The Routledge Handbook of Instructed Second Language Acquisition

Shawn Loewen, Masatoshi Sato

Intentional and Incidental L2 Learning

Publication details
https://www.routledgehandbooks.com/doi/10.4324/9781315676968.ch3
Ronald P. Leow, Celia C. Zamora
Published online on: 23 Feb 2017

https://www.routledgehandbooks.com/doi/10.4324/9781315676968.ch3

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Intentional and Incidental L2 Learning

Ronald P. Leow and Celia C. Zamora

Background

Whether one can learn a foreign or second language (L2) incidentally, typically defined as the absence of any deliberate intention to learn target L2 information in the L2 input, has been an issue that has not only permeated several studies in the non–second language acquisition (SLA) field for decades but also in the current field of SLA. Indeed, the empirical origins of incidental learning date back to the beginning of the 20th century, and began in psychology-based studies (e.g., Jenkins, 1933). This chapter (1) succinctly traces the evolution of the study of incidental learning, as opposed to intentional learning, in relation to its definition, the target of investigation, the research methodology employed, and empirical findings, (2) discusses the roles of type of learning in light of current theoretical, methodological, and empirical issues within an SLA context, and (3) provides directions for future instructed SLA (ISLA) studies.

Intentional learning, defined recently as “a deliberate attempt to commit factual information to memory” (Hulstijn, 2013, p. 2632), or referred to as “cognitive processes that have learning as a goal rather than an incidental outcome” (Bereiter & Scardamalia, 1989, p. 363), has always been assumed to represent the type of learning, of a more explicit nature, that underscores a formal instructional classroom setting. The definition is relatively stable in many studies, albeit with some nuances as will be discussed herein, and clearly addresses some depth of processing or cognitive effort employed by the learner during the L2 learning process. However, a cursory review of what comprises incidental learning reveals quite a range of perceptions pertaining to what it actually entails and these are typically reflected in the methodology employed to address its role in the L2 learning process.

Non-SLA Field

One of the early and relatively broad definitions of incidental learning was provided by a psychologist, Jenkins (1933), who wrote that incidental learning is “learning which occurs in the absence of a specific intent to remember” (p. 471). This definition appears to refer to a relatively low level of processing or processing without much cognitive effort or subsequent
mental elaboration to retain the information in memory. The target items analyzed in early incidental learning studies were typically lexical-based and ranged, for example, from the learning of syllables (Jenkins, 1933), to pronunciation of trigrams (Mechanic, 1964), to associated/unassociated words (Hyde & Jenkins, 1973). The context for incidental learning later changed from simply lacking the intent to remember by the participant to the distinguishing features of instructional stimuli (e.g., the presence or absence of explicit instruction to learn), particularly those instructions that do not prepare the learners for retention of the material (e.g., Postman, 1964).

The inclusion of orienting tasks was first found in studies of incidental learning in the late 1960s/early 1970s. These orienting tasks were employed to further facilitate processing of the target stimuli under incidental conditions without mentioning the recall tasks or other forms of assessment of the target stimuli (e.g., Craik & Lockhart, 1972; Eysenck, 1982). According to Craik and Lockhart (1972), “the experimenter has a control over the processing the subject applies to the material that he does not have when the subject is merely instructed to learn and uses an unknown coding strategy” (p. 677). These orienting tasks could consist of tasks such as pleasant-unpleasant ratings, estimating the frequency of usage of the stimuli, sentence fragment judgment, and so forth (e.g., Hyde & Jenkins, 1973).

Two types of orienting tasks have been used in the incidental versus intentional learning paradigms: In the first type, participants performed an orienting task based on the stimulus materials, but were not given explicit instructions. In the second type, all participants, regardless of learning condition, were provided instructions to learn some of the stimuli; however, there were some additional stimuli included that participants were not explicitly told to process. The stimuli could be extrinsic (that is, including materials not part of the stimuli participants were instructed to learn) or intrinsic (additional components of the existing stimuli, for example, colors), and were the basis for the assessment of incidental learning (Eysenck, 1982).

From a theoretical perspective, early definitions of and studies on the role of type of learning (incidental versus intentional) in the learning process framed such learning in relation to the role of memory. To account for differential performances between intentional and incidental learning of vocabulary, Craik and Lockhart (1972) went a step further and postulated their levels of processing framework that focused on how learners processed the information in relation to memory. According to Craik and Lockhart, recalling information goes beyond having attended to it during its occurrence or having rehearsed it after its occurrence. Recollection depends also on how deeply this information was processed, namely, shallowly or deeply in relation to how much cognitive effort, elaboration rehearsal, and deeper analysis (such as activation of prior knowledge and meaningful analysis) was involved in the decoding of the incoming data. In a series of 10 experiments on word or lexical processing, Craik and Tulving (1975) reported overall empirical evidence for the effects of levels of processing on both incidental and intentional memory performance. It was assumed, then, that the explicit instructions to learn facilitate the learner’s processing of the material in a more effective manner than the incidental orienting task, which would account for the superiority of intentional over incidental learning (Craik & Lockhart, 1972; Postman, 1964). At the same time, if an appropriate incidental learning condition (such as a well-developed orienting task) were to facilitate deeper processing, and compared to an inferior intentional strategy, “learning under incidental conditions could be superior to that under intentional conditions” (Craik & Lockhart, 1972, p. 677). In other words, it appears that it may not be the experimental learning conditions that matter but how the target stimuli are processed by the learner.
In studies on L1 word lists, the notion of transfer appropriateness (Bransford, Franks, Morris, & Stein, 1979) has also been postulated to account for the typical superiority demonstrated by the intentional learning condition over the incidental one. This postulation is based on the compatibility between learning condition (e.g., read and pay attention to target words in the text) and testing measures (e.g., select words that you recognize from the text). For example, learners exposed to similar learning conditions and assessment tasks (e.g., +semantic/+semantic) were reported to have retained significantly more words when compared to those exposed to incompatible learning conditions and testing (e.g., +semantic/−semantic).

Two major assumptions in these aforementioned studies were that (1) type of experimental learning condition and instructions would lead to differential types of learning, although learning was typically measured offline, and (2) intentional learning was superior based on postexposure tests (Eysenck, 1982).

**Key Concepts**

**Incidental learning**: Learning without any intention to learn.

**Intentional learning**: Learning with intent to learn.

**Cognitive effort**: The mental work involved in making decisions.

**Orienting tasks**: Specific instructions provided in a task to draw participants’ attention to particular feature(s) in the stimuli.

**SLA Field**

The field of SLA has addressed the roles of intentional and incidental learning in the L2 learning process from quite a multifaceted perspective (Leow, 2015a). Theoretically, the notions of intentional and incidental learning, from both a vocabulary and grammatical perspective, appear to have a close connection to Krashen’s (1982) Monitor Model that can be deconstructed from three perspectives (Leow & Cerezo, 2016). The first is that the acquisition process is subconscious, that is, without awareness. Awareness may be defined 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) and is typically associated with type of learning, namely, explicit learning (learning with awareness) and implicit learning (learning without awareness). The second perspective is how the L2 data are processed during acquisition. Acquisition is viewed as being “effortless” on the part of the learner who processes the language with minimal amount of cognitive effort. The third perspective regards the context in which acquisition occurs, namely, a language environment in which exposure to and interaction with the target language is prominent. Krashen (1982) also described acquisition as the following: “implicit learning, informal learning, and natural learning. In non-technical language, acquisition is picking up a language” (p. 10), which appears to indicate that acquisition, incidental learning, and implicit learning all share two important features, namely, a lack of cognitive effort and an absence of awareness during the learning process. This conflation is seen in this direct association between the acquisition process and incidental learning: “Thus, the acquisition process is identical to what had been termed ‘incidental learning’” (R. Ellis, 1994, p. 212).
Empirically, rather than focusing on memory and cognition, the early studies in SLA on incidental versus intentional learning investigated the effects of type of learning condition (intentional vs. incidental) on vocabulary learning through reading (e.g., Hulstijn, 1989; Krashen, 1989). Typically, underlying the motivation for the studies was a reference to the tremendous amount of vocabulary knowledge exhibited by L1 learners who clearly could not have learned all lexical items within a formal instructional setting (see Grabe, 2009 for an overview). Such vocabulary was more likely to have been “picked up” (see Krashen, 1982), which soon became associated with the notion of incidental learning because the vocabulary was not intentionally learned or was not the primary focus of the learner.

The role of attention, signaling a shift to learner internal processes, also began to appear in definitions of incidental learning associated with the notion of “picking up” (R. Ellis, 1994; Schmidt, 1994) and also in the assumption that making a mental effort while reading had a positive effect on vocabulary learning (e.g., Hulstijn, 1992). The late ’90s witnessed a sharper focus on the roles of constructs such as attention and noticing (e.g., Robinson, 1997; Schmidt, 1990) in relation to grammatical items in the L2 data, rather than vocabulary. For example, Robinson (1997) framed incidental learning conditions as an exercise in understanding the meaning of discrete sentences that “replicates the learning condition that Krashen argues leads to unconscious acquisition (processing and understanding the meaning of input without intentionally focusing on grammatical form)” (p. 230). In addition, incidental learning was associated with implicit or unconscious learning that was postulated to be memory-based, item-specific, and nongeneralizable (e.g., Shanks & St. John, 1994) and lacking a focus on form when compared to enhanced or instructed conditions with a focus on form (Robinson, 1997).

Methodologically, the research designs employed in many of these incidental vocabulary and grammatical studies were relatively similar to those employed in the psychology-based studies to address the quantitative aspects or qualitative properties of incidental learning during exposure to a reading text or L2 grammatical data. The majority of the reading studies provided the participants with a reading comprehension task, where, in the intentional learning condition, the target words were included with a dictionary, gloss, contextual clues, or some manner with which the participant could infer the meaning. The grammatical studies typically included a training phase in which the stimuli comprised multiple exemplars of the target word, form, or structure.

**Current Issues**

Current SLA studies from the 2000s continue to address the following general theoretical question: does L2 learning of target information in the L2 input take place without any deliberate attempt to do so (incidental learning), that is, when the primary focus of the learner is on other features of the L2 input? One example may be processing for content

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**Key Concepts**

*Awareness:* “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).

*Explicit learning:* Learning with awareness.

*Implicit learning:* Learning without awareness.
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Information versus processing for lexical or grammatical information. However, the concepts of intentional and incidental learning began to be associated with depth of processing, recently defined as “the relative amount of cognitive effort, level of analysis, elaboration of intake together with the usage of prior knowledge, hypothesis testing and rule formation employed in decoding and encoding some grammatical or lexical item in the input” (Leow, 2015a, p. 204), or conflated with explicit and implicit learning, that is, learning with or without awareness, respectively. Within these learning conditions, studies also began to address methodologically (1) the process, that is, how learners process the L2 data (e.g., the role of attention or awareness or lack thereof), and (2) the product, that is, type of learner knowledge (implicit versus explicit) as measured after the experimental learning exposure. This awareness of different stages along the L2 learning process (Leow, 2015a, 2015b) has led to the current methodological issue of operationalizing and measuring the construct of awareness, assumed to play an important role in differentiating type of learning. Studies have also sought to address other independent variables, for example, frequency of target items (Hamrick & Rebuschat, 2014) and individual differences (e.g., Grey, Williams, & Rebuschat, 2015; Kachinske, Osthus, Solovyeva, & Long, 2015; Robinson, 2005, 2010), within this learning condition strand of research.

Attention/Depth of Processing

Within the incidental L2 vocabulary learning strand, Godfroid, Boers, and Housen (2013) recently employed the concurrent procedure of eye-tracking to establish the role of attention in incidental L2 vocabulary learning (see Leow, Grey, Marijuan, & Moorman, 2014 for a critical discussion of concurrent data elicitation procedures in SLA). Laufer and Hulstijn’s (2001) involvement load hypothesis was proposed to support the roles of attention (e.g., Schmidt, 1990) and cognitive or mental effort (e.g., Craik & Lockhart, 1972) deemed crucial for vocabulary retention. Several studies have tested Laufer and Hulstijn’s involvement load hypothesis (e.g., Keating, 2008; Kim, 2008; Martínez-Fernández, 2008; Rott, 2005). Depth of processing has been associated with levels of awareness (Leow, 2012, 2015a) and postulated to play an important role in the intake processing stage along the L2 learning process (Leow, 2015a).

Key Concepts

Depth of processing: “The relative amount of cognitive effort, level of analysis, elaboration of intake together with the usage of prior knowledge, hypothesis testing and rule formation employed in decoding and encoding some grammatical or lexical item in the input” (Leow, 2015a, p. 204).

Incidental/Implicit Versus Intentional/Explicit

The role of awareness or lack thereof began to be addressed in several permutations of learning conditions. These learning conditions employed basically a similar type of incidental learning condition design in which all participants were provided with instructions to learn some of the experimental data, as discussed earlier. More specifically, some studies began to address the role of intentional or explicit learning in the L2 learning process in opposition...
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... to the role of implicit learning. Implicit learning was defined as learning without awareness and with no intention to learn. However, this type of learning was typically operationalized and measured after the experimental exposure, as observed in definitions of implicit learning such as “the process that occurs when an item is learned without intention or awareness” (Kachinske et al., 2015, p. 387; see also Leung & Williams, 2011, 2012; Williams, 2005). Other studies probed deeper into type of resultant knowledge (implicit vs. explicit) exhibited after an incidental learning condition or exposure (e.g., Grey, Williams, & Rebuschat, 2014; Hamrick & Rebuschat, 2014; Rebuschat, Hamrick, Sachs, Riestenberg, & Ziegler, 2013; Rebuschat & Williams, 2012; Rogers, Révész, & Rebuschat, 2016). This opposition between implicit/incidental learning and explicit/intentional learning appears to be mainly derived from both Krashen’s (1982) Monitor Model and the field of cognitive psychology (see Reber’s seminal 1967 and other studies that investigated these types of learning employing artificial grammars or finite-state grammars that generate meaningless letter strings). At the same time, in an effort to establish the role of awareness or lack thereof during the L2 learning process, that is, how participants were processing the L2 data, other studies (e.g., Hama & Leow, 2010; Leow, 1997, 2000; Rosa & Leow, 2004; Rosa & O’Neill, 1999; Sachs & Suh, 2007) were employing a concurrent data elicitation procedure. This procedure elicited nonmetacognitive think aloud protocols, in which participants were requested to say aloud what they were thinking as they performed the experimental task without any explanation provided for their thoughts. Protocols were subsequently coded to establish empirically the presence or absence of awareness before any statistical analyses were performed to address its role in learning.

The empirical effort to address more directly learners’ cognitive processes, and more particularly, the construct of awareness, has led to the current methodological debate in the strand of research purporting to address its role in the L2 learning process (e.g., Hama & Leow, 2010; Leow, 2015a, 2015b; Leow & Hama, 2013; Leung & Williams, 2011, 2012; Rebuschat, Hamrick, Sachs, Riestenberg, & Ziegler, 2015), which is not difficult to extend to incidental and intentional learning condition studies. This debate has highlighted a crucial difference between stages at which cognitive constructs (e.g., attention, awareness) are being addressed. The first stage is at the concurrent (online) or construction stage of accessing and encoding the incoming experimental information. Operationalizing a cognitive construct at this stage views learning as a process and provides a richer insight into the actual point of encoding and decoding the L2. The second stage is at the nonconcurrent (offline) or reconstruction stage of retrieval of stored knowledge of the target linguistic rule or word and is viewed as a product (see Leow, Johnson, & Zárate-Sánchez, 2011 for further elaboration on stages and Leow, 2015a, 2015b for a distinction between the process of learning measured concurrently versus the product of learning measured nonconcurrently). As pointed out in Leow and Hama (2013), failure to gather concurrent data to establish that some cognitive construct did indeed play a role during the learning process may lead to an internal validity issue, that is, whether the findings faithfully reflect what the study set out to investigate.

Indeed, the typical research design of many of the studies purporting to address the roles of type of learning (e.g., incidental, intentional, implicit, explicit) during the learning process employed offline (awareness) measures administered after the experimental phase or treatment. However, some caution is warranted in the interpretation of the data gathered at this offline stage. Like the early intentional and incidental studies in psychology, there are minimally three major assumptions associated with this research design. The first is that all participants in either experimental condition are going to behave according to the assigned
In other words, those in the intentional learning condition will make an elaborated attempt, that is, demonstrate cognitive effort, to learn the target information in the experimental data. Those in the incidental learning condition will process primarily one feature of the experimental data (e.g., data content) and simultaneously learn, pick up, or process the target information at a very low level. The second assumption is that performance on after-exposure awareness measures will reflect the learning behavior of each experimental learning condition. This operationalization of type of learning assumed to have taken place during an experimental learning condition does not control or guarantee what learners actually did in the condition. For example, some learners assigned to the incidental learning condition might have attempted to learn something in the input, that is, they might have entered the condition without any intention to learn something but during the exposure did intentionally try to learn something, especially after noticing mismatches between their L1 and the L2 input. Establishing what learners actually did during the experimental exposure does provide some confidence in the findings while making assumptions on internal processes may not be robust for scientific research. It is well established in the SLA field that, based on both concurrent (think aloud protocols) (e.g., Alanen, 1995; Hama & Leow, 2010; Leow, 1997, 1998a, 1998b, 2000; Rosa & Leow, 2004; Rosa & O’Neill, 1999) and nonconcurrent (post-exposure questionnaires) (e.g., Robinson, 1996, 1997) data, participants within experimental cells do not all behave according to assigned experimental condition. For example, Leow’s (2000) think aloud protocols revealed that half of the participants processed deeply while the other half did not, notwithstanding being exposed to the same L2 data, and Rebuschat et al. (2015) revealed that participants in the same incidental learning condition demonstrated both implicit and explicit knowledge after exposure; see also Hamrick and Rebuschat (2014), Robinson (2002, 2005), Rogers et al. (2016).

The third assumption is that the amount of time participants are provided to process the experimental data is adequate to promote some kind of incidental or implicit learning. If one were to simulate a learning condition in which there is almost no depth of processing or minimal cognitive effort to learn new information, then participants need to be provided with a very short time span to eliminate potential deeper processing. A cursory survey of studies investigating implicit or incidental learning easily reveals a relatively large amount of time participants were provided to respond during exposure to the target data, ranging from about two seconds (e.g., Kachinske et al., 2015) to 20 seconds (Chen et al., 2011). In some studies, participants also performed a picture description task, a sentence reformulation task, and/or received feedback (e.g., Leung & Williams, 2011, 2012; Williams, 2005) that were assumed to distract participants from focusing on the target data. It is also of interest to note that replication (Martínez-Fernández, 2008) or extension (Hama & Leow, 2010) studies that have employed concurrent data elicitation procedures provide quite different results from the original studies that addressed vocabulary (Laufer & Hulstijn, 2001) and grammatical (Williams, 2005) learning, respectively. As can be seen, the use of experimental learning conditions to operationalize a learning process, be it incidental, intentional, implicit, or explicit, is not without internal validity limitations and may lead to a Type I or Type II error. A Type I or Type II error either over- or underestimates the effect of the learning condition (see Leow & Hama, 2013 for further elaboration). At the same time, it is commendable that some recent studies employing nonconcurrent data elicitation procedures have been more careful to report the effects of type of learning condition on type of knowledge (implicit vs. explicit) instead of attempting to extrapolate the findings to the process of learning, that is, at the encoding stage (e.g., Grey et al., 2014; Hamrick & Rebuschat, 2014; Rebuschat et al., 2013; Rebuschat & Williams, 2012; Rogers et al., 2016).
It is noteworthy that in the research design of the majority of current studies addressing type of learning or knowledge (e.g., Bordag, Kirschenbaum, Tschirner, & Opitz, 2014; Grey et al., 2014, 2015; Hamrick & Rebuschat, 2014; Kachinske et al., 2015; Leung & Williams, 2011, 2012, 2014; Rebuschat et al., 2013; Rebuschat & Williams, 2012; Rogers et al., 2016; Williams, 2005; Williams & Kuribara, 2008) there are two dominant features. The first is the relatively popular use of a (semi)artificial language or lexicon as the experimental L2 input (see Robinson, 2010 for a critique in relation to extrapolating findings from artificial grammar (AG) studies to naturally occurring languages due to a failure to find correlations between his AG group and the naturally occurring Samoan language group). The second is the use of nonconcurrent or offline measures (see Leow & Hama, 2013 for a critique in relation to addressing the process of learning) that may include almost exclusively grammatical or acceptability judgment tasks, offline verbal reports, and subjective awareness measures such as confidence level and source attributions (both self-reports) (see Rebuschat, 2013 for further elaboration of these offline awareness measures).

In sum, there appears to be some conflation between incidental learning (typically associated with “picking up” a language and opposed to intentional learning) and implicit learning (typically associated with a lack of awareness and opposed to explicit learning). There is also a current methodological debate that has highlighted a crucial difference between stages (concurrent/construction vs. nonconcurrent/reconstruction) at which cognitive constructs are being addressed. In addition, it has been recommended that incidental and implicit learning condition studies employing semi-artificial experimental data and after-exposure awareness measures exercise some caution in data interpretation when extrapolating their findings to naturally occurring languages.

Empirical Evidence

The outcomes of intentional and incidental learning have been measured by a variety of instruments in SLA studies. For vocabulary, these include, for example, the Vocabulary Knowledge Scale (VKS, Wesche & Paribakht, 1996), multiple-choice, retention, recognition, recall, vocabulary comprehension, lexical decision, semantic priming tests, self-paced reading, and so on.

Studies addressing grammatical learning or knowledge included instruments such as picture-matching tests, acceptability or grammaticality judgment tasks, morphological and syntactic tests, and reaction times while several of these judgment tests, together with offline verbal reports, confidence ratings, and source attributions were also employed to measure the construct of awareness or lack thereof. The popular cognitive psychology-based statistical analysis, namely, the chance test, has also been employed in some of these studies (e.g., Hama & Leow, 2010; Hamrick & Rebuschat, 2014; Williams, 2005). In a chance test, any mean score statistically above chance (50%) was reported as evidence of learning having taken place (see Williams, 2005).

Quite a range of target items has also been empirically investigated and these include artificial determiners encoding distance and animacy, pseudoclefts of location in English, word order, morphosyntax, dative alternation, semi-artificial languages and pseudo words, non-native syntax such as Japlish (sentences with Japanese syntax and case markers but English lexis) and Japanese scrambling (an optional syntactic operation that moves a phrase in the direction opposite to the head direction) in word order, locative markers, and case markings.

Text length for vocabulary studies ranged from short simplified texts of 100 words to novels consisting of 67,000 words. Data sets (including both lexical and grammatical
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items) ranged from 8 to over 380 exemplars, with a range of untimed or approximately 2–20 seconds of exposure to each individual exemplar in a data set and an overall exposure from 10 minutes to 13 weeks. Training phases lasted from 10 minutes to over a number of days. Only a few studies administered delayed posttests (e.g., Grey et al., 2014, 2015; Robinson, 2002, 2005). Different levels of language experience have also been explored, ranging from no prior instruction on or knowledge of the target language or artificial data to advanced levels.

Even though some vocabulary learning has been reported in studies addressing reading naturally occurring languages (e.g., Barcroft, 2009; Hulstijn, 1992; see Ramos & Dario, 2015 for a critique) or pseudowords (presented in several exposure trials) in relation to frequency effects (Hamrick & Rebuschat, 2014), embedded within a naturally occurring language (Godfroid et al., 2013) or in relation to syntactic complexity (Bordag et al., 2014; Rogers et al., 2016), the robustness of learning leaves much to be desired. With regard to the involvement load hypothesis (Hulstijn & Laufer, 2001; Keating, 2008; Kim, 2008; Martínez-Fernández, 2008; Rott, 2005), several studies have provided empirical support, although Martínez-Fernández (2008) failed to do so after addressing several methodological limitations in the previous research designs, including the failure to use process measures to establish depth of processing.

Other studies have addressed incidental learning conditions or exposure on subsequent grammatical development of mostly artificial items embedded within naturally occurring phrases or sentences. They have also reported evidence that adults can learn aspects of nonnative syntax or morphosyntax while processing the language input for meaning and without any instruction to search for or learn a rule (e.g., Grey et al., 2014; Hamrick, 2014; Kachinske et al., 2015; Rebuschat & Williams, 2012; Robinson, 1995; Rogers et al., 2016; Williams & Kuribara, 2008). This evidence was based primarily on the results of the typical chance test, and was said to occur even after a delay of 2 weeks (e.g., Grey et al., 2014). This type of incidental learning condition can also lead to both implicit and explicit knowledge (e.g., Hamrick & Rebuschat, 2014; Rebuschat et al., 2013, 2015; Rebuschat & Williams, 2012; Rogers et al., 2016), as measured on grammaticality judgment tests. Some studies sought to explain such incidental learning, for example, of word order, in terms of associative (sequence) learning (e.g., Williams, 2010); some have relied on the role of awareness or lack thereof gleaned from awareness measures administered after the experimental exposure (e.g., Hamrick & Rebuschat, 2014; Leung & Williams, 2011, 2012; Rogers et al., 2016; Williams, 2005), while Leung and Williams (2014) addressed the role of prior knowledge in implicit learning and Kachinske et al. (2015) reported partial evidence for statistical learning. However, like the vocabulary studies, the amount of learning reported after exposure, albeit relatively short in duration, is usually not robust.

At the same time, studies comparing intentional versus incidental learning conditions have typically reported that intentional learning conditions often result in more learning when compared to incidental learning conditions (e.g., Hamrick & Rebuschat, 2014). Similarly, studies that compared aware versus unaware learners (operationalized and measured either concurrently or nonconcurrently) also reported similar superior performance by the explicit learning group (e.g., Kachinske et al., 2015; Leow, 2000; Leung & Williams, 2011, 2012; Rebuschat & Williams, 2012, Experiment 1; Rebuschat et al., 2013). Mean percentages obtained by the unaware groups on the chance tests usually fell between a range of 49–61%, while the aware groups were substantially above this range, falling in the 70–88% range.
Future Directions

In spite of the relatively large number of studies that have empirically investigated type of learning (intentional and incidental together with implicit and explicit learning), there still remain theoretical, methodological, and pedagogical issues to be addressed in the SLA literature. First of all, what specifically does it mean to learn intentionally or incidentally? The broad definition of being requested to focus on some particular aspect of incoming L2 data (intentional) or picking up secondary information while the learner’s primary attention is on another feature of the L2 data (incidental) is quite vague with regard to how specifically L2 learners process during incidental or intentional learning conditions. For example, does learning intentionally equate to learning explicitly, that is, with awareness, or does it mean that more cognitive effort is made but no guarantee that awareness of the target information or even learning are indeed achieved? Does learning incidentally equate to implicit learning or picking up the language, that is, learning without awareness or without any measurable amount of cognitive effort? Or does it mean that no intention to learn was present, but during exposure learners may become aware of target information or process deeply such information but with no guarantee that the target information is indeed learned? Is it possible that the mere fact that participants are being exposed to experimental materials, as in an empirical study, may raise some awareness of something to be learned and potentially tested afterwards (in spite of not being provided this priming or testing information)? It is the authors’ perspective that learners do not enter experimental conditions without at least minimal intention to learn something. This perspective finds empirical support in several studies (e.g., Hamrick, 2014; Rebuschat et al., 2013, 2015; Rogers et al., 2016) that have reported intentional or explicit learning during a so-called incidental learning condition, defined as not providing specific instructions to learn any specific information in the L2 data or information regarding a postexposure test. What these basic questions reveal is a major concern of studies purporting to address the internal processes of adult L2 learners: the inadequacy of the operationalizations of these learning conditions in relation to assumed cognitive processes if concurrent data are not provided to support assumptions made on preexposure instructions and/or postexposure measures.

More specifically, how do studies addressing the roles of intentional and incidental learning relate to ISLA? This was defined recently as

a theoretically and empirically based field of academic inquiry that aims to understand how the systematic manipulation of the mechanisms of learning and/or the conditions under which they occur enable or facilitate the development and acquisition of a language other than one’s own.

Loewen, 2015, p. 2, emphasis added

What appear to be underscoring this definition (and others, see, for example, Housen & Pierrard, 2005) are (1) the focus on the “mechanisms of learning” (cognitive processes) employed in an instructed setting, that is, how L2 learners process L2 data in this setting as opposed to a more naturalistic setting; and (2) whether such processes can be manipulated by instructional intervention with the assumption that superior or faster L2 development will result. It may be instructive to situate future ISLA directions in relation to, for example, (1) a clearer definition of the construct of learning; (2) the operationalization of what constitutes type of learning (intentional, incidental, explicit, implicit), that is, how
L2 learners actually process the L2 data; (3) a more robust methodology to address type of learning; and (4) the context in which the learning is assumed to take place and its pedagogical implications.

First of all, future studies may want to address more precisely the construct of learning in (I)SLA. A cursory survey of published studies in both SLA and non-SLA fields reveals an inevitable mention of the term “learning.” At the same time, as pointed out in Leow (2015a), it is also revealing that what comprises “learning” within and between the SLA and non-SLA fields may not be the same construct. For example, the concept of intake (Corder, 1967) is postulated in many SLA theoretical models (e.g., Gass, 1997; Leow, 2015a; VanPatten, 2007) as information taken in during a preliminary stage along the L2 learning process but does not represent what is internalized in the L2 learner system. However, this concept is not well acknowledged in many non-SLA fields and whatever is taken in may be viewed as learning. Indeed, recent publications have discussed the construct of learning in reference to the role of memory (see Hulstijn, 2013) and memory traces (see Bordag et al., 2014), which may be associated with working memory from which initial data without further processing may disappear and not enter the L2 learner’s internal system. Other studies have viewed learning as a product that has been processed and eventually resides in the L2 learner’s internal system (e.g., Leung & Williams, 2012; Williams, 2005). In addition, there may be quite a lot of terminological confusion given that the construct of learning appears to be operationalized or measured by quite a wide range of assessment tasks, from simple recognition to production to grammaticality judgment tasks (see Leow, 2015a for a tri-dimensional perspective of the construct of learning in SLA).

To address type of learning, it may be important to revisit two key terms typically conflated in both the SLA and non-SLA literatures, namely, acquisition and learning (Leow, 2015a; Leow & Cerezo, 2016). The key distinctions between acquisition and learning lie precisely in how L1 and L2 learners process the L1 and L2 data, respectively (e.g., depth of processing, level of awareness, cognitive effort) and where exposure to the L1 and L2 occurs. In addition, the amount of time (and as an extension, the amount of target data) learners are exposed to and interacting with either the L1 or L2 needs to be seriously considered. In other words, viewed from this processing perspective and the ISLA formal and instructed context, two major distinctions between acquisition and learning are clearly based on type of processing (incidental/implicit vs. intentional/explicit, respectively) and type of context (naturalistic vs. instructed environment, respectively). More specifically, the typical ISLA formal setting, situated importantly within a language curriculum with its outcome goals, textbook, syllabi, limited exposure, tests, and so forth, is designed to promote more explicit and intentional learning than implicit and incidental learning and acquisition (see Leow & Cerezo, 2016, for a curricular approach to ISLA). This setting does not negate any instance(s) of incidental or implicit learning taking place in the formal instructed environment but, as Leow (2015a) cautions,

this kind of processing depends heavily on many factors that include the provision of large amounts of exemplars in meaningful contexts and quite a long period of time to process, internalize the exemplars, and have the knowledge available for subsequent usage.

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To address methodologically the process or mechanisms of learning, future research may want to make every effort to employ some concurrent data elicitation procedure
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(e.g., eye-tracking, think aloud protocols) in the research design, if feasible, to gather data on learner processing and processes being employed while they are exposed to or interacting with the L2 data. The richness of concurrent data cannot be minimized and can certainly shed more light on internal processes or be used to triangulate data gathered at both online and offline stages (Leow, 2013; Rebuschat et al., 2015; Winke, 2013). Indeed, studies that have employed think aloud protocols have revealed robust L2 development associated with great depths of processing, high levels of awareness (hypothesis testing and rule formulation), and activation of both recently learned and prior knowledge (e.g., Cerezo, Caras, & Leow, 2016; Hsieh, Moreno, & Leow, 2015; Leow, 1997, 1998a, 1998b, 2000; Medina, 2015; Rosa & Leow, 2004; Rosa & O’Neill, 1999). Without concurrent data or empirical evidence to demonstrate that no intent or conscious effort was made during exposure to learn target items in the input (whether learners did, for example, pause at some target items and processed them with some level of cognitive effort or awareness or developed some strategy to process the L2 data), type of learning remains an unanswered question and, as noted earlier, ultimately lowers the level of internal validity of the study.

From a contextual perspective, it is not uncommon for researchers to premise their studies within an L1 acquisition perspective, that is, several references are made to the processes employed by L1 children with some assumption that their studies are being situated within a similar context. For example, with regard to the “picking up” of vocabulary, it is not controversial to note that the depth of processing exhibited by children acquiring their L1 may be relatively low and almost effortless. A similar contextual issue is found in incidental or implicit grammatical learning condition studies that appear to ground their theoretical underpinnings in child acquisition, for example, statistical learning (Saffran, 2003), sequence learning (Williams, 2010), or Krashen’s (1982) Monitor Model. Exposing L2 learners to an experimental written text or a series of data sets (oral or written) for less than an hour and then assuming that they will “pick up” (and, given the absence of delayed posttests, retain?) new vocabulary or grammatical information, even if presented multiple times, does not appear to acknowledge the following: (1) the huge disparity between L1 acquisition and L2 learning in regard to amount and type of exposure to and interaction with the L1 or L2 data, and (2) the depth of processing associated with type of learning. In addition, if pedagogical implications can be offered from studies investigating incidental learning conditions, researchers may need to address naturally occurring languages instead of the typical semi-artificial languages or lexicons employed in the research designs.

Probing deeper into the roles of incidental/implicit learning in adult L2 learning is of clear theoretical value to the field of SLA. However, viewed from both processing and contextual perspectives together with the empirical findings of demonstrated superiority of intentional and explicit learning over incidental and implicit learning, ISLA may better inform language curricula and teaching methodology by focusing on the potential roles either intentional or explicit learning (see also N. Ellis, 2015; Leow, 2015a) may play in promoting more robust learning in this setting. To this end, a strong ISLA research agenda may be to continue probing deeper into the cognitive processes employed by L2 learners as they interact with or are exposed to the L2 across different modalities, types of tasks, linguistic items, language levels, or instructions. A better understanding of these processes can contribute to the creation of theoretically based and empirically supported pedagogical tasks or activities that are designed to promote robust use of students’ mechanism of learning while performing such tasks or activities. This direction falls neatly within recent definitions of ISLA (e.g., Loewen, 2015).
Conclusion

This chapter has provided a succinct overview of the roles of intentional and incidental learning from its non-SLA root to current studies in the (I)SLA field. It has revealed the subtle changes in the definitions of what comprises both types of learning over the years, in the target of investigation, and in the research methodology employed. A critical discussion of these roles has also been provided in relation to current theoretical, methodological, and empirical issues within an SLA context, and, keeping closely to current definitions of ISLA, several directions for future ISLA studies are proposed.

Notes

1. This assumption is exemplified in Perruchet and Pacteau’s (1991) statement: “That implicit learning follows from incidental instructions is a tacit assumption” (p. 4).
2. Statistical learning refers to one’s ability to make use of statistical information in the input to support language acquisition. Early studies focused primarily on child acquisition.

References

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