10 Chomskyan Syntactic Theory and Language Disorders

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10.1 Introduction

Chomsky’s theory of generative grammar regards human language as a cognitive system that is represented in a speaker’s mind/brain with a grammar as its core element. The theory has seen substantial revisions over time (Chomsky, 1957, 1965, 1981, 1995, 2000), and several researchers have employed concepts and notions from different versions of Chomskyan theory in their studies of language impairments. The aim of this chapter is to present an overview of some prominent generative accounts of language impairments. Relevant concepts and notions from Chomskyan theory will be briefly mentioned, but for more detailed background information, the reader is referred to one of the many introductions to Chomskian syntax (see e.g. Haegeman, 1991; Radford, 2004).

Why should anybody who wants to study language impairments in children or adults care about linguistic theory, more specifically, about Chomskyan generative syntax? One obvious reason is that linguistic theory provides the descriptive tools for analyzing the object of inquiry, i.e. language, and that employing these tools will lead to descriptively more precise characterizations of language disorders. A case in point comes from the study of Williams syndrome (WS), a genetically determined disorder with general cognitive deficits and a relative strength in language. Until recently linguistic studies of WS were not available, and the language of people with WS was characterized in intuitive terms, as, for example, “verbose” (Udwin & Yule 1990), exibiting “morphosyntactic difficulties” (Thal, Bates, & Bellugi, 1989), and showing an “unusual semantic organization” (Bellugi, Wang, & Jernigan, 1994). This has changed in the last few years as research on WS has adopted a linguistically more informed approach and produced detailed profiles of linguistic strengths and weaknesses of people with WS across a range of languages; see, for

Another potential advantage of a linguistic approach to language disorders is that it introduces a new way of looking at impaired language which is not readily available from traditional clinical taxonomies. This is particularly true for Chomskyan theory, which regards the human language faculty as a modular cognitive system that is said to be autonomous of non-linguistic cognitive systems such as vision, hearing, reasoning, or memory. The core of the human language faculty is a mental grammar which is broken down into various components (lexicon, phonology, morphology, syntax). This view of human language makes it possible to investigate language impairments as selective within-language deficits. In the past, most generative studies of language disorders have dealt with aphasia and Specific Language Impairment (SLI), i.e. with relatively pure language impairments in which other cognitive systems appear to remain intact. More recently, however, several researchers have begun to investigate a wider range of acquired and developmental disorders from this perspective, including Williams syndrome (Clahsen & Almazan, 1998) and Down’s syndrome (Ring & Clahsen, 2005).

This chapter will focus on production studies of agrammatic aphasia and SLI. In addition, I will briefly outline how the study of broader cognitive impairments, in this case Down’s syndrome, may benefit from a generative perspective.

10.2 Agrammatic Aphasia

Agrammatism in aphasia has traditionally been defined as a disorder of language production which mainly affects function words, i.e. bound grammatical morphemes (e.g. inflectional affixes) and free-standing functional morphemes (auxiliaries, determiners, etc.), while content words, the major lexical categories (nouns, verbs, adjectives) remain intact. Agrammatic production is often characterized as ‘telegraphic speech’ consisting mainly of content words and frequent omissions of grammatically required bound and free functional morphemes (boy kiss girl); see, for example, Goodglass (1968), Marshall (1986), Leuninger (1989), and Jarema (1989). However, much research has shown that agrammatic patients also have specific comprehension problems, for example in sentences in which functional grammatical morphemes are critical for interpretation.

Several researchers have made attempts to characterize agrammatic production in terms of Chomskyan theory. The earliest account comes from Kean (1979), who relied on Chomsky and Halle’s (1968) model of generative phonology and proposed an underlying deficit at the level of phonological representation for agrammatism. Kean highlighted the fact that agrammatism affects both bound morphemes, e.g. inflectional affixes, and free-standing functional morphemes, e.g. auxiliaries and determiners, and that in semantic and
syntactic terms the elements that are omitted in agrammatic production are rather heterogeneous and difficult to characterize. What they all share, however, is that they are phonological clitics in terms of Chomsky and Halle’s theory. The basic distinction Kean employs is between phonological words, i.e. units relevant for word-stress assignment, and phonological clitics, that are irrelevant for stress assignment. For example, the word *kissing* is represented as [#{kiss#} ing#] with the phonological word, but not the phonological clitic (ing#), being marked by boundary symbols on the left and on the right edge (#kiss#), thereby identifying a domain for stress assignment. According to Kean, this level of representation provides for a straightforward distinction between elements that remain intact in agrammatism (phonological words) and those that are affected (phonological clitics).

10.2.1 Feature and trace deletion


With respect to agrammatic comprehension, Grodzinsky focused on difficulties agrammatic patients experience in the comprehension of passive sentences and other constructions which according to Chomsky (1981) involve syntactic movement. Consider, for example, passive sentences such as *The fish is eaten by the man* in which the passive participle *eaten* cannot assign objective case to its internal argument (*the fish*), resulting in movement of this argument to the subject position where it can be assigned nominative case. Object-to-subject movement is said to leave behind a phonologically silent copy of the object (trace) that is coindexed with the moved object and is assigned a thematic role by the verb (*The fish* is eaten *by the man*). Grodzinsky (1990) found that agrammatic patients have difficulty comprehending passive sentences and other constructions involving movement traces but not corresponding simple active sentences that do not involve syntactic movement. Consequently, he argued that agrammatic patients construct syntactic representations for comprehension that do not contain any movement traces, the so-called Trace-Deletion Hypothesis. Although this accounts for the agrammatists’ comprehension difficulties with passives and other syntactic phenomena involving traces, the Trace-Deletion Hypothesis has been subject to much criticism, and generative accounts of agrammatic comprehension have been much refined in recent years (see, e.g., Hickok & Avrutin, 1995; Beretta & Munn, 1998; Grodzinsky, 2000).

With respect to agrammatic production, Grodzinsky’s (1990) idea was that the specific values of the features associated with functional categories are lost or deleted in agrammatism. This Feature-Deletion Hypothesis was presented in terms of Chomsky (1981), in which functional categories need to be specified for a set of abstract grammatical features. The functional category INFL,
for example, is specified for features such as Tense ([PresTns] or [PastTns]), which determine the temporal value of the sentence. The functional category D(eterminer), on the other hand, which requires a nominal complement, is associated with features such as number, gender, definiteness. Grodzinsky claimed that although categories such as INFL or D are present in agrammatism, their internal features are deleted. Consider, as an illustration, the syntactic representation of the sentence The boy kissed the girl in normal standard English (1a) and in agrammatic English (1b).

\[(1a)\]
\[
\begin{array}{c}
\text{IP} \\
\text{DP} \\
\text{D} \\
[+\text{def}] \\
\text{The} \\
\end{array}
\begin{array}{c}
\text{I'} \\
\text{N} \\
\text{boy} \\
[+\text{past}] \\
\text{kiss} \\
\end{array}
\begin{array}{c}
\text{VP} \\
\text{D} \\
[+\text{def}] \\
\text{girl} \\
\end{array}
\begin{array}{c}
\text{DP} \\
\text{the} \\
\end{array}
\]

\[(b)\]
\[
\begin{array}{c}
\text{IP} \\
\text{DP} \\
\text{D} \\
[+\text{def}] \\
\text{boy} \\
[\text{notns}] \\
\text{kiss} \\
\end{array}
\begin{array}{c}
\text{I'} \\
\text{N} \\
\text{D} \\
[+\text{def}] \\
\text{girl} \\
\end{array}
\begin{array}{c}
\text{VP} \\
\text{N} \\
\text{the} \\
\end{array}
\begin{array}{c}
\text{DP'} \\
\end{array}
\]

Grodzinsky (1990, p. 56) argued that the crucial property of (1b) is that the internal feature specifications of the two functional categories D and INFL are left unspecified with respect to definiteness and tense. As a consequence, English-speaking agrammatics leave the functional category slots empty, which results in telegraphic sentences such as boy kiss girl.
One problem for this account is that much research on agrammatic production has indicated that not all functional elements are equally affected. For example, complementizers are comparatively well retained (e.g., Goodglass, 1976; Menn & Obler, 1990), and regular noun plurals present less difficulty than possessive marking in English-speaking aphasics (Gleason, 1978), even though in phonological terms it is the same segment (-s). Moreover, a series of studies across a range of languages have produced evidence that tense marking is more impaired than subject–verb agreement in agrammatic production (e.g., Friedmann & Grodzinsky, 1997, 2000; Benedet, Christiansen, & Goodglass, 1998; Kolk, 2000; Wenzlaff & Clahsen, 2004). Friedmann and Grodzinsky (1997), for example, testing Hebrew- and Arabic-speaking subjects on sentence repetition and oral sentence completion tasks, found that subject–verb agreement was almost intact with error rates of less than 10 percent, whereas tense marking was severely impaired. Similar contrasts were found for English, German, Spanish, and Dutch. These findings are challenging for an account in which all functional categories (Grodzinsky, 1990) are said to be affected. In Chomsky (1981) both tense-marked verb forms and subject–verb agreement forms involve the specification of grammatical features of the functional element INFL, and hence according to Grodzinsky (1990) should both be affected in agrammatic production. The same is true for Ouhalla’s (1993) proposal that in agrammatic speech, functional categories are completely missing. If this were correct, then the contrasts mentioned above, for example, between tense-marking and subject–verb agreement marking would be left unexplained. Likewise, in Chomsky and Halle (1968) both the past-tense -ed and the 3rd sg. affix -s are phonological clitics, and should therefore be equally affected if Kean’s (1979) idea was correct that phonological clitics are impaired in agrammatic production. This prediction does not seem to hold, however, as the results mentioned above indicate. In short, the problem with these early generative accounts is that they fail to explain the subtle dissociations seen in agrammatic speech.

10.2.2 Tree-pruning

Several researchers have employed the hierarchy of functional projections posited in GB-theory to account for agrammatic production deficits (Hagiwara, 1995; Friedmann & Grodzinsky, 1997, 2000; Lee, 2003). Here our focus will be on the so-called Tree-Pruning Hypothesis (TPH; Friedmann & Grodzinsky, 1997, 2000) which explains the structural selectivity of the agrammatic production deficit in terms of Pollock’s (1989) split-INFL hypothesis, according to which the category INFL is split into the functional categories TP (Tense Phrase) and AgrP (Agreement Phrase), with the former located above the latter.

Given this framework, the Tree-Pruning Hypothesis claims that in agrammatism any syntactic node from TP upwards becomes unavailable (pruned, in their terms), yielding phrase-structure representations without TP or any other functional category above TP, as illustrated in (2).
This account does not only explain why subject-verb agreement is preserved (since AgrP is lower than TP) whereas tense marking is impaired in agrammatic production; the TPH also predicts impairments in the production of wh-questions, embedded clauses and other CP-related phenomena in agrammatism, due to the unavailability of the CP-layer. Friedmann (2001) presents some evidence for this prediction from a series of repetition and elicited production tasks with 14 agrammatic patients, in which she found that the patients had difficulty repeating or producing sentences containing embedded complement clauses, object-relative clauses, and wh-questions, while at the same time they had no difficulty repeating or producing sentences with untensed complements (e.g. John saw the woman dance) and yes–no questions (without subject–verb inversion). Friedmann points out that these contrasts are compatible with the TPH, as the impaired phenomena all involve the CP-domain (which is unavailable for agrammatic production), and the non-impaired ones do not.

The TPH has been criticized, however, both from a theoretical perspective and on empirical grounds. Tree-pruning presupposes AgrP and TP as separate functional categories, as well as a fixed hierarchy of functional categories for CP-TP-AgrP-VP. Chomsky (2000), however, has pointed out that agreement and tense are fundamentally different syntactic concepts, with tense being an interpretable feature of the syntactic category T, and agreement not forming a functional category of its own. Instead, Agree is conceived of as an operation that establishes a structural relationship between, for example, the person and number features of a clausal subject and the corresponding uninterpretable
features of a finite verb, which are checked by T. Thus, if T is pruned in the agrammatic phrase-structure tree (which according to the TPH accounts for impaired tense marking), Agree should not be able to operate because the host for a verb’s person and number features (T) has been deleted. This means that an impairment of tense should co-occur with impairments in agreement, thus making it hard for the TPH to explain the observed selective impairment in tense marking.

On an empirical level, the TPH predicts that impairments in tense should coincide with impairments of CP-related phenomena. Friedmann and Grodzinsky (2000, p. 93) explicitly state that “nodes above TP do not exist in agrammatic representation”. Likewise, Hagiwara (1995) predicts that there must not be any patient who can handle the elements in C(omp) but not those in T. Wenzlaff and Clahsen (2004, 2005) investigated a group of seven German-speaking agrammatic patients with respect to these predictions examining (among other phenomena) tense marking and the so-called verb-second constraint, which requires German main clauses to have a finite verb in CP. Verb-second in adverb-initial sentences such as those tested by Wenzlaff and Clahsen (2005) is clearly CP-related as it involves finite verb raising to C(omp) into a structural domain (CP) that is definitely higher than TP. And yet, in sentence-completion tasks, the patients had overall low accuracy scores for tense marking and all but one patient showed chance-level performance, while for verb-second the opposite pattern was found, i.e. overall high accuracy levels, and all but one patient performed significantly above chance level (see Wenzlaff & Clahsen, 2005, pp. 40–1). These results indicate that (contrary to what the TPH predicts) tense deficits in agrammatism are not linked to impairments with the verb-second constraint; see also Penke (1998, 2000) for converging evidence that verb-second is largely preserved in German-speaking agrammatists.

10.2.3 Underspecification of T/INFL

Wenzlaff and Clahsen (2004, 2005) proposed an interpretation of agrammatism in terms of Chomsky’s (1995) Minimalist Program, claiming that in agrammatism the syntactic category T/INFL is unspecified for tense, with other features unimpaired. This account adopts the distinction between interpretable features, i.e. features relevant for semantic interpretation, and non-interpretable ones that are irrelevant for interpretation. According to Chomsky (1995), non-interpretable features must be checked and deleted in the course of the derivation, while interpretable features need not enter into checking relations. Wenzlaff and Clahsen’s (2004, 2005) account rests on two crucial assumptions, (1) that T/INFL contains uninterpretable agreement features along with interpretable tense and mood features, and (2) that among the interpretable features of T/INFL, mood distinctions (between reals and irreals forms) are primary and tense distinctions (between past and non-past forms) secondary, as illustrated in (3).
T/INFL is the host of verb finiteness features and as such contains not only agreement and tense, but also mood features, which distinguish between indicative ([–Irrealis]) and subjunctive or conditional ([+Irrealis]) finite verb forms. Mood and tense features are interpretable whereas agreement features of verbs are non-interpretable, i.e. irrelevant for the semantic interpretation of verbs. Within the interpretable features, mood distinctions are taken to be more basic than tense oppositions; mood marking is more common across languages than tense marking, and acquired earlier by children. Given these assumptions, the Tense Underspecification Hypothesis claims that agreement features and mood distinctions are maintained, while the secondary distinction between [+Past] and [–Past] is lost.

The empirical evidence for this account comes from a series of experiments investigating a group of seven German-speaking agrammatic patients with respect to subject–verb agreement and tense and mood marking. Wenzlaff and Ciechan examined these phenomena in sentence-completion tasks (to test for production deficits) as well as in grammaticality judgment tasks to determine which agrammatic symptoms extend to other modalities. It was found that all agrammatic patients performed at high accuracy levels for mood and agreement in the sentence-completion and the grammaticality judgment tasks. By contrast, tense was impaired in the agrammatic patients, and in both tasks. These results are consistent with the notion of an underspecification of T/INFL in agrammatism. Moreover, the finding that the grammaticality judgment and the sentence-completion tasks yielded parallel results and that no significant task effects were found indicates that T/INFL underspecification is a central representational deficit in agrammatism which can be seen not only in production, but also in other modalities; see Burchert, Swoboda-Moll, and De Bleser (2005) and Varlokosta, Valeonti, Kakavouli, Lazaridou, and Economou (2005) for recent extensions of the T/INFL underspecification account.

### 10.3 Specific Language Impairment

SLI is defined as a delay or a disorder of the normal acquisition of grammar in the absence of neurological trauma, cognitive impairment, psycho-emotional disturbance, or motor-articulatory disorders (see Leonard, 1998; Levy & Kavé,
1999; Clahsen, 1999 for review). Several researchers have employed concepts and notions from Chomskyan theory in their attempts to characterize the morphosyntax of individuals with SLI and how it differs from that of typically developing children. Some accounts have posited relatively broad impairments in the underlying syntactic representations of SLI individuals to capture the kinds of difficulties they experience in morphosyntax. Other accounts have attempted to identify specific linguistic markers of SLI rather than providing a complete grammatical characterization.

One of the earliest accounts of SLI that posited a relatively broad syntactic deficit (Clahsen, 1989, 1991) claimed that the Control-Agreement Principle (Gazdar, Klein, Pullum, & Sag, 1985) is impaired in the grammars of individuals with SLI. In Gazdar and colleagues’ theory, this principle is responsible for matching grammatical features of different syntactic categories within a sentence, as required for subject–verb or object–verb agreement, gender and number concord, structural case marking, and other kinds of syntactic dependencies. Another idea was that the system of functional categories (CP, IP, DP, etc.) is particularly vulnerable in these individuals (Eyer & Leonard, 1995; Guiltfoyle, Allen, & Moss, 1991; Leonard, 1995, 1998). The third account of that ilk is van der Lely and colleagues’ Representational Deficit for Dependent Relations (RDDR) hypothesis, which claims that individuals with SLI have “a deficit with building non-elementary complex syntactic dependencies between constituents” (van der Lely & Stollwirck, 1997, p. 283). What is common to these approaches is that they all posit relatively broad syntactic impairments.

Challenging for these kinds of accounts are findings indicating selective rather than broad impairments/delays in SLI grammars. Consider, for example, results from a recent study of structural case marking (Eisenbeiss, Bartke, & Clahsen, 2006), which examined large samples of production data from five German-speaking children with SLI and five control children who were matched to the children with SLI on the basis of their MLU (mean length of utterance). It was found that both the control and the children with SLI achieved high accuracy scores for all kinds of structural case marking, i.e. for nominative subjects, for accusatives on direct objects and complements of prepositions, and for datives on indirect objects, and that they overgeneralized structural case markers to exceptions, i.e. when lexical case marking was required in the adult language. For subject–verb agreement marking, on the other hand, the same children with SLI (with the exception of one child who was not available for the earlier study) performed considerably worse, with low accuracy scores relative to their MLU scores (Rothweiler & Clahsen, 1994). Structural selectivity of this kind is hard to explain by any of the three syntactic deficit accounts mentioned above, as in terms of Chomsky (1981) both case and agreement involve functional categories and a ‘syntactic dependency’ between grammatical features (feature checking/valuing). Thus, if any of these mechanisms were affected in SLI, we should see impairments for both structural case marking and agreement.
Another family of accounts of SLI has aimed at identifying linguistic markers of SLI, i.e. these aspects of the linguistic system that are most consistently affected across different individuals, different age groups and different languages. Several researchers working from this perspective have relied on Chomskyian theory. The following will provide a brief overview of these accounts with a focus on tense, agreement, and case marking in SLI.

10.3.1 Optional tense

The most widely known proposal of this kind is the Extended Optional Infinitive (EOI) hypothesis of Rice, Wexler and collaborators. The initial version of the EOI hypothesis (Rice, Wexler, & Cleave, 1995; Rice & Wexler, 1996) claimed that the functional category T(ense) is not obligatory in SLI children’s grammars and that difficulties with tense marking constitute “a clinical marker” for SLI. Rice, Wexler and Cleave (1995) found, for example, that English-speaking children with SLI omitted, in obligatory contexts, 70 percent of the 3rd sg. -s forms and 78 percent of the past tense -ed forms – significantly more than non-impaired controls did. They also reported that the finite verb forms of BE and DO produced by the children with SLI were most often correctly inflected. In addition, the children with SLI did not use non-finite forms of auxiliaries when finite forms were required; for example, they did not produce sentences such as *He be sleeping.* The same pattern of errors was seen for past-tense forms, i.e., if the children used a past-tense form, it appeared in a past-tense context. Rice and colleagues noted that the common property of the 3rd sg. -s and the past-tense -ed is that they encode tense, and that they appear to be equally problematic for children with SLI. Their idea that T is optional in SLI children’s grammars accounts for the fact that the children alternate between using bare verb stems and tense-marked verb forms in obligatory contexts for finite verbs, and that if a tense-marked form is used, it is correctly inflected. In more recent work, Rice (2003) presented analyses of longitudinal data showing a selective delay of the development of tense markers in children with SLI compared with unimpaired children. Rice showed that although other grammatical morphemes, e.g. the plural -s in English, develop within normal limits, children with SLI start using tense markers at a later age than unimpaired children, and even after several years do not achieve the same high accuracy scores as unimpaired children.

Although the idea that T is optional in the SLI grammar accounts for the pattern of results found in the children with SLI studied by Rice and colleagues, it does not seem to hold cross-linguistically. For languages such as German and Greek in which (unlike in English) tense and agreement marking can be clearly distinguished, tense marking was found to be almost error-free in children with SLI, whereas the same children showed significantly lower accuracy scores for subject-verb agreement (Claussen, Bartke, & Gollner, 1997; Claussen & Dalalakis, 1999). Moreover, these studies reported a fair number of true agreement errors in children with SLI, which according to the EOI
hypothesis should be non-existent. There are even English SLI data which are problematic for the original version of the EOI hypothesis. Given that nominative subject case is assigned by Agr(eement) in English, the EOI hypothesis predicts that children with SLI should not produce any subject case errors, as agreement was said to be unimpaired. However, as shown in several studies, English-speaking preschool children with SLI do in fact produce many non-nominate subjects (Leonard, 1995; Loeb & Leonard, 1991; Schütze, 1997). In response to these challenges, the original version of the EOI hypothesis has been revised. The current version (Wexler, Schütze, & Rice, 1998; Wexler, 2003) claims that both tense and agreement are selectively delayed in SLI.

### 10.3.2 The Agreement/Tense Omission model

In order to explain that both tense and agreement are affected in SLI, this account draws on the assumption that the functional categories Agr and T both contain a D-feature that needs to be checked against the D-feature of the subject-DP to satisfy the Extended Projection Principle (Chomsky, 1995). Wexler (1998, 2003) claimed that the grammars of typically developing children (when they are in the ‘optional-infinitive stage’) are subject to a developmental constraint, the so-called Unique Checking Constraint (UCC), according to which formal features can only be checked once. UCC prevents a D-feature on the subject-DP from checking more than one D-feature on functional categories, thus forcing either Agr or T to be omitted.

Wexler, Schütze, and Rice (1998) and Wexler (2003) proposed a two-factor account according to which children with SLI sometimes leave T/Agr unspecified. This account allows for four options:

1. full specification of tense and agreement,
2. underspecified tense and agreement,
3. underspecified tense only,
4. underspecified agreement only.

Wexler and colleagues argue that these possibilities can all be found in data from English-speaking children with SLI. Option 1 underlies instances in which children get subject case, tense and agreement marking right and produce adult-like utterances. Sentences in which neither T nor Agr is specified (i.e., option 2) may have a null subject or a subject in the default (objective) case and a bare verb stem, e.g. *(him) fall down*. Option 3, when Agr is specified and T is unspecified, covers cases of correct nominative subject case and uninflected bare verb forms, such as *he bite me*. Finally, option 4, unspecified Agr and specified T, is for incorrect non-nominate subjects in sentences with tense-marked verbs, e.g. *(me) falled in grave*. In this way, Wexler, Schütze, & Rice (1998) capture the optional occurrence of finite and non-finite verb forms and of nominative and non-nominate subjects in the speech of English-speaking preschool children with SLI.
One problem with the Agreement/Tense Omission model is that it does not explain the distribution of case and finiteness markings in older English-speaking subjects with SLI. Clahsen, Bartke, and Göllner (1997) found that the group of 10- to 13-year-old children with SLI they studied had 100 percent correct nominative case marking, and past tense marking correctness scores of around 80%, but chance-level scores for the 3rd sg. -s. To derive the correct case marking from Wexler and colleagues’ typology, one would have to say that, for these children with SLI, Agr is always specified. If this is the case, however, then the low correctness scores of the 3rd sg. -s remain unexplained. Moreover, if Agr was tied up with nominative case, as argued by Wexler et al., one would expect to find more instances of non-nominative subjects in sentences in which T is present but Agr is not than in sentences with the reverse distribution. Schütze and Wexler (1996) reported data from unimpaired children in which this contrast did in fact hold. In the SLI data, however, there is no such contrast. Clahsen, Bartke, and Göllner (1997) found that the children with SLI did not produce any non-nominative subject, even in the 311 sentences that contained a verb form that was specified for tense but not for agreement. The lack of non-nominative subjects in sentences with past-tense verb forms (*ne falled in grave) in these data is not what one would expect from the typology of Wexler and colleagues.

### 10.3.3 The agreement-deficit account

The idea of a grammatical agreement deficit in SLI has been couched in terms of Chomsky’s (1995) theory of formal features (Clahsen, Bartke, & Göllner, 1997). Recall that Chomsky distinguishes interpretable features, i.e., features relevant for semantic interpretation, from non-interpretable ones that are irrelevant for interpretation. Agreement features of verbs (and adjectives) form a natural class in Chomsky’s system of formal features in that they are non-interpretable and need to be checked off in the course of the derivation. The agreement-deficit hypothesis claims that these features are specifically affected in SLI. This account is not meant to provide a complete characterization of the language problems of people with SLI. Clearly, several linguistic phenomena which have been observed to cause difficulty for subjects with SLI fall outside of what is covered by an impairment of agreement, for example impaired comprehension of reversible passive sentences and reflexive anaphors (van der Lely, 1996; van der Lely & Stollwerck, 1997), difficulties with tense marking (Rice, Wexler, & Cleave, 1995), and other functional elements (Leonard, 1998).

The agreement-deficit account has received empirical support from a range of SLI data indicating that subject–verb agreement causes difficulty for people with SLI across different languages and different age groups, and even for children for whom tense marking functions normally (see Clahsen & Dalalakis, 1999 for review). On the other hand, the reverse pattern, i.e. impaired tense marking and intact subject–verb agreement marking, does not seem to exist in SLI. Moreover, structural case marking for direct and indirect objects, a
phenomenon outside the domain of agreement features of verbs (and adjectives), was found to be unimpaired in SLI (Eisenbeiss, Bartke, & Clahsen, 2006).

Chomsky (1995) distinguishes between two separate components of the language faculty, a lexicon of stored entries and a computational system of combinatorial operations and principles to form larger linguistic expressions. Given this distinction one may think of two possible sources for the problems that people with SLI have with grammatical agreement. The first possibility would be an impairment of the computational system such that agreement features would be supplied from the lexicon, but not be properly checked, because the particular computational mechanism that normally checks agreement features is missing from the SLI grammar. The effect of this would be that agreement features of verbs cannot be deleted in the course of the derivation and have to be ignored for the purposes of interpretation. Consequently, a child with SLI would be free to use any person and number form of a given verb, yielding many agreement errors. This, however, is not what we typically find in SLI data. Even though children with SLI do indeed produce agreement errors (see, e.g., Clahsen, Bartke, & Göllner, 1997), it is true that most of the occurring finite verb forms are correctly marked for agreement and that verbs which do carry an agreement inflection have a subject with correctly matching person and number features; this suggests that abstract (computational) knowledge of agreement is unlikely to be missing completely.

Another possibility is that an impairment of agreement affects the lexicon. Effects of this can be seen most clearly in languages with rich agreement paradigms. For SLI in Greek, for example, Clahsen and Dalalakis (1999) found that 2nd sg. and 2nd pl. contexts accounted for most of the agreement errors, whereas for other combinations of person and number features (e.g. in 1st sg., 1st pl., and 3rd pl. contexts) correctness scores were much higher (80 to 90 percent). For SLI in German, several studies have shown particularly low accuracy scores and many errors in cases in which the 2nd person singular suffix -st is required in the adult language (Rothweiler & Clahsen, 1994; Bartke, 1998). For Italian, Leonard, Bertolini, Caselli, McGregor, & Sabbadini (1992) found that with respect to 3rd pl. subject–verb agreement suffixes, the mean percentage of correct usage in obligatory contexts was significantly lower for children with SLI than for MLU controls (49.9% vs. 82.3%), whereas for 3rd sg. forms children with SLI achieved the same high correctness score (92.7%) as the MLU controls. For Hebrew-speaking children with SLI, Dromi, Leonard, Adam, and Zaduraisky-Ehrlich (1999) reported significantly more agreement errors for children with SLI than for MLU-matched unimpaired children in one verb class (binyan), whereas in the other two binyanim they studied, children with SLI achieved similar correctness scores to MLU-matched controls. These findings suggest that agreement is not completely absent in SLI, but that the adult agreement paradigm seems to be incomplete, with problems focusing on particular forms or verb classes. These cases are likely to be the result of incomplete acquisition of the morphological paradigm of subject–verb agreement. The consequences of that are that agreement features
are not always fully specified on verbs taken from the lexicon, and that a child with SLI may produce non-finite (default) forms or incorrect agreement markings when a verb is taken from the lexicon without any agreement features or with an incomplete feature set.

10.4 Down’s Syndrome

Concepts from Chomskyan theory have recently also been applied to developmental disorders such as Down’s syndrome and Williams syndrome, in which language impairments coincide with more general cognitive delays and deficits (see, e.g., Clahsen & Almazan, 1998; Perovic, 2004; Ring & Clahsen, 2005). Here our focus is on Down’s syndrome.

Down’s syndrome (DS) is a congenital neurodevelopmental disorder resulting from the triplication of (part of) chromosome 21, with an approximate incidence of 1 in 800 live births (Lubec, 2002). Several previous studies have indicated that language abilities are relatively more impaired than other areas of cognition in this population (Fowler, Gelman, & Gleitman, 1994; Miller, 1996; Mervis & Bertrand, 1997; Tager-Flusberg, 1999; Cibbens, 2001), and that within the language system, morphosyntax is more impaired than other linguistic domains (see Miller, 1988; Fabretti, Pizzuto, Vicari, & Volterra, 1997; Schaner-Wolles, 2004). Several studies have also reported asynchronous patterns of linguistic development in DS, for example enhanced levels of lexical skill relative to reduced levels of morphosyntax (Miller, 1988; Chapman, Schwarz, & Kay-Raining Bird, 1991; Keman & Sabsay, 1996; Vicari, Caselli, & Tonucci, 2000, among others). Moreover, there are studies of DS that discovered patterns of morphosyntactic skill that are qualitatively different from those observed in normally developing children (Fabretti, Pizzuto, Vicari, & Volterra, 1997). Taken together, these results suggest the possibility of within-language impairments in people with DS.

Two recent studies have employed Chomskyan theory to characterize language impairments in DS. Perovic (2004) was the first to report an unusual pattern of performance in the comprehension of anaphoric pronouns in four English-speaking adolescents with DS. She found (near) perfect accuracy scores in sentences with non-reflexive pronouns and reduced accuracy scores of around 50 percent in sentences with reflexives for her participants with DS, which led her to suggest “a specific syntactic deficit” in DS.

Ring and Clahsen (2005) presented results from a somewhat larger study investigating anaphoric binding and passivization in eight adolescents diagnosed with DS and, for control purposes, groups of 5-, 6-, and 7-year-old children whose chronological ages were matched to the mental ages of the impaired participants but who had no known learning impairments. For anaphoric binding, Ring and Clahsen replicated Perovic’s results showing that for reflexive pronouns the participants with DS performed significantly worse than the controls, whereas on non-reflexive pronouns they achieved the same high accuracy scores as the controls. With respect to active and passive
sentences, Ring and Clahsen found that the DS participants’ accuracy scores for actives were significantly higher than for passives, and that the participants with DS gave significantly more reversal responses than the controls, i.e., they incorrectly took the first NP they heard as the agent argument.

Ring and Clahsen (2005) offered a syntactic interpretation of these findings, adopting accounts of binding and passivization from Chomskyan syntax. Specifically, they followed Reuland (2001), who showed that the binding properties of reflexive pronouns follow from independently needed conditions on A-chains, as both the reflexive and the antecedent are in argument positions and share the same syntactic features, and the antecedent c-commands the reflexive, whereas the interpretation of non-reflexive pronouns is determined by semantic principles. Moreover, A-chain formation is also involved in the derivation of passive sentences, in order to syntactically link the nominal expression in subject position to its underlying object position. Ring and Clahsen claim that A-chain formation is impaired in DS, which not only accounts for difficulties in interpreting sentences with reflexives but also for the relatively low accuracy scores in comprehending passive sentences.

Clearly, research on developmental disorders has only fairly recently begun to employ notions and concepts from linguistic theory, and more empirical studies are required before any strong conclusions can be drawn. The two studies mentioned on DS, for example, raise several questions, which have to be left to future research. Does the impairment affect other syntactic constructions that involve A-chains, e.g. raising constructions (John seems to be a nice guy), to infinitives (John is believed to be a nice guy), or unaccusatives (The book arrived yesterday)? Does the impairment extend to other syntactic dependencies, e.g. A’-chains, as required for wh-questions or relative clauses? Are the difficulties with passives and reflexives that people with DS experience more readily explicable in terms of broader (non-linguistic) deficits? Although these questions have to be left open, the studies mentioned above illustrate that a Chomskyan perspective can be helpful in characterizing language impairments, even in people who have other known impairments outside the domain of language.

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