Implicit and explicit learning in incidental vocabulary acquisition

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1. Introduction

Psychological studies about implicit/explicit learning in language acquisition have typically been concerned with the acquisition of grammatical structures. Reber (1967) was the first researcher to formulate a theory of implicit learning on the basis of experiments on the learning of miniature artificial grammars, in which he demonstrated that information was abstracted out of the environment without conscious operations; since then, the analysis of implicit and explicit learning has developed considerably, and theories have been proposed which go beyond the context of learning artificial languages in experimental settings (cf. Ellis 1994b).

In the field of vocabulary acquisition, the nature of the implicit/explicit distinction is somewhat different than in grammar learning, and research in this area is still very scarce. Furthermore, it seems that the debate about implicit/explicit learning and vocabulary acquisition has frequently been blurred by a confusion of the issue under discussion. This can be illustrated by the diverse terminology used, contrasting e.g. 'incidental' vs. 'intentional' learning, 'attended' vs. 'unattended' learning, or 'implicit' acquisition vs. 'explicit' directed learning. Among these terms, particularly the notion of incidental vocabulary acquisition constitutes a central research focus in L2 pedagogy which is insufficiently distinguished from the concept of implicit learning in psychology.

In an attempt to disentangle and relate these two terms, the present paper investigates in how far incidental vocabulary acquisition can be said to correspond to implicit (and/or explicit) learning. For such a discussion, the approach suggested by Ellis (1994c) appears to offer a valuable framework and starting point; yet, a preliminary clarification of terminological issues seems to be required due to the inconsistent uses and definitions of the basic terms in the literature. The paper thus starts out with a theoretical discussion of the

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central concepts and subsequently provides an analysis of Ellis' (1994c) claims in the light of empirical case studies on incidental vocabulary acquisition through reading.[1]

2. Terminological issues

2.1 Implicit vs. incidental learning

Current definitions of implicit and explicit learning originate in the field of psychology; these definitions generally focus on the absence or presence of conscious operations as a crucial distinguishing factor, which is in line with Ellis' terminology: Implicit learning is typically defined as "acquisition of knowledge about the underlying structure of a complex stimulus environment by a process which takes place naturally, simply and without conscious operation", while explicit learning is said to be characterized by "more conscious operation where the individual makes and tests hypotheses in a search for structure" (Ellis 1994b: 1).

In vocabulary acquisition as it is discussed in L2 pedagogy, a distinction is frequently made which superficially appears to correspond to the implicit-explicit debate: that of incidental vs. intentional vocabulary acquisition. Here, incidental vocabulary acquisition is generally defined as the "learning of vocabulary as the by-product of any activity not explicitly geared to vocabulary learning" and is contrasted with intentional vocabulary learning, defined as "any activity geared at committing lexical information to memory" (Hulstijn 2001: 271).

The fact that incidental vocabulary acquisition takes place in second language learning is generally acknowledged among researchers. Most scholars agree that except for the first few thousand most common words, L2 vocabulary is predominantly acquired incidentally (cf. Huckin & Coady 1999). However, as for an exact definition and characterization of the processes and mechanisms involved in this phenomenon, many questions remain unsettled.

A general problem with the operational definition of incidental vocabulary acquisition given above is that it seems to suggest that incidental learning occurs unconsciously. As Gass (1999) notes, however, defining incidental vocabulary acquisition as the 'side-effect' of another activity neglects the active

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1 This article is an extended version of a paper presented at the EUROSLA 2003 conference in Edinburgh.

role of the learner in this process. The fact that learning occurs as a by-product of reading does not automatically imply that it does not involve any conscious processes (see diagram 1). The seeming equation of 'incidental' with 'unconscious' is also criticized by Ellis (1994a: 38), who states that incidental vocabulary acquisition is non-explicit in so far as it does not involve an explicit learning intention (the overall goal of the learner is text comprehension), but that neither the process nor the product of such learning is necessarily implicit in the sense of non-conscious.
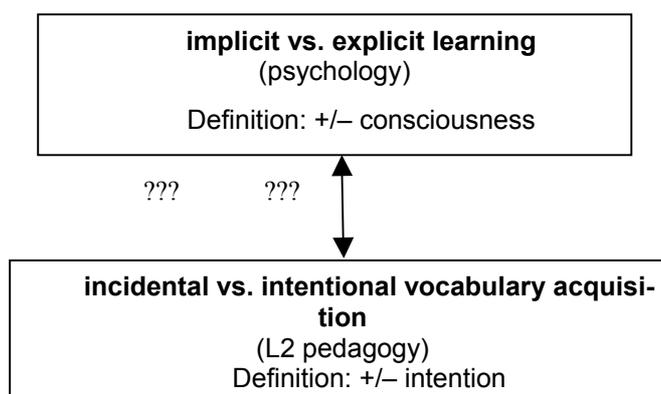
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      ┌─────────────────────────────────────────┐
      │      implicit vs. explicit learning      │
      │               (psychology)               │
      │                                          │
      │       Definition: +/– consciousness      │
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      │ incidental vs. intentional vocabulary acquisi-│
      │                   tion                   │
      │               (L2 pedagogy)              │
      │         Definition: +/– intention        │
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Diagram 1: unclear relation between implicit/explicit and incidental/intentional learning

Even in cases where the notions of implicit and incidental second language learning are brought together in L2 pedagogy, the distinctions and definitions frequently remain notoriously vague. In Hulstijn's article on implicit and incidental second language learning (Hulstijn 1998), for instance, implicit learning is initially defined as "without teaching" and "without conscious inductions", while it is also stressed that implicit lexical learning does in fact require the learner's attention to word form and meaning (Hulstijn 1998: 49). The question in how far the notion of consciousness relates to that of attention, however, remains unanswered. Incidental learning, in turn, is defined as "learning without intention", and does not appear to form a contrast to implicit learning here. Rather, both terms are used side by side, jointly referring to the process of 'picking up' a language.

As these observations suggest, the terminological confusion largely seems to be caused by ambiguities in the interpretation of the term consciousness itself. As Schmidt (1994: 168) points out, the term *unconscious* in definitions of implicit learning can be interpreted in two ways: firstly meaning that implicit learning is *unintentional* and thus incidental, and secondly meaning that it involves induction *without awareness*. These multiple interpretations appear

to be symptomatic of a general quandary in the debate about the role of consciousness in second language learning: the blurred definition and operationalisation of the term consciousness itself (see diagram 2).
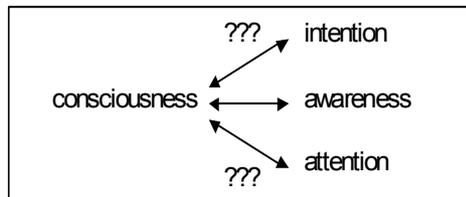

Diagram 2: The unclear definition of the term consciousness

2.2 Concepts of consciousness in second language learning

The inconsistent use and unclear status of the term consciousness in the literature have been noted by various researchers (e.g. Marcel & Bisiach 1988); some even go as far as stating that it is a concept which is too elusive to be criterial (e.g. McLaughlin 1990). In the context of second language learning, there appear to be no less than five basic definitions of consciousness (cf. Schmidt 1990: 138-149, Ellis 1994a: 38):

- consciousness as **intentionality** (incidental vs. intentional learning),
- consciousness as a product of **attention** (attended vs. unattended learning),
- consciousness as **awareness** (learning with/without online awareness).
- consciousness as **instruction** (implicit acquisition vs. explicit instruction),
- consciousness as **control** (implicit vs. explicit memory).

As a result, studies on the role of consciousness in second language learning are too diverse in their scope and claims to be compared, or remain blurred in their statements due to insufficient clarifications of the object under discussion.

     As far as the definition of consciousness in the implicit/explicit learning debate is concerned, the notion of consciousness is commonly equated with awareness in this context. Explicit learning is characterized as involving the learner's online awareness, whereas implicit learning is seen as an automatic process without awareness of either the acquisition process or the resulting

knowledge (cf. Reber 1993: 12). This tradition is also reflected in Ellis' (1994a,b,c) definitions of implicit and explicit learning, where the terms consciousness and awareness are used synonymously.

With regard to the relation between attention and consciousness, Schmidt (2001: 11) notes that the two phenomena are not to be equated, but related in so far as attention controls access to consciousness. If we furthermore incorporate Schmidt's claim that attention to input is a prerequisite for any learning to take place (Schmidt 1994, 2001), we can thus conclude that implicit learning does involve attention to the stimulus but does not involve conscious operations.

In line with the above specifications, the term implicit will be equated with 'non-conscious' in the sense of unaware, while incidental will be equated with 'un-intentional' (without any restrictions as to the role of awareness) in the following sections. This terminological clarification finally enables us to relate the terms *implicit* and *incidental* (see diagram 3) by viewing incidental vocabulary acquisition as being composed of implicit learning processes (which happen without the learner's awareness) and/or of explicit learning processes (which take place without learning intention but nevertheless involve online awareness and hypothesis formation).

Diagram 3. Incidental vocabulary acquisition as a process involving implicit and/or explicit learning
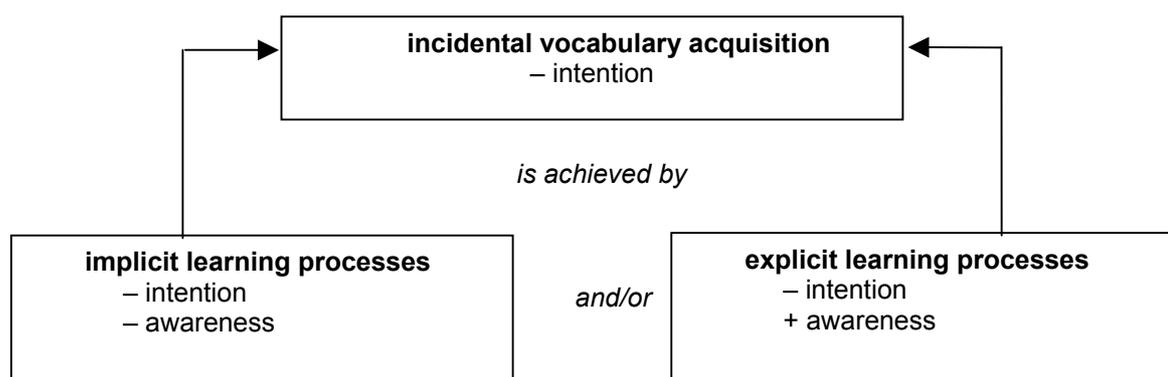
2.3 Incidental vocabulary acquisition and implicit/explicit learning

Within the terminological framework presented above, the relation of incidental vocabulary acquisition and implicit/explicit learning can now be investigated. As stated in section 2.1, incidental vocabulary acquisition can be regarded as non-explicit in so far as it does not involve an explicit learning *intention* (i.e. the overall goal of the learner is text comprehension and not vocabulary acquisition). With regard to the role of *consciousness*, however, two complementary viewpoints can be distinguished. An implicit viewpoint would hold that incidental vocabulary acquisition takes place without awareness, involving implicit learning processes only (e.g. Krashen 1989). What this viewpoint fails to take into account is the fact that learners are active and strategic information processors. An explicit viewpoint would thus argue that incidental vocabulary acquisition also involves explicit (i.e. conscious) learning processes, and would consequently characterize it as primarily explicit learning.

The most comprehensive account of implicit/explicit learning processes in incidental vocabulary acquisition available to date is that of Ellis (1994a, 1994b, 1994c, 1997). Ellis develops a theory for L1 as well as L2 vocabulary acquisition in the framework sketched above, and bases his arguments on an extensive body of experimental psycholinguistic research in the fields of vocabulary and intelligence, implicit memory and global amnesia. His resulting claims are that both implicit and explicit learning mechanisms are involved in incidental vocabulary acquisition: while the acquisition of a word's form, collocations and grammatical class information are said to involve implicit processes, acquiring a word's semantic properties and mapping word form to meaning are claimed to result from explicit learning processes. Furthermore, Ellis argues for a complete dissociation of implicit (i.e. formal) aspects and explicit (i.e. semantic) aspects of vocabulary acquisition (see diagram 4).
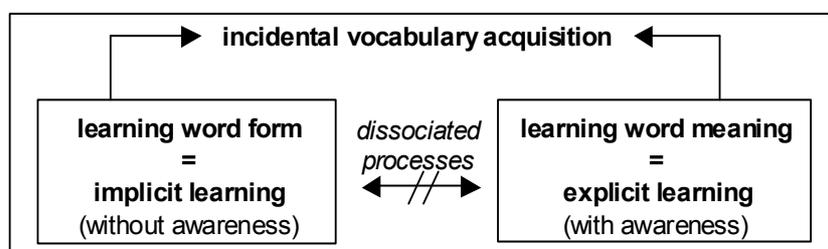

Diagram 4. Ellis' view of implicit/explicit learning processes in incidental vocabulary acquisition

Other authors touching on the issue appear to build on Ellis' model and provide comments and reactions to his claims rather than presenting original

viewpoints of their own. Singleton (1999: 153) for instance criticises Ellis' notion of dissociated processes, stating that even if learning forms and meanings of unknown words are initiated by different mechanisms, this does not necessarily imply that they are managed separately at all stages. Instead, Singleton would argue for a possible interaction between implicit and explicit systems. Börner (1997: 61-64) in turn stresses the need for a modification and differentiation of Ellis' model in the sense of integrating different degrees of explicitness and allowing for both explicit and implicit learning of form features.

Although modifications and refinements have been suggested, the basic validity of Ellis' theory still appears to be generally acknowledged. Within the framework of the terminological specifications described above, the following section will thus take Ellis' claims as a starting point and investigate them in the light of empirical evidence on incidental vocabulary acquisition through reading.

3. Empirical investigations

3.1 Research background

The present analysis starts out from Ellis' (1994c) claims that implicit learning is only involved in learning receptive/productive aspects of word forms, while acquiring semantic aspects necessarily constitutes explicit learning, and that these processes are dissociated. Taking these claims as a starting point, the role of implicit and explicit learning in the construction of formal and semantic lexical knowledge during the text comprehension process is analysed on the basis of empirical case study results.

With regard to incidental word form/meaning acquisition, the following questions will be addressed:

1. In how far can inferring unknown word meanings from context during reading be equated with explicit learning?

2. In how far are implicit learning and/or explicit learning responsible for learning word forms incidentally?

Thirdly, a complementary strand of investigation will briefly touch on the nature of the knowledge acquired:

3. In how far can the resulting lexical knowledge be characterized as implicit and/or explicit?

The empirical analysis is based on selected results from a range of case studies on incidental vocabulary acquisition through reading. The study referred to in this article was carried out with 8 German speaking learners of English at an intermediate to advanced level, and involved a think-aloud text comprehension task with 5 short text passages (39-93 words), in which a total of 8 words were substituted by nonsense-words in order to ensure that these words were unknown. The learners were neither informed about the aim of the study nor of the presence of nonsense-words in the texts, but were only instructed to read the texts for comprehension and to verbalize their thoughts in a think-aloud manner. After reading, they received an unannounced vocabulary post-test containing the target words.[2]

The examples presented refer to learner verbalizations and test results for the same text passage (text 2) containing the target words <u>cummous</u> (= bold), <u>refty</u> (= pushy) and <u>amped</u> (= committed):

Text 2

'I would seize the opportunity at once if I were you! And I'll say this again and again, in my eyes you can't get a better chance!'

'What a cummous thing to say! You've really got no sense of shame at all! Would you please stop being so refty and leave me in peace for a moment?'

'But I'm not trying to persuade you – I just think you're so amped to your old job that you don't see the advantages of leaving the place and taking the other company's offer seriously!'

Since the type of study presented (i.e. verbal reports and tests for explicit memory) can only claim to contain genuine evidence about explicit, i.e. verbalized processes, statements about implicit processes will have to be of a more speculative nature. Taking into account these limitations, the case study results nevertheless offer insights with regard to both explicit and implicit learning processes.

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2 For a comprehensive description of the study setup and materials see Rieder 2002a (s.v. Fallstudie 1/1).

3.2   Inferring unknown word meanings

The first focus of the analysis concerns word meaning elaboration during reading. In line with Ellis' argumentation, the case study results suggest that inferring unknown word meanings from context does indeed involve conscious cognitive operations, i.e. selective attention, hypothesis formation and strategy application. One part of these learner strategies relate to the text level and involve adapting the inferencing effort to the overall text comprehension goal (i.e. skipping words deemed unimportant, minimizing the elaboration effort so as to satisfy the comprehension goal). The other group of strategies applies to the process of meaning inference itself (cf. Rieder 2000a). However, the general question arises whether the meaning elaboration process *as such* can be equated with the explicit learning of word meaning.

Interestingly, numerous instances were observed in the case studies where in the vocabulary post-tests learners could not remember the meanings they had inferred during reading, or not even remember having encountered the respective words in one of the texts (see also section 3.3), although they had spent considerable effort on elaborating the meaning of these words during the reading process.

The following verbalisation of one of the case study participants (Cora), exemplifies one of these cases (see transcript 1, TA). As with the other texts she was given, Cora stumbles over the unknown target words in the example text, and gives meaning guesses for the target words (illustrated for the word cummous). After her first guess (not good, inadequate, bad), she carries on reading the text and finally returns to cummous again, checking and confirming her previous hypothesis ('something like I thought before, I think, something like not okay or mean, like that'). In the vocabulary test after reading, however, she does not remember in which of the texts she has encountered the word, nor can she remember any meaning for the word (see transcript 1, Test).[3]

> **TA:**   "*I would seize the opportunity at once if I were you! And I'll say this again and again, in my eyes you can't get a better chance!'* Yes, everything clear so far. *'What a cummous thing to say!* Cummous - *You've really got no sense of shame at all!* […] *cummous thing to say*, cummous, ph, well, not good, inadequate, bad […] *What a cummous thing to say! – don't be so*

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[3] The think-aloud excerpts presented in this article constitute English translations of the original verbalizations, which were mainly in German (the learners' native language). Passages or words which were originally uttered in English are printed in italics.

refty, yes, something like I thought before, I think, […] cummous is some-
thing like not okay or mean, like that…"

Test: ✓(II) I remember seeing the word in one of the texts, but I do not remember
its meaning[4]
"I've seen cummous, but I don't quite remember how that was, in what con-
text …Cummous I don't know anymore. I remember seeing it but I don't
know anymore at all."

Transcript 1. Cora – Think-aloud (TA) vs. vocabulary test answer (Test), text 2

Although the study setup does not lend itself to strong quantitative conclu-
sions, it is still surprising how often this phenomenon occurred in the case
study. For almost one third of the target words whose meaning had been in-
ferred during reading, the learners could not remember form and/or meaning
in the post-test which was carried out immediately after reading.[5] What this
observation certainly suggests is that the path from meaning inference to
meaning acquisition is less straightforward than assumed.

This empirical observation can be complemented by a cognitive model in-
tegrating word meaning inference and text comprehension (cf. Rieder 2002b).
When a learner builds up a mental model of the text meaning, the meanings of
the words in the text will generally form one of the bases on which this model
is constructed. Unfamiliar words will thus be perceived as discontinuities or
gaps in the learner's mental representation of the text meaning, and conse-
quently, learners will typically only attempt to specify the contribution of
these words to the textual meaning in order to complete their mental model.
This implies that meaning elaboration strategies are not automatically strate-
gies for inferring word meaning, but rather text comprehension strategies and
means-to-an-end for bridging discontinuities in the text meaning.

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4 In the post-tests, the learners were asked to specify the meaning of each test word, as
  well as to tick the most appropriate description of their knowledge status from a choice
  of four answers:

(I) I don't remember seeing this word in the texts.

(II) I remember seeing the word in one of the texts, but I do not remember its meaning.

(III) I have seen this word and I think it means _____.

(IV) I know this word. It means _____.

5 In the case study, learners had given meaning guesses for target words during reading in
  51 cases. For 13 of these words, the learners could not remember their meanings in the
  post-test, and in 3 cases they could neither remember form nor meaning.

The knowledge gained this way is thus initially part of the text meaning knowledge, and the true vocabulary learning step is only induced by an additional, active shift from the text level to the word level on the learners' part, i.e. focus on the word form, abstraction from text to word meaning, integration of this meaning into existing knowledge structures and consolidation of the form-meaning connection.

The vital shift from text to word meaning can either be triggered by learner-specific factors (individual interest in a particular word, general motivation for vocabulary enlargement, etc.). On the other hand, formal factors such as the prominence of a word form or recurring encounters with a word, or content-related factors such as the word's centrality for the textual meaning, will also enhance the chances of focus on the word level.

At any rate, it seems that in many cases we are actually facing learning which is gradually intentional rather than incidental, and that this explicit learning takes place *not* at the level of inferring meaning with text comprehension focus but at the level of abstraction with word learning focus. This point, i.e. the fact that the distinction between incidental and intentional vocabulary learning is in fact difficult to maintain theoretically (even though it may still be relevant methodologically) has also been acknowledged in recent publications (e.g. Hulstijn 2001: 267).

After discussing semantic aspects of lexical acquisition, let us now turn to aspects of form acquisition and the nature of the learning processes involved.

3.3   Learning word forms

The second question of interest concerns the nature of form learning in incidental vocabulary acquisition, which Ellis claims to be implicit and dissociated from explicit learning processes. In the case studies, form-learning through simple attention to input without further conscious processes was recorded in some cases. However, interesting observations include those instances in which the learners did not remember having encountered the target word forms in one of the texts when they saw them in the post-tests, although they had invested effort in specifying the meaning of these words during reading.

This phenomenon can be illustrated by the verbalization of the case study participant Susi (see transcript 2, TA). When she reads the target words, they obviously attract her attention and she recognizes them as unknown words ('I don't know what cummous means', refty is at first left untranslated in her passage translation, followed by a meaning guess). But although she notices

the words and invests effort in narrowing down their meanings, she cannot remember having seen the words in the post-test (see transcript 2, Test).

> **TA:**   "…*What a cum-, cummous thing to say, you've really got no sense of shame at all, would you please stop being so refty and leave me in peace for a moment.* I don't know what cummous means, or how you pronounce it, but, well, at any rate it means something, well it's some sort of criticism of his previous statement. You really have no sense of shame, or something like that, no sense of that at all. Would you please stop now being so refty and leaving me alone for a moment, well, leaving me in quiet leaving me in peace, so refty, ah, probably so pushing, or something along these lines, well at any rate he seems to feel a little under pressure somehow, or she. *But I'm not trying to persuade you …*"

> **Test:**   cummous: ✓(I) I don't remember seeing the words in one of the texts
> refty: ✓(I) I don't remember seeing the words in one of the texts
> "… I've, well ahm, I can, I've heard them before, well in the texts, but, that doesn't have to be the case, right? Well, mh, refty, right, I don't necessarily have to have heard that before, cummous – […] – refty – I don't remember. And cummous – I don't remember either."

Transcript 2: Susi – Think-aloud (TA) vs. vocabulary test answer (Test), text 2

Despite Susi's attention the target words during reading and her conscious meaning specification, the quality of her processing appears to have been too superficial to result in memory of the word form. One possible explanation for this phenomenon might be that her focus was on the text level rather than on the word level, which is illustrated by her immediate reference to the contribution of the target words to the text meaning (cummous: 'it's some sort of criticism of his previous statement', refty: 'he seems to feel a little under pressure somehow'). This observation ties in with the lack of focus on the word level in text comprehension referred to above, and consequently raises the question in how far strategic focus and memorizing are helpful or necessary for form-learning to take place, and to what extent explicit and implicit processes might interact in this case.

As far as Ellis' argument is concerned, he allows for form-learning to be speeded by explicit knowledge (cf. Ellis 1994c: 268), but still claims that it is completely implicit and dissociated from explicit learning. However, if we take into account the above example, it might be argued that simple attention to the stimulus is not sufficient for incidental form acquisition in this case, but that explicit focus on the word form is necessary here to induce learning.

Generally, it would appear that explicit learning can at least have an enhancing effect on form learning, if we consider explicit mediation strategies like the keyword technique, which involves relating word form and meaning through mnemonic devices (cf. Atkinson 1975). In the light of this evidence, the claim of a distinct implicit learning module appears difficult to maintain, and Singleton's (1999: 153) criticism of the complete dissociation suggested by Ellis seems to be justified; the alternatively proposed interaction of implicit and explicit learning processes, as well as of form and meaning learning, seems to represent a more accurate picture of the situation.

Complementary to these observations on the role and interaction of implicit and explicit learning processes in incidental vocabulary acquisition, we will now briefly comment on some aspects of the lexical knowledge gained incidentally which appear to be of interest with regard to the implicit/explicit debate.

3.4 Implicit/explicitness of lexical knowledge

Turning from implicit/explicit learning to implicit/explicit knowledge, we are turning from the process to the product of learning. Although the two notions are not identical, some case study observations which were related to lexical knowledge rather than learning appear to justify a discussion in this context.

Interesting observations in this context concern the nature of the meaning knowledge which had been built up in the process of reading, but which was not abstracted to the word level at this point.

In the post-tests, it was observed that learners sometimes retrieved the text situation, and then extracted some 'meaning essence' for the target words at the point of the test. Transcript 3 shows an excerpt from a verbalization for the target word <u>cummous</u> which illustrates this procedure:

Test: <u>cummous</u>
"that was in the texts and I think that meant – that was at this one instance where someone complained about the way the other one is talking to him, about him, about the new job, that he wants to impose the new job on him. I think that perhaps means – (4 second pause) – ha, now that's difficult. Perhaps a little impertinent or something like that…"

Transcript 3: Michael - Vocabulary test answer (Test), <u>cummous</u>

Here, it appears that Michael has not narrowed down the meaning of <u>cummous</u> sufficiently during reading to specify the meaning at the test. In fact, when reading the text, he did not give any meaning guess for the word; but as

he can obviously remember the text in which the word occurred when he sees it at the post-test, he conjures up the text situation and the specific co-text again and aims at narrowing down the word meaning on the basis of his memory. In a way, this type of knowledge appears to be implicit since it is not directly available. On the other hand, it does not constitute word meaning knowledge per se initially, but rather an un-analysed, indirect source for word meaning construction. Consequently, characterizing it as 'indirect' or 'covert' knowledge (which is explicit in so far as it is retrievable) rather than as truly implicit knowledge seems to be more appropriate.

In terms of the learning processes, form-learning appears to have taken place during reading, since Michael can remember the target word, but the learning of word meaning seems to have been partly delayed to the test situation. In a way, we could thus speak of delayed explicit learning in this context. At any rate, these observations seem to suggest different degrees and forms of explicitness with regard to both learning and knowledge, in line with Börner's (1997) claim for a refinement of the implicit/explicit dichotomy.

4. Conclusion

There appears to be some confusion in research on language learning with regard to the notions of implicit vs. incidental learning, which is partly due to the notorious ambiguities of the term consciousness. The present paper aimed to provide a terminological clarification of the notions under discussion, and a framework for analysing the relationship between incidental vocabulary acquisition and implicit/explicit learning processes.

Within this framework, the vocabulary acquisition model proposed by Ellis constitutes an apt starting point: The case study results correspond with his claims in so far as incidental learning of meaning aspects appears to be characterized by explicit learning, whereas form learning may occur through implicit learning with simple attention to input only. However, the empirical observations only partly match Ellis' model, clashing in particular with the claim that implicit and explicit learning processes are dissociated, and with the simple implicit-explicit dichotomy. The data points to the need for modifications and differentiations on three levels: With regard to form-learning, explicit learning mechanisms seem to have facilitating effects, which would imply an interaction of implicit and explicit learning processes rather than the proposed separation. As regards meaning-learning, a more refined specification of the actual nature of the processes involved would have to be provided. Finally, different levels of explicit learning/knowledge appear to exist which are not grasped by the implicit vs. explicit distinction.

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