. Boston, MA: Little, Brown.
- Dienes, Z., Broadbent, D., & Berry, D. (1991). Implicit and explicit knowledge bases in artificial grammar learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 17, 875-87.
- Edelman, G. (1989). *The remembered present*. New York: Basic Books.
- Ellis, N. (1993). Rules and instances in foreign language learning: Interactions of explicit and implicit knowledge. *European Journal of Cognitive Psychology*, 5, 289-318.
- Ellis, R. (1993). The structural syllabus and second language acquisition. *TESOL Quarterly*, 27, 91-113.
- Fantuzzi, C. (1992). Connectionism: Explanation or implementation. *Issues in Applied Linguistics*, 3, 319-340.
- Fodor, J. (1983). *The modularity of mind*. Cambridge, MA: MIT Press.
- Gazzaniga, M.S. (1993). Brain mechanisms and conscious experience. In G. R. Bock and J. Marsh (Eds.), *Experimental and theoretical studies of consciousness* (pp. 247-257). New York: John Wiley.
- Green, P.S., & Hecht, K. (1992). Implicit and explicit grammar: An empirical study. *Applied Linguistics*, 13, 168-84.
- Harder, P., & Togeby, O. (1993). Pragmatics, cognitive science and connectionism. *Journal of Pragmatics*, 20, 467-492.
- Hardcastle, V.G. (1993). The naturalists versus the skeptics: The debate over a scientific understanding of consciousness. *Journal of Mind and Behavior*, 14, 27-50.
- Harnad, S. (1990). Lost in the hermeneutic hall of mirrors. *Journal of Theoretical and Experimental Artificial Intelligence*, 2, 321-327.
- Harnad, S. (1991). Other bodies, other minds: A machine incarnation of an old philosophical problem. *Minds and Machines*, 1, 43-54.
- Hatch, E. (1983). *Psycholinguistics: A second language perspective*. Rowley, MA: Newbury House.
- Hulstijn, J. (1989). Implicit and incidental second language learning: Experiments in the processing of natural and partly artificial input. In H.W. Dechert & M. Raupach (Eds.), *Interlingual processes* (pp. 49-73). Tübingen: Gunter Narr Verlag.
- Hulstijn, J. (1992). Retention of inferred and given word meanings: Experiments in incidental vocabulary learning. In P. Arnaud & H. Bejoint (Eds.), *Vocabulary and applied linguistics* (pp. 113-25). London: Macmillan.

- Jackendoff, R. (1987). *Consciousness and the computational mind*. New York: Academic Press.
- James, C. and P. P. Garrett (Eds.). 1991. *Language awareness in the classroom*. London: Longman.
- Karmiloff-Smith, A. (1986). From meta-processes to conscious access: Evidence from children's metalinguistic and repair data. *Cognition*, 23, 95-147.
- Kihlstrom, J. (1984). Conscious, subconscious, unconscious: A cognitive perspective. In K. Bowers and D. Meichenbaum (Eds.), *The unconscious reconsidered* (pp. 149-211). New York: Wiley.
- Klein, W. (1986). *Second language acquisition*. Cambridge: Cambridge University Press.
- Krashen, S.D. (1983). Newmark's 'ignorance hypothesis' and current second language acquisition theory. In S.Gall and L. Selinker (Eds.), *Language transfer in language learning* (pp. 135-152). Rowley, MA: Newbury House.
- Krashen, S.D. (1989). We acquire vocabulary and spelling by reading: Additional evidence for the input hypothesis. *Modern Language Journal*, 73, 440-64.
- Krashen, S.D. (1993). The effect of formal grammar teaching: Still peripheral. *TESOL Quarterly*, 26, 722-725.
- Krashen, S.D., & Terrell, T. (1983). *The natural approach: Language acquisition in the classroom*. New York: Pergamon.
- Lamendella, J. (1977). General principles of neurofunctional organization and their manifestation in primary and second language acquisition. *Language Learning*, 27, 155-196.
- Lightbown, P.M., & Piennemann, M. (1993). Comments on Stephen D. Krashen's "Teaching issues: Formal grammar instruction." *TESOL Quarterly*, 26, 717-722.
- Logan, G.D. (1988). Toward an instance theory of automatization. *Psychological Review*, 95, 492-527.
- Long, M.H. (1988). Instructed interlanguage development. In L. Beebe (Ed.), *Issues in second language acquisition* (pp. 114-41). New York: Newbury House.
- Lycan, W.G. (1987). *Consciousness*. Cambridge, MA: MIT Press.
- McLaughlin, B. (1990a). "Conscious" versus "unconscious" learning. *TESOL Quarterly*, 24, 617-34.
- McLaughlin, B. (1990b). Restructuring. *Applied Linguistics*, 11, 113-128.
- McLaughlin, B., Rossman, T., & McLeod, B. (1983). Second language learning: An information-processing perspective. *Language Learning*, 33, 135-57.
- Nagel, T. (1974). What is it like to be a bat? *Philosophical Review*, 83, 435-451.
- Nagel, T. (1993). What is the mind-body problem? In G.R. Bock and J. Marsh (Eds.), *Experimental and theoretical studies of consciousness* (pp. 1-7). Chichester: John Wiley.
- Newell, A. (1990). *Unified theories of cognition*. Cambridge, MA: Harvard University Press.
- Newell, A., & Rosenbloom, P.S. (1981). Mechanisms of skill acquisition and the law of practice. In J.R. Anderson (Ed.), *Cognitive skills and their acquisition* (pp. 1-55). Hillsdale, NJ: Lawrence Erlbaum.
- Nissen, M. & Bullemer, P. (1987). Attentional requirements of learning: Evidence from performance measures. *Cognitive Psychology*, 19, 1-32.
- Norman, D., & Shallice, T. (1986). Attention to action: Willed and automatic control of behavior. In R. Davidson, G. Schwartz, and D. Shapiro (Eds.), *Consciousness and self-regulation: Advances in research and theory* (Vol. 4, pp. 1-18). New York: Plenum Press.
- Odlin, T. (1986). On the nature and use of explicit knowledge. *IRAL*, 24, 123-44.
- O'Keefe, J. (1985). Is consciousness the gateway to the hippocampal cognitive map? A speculative essay on the neural basis of mind. In D. Oakley (Ed.), *Brain and mind* (pp. 59-98). London: Methuen.
- Paradis, M. (In press). Neurolinguistic aspects of implicit and explicit memory: Implications for bilingualism. In N. Ellis (Ed.), *Implicit and explicit learning of languages*. London: Academic Press.
- Pinker, S. (1992). Review of *Language and Species* (Bickerton). *Language*, 68, 375-382.
- Posner, M.I., & Rothbart, M.K. (1991). Attentional mechanisms and conscious experience. In D. Milner and M. Rugg (Eds.), *The neuropsychology of consciousness* (pp. 91-111). San Diego, CA: Academic Press.
- Posner, M., & Snyder, C. (1975). Attention and cognitive control. In R. Solso (Ed.), *Information processing and cognition: The Loyola symposium* (pp. 55-85). Hillsdale, NJ: Lawrence Erlbaum.
- Reason, J. (1984). Lapses of attention in everyday life. In R. Parasuraman and D. Davies (Eds.), *Varieties of attention* (pp. 515-549).
- Reber, A. (1989). Implicit learning and tacit knowledge. *Journal of Experimental Psychology: General*, 118, 219-35.
- Reber, A.S. (1992). The cognitive unconscious: An evolutionary perspective. *Consciousness and Cognition*, 1, 93-133.
- Reber, A.S. (1993). *Implicit learning and tacit knowledge: An essay on the cognitive unconscious*. Oxford: Oxford University Press.
- Rutherford, W. (1987). *Second language grammar: Learning and teaching*. London: Longman.
- Schachter, D.L. (1987). Implicit memory: History and current status. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 13, 501-18.
- Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics*, 11, 129-158.
- Schmidt, R. (1992). Psychological mechanisms underlying second language fluency. *Studies in Second Language Acquisition*, 14, 357-85.
- Schmidt, R. (1993a). Awareness and second language acquisition. *Annual Review of Applied Linguistics*, 13, 206-226.
- Schmidt, R. (1993b). Consciousness, learning, and interlanguage pragmatics. In G. Kasper & S. Blum-Kulka (Eds.), *Interlanguage pragmatics* (21-42). Oxford: Oxford University Press.
- Schmidt, R. (In press). Implicit learning and the cognitive unconscious. In N. Ellis (Ed.), *Implicit and explicit learning of languages*. London: Academic Press.
- Schmidt, R., & Frota, S. (1986). Developing basic conversational ability in a second language: a case study of an adult learner of Portuguese. In R.R. Day (Ed.), *Talking to learn: Conversation in second language acquisition* (pp. 237-322). Rowley, MA: Newbury House.
- Schneider, W., & Detweiler, M. (1988). The role of practice in dual-task performance: Toward workload modeling in a connectionist/control architecture. *Human Factors*, 30, 539-566/
- Schneider, W., Dumais, S., & Shiffrin, R. (1984). Automatic and control processing and attention. In R. Parasuraman and D. Davies (Eds.), *Varieties of attention* (pp. 1-27). Orlando, FL: Academic Press.
- Schwartz, B.D. (1986). The epistemological status of second language acquisition. *Second Language Research*, 2, 120-59.
- Schwartz, B.D. (1993). On explicit and negative data effecting and affecting competence and linguistic behavior. *Studies in Second Language Acquisition*, 15, 147-163.
- Schwartz, B.D. and M. Gubala-Ryzak. (1992). Learnability and grammar reorganization in L2A: Against negative evidence causing the unlearning of verb movement. *Second Language Research*, 8, 1-38.
- Scovel, T. (1991). Attention, apperception, awareness, and acquisition. Paper presented at the Thai TESOL Eleventh Annual Convention, Bangkok, January, 1991.
- Searle, J.R. (1983). *Intentionality*. Cambridge: Cambridge University Press.
- Searle, J.R. (1990). Consciousness, explanatory inversion, and cognitive science. *Behavioral and Brain Sciences*, 13, 585-596.
- Servan-Schreiber, E., & Anderson, J.R. (1990). Learning artificial grammars with competitive chunking. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 16, 592-608.

- Sharwood Smith, M. (1981). Consciousness-raising and the second language learner. *Applied Linguistics*, 7, 239-256.
- Sharwood Smith, M. (1991). Speaking to many minds: on the relevance of different types of language information for the L2 learner. *Second Language Research*, 7, 118-132.
- Sharwood Smith, M. (1993). Input enhancement in instructed SLA: Theoretical bases. *Studies in Second Language Acquisition*, 15, 165-179.
- Shiffrin, R.M. & Schneider, W. (1977). Controlled and automatic human information processing II: Perceptual learning, automatic attending, and a general theory. *Psychological Review*, 84, 127-90.
- Slimani, A. (1992). Evaluation of classroom interaction. In J.C. Alderson & A. Beretta (Eds.) *Evaluating second language education* (pp. 197-220). Cambridge: Cambridge University Press.
- Tomasello, M. and C. Herron. (1989). Feedback for language transfer errors: The garden path technique. *Studies in Second Language Acquisition*, 11, 385-395.
- Tomasello, M. and C. Herron. (1991). Experiments in the real world: A reply to Beck and Eubank. *Studies in Second Language Acquisition*, 13, 513-517.
- Tomlin, R., & Villa, V. (1993). *Attention in cognitive science and SLA*. Technical Report No. 93-12. Eugene, OR: University of Oregon, Institute of Cognitive and Decision Sciences.
- Van der Heijden, A.H.C. (1992). *Selective attention in vision*. London: Routledge.
- VanPatten, B., & Cadierno, C. (1993). Explicit instruction and input processing. *Studies in Second Language Acquisition*, 15, 225-241.
- Velmans, M. (1991). Is human information processing conscious? *Behavioral and Brain Sciences*, 14, 651-669.
- White, L. (1991). Adverb placement in second language acquisition: Some effects of positive and negative evidence in the classroom. *Second Language Research*, 7, 133-161.
- White, L. (1992). On triggering data in L2 acquisition: a reply to Schwartz and Gubala-Ryzak. *Second Language Research*, 8, 120-137.
- White, P. (1980). Limitations on verbal reports of internal events: A refutation of Nisbett and Wilson and of Bem. *Psychological Review*, 87, 105-12.

EVALUATING THE ROLE OF CONSCIOUSNESS IN SECOND LANGUAGE ACQUISITION: TERMS, LINGUISTIC FEATURES & RESEARCH METHODOLOGY¹

Bill VanPatten
University of Illinois at Urbana-Champaign

Abstract

In the present paper, I argue that much of the debate surrounding consciousness in SLA has to do with a confusion between process, product, context and purpose. I argue for a process-oriented approach to consciousness that focuses on how learners allocate attention during on-line processing of input. In addition, I evaluate the relative value of the research in cognitive psychology on the learning of finite state grammars and conclude that this line of research cannot elucidate the acquisition of natural languages. In a final section, I argue that research on attention (and therefore consciousness) should involve research paradigms that focus on comprehension and input processing. It is my position that with an appropriate definition of attention we can better understand what a learner pays attention to in the input and why. I end with a cautionary note about the term "conscious" and the potential for misinterpretation by researchers and practitioners.

Introduction

No concept raises more hackles in second language acquisition (SLA) circles than "consciousness." Indeed, McLaughlin (1990) has suggested that we abandon the concept altogether and work with other more definable (and hence, operationalizable) constructs. In the present paper, I will not debate conscious vs. subconscious processes in SLA but instead will suggest that we begin thinking about an operative construct based on "attention." It is my belief that significant advances can be made if (1) we have a clear definition of attention, (2) we do not confuse attention (a processing resource) with other constructs such as product, context or focus of attention, and (3) if we keep clear what we mean by "grammar." I will begin my comments by examining some terminology.

On Terminology and Definitions

The "problem of consciousness" (or better yet, the "debate" on consciousness) in SLA is in part a problem of terminology-- and a large part of the problem in terminology lies in the confusion between process, product, context and focus or purpose. This debate has tended to revolve around the question "Can explicit (read "conscious") knowledge become implicit (read "subconscious") knowledge?" Framed slightly differently, the question is "Can declarative knowledge become procedural knowledge?" What is important to note in these questions is that the underlying conceptualization of language learning is one of skill-getting to skill-using. With its focus on *production of the language*, the profession has approached the "consciousness issue" as a problem in *language output* and has, in a sense, recast the old debate between behaviorism and cognitive code-learning theory. However, it is important to remember that current consensus in SLA circles is that the building up of a linguistic system

¹This paper is a revised version of a paper presented at the special symposium "The Role of Consciousness in Second Language Learning" held at the 10th World Congress of the International Association for Applied Linguistics, August 9-14, Amsterdam. I would like to thank the symposium organizers, Jan Hulstijn and Dick Schmidt, for comments on an earlier version of this paper. I would also like to thank Cristina Sanz for her comments and reactions.