



FORMAL FEATURES IN IMPAIRED GRAMMARS: A COMPARISON OF ENGLISH AND GERMAN SLI CHILDREN

HARALD CLAHSEN,* SUSANNE BARTKE† and SANDRA GÖLLNER*

*University of Essex, Colchester, U.K. and †University of Marburg, Germany

Abstract—One important problem in the recent theoretical debate on Specific Language Impairment (SLI) is that most of the SLI accounts have not yet been tested crosslinguistically. As a step towards a crosslinguistic characterization of SLI, we directly compare data from nine English and six German SLI subjects in this paper. We found that subject–verb agreement is more impaired than tense marking, and that all SLI subjects achieve low scores for subject–verb agreement. Moreover, we found that SLI children produce structures which have been reported to be absent from the speech of unimpaired children, e.g. root infinitives with fully specified subjects and verb-second patterns with non-finite verbs. The results will be explained in terms of the agreement-deficit hypothesis: formal features which do not have a semantic interpretation, specifically ϕ -features of verbs, cause acquisition problems for SLI children.

1. INTRODUCTION

In an article published in 1901, the German neurologist Albrecht Liebmann [1] discovered a condition of disordered or delayed language acquisition which is characterized by severe problems in the normal development of morphosyntax in subjects who did not seem to have any clear non-linguistic deficits. Their general intelligence appeared to fall within the normal range, they did not have any hearing deficits or obvious emotional or behavioral disturbances. Thus, there was no clear non-linguistic cause for their difficulty in acquiring grammar. Liebmann called this condition *Agrammatismus infantilis*, as it typically occurred in children. In his article he provided a basic classification of the linguistic symptoms of *Agrammatismus infantilis* based on his clinical practice and distinguished between three degrees of severity. In the severest cases, he noted, subjects could only combine uninflected words to form short sentences such as *Garten gehen* ‘garden go’ and *Suppe esse* ‘soup eat’ (Liebmann [1]: 240). The condition described by Liebmann is nowadays called developmental dysphasia or Specific Language Impairment (SLI), but his taxonomy is still in use for routine clinical assessment, at least in Germany.

It is only recently that this group of language-impaired subjects has become the focus of linguistic and psycholinguistic investigation. Researchers have discovered that results from SLI studies might bear on general issues such as the autonomy and modularity of language. If, for example, the view held by Chomsky and his followers is correct that the knowledge of language is largely innate, grammar being the core of it, then we would expect to find genetically-based disorders of grammar. Such genetic disorders, however, have not yet been identified beyond any doubt, but there is some hope that investigations of SLI subjects might provide the missing link (cf. [2, 3, 4]).

Since the days of A. Liebmann, SLI researchers have made some progress in trying to

characterize the linguistic problems of SLI subjects in the framework of both current grammatical theories and theories of grammatical development. One proposal is the *grammatical agreement deficit* account [5], according to which SLI children are said to have problems establishing grammatical relationships such as case and agreement between different elements of a phrase or a clause. While many of the linguistic problems of SLI subjects can be shown to derive from such a deficit [6], several researchers have also pointed out other properties of SLI which could not be derived from a grammatical agreement deficit. Consequently, alternative proposals have been made. Syntactic features, i.e. TENSE PERSON, NUMBER, etc., have been claimed to be absent from the grammars of SLI individuals [7]. On a different view, SLI subjects are supposed not to have access to regular rules of inflection [3]. SLI has also been characterized as a selective delay of grammatical development affecting particular syntactic categories, most notably Tense [8]. Some aspects of the controversies could be due to the heterogeneity of the population of SLI subjects. It might be that some accounts only hold for particular subgroups of SLI subjects and differing accounts are, therefore, not incompatible. But even researchers who have investigated subgroups of SLI subjects selected for similar linguistic profiles, such as the SLI studies mentioned above, disagree as to how the subjects' linguistic problems should be explained.

In this paper, we will not present the general controversies between the various linguistic interpretations of SLI in any detail; cf. [9, 10] and [11] for discussion. Rather, the purpose of the present article is to further elaborate the hypothesis of a grammatical agreement deficit in the light of new theoretical developments and empirical findings.

2. THE GRAMMATICAL AGREEMENT DEFICIT IN SLI

The agreement deficit hypothesis first emerged from our project on German-speaking children with SLI (cf. [5, 6, 12, 13]). The theoretical argument is based on the assumption that there are natural classes of features whose control may be selectively impaired. Specifically it claims that features that enter into agreement relations and are controlled by some other element in the clause or phrase are affected in SLI. Consider, for example, subject-verb agreement. PERSON and NUMBER are not primary features of verbs. They are only realized on (finite) verbs, but provide information about the subject and, in this way, can be said to be controlled by the subject. It is this kind of feature control that is said to be impaired in SLI. PERSON is, however, an inherent feature of nouns. Under the agreement-deficit hypothesis SLI subjects should therefore not have any problems using this feature on subjects or objects.

The empirical evidence for the agreement deficit hypothesis comes mainly from our studies on SLI in German. Recently some SLI researchers have challenged the agreement deficit hypothesis by arguing that SLI subjects perform much better on agreement phenomena than a specific deficit in this area might lead us to expect (e.g. Rice *et al.* [8] and Bottari *et al.* [14]). It has also been claimed that some linguistic phenomena that seem to be problematic for SLI subjects fall outside of the range of the notion of control-agreement, such as the incorrect use of word order [15] and problems with tense marking [8]. We will discuss these claims together with the results of the present study.

When the agreement-deficit hypothesis was first introduced, it was presented in the framework of Generalized Phrase Structure Grammar (GPSG), cf. [16], because GPSG provided us with a theory of grammatical features as well as principles determining the control and percolation of these features which helped to characterize SLI in linguistic terms. In GPSG and its successors, a distinction is made between principles of phrase-structure configuration

and principles determining the control and percolation of grammatical features. While phrase-structure geometry is determined by configurational principles such as immediate dominance and linear precedence, the most important principle determining grammatical features is the Control-Agreement Principle (cf. Gazdar *et al.* [16]: 89). The CAP establishes an asymmetrical relationship between two categories, where one instance of a category is a functor and the other is an argument controlling the functor. Our claim was that this control-agreement principle is selectively impaired in SLI, leaving configurational principles intact.

In the meantime, Chomskian generative grammar has also developed an elaborate system of morphosyntactic features [17] which makes it possible to rephrase the agreement deficit hypothesis in these terms. The following graph presents an overview of the formal features from Chomsky [17].

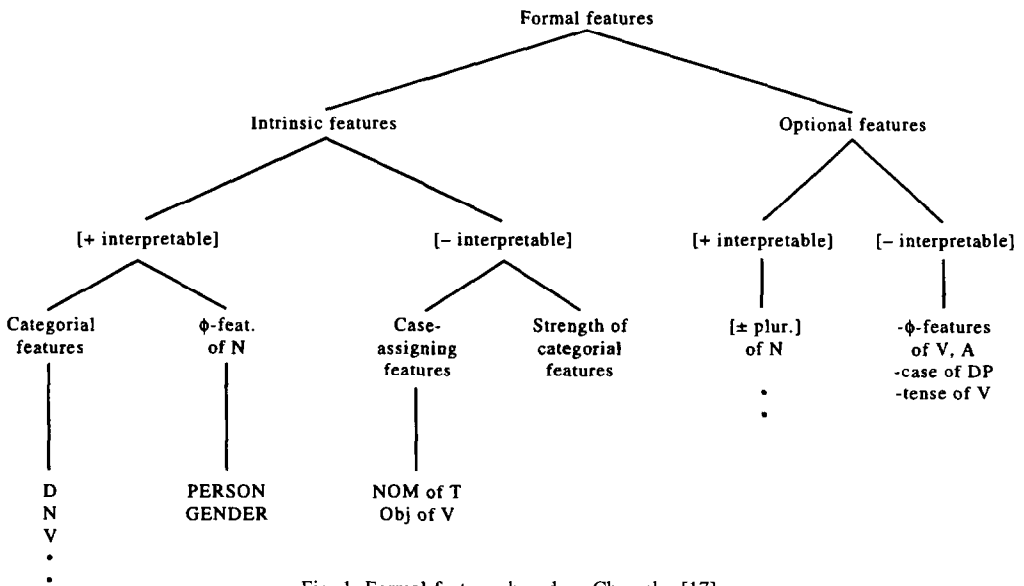


Fig. 1. Formal features based on Chomsky [17].

What is particularly relevant for us is the distinction Chomsky introduces between interpretable and non-interpretable features, i.e. features relevant for semantic interpretation and features which are irrelevant for interpretation. Non-interpretable features must be checked and deleted before LF, while interpretable features need not enter checking relations. For example, ϕ -features of nouns such as PERSON and GENDER contribute to the interpretation of nouns and are thus +interpretable, whereas ϕ -features of verbs and adjectives are non-interpretable and need to be checked off. Within this system the agreement deficit hypothesis might be re-interpreted in two ways. One possibility would be that all non-interpretable features are affected. This would mean that SLI children have problems with case features, with movement (which is assumed to be triggered by strong categorial features), and with ϕ -features and tense features of verbs and adjectives. Alternatively, under a narrower view, just the optional non-interpretable ϕ -features of verbs, i.e. the verb's agreement features would be affected. Let us work with the narrow interpretation first, since it might suffice to characterize the deficit. What are the predictions that could be derived from this interpretation of the agreement deficit hypothesis?

One obvious prediction is that PERSON and NUMBER inflection on verbs ought to be severely impaired in SLI.¹ Moreover, we would expect to find a dissociation in the sentences produced by SLI children between the feature content of subjects and the features of verbs: the features NUMBER, GENDER and PERSON of subject-DPs as well as the Nominative-assigning feature of Tense are intrinsic and/or interpretable features, and if the narrow version of the agreement deficit hypothesis holds, SLI children should have their subject-DPs specified for NOM case and for φ -features, even in sentences in which the agreement features of verbs are left unspecified. The third prediction concerns verb raising and other movement operations. In Chomsky's framework, overt movement is driven by strong features in functional heads. As the strength of the categorial features is independent of the φ -features of verbs, SLI children should be able to raise verbs irrespective of the φ -feature specification of these verbs.

We have examined these predictions in a relatively large set of English and German SLI data; results will be reported in the following sections.

3. DATA

We have investigated data from 15 SLI children, nine with English and six with German as their native language. The English SLI data were collected by Heather van der Lely and kindly made available to us. The German SLI data were gathered by our research group at the University of Düsseldorf.

The children included in this study have been independently diagnosed by speech therapists as having SLI, i.e. while they are severely impaired in language development as measured by clinical tests of language abilities, they are not reported to show any obvious non-linguistic deficits. Their non-verbal cognitive abilities fall within the normal limits for their chronological age, there are no hearing losses, obvious neurological dysfunctions or motor deficits; cf. [18] for background information on the English-speaking subjects and [19] on the German SLI subjects.

The data from the six German SLI children are based on 13 recordings of spontaneous speech of about one hour each (age range: 5;8–7;11, MLU range: 2;6–4;2). Participants were the child and the speech therapist or another adult who the child was familiar with. The recordings took place in the institutions and clinics where the children were treated and in one case (Michael) at the child's home. In these recordings, the SLI children produced a total of 3617 utterances which were transcribed and subsequently analyzed by members of our research group; cf. Table 1 in the appendix for the individual subject data.

The data from the nine English-speaking SLI subjects (age range: 10;00–13;01) come from recordings of two elicitation tasks, one of which prompted the children to produce 3rd sg. present tense forms and the other one past tense forms. For the present 3rd sg. elicitations, the child was asked what their mother or father usually did every morning or every day: 'Every morning, my mum...'. The past tense elicitations consisted of different stories the children were asked to tell, starting with 'Once upon a time ...'. This context was expected to elicit past tense forms. Both elicitation tasks were carried out twice for each child, in summer 1993 and 12 months later, yielding a total of 36 recordings in which the children produced 795 analyzable utterances, 229 in the 3rd sg. task and 566 in the past tense task; cf. Table 2 for the individual subject data.

Overview

In the next section, we will test the prediction that PERSON and NUMBER inflection on verbs is severely impaired in SLI; we will also compare PERSON and NUMBER inflection with TENSE marking. In Section 5, we will study links between the form of verbal elements and the structure of subjects in young children's clauses, focusing on Nominative case assignment in English and on φ -features of subjects in German. Finally, in Section 6, we will investigate verb raising in German SLI children, in relation to the φ -feature specification of verbs.

4. TENSE AND AGREEMENT

4.1 SLI English

Rice *et al.* [8, 20] have argued that SLI involves a specific impairment of TENSE marking. English SLI children should therefore experience difficulty in the use of the past tense *-ed*, such that past tense forms such as *he walked* are expected to occur in free variation with (non-finite) bare stems. By contrast, the agreement deficit hypothesis predicts that the children's problems would focus on the 3rd sg. *-s* as the use of this affix is controlled by φ -features of verbs.

Consider first the use of the 3rd sg. *-s* and the past tense *-ed* on main lexical verbs. The children produced a total of 160 main verbs which required the 3rd sg. *-s*, 97 in 1993 and 63 in 1994, and 407 contexts requiring past tense marking on main verbs, 278 in 1993 and 129 in 1994; cf. Table 3 in the appendix for the individual subject data. Figure 2 presents percentages-correct in obligatory contexts for main lexical verbs. The mean scores for the past tense are 0.75 and 0.78, respectively, as opposed to 0.40 and 0.48 for the 3rd sg. *-s*, a statistically significant difference both in 1993 ($t(8)=4.95$, $P=0.001$, two-tailed) and 1994 ($t(8)=2.78$, $P=0.027$, two-tailed).

The same picture emerges from auxiliaries. Twenty obligatory contexts for 3rd sg. forms of auxiliaries were elicited, but only seven were correctly inflected (=35%). The past tense task elicited 154 auxiliaries, 137 of which were correctly inflected (=89%). Here are some examples of agreement errors on auxiliaries:

- (1) a. they was (JS, 10;10)
 b. he don't know (RJ, 11;11)
 c. she do (AT, 13;01)

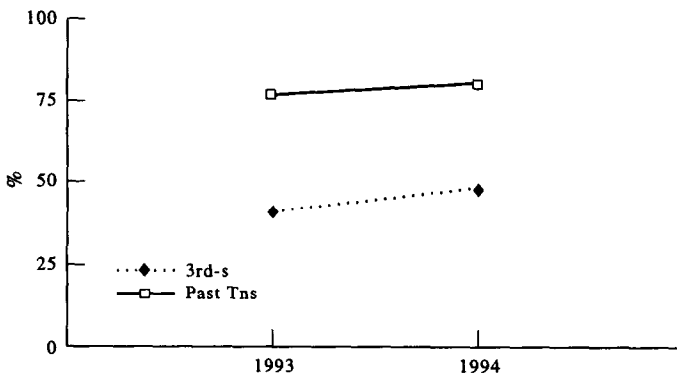


Fig. 2. 3rd *-s* and past tense *-ed* correct in obligatory contexts with main verbs.

With correctness scores of 76.4% on main lexical verbs and 89% on auxiliaries, tense marking is far from 'optional' in these children (contra Rice *et al.* [8]). The mean correctness scores for the 3rd sg. *-s*, however, are at chance level, 49% for main verbs and 35% for auxiliaries. Notice also that the subgroup of SLI children studied here is much older than the children investigated in other SLI studies. Moreover, there are no dramatic changes in the correctness scores from 1993 to 1994. Thus, we can be reasonably sure that the agreement deficit in these SLI children is persistent over time.

4.2. SLI German

To further assess the agreement-deficit hypothesis we have examined subject-verb agreement and preterite tense marking in six German SLI children.

The paradigm of subject-verb agreement consists of four regular suffixes: *-O/-e* for 1st sg., *-st* for 2nd sg., *-t* for 3rd sg. and 2nd pl. and *-n* for 1st pl. and 3rd pl.; *-n* is also the infinitive ending. In contrast to English, where the 3rd *-s* only occurs in the present tense of main lexical verbs, the German agreement suffixes are used in all tenses and on modal verbs as well as on the auxiliary *haben* 'to have'. It is only the verb *sein* 'to be' which has largely suppletive subject-verb agreement forms in the present tense. We will therefore investigate these forms separately.

In adult German, simple past tense forms are rarely used in spoken discourse. Instead, events in the past are normally expressed through what is traditionally called the present perfect which consists of a finite auxiliary in the present tense (*haben* 'to have' or *sein* 'to be') and a non-finite participle. This also holds for child language (cf. Clahsen and Rothweiler [21]). Past participles, when used together with present tense auxiliaries, refer to events in the past, but they do not carry any past tense marking. In order to determine whether SLI involves an impairment of tense marking, we have restricted the analysis to cases in which a past tense marking was required on a finite verb form. These forms are called preterites in German. The regular preterite affix is *-te*, irregular preterite forms involve vowel changes (=ablaut) and no suffix, e.g. *gehen-ging* 'to go-went'. The verb *sein* has a suppletive preterite form (= *war* 'was') and will be analyzed separately.

In the spontaneous speech samples, the SLI children produced 1192 verbs which required some sort of agreement marking and 92 verbs which required a preterite form. The mean correctness scores are shown in Fig. 3 for the suppletive forms of *sein* 'to be' as opposed to all

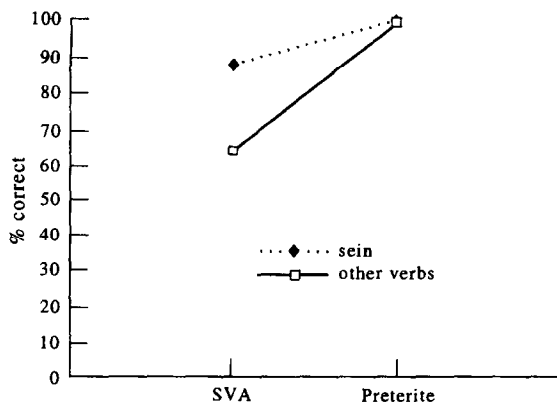


Fig. 3. Subject-verb agreement and preterite marking in German SLI children.

other verbs; the individual subject data are in the appendix, Table 4 for subject–verb agreement and Table 5 for the preterites.

Figure 3 shows that the mean correctness scores for subject–verb agreement are lower than those for preterite marking: 99% of the preterites of main verbs are correct, but only 64% with respect to subject–verb agreement, a statistically significant difference ($t(5) = -6.20$, $P = 0.002$), 100% of the preterites of *sein* are correct, but only 88% of the subject–verb agreement forms, a marginally significant difference ($t(5) = -2.09$, $P = 0.091$). This shows that subject–verb agreement marking resulted in more errors in the speech of SLI children than preterite tense marking.

As is clear from Table 4, the SLI children under study produce many agreement errors. There are a total of 313 verb forms which do not have correct subject–verb agreement marking, and 31 of these are infinitive forms ending in *-n*. This still leaves 282 cases (=90%) in which a finite verb form is used incorrectly. Rice *et al.* [8] have argued that when SLI children use a finite verb form it tends to be correctly inflected and that root infinitives (with *-n* in German) are the only kind of ‘error’. The overall correctness of the finite verb forms is taken as an indication that agreement is not impaired in SLI. Clearly, however, Rice *et al.*’s conclusions are not supported by our data. Even if we excluded the incorrect *-O* forms as they are ambiguous between finite 1st sg. forms and non-finite bare stems, there are still 97 cases (=31%) in which a finite verb form (= *-st*, *-t*, *-e* or a finite form of *sein*) is used incorrectly. Here are some examples:

- | | | |
|--------|--|-----------|
| (2) a. | die <i>kanns</i> viele laufen die tiere | Dieter |
| | they can-2sg. a lot run the animals (=The animals can run a lot.) | |
| b. | ich <i>wills</i> lieber zusehen | Dieter |
| | I will-2sg. rather watch (=I’d rather watch.) | |
| c. | ich gar nich mehr sehen <i>kannt</i> | Sebastian |
| | I not anymore see can-3sg. (=I can’t see anything anymore.) | |
| d. | du <i>kommt</i> dahin | Sebastian |
| | you come-3sg. there (=You go there.) | |
| e. | da waren Christoph | Peter |
| | that was-3pl. Christoph (=That was C.) | |
| f. | da fliegt mehr federn runter | Peter |
| | there fly-3sg. more feathers down(=More feathers are coming down.) | |
| g. | der so kratze | Connie |
| | he so itche-1sg. (=This itches very much.) | |

To summarize the tense and agreement data, we found that agreement phenomena cause major problems for English and German SLI children. The impaired children achieve relatively low correctness scores for subject–verb agreement, and the German SLI children produce many agreement errors. At the same time, tense marking does not appear to be particularly affected in the speech of either group of SLI children.

5. FINITENESS AND THE STRUCTURE OF SUBJECTS

5.1. SLI English

In recent studies on language-unimpaired children, researchers have started to explore links between the form of verbal elements and the structure of subjects in young children’s clauses.

One major finding comes from studies on early English children during what Wexler [22] has referred to as the optional infinitive stage, i.e. the approximate age period between 1;11 and 2;5. Several researchers [23–25] have discovered that English children produce case marking errors on subjects during this stage and that the use of case marking differs depending on whether the verb form is finite or non-finite: in clauses with fully specified finite verb forms the subject typically appears in NOM case (e.g. *he come-s, he walk-ed*), whereas in sentences with verbs ending in *-O* non-NOM as well as NOM subjects may occur (*him come, he come*). In Chomsky's [17] framework, this correlation can be derived from assuming that the functional category T(ense) has an intrinsic case feature that is checked against the NOM feature of the subject DP in (Spec, T). This holds for finite T only. Verb forms such as *walk, come* etc., without overt inflections are, however, ambiguous with respect to finiteness in English. In *him come*, for example, T could be said to be absent, with the case feature 'Assign NOM' being absent as well, and the child producing the subject in its default form (which is accusative in English). In *he come*, however, we might assume that a finite T is present (which checks NOM of the subject) and that *come* therefore is a finite verb form.

With respect to SLI, the agreement-deficit hypothesis predicts that SLI children will not have particular problems with NOM case marking. This is because the impairment is said to focus on agreement phenomena, expressed in terms of ϕ -features in Chomsky's framework, which are independent of the case feature 'Assign NOM' in English.

To test this prediction we compared data from four language unimpaired children with the SLI data presented in Table 1 with respect to subject case marking and verb inflection. Ambiguous subject pronouns such as *you* and *it* which could either be +NOM or -NOM were excluded from the data analysis. With respect to verbs, a distinction was made between (i) *finite* verb forms, i.e. overt tense/agreement inflections including modals and the suppletive forms of *to be*, and (ii) uninflected verb forms such as *walk*, or *come*. Note that the latter are ambiguous with respect to finiteness.

The data on the language-unimpaired children come from Pensalfini [26]. He investigated five children from the CHILDES database. Four of these children are in the optional infinitive stage: Eve (1;6–2;3), Peter (2;0–2;8), Nina (2;1–2;5) and Naomi (2;0–2;5). These children produce non-NOM subjects as well as uninflected verb forms in contexts in which overtly inflected forms are required. The fifth child (Alison) was included for control purposes. Pensalfini argued that this represents a more advanced stage of development, since Alison was studied at a later age (2;4–2;10) than the other four children and she produces no non-NOM subjects and "very few instances of unambiguously uninflected clauses at all" (Pensalfini [17]: 307).

Results

In finite clauses produced by unimpaired children, only 2% (23/1078) of the subjects have non-NOM case, whereas in sentences with uninflected verb forms 19% (170/888) of the subjects appear in non-NOM case; χ^2 -tests show that this difference is statistically significant for each of the four unimpaired children (cf. Table 6 in the appendix). Thus NOM case and finiteness of verb forms are correlated in these unimpaired children.

The SLI subjects produced 217 NOM subjects and no single non-NOM subject, even in sentences with uninflected verb forms; cf. Table 7. With respect to the use of uninflected verb forms, the SLI children are similar to unimpaired children in the optional infinitive stage. In contrast, with respect to subject case marking, the SLI data are similar to data from Alison representing a later developmental stage.

Discussion

Two potential artifacts for the differences between SLI and unimpaired children can be ruled out. First, the absence of subject case errors in the SLI data does not result from gaps in the children's lexicon. All the SLI children produce non-NOM pronouns such as *him, her, my*, etc., but these are restricted to objects or possessives. Second, one might argue that (for some unknown reason) SLI children treat NOM as the default case, unlike adult and child English, and hence the absence of non-NOM in subjects. Under this assumption, we would expect to find overapplications of NOM to objects, as they typically occur in the acquisition of languages in which NOM is the default case (cf. [27]). However, the SLI children do not produce NOM pronouns in contexts in which non-NOM is required in English. We conclude that the absence of non-NOM subjects in SLI children does not result from lexical gaps in their pronoun system or from misanalyzing NOM as the default case in English.

The correct use of NOM subjects in the SLI children is not what one would expect from the tense-deficit hypothesis as presented in Rice *et al.* [8, 20]. These children are said to drop T(ense) optionally. Hence, in those sentences in which T is inactive non-NOM subjects should occur. Such a prediction, however, is not supported by the data.

One possibility of making the results on subject case marking reported above compatible with Rice *et al.*'s tense-deficit hypothesis of SLI would be to adopt a different theory of NOM case assignment for English, namely that NOM is assigned by Agr, rather than by T(ense), as originally proposed in Chomsky ([28]: 264) and adopted by Schütze and Wexler [25]. In this case, the SLI children's correct use of NOM would be compatible with the assumption of a tense deficit, as NOM case assignment is, in principle, independent of T in Chomsky's [28] theory. There are several problems with such an analysis, however. First, it is not compatible with the use of verb inflections in SLI presented in Section 4. If NOM is assigned by Agr, then the overall correctness of NOM indicates that Agr is active in every sentence produced by the SLI children, while T might optionally be dropped. Given this, we would expect that SLI children achieve higher correctness scores on Agr inflections such as the 3rd *-s* than on pure Tense inflections such as *-ed*, if Agr in INFL is understood to host the agreement morpheme or to contain an abstract representation of it. This expectation is not supported. Second, if Agr rather than T assigns NOM, we would expect to find some instances of non-NOM subjects in sentences in which T is present but Agr is not. In their data from unimpaired children, Schütze and Wexler [25] did indeed find that 4–30% of the sentences with past tense forms occurred with non-NOM subjects but only 0–3% of the sentences with the 3rd *-s*. The authors argue that in the former cases Agr is absent. Such a difference does not, however, exist in our SLI data. There were 566 past tense forms, and in none of these sentences did the SLI children produce any non-NOM subjects. Third, the claim that Agr assigns NOM presupposes that AgrP is an independent functional category in the grammar of English, an assumption with many undesirable consequences, as pointed out in chapter 4 of Chomsky [17].

To conclude, we propose that the agreement-deficit hypothesis provides a parsimonious explanation for the observed dissociation between correct subject case marking and impaired subject–verb agreement marking in the SLI data. We assume that φ -features of verbs are independent of the case feature of T and that T is not affected in SLI. Hence NOM case assignment is possible, even in cases in which subject–verb agreement breaks down. This is exactly the pattern we found in the data.

5.2 SLI German

Potential links between formal features of subjects and verbs were also investigated in the

German data, both from unimpaired and SLI children. In German, unlike English, NOM is the default case. Thus we cannot draw any strong conclusions from correct nominatives in children's speech, as these could either be instances of default case or result from structural case marking. Another set of relevant features for which subjects (as well as other DPs) are marked in German is GENDER, NUMBER and PERSON. These are features of nouns which contribute to their meanings, i.e. interpretable features of N in Chomsky's system. According to the agreement deficit hypothesis, we would expect to find a dissociation similar to the one in the English data: German SLI children should have their subject-DPs specified for φ -features, even in sentences in which the φ -features of verbs are left unspecified. This is because φ -features are impaired in SLI, whereas the former are interpretable features which the agreement-deficit hypothesis claims are not affected in SLI.

We examined the data from two perspectives. First, we looked at all root-clause infinitives (=sentences which do not have any PERSON or NUMBER features on the verb) and determined in how many of these the children produced a fully specified subject, i.e. a DP which is overtly marked for GENDER and/or NUMBER (these are shown on the left-hand side in Fig. 4). Conversely, for our second analysis, we looked at all the fully specified DP-subjects used by the children and determined how many of those occurred with a correctly inflected finite verb form (these are shown on the right-hand side of Fig. 4). We investigated data from five unimpaired children between 2;4 and 3;1 [see 29] and the six SLI children studied here.

Results for unimpaired children

Figure 4 shows that, in the speech of unimpaired children, fully specified DP-subjects are practically non-existent in root-clause infinitives (<1%, 2 out of 147 cases, cf. Clahsen *et al.* [29]: 150). Rather, in root-clause infinitives, in which arguably verbs do not have PERSON and NUMBER features, children either drop subjects or use underspecified subjects which lack at least one of the relevant features.

Figure 4 also shows that when an unimpaired child produces a fully specified DP-subject, then the sentence also contains a finite verb form with full feature content. This holds for 96% of the fully specified subjects (1210 out of 1315 cases); in the remaining 4%, the verb had been dropped.

The two findings taken together demonstrate close links between the feature contents of finite verbs and of subjects in the sentences produced by unimpaired children.

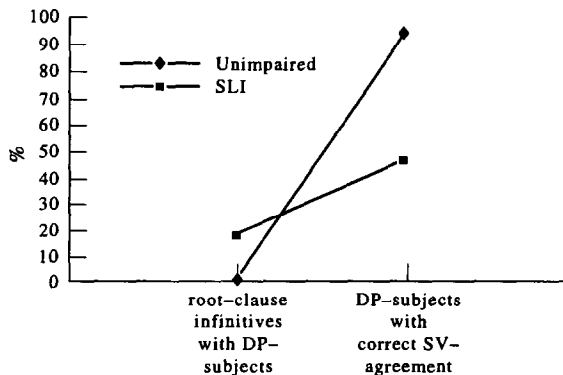


Fig. 4. Finiteness and the structure of subjects (German children).

We have interpreted these links from the control data in terms of Checking Theory: whereas root infinitives lack φ -features, and hence there is no need for the verb to have any of its features checked, a correctly inflected verb, in contrast, contains non-interpretable φ -features which have to be checked against those of the subject, and hence the link between the feature contents of subject DPs and finite verbs (cf. [29]).

Results for SLI children

Figure 4 and the individual subject data in Table 8 show that the SLI children are different from the unimpaired ones in two ways. First, in root-clause infinitives, SLI children produce more fully specified DP-subjects than unimpaired children (19% as opposed to 1%); and second, in sentences with fully specified DP-subjects, SLI children produce fewer verb forms which are correctly inflected for PERSON and NUMBER (= 53%) compared to unimpaired children (= 96%).

Table 8 shows that five of the six SLI children produce root-clause infinitives with fully specified DP-subjects; here are some examples:

- | | | |
|--------|---|-------------|
| (3) a. | dieser auch fleisch essen | (Michael) |
| | 'this one also meat eat-inf.' | |
| | (=This (guy) is also eating meat.) | |
| b. | das selber ohne wasser wachsen | (David) |
| | 'this on its own without water grow-inf.' | |
| | (=This (plant) grows on its own water without.) | |
| c. | der essen gänse | (Dieter) |
| | 'he eat-inf. geese' (=He eats geese.) | |
| d. | er viel so rumfahren | (Peter) |
| | 'he a lot so around drive-inf.' | |
| | (=He drives around a lot.) | |
| e. | dann der tigern kommen | (Sebastian) |
| | 'then the tiger come-inf.' | |
| | (Then, the tiger is coming. ²) | |

These data show that there is a dissociation in the SLI data between the feature content of DP-subjects and the features of verbs which is not found in unimpaired children. As illustrated in the examples in (3), the subjects in these SLI sentences are fully specified for PERSON, NUMBER and GENDER, while verbs always appear in the infinitive form.

To summarize, in terms of Chomsky's feature system (cf. Fig. 1), the φ -features of N are fully specified in these sentences, but the φ -features of verbs are left unspecified. It is thus not the interpretable features but rather the optional uninterpretable agreement features that cause problems for SLI children. We take this dissociation as a further piece of evidence for the agreement-deficit hypothesis.

6. FINITENESS AND VERB PLACEMENT IN GERMAN SLI CHILDREN

If SLI children have problems mainly with agreement, word order should not be directly affected [5, 6]. However, the agreement deficit may have *indirect* effects on word order in the following way. One consequence of the SLI children's problems with agreement is that they do not have a general paradigm of subject-verb agreement, but only a small set of (stored) finite verb forms. Hence SLI children produce many non-finite verb forms. Non-finite verbs appear in

clause-final position in German matrix clauses. We might therefore find many verb-final patterns in the speech of German SLI children depending on how many non-finite verbs the children use.

In contrast to the prediction of the agreement-deficit hypothesis, Grimm and her collaborators have claimed that SLI involves genuine word-order deficits, the most significant one being problems with Verb-Second (V2) (cf. Grimm [15], Grimm and Weinert [30]). Instead of moving the finite verb from clause-final to second position as required by German main clauses, Grimm has argued that SLI children tend to leave verbs in clause-final position irrespective of whether they are finite or non-finite, which she interprets to indicate a severe deficit in verb movement.

To examine the two contradictory predictions, we will compare verb placement patterns of German SLI subjects with the system of verb placement observed for unimpaired children at an early developmental stage (= around age 2;0) during which the subject-verb paradigm has not yet been acquired. If the predictions of the agreement-deficit hypothesis concerning word order in SLI are correct, the verb-placement system of German SLI subjects should be similar to the one of unimpaired children at this developmental stage. If, however, there is an independent word-order deficit, as argued by Grimm, we should find differences between unimpaired and SLI children.

Before investigating the SLI data, let us briefly consider the verb-placement system of the German language. German clearly distinguishes between the placement of finite and non-finite verbs. Out of the four logical possibilities for the placement of simple main verbs (cf. 4), three are attested in adult German: (i) represents the position of the verb in main clauses; (ii) in embedded clauses; and (iv) the position of non-finite verbs in VPs. Only (iii) is illegal in adult German.

(4)

Verb-second	Clause-final
(i) finite verb	(ii) finite verb
*(iii) non-finite verb	(iv) non-finite verb

We have investigated verb-placement patterns in four unimpaired children (age range: 1;10–2;4) studied in Clahsen *et al.* [29] and the six children in Table 1. The same criteria were employed in analyzing these data (cf. Clahsen *et al.* [29]: 137ff). Only unambiguous cases of V2 and verb-final patterns as well as unambiguous cases of finite and non-finite verbs were included in the data analysis. Finite verb forms are those inflected with *-st*, *-e* or *-t*, and finite forms of the verb *sein* ‘to be’. Non-finite verbs included are verbs with the (infinitive ending) *-(e)n*. All potentially ambiguous verb forms, most notably verbs with *-O* endings were excluded from the analysis. This reduced the data sets to clear cases. Sentences with simple lexical verbs were analyzed separately from sentences with verb clusters, i.e. auxiliary+participle and modal+infinitive patterns. The percentages to be reported were calculated as follows:

$$\begin{aligned} \text{--- } \% \text{ V2-finite} &= \frac{\text{\#V2-patterns with finite verbs}}{\text{\#V2 with finite v. + \#V-final with finite verbs}} \\ \text{--- } \% \text{ V2-nonfinite} &= \frac{\text{V2 with non-finite verbs}}{\text{\#V2 with nonfin. v. + \#V-final with nonfin. v.}} \end{aligned}$$

Results for unimpaired children

The control data show a clear distinction between the placement of finite and non-finite verbs. Ninety-one percent of the finite verbs appear in the V2-position (=4i), whereas 98% of the non-finite verbs are placed clause-finally (=4iv) (cf. Clahsen *et al.* [29]: 138 for the individual subject data). We also found that non-finite verbs appearing in the V2-position are practically non-existent (=1.6%), whereas pattern (4ii) is represented in the data: approximately 10% of the finite verbs do occur in clause-final position.

Verb placement in verb clusters is as required in adult German main clauses, with the finite verb in the V2-position and the non-finite verb in clause-final position. Verb clusters with the finite verb following the non-finite verb are extremely rare, 1% (2 out of 149 cases); cf. Clahsen *et al.* [29]: 139ff).

In sum, three of the four logical possibilities are used by the children, but with different proportions. Finite verbs frequently occur in the V2-position and rarely in clause-final position; non-finite verbs only occur clause-finally, and not in the V2-position. V2-raising, therefore, appears to be available to unimpaired children from as early in development as we can observe it in their speech production data. Finite verbs are sometimes left in clause-final position, but two-year-olds do not produce the ungrammatical pattern (iii) with raised non-finite verbs; cf. Poeppel and Wexler [31], Clahsen *et al.* [32], Boser *et al.* [33], Déprez and Pierce [34], among others, for similar findings.

Results for SLI children

We found that, as a group, the six SLI children behave very much like the four unimpaired children in that finite and non-finite verbs are treated differently with respect to V2: 87% of the finite verbs occur in V2, whereas 89.5% of the non-finite verbs do not undergo V2 and remain in clause-final position. In verb clusters with auxiliaries and modals, the finite verbal elements almost always appear in second and the non-finite ones in clause-final position; only in 4% of the verb clusters was the finite verb placed after the non-finite one. These observations are taken to indicate that SLI children have acquired V2-raising and that verb placement does not seem to be impaired.

A closer examination, however, of the individual subject data in Tables 9 and 10 reveals interesting differences between some SLI children and the unimpaired ones. Consider, for example, the SLI child Dieter who seems to generalize V2 to non-finite verbs. Table 9 shows that 11 out of the 48 non-finite verbs that Dieter produces, i.e. 23%, appear in the V2-position; cf. the examples in (5).³ Recall that such verb-placement patterns are extremely rare in the speech of unimpaired children, 1.6% in the data from Clahsen *et al.* [29].

- (5) a. der *fahrn* in gleichen schulbus (Dieter)
 ‘he drive-inf. in (the) same schoolbus
 (=He takes the same schoolbus.)
- b. da *stehen* der apfelbaum (Dieter)
 ‘there stand-inf. the apple tree’
 (=The apple tree is standing over there.)
- c. die oma *haben* gut (Dieter)
 ‘the grandma have good’
 (=This grandma is pretty well off.)
- d. der *stehen* hier (Dieter)
 ‘he stand-inf. here’
 (=He is standing here.)

A second interesting finding is that SLI children may radically underapply V2. The clearest case in the present data set is Connie. Table 9 shows that 54% (14 out of 26 cases) of Connie's finite verb forms appear in V2, while 46% of them are left in clause-final position. This contrasts with unimpaired children in the root-infinitive stage where only about 10% of the finite verb forms appear clause-finally. The SLI child Sebastian is less extreme than Connie, but he still leaves 25% (37 out of 147 cases) of his finite verb forms in clause-final position.

This pattern also holds for verb clusters. Table 10 shows that Connie and Sebastian produce eight verb clusters in which the finite verb appears in clause-final position where it follows the non-finite verb; cf. examples in (6). In the other SLI children, as well as in unimpaired children during the root-infinitive stage, verb clusters such as these are extremely rare.

- (6) a. der kleine mann auch wieder da reingesperrt werd (Sebastian)
 'the little man also again there in-locked will'
 (=The little man will also be locked in again.)
- b. ich aber gemacht hat (Sebastian)
 'I but made this'
 (=But I have made (that).)
- c. ich nich lesen kann (Connie)
 'I not read can.'
 (=I can't read.)
- d. wir so wasser fahren kann (Connie)
 'we this way water drive can'
 (=We can drive on the water in this way.)

One case of an SLI child similar to Connie and Sebastian in underapplying V2 was reported in Clahsen [5, 6]. That child (=Petra) had 68% (47 out of 69 cases) of her finite verb forms in clause-final position, cf. Clahsen [6]: 191ff. In verb clusters, however, she always placed the finite verbal element in second and the non-finite one in clause-final position, as required by German.

Discussion

The SLI data we have investigated here clearly demonstrate that all the children have acquired V2. Some like Dieter overapply V2 by raising non-finite verbs. In contrast, other SLI children underapply V2 by leaving finite verbs in clause-final position more frequently than unimpaired children do. But lack of V2-raising in such sentences does not mean that these SLI children are incapable of raising verbs; recall that 54% of Connie's finite verbs and 75% of Sebastian's appear in the V2-position. In any case, it cannot be argued that Connie and Sebastian produce any 'deviant word-order pattern' (Grimm), since unimpaired children in the root-infinitive stage also produce clause-final patterns with finite verbs and this pattern is also licit in adult German. We may conclude then that Grimm's hypothesis of a genuine word-order deficit in SLI must be rejected, at least with respect to verb raising in German.

How would the agreement-deficit hypothesis explain the results on verb raising? We assume that SLI children's grammars are like the non-impaired children's grammar, with the notable exception that SLI children's verbs may lack non-interpretable ϕ -features. This results in SLI children not having a general paradigm of PERSON and NUMBER inflection, and so their grammars do not allow them to generate a corresponding finite form for any given verb. Instead, SLI children resort to non-finite verb forms. Given that their grammar is assumed otherwise unimpaired, SLI children are expected to generate adult-like clause structures for

both finite and non-finite verbs. Thus, SLI children's non-finite verbs should appear in clause-final position, as in adult German, with Comp and Tense not entering the structure of these clauses, whereas SLI children's finite verb forms should appear in V2, with Comp and Tense being fully specified. These two predictions were confirmed for most of the SLI children studied here.

Let us now examine the cases represented by Dieter, Connie and Sebastian. Dieter over-applies V2 to non-finite verbs which is an illegal pattern in adult German (cf. 4iii above). Under the agreement-deficit hypothesis, φ -features of verbs may be lacking, but otherwise Dieter's grammar should be like the normal grammar. How can we analyze the V2-overapplications within this framework? Suppose that Dieter generates Comp for every sentence that contains a verb. It follows that these Comps must have strong categorial features, as does the grammar of German. Strong categorial features need to be checked off which can be achieved by verb raising. Non-finite verbs can be raised to Comp, as these verbs are unspecified for φ -features and do not have any features that would produce a feature mismatch in Comp. In Dieter's grammar, the verb is then a kind of joker which may well raise to Comp to satisfy its strong categorial feature.

Consider now the findings on the other SLI children, Connie, Sebastian and Petra [6], who underapply V2 and sometimes leave finite verbs in clause-final position. When these children's sentences do not contain a finite verb, Comp does not enter the structure, and hence we observe no verb raising of non-finite verbs, as we do for unimpaired children. Suppose, however, that in sentences of the V2-underappliers even when they have a verb form specified for φ -features, Comp may sometimes be lacking. As there is no need for V2-raising in such cases, this results in clause-final patterns for finite verbs.

In sum, according to the analysis suggested above, movement in general is driven by the requirement that uninterpretable features must be eliminated from the representation. Sentences with finite verbs, i.e. with verbs specified for φ -features, have Comp and Tense with strong features and hence require verb raising, sentences with non-finite verbs lack Comp and Tense and hence no verb raising. This applies to unimpaired children and to most SLI children. In some SLI children, however, the φ -feature content of verbs is less directly related to the features that trigger verb movement. A V2-overapplier such as Dieter has a strong Comp in every sentence with a verb, irrespective of the verb's feature specification, and the V2-underappliers do sometimes lack strong C, even in sentences with fully specified φ -features on verbs. Nevertheless, many of the sentences produced by these children exhibit the common non-impaired pattern (finite verbs in V2, non-finite ones clause-finally), and overall, verb placement and verb inflection are linked in SLI grammars in similar ways as in the grammar of unimpaired children.⁴

7. GENERAL DISCUSSION

In this section we will discuss two alternative linguistic interpretations of SLI, Gopnik's rule-deficit hypothesis and Rice *et al.*'s tense-deficit, focussing on the question of whether the data and results presented here in the previous sections can be accounted for by these two approaches.

Gopnik and her collaborators have argued that the deficit is primarily restricted to inflectional rules, sparing the ability to store inflected words [3, 35, 36]. On the basis of elicited production data from an extended family of both adult and child SLI subjects as well as other SLI data, these authors have argued that SLI subjects have problems with regular inflection, e.g. the regular past

tense *-ed* and the plural *-s*, which is said to be rule-based, whereas irregular past tense forms and irregular plurals which are claimed to be stored in memory are unimpaired in SLI.

Some of our results are indeed compatible with this account. In the English SLI data we found that most auxiliaries are correctly inflected for past tense (89% of all obligatory past tense contexts), while correctness scores on the 3rd *-s* are at chance level. Similarly, English SLI children do not experience any problems in NOM case marking, even in sentences in which the 3rd *-s* is incorrectly dropped. These differences are expected from Gopnik's account as auxiliaries and case-marked subject pronouns are irregular forms which are probably stored in memory and hence unimpaired, whereas the 3rd *-s* involves a regular affixation rule which is said to cause problems for SLI children. Moreover, the observation that the irregular forms of the verb *sein* 'to be' are most often correct in German SLI children is compatible with the idea that SLI children are not impaired in memorizing irregularly inflected verb forms.

On the other hand, there are some findings which go against the rule-deficit model: (i) high correctness scores, 75% and 78%, for the regular past tense *-ed*; (ii) a high correctness score for regular preterite forms in German (100%); (iii) low correctness scores of 3rd sg. forms of auxiliaries in the English SLI data, ranging from 35 to 40%. Finally, the observation that some of the German SLI children experience problems with V2 is left unexplained in this account.

An alternative interpretation of SLI has been developed by Rice and her group [8, 20]. Rice *et al.* [20] investigated data from 18 English-speaking SLI children and observed that they often drop the past tense *-ed* and the 3rd *-s*. The common property of these two morphemes is that they encode TENSE, and both seemed in their study to be equally problematic for SLI children. Rice *et al.* have therefore argued that SLI subjects are impaired with respect to Tense which is not obligatory in SLI grammars. This hypothesis predicts that for SLI individuals, bare verb stems can be used in free variation with finite verb forms, i.e. with present tense and past tense forms. Rice *et al.* stressed that although unimpaired children also go through a stage in which their grammar does not generate T in every sentence, SLI children somehow get stuck at that stage.

How can our results be explained in terms of the tense-deficit hypothesis? Some findings are compatible with the Rice *et al.* hypothesis; (i) that the English and the German SLI subjects achieve low correctness scores on *some* finite verb forms, namely on the 3rd *-s* in English and on the various subject-verb agreement endings in German; (ii) that they typically use bare stems and/or infinitives in such cases. When it comes to overt tense marking, however, the SLI subjects perform much better than on subject-verb agreement; the correctness scores for SLI past tense marking in English and preterite tense marking in German are significantly higher than those for agreement and with approximately 80% correct in obligatory contexts tense marking is far from 'optional'. This difference between agreement and tense marking does not support the tense-deficit hypothesis. Moreover, we found many finite verb forms which SLI children incorrectly inflected with respect to agreement, such as occurrences of 1st sg. suffixes in sentences with 3rd sg. subjects and vice versa (cf. the frequencies and examples in Section 4). According to the Rice *et al.* account such marked forms should be non-existent.

There is another tense-deficit prediction which is not met. With respect to NOM case marking in English, the tense-deficit hypothesis predicts that SLI subjects will produce non-NOM subjects as well as correct NOM subjects. If T(ense) hosts the feature 'Assign NOM' in English and if T is impaired, then we would expect that impairments of T would not only affect verb inflections but also NOM case assignment. This is not supported, however, by the SLI data we have investigated. Rather, NOM is *always* correctly assigned, even in sentences with bare verb stems.

The basic claim of the tense-deficit hypothesis is that SLI children's grammars are identical to those of unimpaired children in the optional infinitive stage. Two findings from the German SLI data challenge this view: (i) German SLI children use root infinitives with fully specified DP-subjects (mean: 19%); and (ii) some SLI children raise non-finite verbs to the V2 position (2–23%). Such data are practically non-existent in the speech of unimpaired children at any stage of development. These differences between unimpaired children and SLI subjects are left unexplained by the tense-deficit account.

The third approach for SLI grammatical impairments is the agreement-deficit hypothesis according to which SLI subjects have specific problems establishing grammatical agreement relationships [5, 6]. We have combined this idea with Chomsky's [17] theory of formal features, and have argued that the empirical findings on SLI in English and German reported in Sections 4, 5 and 6 can be derived from the narrow interpretation of the agreement-deficit hypothesis according to which only the optional non-interpretable ϕ -features of verbs, i.e. the verb's agreement features, are specifically affected.

We conclude that Gopnik *et al.*'s and Rice *et al.*'s models provide less viable explanations of the SLI data presented in this paper than the agreement-deficit account.

8. SUMMARY AND CONCLUSION

In an attempt to contribute to a cross-linguistic characterization of SLI, we have directly compared data from nine English and six German SLI subjects with respect to tense and agreement marking, the feature specifications of DP-subjects, and verb raising. The results can be summarized as follows:

- a. The English and German SLI subjects achieve significantly lower scores for subject-verb agreement marking than for past tense or preterite tense marking.
- b. English SLI children do not produce any non-NOM subjects, even in sentences with bare (uninflected) stems.
- c. Two kinds of structures which have been reported to be absent from the speech of unimpaired German-speaking children are productively used by SLI children:
 - Non-finite verbs raised to second position.
 - Root infinitives with fully-specified and case-marked DP subjects.

We have adopted Chomsky's theory of formal features to analyze the data. The results in (a) show that SLI children tend to have problems with the agreement features of verbs, while TENSE appears to be far less affected. This finding is compatible with the agreement-deficit hypothesis. The result in (b) shows that the NOM-assigning feature of Tense is still active in the SLI grammar. The patterns in (c) indicate that the strong categorial features of Comp (and Tense) as well as the ϕ -features of subject-DPs are present, even in sentences in which the (uninterpretable) agreement features of verbs are absent. Taken together, these findings support the narrow interpretation of the agreement-deficit hypothesis, according to which ϕ -features of verbs are selectively impaired in the SLI grammar. Alternative explanations (rule deficit, tense deficit) were examined, but were assessed as less viable than the account argued for in this paper.

Acknowledgements—Supported by a German Science Foundation grant to HC (grant No. C1 97/5.1-3). The collection of the data on the English SLI subjects was supported by a Medical Research Council grant to Heather van der Lely (G9325311N). We are grateful to Claudia Felser and Jenny Dalalakis for helpful comments and for correcting our English. Parts of the research in this paper were presented at the VII International Congress for the Study of Child Language, Istanbul, and at the 21st Boston University Conference on Language Development.

NOTES

¹Note that the agreement-deficit hypothesis also makes predictions for adjective agreement. We will not investigate these predictions here, but rather restrict ourselves to verbs.

²Note that Sebastian is referring to a single tiger here and that *tigern* is not the plural form of the noun *tiger*. Thus, we can be reasonably sure that the verb form *kommen* is an infinitive rather than a finite plural form.

³V2-patterns with non-finite verbs are also produced by Michael (9%, 2 out of 22 non-finite verbs), Peter (7%, 5 out of 67 cases), and Sebastian and David (1 case each).

⁴Notice also that if verb placement and verb inflection were indeed completely independent, we would expect to find children who raise non-finite verbs to V2 and leave finite ones in clause-final position. Such cases do not exist, to the best of our knowledge, either among SLI or unimpaired children.

REFERENCES

1. Liebmman, A., Agrammatismus infantilis. *Archiv für Psychiatrie und Nervenkrankheiten* **34**, 240–252, 1901.
2. Gopnik, M., Feature-blind grammar and dysphasia. *Nature* **344**, 715, 1990.
3. Gopnik, M. and Crago, M., Familial aggregation of a developmental language disorder. *Cognition* **39**, 1–50, 1991.
4. Van der Lely, H. and Stollwerck, L., A grammatical specific language impairment in children: an autosomal dominant inheritance? *Brain & Language* **5**, 484–504, 1996.
5. Clahsen, H., The grammatical characterization of developmental dysphasia. *Linguistics* **27**, 897–920, 1989.
6. Clahsen, H., *Child Language and Developmental Dysphasia: Linguistic Studies of the Acquisition of German*. Benjamins, Amsterdam, 1991.
7. Gopnik M., Feature-blindness: a case study. *Language Acquisition* **1**, 139–164, 1990.
8. Rice, M., Wexler, K. and Cleave, P., Specific language impairment as a period of extended optional infinitives. *Journal of Speech and Hearing Research* **38**, 850–863, 1995.
9. Clahsen, H., Linguistic perspectives on specific language impairment. In *Handbook of Language Acquisition*, eds W. C. Ritchie and E. K. Bahtia. Academic Press, in press.
10. Bishop, D., Grammatical errors in specific language impairment: competence or performance limitations? *Applied Psycholinguistics* **15**, 507–550, 1994.
11. Watkins, R. and Rice, M., *Specific Language Impairments in Children*. Brookes, Baltimore, 1994.
12. Rothweiler, M. and Clahsen, H., Dissociations in SLI children's inflectional systems: a study of participle inflection and subject-verb-agreement. *Journal of Logopedics and Phoniatrics* **18**, 169–179, 1993.
13. Clahsen, H. and Hansen, D., The grammatical agreement deficit in specific language impairment: evidence from therapy experiments. In *The Biological Basis of Language*, ed. M. Gopnik, pp. 148–168. Oxford University Press, Oxford, 1997.
14. Bottari, P., Cipriani, P. and Chilosi, A.M., Root infinitives in Italian SLI children. In *Proceedings of the 20th Annual Boston University Conference on Language Development*, eds D. MacLaughlin and S. McEwen. Cascadilla Press, Boston, 1996.
15. Grimm, H., Syntax and morphological difficulties in German-speaking children with specific language impairment: implications for diagnosis and intervention. In *Language Acquisition Problems and Reading Disorders: Aspects of Diagnosis and Intervention*, eds H. Grimm and H. Skowronek, pp. 25–64. de Gruyter, Berlin, 1993.
16. Gazdar, G., Klein, E., Pullum, G. and Sag, I., *Generalized Phrase Structure Grammar*. Harvard University Press, Cambridge, MS, 1985.
17. Chomsky, N., *The Minimalist Program*. MIT Press, Cambridge, 1995.
18. van der Lely, H. and Stollwerck, L., Language modularity, Binding theory and specifically language impaired children. *Cognition*, in press.
19. Bartke, S., Experimentelle Studien zur Flexion und Wortbildung. Pluralbildung und lexikalische Komposition im unauffälligen Spracherwerb und im Dysgrammatismus. Diss., Heinrich-Heine-Universität Düsseldorf, 1996.
20. Rice, M. and Wexler, K., A phenotype of specific language impairment: extended optional infinitives. In *Toward a Genetics of Language*, ed. M. Rice, pp. 215–237. Erlbaum Press, Mahwah, NJ, 1996.
21. Clahsen, H. and Rothweiler, M., Inflectional rules in children's grammars: evidence from German participles. *Yearbook of Morphology 1992*, 255–288, 1993.
22. Wexler, K., Optional infinitives, head movement and the economy of derivations in child grammar. In *Verb Movement*, eds D. Lightfoot and N. Hornstein, pp. 305–350. CUP, Cambridge, 1994.
23. Radford, A., *Syntactic Theory and the Acquisition of English Syntax: The Nature of Early Child Grammars of English*. Basil Blackwell, Oxford, 1990.
24. Vainikka, A., Case in the development of English syntax. *Language Acquisition* **3**, 257–325, 1994.
25. Schütze, C. and Wexler, K., Subject case licensing and English root infinitives. In *Proceedings of the 20th Annual Boston University Conference on Language Development*, eds D. MacLaughlin and S. McEwen. Cascadilla Press, Boston, 1996.
26. Pensalfini, R., Pronoun case errors, both syntactic and morphological. *MIT Working Papers in Linguistics* **26**, 305–324, 1995.

27. Clahsen, H., Eisenbeiss, S. and Vainikka, A., The seeds of structure. A syntactic analysis of the acquisition of case marking. In *Language Acquisition Studies in Generative Grammar*, eds T. Hoekstra and B. Schwartz, pp. 85–118. Benjamins, Amsterdam, 1994.
28. Chomsky, N., *Lectures on Government and Binding*. Foris, Dordrecht, 1981.
29. Clahsen, H., Eisenbeiss, S. and Penke, M., Lexical learning in early syntactic development. In *Generative Perspectives on Language Acquisition*, ed. H. Clahsen, pp. 129–159. Benjamins, Amsterdam, 1996.
30. Grimm, H. and Weinert, S., Is the syntax development of dysphasic children deviant and why? New findings to an old question. *Journal of Speech and Hearing Research* **33**, 220–228, 1990.
31. Poeppel, D. and Wexler, K., The full competence hypothesis of clause structure in early German. *Language* **69**, 1–33, 1993.
32. Clahsen, H., Penke, M. and Parodi, T., Functional categories in early child German, *Language Acquisition* **3**, 395–429, 1993.
33. Boser, K., Lust, B., Santelmann, L. and Whitman, J., The syntax of V2 in early child German grammar: the strong continuity hypothesis. *Proceedings of the Northeast Linguistic Society* **22**, 51–66, 1992.
34. Déprez, V. and Pierce, A., Negation and functional projections in early grammar. *Linguistic Inquiry* **24**, 25–67, 1993.
35. Gopnik, M., Impairments of tense in a familial language disorder. *Journal of Neurolinguistics* **8**, 109–133, 1994.
36. Ullman, M. and Gopnik, M., Past tense production: regular, irregular and nonsense verbs. *McGill Working Papers in Linguistics* **10**, 81–118, 1994.

APPENDIX

Table A1. Overview: German SLI data

Words	Number of recordings	Age	Number of utterances	MLU in
Dieter	1	7;2	1001	3.3
Sebastian	4	5;8–6;6	658	2.6–3.5
David	1	7;11	436	4.1
Peter	3	6;6–7;6	779	3.5–3.8
Connie	1	6;3	284	4.2
Michael	1	7;2	459	3.6
Totals	13	5;8–7;11	3617	2;6–4;2

Table A2. Overview: English SLI data

	Number of recordings	Age 1993	Number of elicited verbs in 3rd sg. task	Number of elicited verbs in past tense task
JW	4	10;03	35	58
WL	4	10;05	22	74
JS	4	10;10	25	57
AZ11	4	11;03	20	69
RJ	4	11;11	31	61
AZ12	4	12;00	22	59
CT	4	12;11	17	45
SB	4	13;00	29	95
AT	4	13;01	28	48
Totals	36	10;00–13;01	229	566

Table A3. Past tense and 3rd -s on main verbs

	3rd -s: 1993		3rd -s: 1994		Past tense: 1993		Past tense: 1994	
	# oblig. contexts	# correct	# oblig. contexts	# correct	# oblig. contexts	# correct	# oblig. contexts	# correct
JW	7	2	11	2	27	17	15	13
WL	10	7	7	5	42	24	16	11
JS	10	3	8	8	20	16	18	16
AZ11	10	2	5	1	23	18	22	15
RJ	10	0	7	1	29	10	13	6
AZ12	12	7	5	2	29	26	20	16
CT	16	5	0	0	34	31	0	0
SB	13	8	11	7	45	43	15	15
AT	9	5	6	4	29	25	10	9
Totals	97	39	60	30	278	210	129	101

Table A4. Subject-verb agreement

	ST/corr.	ST/inc.	T/corr.	T/inc.	E/corr.	E/inc.	O/corr.	O/incor.	N/corr.	N/incor.	SEIN/cr.	SEIN/in.
Dieter	0	2	10	1	3	0	116	60	6	11	79	8
Sebasti.	10	0	35	19	12	2	56	33	7	4	86	1
Peter	0	0	98	2	1	3	49	39	39	6	72	0
Connie	1	0	11	1	4	3	31	15	16	0	20	9
Michael	0	0	8	6	3	23	20	13	6	7	22	1
David	2	0	8	1	5	13	26	25	10	3	7	2
Totals	13	2	170	30	28	44	298	185	84	31	286	21

Table A5. Preterite marking

	Pret./corr.	Pret./inc.	WAR/corr.	WAR/incor.
Dieter	5	0	5	0
Sebastian	12	0	9	0
Peter	52	1	35	0
Connie	13	0	13	0
Michael	3	0	1	0
David	6	0	2	0
Totals	91	1	65	0

Table A6. Finiteness and case marking in unimpaired English children (based on Pensalfini, 1995)

	Finite verb		Bare stems		Signifi.
	+Nom.	-Nom.	+Nom.	-Nom.	
Eve	183	1	386	18	*
Peter	714	5	98	20	*
Naomi	131	4	56	7	*
Nina	50	13	178	125	*
Totals	1078	23	718	170	*

Table A7. Finiteness and case marking in English SLI children

	Finite verb		Bare stems	
	+Nom.	-Nom.	+Nom.	-Nom.
JW	17	0	8	0
WL	21	0	11	0
JS	16	0	3	0
AZ11	19	0	3	0
RJ	2	0	12	0
AZ12	31	0	5	0
CT	9	0	3	0
SB	27	0	4	0
AT	26	0	0	0
Totals	168	0	49	0

Table A8. Finiteness and case marking in German SLI children

	Root-clause infinit.		Full DP-subjects	
	With full DP-subjects	Without DP-subj.	With correct SV-agreem.	With incorrect SV-agreem.
Dieter	7	16	9	39
Michael	2	8	13	36
Sebastian	1	24	31	28
Peter	2	5	98	28
David	2	9	9	22
Connie	0	2	29	11
Totals	14	64	189	164

Table A9. Finiteness and verb placement in German SLI children

	Dieter	Sebastian	David	Peter	Michael	Connie
Finite/non-finite verbs						
V _{+fin} in V2-position	95	110	24	152	32	14
V _{+fin} in V-final position	0	37	3	3	8	12
V _{-fin} in V2-position	11	1	1	5	2	0
V _{-fin} in V-final position	37	67	29	62	20	16

Table A10. Verb clusters in German SLI children

	Dieter	Sebastian	David	Peter	Michael	Connie
Verb clusters						
V _{+fin} < V _{-fin}	51	65	32	72	15	25
V _{-fin} < V _{+fin}	0	3	1	1	1	5