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Håkansson, Gisela

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LUND UNIVERSITY

PO Box 117  
221 00 Lund  
+46 46-222 00 00



## Tense morphology and verb-second in Swedish L1 children, L2 children and children with SLI\*

GISELA HÅKANSSON  
Lund University

*This paper compares the development of tense morphology and verb-second in different learner populations. Three groups of Swedish pre-school children are investigated longitudinally; ten L1 children, ten L2 children and ten children diagnosed with Specific Language Impairment (SLI). Data was collected twice, with an interval of six months. The results at Time 1 reveal a significant difference between normally developing L1 children on the one hand and L2 children and children with SLI on the other. The L1 children use verb-second correctly in topicalized declaratives, whereas both L2 children and children with SLI use structures with the verb in third position (XSV structures) as an intermediate step towards verb-second. There is a clear development between the two data collection sessions for the L2 children and the children with SLI, diminishing the difference between them and the unimpaired L1 children. The similarity that is found between L2 children and children with SLI in this study bears important implications for the discussion of the role of transfer in L2 research and for the question of a defective linguistic representation in SLI research.*

The acquisition of verb-second in L1 and L2 acquisition has been a matter of debate in the literature on language acquisition for some time. Especially within the UG framework this has been a hot topic, as is witnessed by the large number of journal articles and book volumes that have been devoted to this subject. It has been suggested, and is generally assumed, that this is a case where syntax and morphology interlock, i.e. only finite verbs raise to the verb-second position. Interestingly enough, there seems to be a difference between L1 learners and L2 learners in this respect. For example, the acquisition of subject–verb agreement has been found to coincide with the acquisition of verb-second in L1 children but not in L2 acquisition (e.g. Clahsen and Muysken, 1989). Most research has dealt with German (Clahsen and Muysken, 1986, 1989; Eubank, 1992; Meisel and Müller, 1992; Meisel, 1994) but there are also studies on Swedish (Platzack, 1992, 1996). Since Swedish is a verb-second language without subject–verb agreement, the discussion has been about finiteness and verb-second in the Swedish studies.

The verb-second phenomenon has attracted con-

siderable interest not only in language acquisition research, but also only in research on language disorders. Although the vast majority of studies on children with Specific Language Impairment (children with SLI) report morphological deficits, e.g. tense markings (Rice and Wexler, 1996), there are also indications that, in verb-second languages, word order constitutes a specific problem for these children. Studies of German children with SLI (Grimm and Weinert, 1990; Clahsen, 1991; Clahsen, Bartke, and Göllner, 1997) show that these German children do not have problems with tense, but with verb agreement morphology. Some of these children also exhibited problems with verb-second. For Swedish children with SLI, who do not have to worry about the agreement issue since Swedish does not have subject–verb agreement, verb-second problems are reported to be the most typical characteristic of SLI grammar (Håkansson and Nettelblatt, 1993, 1996; Hansson and Nettelblatt, 1995).

Surprisingly, although there is considerable evidence that phenomena associated with finiteness, such as word order and verb morphology, constitute fruitful areas for research in unimpaired and impaired first language acquisition, as well as in second language acquisition, there are only a handful of studies where comparisons between these three different groups of children are actually made (e.g. Håkansson and Nettelblatt, 1993, 1996; Paradis,

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1999; Penner, in press; Paradis and Crago, 2000). On the contrary, L1, L2 and SLI children are traditionally studied within quite different frameworks, with different research questions in mind. For example, the study of L2 acquisition often entails the issue of transfer; and target structures are chosen with the purpose of comparison between the L1 and the L2. The study of children with SLI, on the other hand, typically deals with the question of whether the children have representational deficits or processing problems, and the most striking errors in production and comprehension are analysed.

Another important difference between L1 and L2 research on the one hand and SLI research on the other hand is that the perspective is developmental in L1 and L2 research and the learners are followed over time in longitudinal studies. This is rare in studies on children with SLI, where data is usually only collected on a single occasion. There are, however, some exceptions to this tendency. Håkansson, Nettelbladt and Hansson (1991) conducted a longitudinal study comparing the grammatical structures in spontaneous speech in Swedish L1 children, L2 children and children with SLI (see also Håkansson and Nettelbladt, 1993, 1996). The results from this study showed interesting similarities between L2 children and children with SLI in the acquisition of verb-second.

The present study takes these results on word order as a point of departure and expands the analysis to include tense marking on verbs. More precisely, the focus of the investigation concerns the relation between verb-second and tense marking in three groups of Swedish pre-school children recorded on two different occasions. The paper is organised in the following way. First, a short overview of the theoretical predictions and some relevant aspects of Swedish grammar will be given. Then the empirical data on the acquisition of tense marking and verb-second in Swedish by L1 children, L2 children and SLI children will be described. The results are given as group means from the two different recording occasions. Finally, the theoretical impact of comparing various sorts of language development within the same framework is discussed.

### Processability Theory

As the theoretical framework for the study, a theory of L2 development called Processability Theory (Pienemann, 1998a, b) is used. The choice of a psycholinguistic theory of second language development in order to analyse L1 children, L2 children and children with SLI is not an uncontroversial one. It implies that the children with SLI will be treated as

Table 1. *Hierarchy of processing procedures* (Pienemann and Håkansson, 1999)

| Processing procedures           | Structural outcome                 |
|---------------------------------|------------------------------------|
| 5. Subordinate-clause procedure | Main and sub clause                |
| 4. S-procedure                  | Inter-phrasal information exchange |
| 3. Phrasal procedure            | Phrasal information exchange       |
| 2. Category procedure           | Lexical morphemes                  |
| 1. Word or lemma access         | Words                              |

having developing grammars, just like the other children. This perspective stands in sharp contrast with the more traditional treatment of language disorders as cases of deficits, in particular representational deficits (e.g. Clahsen, 1991; Rice and Wexler, 1996).

Processability Theory (henceforth PT) assumes that there is a predictable sequence of acquisition for the procedural skills that are needed for language processing. Each level in the developmental sequence serves as a prerequisite for the next, higher level. The theory relates to Levelt's (1989) model of language production, particularly the part of the model that deals with the grammatical encoding of a message. One very critical feature in the learner's development of the grammar is the concept of "unification of grammatical features" from Lexical Functional Grammar (Bresnan, 1982). According to PT, language development is seen as a gradual construction of the mental grammar. Each stage in the development is built upon the automatization of the preceding stages. The learner's task is to build up his or her own grammar by testing hypotheses about the target language. The precise procedures needed for the processing of each stage in the development are described in Table 1.

As a first step in this developmental route the learner identifies and acquires the *words* of the target language (level 1). The next step is to categorise the lexicon and list the diacritic features of the lexemes in the lexicon. This is the level of *lexical morphology* (level 2). Lexical morphology is a necessary prerequisite for *phrasal morphology* (level 3) to be processable. The processing of phrasal morphology allows the learner to unify the features of head and modifier in a phrase. When phrasal morphology is automated, *inter-phrasal morphology* is processable (level 4). This step implies that the grammatical functions of the words in a clause will be accessible and feature unification between phrases will be possible. At this

Table 2. *Processing hierarchy of Swedish structures (after Pienemann and Håkansson, 1999)*

| Processing prerequisites | Exchange of information   | Outcome Swedish grammar              |
|--------------------------|---------------------------|--------------------------------------|
| 5. clause boundary       | main and sub. clause      | subordinate clause word order        |
| 4. S-procedure           | inter-phrasal information | <b>verb-second</b>                   |
| 3. phrasal procedure     | phrasal information       | NP, VP agreement                     |
| 2. category procedure    | lexical morphology        | <b>tense markings; past, present</b> |
| 1. word/ lemma           | words                     |                                      |

level the rule that regulates subject–verb inversion is processable. Finally, when main clause word order rules are automated, the hierarchical relation between main and subordinate clauses is processable and the learner can apply different grammatical rules in *main and subordinate clauses*.

### Grammatical structures in Swedish

The sequences in which the target language develops are described in a non-language-specific manner in the section above. In Pienemann and Håkansson (1999) Swedish grammar was translated through Lexical Functional Grammar into a hierarchy of processing complexity. In this section I will give a short description of the Swedish structures that have been selected for this study.

The following two Swedish structures will be analysed:

- Tense marking: verbal suffixes expressing present and past tense
- Verb-second: subject-verb inversion in topicalized declaratives

Table 2 summarises Swedish morphology and syntax and illustrates how tense marking and verb-second fit into the larger picture of the processability hierarchy. The structures selected for this study are printed in boldface.

#### *Tense marking*

As mentioned above, Swedish differs from e.g. German and Dutch in not having subject–verb agreement on the verb. The verbs are only marked for tense. In traditional terms, however, inflected verbs are usually labelled finite verbs, also in Swedish. This implies that the relation between verb morphology, finiteness and verb-second is not as straightforward as in languages where the verbal morpheme fulfils a subject–verb agreement function. In other words, it is possible to distinguish finiteness from tense marking,

since finiteness is expressed by verb-second (cf. Meisel, 1994; Platzack, 1996), but tense by a verbal suffix. Thus, the tense marker can be assumed to be a diacritic feature which is a part of the verb. This separation of tense from finiteness carries important implications for the PT predictions. If the tense suffix is to be regarded as a lexical suffix, it can be expected to appear *before* the processing of finiteness is possible, since the tense marking in itself does not involve any exchange of grammatical information between constituents, but it is only a diacritic feature in the lexicon. In this paper, I will follow the suggestion that it is possible to distinguish finiteness from tense and I will use the term *tensed verbs* for verbs which exhibit morphological endings.

Tense marking is quite consistent and salient in Swedish. There are three different weak conjugations, one class of strong verbs and one class of irregular verbs. The suffixes in the different conjugations have slightly different, phonologically determined forms for present (stem + *-r* or stem + *-er*) and past tense (stem + *-de*, or stem + *-te*). Strong verbs typically exhibit vowel shift (*umlaut*) and irregular verbs have idiosyncratic forms.

#### *Verb-second*

At the PT level of S-structure, the different grammatical functions of the constituents in the clause are identified and finiteness is used. Here, we commonly find subject–verb agreement, i.e. exchange of information between NP and VP. However, since Swedish lacks overt subject–verb agreement, the processing of this level is realised as subject–verb inversion. This is obligatory in yes/no questions, wh-questions where the subject is not questioned and in topicalised declaratives.

The Swedish word order rules are illustrated in example (1) a declarative clause, (2) a topicalised declarative clause with the adverb in first position, and (3) a topicalised clause with the object in first position.

- (1) NP<sub>subj</sub>-V<sub>tense</sub>-NP<sub>obj</sub>-ADV  
*Han köpte en bok igår*  
 he bought a book yesterday  
 “He bought a book yesterday”
- (2) ADV -V<sub>tense</sub>-NP<sub>subj</sub>-NP<sub>obj</sub>  
*Igår köpte han en bok*  
 yesterday bought he a book  
 “Yesterday he bought a book”
- (3) NP<sub>obj</sub>-V<sub>tense</sub>-NP<sub>subj</sub>-ADV  
*En bok köpte han igår*  
 a book bought he yesterday  
 “Yesterday he bought a book”

### The acquisition of Swedish grammar

We will now proceed to the research on the acquisition of Swedish grammar. The different research areas, L1 research, L2 research and SLI research, are presented in separate sections.

#### L1 acquisition

There is surprisingly little research on L1 acquisition of Swedish verb-second. In the early accounts of children acquiring Swedish as a first language, there is no mention at all of verb-second (e.g. Lange and Larsson, 1977; Plunkett and Strömquist, 1992). These studies focussed on the relative order of appearance of different sentence elements, e.g. whether subjects and verbs came earlier than adverbials, not on the specific ordering of elements within a sentence. In more recent studies, however, verb-second has been explored in a systematic way (e.g. Håkansson, 1989, 1992, 1997a, b; Santelmann, 1995; Platzack, 1996; Josefsson, 1999). These studies unanimously show that L1 children use inversion in topicalised clauses from the age of around two years, i.e. from the earliest multiword utterances (Santelmann, 1995, 182).

Tense suffixes on verbs emerge around the same time, e.g. at the age of two years. There is, however, an interesting difference between morphology and verb-second in the patterns of acquisition. Verb-second is used correctly as soon as topicalised clauses occur, and very few errors are found in the children's speech. The verbal morphology seems to be used in a more optional way and there is a gradual development from little use to full proficiency (Santelmann, 1995; Platzack, 1996).

#### L2 acquisition

In contrast to research in L1 acquisition, verb-second has been the main issue in research on Swedish as a second language, involving a large number of em-

pirical studies (see Pienemann and Håkansson, 1999 for an overview of studies). The acquisition of verb-second in Swedish was first discussed in terms of a problem area in Hyltenstam's study of adult L2 learners (Hyltenstam, 1977). Hyltenstam elicited sentences with a preposed adverb using a written test given to 160 informants with 35 different first languages. The informants participated in Swedish language courses in the southern part of Sweden. Tests were administered on two occasions, with an interval of five weeks. On the first occasion, 143 learners produced non-target sentences, and on the second occasion 84 learners still used the non-target XSV structures instead of XVS (V2) structures. Subsequent studies of spontaneous speech production have confirmed the findings that subject-verb inversion is highly problematic in adult L2 learners (e.g. Hammarberg and Viberg, 1977; Bolander, 1988) as well as in child L2 learners (Håkansson, 1992; Håkansson and Nettelbladt, 1993, 1996).

Similarly, in a study of the acquisition of Swedish as a foreign language in Switzerland, Naumann (1997) reported that the most common error made by the students was the non-inversion after a preposed adverb. This finding is particularly interesting, since the learners have the same inversion rule in their first language, Swiss German. Naumann concludes that L1 transfer seems to play only a minor role in the acquisition of verb-second.

Let me add a note on the L1-L2 distinction. This distinction is not an unproblematic one. It has been suggested that L1 acquisition takes place before the age of three years (McLaughlin, 1987), whereas the L2 learner acquires the target language after the age of three years. (This is the definition that will be used for the selection of informants in the present study.) However, children who are exposed to the language before the age of three also sometimes behave like L2-learners. Thus, in studies of simultaneous bilingualism, some children have been found to acquire one of their languages as a weaker language and the other as a stronger language. In Schlyter and Håkansson (1994) bilingual children with Swedish as one of their two languages were compared to monolingual L1 children and to L2 children acquiring Swedish after the age of three years (i.e. successive bilinguals). Three of the simultaneous bilinguals had been defined as having Swedish as their weaker language in an earlier study (Schlyter, 1993). The children with Swedish as the weaker language showed the same problems as did the successive bilinguals and used non-inverted clauses (XSV) to the same degree. Interestingly, XSV structures were also reported in a study on internationally adopted children. If the children were adopted after the age of

four years they had problems with V2, but not if they were adopted earlier (de Geer, 1992).

### *Children with SLI*

Children with SLI constitute a special group among young monolingual children. Otherwise no different from unimpaired children, they have problems acquiring their first language. It is often claimed that these children have general problems with grammatical morphology (e.g. Clahsen, 1991; Gopnik, 1994; Rice and Wexler, 1996, 1997; Clahsen et al., 1997; Leonard, 1998). English children with SLI seem to have most difficulties with tense markings (e.g. Rice and Wexler, 1996, 1997), and German children with SLI are reported to have problems with both subject-verb agreement and word order (e.g. Clahsen, 1991; Clahsen et al., 1997). Unlike German unimpaired children, some of the impaired children placed finite verbs in final position, a position which is usually reserved for infinitives. However, the problems are different in Swedish children with SLI. In their case, it is the problems with word order that are found to be the most common feature (Nettelbladt, Sahlén, Ors and Johannesson, 1989; Håkansson and Nettelbladt, 1993, 1996; Hansson and Nettelbladt, 1995).

Importantly, tense marking in verbs, which is a frequently reported problem area in English-speaking children with SLI, and which has even been suggested to be the clinical marker of SLI (Rice and Wexler, 1996), is not a particular problem area to Swedish children (cf. Hansson, 1997) nor to Norwegian children with SLI (Simonsen and Bjerkan, 1998). There are, however, large typological differences in how tense markings are used in different languages, and cross-linguistic comparisons between children with SLI should therefore be interpreted with caution. For example, Paradis and Crago (2000) have shown that both French L2 children and children with SLI have problems with tense markings. Their error patterns differed however: the SLI children preferred infinitives, whereas the L2 children preferred the present tense as a substitute for past tense.

Furthermore, simple and complex tenses may be acquired differently. Some Swedish children with SLI who use simple tense without problems have great problems when it comes to complex tenses (Håkansson, 1998). Finally, studies of German children (Penner and Hamann, 1998) have shown that children may also acquire different types of tenses differently. They found an asymmetry in the tense markings of German language impaired children. These children marked internal tense when there was a salient anchoring in time, but they failed to mark tense when there was no overt time referent, or when

there was a relationship between two events. Examples such as these call for deeper and more sophisticated cross-linguistic investigations into which different types of tense markings are problematic to impaired children. They also question the idea of having tense as a general clinical marker for impaired children.

### *Earlier comparisons among verb-second in L1, L2 and SLI*

In a predecessor to this study (reported on in Håkansson and Nettelbladt, 1993, 1996), data were collected from six L1 children, six L2 children and six SLI children in spontaneous speech situations. Each child was recorded several times, with longer intervals for SLI children and shorter intervals for L1 and L2 children. Interestingly, the results showed that the L1 children followed a developmental path that was different from the other children's. The L2 and SLI children used uninverted clauses after preposed elements, i.e. XSV clauses, before they were able to use inversion. The L1 children, on the other hand, used inversion as soon as they started using preposed adverbs. In other words, there was no evidence of a stage with XSV structures in their production, whereas there were plenty of examples of this structure in the L2 and SLI children.

The interpretation was that the L1 children were helped by their shorter utterances when adverbs emerged. The MLU of the L1 children at the onset of adverb preposing was much shorter than the MLU of the L2 children. We have no information of early adverb preposing by SLI children, but we know that SLI children still use XSV structures with quite long utterances. The task may be regarded as more complex when the utterances contain more words. A reasonable hypothesis is that the grammar is easier to deal with when lexical development goes hand in hand with grammatical development. In other words, the language development in L2 and SLI children can be characterised as being out of synchrony, since they use long but linear utterances (cf. Menyuk and Looney, 1976).

### *Summary of earlier research on Swedish verb-second*

Summarizing, there is a large body of studies on verb-second in Swedish. Most studies have investigated verb-second in L2 learners, bilingual children and children with language impairment. These groups seem to have particular problems in acquiring verb-second. It is striking that violations of verb-second in topicalized declaratives, i.e. in the form of XSV structures, have only been reported in studies

Table 3. *Studies on the acquisition of Swedish verb-second*

| Population                         | XSV-<br>structures | Study   |
|------------------------------------|--------------------|---|
| Monolingual<br>unimpaired children | no                 | Lange and Larsson, 1977;<br>Plunkett and Strömquist,<br>1992; Håkansson, 1992,<br>1997a, Santelmann, 1995 |
| Monolingual children<br>with SLI   | yes                | Håkansson, Nettelblatt and<br>Hansson, 1991; Håkansson<br>and Nettelblatt, 1993, 1996                     |
| Simultaneous bilinguals            |                    | Schlyter, 1993; Schlyter<br>and Håkansson, 1994   |
| Swedish stronger                   | no                 |   |
| Swedish weaker                     | yes                |   |
| Internationally adopted            |                    | de Geer, 1992   |
| < 4yrs                             | no                 |   |
| > 4 yrs                            | yes                |   |
| Successive bilinguals              | yes                | Håkansson, 1992;<br>Håkansson and Nettelblatt,<br>1993, 1996  |
| Adult L2 learners                  | yes                | Hyltenstam, 1977;<br>Bolander, 1988;<br>Naumann, 1997   |

on these learners, never in unimpaired monolingual L1 acquisition. Table 3 gives an overview of studies of the acquisition of Swedish word order.

### A longitudinal study of L1, L2 and SLI

I will now proceed to describe the empirical study of grammatical development in Swedish pre-school children. This study forms part of a larger investigation on production and comprehension of Swedish grammatical structures (cf. Håkansson, 1997a, b, 1998; Håkansson and Hansson, 2000). The part of the study that will be dealt with here focuses on the occurrence of verb-second and tense morphology in the children's production on two different occasions, with an interval of six months.

### Hypotheses

The following hypotheses will be tested:

- (i) The Swedish grammar will develop according to the predictions from PT: tense before verb-second.
- (ii) All children will follow the same route.

### Data

Ten unimpaired L1 children, ten L2 children and ten children with SLI were chosen as subjects. The impaired children had been independently diagnosed as SLI by speech therapists well before the experiment, and their general language performance was well below age expectations.

A group of younger unimpaired L1 children was chosen as control to the impaired children. Since the aim is to find early developmental stages, and not to define SLI, we chose not to use unimpaired age-mates as control. Instead, we aimed at finding unimpaired children as young as possible to match the grammatical levels of the children with SLI. The results from a pilot study showed that if the same elicitation material was to be used, the children in the control group should not be younger than three years of age at the beginning of the study.

The L2 children were mainly refugee children arriving in Sweden from the war in former Yugoslavia. Children over the age of three years at the arrival were chosen as informants (cf. discussion above). When the data collection started they had spent approximately four months in Sweden.

The ages of the children at Time I varied between three years and one month (3;1) to six years and three months (6;3). The age of the L1 children was between 3;1 and 3;7 years, the age of the children with SLI was between 4;0 and 6;3 years, and the age of the L2 children was between 3;6 and 6;0 years. Table 3 gives names, ages at Time I and first languages of the children involved. At Time II all children were approximately six months older.

### Matching

In comparisons between unimpaired and impaired children, different matching techniques are discussed in the literature, with age match or language match being the most common ones. In this study, we used language match. This means that the children's language is matched according to the results from comprehension and production tests. The tests turned out not to be very suitable for the L2 children, possibly because of the culture-specific vocabulary, and we can see that these children score much lower than the others, especially in the production test. Table 4 gives the test results from the three groups before the data collection started.

The production test, The Lund Test of Phonology and Grammar (Holmberg and Stenkvist, 1983) includes plural forms and genitive markings of nouns, comparison markers on adjectives, tense markers on verbs, pronouns, prepositions and placement of nega-



Table 4. *Names, ages and L1s of the informants at Time I*

| L1 children |     | SLI children |      | L2 children |      |                  |
|-------------|-----|--------------|------|-------------|------|------------------|
| name        | age | name         | age  | name        | age  | L1               |
| 9           | 3;1 | Filip        | 4;0  | Agnes       | 3;6  | Albanian/Bosnian |
| 15          | 3;1 | Josef        | 4;3  | Rosita      | 3;7  | Albanian         |
| 5           | 3;2 | Greg         | 4;6  | Leila       | 3;11 | Arabic           |
| 13          | 3;3 | Hans         | 4;7  | Ursa        | 3;11 | Arabic           |
| 12          | 3;5 | Hillevi      | 4;8  | Kenan       | 4;6  | Bosnian          |
| 10          | 3;5 | Kris         | 5;4  | Eddie       | 4;10 | Albanian         |
| 6           | 3;5 | Fabian       | 5;10 | Bekim       | 5;11 | Albanian/Bosnian |
| 7           | 3;5 | Robert       | 5;11 | Rizzi       | 5;11 | Albanian/Bosnian |
| 8           | 3;6 | Tony         | 6;0  | Benita      | 6;0  | Albanian         |
| 2           | 3;7 | Henrik       | 6;3  | Bushra      | 6;0  | Arabic           |

Table 5. *Results from the production and comprehension tests*

| Test                     | Maxi-<br>mum | L1   |     | SLI  |     | L2   |     |
|--------------------------|--------------|------|-----|------|-----|------|-----|
|                          |              | mean | SD  | mean | SD  | mean | SD  |
| Lund Grammar Test        | 46           | 31.5 | 5.7 | 29.5 | 6.6 | 14.7 | 4.5 |
| Swedish<br>Comprehension | 46           | 32.3 | 5.3 | 35.5 | 6.9 | 25.3 | 5.0 |

tion. In other words, there is a heavy bias towards morphology, and only one structure related to verb-second is used, namely placement of negation.

The results for production show that the L1 children are within normal age expectations. The results for the children with SLI place them in the same group (3;0–3;6 years) i.e. they perform like children one to two years younger. The L2 children have a mean score of 14.7, which is below the norm for 2;6–3;0 years (their mean is 20.3). Their greatest problems lie in adjectival comparatives, placement of negation, and especially in prepositions, where practically all of the L2 children fail.

For comprehension, the Swedish Test of Language Comprehension, SIT (Hellquist, 1989), was used. This test includes different tense forms of verbs, pronouns, prepositions, conjunctions and placement of negation. The results for comprehension show that the children with SLI perform slightly better than the L1 children, but there is no significant difference between them. The L2 children have more problems. Summarising, the L1 children and the children with SLI were quite equal in proficiency, measured by these tests, with the L2 children lagging behind. (In

this context, it is important to keep in mind that the children with SLI are two years older than the L1 children.) This is the starting point for the present study.

### *Elicitation and analysis*

Each child participated in test sessions with an adult. Structures that were regarded as relevant for the different levels of processability were chosen, and tests were designed to create obligatory contexts for these structures.

In order to obtain data on tense marking, the child was asked to comment on pictures or activities. From pictures, the investigator triggered past tense by asking for example: “What did these children do yesterday?”<sup>1</sup> In the action test, the investigator put objects in different places and asked “What did I do?” Instead of looking for deviations from the norm, a distributional analysis was undertaken. This means that *all* instances of tense suffixes on the verbs in the test material were scored as tense markings, irrespective of whether they were target-like or not. In other words, occurrences of overgeneralizations on irregular verbs were counted as active morphology (e.g. *skriwa-de* instead of *skrev* “wrote”). Most children used past tense suffixes. However, there were also examples of past participles being used in place of past tense. These suffixes were counted as efforts to produce past morphology (e.g. *skriv-it* “written” instead of *skrev* “wrote”), although past participles have to be accompanied by an auxiliary (*har skrivit* “has written”) in order to be a grammatical structure in the target language. To summarise, all verbs that had a suffix indicating past tense forms were counted in relation to obligatory contexts.

To investigate occurrence of verb-second, subject-verb inversion after a topicalised adverb was chosen as the target structure. The results from earlier studies showed that the earliest contexts for subject-verb inversion were clauses with topicalised time adverbials. Therefore, this type of structure was elicited. Short narratives were used as elicitation material. The investigator read three short stories together with the child, and then the child was encouraged to retell the stories. If needed, the investigator prompted topicalisation by saying, “What happened then?” or “And . . . ?” The total sum of given contexts for topicalisation was 28 instances.

<sup>1</sup> It has been pointed out to me by a referee that it may be problematic to use wh-questions in the elicitation, since children with SLI often have problems with this type of question. Since the children in this study give appropriate answers to the wh-questions I assume that they have interpreted the questions correctly.

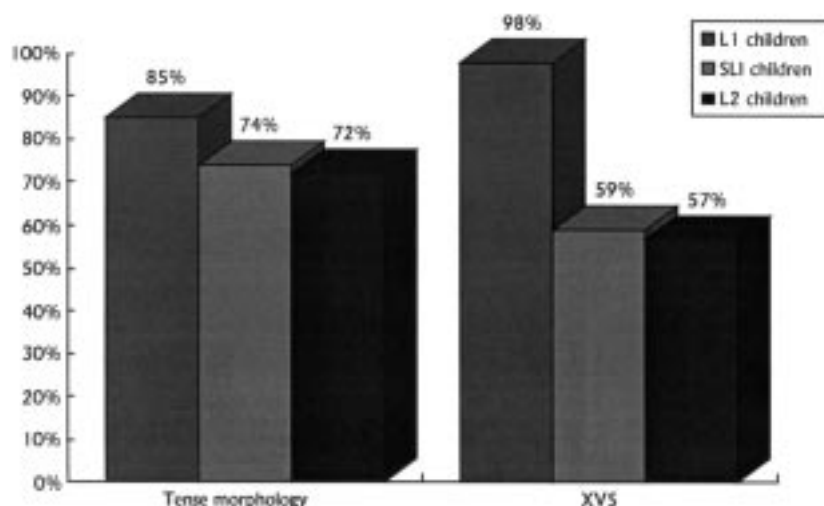


Figure 1. Verb-second (XVS structures) and tense marking at Time I in L1 children, children with SLI and L2 children (the results are measured in percentage of occurrences out of obligatory contexts)

Only one of the children (number 12, an L1 child) hit this target, and for the other children the number of contexts varied. The L2 children, in particular did not use much topicalisation. Avoidance of topicalisation (e.g. saying “They fell then” instead of “Then they fell”) may be a sign of the child’s not being able to produce subject–verb inversion. It is, however, very difficult to create contexts where not using topicalisation can be regarded as ungrammatical. Therefore, only the number of topicalised sentences were counted as obligatory contexts in the scoring. All occurrences of inverted structures were compiled as percentages out of obligatory contexts.

#### ***Results from the comparison of verb morphology and verb-second***

Figure 1 shows the results from the comparison of verb morphology and verb-second (XVS) at Time I in L1, L2 and SLI children. As is shown in the figure, no obvious relation between use of tense marking and verb-second can be seen. Such a connection, which has been found in some previous studies of German and Swedish (e.g. Clahsen and Muysken, 1989; Platzack, 1992, 1996) cannot be found in this Swedish data, not in the L1, L2 or the SLI group. Instead, the results show significant differences between tense marking and verb-second in all groups. Interestingly, we find opposite tendencies in the L1 group when compared to the L2 and the SLI groups. While the L1 children seem to find it easier to use verb-second than to mark tense ( $p < 0.03$ ), the L2 children and the children with SLI use tense marking

to a higher degree than verb-second (to a non-significant degree).

The results for the L1 children confirm earlier results by Santelmann (1995), who found that the verb was placed correctly in second position immediately after the children’s first use of multiword utterances, whereas tense markings on verbs were more gradual in nature. However, this contradicts what was predicted by PT. According to PT, tense marking is a prerequisite for verb-second, and it is therefore expected to be automatised to a higher degree than verb-second. This is precisely what is shown in the results from the L2 children and the children with SLI. Since PT mainly deals with L2 acquisition it is not surprising that the Swedish L2 children behave according to the predictions, but the data from the children with SLI is novel and interesting. A similarity between L2 children and children with SLI has been found in earlier studies on the acquisition of Swedish word order (Håkansson and Nettelbladt, 1993, 1996), but this is the first time development of morphology and word order have been compared.

Thus, the PT predictions fit with the outcome from two of the groups, SLI and L2, but not with the L1 group. We have here a case where it is the “normal” L1 acquisition that needs further explanation and not the “non-normal” SLI and L2.

#### ***Comparison of L1, L2 and SLI at Time I***

As is shown in Figure 1, the largest difference between the L1 group and the two others, L2 and SLI, is the application of subject–verb inversion in

Table 6. Results from the elicitation on verb-second and tense marking at Time I

| Subject-verb inversion |               | Tense marking |               |
|------------------------|---------------|---------------|---------------|
| L1 > L2                | p < 0.0005*** | L1-L2         | ns (p < 0.09) |
| L1 > SLI               | p < 0.001**   | L1-SLI        | ns (p < 0.12) |
| L2-SLI                 | ns (p < 0.9)  | L2-SLI        | ns (p < 0.9)  |

topicalised declaratives at Time I. The L1 children very rarely violate the rule that places the verb in second position in clauses with topicalised adverbs. The L2 children and the children with SLI, however, produce a lot of examples with the verb in third position, i.e. XSV-structures. It is worth noting that they also produce examples of the correct inverted structure. In other words, while the L1 children have obligatory verb-second in topicalised declaratives, the L2 children and the children with SLI use verb-second only optionally.<sup>2</sup>

The difference in use of subject-verb inversion between the L1 and L2 children is statistically significant. Also, the difference between the L1 and SLI children is highly significant. However, there is no significant difference between SLI and L2 children, which may come as a surprise, considering that L2 children are bilinguals acquiring a second language, and SLI children are monolingual L1 learners as the L1 children. For tense, there is only a non-significant difference between the three groups of children. The levels of statistical significance, based on an unpaired t-test, are shown in Table 6. Before we go into discussing the interpretations, I will give some examples from the typical language production in each of the three groups.

Three examples of clauses with preposed adverbs from the different groups may illustrate the difference in the children's performance. In example (4), the L1 child uses inverted word order after the preposed adverbs, and the verbs are used correctly, in present or past form.

(4) L1 number 2, boy, age: 3;1

Adult: *Och sen?*  
and then?  
“And then?”

<sup>2</sup> Since finiteness is expressed by verb-second in Swedish one might claim that this is a case of optional infinitives (cf. Rice and Wexler, 1997).

Child: *Och sen är han törstig*  
and then be-PRES *he thirsty*  
“and then he is thirsty”

Adult: *Och sen är han törstig, ja*  
and then be-PRES *he thirsty, yes*  
“and then he is thirsty, yes”

*Och sen?*  
and then?  
“And then?”

Child: *Och sen spillde han*  
and then spill-PAST *he*  
“and then he spilt”

The next example, example (5), is produced by one of the L2 children, Eddie. He gives three examples of non-inversion after preposed adverbs, i.e. XSV structures. Observe that all his verbs are marked for past tense, with overgeneralisations of the regular suffix to the irregular verbs.

(5) L2 child: Eddie, boy, age 4;10, L1 Albanian

Adult: *Och vad gjorde barnen?*  
and what did the children  
“And what did the children do?”

Child: *Nu dom badade*  
now they swim-PAST  
“Now they went swimming”

*Nu han togde det*  
Now he take-PAST it (“tog-de” instead of the irregular “tog”, *took*)  
“Now he took it”

*Och nu dom sede* (“se-de” instead of the target “sydde” *sewed*)  
and now they sew-PAST  
“And now they sewed”

The last example, example (6), is taken from the data from one of the SLI children, Robert. Also in this excerpt, there are XSV structures, i.e. clauses with non-inversion after preposed adverbs. As for the use of verb suffixes, one of the verbs (*trilla* “fall”) belongs to a verb conjugation in which the verbs keep the same form in infinitive, present and past tense in casual speech. This means that we cannot determine whether this verb is tense marked or not. In the two other clauses, however, the verb has the correct present tense form (the modal *vill* “want”, and the copula *är* “is”).

(6) SLI child Robert, boy, age 5,11

Adult: *Och då*  
and then  
“And then”

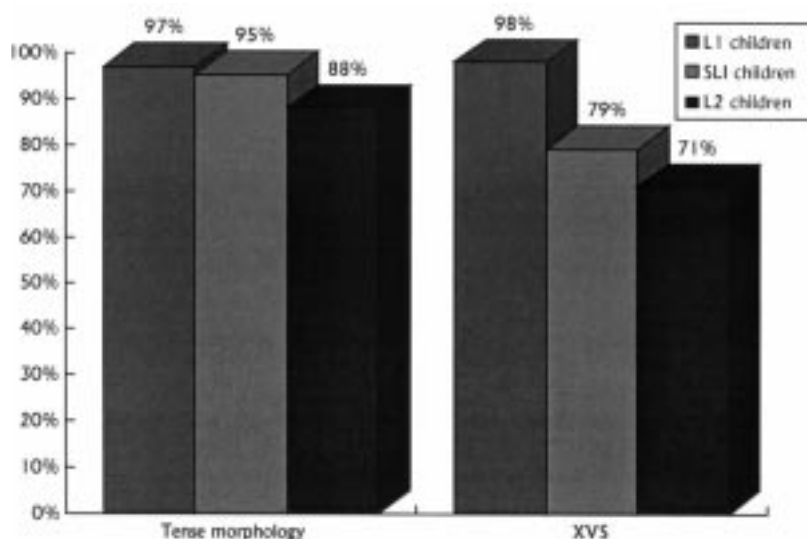


Figure 2. Verb-second (XVS structures) and tense marking at Time II in L1 children, children with SLI and L2 children (the results are measured in percentage of occurrences out of obligatory contexts)

Child: *Sen han trilla här*  
then he fall here  
“Then he fell here”

*Och sen han vill inte vara i den pottan*  
and then he will not be in that pot  
“And then he does not want to be in that pot”

*Och sen han är i där*  
and then he be-PRES in there  
“And then he is in there”

### *A developmental perspective: from Time I to Time II*

At the second data collection session, after six months, all the children produce more correct structures, and the differences between the groups have diminished. The development is rather small in the L1 children because of the ceiling effect, but both the L2 children and the children with SLI have improved their productive skills considerably (from 57% to 71% correct verb-second for the L2 children; from 59% to 79% for the children with SLI). Figure 2 shows the results. Observe that there are no longer statistically significant differences between the groups, although there are still some differences to be found.

### **Discussion**

Processability Theory assumes no difference between L1 and L2 acquisition. Both types should involve the gradual automatization of grammar in the formulator. PT provides us with a tool to study in great

detail the gradual stages through which language develops. The predictions that the learners were to proceed from markings on lexical morphology to marking of the hierarchical relations at the sentence structure were confirmed for L2 and SLI children.

Problems with verb-second have been reported in earlier studies on L2 learners as well as in studies on children with SLI. What explanations have been offered before to account for this? Let us look at some earlier accounts of L2 and SLI.

### *Explanations of L2*

Explanations of L2 are often based on assumptions about transfer from the L1. This is true also in studies of the acquisition of verb-second. The discussion often concerns the amount of transfer that can be detected: Is the learner using the first language as the initial hypothesis of the second language (Schwartz and Sprouse, 1994) or is the learner only transferring a minimal part of the first language (Vainikka and Young-Scholten, 1994)? No agreement has yet been reached on this question.

The directionality of transfer found in some studies is intriguing. There are a large number of studies evidencing the difficulties in the acquisition of verb-second by speakers of non verb-second languages. In the ZISA project (Meisel, Clahsen and Pienemann, 1981), learners with a Romance language background were followed longitudinally when acquiring German as L2. Their results point at a clear developmental pattern in the acquisition of the German word order rules, starting with canonical SV

word order and with XSV as a second stage. In his study of Swedish as L2, Hyltenstam (1977) found that the acquisition of subject–verb inversion constituted a long-lasting problem for the learners, the majority of whom had an XSV language as L1. Only 3 learners out of a total number of 160 had a verb-second language as L1 (German). The finding that these learners produced the same errors as the others with respect to word order is interesting and agrees with the findings in Naumann (1997) that even learners with a verb-second language as L1 make verb-second errors.

However, there are only a few studies showing that the verb-second phenomenon is transferred. On the contrary, in a study on Danish children learning English as L2, Færch (1984) found that there were only very few examples of the Danish XVS rule being transferred into the children's English, in comparison to other phenomena. Faerch explains this difference by referring to markedness conditions, assuming that verb-second is the more marked word order. A study along the same line is the study by Rahkonen (1993), where the acquisition of Swedish verb-second by Finns was compared to the acquisition of Finnish XSV word order by Swedes. There was a significant difference between the number of errors made by the Finns (learning the verb-second) and the number of errors made by the Swedes (learning the XSV). Rahkonen concluded that it is easier to leave the verb-second structure and start using the unmarked XSV, than to do the opposite.

To summarise, there seems to be a consensus that verb-second is a long-lasting problem for L2 learners. There is, however, no consensus on the explanation behind this fact. If the L2 learners have an L1 that is not verb-second, transfer from L1 is used as the explanation of the problem (e.g. Schwartz and Sprouse, 1994; Vainikka and Young-Scholten, 1994). If the learners' L1 is also a verb-second language, the problematic nature of the acquisitional task has been explained as the influence of another language, e.g. English (Naumann, 1997), or as being due to typological markedness (Rahkonen, 1993; Færch, 1984). The results from the present study, that verb-second is acquired late not only in L2 learners but also in children with SLI, suggest that other explanations may be needed to account for the parallel development of these two groups.

### *Explanations of SLI*

Explanations of SLI have been following three main lines: the impairment is said to lie in a deficient linguistic representation, learning deficit, or in difficulties in processing the input. The representational

deficit hypothesis has been suggested by e.g. Gopnik (1994) and Rice and Wexler (1996, 1997). Their claim is that children with SLI have impairments in one subcomponent of the language system, for example the tense marker. This claim cannot be used to account for the resemblance between L2 and SLI found in this study. Firstly, the nature of the problem – a tense deficit – was not found at all. Secondly, the L2 children in this study cannot be characterised as having representational deficits, since they have a fully functioning first language.<sup>3</sup> The problems that the Swedish SLI children show with applying verb-second are more compatible with the hypothesis put forward by Penner and Hamann (1998). They propose that there is an underspecification of the CP-shell which makes verb-second, wh-questions, subordination and certain tense markings vulnerable in German children with SLI. Interestingly, verb-second, subordination and wh-questions belong to the structures that are predicted to appear at a late stage according to PT. These two proposals have, in fact, much in common, the important difference being that PT has a dynamic developmental perspective whereas Penner and Hamann (1998) assume that the children with SLI have a grammar in stagnation. The results from the group of SLI children in this study, who increased their use of verb-second from 59% at Time I to 79% at Time II, show that they are in fact able to acquire structures belonging to the CP-shell. Additional evidence comes from a study on relative clauses including the same children (Håkansson and Hansson, 2000), which showed that subordination is a vulnerable structure for children with SLI, as the children had selective problems with this structure. Still, most of the children exhibited an increasing use of correct relative clauses. In other words, the C-domain (realised in finiteness, verb-second, subordination) constitutes a particularly vulnerable area for the children with SLI, as for the L2 children, but most of the children develop from Time I to Time II.

The third explanation, “processing problems”, has been dealt with in terms of auditory processing. Leonard (1989, 1998) suggests that children with SLI have perceptual limitations and therefore, they have problems in perceiving elements of low phonetic substance. This explanation may hold for the difficulties with English third person -s, but certainly not for the difficulties that Swedish SLI children have in using verb-second. Word order problems are of a

<sup>3</sup> Moreover, L2 adults have also been found to pass through exactly the same developmental stages as the SLI children and L2 children in this study (cf. Pienemann and Håkansson, 1999).

different kind. Is it possible to cover both these problem areas within the same explanation?

In fact, Leonard's proposal (1989) that processing and not representational deficits is the source of the problem in these children, is partly compatible with the results from the present study. Firstly, the fact that SLI children resemble L2 children may be explained by processing difficulties in both groups. It is plausible that L2 children also have problems in perceiving those elements in the target language that have low phonetic substance. In contrast to Leonard, however, I would like to suggest that the processing difficulties not only take the form of perceptual limitations, but also surface in the limitations of automated grammatical processing in the formulator.

### The explanatory value of PT

It is striking that exactly the same grammatical phenomenon, namely verb-second, is problematic for L2 children and children with SLI, but not for young L1 children. This similarity cannot be explained by reference to transfer or to general language deficits. The developmental perspective, on the other hand, makes it possible to compare the groups. L1 children, L2 children and children with SLI are all language learners, and they are developing towards the target grammar. Pienemann (1998a, 17) claims that L1 learners as well as L2 learners follow developmental paths that are within the constraints defined by PT. Because of their different initial hypotheses, the L1 learners have a more economical and successful development than the L2 learners. The results from the present study suggest that sometimes even L1 children may choose the less successful path, namely if they are language impaired. One possible explanation for the successful path in the L1 children is that the lexical and the grammatical development go hand in hand in their case (cf. Bates and Goodman, 1999). These children simply do not use multiword utterances until they master the corresponding grammatical structures. Recall Santelmann's claim that Swedish L1 children use verb-second as soon as they start using multiword utterances. In PT terms we could say that they reach the S-structure level and leave the phrase level as soon as the lexicon has expanded and adverbs can be preposed in the clauses. The L2 and the SLI children, however, continue to stay at the phrasal level and line up the phrases after each other instead of joining them at the S-structure level. Their clauses can be described as consisting of a succession of the phrases [ADV]<sub>ADVP</sub> [S]<sub>NP</sub> [V]<sub>VP</sub> instead of [ADV-S-V]<sub>S</sub>.

If we take a closer look at the structures that are on top of the processability hierarchy and which are

predicted to be acquired later, we find that these late structures are in fact exactly the structures that have been found to be vulnerable in children with SLI and problematic to L2 learners. They belong to the processing of the S-structure. Thus, there may in fact be a common denominator for grammatical problems in L2 children and children with SLI: the processing of the S-structure. If this is correct, we could expect that:

- Verb-second, the grammatical expression for S-structure to differentiate main clauses from subordinate clauses, will be problematic in languages with verb-second.
- Sentence functions such as subject, verb and objects are not obligatory, and may be missing.
- Subject-verb agreement is problematic.

Along the same lines, if the lower level, such as lexical and phrasal morphology are processable, we can expect that:

- Person markings on verbs occur when they have semantic value, i.e. in pro-drop languages.
- Other verb markings occur when they are semantically valid.

In fact, this is exactly what we find in the literature on children with SLI in typologically different languages. For Italian, subject-verb agreement, being at the lexical level, does not seem to constitute a problem, whereas clitic pronouns marking objects are found to be problematic (Leonard, Bortolini, Caselli, McGregor and Sabbadini, 1992). The same goes for Hebrew. Verb markings are not problematic, but definite accusative case markers are difficult (Dromi, Leonard and Shteiman, 1993; Rom and Leonard, 1990).

The suggestion that the S-structure is a major problem in L2 children and children with SLI has a lot in common with the proposal of a C-shell problem (Penner and Hamann, 1998). There is, however one major difference. The perspective in PT is developmental, and it predicts the order of emergence of grammatical structures. This is what makes the comparison L1-SLI-L2 interesting. The present study has shown that, when treated as having grammars in development and compared with L2 children, the children with SLI are found to follow one of the paths in the acquisition of Swedish, namely the same path as the L2 children. The dissociation between tense and verb-second in the children with SLI, which looks "unnatural" if compared to L1 children, is in fact in line with the development found in L2 children. In the results from the traditional Swedish language tests, the children with SLI were comparable to monolingual children two years younger.

However, when structures typical to bilingual children were tested, another pattern emerged and the children with SLI showed the same profile as L2 children. This shows that a theory of second language development may shed new light on language development in other learner groups, and suggests that not only structures found in younger monolingual children should be used in the testing of children with SLI, but also structures found in the productions of bilingual children.

## Conclusions

Two important conclusions can be drawn from this study:

- (1) There is no direct relationship between tense morphology and verb-second in the acquisition of Swedish in any of the learner groups. This implies that tense can be acquired separately from finiteness in Swedish.
- (2) The similarities that were found between L2 children and children with SLI challenge previous accounts of these learner groups. The results question both the importance of transfer in L2 acquisition and the deficit representation view of language disorders and suggest that there is a developmental schedule that must be followed.

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