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Why Free Morphemes are Acquired Earlier than Bound Morphemes: A Minimalist Account

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The acquisition of grammatical morphemes was intensively studied in the 1970's and 1980's. Recently second language researchers have been trying to account for the acquisition order, relying on certain non-linguistic factors, such as processing and/or saliency. However, these explanations are not satisfactory. Instead, I will suggest that the acquisition/accuracy order in fact reflects the second language learners' morpho-syntactic knowledge. By positing the differences in the requirement at the interface level and the availability of non-linguistic knowledge in first language acquisition and second language acquisition, it will be suggested that second language acquisition is PF-oriented whereas first language acquisition is LF-oriented.

文法形態素の習得は1970年代および1980年代に盛んに研究された。　近年、第二言語では、習得順序に関して、言語処理や顕著度など言語知識以外の要因を基にした説明が試みられている。しかし、これらの説明は十分であるとはいえない。本論文では、習得順序は、言語知識以外の要因が原因ではなく、第二言語学習者の形態統語知識を反映したものであると論じる。母語習得と第二言語習得における、境界面での要求と言語外の知識の違いを仮定し、母語習得は意味境界面（LF）主導で行われるのに対し第二言語習得は音声（PF）主導で行われるという提案を行う。

Second language acquisition researchers have been convinced that second language acquisition is far more than habit formation and second language learners construct and develop their own interlanguage grammar with second language input and the innate cognitive device. Theories of second language acquisition reflect the basic observation that language learners share certain similarities among themselves, especially in terms of how they develop their grammars.

Recently, with the progress in linguistics and psycholinguistics, some second language acquisition researchers have tried to explain why certain acquisition orders are so rigorously observed in second language acquisition, although the orders themselves are often different from the order in first language acquisition. In my view, however, none of these explanations are satisfactory, and hence I will try to offer an alternative explanation adopting the current linguistic theory as its framework.

Basically, what I offer here is:

1. Critical review of recent proposals to explain the acquisition order of grammatical morphemes; and
2. A new explanation and a model of second language acquisition in the light of the Minimalist Program (Chomsky, 1995).

This new explanation includes:

3. Second language acquisition of morpho-syntax is carried out by learning formal features associated with functional and lexical categories, under the sanction of Universal Grammar (UG);
    1. The order of learning a group of features reflects the constraints which are innately given in the syntactic knowledge;
    2. The constraints of UG operate in second language acquisition but some of them operate in a different way from how they operate in first language acquisition; and
    3. Phonological saliency and other factors that are outside morpho-syntactic knowledge may play some role, but it is not a determinate factor in either first language acquisition or second language acquisition of morpho-syntactic aspects of the target language.

This paper is structured as follows. In section 2, in order to focus on the theoretical discussion, I will first present relevant data, and then review previous studies that have tried to give accounts for the acquisition order. This will reveal some shortcomings in these studies. In section 3, I will introduce the theoretical background of this study. In section 4, I will discuss data with the theoretical framework. In section 5, I will discuss its implications to second language acquisition in general.

Previous Studies

Previous Findings

Inspired by Brown's (1973) pioneering study of the first language acquisition, Duley and Burt (1973) and others were interested in the question of whether there is an acquisition order in second language acquisition. Larsen-Freeman and Long (1991, p.93) summarized these studies, and suggest that there is a common accuracy/ acquisition order in interlanguage.

In a subgroup of morphemes, however, L1 transfer was clearly observed. These morphemes include articles and plural markers, for which some languages, such as Japanese, lack the obligatory feature marking.

Here, I cite data from Andersen (1978) and Shirahata (1988). These two data sets show almost the same order, as in (1), concerning verbal morphemes, even though the first language of Andersen's subjects was Spanish and that of Shirahata's was Japanese. These two researchers used the same kind of tasks (oral production) and the same statistical analysis (implicational scaling, 80% for the threshold). They found the orders in (1):

(1) A: Acquisition order of verbal morphemes in Andersen (1978)
Copula *be* → auxiliary *be* → irregular past → regular past → 3rd person-*s*

B: Acquisition order of verbal morphemes in Shirahata (1988)
Copula *be* → auxiliary *be* → irregular past → regular past → 3rd person-*s*

Zobl and Liceras (1994) and Vainikka and Young-Scholten (1996) summarized previous studies and suggest the following order as 'universal', which is compatible with Andersen (1978) and Shirahata (1988):

Table 1: *Acquisition order of verbal morphemes*

First Group	Copula *be*, Auxiliary *be*
Second Group	Irregular past, regular past *–ed*, 3rd person *–s*

I assume that the order in Table 1 is correct and that this order is uniform in second language acquisition. Then the next question is why those in the first group are acquired earlier than those in the second group.

Explanations

Vainikka and Young-Scholten (1996) noticed that the morphemes in the first group are free morphemes, which do not have to attach other lexical items, while those in the second group are bound morphemes, which have to attach other lexical items. They attribute the

acquisition order to the difference in their phonological saliency. That is, the free morphemes are more salient than bound morphemes. Free morphemes may have the phonological stem in some circumstances, while bound morphemes in the second group will never have it. Hence, it may sound plausible at a first glance. However, this explanation has some shortcomings.

Considering that both learners in a naturalistic environment and learners in a classroom situation exhibit the same sequence, this explanation is not plausible. Shirahata's (1988) subjects are high school graduates who received formal instruction in Japan for a minimum of 6 years. Typically, for example, 3rd person *–s* is made salient in input by explicit grammar teaching in English classes in Japan. Hence, it is true that those in the second group may not have 'phonological' saliency, but they are likely to be made 'salient' in classroom, hence the difference can not be solely attributable to this factor.

Moreover, interestingly, in first language acquisition, the order is the opposite. That is, bound morphemes are acquired earlier than free morphemes. Vainikka and Young-Scholten (1995), in fact, noticed this, and suggested that this difference between first language acquisition and second language acquisition is attributable to the difference in psychological processing between children and adults, citing Newport (1990). Although such a difference may actually exist, they do not offer an account for why children acquire bound morphemes earlier than free morphemes in first language acquisition.

Moreover, if we assume phonological processing does not change until puberty, as Newport (1990) suggests, this explanation seems to fail. It is well known that child second language learners acquire grammatical morphemes in the order identical to the one adult second language learners exhibit, which is different from the order L1 learners exhibit (Bailey, Madden and Krashen, 1974).

Zobl and Liceras's (1994) offer a different account, which is much more principled. They suggest that UG guides first language acquisition and hence L1 children acquire grammatical morphemes in a certain order. In their view, L1 grammar is acquired by so-called structure building, where the syntactic structure expands from VP to IP, then to CP. On the other hand, although UG does operate in second language acquisition as constraint, it does not guide in structuring the syntactic knowledge in second language acquisition, and hence second language learners acquire the grammatical morphemes in a different sequence. This explanation is principled, but there is ample evidence that UG not only constrains second language acquisition but also guides it (see e.g. Hawkins, 2001), and hence their explanation is not plausible. Moreover, their explanation does not answer why all second language learners follow a certain order

in acquiring grammatical morphemes.

Wei (2000) tried to explain the acquisition order adopting 4-M model (Myer-Scotton and Jake, 1999). This model was first offered to explain some phenomena observed in code-switching, Creole language, aphasia, and speech errors. Positing that morphemes can be divided into four levels depending on the semantic and structural properties, she suggested that those with intrinsic semantic meaning are acquired first, those purely functional are acquired last, and others are in-between. Her data appear to support this argument. For example, modal auxiliaries (e.g. *can*) are acquired earlier than copula *be*, and referential pronouns (e.g. *it* in *it is my book*) are acquired earlier than expletive ones (e.g. *it* in *it is raining*).

However, although her explanation is likely to account for some order, it is rather limited, and it does not appear to answer our question. First, when she examined her hypothesis, she divided grammatical morphemes into some groups, such as 'verb inflections,' 'pronouns,' 'determiners,' and 'verbs under INFL,' and she examined those in one group independently from the ones in other groups. Hence, for example, although her data clearly show that copula *be* is much easier than 3rd person singular *-s*, she did not refer to this difference at all.

Moreover, some morphemes (e.g. *can*, *it*) for which explanation is offered for why they are acquired earlier than others are not usually included in the earlier morpheme studies. Hence, this study, in fact, does not provide explanations for the classical 'natural sequence.' For example, she does not answer why the morphemes in the first group in Table 1 are acquired earlier than the second group, despite this is needed to give account for 'the acquisition order'.

Goldschneider and DeKeyser (2001) examined previous studies by "meta-analysis," which is "a non-experimental technique that uses previously reported research findings as its 'subjects'"(Driscoll, 1984, cited in Goldschneider and DeKeyser, 2001, p. 14). They chose 12 studies out of 25 candidates and reviewed them using some scaling criteria and statistical tools. They weighed each morpheme in terms of perceptual salience (including number of phones, syllabicity, and sonority), semantic complexity, morphophonological regularity (including number of phonological alternations, homophony with other grammatical functors, and other subfactors), syntactic category, frequency, and L1 transfer, and used multiple regression analysis to analyse the influence of these factors. Reflecting their presupposition that the multiple factors influence the acquisition order, they found that it is really the case that five factors, namely phonological, morphological, syntactic, semantic, and numerical aspects of salience account for the acquisition order. In the discussion of results, they argued that these factors all contribute to

the saliency of the items, and therefore that 'just one valuable, salience, is the ultimate predictor of the order of acquisition' (Goldschneider and DeKeyser, 2001, p. 36).

There are some shortcomings in this study. One is that Goldschneider and DeKeyser's quantifications of some factors appear to be unreliable. For example, they assign points to syntactic categories as follows: lexical free morphemes: 4 points; lexical bound morphemes: 3 points; functional free morphemes: 2 points; and functional bound morphemes: 1 point. However, they do not offer any reasons why lexical free morphemes get four times as many points as functional bound morphemes get. For example, scoring as follows may show different results: lexical free morphemes: 104 points; lexical bound morphemes: 103 points; functional free morphemes: 102 points; and functional bound morphemes: 101 point.

The second and more important problem has been already mentioned above, when I discussed Vainikka and Young-Scholtens' account, which also suggests that saliency is the key aspect for the acquisition order. If saliency is the sole factor, why do learners in the classroom show the same acquisition order? An even more serious problem is that second language learners have tremendous difficulty in certain morphemes even if they are made salient in input. In other words, making certain morphemes salient does not guarantee that they will be acquired. Therefore, there must be some other factors which prevent the acquisition.

The last and the most serious problem with this account is that even if saliency were the sole cause for the acquisition order, offering the cause does not "'explain' the natural order of second language morpheme acquisition". It is far from showing what is going on in learners' mind, and it does not even try to show it.

So, until today, no plausible explanation has been offered for why free morphemes are acquired earlier than bound morphemes in second language acquisition (but see Wakabayashi, 1997). In the rest of this paper, I will try to explain why free morphemes are acquired earlier than bound morphemes in second language acquisition, and why the reverse order is observed in first language acquisition. In order to carry out this task, I need to present the theoretical assumptions of this study.

Theoretical Background

Modularity of linguistic knowledge

In this study, I adopt the modular model of linguistic knowledge and assume that the syntactic knowledge is not influenced by general cognitive mechanisms (Fodor, 1983; Smith and Tsimpli, 1995; Crain and Thornton, 1997). Moreover, I assume that the modules are hierarchically structured, and hence do not compete against other factors. All linguistic information has to pass this module in order to be processed.

Competence vs. Performance

When we use language, it is surely true that performance factors are involved. However, with the assumption above, I assume that linguistic performance cannot exist without underlying linguistic knowledge (i.e. competence) of the target language.

There is plenty of evidence that linguistic knowledge is under the sanction of UG. The existence of acquisition order may constitute one such evidence. To mention others, second language learners know what is undermined in second language input (White, 1989), there is no wild grammar in second language (Thomas, 1991), second language grammar is very systematic in such a way as UG allows but is different from both their L1 and second language (Finer and Broselow, 1986; Wakabayashi, 1996).

Following the Modularity Matching Model (Crain and Thornton, 1998), I assume that the performance data largely reflect the learners' competence unless there are some reasons to the contrary. There is certainly some strategic use of lexical items and pragmatic knowledge, these kinds of non-linguistic strategy are very unlikely to become involved in the use of grammatical morphemes, since they are, as often suggested, 'light' in terms of the requirement in communication.

The Minimalist Program

The specific linguistic theory adopted in this study is the Minimalist Program in Chomsky (1995). In this model, syntactic modules intervene between the articulatory-perceptual interface and the conceptual-intentional interface.

Syntactic knowledge is derivational, and every sentence has to be constructed in the derivation. Derivation starts from the Lexicon. In the Lexicon, every relevant lexical item is associated with the relevant formal features either intrinsically or optionally, and then is taken into a numeration. A syntactic object is structured by Merge. Other operations, such as Attract/Move may apply when necessary. At some point of the derivation, its phonological property is taken into the interface where sounds are interpreted, which is called PF. Derivation continues until all formal features are interpreted (the Principle of Full Interpretation) and then taken into the interface where semantic property of the syntactic object is interpreted, which is called LF. This is illustrated in Figure 1:

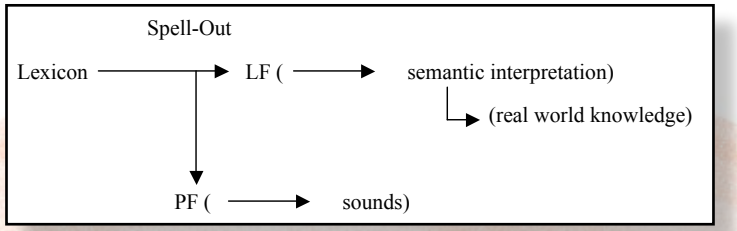


Figure 1: *Syntactic derivation in the Minimalist Program*

In addition to the general assumption of the economy of derivation, such as Merge is more economical than Move, and feature attraction after Spell-Out is more economical than the movement of lexical items before Spell-Out, I further assume that Merge can take place in covert syntax (cf. Chomsky, 1995, 292) and Procrastinate holds of Merge as well as Move (Chomsky, 1995, p.292).

Models of Language Acquisition

First language acquisition

Now we are ready to discuss language acquisition. Let us start from first language acquisition.

Following the intuition first given by Radford (1990), I suggest that the syntactic knowledge develops in such a way that larger syntactic objects can be derived at a later stage of development. Adopting Clahsen et al.'s (1994) view, I assume that the expansion of the syntactic objects derived in the computational system is due to the lexical learning, especially the learning of lexical items in functional categories.

Let us consider the derivation of the sentences in (2):

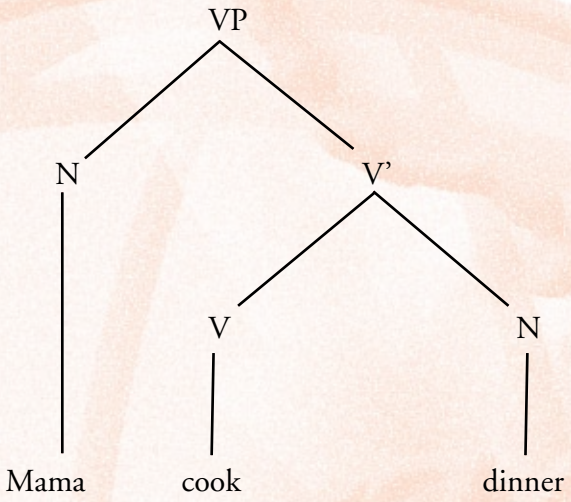
(2)a. Mama cook dinner
b. Mama cooked dinner
c. Mama is angry

These three sentences are artificially made in order to illustrate how the theory works.

In first language acquisition, it is widely observed that verbs do not inflect at an early stage of development. At this stage, where sentences like (2a) are constructed, sentential subjects also often drop, and moreover, when pronouns are used as subjects, the nominative case often fails to be assigned (Radford, 1990).

From this observation, we can assume that TP is not constructed at this stage. In the Minimalist Program, it is attributable to no inclusion of T in the numeration. Hence, the underlying structure of the sentence (2a) can be illustrated as in (3)

(3) The syntactic object and the numeration at Spell-Out for (2a)

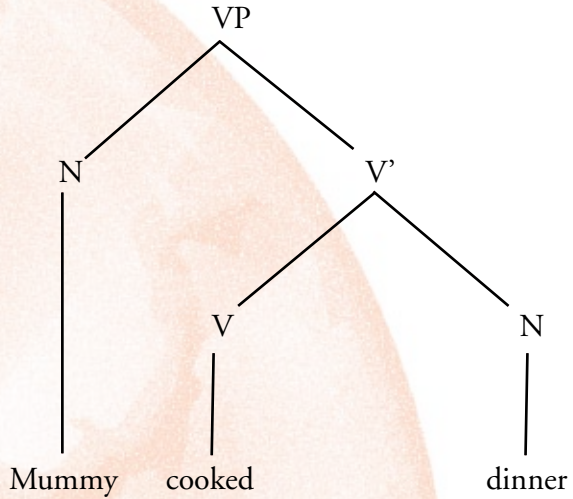


Numeration: 0

When sentence like (2b) is structured, T should be included in the numeration, because tense is clearly marked by the inflection of the verb. However, even when verbs are inflected, subjects still sometimes drop (Sano and Hyams, 1994). Hence, it can be assumed that subjects stay in Spec, VP when it is spelled out. However, since the verb is inflected for the tense feature, this feature has to be checked. Assuming that the merger of T is possible after Spell-out and the Procrastinate holds for Merge as well as Move, T should merge in covert syntax, after the Spell-Out.

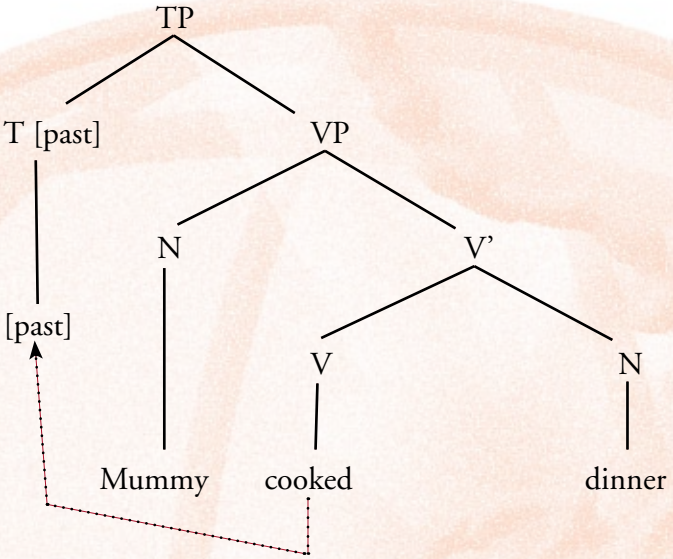
The structure at Spell-Out and the structure after the merger of T, and at LF, are illustrated in (4) and (5):

(4) The syntactic object and the numeration at Spell-Out for (2b)



Numeration: T

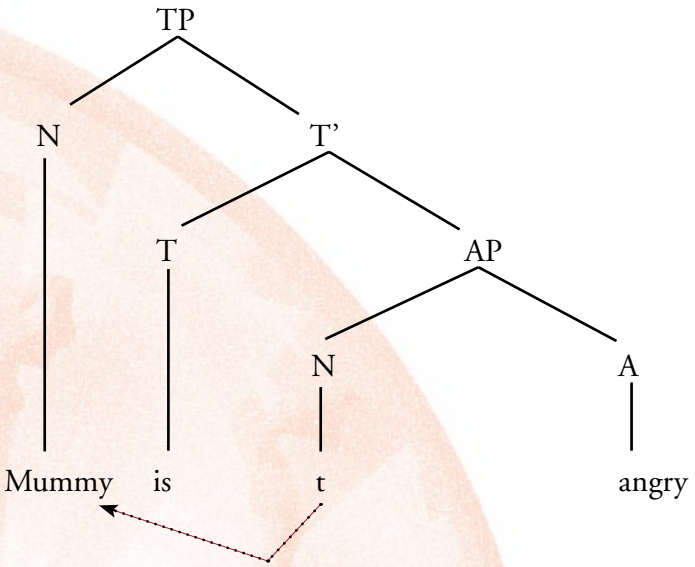
(5) The syntactic object and the numeration at LF for (2b)



Numeration: 0

When one of the inflected forms of *be* (i.e. *is, am, are, was, were*) is used as in (2c), T should merge in overt syntax, since it is spelled out at the head of T. The inclusion of T is also supported by the fact that children do not drop subjects when a form of *be* (or other auxiliaries) are used (Wakabayashi, 1997). The syntactic object at Spell-Out is illustrated in (6):

(6) The syntactic object and the numeration at Spell-Out for (2c)



Numeration: 0

In the first language acquisition, children first use the bare form of verbs, then acquire bound morphemes, and then free morphemes. Hence, we can assume that the syntactic knowledge can develop in such a way that at the first stage, T is not included in the numeration (cf. 4) and then T is included but merges in LF (cf. 4 and 5), and finally T is included and merge before Spell-Out (cf. 6). This development is illustrated in Table 2:

Table 2: *Development of verbal structures in first language acquisition*
(cf. Table 4-2 in Wakabayashi, 1997, p.219)

	Overt syntax	Covert syntax
Stage 1	[L]	[L]
Stage 2	[L]	[T[L]]
Stage 3	[T[L]]	[T[L]]

Note: L = Verb, Adjective, or Noun.

This development from Stage 1 to 3 is 'natural' in a sense, since it is influenced by the Principle of Procrastinate, which is a Principle of Economy posited in the Minimalist Program (Chomsky, 1995). If this explanation is correct, since the expansion of syntactic object first occurs in covert syntax, then in overt syntax, first language acquisition can be said to be covert-syntax or LF oriented.

Second language acquisition

In second language acquisition however, we have evidence that free morphemes are acquired earlier than bound morphemes (see Table 1 above). Then, syntactic knowledge can construct a structure illustrated in (7) earlier than the structure illustrated in (6). In other words, the merger of T in overt syntax is easier than the merger of T in covert syntax and/or the feature checking in covert syntax. Since the merger of T in overt syntax logically makes it unnecessary (in fact, impossible) for T to merge in covert syntax, the difficulty should lies in the feature checking in covert syntax.

Why does feature checking persist in resistance? The reason is likely to be that both T and the verb do not have the relevant feature. If one of them has a formal feature to be checked, but the other does not, the derivation must crash, and hence this asymmetry is not allowed.

Here we have to consider the role of functional categories at the interface level. At PF interface, they are the places where free morphemes are situated. At LF interface, they put the propositional contents of the semantic properties associated with the projections of lexical items in the world of discourse (Hyams, 1994). In other words, without functional categories, the relation between the propositional content of a sentence and the world of discourse is not included in the sentence.

In children's development, it is well known that certain aspects of linguistic knowledge develop earlier than certain aspects of general pragmatic knowledge (e.g. the ability to manipulate numbers). Following this observation, I speculate that linguistic knowledge play the primary role in enabling a small child to understand the relation between the propositional content of the sentence and its function in the real world of discourse.

With this linguistic knowledge, children are able to automatically encode and decode the relevance of the sentence in the real world.

On the other hand, in second language acquisition, the learners are mature enough to figure out the relation between the propositional content and the world of discourse. Hence, the functional category does not have to serve its role as the anchor of the proposition of the sentence. second language learners need functional categories mainly because they are needed for the PF representation. Without the requirement of LF checking, the feature checking becomes difficult for second language learners and hence, bound morphemes are acquired late even though this feature checking is more economical.

In this way, thanks to the development of the linguistic theory, now a plausible explanation is given to the old finding in the so-called morpheme studies. In this section, I offered a model of second language acquisition as well as first language acquisition. The similarities and differences are summarised as follows:

1. The similarity lies in that both are carried out by the expansion of numeration, which results in the expansion of syntactic objects derived in syntax.
2. In other words, both are carried out by lexical learning.
3. The difference lies in that first language acquisition is LF oriented and under the sanction of the Principle of Procrastinate, whereas second language acquisition is PF oriented and the economy principle is unlikely to influence the course of development.
4. This difference is due to the availability of cognitive device: In first language acquisition, linguistic knowledge is more advanced than others; in second language acquisition, mature cognitive knowledge is easy to access, which prevent the development of interlanguage grammar

If the last observation is correct, the availability of general pragmatic knowledge results in the difference of the acquisition order. If this is true, the age effect in second language acquisition (e.g. Johnson and Newport, 1989) may be explained in the same way. Although this seems intuitively correct, I leave this to further research.

At the same time, (IV) above may be totally wrong, if no causal relation exists between the loss of the ability to construct a system for feature checking and the availability of mature pragmatic knowledge. I also have to leave this possibility to be examined in further research.

There are some aspects I have not discussed in this article. For example, I did not discuss L1 influence at all. This is because the data I discussed here exhibit little L1

influence. Where and how L1 influence rises is another interesting topic, which I discuss in other papers (cf. e.g. Wakabayashi, 1997, to appear), but I do not here, because to discuss it requires another set of evidence, and it is far beyond the focus of this study.

Lastly, I should say that this paper was quite technical and rather boring for those who are not familiar with the theoretical background (or probably, for even those who are familiar with them). However, I hope it has become clear that we need a number of technical arguments to 'explain' a simple phenomenon observed in second language acquisition research.

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References

Bailey, N., Madden, C. and Krashen, S. (1974). Is there a "natural sequence" in adult second language learning? *Language Learning*, Vol. 24, 235-243.

Chomsky, N. (1995). *The Minimalist Program*. MIT press.

Clahsen, H., Eisenbeiss. S. and Vainikka, A. (1994). The seeds of structure. A syntactic analysis of the acquisition of case marking. In Hoekstra, T. and Schwartz, B. D. (Eds.), *Language Acquisition Studies in Generative Grammar* (pp. 85-118). Amsterdam: John Benjamins.

Finer, D. and Broselow, E. (1986). Second language acquisition of reflexive binding. *Proceedings of NELS 16*, 154-68.

Goldschneider, J. M. and DeKeyser, R. M. (2001). Explaining the "natural order of L2 morpheme acquisition" in English: a meta-analysis of multiple determinants. *Language Learning, Vol. 51,* 1-50.

Hyams, N. (1994). V2, Null Arguments and COMP Projections. In Hoekstra, T. and Schwartz, B. D. (Eds.), *Language Acquisition Studies in Generative Grammar* (pp. 22-55). Amsterdam: John Benjamins.

Newport, E. (1990). Maturational constraints on language learning. *Cognitive Science* Vol. 14, 11-28.

Sano, T. and N. Hyams (1994) "Agreement, Finiteness and the Development of Null Arguments," *Proceedings of NELS* 24, 543-558.

Thomas, M. (1991). Do second language learners have "rogue" grammars of anaphora? In L. Eubank (Ed.), *Point Counterpoint: Universal Grammar in the Second Language* (pp. 375-88). Amsterdam: John Benjamins.

Vainikka, A. and Young-Scholten, M. (1995). Tree growth and morphosyntactic triggers in adult SLA. Paper presented at GASLA, New York.

Wakabayashi, S. (1997). *The Acquisition of Functional Categories by Learners of English*. Ph.D. Dissertation, University of Cambridge.

Wakabayashi, S. (to appear in 2002). The acquisition of non-null subjects in English: a Minimalist account. *Second Language Research*, *Vol.18, No.1.*

Wei, L. (2000). Unequal election of morphemes in adult second language acquisition. *Applied Linguistics, Vol. 21. No. 1., 106-41.*

White, L. (1989b). *Universal Grammar and Second Language Acquisition*. Amsterdam: John Benjamins.

Zobl, H. and Liceras, J. (1994). Review Article: Functional Categories and Acquisition Orders. *Language Learning*, *44*, 159-180.