

Attention, Noticing, and Awareness in Second Language Acquisition

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Introduction

The role attention plays in the learning process has almost always been assumed since the earliest studies in the field of second language acquisition (SLA). Any exposure, be it aural or written, manipulated or authentic, to the foreign or second language (L2) is arguably premised on the role of attention on the part of the learner. The SLA field up to the mid-1990s had generally assumed that experimental conditions (instruction or exposure, be it explicit, that is, with awareness, or implicit, that is, without awareness) elicited the required attention paid to the targeted item(s) in the L2 input. This premise is evidenced in the type of research design employed in the studies, which was the classical pretest—experimental condition—posttest design, without any concurrent or online data on learners' actual attention paid to the targeted items in the input.

The early postulations of Schmidt (1990, 1993) and Robinson (1995a) in SLA and Tomlin and Villa (1994) from the field of cognitive science regarding the roles of attention and awareness in input processing arguably propelled several researchers to probe deeper, both methodologically and empirically, into the constructs of attention and awareness. As Schmidt (2001) pointed out, it is quite challenging to separate these two constructs given that in psychology they are commonly viewed as being intrinsically integrated. While the role attention plays is relatively non-controversial in most research fields that include cognitive psychology, cognitive science, and SLA, whether awareness plays a role in learning remains highly debated in all these fields.

This entry presents a concise review of the important tenets of the several major theoretical approaches that have postulated roles for both the constructs of attention and awareness in L2 learning at the initial stage of language processing (e.g., Schmidt, 1990, 1993, 2001; Tomlin & Villa, 1994; Robinson, 1995a). A report of empirical studies premised on some role for attention/noticing are presented followed by those that have isolated the construct of awareness to investigate its effects on L2 learning. Finally, the few current studies in SLA that have empirically probed deeper into the construct of unawareness will be reported.

Theoretical Approaches to the Roles of Attention and Awareness in SLA

While there are several theoretical underpinnings in the SLA field that have postulated an important role for attention at the initial stage of L2 development, only Schmidt's (1990 and elsewhere) noticing hypothesis, Tomlin and Villa's (1994) functional model of input processing in SLA, and Robinson's (1995a) model of the relationship between attention and memory have directly addressed the roles of both attention and awareness. The main tenets of these three approaches are discussed below.

Schmidt's Noticing Hypothesis

Drawing from works in cognitive psychology and his own personal experience while learning Portuguese, Schmidt's (1990, and elsewhere) noticing hypothesis postulates that attention, which "is necessary in order to understand virtually every aspect of second language acquisition" (Schmidt, 2001, p. 3), controls access to awareness and is responsible for noticing. Noticing is "the necessary and sufficient condition for the conversion of input into intake" (Schmidt, 1993, p. 209). Intake in SLA is usually defined as a subset of the input that has been taken in by the learner but not necessarily internalized in the language system and occurs at a preliminary stage along the acquisitional process (e.g., Leow, 1993). Attention, according to Schmidt, is isomorphic with awareness and he rejects the idea of learning without awareness. In addition, Schmidt proposes a level of awareness that is higher than awareness at the level of noticing, namely, awareness at the level of understanding. Whereas awareness at the level of noticing leads to mere intake, this higher level of awareness promotes deeper learning marked by restructuring and system learning and is underscored by learners' ability to analyze, compare, and test hypotheses at this level.

Tomlin and Villa's Functional Model of Input Processing in SLA

While concurring with Schmidt's noticing hypothesis on the important role of attention in learning, Tomlin and Villa's (1994) model of input processing in SLA differs sharply from Schmidt's regarding the role of awareness in the acquisitional process. Drawing on works in cognitive science, Tomlin and Villa (1994) propose a functionally based, fine-grained analysis of attention. In their model, attention comprises "three separable attentional functions that have also been paired to separate yet interconnected neuroanatomical areas" (Tomlin & Villa, 1994, p. 190): (a) alertness (an overall readiness to deal with incoming stimuli), (b) orientation (the direction of attentional resources to a certain type of stimuli), and (c) detection (the cognitive registration of stimuli). The network hypothesized to be necessary for further processing of input and subsequent learning to take place is that of detection. The other two networks (alertness and orientation) are important in SLA and can enhance the chances that detection will occur, but their role in promoting detection is not crucial. According to Tomlin and Villa, in their model, detection does *not* imply awareness, that is, awareness does not play a crucial role in the preliminary processing of input during exposure.

Robinson's Model of the Relationship Between Attention and Memory

Robinson's (1995a) model of the relationship between attention and memory neatly reconciles Schmidt's notion of noticing (which involves awareness) and Tomlin and Villa's notion of detection (which does not imply awareness). In this model, detection is strategically placed at an earlier stage in the acquisitional process when compared to noticing. In other words, linguistic information may be detected and taken in by the learner but if this information is not accompanied by awareness, then the chance of this information being further processed is relatively minimal. Noticing, according to Robinson, is "detection plus rehearsal in short-term memory, prior to encoding in long-term memory" (Robinson, 1995a, p. 296). Like Schmidt, Robinson assumes that noticing does involve awareness and that it plays an important role in L2 learning.

As can be seen from the tenets of the different theoretical approaches to the roles of attention and awareness in SLA, the facilitative role of attention in L2 development is generally accepted while the role of awareness is not without debate. More specifically, while both Schmidt's noticing hypothesis and Robinson's model posit a crucial role for awareness, Tomlin and Villa's model does not. What is not controversial, then, is that

attentional resources do need to be allocated to specific linguistic (grammatical, lexical, phonological, etc.) information in the input. However, whether these attentional resources need to be accompanied by learner awareness to process the linguistic information in the input for intake and subsequent learning remains debatable in the SLA literature.

Attention/Noticing and Learning: Empirical Evidence in SLA

There are several strands of SLA research that are explicitly or implicitly premised on the role(s) of attention, or noticing (attention plus a low level of awareness), or both, in L2 development. These strands include processing instruction, interaction or feedback, learning conditions, input/textual enhancement, focus on form, and so on. Attention/noticing has been measured by a variety of instruments in SLA studies that include offline questionnaires, online uptake charts, learning diaries, online verbal reports, and offline verbal reports such as stimulated recall protocols. In addition, in some studies students were prompted to take notes while reading an L2 text, to underline, circle, or check targeted linguistic structures in written text, or to make a check mark every time a targeted item is heard.

Quite a large range of linguistic items has also been empirically investigated and these include Spanish imperatives, imperfect and preterit forms, present perfect forms, relative pronouns, past conditional; Finnish locative suffixes; English possessive determiners, relative clauses; French past participle agreement, and so on. Different levels of language experience have also been explored, ranging from beginner learners of an L2 to intermediate to advanced levels. Amount of exposure is also differential, ranging from less than an hour to over several days.

Overall, the findings of these studies provide strong support for the role of attention, or noticing, or both, in L2 development. However, the research designs of many of these studies did not methodologically tease out the specific role awareness played while learners were attending to incoming L2 data. To this end, the next section reports on the definition and operationalization of the construct of learner awareness and empirical studies that methodologically addressed the role of this construct in L2 development.

Awareness and Learning in SLA

Awareness is defined in SLA as “a particular state of mind in which an individual has undergone a specific subjective experience of some cognitive content or external stimulus” (Tomlin & Villa, 1994, p. 193). Awareness, according to Leow (2001), may be demonstrated through (a) some resulting behavioral or cognitive change, (b) a meta-report of the experience but without any metalinguistic description of a targeted underlying rule, or (c) a metalinguistic description of a targeted underlying rule. In addition, the operationalization and measurement of what constitutes awareness in SLA is methodologically thorny and varied. Leow, Johnson, and Zárate-Sánchez (in press) provide a methodological review of relevant studies in both SLA and non-SLA fields and call for a finer-grained approach to the study of the construct of awareness. This finer-grained approach advocates, in any report on the role of awareness in L2 development careful consideration of several aspects of the research design that include (a) where awareness is measured (at the stage of encoding that is online versus at the stage of retrieval that is offline), (b) what kind of item is being targeted, and (c) how awareness is measured (the measurement instrument).

Whether awareness plays a role during attention to or processing of incoming L2 data has led to a growing debate in SLA. Several researchers have supported a dissociation between learning and awareness in SLA (e.g., Tomlin & Villa, 1994; Williams, 2004, 2005)

while others have rejected this dissociation (Schmidt, 1990, and elsewhere; Robinson, 1995a; Leow, 2000; Hama & Leow, 2010).

Studies addressing the role of awareness in L2 development can be categorized into two methodological approaches, namely, awareness was measured either concurrently or online (e.g., Rosa & O'Neill, 1999; Leow, 2000, 2001; Rosa & Leow, 2004; Martínez-Fernández, 2008; Hama & Leow, 2010) or non-concurrently or offline (e.g., Robinson, 1995b; Williams, 2004, 2005). Concurrent measures of awareness in SLA occur at the stage of encoding or construction, that is, *while* learners are processing the incoming data, and include think aloud protocols or verbal reports. Non-concurrent measures, on the other hand, occur at the stage of retrieval or reconstruction, that is, *after* the data have been processed, and they include questionnaires, offline verbal reports, or oral interviews. Currently, there is some methodological debate regarding the validity of concurrent verbal reports given the potential reactive nature of this measurement. While most of the studies addressing this issue do not report any significant change in learners' processing due to thinking aloud during task performance when compared to a non-think aloud control group, the issue still warrants further empirical exploration. Similarly, non-concurrent measures such as offline verbal reports, oral interviews, or stimulated recasts run the risk of veridicality or memory decay (Leow, 2000; Egi, 2008), that is, the reports provided may not reflect the actual process employed during the initial exposure at the encoding stage.

Empirical Evidence for the Role of Awareness in SLA

Overall, many of the studies that have independently investigated the construct of awareness by employing online verbal reports to operationalize and measure this construct appear to provide empirical support for the facilitative effects of awareness on foreign-language behavior and learning. Several levels of awareness have also been reported that include, for grammatical items, awareness at the levels of noticing and understanding (Rosa & O'Neill, 1999; Leow, 2001; Rosa & Leow, 2004) and an intermediate level of awareness between the levels of noticing and understanding, namely, awareness at the level of reporting (Leow, 2001). For lexical items, Martínez-Fernández (2008) reported two levels: "noticing of one word aspect" (either the word form or the meaning) and "noticing of two word aspects" (i.e., both word form and the meaning). In addition, higher levels of awareness appear to correspond with both higher levels of intake and learning and the presence of hypothesis testing and rule formation, providing empirical evidence for Schmidt's two levels of awareness postulated in his noticing hypothesis.

To date, however, only a very limited number of published SLA studies has directly examined whether language development can occur among *unaware* learners (Leow, 2000; Williams, 2004, 2005; Hama & Leow, 2010). The paucity of studies on this issue in SLA is relatively alarming given that many so-called learning conditions designed to promote either implicit or explicit learning have not gathered empirical evidence that first established the presence of such processing taking place in the experimental conditions before statistically analyzing the effects of type of learning condition on L2 development. The performance on a post-condition task is usually assumed to be based on knowledge gleaned from either explicit (with awareness) or implicit (without awareness) processing of the linguistic information embedded in the experimental input. This assumption has been challenged by several studies (e.g., Rosa & O'Neill, 1999; Leow, 2000, 2001; Rosa & Leow, 2004) that have gathered concurrent data while learners were processing the experimental input. These studies reported that, notwithstanding the experimental condition, some participants did not represent the condition under which they were placed. To this end, the studies on unaware learners are closely examined in the next section.

Learning Without Awareness?

There are currently four published studies that have investigated the performances of learners who have been coded as being unaware of the underlying grammatical rule while exposed to the experimental input (Leow, 2000; Williams, 2004, 2005; Hama & Leow, 2010). Leow (2000) employed a hybrid design that employs both qualitative (based on online think aloud protocols data) and quantitative (based on offline procedures data) analyses. His study addressed the effect of awareness or lack thereof on 32 adult English-speaking L2 learners' subsequent intake and production of L2 forms (third persons of Spanish irregular preterit verbs ending in either *-er* or *-ir* that have a stem change in this tense). His experimental task was a problem-solving one (a crossword puzzle). He reported that learning did not appear to occur among unaware learners.

Williams (2005) reported that unaware learners can provide evidence of learning without awareness. Following up on his 2004 study with methodological improvements, Williams conducted two experiments to test whether participants were able to learn miniature noun class systems without awareness. The 41 participants in his studies were from a variety of language and linguistics-related backgrounds. The noun phrases used for Williams's experiments were four novel determiners, *gi*, *ro*, *ul*, *ne*. *Gi* and *ro* are the English translation equivalence of 'near', and *ul* and *ne* are equivalent to 'far'. These determiners also carry animacy values: *gi* and *ul* are animate and *ro* and *ne* are inanimate. The results revealed that many of the participants who were classified as unaware were able to choose the correct noun phrase during the assessment task at a significantly above-chance level.

The conflicting results reported in the two studies are not surprising given the several differences between Leow's and Williams's studies. These differences include learning measures (a four-option multiple-choice (MC) recognition assessment task versus a two-option MC assessment task), coding of awareness (at the level of noticing versus at the level of understanding), and stage of awareness measurement (the encoding and retrieval stages versus only the retrieval stage).

Hama and Leow (2010) revisited Williams (2005) by employing a hybrid design to gather data at the concurrent stage of encoding, during the testing phase, and after the experimental exposure (retrieval stage). In addition, the study methodologically extended Williams's research design to probe deeper into learners' processes by (a) increasing the number of items (four instead of two) on his MC test to include the presence of distance in learners' selection of options (i.e., animacy *plus* distance) in order to replicate the training context, (b) including a production test in addition to the MC test, and (c) providing the same modality for both the learning and testing phases.

The quantitative analyses revealed that, at the encoding or construction stage, unaware learners do not appear capable of selecting or producing the correct determiner-noun combination when required to do so from options that include both animacy and distance information. This may be due to the type of research methodology employed, the level of cognitive effort required to process the information at a sentential level when compared to a form or noun phrase level, prior knowledge of a foreign language (in Williams's study this variable was correlated with learning effects), the mode in which the assessment prompts were provided, or all of these. The qualitative data underscore the importance of measuring the construct of unawareness from different sources, that is, both online and offline, given that processes demonstrated during different phases of exposure to the input may not be fully reported at the non-concurrent stage of retrieval of such awareness.

As can be seen, preliminary studies in SLA that have investigated unaware learners reveal contradictory findings similar to those reported in cognitive psychology. While the research indicates quite clearly that the presence of awareness (and its corresponding levels) does appear to have a facilitative effect on intake and learning, more research on

the construct of unawareness is clearly needed to address whether learning can indeed take place in an unaware condition.

Conclusion

This entry has presented a concise overview of the theoretical, methodological, and empirical issues surrounding the roles of attention, noticing, and awareness in adult L2 behavior and learning and provided brief reports of empirical studies premised on these roles in L2 development. The overall findings appear to indicate facilitative effects of attention/noticing and awareness on adult L2 learners' subsequent processing, intake, and learning of targeted L2 forms or structures embedded in the L2 data. At the same time, notwithstanding the methodological concerns inherent in both the operationalization and measurement of the slippery construct of awareness, further research on unaware learning is warranted given the central role awareness plays in many major strands of SLA research. While current research findings are indeed promising, more robust research designs are clearly needed to address the issue of L2 development premised on the roles of attention/noticing and (un)awareness given the wide variety of variables that can potentially impact learners' processes while interacting with L2 data. Such findings can only improve our understanding of the attentional and cognitive processes involved in L2 learning.

SEE ALSO: Automatization, Skill Acquisition, and Practice in Second Language Acquisition; Explicit Learning in Second Language Acquisition; Implicit Learning in Second Language Acquisition; Incidental Learning in Second Language Acquisition; Input Processing in Second Language Acquisition; Interaction Approach in Second Language Acquisition; Task-Based Learning; Cognitive Underpinnings

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Suggested Readings

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