Specific Language Impairment as evidence for the division of labor between interface pragmatics and grammar

Jeannette Schaeffer
Ben-Gurion University of the Negev

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1. Introduction

Models of cognition and language, such as the Modularity Hypothesis (Fodor, 1983; Chomsky, 1986) can help generate hypotheses about the nature of language disorders, and vice versa. The Modularity Hypothesis is informally described as in (1):

(1) Modularity Hypothesis (Fodor, 1983; Chomsky, 1986)
The view of cognition in general, and language, in particular, as arising from a complex interaction of various cognitive domains and further, that these domains are autonomous in the sense that they are governed by distinct principles.

This description suggests that we can distinguish two types of modularity, as in (2):

(2) A. modularity of cognition (with language being one of the modules) – “Big Modularity” (Levy & Kave, 1999);
B. modularity of language – “Small Modularity” (Levy & Kave, 1999)

Results of studies on Specific Language Impairment, showing that impairment can be isolated to language alone, provide support for a Modularity Hypothesis corresponding to A: Big Modularity. As for the one in B, or Small Modularity, the question arises as to what modules language itself consists of. We take a Chomskyan view of language as a starting point, and assume the modules of language to be as in (3):
As for Small Modularity, Specific Language Impairment (SLI) is a particularly relevant field of research because the impairment is possibly restricted to grammar, a module of language (Leonard, 1998; van der Lely, 2003).

In this talk we focus on the question whether and how the Computational System and the Pragmatic System are distinct modules, and how they interact. More specifically, we concentrate on the influence of so-called “interface pragmatics” on grammar (syntax/semantics). We do this by investigating the topics listed in (4): subjects, articles, and direct object scrambling in the spontaneous speech production of English and Dutch speaking children with SLI.

(4) **Topics of investigation**
(i) subjects (in English)
(ii) articles (in English)
(iii) direct object scrambling (in Dutch)

We will come back to the choice of these topics later. Let us first elaborate on some different notions of pragmatics.
2. Background

2.1 Interface Pragmatics

Kasher (1991) proposes that there are different types of pragmatics. First, there is 'linguistic pragmatics', including speech acts, conversational participation and discourse regulation (initiations, replies, topic maintenance, turn taking, utterance repair, etc.), and code switching. Second, there is 'non-linguistic pragmatics', a central, non-modular cognitive system with general principles of intentional action which apply to linguistic structure, but also to the output of other, non-linguistic functions. The system of non-linguistic pragmatics is responsible for, for instance, indirect speech acts, politeness, registry, and style. Finally, Kasher proposes another type of pragmatics, namely 'interface pragmatics' as formulated in (5), which seems to have a much more immediate impact on the linguistic structure.

(5) Interface pragmatics (Kasher, 1991)
"[...] pragmatic knowledge which involves integration of data from a linguistic channel with data from other channels. For example, understanding certain indexical expressions, such as she or there, involves integration of the output of a language module with the output of some perception module, each serving as input for some central unit which produces the integrated understanding of what has been said in the context of utterance." (Kasher, 1991:391).

Examples: reference, presupposition

He characterizes interface pragmatics as "[...] pragmatic knowledge which involves integration of data from a linguistic channel with data from other channels. For example, understanding certain indexical expressions, such as she or there, involves integration of the output of a language module with the output of some perception module, each serving as input for some central unit which produces the integrated
understanding of what has been said in the context of utterance." (Kasher, 1991:391). In terms of production, we could say that integration needs to take place between the output of the Computational System and the output of other perception modules before the utterance can be spelled out. This integration is executed by interface pragmatics. Thus, referring back to Kasher's pronoun example, notions such as "reference" and "presupposition" seem to belong to interface pragmatics. In this sense, interface pragmatic principles immediately influence the realization of certain linguistic structures, such as the choice of pronominal elements versus noun phrases, the choice between covert and overt subjects, the choice between definite and indefinite nominal expressions, and, in turn, their correct position in the syntactic structure.

In order to obtain an answer to the question as to whether the pragmatic system of children with SLI can be impaired in its own right, and is not the result of impaired grammar, we should investigate either non-linguistic pragmatics, or interface pragmatics. Impairment of non-linguistic pragmatic abilities does not have an immediate impact on the grammar, which makes it difficult to investigate it by means of spontaneous speech samples. However, as we saw before, interface pragmatics does influence the realization of the grammar. Therefore, we chose to concentrate on interface pragmatics. In the next section we discuss some concepts that are likely to be part of interface pragmatics.

2.2 Speaker/Hearer Assumptions and the Concept of Non-Shared Assumptions

Let us assume with Kasher that referential expressions such as pronouns and locative *there* are the output of interface pragmatics. The question is what exactly the interface pragmatic principles are that govern the appropriate use of such linguistic
elements. We propose that one of them is the "Concept of Non-Sha red Assumptions" (Schaeffer, 1999; 2000; Schaeffer & Matthewson, 2002). This concept makes crucial use of the notions "Speaker Assumptions" and "Hearer Assumptions", which we will explain first.

In order for a conversation not to break down, a speaker needs to take into account what her interlocutor, the hearer knows. For example, if a speaker starts a conversation out-of-the-blue as in (6) with the sentence: "The tree fell down" in a situation in which no tree is visible, her interlocutor/hearer will be confused, because the use of the definite article *the* implies that the reference of the noun *tree* is assumed to exist not only by the speaker, but also by the hearer. The hearer is not familiar with the referent of *tree* because it has not been introduced to her in the preceding discourse. Consequently, communication break-down takes place. This phenomenon is also referred to as "Presupposition Failure". Similar break-downs occur when pronouns are used out-of-the-blue.

(6)  

Presupposition failure \(\Rightarrow\) communication break-down  
A:  The tree fell down.  
B:  ??? What tree?  
A:  She ate my cookie!  
B:  ??? Who is she?

We claim that break-downs such as the ones just described are the result of a failure in the interface pragmatics, namely in the application of the “Concept of Non-shared Assumptions”, which is defined in (7):
The Concept of Non-shared Assumptions expresses an obligation for the speaker to consider the hearer’s assumptions as a separate entity and therefore as something that is in principle different from the speaker’s assumptions. However, in certain cases, speaker and hearer assumptions may coincide. Notice that if the Concept of Non-shared Assumptions is absent, or fails to apply, speaker and hearer assumptions are not always independent, implying that there are situations in which the speaker automatically attributes her own assumptions to the hearer.

Returning to SLI, investigating speaker/hearer assumptions in children with SLI can provide a better insight into the question whether interface pragmatics is a device separate from other types of pragmatics and from the Computational System, and the question whether pragmatics in general, and interface pragmatics in particular, can be problematic for children with SLI in its own right, rather than being the consequence of impaired grammar. We do this by analyzing three of the many linguistic effects of the application of the Concept of Non-shared Assumptions, namely null subjects in English, article choice in English, and direct object scrambling in Dutch. In addition, we examine some grammatical properties of subjects, articles and direct objects. But before we turn to SLI, let us first describe these phenomena in adult English and Dutch, and report some results regarding them in normally developing child language.
2.3 **Subjects**

2.3.1 **Syntactic and pragmatic properties**

Subjects display syntactic properties, such as agreement with the verb, and Case, but also pragmatic properties. Unlike in languages such as Italian and Spanish, whose grammars license empty subjects, in adult English subjects may be dropped only in certain pragmatic contexts, in which the referent of the subject is recoverable from the preceding linguistic or the situational discourse. For example, answers to WH-questions may omit the subject if the referent of that subject is mentioned in the preceding WH-question, as illustrated in (8):

(8) **Subject drop in English**

A: What did Rebecca do last night?
B: __ Watched TV.

Another pragmatic context in which subjects may be left out is the so-called "diary drop" context, as first pointed out by Haegeman (1990). She describes a cluster of properties observed in diary drop, which is exemplified in (9):

(9) **Diary drop** (Haegeman, 1990)

(i) In English, the dropped subject is usually first person:

\[
A \text{ very sensible day yesterday. } \underline{\text{____ saw noone. }} \underline{\text{____ took the bus to Southwark Bridge. }} \underline{\text{____ walked along Thames Street. }} . . .
\]


(ii) The subject cannot be dropped after a preposed element:

a)  \( \underline{\text{____ was so stupid!}} \)
b)  *How stupid \( \underline{\text{____ was!}} \)
(iii) Main subjects can be dropped, embedded subjects cannot:

a) ______ can’t find the letter that I need.
b) *I can’t find the letter that _____ need.

(iv) Subjects can be dropped, objects cannot:

a) ______ saw her at the party.
b) *I saw ____ at the party.

Thus, English subject drop exists, but it is driven by pragmatic, rather than syntactic factors. Empty subjects are not licensed by anything in the syntax, such as verbal agreement. However, they can be identified by a referent in the discourse in restricted pragmatic contexts. On the other hand, pragmatic subject drop in English is constrained by syntactic factors such as the ones described in (9(ii) and (iii)), namely, a null subject cannot appear after a preposed constituent, or in an embedded clause, even if it can be identified by the context.

We propose that the pragmatic concepts responsible for subject drop in English include Speaker/Hearer Assumptions and the Concept of Non-Shared Assumptions. Given the right syntactic environment, an English subject can be null if both speaker and hearer assume the existence of the referent. This is achieved if the referent is in the so-called “Common Ground” between the speaker and the hearer – either because the referent was just mentioned in the linguistic discourse, or because it is present in the situational context. Thus, based on the Concept of Non-Shared Assumptions, namely that in principle, speaker and hearer assumptions are independent, a speaker needs to calculate whether the referent of the relevant subject is assumed to exist by the hearer as
well. If so, and if the syntactic requirements are satisfied, the speaker can use a null subject.

To sum up, adult English subjects display pragmatic properties, such as subject drop, and grammatical properties, such as subject-verb agreement and Nominative Case, as is stated in (10):

(10)  *English subjects*

(i)  Interface pragmatic properties: subject drop

(ii) Grammatical properties: subject-verb agreement, NOM Case

2.3.2  *Subject drop in normally developing standard child English*

Young normally developing, standard-English speaking children up to age 3;0 drop subjects at substantial rates (Brown, 1973; Hyams, 1983; 1986). Sano & Hyams (1993) carried out a detailed quantitative study and investigated the overtness of subjects in different types of finite constructions, namely “inflected *be*”, “modals”, “3rd person singular –s”, and “past tense –ed”. They show that constructions with inflected *be* and modals hardly ever contain null subjects. However, if the verb has a 3rd person singular -s, or a regular past tense -ed inflection, there is a substantial proportion of null subjects.

Consider Table 1:

Table 1: *Proportions of null subjects with finite verbs ending in -s and -ed in ND child English* (Sano & Hyams, 1993)

<table>
<thead>
<tr>
<th>name of child</th>
<th>age</th>
<th>-s</th>
<th>-ed</th>
<th>total –s/-ed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eve</td>
<td>1;6-2;3</td>
<td>10% (5/50)</td>
<td>23% (9/40)</td>
<td>16% (14/90)</td>
</tr>
<tr>
<td>Adam</td>
<td>2;3-3;0</td>
<td>26% (16/62)</td>
<td>57% (13/23)</td>
<td>34% (29/85)</td>
</tr>
<tr>
<td>Nina</td>
<td>2;2-2;4</td>
<td>19% (3/16)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Eve produces null subjects in 10% of her 3rd person singular present tense constructions and in 23% of her regular past tense constructions. Adam's proportions are even higher: 26% in the present tense and 57% in the past. For Nina only regular past tense counts were carried out, and she dropped subjects in these contexts 19% of the time.

We suggest that this early English subject drop in finite clauses is due to the lack of the interface-pragmatic Concept of Non-Shared Assumptions. As long as this concept is absent, children will not systematically distinguish between speaker and hearer assumptions, and often automatically attribute their own assumptions to the hearer. Consequently, they will use null subjects not only when the referent is assumed to exist by both speaker and hearer, but also when the referent is assumed to exist by the speaker (i.e. the child) only. In other words, young normally developing English acquiring children overgenerate null subjects: they allow null subjects in a larger number of pragmatic contexts than adults do. By the age of about 3;6, normally developing English speaking children no longer produce non-adultlike null subjects, indicating that they have acquired the interface pragmatic Concept of Non-Shared Assumptions.

2.4 Articles

2.4.1 Pragmatic properties of articles: article choice

Articles have pragmatic properties, too. The choice between using a definite or an indefinite article depends on pragmatic concepts such as speaker/hearer assumptions (cf. Maratsos, 1974). If the referent of the noun is assumed to exist by both speaker and hearer, a definite article is used, whereas an indefinite article is felicitous if the referent is
assumed to exist by only the speaker, but not the hearer. This is exemplified by the two sentences in (11).

(11) This is a story about a girl. The girl lived in a little house with her mother.

In order to make these distinctions, the Concept of Non-Shared Assumptions must be at work: Speaker and hearer assumptions are always independent, and thus in principle different.

2.4.2 Article choice in normally developing standard child English

Since Maratsos (1974), researchers of child language have reported that young children acquiring languages that distinguish between definite and indefinite articles sometimes use the definite article in a context in which adults would use an indefinite article. However, overgeneration in the other direction (using an indefinite instead of a definite article) is rarely attested. The overgeneration of a definite article often leads to a communication breakdown, as is illustrated in (12):

(12) Sarah: Where’s the black tape? (Brown, 1973:341)
Mother: What black tape?

Obviously, the referent for the nominal expression the black tape had not been introduced in the discourse, which explains the mother’s confusion.

In Schaeffer (1999) we report on a study testing the overgeneration of the in English-acquiring children and found that 2-year olds overgenerate the 16% of the time, but that 3-year olds behave adultlike, as is shown in Table 2:
Table 2: *Overgeneration of the in ND child English* (Schaeffer, 1999)

<table>
<thead>
<tr>
<th>age</th>
<th>‘the’ in indefinite contexts</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>16% (14/89)</td>
</tr>
<tr>
<td>3</td>
<td>4% (6/135)</td>
</tr>
<tr>
<td>4</td>
<td>4% (2/52)</td>
</tr>
<tr>
<td>5</td>
<td>0% (0/18)</td>
</tr>
<tr>
<td>adults</td>
<td>4% (13/345)</td>
</tr>
</tbody>
</table>

We attribute the phenomenon of *the* overgeneration to the lack of the Concept of Non-Shared Assumptions. Lacking the Concept of Non-Shared Assumptions causes the child to attribute her own knowledge to the hearer. Since definite articles denote familiarity of the noun’s referent to both speaker and hearer, it follows that children overgenerate the definite article: they use it when the referent is familiar to the speaker, i.e. themselves, and the hearer (this is adultlike), but also when the referent is familiar only to the speaker, i.e. themselves (this is non-adultlike). Between the ages of 3;6 and 4;0, normally developing children usually no longer overgenerate the definite article.

2.4.3 Grammatical properties of articles: (c)overtness

Obviously, articles have grammatical properties as well. For example, English singular nouns can be accompanied by an article, or they can occur bare. Following Chierchia (1998) we assume that this is grammatically (semantically) determined, as schematized in (13): in English, count nouns enter the computation as predicates, whereas mass nouns enter the computation as arguments. In order to occupy argument positions predicative nouns must be accompanied by an article, as in, for example, *The cat is beautiful*. Mass nouns can occupy argument positions without modifying them with an article, as in, for example, *Water is refreshing*. Thus, certain nouns (namely mass nouns) can occupy argument positions without being modified by an article while other nouns (count nouns)
must have an article in order to occupy argument positions. Put differently, in adult English, articles reflect argumenthood, but argumenthood is not always expressed by articles.

(13)  

Articles and Argument-hood (after Chierchia, 1998)

Count nouns enter computation as predicates.
Mass nouns enter computation as arguments.
Predicative noun must have article to occupy argument position (The cat is beautiful). Mass noun can occupy argument position without article (Water is refreshing).

Articles reflect argument-hood, but:
Argument-hood is not always expressed by articles.

2.4.4 Article drop in normally developing standard child English

As is well-known, young children often drop articles. For English, this has been noted at least since Brown (1973). As represented in Table 3, our study in ‘99 (Schaeffer, 1999) shows that in an experimental setting, English-acquiring children drop articles around 10% between the ages of 2 and 3. By the age of 3, they no longer drop articles.

<table>
<thead>
<tr>
<th>age</th>
<th>definite article drop</th>
<th>indefinite article drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8% (4/52)</td>
<td>10% (3/30)</td>
</tr>
<tr>
<td>3</td>
<td>1% (1/94)</td>
<td>2% (1/60)</td>
</tr>
<tr>
<td>4</td>
<td>0% (0/32)</td>
<td>0% (0/22)</td>
</tr>
<tr>
<td>5</td>
<td>0% (0/14)</td>
<td>0% (0/9)</td>
</tr>
<tr>
<td>adults</td>
<td>0% (0/275)</td>
<td>0% (0/163)</td>
</tr>
</tbody>
</table>
Inspired by Chierchia et al. (2000) we propose the following explanation for article drop in child language. The task for children is as in (14):

(14)  

Acquisition of argumenthood

(i) map the semantic feature “predicatehood” to its correct morpho-syntactic counterpart;
(ii) map the semantic feature “argumenthood” to its correct morpho-syntactic counterpart.

As for predicatehood, the English acquiring child receives clear, unambiguous evidence from the input: predicatehood can be expressed through common nouns only (and not by article+noun clusters). On the other hand, the evidence for argumenthood is ambiguous: argumenthood can be expressed through bare nouns, but also through article+noun clusters. We argue that missing articles in child language result from a mis-mapping between the semantic property ‘argumenthood’ and its syntactic counterpart (noun, or article+noun). Misanalyzing predicative nouns (for example, cat) as argumental results in non-adultlike bare nouns.

As stated in (15), we conclude that articles in English, and in Dutch, for that matter, have interface pragmatic properties, namely in the case of article choice, and that the presence/absence of articles is a grammatical phenomenon:

(15)  

Articles

Interface pragmatic properties: article choice (e.g. definite vs. indefinite)
Grammatical properties: presence/absence
2.5 **Direct object scrambling**

2.5.1 **Pragmatic properties of direct object scrambling**

Finally, Dutch object scrambling, a syntactic mechanism that moves the object to a higher position, is argued to involve an interface pragmatic property as well, namely referentiality: a referential object scrambles over an adverb or over negation, but a non-referential object does not.

This is illustrated in (16) (the adverb and the object are bold-faced):

(16) a. *non-referential object: unscrambled*

... dat Saskia *waarschijnlijk een boek* gelezen heeft
... that Saskia probably a book read has
'... that Saskia probably read a book'

b. *referential object: scrambled*

... dat Saskia *het boek waarschijnlijk* gelezen heeft
... that Saskia the book probably read has
'... that Saskia read the book probably'

Referentiality can be formulated in terms of speaker and hearer knowledge: a nominal expression is referential if its referent is assumed to exist by at least the speaker; it is non-referential if the referent is assumed to exist by neither the speaker, nor the hearer. This is schematized in (17):

(17) **Referentiality**

If referent of nominal expression is

(i) assumed to exist by speaker  ⇒  referential (indefinite)
(ii) assumed to exist by speaker and hearer  ⇒  referential (definite)
(iii) not assumed to exist by speaker  ⇒  non-referential (indef)
(iv) not assumed to exist by speaker or hearer  ⇒  non-referential (indef)
2.5.2 Direct object scrambling in normally developing child Dutch

Dutch 2-year old children often fail to scramble referential objects in obligatory contexts. In Schaeffer (1995) we report on object scrambling in the spontaneous speech of two Dutch children: Laura and Niek. The results, represented in Table 4, show that Laura fails to scramble referential objects in obligatory contexts around 70% of the time up till age 3;4. After this age this percentage drops to 12%. Niek leaves referential objects unscrambled around 25% of the time, but for a longer period, namely up till age 3;11.1

Table 4: Proportions of unscrambled referential objects (pronouns) in spontaneous ND child Dutch (Schaeffer, 1995)

<table>
<thead>
<tr>
<th></th>
<th>stage I</th>
<th>stage II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laura</td>
<td>70%</td>
<td>12%</td>
</tr>
<tr>
<td>Niek</td>
<td>29%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Laura - stage I: 1;9 - 3;4
stage II: 3;4 - 5;4
Niek - stage I: 2;7 - 3;5
stage II: 3;6 - 3;11

An elicited production task with 49 Dutch speaking children (Schaeffer, 1997, 2000) shows that Dutch 2-year olds fail to scramble referential objects in obligatory contexts around 75% of the time, a percentage that drops dramatically in the responses of the 3-year olds. This is presented in Table 5:

Table 5: Proportions of unscrambled referential objects in elicited production task with ND Dutch speaking children (Schaeffer, 1997; 2000)

<table>
<thead>
<tr>
<th></th>
<th>definite DP</th>
<th>personal pronoun</th>
<th>demonstrative pronoun</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-year olds (7)</td>
<td>70%</td>
<td>67%</td>
<td>83%</td>
</tr>
<tr>
<td>3-year olds (13)</td>
<td>28%</td>
<td>5%</td>
<td>22%</td>
</tr>
</tbody>
</table>

We argue that the failure to scramble referential objects is due to the lack of the pragmatic Concept of Non-Shared Assumptions. If no distinction is made between

TP1PTNiek is known to be a slow-developing child in terms of language.
speaker and hearer assumptions, it is impossible to correctly infer what referentiality is. Consequently, in these cases, referentiality is not syntactically marked on the direct object, and the object is not scrambled.

Young Dutch children also produce a large number of non-adultlike bare object nouns, of which the majority is unscrambled. The results of both the spontaneous speech and the elicited production task studies referred to above are provided in Tables 6 and 7, respectively:

Table 6: Proportions of scrambled and unscrambled article-less object nouns in spontaneous ND child Dutch (Schaeffer, 1995)

<table>
<thead>
<tr>
<th></th>
<th>stage I</th>
<th>stage II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>scrambled</td>
<td>unscrambled</td>
</tr>
<tr>
<td>Laura</td>
<td>0% (0)</td>
<td>100% (18)</td>
</tr>
<tr>
<td>Niek</td>
<td>18% (11)</td>
<td>82% (50)</td>
</tr>
</tbody>
</table>

Table 7: Proportions of scrambled and unscrambled article-less object nouns in elicited production task with ND Dutch speaking children (Schaeffer, 1997)

<table>
<thead>
<tr>
<th></th>
<th>Scrambled</th>
<th>unscrambled</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-year olds</td>
<td>11% (3)</td>
<td>89% (24)</td>
</tr>
<tr>
<td>3-year olds</td>
<td>30% (3)</td>
<td>70% (7)</td>
</tr>
</tbody>
</table>

We attribute this phenomenon to the more general grammatical phenomenon of article drop that has been observed cross-linguistically in the speech of young children (see also section 2.3.2). The reason why these article-less object nouns do not scramble is as follows. First of all, we assume that referentiality is a syntactic feature in the D head of the DP, as is illustrated in (18):
As you can see, we also adopt a functional 'NumP' layer, which stands for 'Number Phrase' and which we assume to take care of number checking (singular/plural). However, this is not crucial for our story here). Second, the article occurring in the D-head spells out the referentiality feature and marks the whole nominal expression as referential. When there is no article, referentiality is not realized, which means that the entire nominal expression is not marked for referentiality. Therefore, scrambling does not take place. In this case then, the failure to scramble is caused by something grammatical, namely article drop.

Thus, as stated in (19), we assume that direct object scrambling involves interface pragmatic notions, such as referentiality, and grammatical properties, namely the presence or absence of an article:

(19) *Direct object scrambling*

Interface pragmatic properties: referentiality
Grammatical properties: presence/absence of article
2.6 **Hypotheses and predictions**

In summary, subjects, articles, and object scrambling all have interface-pragmatic and grammatical properties, and therefore provide an excellent test-ground for the modularity of language. As stated in (20), we hypothesize that interface pragmatics is a distinct module separate from the grammar (syntax/semantics), and that children with SLI have deficits in their grammar only, and thus not in their interface pragmatic system.

(20) *Hypotheses*

Hypothesis 1: Interface pragmatics is a distinct module separate from the grammar (syntax/semantics).

Hypothesis 2: Children with SLI have deficits in their grammar, but not in their (interface-) pragmatic system.

These hypotheses render several predictions with respect to the topics of investigation we suggested. The predictions are listed in (21). First, we predict that children with SLI older than 3;6 have the interface pragmatic Concept of Non-Shared Assumptions, just like their normally developing age mates. From this it follows that English acquiring children with SLI older than 3;6 should not overgenerate null subjects, nor should they overgenerate definite articles. It also follows that Dutch acquiring children with SLI older than 3;6 should not fail to scramble referential direct objects with an overt article. Second, we predict that children with SLI might have problems with the grammatical properties of subjects, articles, and object scrambling. In particular, English acquiring children with SLI are predicted to produce errors with respect to subject-verb agreement and Nominative Case, and to drop articles, and Dutch acquiring children with SLI are predicted to drop articles, and leave direct objects without articles unscrambled.
(21) Predictions
I. Children with SLI older than 3;6 have the interface pragmatic Concept of Non-Shared Assumptions:
   (i) English acquiring children with SLI older than 3;6 do not overgenerate null subjects;
   (ii) English acquiring children with SLI older than 3;6 do not overgenerate definite articles;
   (iii) Dutch acquiring children with SLI older than 3;6 do not fail to scramble referential direct objects with an overt article.

II. Children with SLI have deficits in their grammar:
   (iv) English acquiring children with SLI (younger or older than 3;6) make errors with respect to subject-verb agreement and Nominative Case;
   (v) English acquiring children with SLI (younger or older than 3;6) drop articles;
   (vi) Dutch acquiring children with SLI (younger or older than 3;6) drop articles. In the case of direct objects, this results in non-scrambling.

3. Methods
3.1 Participants
For the investigation of subjects and articles we examined the spontaneous speech transcripts of 14 English-speaking children with SLI between the ages of 3;11 and 4;10 (mean age 4;5) and an MLU range of 2.0-5.0 (mean MLU 3.8) and two individually matched control groups (MLU and age) of 14 children each. These data are part of the “San Diego Longitudinal Study” (Tallal, Curtiss and Kaplan, 1988) and were kindly made available to us by Susan Curtiss. Details regarding the individual subjects’ gender, age and MLU are provided in (22) and (23).
(22) *English speaking children with SLI (N=14) and their MLU controls (N=14)*  
(San Diego Longitudinal Study - Tallal, Curtiss and Kaplan, 1988)

<table>
<thead>
<tr>
<th>ID</th>
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<th>Age</th>
<th>ID</th>
<th>Gender</th>
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Average 3.827 4;04 years  
Average 3.842 3;0
(23) *English speaking children with SLI (N=14) and their age controls (N=14)*

<table>
<thead>
<tr>
<th>SLI</th>
<th>Gender</th>
<th>MLU</th>
<th>Age</th>
<th>AGE-CONTROLS</th>
<th>Gender</th>
<th>MLU</th>
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<td>Average</td>
<td>6.320</td>
<td>4;03 years</td>
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</table>

As for direct object scrambling, we examined the spontaneous speech of 20 Dutch children with SLI between the ages of 4;2 and 8;2 and an MLU range of 2.1 - 5.7. These data were collected by Gerard Bol and Folkert Kuiken (Bol & Kuiken, 1988). The details regarding their gender, age and MLU are provided in (24).
Dutch children with SLI (N=20)  
(Bol & Kuiken, 1988)

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<tr>
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<td>F</td>
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<td>2.2</td>
</tr>
<tr>
<td>03</td>
<td>F</td>
<td>4:01.16</td>
<td>2.4</td>
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<td>M</td>
<td>6:02.10</td>
<td>2.5</td>
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<td>M</td>
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</tr>
<tr>
<td>09</td>
<td>M</td>
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<td>M</td>
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<td>F</td>
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<td>4.4</td>
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<tr>
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<td>M</td>
<td>7:04.19</td>
<td>5.7</td>
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</table>

3.2 Materials and analysis

For the utterances used for coding and analysis of the English and Dutch data we refer to (25) – (30) in your hand-out:

(25) Utterances used for analysis of subject drop in English (pragmatic)
All clauses containing a verbal element, except for:
(i) imperative constructions;
(ii) relative clauses;
(iii) non-finite embedded clauses;
(iv) elliptical clauses, repetitions and completions of adult utterances;
(v) second conjunct in sentential coordinations.

(26) Utterances used for analysis of subject-verb agreement in English (grammatical)
All utterances containing:
a) 3rd person singular main verbs;
b) 3rd person singular auxiliary verbs DO and HAVE;
c) copular and auxiliary forms of BE for all persons.
(27) **Utterances used for analysis of subject Case in English (grammatical)**
All utterances containing a combination of a verb and a subject pronoun displaying overt (NOM/ACC/GEN) Case

(28) **Utterances used for analysis of the overgeneration in English (pragmatic)**
Utterances containing obligatory environments for indefinite articles.

(29) **Utterances used for analysis of article drop in English (grammatical)**
Utterances containing obligatory environments for overt articles in sentences/phrases (isolated/naming contexts were excluded)

(30) **Utterances used for analysis of direct object scrambling in Dutch**
All child utterances containing a verb, an object, and negation (niet or nie - 'not') or one of the following adverbs: nu ('now'), nou ('now'), gisteren ('yesterday'), morgen ('tomorrow'), altijd ('always'), even ('just', 'for a moment'), eventjes ('just', 'for a moment'), ook ('also'), maar (?), weer ('again'), zo ('this way'), gewoon ('just').

4. **Results and discussion**

4.1 **Subjects**

In order to make our subject drop results comparable to Sano & Hyams’ results for normal English child language, we examined only finite constructions. We subcategorized the finite verbs into three groups: a) 3rd person singular finite verbs ending in –s plus regular past tense finite verbs ending in –ed, b) irregular past tense verbs (including past tense forms of to be) and, c) present tense forms of to be plus modals, which are inherently finite.

The results for these categories are presented in Table 8:
Table 8: Proportions of overt and adultlike/non-adultlike null subjects

<table>
<thead>
<tr>
<th></th>
<th>SLI (age 4:04, MLU 3.827)</th>
<th>MLU CONTROLS (age 3:0, MLU 3.842)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-s + -ed</td>
<td>irreg. past (+was/were)</td>
</tr>
<tr>
<td>Overt subjects</td>
<td>93% (55/59)</td>
<td>96% (48/50)</td>
</tr>
<tr>
<td>Adultlike null subjects</td>
<td>5% (3/59)</td>
<td>0% (0/50)</td>
</tr>
<tr>
<td>Non-adultlike null</td>
<td>2% (1/59)</td>
<td>4% (2/50)</td>
</tr>
</tbody>
</table>

As the first four columns show, the English speaking children with SLI hardly ever drop subjects in a non-adultlike fashion: only around 4%. To be precise, they produce 2% non-adultlike subjects with verbs ending in –s and –ed; 4% with irregular past verbs, and 5% with inflected forms of be and modals. In columns 6-9 we see that the MLU controls, whose average age is 3;0 show similar patterns of non-adultlike null subjects: 8% for –s and –ed; 7% for irregular past, and 5% for inflected forms of be and modals. However, the ND children studied by Sano & Hyams (1993) and by Valian (1991), who are all

<table>
<thead>
<tr>
<th>AGE CONTROLS (age 4:03, MLU 6.320)</th>
<th>YOUNGER ND CHILDREN</th>
</tr>
</thead>
<tbody>
<tr>
<td>-s + -ed</td>
<td>irreg. past (+was/were)</td>
</tr>
<tr>
<td>Overt subjects</td>
<td>94% (158/168)</td>
</tr>
<tr>
<td>Adultlike null subjects</td>
<td>4% (6/168)</td>
</tr>
<tr>
<td>Non-adultlike null subjects</td>
<td>2% (4/168)</td>
</tr>
</tbody>
</table>
younger than 3;0, show significantly higher proportions of non-adultlike null subjects, ranging from 16% to 34%. Finally, the age controls are similar to the children with SLI in that they hardly drop any subjects in a non-adultlike manner in finite constructions.

Thus, our results confirm Prediction (i), that English acquiring children with SLI older than 3;6 do not overgenerate null subjects.

(21) Predictions
I. Children with SLI older than 3;6 have the interface pragmatic Concept of Non-Shared Assumptions:
   (i) English acquiring children with SLI older than 3;6 do not overgenerate null subjects;
   (ii) English acquiring children with SLI older than 3;6 do not overgenerate definite articles;
   (iii) Dutch acquiring children with SLI older than 3;6 do not fail to scramble referential direct objects with an overt article.

II. Children with SLI have deficits in their grammar:
   (iv) English acquiring children with SLI (younger or older than 3;6) make errors with respect to subject-verb agreement and Nominative Case;
   (v) English acquiring children with SLI (younger or older than 3;6) drop articles;
   (vi) Dutch acquiring children with SLI (younger or older than 3;6) drop articles. In the case of direct objects, this results in non-scrambling.

This in turn provides evidence for the more general prediction that English acquiring children with SLI older than 3;6 have the Concept of Non-Shared Assumptions, just like their age mates, and thus for the hypothesis that their interface pragmatic development is normal.

On the other hand, the English speaking children with SLI do not perform so well on syntactic subject properties such as subject-verb agreement and subject Case, as is demonstrated by the numbers in Tables 9 and 10.
Table 9: Proportion of errors in subject-verb agreement / finiteness

<table>
<thead>
<tr>
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<th>SLI</th>
<th>N-MLU</th>
<th>N-AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>main verbs (bare stem)</strong></td>
<td>45% (34/75)</td>
<td>30% (18/63)</td>
<td>10% (16/158)</td>
</tr>
<tr>
<td><strong>copulas</strong></td>
<td>27% (22/83)</td>
<td>11% (7/62)</td>
<td>1% (3/268)</td>
</tr>
<tr>
<td><strong>auxiliaries</strong></td>
<td>28% (13/47)</td>
<td>32% (13/41)</td>
<td>4% (4/110)</td>
</tr>
<tr>
<td><strong>modals</strong></td>
<td>40% (4/10)</td>
<td>(0/0)</td>
<td>18% (2/11)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>34% (73/215)</td>
<td>23% (38/166)</td>
<td>5% (25/547)</td>
</tr>
</tbody>
</table>

At the bottom of the second column of Table 9 we see that the children with SLI produce 34% errors with respect to subject-verb agreement, or finiteness. In the bottom cell of the penultimate column we can see that this error percentage is comparable to that of the MLU controls (23%), but radically different from that of the age controls (5%). This finding is consistent with other agreement studies on children with SLI, for example, Rice & Wexler (1996).

Let us now turn to the results on subject Case. Table 10 shows that the children with SLI produce 13% non-Nominative Case on subject pronouns, as opposed to both their MLU- and their age-matched controls who virtually produce no subject Case errors.

Table 10: Proportions of non-Nominative Case on subject pronouns

<table>
<thead>
<tr>
<th></th>
<th>SLI</th>
<th>N-MLU</th>
<th>N-AGE</th>
<th>Younger ND children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-nominative Case</td>
<td>13% (29/216)</td>
<td>3% (7/253)</td>
<td>0% (2/824)</td>
<td>9% - age 1:0-3:0 (N=12) (Rispoli, 1994)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22% - age 2;0-2;6 (Nina) (Schuetze, 1997)</td>
</tr>
</tbody>
</table>
Notice that our MLU controls perform much better than the children with SLI on subject Case. This is not surprising if we take the age of the MLU controls into consideration: most of them are older than 3, which is the age that non-NOM Case errors usually disappear. Studies on subject Case in young, normally developing, English acquiring children (for example, Rispoli, 1994, Vainikka, 1994; Schuetze, 1997; Wexler, Schuetze and Rice, 1998) report higher percentages of non-Nominative Case on subject pronouns in the language of children younger than 3. Rispoli (1994) finds 9% non-Nominative subjects in the 12 normally developing children between age 1;0-3;0 that he studied. Furthermore, Schuetze (1997) reports that Nina, a normally developing English-acquiring child, produces 22% non-Nominative 1\textsuperscript{st} and 3\textsuperscript{rd} person singular subjects between the ages of 2;0 and 2;6.

More importantly, the fact that the children with SLI whom we studied show substantial error rates with regard to both subject-verb agreement and subject Case confirm prediction (iv) and provides again evidence for the hypothesis that the children in the SLI group are impaired specifically in their grammar.

(21) \textit{Predictions}

I. \textbf{Children with SLI older than 3;6 have the interface pragmatic Concept of Non-Shared Assumptions:}

(i) English acquiring children with SLI older than 3;6 do not overgenerate null subjects;

(ii) English acquiring children with SLI older than 3;6 do not overgenerate definite articles;

(iii) Dutch acquiring children with SLI older than 3;6 do not fail to scramble referential direct objects with an overt article.
II. **Children with SLI have deficits in their grammar:**

(iv) English acquiring children with SLI (younger or older than 3;6) make errors with respect to subject-verb agreement and Nominative Case;

(v) English acquiring children with SLI (younger or older than 3;6) drop articles;

(vi) Dutch acquiring children with SLI (younger or older than 3;6) drop articles. In the case of direct objects, this results in non-scrambling.

4.2 **Articles**

Turning now to the results on the overgeneration of the definite article, we see in Table 11 that the English speaking children with SLI correctly produce indefinite articles in indefinite contexts.

Table 11: *Proportions of the overgeneration*

<table>
<thead>
<tr>
<th></th>
<th>SLI</th>
<th>N-MLU</th>
<th>N-AGE</th>
<th>ND 2-year olds</th>
</tr>
</thead>
<tbody>
<tr>
<td>the overgeneration</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>16%</td>
</tr>
<tr>
<td>in indefinite contexts</td>
<td>(0/70)</td>
<td>(0/102)</td>
<td>(0/271)</td>
<td>(14/89) (Schaeffer, 1999)</td>
</tr>
</tbody>
</table>

The percentages in Table 11 indicate that just like both their MLU and their age controls, the children with SLI never overgenerate the definite article *the* in indefinite contexts. Recall that this is in contrast with the behavior of normally developing children who are younger than 3;0: as we saw in Table 2, 2-year old normally developing English-acquiring children overgenerate *the* at a rate of 16%. Thus, with respect to the pragmatic use of articles, children with SLI older than 3 behave in no way differently from normally developing children older than 3 (in this case both their MLU and their age controls), but they do differ from ND 2-year olds. This confirms our prediction (ii).
(21) **Predictions**

**I. Children with SLI older than 3;6 have the interface pragmatic Concept of Non-Shared Assumptions:**

(i) English acquiring children with SLI older than 3;6 do not overgenerate null subjects;

(ii) *English acquiring children with SLI older than 3;6 do not overgenerate definite articles;*

(iii) Dutch acquiring children with SLI older than 3;6 do not fail to scramble referential direct objects with an overt article.

**II. Children with SLI have deficits in their grammar:**

(iv) English acquiring children with SLI (younger and older than 3;6) make errors with respect to subject-verb agreement and Nominative Case;

(v) English acquiring children with SLI (younger and older than 3;6) drop articles;

(vi) Dutch acquiring children with SLI (younger and older than 3;6) drop articles. In the case of direct objects, this results in non-scrambling.

Nonetheless, the 4-year old English speaking children with SLI do drop articles, which we claimed to be a grammatical phenomenon. This is shown in Table 12:

Table 12: *Proportions of article drop*

<table>
<thead>
<tr>
<th></th>
<th>SLI</th>
<th>N-MLU</th>
<th>N-AGE</th>
<th>ND 2-year olds</th>
</tr>
</thead>
<tbody>
<tr>
<td>article drop in sentences/phrases</td>
<td>13%</td>
<td>8%</td>
<td>1%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>(14/105)</td>
<td>(14/166)</td>
<td>(7/455)</td>
<td><em>(Schaeffer, 1999)</em></td>
</tr>
</tbody>
</table>

As we see in the second column of Table 12, the children with SLI drop articles 13% of the time. The MLU controls perform slightly better, but drop articles too, at a rate of 8%. Recall that this is similar to the rates of article drop reported by Schaeffer (1999), as was shown in Table 1. The last column in Table 12 indicates that normally developing age mates no longer drop articles. This result confirms prediction (v).
Predictions

I. Children with SLI older than 3;6 have the interface pragmatic Concept of Non-Shared Assumptions:
(i) English acquiring children with SLI older than 3;6 do not overgenerate null subjects;
(ii) English acquiring children with SLI older than 3;6 do not overgenerate definite articles;
(iii) Dutch acquiring children with SLI older than 3;6 do not fail to scramble referential direct objects with an overt article.

II. Children with SLI have deficits in their grammar:
(iv) English acquiring children with SLI (younger and older than 3;6) make errors with respect to subject-verb agreement and Nominative Case;
(v) English acquiring children with SLI (younger and older than 3;6) drop articles;
(vi) Dutch acquiring children with SLI (younger and older than 3;6) drop articles. In the case of direct objects, this results in non-scrambling.

4.3 Direct object scrambling

Finally, our results regarding the Dutch data show that Dutch children with SLI do not have many problems with the scrambling of referential objects. This is shown in Table 13:

Table 13: Proportions of object scrambling

<table>
<thead>
<tr>
<th></th>
<th>pronoun</th>
<th>proper name</th>
<th>definite DP</th>
<th>indefinite</th>
<th>article-less</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
<td>U</td>
<td>S</td>
<td>U</td>
<td>S</td>
</tr>
<tr>
<td>negation</td>
<td>92%</td>
<td>*8%</td>
<td>50%</td>
<td>*50%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>12/13</td>
<td>1/13</td>
<td>1/2</td>
<td>1/2</td>
<td>0/1</td>
</tr>
<tr>
<td>Adverbs</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>11/11</td>
<td>0/11</td>
<td>0/1</td>
<td>0/1</td>
<td>0/17</td>
</tr>
<tr>
<td>Total</td>
<td>96%</td>
<td>*4%</td>
<td>33%</td>
<td>67%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>23/24</td>
<td>1/24</td>
<td>1/3</td>
<td>2/3</td>
<td>0/18</td>
</tr>
</tbody>
</table>

S = scrambled
U = unscrambled
definite DP = noun preceded by definite determiner
indefinite = noun preceded by indefinite determiner
article-less = bare noun

* = incorrect in adult language
Referential objects such as pronouns in obligatory contexts are correctly scrambled at a rate of 96%. Recall that this is in sharp contrast to findings regarding younger, normally developing Dutch children with a comparable MLU, as was shown in Table 5: 2-year olds scramble referential objects in obligatory contexts only around 25%; 3-year olds around 80% (Schaeffer, 2000). Nonetheless, just like the younger ND children, the Dutch children with SLI produce article-less object nouns, none of which have scrambled.

In summary, the Dutch children with SLI differ from younger Dutch ND children in that they scramble referential objects correctly, whereas younger Dutch ND children often fail to scramble them. On the other hand, the Dutch children with SLI resemble young Dutch normally developing children in that they all produce article-less object nouns, which remain unscrambled. These results show that the predictions formulated in (iii and vi) are borne out.

(21) Predictions

I. Children with SLI older than 3;6 have the interface pragmatic Concept of Non-Shared Assumptions:
   (i) English acquiring children with SLI older than 3;6 do not overgenerate null subjects;
   (ii) English acquiring children with SLI older than 3;6 do not overgenerate definite articles;
   (iii) Dutch acquiring children with SLI older than 3;6 do not fail to scramble referential direct objects with an overt article.

II. Children with SLI have deficits in their grammar:
   (iv) English acquiring children with SLI (younger and older than 3;6) make errors with respect to subject-verb agreement and Nominative Case;
   (v) English acquiring children with SLI (younger and older than 3;6) drop articles;
   (vi) Dutch acquiring children with SLI (younger and older than 3;6) drop articles. In the case of direct objects, this results in non-scrambling.
Thus, data from Dutch SLI as well confirm the more general predictions that children with SLI have the interface-pragmatic Concept of Non-Shared Assumptions, but have deficits in their grammar.

5. **Summary and conclusion**

To sum up, the results on the pragmatic and syntactic properties of subjects, articles and direct object scrambling suggest that

(31) **Summary**
   a) children with SLI of 4 years and older do NOT lack the interface pragmatic Concept of Non-Shared Assumptions, which regulates subject drop, article choice, and object scrambling, contrary to younger normally developing children;  
   b) in terms of grammar, children with SLI make errors comparable to normally developing children of 2/3 years old, indicating that they are in the same grammar developmental stage, and  
   c) in children with SLI interface pragmatic principles develop as a function of age, rather than as a function of grammar developmental stage.

Concluding, our results provide support for our two main hypotheses, namely a dissociation between interface pragmatics and grammar, each developing at its own pace, and a non-impaired interface pragmatic system of children with SLI:

(32) **Conclusions**
   (i) Children with SLI have deficits in their grammar, but not in their (interface-) pragmatic system \( \rightarrow \)  
   (ii) Interface pragmatics is a distinct module separate from grammar (syntax/semantics).
References


