

SLI as a Syntax-Phonology (PF) Interface Problem: Evidence From Afrikaans¹

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Word count: **XXXX**

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Abstract

A new theoretical account of specific language impairment—one which places the locus of the impairment at Spell-Out at the syntax-phonology interface as opposed to at the lexicon-syntax interface—was proposed and then tested against utterances from Afrikaans-speaking children with SLI. Drawing on Minimalism, our account offers a unified explanation for the seemingly diverse phenomena found in the Afrikaans data: omission of certain lexical material, double articulation of other lexical material, and word order deviations. We conclude that the language problem of children with SLI lies neither in the mapping from lexicon to syntax (thus in the selection of a lexical item as a member of the numeration) nor in the computational system, but in the mapping of an adult-like syntactic representation onto a proper sound representation.

Keywords: Afrikaans, ATOM, doubling, lexicon-syntax interface, EOI, SLI, syntax-phonology interface

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1. Introduction

Specific language impairment (SLI)² is a significant impairment in the spoken language ability of children in the absence of identifiable causal factors or obvious accompanying factors such as neurological deficits, mental challenges, hearing disabilities, and emotional or behavioral problems (Leonard, 1998; Stark & Tallal, 1981). It affects an estimated 7.4% of children (Tomblin, Records, Buckwalter, Zhang, Smith, & O'Brien, 1997) and is of a long-standing nature (see Brinton, Fujiki, & Robinson, 2005; Clegg, Hollis, Mawhood, & Rutter, 2005; Gopnik, 1994).

Although SLI is not a new field of study, the development of theories to account for the characteristics of SLI is a relatively new focus in this field. One established approach to account for the deviant linguistic expressions produced by children with SLI—that is, deviant from those produced by typically developing children—views the locus of the language impairment as lying at the interface between the lexicon and syntax, where the lexical items (i.e., the “atoms of computation”; see Baker, 2001) in the selected lexical array (or

² The following abbreviations are used in this paper: AdvP = Adverbial Phrase, Agr = Agreement, ATOM = agreement/tense omission model, CP = Complementizer Phrase, DP = Determiner Phrase, EOI = extended optional infinitive, LF = logical form, N = Noun, P = Preposition, PP = Prepositional Phrase, PF = phonetic form, PolP = Polarity Phrase, SLI = specific language impairment, T = Tense, TP = Tense Phrase, VP = Verb Phrase, vP = Light-verb Phrase.

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numeration; see Chomsky, 1995a) have to be mapped onto a syntactic structure by means of the computational system (say, Merge and Move) . We shall call this account of SLI utterances the “impaired lexicon-syntax mapping approach”. In this article, we propose a different approach—specifically the impaired syntax-phonology mapping approach—according to which the locus of the impairment is said to be at the interface between the syntax and (morpho)phonology, thus at Spell-Out in Phonetic Form (PF; see Chomsky, 1995b). It means that the “deviant” nature of SLI utterances finds its cause in the **so-called** externalization (Chomsky, 2009, 2010) of syntactic structure, i.e. the mapping from the syntax to the sensorimotor system.

We start our discussion by setting out the two approaches, demonstrating how probably the most prominent lexicon-syntax interface approach towards SLI thus far, namely the extended optional infinitive (EOI) hypothesis of Rice, Wexler, and Cleave (1995)—known in its current form as the agreement/tense omission model (Schütze & Wexler, 1996; Wexler, Schütze, & Rice, 1998)—can be classified as locating the language problems of children with SLI at the lexicon-syntax interface. The SLI phenomena which typically constitute the empirical basis for this approach involve the omission of lexical material: that is, certain grammatical morphemes are absent in structural contexts where they should appear according to the adult non-SLI language. Importantly, in the present paper, we will discuss SLI expressions which have the property of containing too much lexical material; more specifically, lexical material is “duplicated” at the surface. These SLI data come from

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Afrikaans.³ We will argue that these “doubling patterns” are hard to account for under an impaired lexicon-syntax interface approach, and we will demonstrate that an approach in terms of impairment at the level of externalization (i.e., the mapping of syntax onto PF) provides a natural explanation for doubling patterns. In addition to the SLI doubling phenomena, we will discuss phenomena of omission and linearization (i.e., word order) in Afrikaans linguistic expressions from children with SLI, arguing that these phenomena also hint at the syntax-phonology (PF) interface as the locus of SLI.

The paper is organized as follows: In section 2, we will present the two interface approaches towards SLI expressions: (a) the lexicon-syntax interface approach, and (b) the syntax-PF interface approach. Section 3 provides information on the collection of the Afrikaans SLI data that constitute the empirical basis for this study. In section 4, we briefly present some core syntactic properties of (adult, non-SLI) Afrikaans, providing in this way a comparative background for interpreting the linguistic expressions produced by children with SLI. Section 5 discusses the phenomenon of doubling or duplication in Afrikaans SLI expressions, section 6 the phenomenon of omission, and section 7 some deviant word order phenomena in Afrikaans SLI expressions. Section 8 contains the conclusion.

³ Afrikaans, a morphologically impoverished descendent of Dutch primarily spoken in South Africa, has approximately 6 million mother-tongue speakers, i.e., 13% of the South African population. It is the mother-tongue with the third largest speaker base in South Africa. Of the other 10 official languages, only isiZulu (24%) and isiXhosa (18%) have more mother-tongue speakers (Statistics South Africa, 2003).

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2. Interface Approaches Towards SLI Utterances

2.1 Impaired lexicon-syntax mapping

One prominent account for the lack of tense marking in the language of children with SLI is that of Wexler and colleagues (Rice et al., 1995; Rice & Wexler, 1996; Wexler et al., 1998). According to Wexler (1994), younger typically developing children pass through an optional infinitive stage, in which they sometimes refrain from overtly marking tense by means of a grammatical morpheme in matrix clauses. Children with SLI also go through this stage, but for an extended period. Optional infinitives have been shown to occur in the language of child speakers with SLI of a range of languages, including the following West Germanic ones: English (Rice & Wexler, 1996), Dutch (de Jong, 2003; Wexler, Schaeffer, & Bol, 2004), German (Clahsen, 1989), and, most recently, Afrikaans (Southwood & Van Hout, 2010).

According to Wexler (1994), children fail to mark tense overtly because they treat the grammatical category Tense (T) as being optional, where Tense is the head of the Tense Phrase (TP) on Pollock's (1989) split-Inflection hypothesis. Accordingly, if TP is present in a derivation, then the verb will move⁴ overtly or covertly from the Verb Phrase (VP) to the TP so that the verb can be marked for tense. However, if TP is not present in a derivation, the

⁴ In more recent work, Move is defined as "internal Merge", i.e., as a combination of Copy and Merge. See, e.g., Adger (2003); Chomsky (2007); Hornstein (2001); Lasnik and Uriagereka (2005) in this regard. The term "Move" is used here and below for the sake of simplicity. However, in tree diagrams, copies instead of traces will be entered.

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construction will be treated as an infinitival one, where the verb does not move to TP (seeing that TP is not present), resulting in the verb not being marked for tense. Hence, the grammatical tense marker is omitted in the phonological realization, resulting in the verb displaying the infinitival form. For this reason, children with SLI often produce utterances such as **Yesterday I watch TV*, where the grammatical tense marker *-ed* has been omitted.

The term *omitted* in the above analysis is an abbreviation for “not apparent in the surface forms, i.e., in the phonological forms” (Rice & Wexler, 1996, p. 1240). These authors stated that the absence of surface tense markers can be attributed to the non-occurrence of the functional category Tense in a given derivation. On the view of these authors, it is thus not the case that Tense is totally absent in the grammars of children with SLI and that surface tense markers are always omitted; rather, these children’s grammars allow utterances with TPs as well as utterances without TPs whereas the adult grammar, in this context, would allow only utterances with TPs.

Schütze and Wexler (1996) and Wexler et al. (1998) expanded the EOI account and proposed that optional infinitives can result from the underspecification of either the T or Agreement (Agr) features (or both) in children’s grammars. Schütze and Wexler (1996) assume “the separation of T and Agr” (p. 677), where *Agr* refers to subject agreement. In other words, a clause is taken to contain an Agreement-Subject Phrase and a TP, which together replace the category Inflectional Phrase of earlier theories of phrase structure. Schütze and Wexler (1996) further assume that “Agr, not T, assigns/checks NOM(inative) case” (p. 677). Specifically, on Schütze and Wexler’s (1996) analysis, either T or Agr may be independently missing in finite environments during the (extended) optional infinitive stage. If both T and Agr are present (and marked), then the utterance will contain a nominative

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subject. If Agr is missing, nominative case will not be licensed, and the structural subject will occur in the default case of the language which, for English, is taken to be the accusative (Schütze, 1999). This is the proposal known as the “ATOM” (Agr/T omission model).

Both the EOI hypothesis and the ATOM thus propose that at times T and/or Agr will be part of the derivation and at other times not. This can be reinterpreted as T and Agr sometimes forming part of the numeration and at other times not. Taking the numeration to be an array of lexical items chosen from the lexicon which constitute the lexical input to a derivation of a structured linguistic expression, one might characterize Agr/T omission as a lexicon-syntax interface problem: The structure representing the optional infinitive phenomenon results from a deviant mapping from lexicon to syntax, with omitted material in the syntactic structure resulting from absence of a lexical atom in the numeration.⁵

⁵ In Wexler (1998, 2002), it is proposed that ATOM follows from what he calls the *Unique Checking Constraint*. According to this constraint, the (interpretable) categorial D-feature of a nominal expression (i.e., Determiner Phrase [DP]) can only be used once in a checking relation with a functional head. In other words, the D-feature cannot be used for both checking the (uninterpretable) D-feature of AgrS and the (uninterpretable) D-feature of T. It is argued that this is a developmental constraint on the computational system of language and, thus, not a constraint on the adult grammar. In other words, the omission of Agr and/or T in the optional infinitive stage stems from the difficulty in the child’s computational system of checking syntactic features. Importantly, also on this deeper explanation of Agr/T omission, a crucial factor is the absence of a functional category (Agr,

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2.2 Impaired syntax-PF mapping

As stated above, we wish to propose that the lexicon-syntax interface in children with SLI is intact and that the locus of their language problem rather lies at the syntax-PF interface. Specifically, on our account, most of the errors made by children with SLI regarding grammatical morphemes and word order are related to grammatical features: We propose that the problem does not principally lie with the checking of grammatical features, that is, with the movement operations required for feature checking; these children do not experience a problem with the syntactic computation in terms of Move. The problem lies with spelling out these features at the syntax-phonology interface and also with spelling out the correct copies that constitute a chain. Whereas the left-most copy is typically spelled out in the adult grammar and (usually) all lower copies deleted, these children sometimes delete left-most copies and spell out lower (intermediate or right-most) ones. In other words, movement operations occur as they should, rendering a fully grammatical (i.e., adult-like) derivation before the point of Spell-Out. However, at Spell-Out, some copies which are supposed to receive sound form do not, and/or others which are supposed to be left phonologically empty are, in fact, spelled out.

Stated differently, the computational component of children with SLI is intact, but the mapping of the syntactic information onto sound form—so-called externalization; see

T, or both) in the numeration, the latter constituting the lexical input to the derivation of the linguistic expression.

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Chomsky (2009, 2010)—appears to be defective.⁶ Furthermore, for these children, difficulties seem to arise specifically in contexts where there is more than one potential Spell-Out candidate available—i.e., where there is competition between sound forms that may realize a functional category, or competition between various copies for Spell-Out.

Below (in section 4), we consider what support data from Afrikaans-speaking children with SLI lend to the two accounts. Before that, in section 3, we discuss the methods by which we obtained the Afrikaans data.

3. Data Collection and Methodology

3.1 Participants

The experimental group consisted of 15 Afrikaans-speaking children with SLI (eight girls, seven boys), who were referred to the research project by their speech-language therapists. Their ages ranged from 6 years 0 months to 6 years 11 months ($M = 6$ years 5.3 months) and their mean lengths of utterance measured in words (MLUw) from 3.54 to 5.79 ($M = 4.35$). Their hearing sensitivity was within normal limits bilaterally, and their parents

⁶ According to Chomsky (2009, 2010), cross-linguistic diversity relates to the externalization of syntactic structures: “The externalization systems are overwhelmingly — maybe, some day, we will discover *entirely*— where languages differ from one another. The wide variety of languages is almost entirely, maybe entirely if we know enough, in the externalization process of getting it out into the sensory motor system” (Chomsky, 2010, p. 21).

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and classroom teachers reported age-appropriate socioemotional development and an absence of any visible neurological deficits. Their nonverbal IQ scores were 85 (or the equivalent thereof) or above. All 15 children with SLI were reported by their speech-language therapists to demonstrate problems with morphosyntax, but not with pragmatics. Only one of the children in the SLI group possibly had a family history of SLI.

Fifteen typically developing Afrikaans-speaking 6-year-olds (nine girls, six boys) formed the age-matched (TD6) control group and 15 4-year-olds (eight girls, seven boys) the younger, language-matched (TD4) control group. Their ages ranged from 6 years 2 months to 6 years 11 months ($M = 6$ years 6.8 months) and from 4 years 0 months to 4 years 7 months old ($M = 4$ years 2.3 months), respectively. The 6-year-olds had a mean MLUw of 5.92 (ranging from 5.12 to 7.10) and the 4-year-olds of 4.56 (ranging from 3.91 to 5.00). The MLUs of the children with SLI differed significantly from those of their age-matched peers—one-way analysis of variance, $F(1, 28) = 56.34, p = .00$ —but not from those of the 4-year-olds, $F(1, 28) = 1.87, p = .18$.

According to their parents and classroom teachers, the participants in the control groups were typically developing in all respects: Their language, intellectual, and socioemotional development were seen as being age-appropriate, and there was no evidence of any visible neurological deficits. All 30 typically developing children exhibited hearing sensitivity within normal limits during hearing screening and had no previous referral to, or treatment by, a speech-language therapist.

All parents were informed in writing of the aims of the project and gave written consent for the participation of their children in the study. The children themselves gave oral assent.

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3.2 Experimental task

We used a sentence completion task to assess the production of past tense forms. The participant was shown a picture of a person or animal performing an action, was told that this action is performed everyday and was requested to provide information on what the person or animal did the day before. For instance, the participant was shown a picture of a boy brushing his teeth and told *Hierdie kind borsel elke dag sy tande. Gister, net soos elke ander dag, ...* ‘This child brushes his teeth every day. Yesterday, just like every other day, ...’. If the participant used the historic present tense (which resembles the infinitival form in Afrikaans and which would be appropriate due to the adverb *gister* which indicates past tense; see section 4.4), the researcher provided the temporal auxiliary *het* ‘have’, as in *Hierdie kind borsel elke dag sy tande. Gister, net soos elke ander dag, het ...*

The task consisted of 20 items of which the first two were practice items. The following types of verbs were included:

- Four main verbs which take the *ge-* prefix in the past participial form—as in the *borsel* example given above.
- Two main verbs which do not take the *ge-* prefix in the past participial form—e.g., *betaal* ‘pay’ in *Hierdie vrou betaal elke dag die verwer. Gister, net soos elke ander dag, ...* ‘This woman pays the painter every day. Yesterday, just like every other day, ...’.
- Two *be* forms—e.g., *Hierdie katjie is elke dag hier. Gister, net soos elke ander dag, ...* ‘This kitten is here every day. Yesterday, just like every other day, ...’.

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- Two *have* forms—e.g., *Hierdie seun het elke dag 'n nuwe maatjie. Gister, net soos elke ander dag, ...* ‘This boy has a new friend every day. Yesterday, just like every other day, ...’.
- Six modal auxiliaries—e.g., *Hierdie eendjie wil elke dag swem. Gister, net soos elke ander dag, ...* ‘This duckling wants to swim every day. Yesterday, just like every other day, ...’.
- Two hendiadyses (see section 4.4)—e.g., *Hierdie man staan elke dag en wag vir die bus. Gister, net soos elke ander dag, ...* ‘Every day, this man stands waiting for the bus. Yesterday, just like every other day, ...’.

A similar procedure had been used with success to test the production of past tense structures in, amongst other languages, English (Loeb & Leonard, 1991), French (Jakubowicz, 2003), and Swedish (Hansson & Leonard, 2003). The task was first performed with typically developing Afrikaans-speaking 3-, 4-, 5-, and 6-year-olds during a pilot study, in order to ensure that test items were appropriate and that the demands placed on the participants were realistic (see Southwood, 2005, 2006). The second author administered the task to each participant individually. During one such administration, another child was present but did not take part: A girl with SLI did not want to participate unless her typically developing twin sister could accompany her to all data collection sessions.

3.3 Collection of spontaneous language

During language sample elicitation, the second author and the participant mostly played alone in a quiet room at the participant’s school, care centre, or home, or in a quiet part of a room in which other people were also present. The sample of the above-mentioned

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girl and two further samples (both of typically developing 4-year-old boys) were collected with other children taking part in the conversation, at the request of the participants.

Language sample elicitation took the form of freeplay with toys that included little figurines with accessories such as radios, hats, mugs, and brooms; wooden building blocks; and plastic kitchen furniture. The second author initiated the language sampling interaction by inviting the participant to join her in kitting out the dolls, building a house, and/or assembling the kitchen. If the participant was quiet for extended periods, the author used a variety of techniques to encourage conversation, including parallel play, making statements, and asking questions (both *wh*- and *yes/no*-questions). These questions were asked about topics found to be suitable for discussion with South African preschool children, such as their families, pets, and birthday celebrations (see Southwood & Russell, 2004). Following Crystal, Fletcher, and Garman (1976), the language samples collected in this study were at least 30 minutes long each. An audio-cassette recording was made of each language sample collection session, using an observable recorder.

3.4 Data transcription and scoring

3.4.1 Experimental task.

All responses on the experimental tense production tasks were recorded on a score sheet. Spontaneous self-corrections were allowed and recorded, but only the final response was scored.

3.4.2 Language sample.

The utterances occurring in the first 30 minutes of each language sample were transcribed orthographically. Hereafter, the first 100 complete and fully intelligible utterances were identified. Following Hunt (1970), an utterance was considered to be a T-unit, i.e., “one

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main clause plus whatever subordinate clause and nonclausal expressions are attached to or embedded within it” (p. 4). Accordingly, *want* ‘because’, *en toe* ‘and then’, and *en dan* ‘and then’ were each taken to introduce a new T-unit, as were *en* ‘and’ and *maar* ‘but’ if these two were followed by a clause containing a verb. The words in the first 100 complete and fully intelligible utterances were then counted and the mean determined, in order to calculate the MLUw.

Next, the instances of insertion of the following in the first 30 minutes of each sample were tallied separately: main verbs; hendiadyses; auxiliary verbs; pronouns; and negative elements. The instances of omission of the following were also tallied: past participles as a whole; the past participial morpheme *ge-*; verb particles (such as *uit* ‘out’ of *uitgooi* ‘throw out’); particle verbs (such as *gooi* of *uitgooi*); negation words; the possessive marker *se* ‘’s’; determiners; pronouns; possessive prepositions; and nouns, the latter from Noun Phrases (NPs) that would not have consisted of only the noun in the adult form of the utterance. For instance, *poppie* ‘doll-diminutive’ would have been tallied in **die rooi Ø staan hier* ‘the red stands here’ but not *staan hier en eet haar pap* ‘stands here and eats her porridge’ where the whole DP or possibly a pronoun was omitted. Lastly, all utterances with nonadult-like word order were placed in a data base and classified according to the type of deviant word order.

4. Some Remarks on the Morphosyntax of Afrikaans

Before turning to the Afrikaans SLI data, a brief overview will be given of tense marking in Afrikaans and of other aspects of Afrikaans (morpho)syntax. As regards word

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order, Afrikaans is a verb-second⁷ language. Since Koster (1975) and Den Besten (1977/1983), verb-second languages which demonstrate a verb-second surface word order in matrix clauses but a verb-final one in embedded clauses have been analysed as Subject-Object-Verb underlyingly (Biberauer, 2002). Because Afrikaans patterns like Dutch (its parent) in terms of being verb-second, it has been analysed together with Dutch as a Subject-Object-Verb language since the 1970s and 1980s (see, e.g., Waher, 1982). However, after Zwart (1993, 1994) proposed that Dutch is a Subject-Verb-Object language and particularly since Kayne's (1994) proposal that all phrase structure could be seen as underlyingly head-initial, Afrikaans verb phrases are increasingly considered to have an underlying Verb-Object structure (see Oosthuizen, 1996, 1998). However, for our purposes, Afrikaans is taken to be a verb-second language which demonstrates an underlying Subject-Object-Verb word order. Aspects of word order pertaining to (a) the placement of the finite verb, (b) the derivation of question constructions, (c) negative constructions and (d) preposing and scrambling are discussed below.

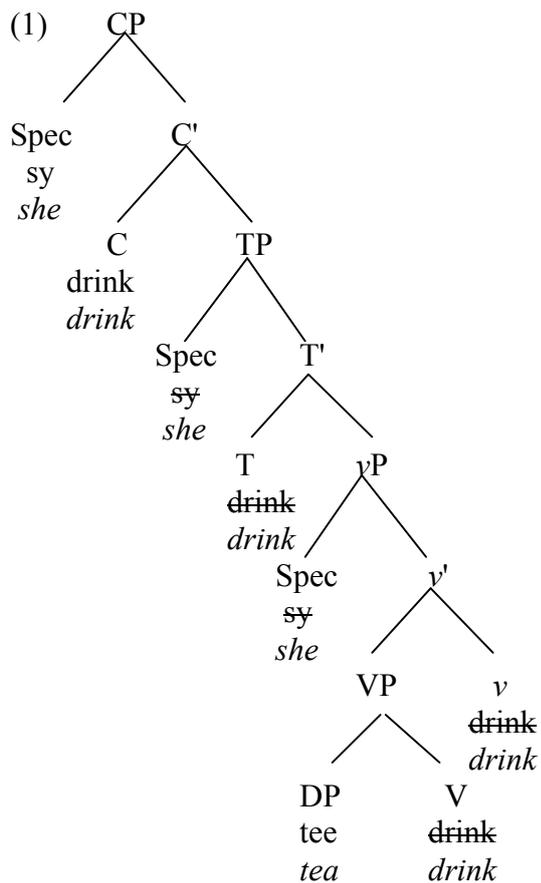
4.1 Placement of the finite verb

In simple declarative sentences containing one verb—for example, *Sy drink tee* 'She drinks tea'—this main verb is placed in the second position of the sentence. From the tree diagram in (1), it can be seen that the subject is taken to originate in the specifier position of

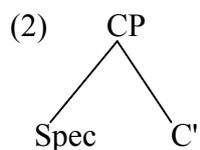
⁷ The verb-second phenomenon entails the obligatory occurrence of finite verbs in the clause-second position, preceded by some clause-initial (usually phrasal) constituent (Biberauer, 2002).

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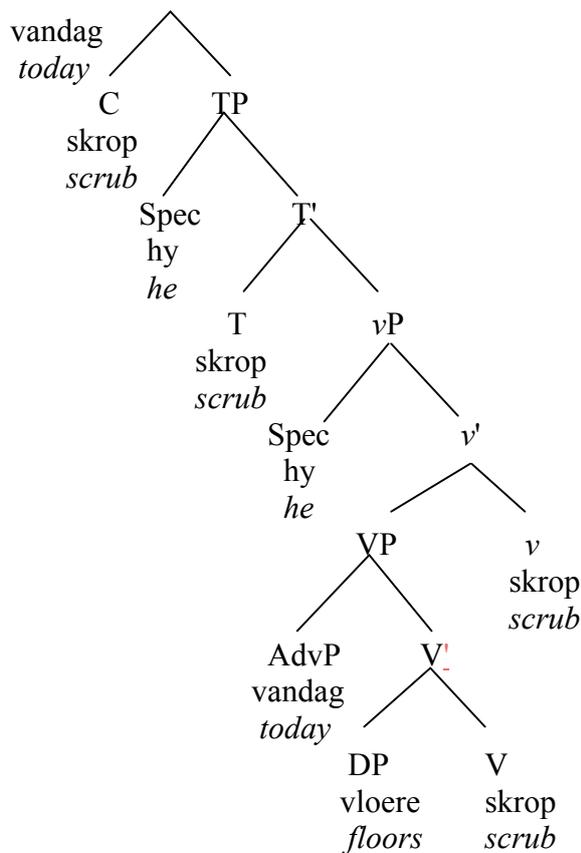
Light-verb Phrase (vP), from which it moves first to the specifier position of TP and then to the specifier position of Complementizer Phrase (CP). The verb originates in the V-position and moves from there first to v , then to T and then to Complementizer (C).



In a sentence such as (2), *Vandag skrop hy vloere* 'Today he scrubs floors', the verb undergoes the same movement as it did in (1), but the subject does not undergo the final move to the specifier position of CP. This is because this position is occupied by the adverb *vandag* 'today', which we take to be here a sister of V'.



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In sentences containing auxiliary verbs, the auxiliaries appear in the second position and the past participle or infinitival verb in the sentence-final position, as shown in (3a) which contains a temporal auxiliary and (3b) which contains a modal auxiliary .

(3a) hy het vloere geskrop

he have floors scrub-past.participle

‘He scrubbed floors’

(3b) hy sal vloere skrop

he will floors scrub-infinitive

‘He will scrub floors’

In embedded sentences, the object appears before the verb (and before any auxiliaries), as shown in (4). In the case of modal auxiliaries, the infinitive appears in the sentence-final position, as shown in (5). If an embedded sentence contains the temporal auxiliary *het*, this auxiliary occurs in the sentence-final position, directly preceded by the past participle, as shown in (6).

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- (4) Sy het gesê dat hy vloere skrop
she have say-past.participle that he floors scrub
'She said that he scrubs floors'
- (5) Sy het gesê dat hy vloere sal skrop
she have say-past.participle that he floors will scrub-infinitive
'She said that he will scrub floors'
- (6) Sy het gesê dat hy vloere sou geskrop het
she have say-past.participle that he floors will-past scrub-past.participle have
'She said that he would have scrubbed floors'

4.2 Question constructions

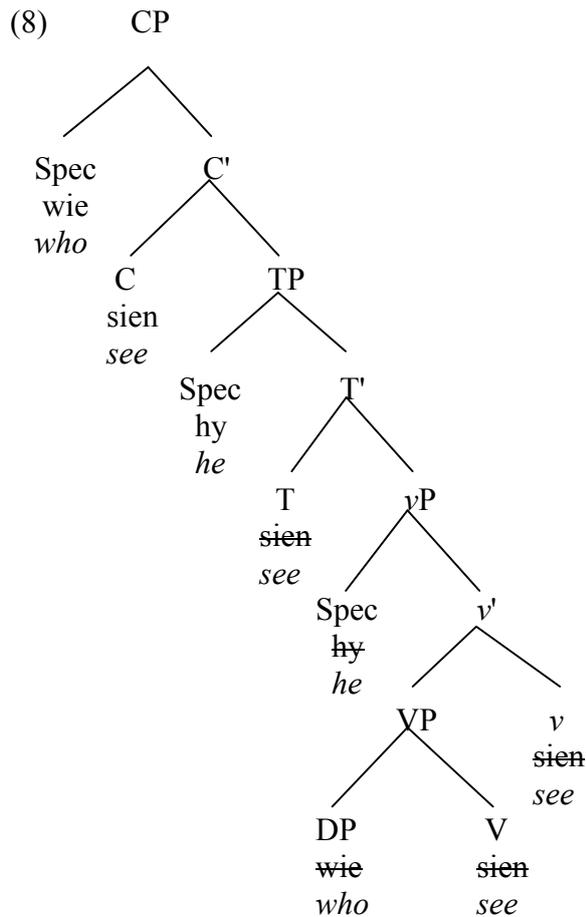
The derivation of *yes/no*-questions in Afrikaans involves what is generally called “subject-verb inversion”, where the main verb moves to the head position of the CP. For example, in a sentence such as *Drink sy tee?* ‘Drinks she tea? = Does she drink tea’, the finite verb *drink* has been moved to C across the subject-DP *sy* in [Spec,TP]. Thus, in contrast to English, Afrikaans does not use the “*do*-support” strategy for forming *yes/no* questions. As in English, auxiliary verbs in Afrikaans can also undergo subject-verb inversion, as illustrated in (7).

- | | | |
|-----|--------------------------------|--------------------------------|
| (7) | <i>Declarative:</i> | <i>Interrogative:</i> |
| | Hy het dit gesien | Het hy dit gesien? |
| | he have it see-past.participle | have he it see-past.participle |
| | 'He saw it' | 'Did he see it?' |

In the derivation of Afrikaans *wh*-questions, as is the case in English, the phrase containing the *wh*-element moves to the specifier position of the CP. In the course of the

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derivation, the verb also moves into the head position of the *v*P, then into the head position of the TP and from there to the head position of the CP. Again, the equivalent of *do*-support does not occur. The structure in (8) exemplifies the derivation of the interrogative main clause *Wie sien hy?* ‘Who does he see?’.



4.3 Negation

A salient characteristic of Afrikaans is the use two or more negative elements in negative sentences, the right-most of these being *nie* (henceforth *nie*₂). However, Afrikaans is not a Double Negation language but rather a strict Negative Concord one (Biberauer, 2006). In contrast to its parent, Dutch, two or more negative elements in Afrikaans generally do not cancel each other out, as shown in (9).

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- (9a) Dit is nie snaaks nie
it is not funny *nie*₂
'It's not funny'
- (9b) Hy kry nooit niks nie
he receive never nothing *nie*₂
'He doesn't ever receive anything'

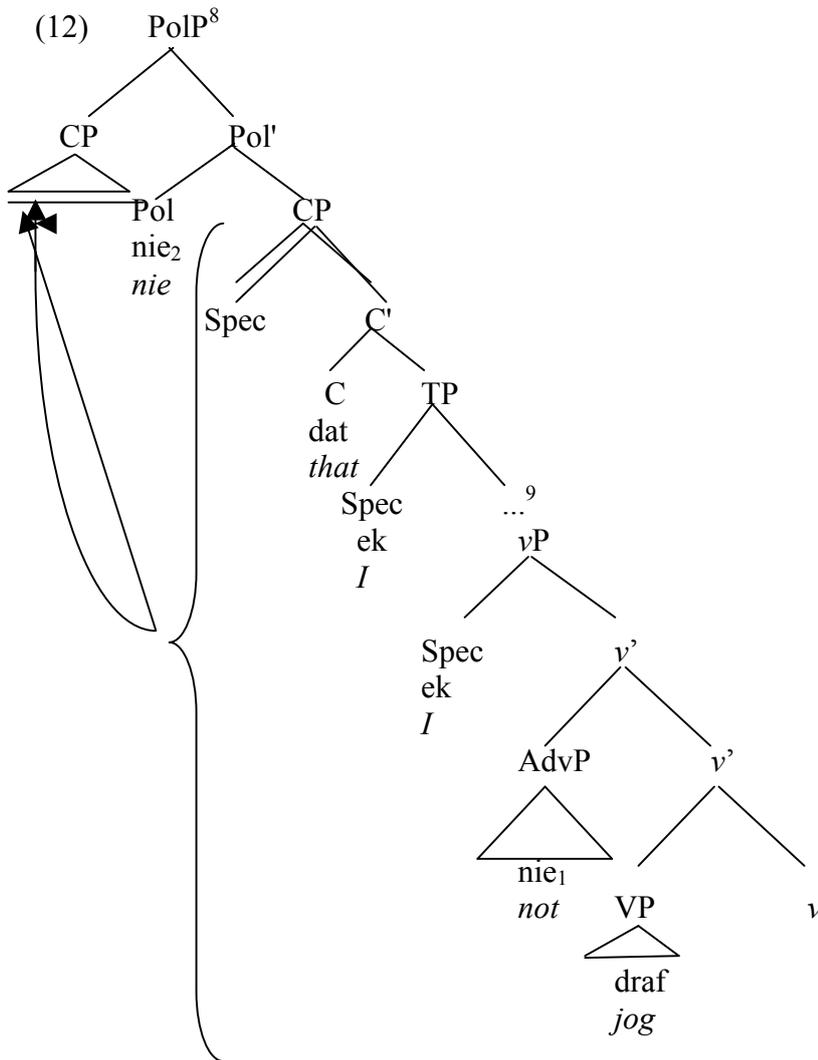
Although a simple negative sentence in Afrikaans usually contains at least two negative elements, as shown in (9), at times such sentences occur with a single negation word, i.e., without *nie*₂ (Biberauer, 2006). Compare (10a) to (10b), and the embedded clause in (11a) to the matrix clause in (11b).

- (10a) Ek glo nie die storie nie
I believe not the story *nie*₂
'I don't believe the story'
- (10b) Ek glo die storie nie
I believe the story not
'I don't believe the story'
- (11a) Ek wil bevestig dat ek nie draf nie
I want to confirm that I not jog *nie*₂
'I wish to confirm that I don't jog'
- (11b) Ek draf nie
I jog not
'I don't jog'

Biberauer (2006) proposes that the presence or absence of the so-called "second *nie*" or *nie*₂ in Afrikaans is entirely predictable and is regulated "via a very general haplological mechanism which appears to be widely operative" (p. 31), a mechanism which states that phonologically identical elements may not be spelled out adjacent to one another wherever these occupy the same prosodic phrase (see Biberauer, 2006, for a comprehensive explanation).

The tree diagram in (12) illustrates the derivation of an Afrikaans negative sentence, specifically the embedded clause in (11b) (adapted from Biberauer, 2006, which is based on Oosthuizen, 1998).

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Note that on this analysis, negation words such as *nie* (specifically *nie*₁) ‘not’, *nêrens* ‘nowhere’ and *nooit* ‘never’ are seen as AdvPs. In (12), the AdvP *nie*₁ is merged as an adjunct to *v'*. Furthermore, *nie*₂ represents the head of PolP which is merged above CP, with the PolP in (12) specifying the clause in question as negative (see Oosthuizen, 1998).

⁸ PolP = polarity phrase.

⁹ Afrikaans phrase structure simplified here.

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According to Biberauer (2006), the entire CP (and not merely *nie*₁) is raised to the specifier position under PolP.

The diagram in (12) illustrates an instance of sentential negation. In addition to this type of negation, Afrikaans also exhibits constituent negation, i.e., negation of specific phrases such as DP, PP, and AdvP. To illustrate, consider the examples in (13a) to (13c), respectively; see Oosthuizen (1998) and Biberauer (2009).

(13a) (Hy lees die boek) nie die koerant nie

(he read the book) not the newspaper *nie*₂
'(He is reading the book) not the newspaper'

(13b) (Hy sit altyd op die stoel) nooit op die bank nie

he sit on the chair, never on the sofa *nie*₂
'(He sits on the chair) not on the sofa'

(13c) (Hy loop vinnig) nie stadig nie

(he walk fast) not slow *nie*₂
'(He walk fast) not slowly'

Neither Oosthuizen (1998) nor Biberauer (2006, 2009) provides an analysis of constituent negation. It is plausible, however, that this type of negation can be analyzed in essentially the same manner as that illustrated above for sentential negation, i.e., by proposing that the relevant phrase (DP, PP, AdvP) is contained within a PolP with *nie*₂ as the phonetic realization of the functional head Pol. It could then be argued that the DP/PP/AdvP complement of Pol which contains the negation word moves to the specifier position under PolP, presumably for feature checking purposes.

4.4 Preposing and scrambling

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past.participle have

past.participle have

‘Because he ate an apple yesterday’

‘Because he ate an apple yesterday’

4.4 Tense marking

Present tense is indicated on the modal auxiliaries in Afrikaans constructions containing one or more of these auxiliaries. As illustrated in (17), these auxiliaries co-occur with the infinitival form of the main verb.

(17) Hy sal / wil / kan / moet / mag sing

he will / want.to / can / must / may sing-infinitive

‘He will / wants to / can / must / may sing’

When modal auxiliaries do not occur, present tense is “carried” by the main verb, which has the same form as the infinitive, regardless of the person and number features of the subject, as can be seen in (18).

(18) Ek / Ons / Jy / Julle / Hy / Sy / Dit / Hulle / Die seun(s) sing

I / we / you-singular / you-plural / he / she / it / they / the boy(s) sing-present

‘I / We / You / You / He / She / It / They / The boy(s) sing(s)’

As mentioned in section 3.2, the present tense form of the main verb may also facultatively be used in contexts where past tense is denoted by, for example, an AdvP, as shown in (19). This is called the “historic present tense form.”

(19) Gister speel hy sokker

yesterday play he football

‘Yesterday he played football’

Past tense, on the other hand, is expressed by the obligatory temporal auxiliary *het* in constructions **not** containing modal auxiliaries. The *het* co-occurs with the past participial

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form of the main verb, as shown in (20). This form resembles the infinitive in the case of verbs beginning with the derivational morphemes *be-*, *ge-*, *her-*, *er-*, *ont-*, or *ver-*, or another unstressed prefix (see Donaldson, 1993), but has the prefix *ge-* in all other cases.

- (20) Die man het 'n boek gekoop
the man have a book buy-past.participle
'The man bought a book'

Another exception is the second verbal element of a so-called *hendiadys*. A hendiadys in Afrikaans is a syntactic construction in which two verbal elements are connected by means of the coordinating conjunction *en* 'and' to express a single complex idea (Roberge, 1994). An example is *loop en eet* 'walking along eating'. According to Roberge (1994), the second verbal element is the main verb. Yet, this element occurs in the form resembling the infinitival one in a past tense hendiadys, whereas the first element can occur either in the form resembling the infinitival one or in the *ge-* past participial form, as shown in (21).

- | | |
|-----------------------------------|------------------------------|
| (21a) Ons het gestaan en praat | (21b) Ons het staan en praat |
| we have stand-past.participle and | we have stand-infinitive and |
| talk-infinitive | talk-infinitive |
| 'We stood around talking' | 'We stood around talking' |

When expressing past tense in constructions containing a modal auxiliary, the use of the temporal auxiliary *het* and the *ge-*past participial form of the main verb is optional. If *het*

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and the past participle are **not** used, the main verb remains in its infinitival form. In cases like these, the modal auxiliary takes its past tense form, as can be seen in (22b).¹⁰

- | | | | |
|-------|--------------------------------------|-------|---------------------------------------|
| (22a) | Sy wil / moet / kan speel | (22b) | Sy wou / moes / kon speel |
| | she want.to-present / must-present / | | she want.to-past / must-past / |
| | can-present play-infinitive | | can-past play-infinitive |
| | ‘She wants to / must / can play’ | | ‘She wanted to / had to / could play’ |

If the temporal *het* and the past participial form of the main verb are used in past tense constructions containing modal auxiliaries (apart from *mag* ‘may’ and *durf* ‘dare’), then these modals may occur in either the present or the past tense form. The past tense feature is then presumably carried by the *het* and not by the modal(s). The following examples serve to illustrate this, where (23a) and (23b) are synonymous with (22b).

- | | | | |
|-------|---------------------------------------|-------|---------------------------------------|
| (23a) | Sy wil / moet / kan gespeel het | (23b) | Sy wou / moes / kon gespeel het |
| | she want.to / must / can | | she want.to-past / must-past / |
| | play-past.participle have | | can-past play-past.participle have |
| | ‘She wanted to / had to / could play’ | | ‘She wanted to / had to / could play’ |

¹⁰ Less commonly, *ge-* is bound to the modal instead of to the main verb, as shown below.

- (i) Sy het gewou / gekon deelneem
she have want-to-past.participle / can-past.participle participate-infinitive
‘She wanted to / could participate’

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An interesting property of Afrikaans modal auxiliaries is that they may be “stacked,” i.e., more than one modal auxiliary may occur in one and the same construction, together with or independent of the temporal *het*, as can be seen in (24).

- | | | | |
|-------|---|-------|---|
| (24a) | Hulle sou dit moes kon doen | (24b) | Hulle sou dit moes kon gedoen het |
| | they will-past it must-past can-past | | they will-past it must-past can-past do- |
| | do-infinitive | | past.participle have |
| | ‘They would have had to be able to do it’ | | ‘They would have had to be able to do it’ |

4.5 Summary

Afrikaans is a morphologically impoverished language; few grammatical features are realized overtly. Present tense, for instance, is not realized morphologically, past tense is realized in several ways.

Afrikaans sentences demonstrate a verb-second surface word order in main clauses. In embedded clauses, the verb remains in its final position (i.e., Subject-Object-Verb). The main clause verb-second order results from head movement of the finite verb to C, in combination with movement of a phrasal constituent to [Spec,CP]. This fronted phrase can be an argument (e.g., a subject-DP or an object-DP) or an adjunct. In *wh*-questions, a *wh*-phrase undergoes movement to [Spec,CP]. We further indicated that Afrikaans exhibits the phenomenon of scrambling in the middle field of the clause.

5. Doubling Phenomena in Afrikaans SLI Utterances

Against the background given in section 4 on the morphosyntax of Afrikaans, we discuss in sections 5 to 7 a number of phenomena attested in the utterances produced in the experiment on sentence completion and in the language samples (see section 3) by the

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children with SLI. We will compare these utterances to those obtained from typically developing children. We start our discussion with a phenomenon which, to our knowledge, has received little or no attention in studies on SLI, namely the phenomenon of doubling. By this we mean the multiple appearances of a lexical item in a structural environment which, in non-SLI adult language, permits only a single occurrence of this same lexical item—in other words, the overrepresentation of a lexical item in the linguistic expression.

What is notable is that this doubling phenomenon occurred almost exclusively in the language of the children with SLI (see Table 1); many other instances of insertion of elements also occurred (such as that of determiners), again mostly by the children with SLI, but here we focus on those instances leading to doubling.

Table 1

Frequency of Selected Apparent Insertions in the First 30 Minutes of Language Samples Collected from the Participants with SLI, the Typically Developing 4-Year-Olds (TD4) and the Typically Developing 6-Year-Olds (TD6)

Doubled element	No. of insertions made per group		
	SLI	TD4	TD6
Main verb	7	1	0
Hendiadys	1	1	0
Auxiliary verb	4	0	0
Pronoun	4	0	0
Negative element	2	0	0

As shown in (25) to (30), the doubling phenomenon occurs with a variety of elements: main verbs (see [25]), hendiadyses (26) or auxiliaries (27), but also with pronouns (28), negative elements (29), and, in one instance, with the diminutive suffix (30).

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- | | | |
|-------|---|--|
| | kan word nie | grootword nie |
| | we not can eat not can we not big can | if we not can eat not can we not big. |
| | become not | become not |
| | ‘If we cannot eat, we not cannot grow up’ | |
| (28a) | <i>Utterance by child with SLI:</i> | <i>Target:</i> |
| | *ons ma leer ons saam ons | ons ma leer saam met ons |
| | our mom learn us with us | our mom learn together with us |
| | ‘Our mom is learning with us’ (i.e., she is in our class at school) | |
| (28b) | *hierso is jou klere jou | hierso is jou klere |
| | here are your-singular clothes | here are your-singular clothes |
| | your-singular/you-oblique-singular | |
| | ‘Here are your clothes’ | |
| (29a) | <i>Utterance by child with SLI:</i> | <i>Target:</i> |
| | *ja maar nie so nie my pa nie | ja maar nie soos my pa nie |
| | yes but not like not my dad not | yes but not like my dad not |
| | ‘Yes, but not like my dad’ | |
| (29b) | *jy’t nie geweet dit was nie ek nie | jy’t nie geweet dit was ek nie |
| | you-singular.have-contracted not know- | you-singular.have-contracted not know- |
| | past.participle it be-past not I not | past.participle it be-past I not |
| | ‘You didn’t know it was me’ | |
| (29c) | *hulle wil nie skoonmaak nie hier nie | hulle wil nie hier skoonmaak nie |
| | they want.to not clean-make not here not | they want.to not here clean-make not |
| | ‘They do not want to clean here’ | |

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(30) <i>Utterance by child with SLI:</i>	<i>Target:</i>
*'n rooietjie hoedjie	a rooi hoedjie
a red-diminutive hat-diminutive	a red hat-diminutive
‘A little red hat’	

The question obviously arises as to how to account for these doubling patterns. In our opinion, the impaired lexicon-syntax mapping account (see section 2.1) is not able to give a straightforward explanation for this doubling, unless one takes the improbable view that a certain lexical element, say *reën* in (25a), was selected from the lexicon twice. In the numeration, this double selection of the same lexical item would be represented by means of an index—for example, (*reën*, 2)—which expresses the number of instances of that lexical item that are available for the computation (see Chomsky, 1995a).¹¹ Importantly, under such an analysis, one would expect each instance of the lexical item to contribute semantically to the “descriptive” meaning of the sentence. However, this does not seem to be the case in the SLI utterances: For example, the two instances of *reën* in (25a) do not seem to separately add meaning to the utterance. They do not each introduce their own argument structure; *hulle* seems to function as an argument of both instances of *reën*. One might speculate as to whether the doubling pattern introduces a layer of expressive or discourse-related (e.g., affective-emphatic or contrastive-emphatic) meaning.¹² However, from the contexts in which

¹¹ For example, one might say that in *John’s mother likes John*, the lexical item *John* carries the index ‘2’ in the numeration.

¹² It has been noted in the literature that certain doubling patterns encode particular meanings such as emphasis and focus. See, for example, Martins (2007) for doubling of finite

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these doubling patterns were produced by the Afrikaans-speaking children, doubling does not seem to correlate with emphatic meaning. For example, doubled *reën* in (25a) was uttered in a context in which neither contrast (e.g., ‘to rain’ versus ‘to snow’) nor affect (e.g., exclamative meaning expressing surprise) was involved. Also, the nominal expression *jou klere jou* in (28b) was not used in a context in which the possessor ‘you’ stood in a contrastive relationship with some other potential possessor (as in ‘These are your clothes, not mine’). Another interpretation could be that doubling patterns are the result of hesitation, insecurity or rephrasing. However, we did not observe any such signals in the utterance containing the doublings. The utterances were produced fluently, without particular pauses or breaks.

The question arises as to whether these SLI doubling patterns could be accounted for by an approach which takes the impairment to involve the syntax-PF interface. Stated differently, could these patterns be interpreted as deviant externalizations of (non-deviant)

verbs in European Portuguese, and Nunes and Quadros (2004) for Brazilian Sign Language (see [i]). However, other patterns of doubling, e.g., the pattern of *wh*-duplication in certain variants of German (see [ii]), does not seem to trigger any special meaning effects.

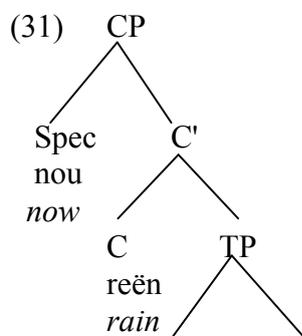
(i) I LOSE BOOK LOSE (Brazilian Sign Language; Nunes & Quadros 2004)
‘I LOST the book (as opposed to, say, *sold it*).’

(ii) **Wen** glaubst du [**wen** Jakob gesehen hat] (German; McDaniel 1986)
whom thinks you whom Jakob seen has
‘Who do you think that Jakob saw?’

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syntactic representations? Let us first consider the verb doubling patterns in (25) to (27).

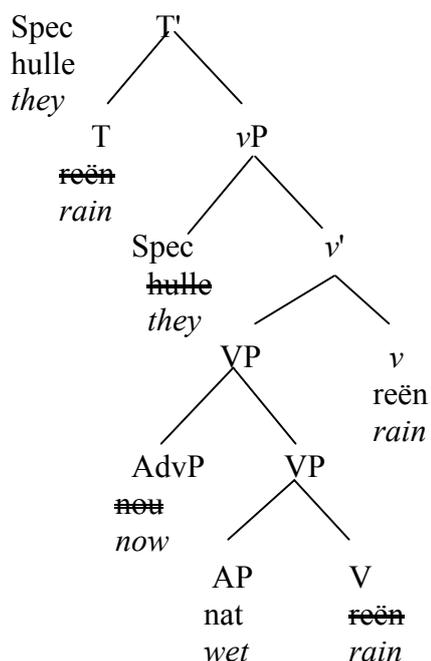
What we propose is that these multiple occurrences of the verb result from the multiple realization (i.e., Spell-out at PF) of traces. More specifically, under the assumption that traces are actually copies of the displaced element (see Chomsky, 1995a), these doubling patterns result from externalization (i.e., pronunciation) of more than one copy.¹³ Normally, only a single copy—typically the highest one, i.e., the head of the chain—is pronounced. For example, in (1) in section 4.1, it is the highest copy of the verb *drink* (i.e., the one occupying the C-position) which is spelled out at PF. Similarly, in the target expression *Nou reën hulle nat* in (25a), it is the verbal copy in the C-position (the verb-second position) which surfaces phonetically (i.e., is pronounced in PF). The lower copies in T, *v* and V remain unpronounced. In the SLI expression *Nou reën hulle nat reën*, one of the lower verbal copies is also pronounced. This is represented in the tree structure in (31).¹⁴



¹³ For discussion of multiple realization of copies, see, among others, Boskovic (2001), Nunes (2004), and Corver and Nunes (2007).

¹⁴ Under the assumption that both VP and *v*P are head-final, it is difficult to determine whether the “doubled” copy is realized in V or *v*. What is relevant for us is that both the highest copy and a lower one are externalized.

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As shown by, for example, (27b), these doubling patterns also occur with finite auxiliary verbs, such as *het* 'have'. Also for this doubling, we argue that there is nothing "syntactically wrong" with it; that is, the syntactic derivation of this linguistic expression is similar to that of the target linguistic expression *want hulle het al 'n paar keer geshock*. However, at Spell-Out, a lower copy of the chain which is supposed to be left unpronounced, is in fact spelled out. Thus, the verbal copy *het* is not only pronounced in the hierarchically most prominent position (i.e., the verb-second position C) but also in one of the lower verbal head positions.¹⁵

¹⁵ Responses containing two *hets* were also given to some items of the sentence completion task assessing the production of tense, for example, *het eet het* 'have eat have' in response to *Hierdie beer kan elke dag heuning eet. Gister, net soos elke ander dag, ...* 'This bear can eat honey every day. Yesterday, just like every other day, ...'. Other relevant

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In sum, the verbal doubling patterns produced by SLI children seem to receive a natural account in terms of the syntax-PF interface relation: impairment regards the externalization of chains. In a way, too much linguistic material is externalized. One might raise the deeper question here as to what underlies this richness in externalization. At present, we do not have any definite answers. Along the lines of Chomsky (2009, 2010), one might speculate that double articulation is interpretatively useful (since each position in the chain is interpretatively relevant) but “physically” costly (i.e., articulation requires a lot of energy; Chomsky, 2010). In adult speakers without SLI, optimality (i.e., economy) in terms of sound typically wins over optimality in terms of meaning (where the latter entails explicitness about the positions of interpretation; e.g., the verbal position where theta-roles are assigned and the position where illocutionary force is defined). Possibly, in the case of children with SLI, the “meaning side” sometimes wins over the “sound side”—that is, explicitness about the syntactic positions which play a role on the meaning side (e.g., the theta-role position and the illocutionary position, the latter being the verb-second position) is more relevant at times than the pronunciation costs associated with double articulation.¹⁶

responses to this task were *het sy alles staan het* ‘have she everything (under)stand have’ (instead of *het sy alles verstaan*) and *het sy ’n blom gepluk het* ‘have she a flower pick-past.participle have’ (instead of *het sy ’n blom gepluk*).

¹⁶ One might further speculate and try to relate this to the notion of ‘phase’ (Chomsky, 2000, 2001), where a phase is a syntactic object of which the parts (more specifically, the complement of its head) can be inspected for convergence (at PF and LF). Under the assumption that *v* and *C* are the phase heads in the clausal architecture, one might argue that

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Having given an account of verbal doubling patterns in terms of externalization of chains (i.e., multiple copy spell out), let us turn next to the other doubling patterns, starting with (28a). The linguistic expression *ons saam ons* features both omission and doubling. Omission regards the preposition *met* which, as shown by the target expression *saam met ons*, co-occurs with *saam*.¹⁷ Of note is that, besides *saam met ons*, we also find *met ons saam* in adult, non-SLI Afrikaans. We will assume that the latter word order is derived from *saam met ons* via leftward displacement of the PP *met ons*. If so, the doubling pattern could possibly again be interpreted as an instance of externalization of two (PP) copies of a chain. More specifically, both the foot of the chain (*saam [P_o ons]*) and the head of the chain, i.e., the displaced PP (*[P_o ons] saam*), are pronounced, yielding the pattern *[P_o ons] saam [P_o ons]*.

The doubling phenomenon in the possessive construction *jou klere jou* in (27b) may also be interpreted in terms of double realization of copies of a chain—in this case, the chain which results from displacement of the possessor from the postnominal position (complement

doubling is typically associated with the verbal phase heads *v* and *C*, i.e., the points in the derivation at which material—i.e., the complement of *v* (i.e., VP) and the complement of *C* (i.e., TP)—is sent off to be interpreted semantically and phonologically. Double externalization of the verbal copies in those phase heads may be a way of “keeping track” of the (meaning of the) sentence during utterance of the sentence.

¹⁷ See section 6 for P-omission in prepositional phrases (PPs).

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to N, as in *die klere van jou* ‘the clothes of you’ = ‘your clothes’) to the pronominal position (say, [Spec,DP]). Schematically, this can be represented as shown in (32):¹⁸

(32) [DP **jou** [D' D [NP klere **jou**]]]

What about the *nie*-doubling in (29)? Admittedly, an analysis in terms of syntactic displacement and multiple copy spell-out seems less likely for those patterns. Following the line of reasoning that doubling in SLI Afrikaans is a phenomenon on the PF side of the grammar, we tentatively propose that *nie*-doubling in expressions such as *nie my pa nie* (29a), *nie ek nie* (29b) and *nie hier nie* (29c) follows from a PF-merger operation which concatenates and copies the final *nie* to the immediate left of the negated phrase to its left. In a way, the first prephrasal *nie* phonologically anticipates the second postphrasal *nie*. In this case, concatenation and duplication takes place at PF, an “affix-hopping”-like operation in the sense of Chomsky (1957),¹⁹ where the final *nie* is taken to be an affix-like element which PF-merges (via concatenation and duplication) onto the initial element of the preceding phrase.²⁰ Schematically, this can be represented as shown in (33):²¹

¹⁸ Absence of *van* before postnominal *jou* follows from the fact that the first occurrence of *jou* in [Spec,DP] already receives genitive case in [Spec,DP], possibly via D. In other words, the chain {*jou*, *jou*} is case-licensed via the highest copy.

¹⁹ See also Embick and Noyer (2001) for extensive discussion of PF-displacement operations.

²⁰ In traditional grammar, this phenomenon of grammatical anticipation is referred to as “prolepsis”: an element appears “too early” in the linguistic representation, i.e., in a position which is not its canonical position or where it does not have its origin (Overdiep,

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1937). A well known case of prolepsis is the phenomenon in which a *wh*-word belonging to an embedded verb appears in the main clause, as in *Who do you think John saw?*. In the generative framework, this pattern of prolepsis has been analyzed in terms of syntactic displacement. Another phenomenon of prolepsis in Dutch is the leftward spreading of attributive adjectival inflection onto certain degree adverbs (see Corver, 1997, 2007).

Compare, for example, the Dutch patterns in (i):

- (ia) een [heel erg leuk-*e*] auto (a really very nice-*e* car)
- (ib) een [heel erg-*e* leuk-*e*] auto (a really very-*e* nice-*e* car)
- (ic) een [hel-*e* erg-*e* leuk-*e*] auto (a really-*e* very-*e* nice-*e* car)
- (id) *een [hel-*e* erg leuk-*e*] auto (a really-*e* very nice-*e* car)

A possible way of interpreting this phenomenon is in terms of leftward affix-hopping, interpreted in the sense of Chomsky (1957), which means that it is an operation that takes place at PF: the affix *-e* hops in PF from right to left and each time right-adjoins to the preceding adverbial element (*erg*, *heel*).

²¹ A possible alternative analysis of the pattern illustrated in (28) would be that such examples involve both sentential and constituent negation (see section 4.3). On this analysis, (a) the sentence contains two PolPs, one dominating the CP and the other dominating the negated constituent in question; (b) two movement operations take place, resulting in the CP being moved to the specifier position of the left-most PolP and the negated constituent to the specifier position of the PolP immediately dominating it; and (c) as result of the two movement operations, two *nie*₂s end up adjacent to one another, with only one of them phonetically spelled out in unimpaired adult speech (see Biberauer, 2006; section 4.3).

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(33a) ja maar nie soos [my pa] **nie** (syntactic representation)

(33b) ja maar nie soos **nie**+ [my pa] **nie** (PF-merger of *nie*)

It does not seem implausible to extend this line of approach to the diminutive-morpheme duplication in (30). The diminutive morpheme *-tjie* starts out on the nomen and “spreads” to the left via PF-merger. In this case, the bound morpheme right adjoins to the prenominal attributive adjective. Schematically, this can be presented as in (34):

(34a) ’n rooi hoed-**tjie** (syntactic representation)

(34b) ’n rooi-**e-tjie**²² hoed-**tjie** (PF-merger of *-tjie*)

To summarize, we pointed out an important phenomenon in the linguistic output of Afrikaans-speaking children with SLI, viz. the phenomenon of doubling or overrepresentation of lexical material. It is not immediately clear how these doubling patterns can be accounted for under an approach which takes the interface between lexicon and syntax to be the location where impairment should be sought. Rather, we proposed that the locus of impairment is the interface between syntax and PF. As such, SLI can be characterized as an externalization problem, that is, a problem pertaining to the mapping from syntax to the sensori-motor systems (i.e., pronunciation).

²² The *-e-* in *rooi-etjie* could be analysed in at least two ways. On the one hand, *-e-* could be taken to be merely a conjoining sound; pronouncing the word without the *-e-* would render the same pronunciation as *rotjie* ‘rat-diminutive’. On the other hand, *rooi-etjie* could also mean ‘red one-diminutive’ with *-e-* representing a nominalization affix; on this analysis, the child could therefore be seen as using a DP consisting of D-N-N.

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6. Omission Phenomena in Afrikaans SLI Utterances

In the impaired lexicon-syntax mapping account, the focus is on the optional presence of certain functional categories (T and Agr, to be precise) in the derivations of children with SLI. Indeed, a lot of research on the language of children with SLI centers on tense-marking, as the latter has been proposed as a clinical marker of SLI in certain languages—see Rice and Wexler (1996) for English; Bortolini, Caselli, Deevy, and Leonard (2002) for Italian; Southwood and Van Hout (2010) for Afrikaans. The explanation that Wexler and colleagues offer for the omission of tense marking is clear: When there is no T in the numeration, tense is not part of the derivation and is consequently absent in the generated syntactic representation. The explanation offered by the impaired syntax-phonology mapping account is that the derivation is complete (i.e., adult-like) but is not spelled out (or externalized) in an adult-like manner. The reason why elements relating to tense are not spelled out pertains to the number of different formal means by which past tense can be expressed in Afrikaans: At Spell-Out, there is competition between these forms. This language-internal diversity in the formal expression of past tense is illustrated by the sentences in (35), which all have the meaning “He wanted to sleep yesterday”.

(35a) Gister wou hy geslaap het

yesterday want.to-past he sleep-past.participle have

(35b) Gister wou hy slaap

yesterday want.to-past he sleep-infinitive

(35c) Gister wil hy geslaap het

yesterday want.to-present he sleep-past.participle have

(35d) Gister wil hy slaap

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yesterday want.to-present he sleep-infinitive

The problems which the child with SLI experiences with selecting the correct verbal form could be of such a magnitude that, at times, the child selects the wrong past tense form and, at other times, the child opts for not spelling out the past tense carrier at all, the latter resulting in apparent absence of tense marking in the syntactic representation. We illustrate this with (36), one of 17 past tense forms produced by the Afrikaans-speaking children with SLI in which the obligatory *het* ‘have’ was not spelled out; the typically developing 4-year-olds produced four such forms and the typically developing 6-year-olds produced one.

(36) <i>Utterance by child with SLI:</i>	<i>Target:</i>
*hulle seergekry	hulle <u>het</u> seergekry
they sore.get-past.participle	they have sore.get- past.participle
‘They got hurt’	

If there is **no** modal auxiliary in the sentence—as in (36), compared to *hulle sou seergekry het* ‘they would have gotten hurt’ where there is a modal—then the derivation should crash if the *het* is omitted, given that T would have an unchecked Verb feature. However, these derivations do not crash in the case of children with SLI, as can be seen in (32); therefore, an alternative explanation is required. On our proposal, *het* is part of the numeration and input to the syntactic derivation: It merges with vP and is subsequently moved to the T, leaving behind a copy (yielding *hulle het seergekry het*, should one ignore the other movement operations) and then to the C, again leaving behind a copy (yielding *hulle het_C hulle het_T hulle seergekry het_V*, should one consider all movement operations). However, at the point of Spell-Out, no copy of *het* (not even the left-most one of the chain {*het*, *het*, *het*}) receives sound form. Importantly, the past tense meaning is recoverable from

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the past participle form *seergekry*, which is determined by the auxiliary *het*.²³ Possibly, this local recoverability of tense information plays a role in the omission (i.e., nonpronunciation) of the auxiliary.²⁴

Het ‘have’ is however not the only auxiliary to be omitted. Children with SLI, but not typically developing children, also omitted modal auxiliaries. An example of such an omission is given in (37).

- | | | |
|------|--------------------------------------|---------------------------------|
| (37) | <i>Utterance by child with SLI:</i> | <i>Target:</i> |
| | OK nou die kinders eet ²⁵ | OK nou moet/wil die kinders eet |

²³ See Chomsky’s (1957) analysis of verbal forms in terms of affix hopping. On this analysis, information about the form (i.e., morphology) of the verb which is selected by the auxiliary is specified on the auxiliary. For example, *het* is lexically specified for the past participle bound morpheme *ge-*. In PF, this morpheme “hops” onto (i.e., PF-merges with) the verb *seerkry*, which is in the complement position of *het*. Thus, ignoring linear order, we could represent the affix hopping operation for *ge-*, as in (i):

- (i) hulle het_[ge-] seerkry → (ii) hulle het seergekry

²⁴ Another possible reason why a child with SLI may find it acceptable to leave *het* phonologically empty could be related to Kayne’s (1993) proposal that ‘have’ could be seen as ‘be’ plus an incorporated preposition (i.e., ‘have’=Preposition_{DATIVE/LOCATIVE}+‘be’), along the lines of Benveniste (1966). As both ‘be’ and the abstract preposition are semantically poor, it could be that the child does not provide the complex form [Preposition+‘be’] with phonological contents at Spell-Out.

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OK now the children eat

OK now must/want.to the children eat

‘OK, now the children must / want to eat’

The impaired syntax-phonology mapping account will offer the same explanation as it does for temporal auxiliary *het* ‘have’, namely that the (at times tense-carrying) modal is in fact part of the numeration and the derived syntactic representation but does not receive sound form at Spell-Out.

Whereas both the impaired lexicon-syntax mapping and the impaired syntax-phonology mapping accounts could be said to offer explanations for impaired tense marking, the latter approach seems to be more in line with the observation that omission of lexical material (both free morphemes and bound morphemes) is a far more general phenomenon. For example, omitted material in the Afrikaans SLI data included the following: (Omitted material enclosed in parentheses.)

- past participles as a whole—*hulle altwee het op ’n blou bed (geslaap)* ‘both of them (slept) on a blue bed’;

²⁵ When considering this utterance out of context, one could argue that the intended utterance was a modal-less construction (‘OK now the children eat’). The “children” in this instance are little figurines which the girl with SLI who made this utterance had just dressed in crash helmets. Immediately after saying *OK nou die kinders eet*, the girl looked at the figurines, presumably saw that they could not eat with their head gear on and said *Nou hoe? Hoe moet julle eet?* ‘How now? How must you-plural eat?’, which led us to believe that the child intended to say *OK nou moet/wil die kinders eet. Nou hoe? Hoe moet hulle eet?* ‘OK, now the children must / want to eat. How now? How must they eat?’.

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- the past participial morpheme *ge-*—*so haar (ge)kou het* ‘chew(ed) het like this’;
- verb particles—*dan sit jy die ander een neer* ‘then you put the other one (down)’;
- particle verbs—*hoe kan ons die rugsakkie af(haal)?* ‘how can we (take) the little rucksack off?’;
- negative elements—*ja hy’s nie so ander Chinese (nie)* ‘yes he’s not like other Chinese (not)’;
- possessive markers—*en juffrou kyk die kyk die ystervarks maag* ‘and teacher looks at the porcupine(’s) stomach’;
- determiners—*soek jy (die/’n) kas?* ‘do you want (the/a) cupboard?’;
- pronouns—*shame (sy) rug kry seer* ‘shame (his) back is sore’;
- nouns—*en ’n pappa sit (?hoedjies) op* ‘and a daddy puts (?caps) on’; and
- prepositions—*Karel Kat gaan jou die plaas toe vat* ‘Tom Cat will take you (to) the farm to’.

The number of times such omissions occurred is indicated in Table 2.

Table 2

Frequency of Selected Apparent Omissions in the First 30 Minutes of Language Samples Collected from the Participants with SLI, the Typically Developing 4-Year-Olds (TD4) and the Typically Developing 6-Year-Olds (TD6)

Omitted element	No. of omissions made per group		
	SLI	TD4	TD6
Past participle as a whole	6	2	0
Past participial morpheme	18	2	0
Verb particle	6	1	2 ^a
Particle verb	6	0	0
Negative element	8	1	1 ^b
Possessive marker	3	0	0

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Determiner	45	19	4
Pronoun	22	4	3
Noun ^c	5	0	0
Preposition	24	4	1

^aThe two verb particles omitted by the typically developing 6-year-olds involved less frequent words (*afrig* ‘coach’, *oppas* ‘cares for / looks after’) than the words from which particles were omitted by their peers with SLI (e.g., *insit* ‘put in’, *afhaal* ‘take off’). ^bThis utterance was **moet ek nie ‘n papier gaan haal dan teken ons goedjies wat ons hierin kan sit Ø? ‘shouldn’t I go and fetch a piece of paper then we draw little things which we can put in here?’*, which is more complex than those utterances from which the children with SLI omitted a negative element, for instance, **dan is dit nie lekker Ø ‘then it is not nice’*. ^cHere, we considered only those omitted nouns that would **not** have comprised NPs on their own in adult derivation, i.e. where a determiner or adjective is present without the noun, as in **daar nog ‘n Ø hier ‘there (is) still a Ø here’*.

The omission of a past participle verb (as a whole), noun or preposition will be problematic for the impaired lexicon-syntax mapping account, for the following reason: Whereas absent tense and agreement marking has to do with functional categories not being present in the numeration, the absence of (main) verbs, nouns and prepositions involves lexical categories. If certain lexical categories are not present in the numeration, then they can obviously not project onto the syntactic structure, nor can the lexical information associated with those lexical categories (such as argument structure or subcategorization information) play any role in the generation of a syntactic structure. So, under a generalized view of omission as absence of a lexical item L (and its projection LP) in the syntactic representation, lexical categories would sometimes simply not be part of the linguistic expression generated

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by the child with SLI. That is, if a noun is not present, then there will be no noun and no projection NP in the derived syntactic representation. Also, omission of a preposition implies absence of P (and its projection PP) in the syntactic representation.

However, this generalized view of omission of lexical material as absence in the numeration and, consequently, as absence in the representation seems problematic. Consider, for example, the following Afrikaans SLI data, which exemplify noun omission and preposition omission, respectively:

- (38) *Utterance by child with SLI:* *Target:*
*hierso moet nou nog 'n rooi Ø hierso moet nou nog 'n rooi een / keppie kom
kom
here must now still a red come here must now still a red one / cap-diminutive
come

‘A red one / cap should now still be placed here (on this figurine’s head)’

- (39a) *Utterance by child with SLI:* *Target:*
my goed is die kas my goed is in die kas
my stuff be the cupboard my stuff be in the cupboard
‘My stuff is in the cupboard’

- (39b) dan hy dan wil dit hom koppe sit hy dan wil hy dit op sy kop sit hy
then he then want.to it his heads put he then want.to he it on his head put he
‘Then he wants to put it on his head, him’

In the SLI utterance ‘n rooi in (38), the noun is omitted. Under a rigid ‘omission = (syntactic) absence’ view, there is no lexical category N present in the linguistic expression ‘n rooi. This immediately raises the question as to what syntactic structure should be assigned to

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the string *'n rooi*. The indefinite article *'n* typically does not merge with the lexical category Adv (*rooi*). That is, indefinite articles are typically part of the extended **nominal** projection in the sense of Grimshaw (1991/2005). This suggests that there is a noun present in the syntactic structure that corresponds to the linear string *'n rooi*. The only difference between the target (i.e., non-SLI) utterance *'n rooi een* and the SLI utterance *'n rooi* regards the pronunciation (i.e., externalization) of the N-position: N remains silent in the SLI utterance.

Consider next the sequences *die kas* in (39a) and *hom koppe* in (39b), which have the spatial interpretation ‘in the cupboard’ and ‘on his head’, respectively. As indicated by the target expression, this spatial information is typically expressed by the prepositions *in* and *op*. Under a rigid ‘omission = (syntactic) absence’ approach, there would be no P(P) in the SLI utterances. This raises two questions. First, how is ‘spatial information’ then expressed? Second, how do selectional relations work, as the verb *sit* in (39b) does not seem to be subcategorized for a nominal expression? Notice, finally, that absence of P in the copular clause in (39a) would entail that we have a predication relationship between *my goed* and *die kas*. Clearly, the meaning ‘my stuff is the cupboard’ is not the intended interpretation. Rather, there is a spatial relationship between *my goed* and *die kas*, with P being the (two-place) predicate that takes as its arguments *my goed* (the external argument) and *die kas* (the internal argument).

In summary, both the impaired lexicon-syntax mapping account and the impaired syntax-phonology mapping account offer satisfactory explanations for impaired tense marking, but the latter account seems to give an account for the phenomenon of omission in SLI utterances more in general. The absence in the sound form of a wide range of elements (thus more than optional infinitives or impaired agreement marking) can be explained by the

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impaired syntax-phonology mapping account, but not by the impaired lexicon-syntax mapping account.

7. Deviant Word Order in Afrikaans SLI Utterances

In the Afrikaans data, there are several instances of utterances in which no deletion took place but in which the word order is nonadult-like. All three groups of Afrikaans-speaking children made some word order errors, indicating that word order is not yet completely adult-like by the age of 6. However, not all types of errors were made by all the groups. Of interest here is that two of the error types, that of main clauses with a Subject-Object-Verb surface word order—as shown in (40)—and main clauses with a Verb-Subject-Object—as shown in (41)—were used exclusively (although infrequently) by the children with SLI. (The derivation of a representative number of these utterances is discussed in Southwood, 2007.)

- | | | |
|------|--|--|
| (40) | <i>Utterance by child with SLI:</i> | <i>Target:</i> |
| | *hulle TV kyk | hulle kyk TV |
| | they TV watch | they watch TV |
| | ‘They are watching TV’ | |
| (41) | <i>Utterance by child with SLI:</i> | <i>Target:</i> |
| | * vryf hy die been en ’n pappa | hy vryf die been van pappa |
| | rub he the leg and a daddy | he rub the leg of daddy |
| | ‘He is rubbing daddy’s leg’ | |

More difficult to classify word order errors also occurred. These are illustrated in (42).

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- (42a) *Utterance by child with SLI:* *Target:*
- | | |
|--|--|
| *en hulle meet om hulle op die lorrie | en hulle meet hulle om op die lorrie te |
| te gaan | gaan |
| and they measure infinitive. | and they measure them infinitive. |
| complementizer they/them on the truck | complementizer on the truck to go |
| to go | |
- ‘And they measure them to go onto the truck’ [them = captivity-bred ostrich chicks, measured to decide whether they are big enough to be sold]
- (42b) *ek sal **ry fiets** ek sal **fietsry**
- | | |
|---------------------|---------------------|
| I will ride bicycle | I will bicycle.ride |
| ‘I will cycle’ | |
- (42c) *waar’s nog **ene so?** waar’s nog **so ene?**
- | | |
|--------------------------------------|--------------------------------------|
| where.be-contracted another one such | where.be-contracted another such one |
| ‘Where’s another one like this?’ | |
- (42d) *seker maar daai wit hondjie wat.se seker maar daai wit hondjie wat.se naam
- | | |
|---|---|
| naam is Nuschka | Nuschka is |
| probably just that white dog-diminutive | probably just that white dog-diminutive |
| whose name be Nuschka | whose name Nuschka be |
- ‘Probably that white doggie whose name is Nuschka’

In (40) to (42), no apparent deletion or insertion occurs, and tense marking appears adult-like (although the present tense is used in all three of these utterances, and the present tense form resembles the infinitival form). Yet the word order differs from that of adult speakers of Afrikaans. That is, the SLI utterances are linearized differently from the target

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expressions. According to Chomsky (2010), “linear order derives from the fact that order is a property of the sensory motor system” (p. 10). In other words, the linear aspect of language is a property that is not encoded in the syntactic representation and that is irrelevant for the interpretive part (i.e., LF) of a linguistic expression.²⁶ If Chomsky is right in saying that linearity is a property of PF (and not of syntax), then the ‘mis-linearizations’ of the SLI utterances in (39) to (41) should also be interpreted as ‘PF errors’. Of interest is that all the word order errors in these examples involve two linearly adjacent elements. For example, instead of the target sequence *kyk TV*, we have *TV kyk* (see [40]) in a main clause, and instead of the target sequence *so ene* we have *ene so* (see [42c]). An interesting mis-linearization is the one in (42a). Instead of the order *hulle om* (i.e., object of the matrix verb *meet* + infinitival complementizer of the embedded clause) we find the reverse order *om hulle*. It seems unlikely that *om* has somehow become part of the matrix syntactic structure. Nor is it likely that (the second) *hulle* is somehow part of the embedded clause structure. In short, the sequence *hulle om* seems to be a linearization error: that is, the syntactic structure is similar to that of the target language, but the linearization of the structure may be deviant as a result of ‘inversion’ of two string-adjacent elements.

To summarize, we have shown in this section that certain SLI errors involve the linearization of two lexical items that are string-adjacent to each other. Under the assumption that linearization is a PF property, rather than a syntactic one, this type of SLI error too may

²⁶ See Kayne (1994) for a different view: he argues that linear order (precedence) is connected to hierarchical structure. More specifically (and somewhat simplified), if constituent A asymmetrically c-commands constituent B, then A precedes B.

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be characterized as an error at the interface between syntax and PF, that is, an externalization error.

We conclude this section by pointing out that only a small portion of the sentences produced by the three groups had incorrect word order: 1.8% by the children with SLI, 0.8% by the 4-year-olds, and 0.9% by the typically developing 6-year-olds. Mostly, then, the children with SLI produce sentences with correct word order. Bearing this in mind, we propose that it is more plausible that these children have intact computational systems with the phonological spell-out of the derivations sometimes being incorrect (thus that the impairment lies at the syntax-phonology interface) than that these children sometimes have correct underlying syntactic structures and at other times not (which will be the case if one accepts that the impairment lies at the lexicon-syntax interface).

8. Conclusion

In this article, we have argued on the basis of a variety of phenomena attested in linguistic expressions produced by Afrikaans-speaking children with SLI that this impairment is essentially what may be called an ‘externalization problem’. Children with SLI typically have a problem with mapping the syntactic representation onto a proper sound representation. In other words, the problem regards the syntax-phonology interface. We based our conclusion on a variety of syntax-phonology interface phenomena, namely (a) double articulations of lexical material, which either involved multiple spell-outs of copies of chains or PF-mergers of morphemes onto adjacent lexical or phrasal categories; (b) omissions, or silences (i.e., non-pronunciation), of structurally available positions, such as the functional category T, but also lexical categories such as N and P; and (c) ‘inverse’ linearizations (i.e., word orders) of

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string-adjacent elements. Importantly, our account proposes that the language problem of children with SLI does not lie in the computational system (i.e., not with Merge or Move), as the syntactic structures generated do not really deviate from those generated by adult speakers of Afrikaans. Furthermore, taking a unified approach towards SLI phenomena, we concluded on the basis of the above-mentioned variety of SLI phenomena (doubling, silence, and inverse linearization) that the locus of the impairment should not be sought in the mapping from lexicon to syntax, i.e. in the selection of a lexical item (e.g., T or Agr) as a member of the numeration and its projection onto syntax. We argued that these SLI phenomena cannot not be explained by an approach that locates the problems at the lexicon-syntax interface (see the ATOM; Schütze & Wexler, 1996; Wexler, Schütze, & Rice, 1998), where the latter approach assumes a defective or incomplete (morpho)syntactic structure.

The question might be raised as to why children with SLI should have problems with Spell-Out at PF. Although we do not have any conclusive answers to this question, we agree with Berwick and Chomsky's (in press) statement that "externalization is not a simple task." As they point out, externalization has to relate two rather distinct systems to each other: the computational system for thought, on the one hand, and the sensorimotor system, on the other. As Berwick and Chomsky (in press) point out, "morphology and phonology—the linguistic processes that convert internal syntactic objects to the entities accessible to the sensorimotor system—might turn out to be quite intricate, varied, and subject to accidental historical events." They further argue that these domains of human language are the domains of parametrization and diversity. Morphology and phonology furthermore appear to be those domains of language that children take longest to master fully. SLI seems offer support for this.

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Our approach is corroborated by recent insights from the field of experimental psycholinguistic studies on morphology. Experimental data seem to support theories that claim that regular inflected forms are not computed in speaking by adding affixes to roots, but are retrieved in their complete form from the lexicon (e.g., Stemberger, 2004). Both irregular and regular forms are accessed directly from the lexicon, which is in line with Word and Paradigm morphology (Blevins, 2003). If regular forms are accessed and retrieved directly from the mental lexicon, then the selection process has to deal with competing, phonologically neighboring forms (that is, competing lexical forms with almost similar PFs). It seems that children with SLI have particular problems in selecting the proper lexical items from the lexicon to form the numeration, the latter constituting the lexical input to a derivation of a structured linguistic expression. The difficulties of children with SLI appear to arise specifically in contexts where more than one potential Spell-Out candidate is available.

Role of the funding source

The SLI material which forms the empirical basis of this article is based on work carried out by the second author and financially supported by The National Research Foundation of South Africa. Other work was in part financially supported by the Alexander von Humboldt Foundation in Germany. The two funding bodies had no involvement in the study design; collection, analysis and interpretation of the data; the writing of the paper; or in the decision to submit the paper for publication. Any opinion, findings, conclusions or recommendations expressed in this material are those of the authors and therefore the funding agencies do not accept any liability in regard thereto.

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References

- Adger, D. (2003). *Core syntax. A minimalist approach*. New York, NY: Oxford University.
- Baker, M. (2001). *The atoms of language*. New York, NY: Basic books.
- Benveniste, E. (1966). *Problèmes de linguistique générale* [Problems of general linguistics]. Paris: Gallimard.
- Berwick, R., & Chomsky, N. (in press). The biolinguistic program: The current state of its evolution and development. In A. M. Di Sciullo, & C. Agüero (Eds.), *Biolinguistic investigations*. Cambridge, MA: MIT.
- Biberauer, T. (2002). Verb second in Afrikaans: Is this a unitary phenomenon? *Stellenbosch Papers in Linguistics*, 34, 19-69.
- Biberauer, T. (2006, March). Doubling and omission: insights from Afrikaans. Papers presented at the Workshop on Doubling in the Dialects of Europe, Amsterdam. Retrieved from http://www.meertens.knaw.nl/projecten/edisyn/Online_proceedings/Paper_Biberauer.pdf
- Biberauer, T. (2009) Jespersen off course? The case of contemporary Afrikaans negation. In E. van Gelderen (ed.). *Cyclical change* (pp. 91-130). Amsterdam: John Benjamins.
- Blevins, J. P. (2003). Stems and paradigms. *Language*, 79, 737-767.
- Bortolini, U., Caselli, M. C., Deevy, P., & Leonard, L. B. (2002). Specific language impairment in Italian: The first steps in search for a clinical marker. *International Journal of Language and Communication Disorders*, 37, 77-94.
- Boskovic, Z. (2001). *On the nature of the syntax-phonology interface: Cliticization and related phenomena*. Amsterdam: Elsevier Science.

SLI AS A SYNTAX-PHONOLOGY INTERFACE PROBLEM

- Brinton, B., Fujiki, M., & Robinson, L. A. (2005). Life on a tricycle: A case study of language impairment from 4 to 19. *Topics in Language Disorders. Language Disorders and Learning Disabilities: A Look Across 25 years*, 25, 338-352.
- Chomsky, N. (1957). *Syntactic structures*. The Hague: Mouton.
- Chomsky, N. (1995a). *The minimalist program*. Cambridge, MA: MIT.
- Chomsky, N. (1995b). Bare phrase structure. In G. Webelhuth (Ed.), *Government and binding theory and the minimalist program* (pp. 383-439). Oxford, UK: Blackwell.
- Chomsky, N. (2000). Minimalist inquiries: The framework. In R. Martin, D. Michaels, & J. Uriagereka (Eds.), *Step by step. Essays on minimalist syntax in honour of Howard Lasnik* (pp. 89-155). Cambridge, MA.: MIT.
- Chomsky, N. (2001). Derivation by phase. In M. Kenstowicz (Ed.), *Ken Hale: A life in language* (pp. 1-52). Cambridge, MA.: MIT.
- Chomsky, N. (2007). Approaching UG from below. In U. Sauerland, & H.-M. Gärtner (Eds.), *Interfaces + Recursion = Language? Chomsky's minimalism and the view from syntax-semantics* (p. 1-29). Berlin: Mouton de Gruyter.
- Chomsky, N. (2009). Conclusion. In M. Piattelli-Palmarini, J. Uriagereka, & P. Salaburu (Eds.), *Of minds and language* (pp. 379-409). Oxford: Oxford University.
- Chomsky, N. (2010, March). *Poverty of stimulus: Unfinished business*. Transcription of paper presented at Johannes-Gutenberg University, Mainz, Germany. [Transcription edited and certified by Noam Chomsky.]
- Clahsen, H. (1989). The grammatical characterization of developmental dysphasia. *Linguistics*, 27, 897-920.

SLI AS A SYNTAX-PHONOLOGY INTERFACE PROBLEM

- Clegg, J., Hollis, C., Mawhood, L., & Rutter, M. (2005). Developmental language disorders—a follow-up in later adult life. Cognitive, language and psychosocial outcomes. *Journal of Child Psychology and Psychiatry*, *46*, 128-149.
- Corver, N. (1997). The internal syntax of the Dutch extended adjectival projection. *Natural Language and Linguistic Theory*, *15*, 289-368.
- Corver, N. (2006). Proleptic agreement as a good design property. In J. Costa, & M.-C. Figueiredo Silva (Eds.), *Studies on agreement* (pp. 47-73). Amsterdam: John Benjamins.
- Corver, N., & Nunes, J. (2007). *The copy theory of movement*. Amsterdam: John Benjamins.
- Crystal, D., Fletcher, P., & Garman, M. (1976). *The grammatical analysis of language disability*. London, UK: Edward Arnold.
- De Jong, J. (2003). Specific language impairment and linguistic explanation. In Y. Levy, & J. Schaeffer (Eds.), *Language competence across populations: Toward a definition of specific language impairment* (pp. 151–170). Mahwah, NJ: Erlbaum.
- Den Besten, H. (1977/1983). On the interaction of root transformations and lexical deletive rules. In W. Abraham (Ed.), *On the formal syntax of Westgermania. Papers from the 3rd Groningen Grammar Talks, January 1981* (pp. 47-131). Amsterdam: John Benjamins.
- Donaldson, B. C. (1993). *A grammar of Afrikaans*. Berlin: Mouton de Gruyter.
- Embick, D., & Noyer, R. (2001). Movement operations after syntax. *Linguistic Inquiry*, *32.4*, 555-595.
- Gopnik, M. (1994). Impairments of syntactic tense in a familial language disorder. *McGill Working Papers in Linguistics*, *10*, 67-80.

SLI AS A SYNTAX-PHONOLOGY INTERFACE PROBLEM

- Grimshaw, J. (1991/2005). Extended projection. Unpublished manuscript, Brandeis University, Waltham, MA. [Subsequently appeared as part of J. Grimshaw. (2005). *Words and Structure*. Stanford: CSLI.]
- Hansson, K., & Leonard, L. B. (2003). The use and productivity of verb morphology in specific language impairment: An examination of Swedish. *Linguistics*, 41, 351-379.
- Hornstein, N. (2001). *Move! A minimalist theory of construal*. Malden, MA: Blackwell.
- Hunt, K. W. (1970). Syntactic maturity in school children and adults. *Monographs of the Society for Research in Child Language Development* (35)1, Serial no. 134.
- Jakubowicz, C. (2003). Computational complexity and the acquisition of functional categories by French-speaking children with SLI. *Linguistics*, 41, 175-211.
- Kayne, R. S. (1993). Toward a modular theory of auxiliary selection. *Studia Linguistica*, 47, 3-31.
- Kayne, R. (1994). *The antisymmetry of syntax*. Cambridge, MA: MIT.
- Koster, J. (1975). Dutch as an SOV language. *Linguistic Analysis*, 1, 111-136.
- Lasnik, H. & Uriagereka, J. (2005). *A course in minimalist syntax. Foundations and prospects*. Malden, MA: Blackwell.
- Leonard, L. B. (1998). *Children with specific language impairment*. Cambridge, MA: MIT.
- Loeb, D. F. & Leonard, L. (1991). Subject case marking and verb morphology in normally developing and specifically language-impaired children. *Journal of Speech and Hearing Research*, 34, 340-346.
- Martins, A.-M. (2007). Double realization of verbal copies in European Portuguese emphatic affirmation. In N. Corver & J. Nunes (Eds.), *The copy theory of movement* (pp. 77-118). Amsterdam: John Benjamins.

SLI AS A SYNTAX-PHONOLOGY INTERFACE PROBLEM

- McDaniel, D. (1986). *Conditions on Wh-chains*. (Unpublished doctoral thesis). City University of New York, NY.
- Nunes, J. (2004). *Linearization of chains and sideward movement*. Cambridge, MA: MIT.
- Nunes, J., & Quadros, R. (2004, September/October). *Phonetic realization of multiple copies in American and Brazilian Sign Languages*. Paper presented at Theoretical Issues in Sign Language Research 8, Barcelona.
- Oosthuizen, J. (1996). Minimalisme en woordordevariasie in Afrikaanse vraagsinne [Minimalism and word order variation in Afrikaans interrogative sentences]. *Stellenbosch Papers in Linguistics*, 29, 71-98.
- Oosthuizen, J. (1998). The final *nie* in Afrikaans negative sentences. *Stellenbosch Papers in Linguistics*, 31, 61-93.
- Overdiep, G. S. (1937). *Stilistiese grammatica van het moderne Nederlandsch* [Stylistic grammar of modern Dutch]. Zwolle, The Netherlands: Tjeenk Willink.
- Pollock, J-Y. (1989). Verb movement, UG and the structure of IP. *Linguistic Inquiry*, 20, 365-425.
- Rice, M., & Wexler, K. (1996). Towards tense as a clinical marker of specific language impairment in English-speaking children. *Journal of Speech and Hearing Research*, 39, 1239-1257.
- Rice, M., Wexler, K., & Cleave, P. (1995). Specific language impairment as a period of extended optional infinitive. *Journal of Speech and Hearing Research*, 38, 850-863.
- Roberge, P. (1994). On the origins of the Afrikaans verbal hendiadys. *Stellenbosch Papers in Linguistics*, 28, 45-81.

SLI AS A SYNTAX-PHONOLOGY INTERFACE PROBLEM

- Schütze, C. T. (1999). Different rates of pronoun case error: Comments on Rispoli (1998). *Journal of Child Language*, 26, 749-55.
- Schütze, C., & Wexler, K. (1996). Subject case licensing and English root infinitives. *Boston University Conference on Language Development Proceedings*, 20, 670-681.
- Stemberger, J. P. (2004). Phonological priming and irregular past. *Journal of Memory and Language*, 50, 82-95.
- Southwood, F. (2005). A comparison of the responses to three comprehension and three production tasks assessing the morpho-syntactic abilities of Afrikaans-speaking preschoolers. *Per Linguam*, 21, 36-59.
- Southwood, F. (2006). An investigation of the morpho-syntactic abilities of Afrikaans-speaking preschoolers. *South African Linguistic and Applied Language Studies*, 24, 35-55.
- Southwood, F. (2007). *Specific language impairment in Afrikaans. Providing a Minimalist account for problems with grammatical features and word order*. Utrecht, The Netherlands: LOT.
- Southwood, F., & Russell, A. F. (2004). Comparison of conversation, freeplay, and story generation as methods of language sample elicitation. *Journal of Speech, Language, and Hearing Research*, 47, 366-376.
- Southwood, F., & Van Hout, R. (2010). Production of tense morphology by Afrikaans-speaking children with and without specific language impairment. *Journal of Speech, Language, and Hearing Research*, 53, 394-413.
- Stark, R. E., & Tallal, P. (1981). Selection of children with specific language deficits. *Journal of Speech and Hearing Disorders*, 46, 114-122.

SLI AS A SYNTAX-PHONOLOGY INTERFACE PROBLEM

- Statistics South Africa. (2003). *Census 2001. Census in brief* (No. 03-02-02-2001). Pretoria, South Africa: Statistics South Africa.
- Tomblin, J., Records, N., Buckwalter, P., Zhang, X., Smith, E., & O'Brien, M. (1997). Prevalence of specific language impairment in kindergarten children. *Journal of Speech, Language, and Hearing Research, 40*, 1245-1260.
- Waher, H. (1982). The position of the finite verb in Afrikaans. *Stellenbosch Papers in Linguistics, 8*, 51-78.
- Wexler, K. (1994). Finiteness and head movement in early child grammars. In D. Lightfoot & N. Hornstein (Eds.), *Verb movement* (pp. 305-350). New York, NY: Cambridge University.
- Wexler, K. (1998). Very early parameter setting and the unique checking constraint: A new explanation of the optimal infinitive stage. *Lingua, 106*, 23-79.
- Wexler, K. (2002). Lenneberg's dream: Learning normal language development and specific language impairment. In J. Schaffer, & Y. Levy (Eds.), *Language competence accross populations: Towards a definition of Specific Language Impairment*. Mahwah, NJ: Erlbaum.
- Wexler, K., Schaeffer, J., & Bol, G. (2004). Verbal syntax and morphology in typically developing Dutch children and children with SLI: How developmental data can play an important role in morphological theory. *Syntax, 7*, 148-198.
- Wexler, K., Schütze C., & Rice, M. (1998). Subject case in children with SLI and unaffected controls: evidence for the Agr/Tns omission model. *Language Acquisition, 7*, 317-344.

SLI AS A SYNTAX-PHONOLOGY INTERFACE PROBLEM

Zwart, C. J.-W. (1993). *Dutch syntax. A minimalist approach*. (Unpublished doctoral thesis, Rijksuniversiteit Groningen, The Netherlands).

Zwart, J.-W. (1994). Dutch is head initial. *The Linguistic Review*, 11, 377-406.