umlaut is not at all restricted to empty affixes: Not “need” e.g. takes a /-/-suffix in the plural (Nöte) while the plural of Land “country” is formed by suffixing /-r/ (Länder).63

Last but not least, I want to present the readjustment rule that is active in the sinken/senken alternation. As mentioned earlier, there is only one common root for both verbs. In case this root is licensed by and combined with a CAUSE morpheme in the head of vP, the readjustment rule in (3-17) will apply and change the quality of the stem vowel:

(3-17) **Readjustment rule triggered by CAUSE morpheme**

\[
V \rightarrow [-\text{high}] / X + \text{[CAUSE]}
\]

(where X = sinken, trinken “to drink”)

Interestingly, a similar alternation is observed with the German verb trinken “to drink” which will become tränken in a [CAUSE] context (as e.g. in Hans tränkt die Kühe “Hans is watering the cows”). A few other German verbs are capable of causativization through umlaut formation, e.g. fallen/fällen “to fall/to fell” or saugen/säugen “to suck/to suckle”. For those, the mechanism is exactly the same, only the relevant readjustment rule will look somewhat different.

To sum up, in this chapter, I have presented the major theoretical assumptions of Distributed Morphology. I have also provided some examples of how (and where) certain of its mechanisms are implemented and what they actually look like.

We have seen that in DM, roots (l-nodes) are assumed to pick up inflectional features, bundled in terminal nodes, through various operations that are either syntactic or rely on syntactic structure; for instance, head movement and adjunction, morphological merger under structural adjacency, fusion of sister nodes, and the addition of morphemes at MS. All these manipulations of structure operate on terminal nodes which are hierarchically organized and yield modified terminal nodes which are hierarchically organized. At PF, all terminal nodes - f-nodes and l-nodes, those present in the syntax and those added at MS - are subject to Vocabulary insertion in exactly the same way.

**4 Speech Errors and Distributed Morphology**

63 In Pfau (2000), it is shown that in spoken as well as in signed languages, phonological readjustment rules may also affect prosodic features. In the Western Sudanic language Gâ e.g., an empty Neg suffix triggers a tone change within the verbal stem while in German Sign Language an empty Neg suffix affects the nonmanual component of the verb sign.
In this chapter, I will investigate how the spontaneous speech errors presented in chapter 2 can be accounted for within the Distributed Morphology framework. On the one hand, I am going to show which of the specific properties of this theory allow for a straightforward explanation of (some of) the error data. On the other hand, I will also consider if any of the DM assumptions possibly prove to be problematic in accounting for the data. To anticipate the main finding: the general picture that emerges from the detailed discussion of a wealth of speech errors below is that a considerable number of them is readily explained within the DM model of grammar. Not surprisingly, however, some problematic cases are also observed and these, too, shall not be concealed from the reader.

The exposition in the preceding chapter has made clear that DM endorses a strict separation of the mechanisms that produce a syntactically complex expression and the mechanisms which supply the corresponding phonological expressions. Within the computational system, only roots and abstract features are manipulated while phonologically specified Vocabulary items are supplied only at PF. It is that very property of the grammar model which suggests to relate it to psycholinguistic models of language production.

One particularly intriguing property of multi-level models of language production is that they also endorse a division of labour amongst several processing levels - no matter if the flow of information in a given model is assumed to be strictly feed forward or if feedback loops from one level back to a preceding level are allowed. In order to illustrate this division, I will sketch the basic architecture of a production model in section 4.1. Firstly, I am going to show how the postulated processing levels are derived from characteristics of certain speech errors. Secondly, the selection of lexical items in production will be considered. A brief description of the production model is important in order to be able to evaluate (in chapter 5) to what extent the psycholinguistic model can be mapped onto the model of grammar (or vice versa).
In section 4.2, I will be concerned with the manipulation of semantic features in language production. Remember that according to DM, semantic features do not play any role within the computational system. This assumption, however, is problematic in view of (at least) two types of errors that have not yet been presented, viz. meaning-based substitutions and semantic anticipations or perseverations. The characteristics of these errors will be discussed and a slight modification of the grammar model will be proposed. Furthermore, I will present some slips that involve the processing of compositional semantic features and of the Neg feature.

As is well-known, grammatical gender plays an important role in German. A noun’s gender determines the surface form of other material within DP. Therefore, I will have a look at the representation and processing of the gender feature in section 4.3. In order to evaluate if gender features possibly remain unspecified within the computational system and/or the Vocabulary, I will be comparing meaning- and form-based substitutions in this context. A closer look at these slips suggests that the gender feature must be specified throughout. Moreover, I will be examining instances of gender accommodation (i.e. morphosyntactic accommodation; cf. subsection 2.4.2) and instances of feature mismatch following substitution errors (cf. data presented in subsection 2.2.2).

In section 4.4, I will be concerned with subject-verb agreement errors. As was pointed out in chapter 3, in DM, features of a subject DP are assumed to be copied onto the AgrS node at the level of MS. This copy process, however, may be defective, i.e. a wrong DP may be chosen for feature copy (cf. data presented in subsection 2.2.1). This erroneously targeted DP may either be closer to the verb than the correct DP (“local agreement”) or it may be more distant from the verb than the subject DP (“long-distance agreement”); both options will be considered in turn. In the last part of this section, I will examine if and how movement operations interact with copy processes.

One important assumption in multi-level models of language production concerns the categorial specification of lemmas drawn from the lexicon. In DM, however, category labels are abandoned, i.e. roots that are selected from List 1 are taken to be acategorial in nature. It is therefore worthwhile investigating what impact this conceptual change has on the speech error analysis. This will be done in section 4.5. Here, I will first point out how the assignment of Vocabulary items to appropriate slots is achieved. Secondly, I am going to present error data that receive a straightforward explanation following the idea that roots

* “And my whole imagination and endeavour is this - to assemble and bring together that which is fragment and riddle and grisly accident.” (transl. A. Tille).
have no category labels (relevant data were presented in subsections 2.4.1 and 2.4.2). Thirdly, however, we also need to account for the well-known categorial identity bias in word exchanges.

The manipulation of morphosyntactic features will be subject to further investigation in section 4.6. I will discuss various instances of errors in which a morphosyntactic feature is either left behind (stranded) in its original position (some relevant examples were presented in subsection 2.4.1) or in which a given feature is isolated and displaced, i.e. shifted, exchanged, anticipated, or perseverated (in this context, some new slips will be introduced). I am going to consider the features number, gender, tense, and case in turn.

In section 4.7, I will come back to the issue of accommodations. Firstly, I will reconsider the so-called context accommodations (see data presented in subsection 2.4.2). I am going to propose that these do not involve repair strategies of any kind. Rather, all the post-error mechanisms that give rise to a grammatical outcome - feature copy, readjustment, and morpheme insertion - apply anyway in the derivation of an utterance and must therefore not be considered an additional processing load. Secondly, I will have a look at error instances in which (grammatical) adaptation is not observed, namely feature conflicts and adaptation failures in stranding errors (see data presented in (sub)sections 2.2.2, 2.3, and 2.4.1). I am going to claim that these errors occur too late for adaptation to take place.

Finally, I will present detailed analyses for three particularly intricate slips in section 4.8. The discussion of these errors summarizes the operations and rules that may come to fruition in speech errors and illustrates how their interplay allows us to give an account even for these complex cases.

**4.1 Multi-Level Models of Language Production**

Sprechen ist, wenn die Stille endlich still ist.

(Elfriede Jelinek, er nicht als er)

Before going into the details of language production models, I shall have a brief glance at early research on spontaneous speech error data. In his seminal work on error-prone
actions (remembering, speaking, and writing amongst others), Freud (1901/1954) claims that speech errors usually reveal our repressed thoughts and secret wishes. Amongst many others, he gives the following two examples:

(4-1) *Two slips from the collection of Sigmund Freud (Freud 1901/1954:56f.69)*

a. Beim weiblichen Genitale hat man trotz vieler Versuchungen,
   in case of the female genital has one in spite of many temptations,
pardon, Versuche ...
   excuse me, experiments ...

* “Speaking is when the silence is finally silent.”*
b. Ich bin so verschnupft, ich kann nicht durch die Ase natmen,
   I am so bunged up, I can not through the (error) (error),
   Nase atmen
   nose breathe

According to Freud, the noun substitution error in (4-1a) in which Versuchungen “temptations” is substituted for Versuche “experiments” clearly exemplifies an instance in which a hidden sexual desire of the speaker surfaces. However, not all Freudian slips need arise from repressed sexual thoughts. In order to understand the deeper meaning of the error in (4-1b), Freud argues, one must thoroughly consider the personal history of the speaker, one of his female patients. She claims to know what motivated the slip: That morning she entered the streetcar at a station called “Hasenauerstraße”. While waiting for the streetcar to arrive, it occurred to her that if she were French, she would pronounce the name of that street without the /h/ in the onset. Upon further enquiry of the therapist, she remembers that as a 14 year old, she had played a French girl in a play, on that occasion speaking German with a French accent. According to Freud, the fact that a few days earlier, a French guest had arrived in her guest-house, evoked this hidden memory. Consequently, the phoneme exchange in (4-1b) has to be analyzed as the result of an inferring unconscious thought from a totally different context.

This causal chain is by far not the most complex one called in by Freud in order to explain a slip. Obviously, his analyses do not say anything about the actual processes and grammatical entities involved in language production. All he is interested in is how the subconscious may influence various actions we perform. However, Freud was not the first one to study speech errors. A few years earlier, Meringer & Mayer (1895), a linguist and a psychiatrist from Austria, provided what is now considered to be a more traditional analysis. On the basis of their corpus of slips of the tongue, they arrived at the conviction:

“dass man sich nicht regellos verspricht, sondern dass die häufigeren Arten sich zu versprechen auf gewisse Formeln gebracht werden können. Mit der Regelmäßigkeit der Sprechfehler [...] gewinnen dieselben an Bedeutung, sie müssen durch konstante psychische Kräfte bedingt sein, und so werden sie zu einem Untersuchungsgebiet für Naturforscher und Sprachforscher, die von ihnen Licht für den psychischen Sprechmechanismus erwarten dürfen.”
(Meringer & Mayer 1895:9)

64 Ellis (1980) is an attempt to reanalyze Freud’s original collection of speech errors in terms of the more modern and process-oriented models of language production outlined below.
65 “that one does not randomly produce slips, but that the more frequent kinds of errors can be reduced to certain formulas. With increasing frequency, speech errors gain in importance; they must be caused by
Our spontaneous speech is far from being perfect; rather it is interspersed with errors of various kinds. And fortunately so, one must say, since - due to their regular (i.e. non-random) character - speech errors are taken as valuable evidence for certain mental representations and processes. Fromkin (1971) was the first one to develop a performance model on the basis of slips of the tongue, giving the impetus to a new field of research within psycholinguistics. On the one hand, Fromkin’s aim was to furnish proof of the psychological reality of theoretical linguistic entities (see subsection 1.2.1). On the other hand, however, she also wanted to show that the characteristic properties of certain error types can be related to certain planning mechanisms and processing stages.

The same approach is pursued by Merrill Garrett. In 1975, he presented a strictly serial model of language production which further developed Fromkin’s ideas and which in the years to follow had a very important influence on research on language processing. In contrast to comprehension models, language production models must account for the real-time construction of an utterance based on the specific meaning that a speaker wishes to convey on a given occasion. Therefore, above all, language production models are driven by an interpretation of conceptual content that gives rise to the communicative intent of a speaker (Garrett 2000).

Garrett’s work as well as that of many other researchers examining the properties of spontaneously occurring speech errors indicates that language production is in fact a multi-stage process. The process of speech production falls into three broad areas (cf. Levelt 1989; Levelt et al. 1999). At the highest level are the processes of conceptualisation that concern the speaker’s intention which in turn determines the concepts that are to be expressed (sometimes called “message-level processes” or “conceptual stratum”). The subsequent processes of formulation involve translating this conceptual representation into a linguistic form (called “lemma stratum” and “form stratum” in Levelt et al. 1999). Finally, the process of articulation which involves detailed phonetic and articulatory planning is executed by the articulatory system (cf. Levelt (1989) for a review of motor control theories of speech production). In (4-2), you will find the basic structure of the language production system (a more detailed version will follow):

constant psychological forces and therefore, they become a field of investigation for natural scientists as well as linguists who may expect them to shed light on the psychological mechanism involved in speaking.” (my translation).
This sequence of processing stages (from intention to articulation) is probably intuitively plausible. However, in a series of papers, Garrett (1975ff) argues that the formulation (translation) process, too, involves a series of distinct levels of processing (the “potential levels of psychological representation” in (4-2)). Most importantly, processing in the model occurs in a fixed temporal order, i.e. the sequence of levels is fixed and the flow of information is strictly top-down. Moreover, the operations executed at each level cannot influence each other, i.e. there is no interaction between levels in the sense of an exchange of information. In particular, every level uses its own processing vocabulary and therefore is only capable of dealing with information which matches that vocabulary.

According to Garrett (1980a), the most important evidence for the distinction of separate processing levels comes from the investigation of exchange errors. On closer examination, it turns out that these errors show different characteristics depending on what kinds of elements are exchanged: Consider the examples given in (4-3):

(4-3) **Exchange errors as evidence for the distinction of processing levels**

a. eine Theorie ist eine Grammatik des Wissens  
   a theory is a grammar of knowledge
a grammar is a theory of knowledge

b. this **spring** has a **seat** in it ← this seat has a spring in it
   (Garrett 1980a:188)

c. a **maniac** for **weekend**-s ← a weekend for maniac-s
   (Fromkin 1973b:259)

d. das sind die wirklich **felenen** Sälle ← seltenen Fälle
   *these are the really (error) (error) ← rare cases*

e. he taught **torses** ← taught courses   (Fromkin 1973b:245)

Word exchanges (as in (4-3abc)) and sound exchanges (as in (4-3de)) are only superficially similar. Closer examination reveals two significant differences: While the elements involved in word exchanges come for the most part from different phrases but are of the same grammatical category, sound exchanges are typically phrase internal and involve segments from words of different grammatical categories. Garrett (1980a) notes that these two properties - phrasal membership and grammatical category - are clearly related to each other; the likelihood of correspondence of grammatical category is certainly affected by whether the error is phrase internal or not.

These distributional features of exchange errors suggest an interesting interpretation, namely that they arise at different processing levels. On the one hand, word exchanges must occur at a point at which the syntactic category of units is part of the processing vocabulary (see the discussion in 4.5.3 for a different account). The fact that the exchanged elements may appear at some distance from each other implies that the processing domain is the whole sentence. Garrett calls this stage in the processing of an utterance the “functional level”. On the other hand, since sound exchanges are not subject to syntactic constraints, they must occur at a point at which the syntactic category of elements is not of any importance to the processor, i.e. is not part of the processing vocabulary. Rather, phonological (and morphological) properties of words are processed phrase by phrase. In Garrett’s model, this processing level is called “positional level”.

Further evidence for the division of separate levels within the translation process comes from exchange errors like the one in (4-3c). As a matter of fact, what is exchanged here are not really words but rather stem morphemes. Obviously, the morpheme *maniac* has been accessed independently of its plural affix, i.e. the plural information is stranded (cf. subsection 2.4.1). Furthermore, the plural morpheme was produced correctly for the
sentence as it was actually uttered, viz. as [z], not as it was planned, viz. as [s]. This accommodation (cf. subsection 2.4.2) to the new phonological environment suggests that the exchange takes place before the plural suffix is phonologically specified.

Another central property of the model concerns the lexical retrieval of items in production. The retrieval of lexical items is the process in speech production whereby we turn thoughts/concepts into sounds. In that context, two important questions must be considered: First, how many stages are involved in lexical retrieval? And second, are these stages independent, or do they interact with each other?

On the basis of characteristic properties of whole word substitutions, many psycholinguists have argued for a two-stage theory of lexical retrieval, where the first stage is semantically organized and the second one is phonologically organized (e.g. Fromkin 1971; Garrett 1975ff; Dell & Reich 1981; Butterworth 1989; Levelt 1989, 1992). The different types of noun substitutions - two each from German and English - are illustrated by the examples in (4-4).

(4-4) **Different types of noun substitutions**

a. Kartoffeln sollen auch nicht so viel Alkohol haben
   \[\textit{potatoes} \quad \textit{shall} \quad \textit{also} \quad \textit{not} \quad \textit{so} \quad \textit{much} \quad \textit{alcohol} \quad \textit{have}\]
   \[\leftarrow \quad \textit{so} \quad \textit{viele} \quad \textit{Kalorien}\]
   \[\leftarrow \quad \textit{so} \quad \textit{many} \quad \textit{calories}\]
   “Potatoes are supposed to not have so many calories either.”

b. he got hot under the \textit{belt} \[\leftarrow \quad \textit{under} \quad \textit{the} \quad \textit{collar}\] (Fromkin 1973b:262)

c. dieses Plätzchen haben wir im \textit{Urwald} entdeckt \[\leftarrow \quad \textit{im} \quad \textit{the} \quad \textit{jungle} \quad \textit{discovered}\]
   \[\textit{this} \quad \textit{spot} \quad \textit{have} \quad \textit{we} \quad \textit{in} \quad \textit{the} \quad \textit{holiday}\]

d. I’ve got an \textit{apartment} now \[\leftarrow \quad \textit{an} \quad \textit{appointment}\] (Garrett 1980a:207)

While in (4-4ab), the intended and the error noun are semantically related, in (4-4cd), they share phonological (word onset, number of syllables) and possibly morphological properties.

According to the two-stage hypothesis, processing proceeds from the semantic level to an intermediate level where individual words are represented in an abstract form. At this level, lexical selection does not retrieve word forms but rather lemmas, i.e. units which are only semantically and syntactically specified. Only after lemma selection is accomplished, the phonological form of words (the lexeme) is retrieved at a subsequent processing level.
In Garrett’s model, the first stage of lexical access (lemma selection) is taken to occur at the functional level, while the second stage (retrieval of phonological form) is taken to occur at the positional level. A more detailed version of the language production model in (4-2) which takes into account the results sketched above is given in (4-5); this is a simplified version of the Levelt model (Levelt 1989:9) which is enriched with some of Garrett’s terminology:
With the help of the “double retrieval theory”, the different kinds of word substitutions are readily explained: meaning-based errors arise in lemma selection while form-based errors arise in lexeme selection. However, the assumption of a strict division of tasks has not remained unchallenged. Remember that Garrett assumes a strict separation of processing levels, i.e. that phonological specification (at the positional level) only begins after lemma retrieval (at the functional level) has been completed. Therefore, in his model, phonological processes can not have any influence upon lemma selection and consequently, semantic and phonological processes should not overlap in lexical retrieval. That is, we expect to find meaning-based substitutions and form-based substitutions but not mixed errors in which the intruder is both semantically and phonologically related to the target. However, Dell &

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66 Moreover, the tip-of-the-tongue phenomenon can be interpreted as success of the first stage of lexical retrieval but failure of the second (Brown & McNeill 1966).
Juliano, distinction; between levels, serial respect (Rumelhart activation restriction 6 do similarity 6). Reich (1981), Butterworth (1982), and Harley (1984) show that far more mixed errors are found than chance would predict; possible examples are given in (4-6).

(4-6) **Two examples for meaning+form-based substitutions**

a. am nächst Monat, äh, Montag  
*on the next month, er, monday*

b. we’re playing the art of the flute ← of the fugue  (Fromkin 1973b:262)

Another argument in favour of weakening the independent level hypothesis is brought forward by Dell & Reich (1981). They show that “lexical bias” is observed in phonological errors, i.e. that these errors tend to result in existing words more often than is expected by chance (e.g. the existing word *reel* in the sound exchange *reel feally bad ← feel really bad*).

The authors therefore conclude that the processing levels cannot be completely independent of each other and that the independent level hypothesis has to be rejected. The simplest solution, they claim, is to allow interaction between the levels. Feedback between the phonological and lemma level explains the tendency of a mixed influence on substitution errors as well as the lexical bias in sound errors. Production models which endorse feedback between the processing levels are called “interactive activation” or “spreading activation” models (Stemberger 1985; Dell 1986, 1988; Berg 1988).

Interactive activation models, too, discriminate different processing levels, but the hierarchy of these levels is undermined by ubiquitous feedback. Still, the flow of activation in these models is not completely unconstrained, i.e. there is no absolute but only relative interactivity. Rather, the planning process is organized in a weakly heterarchical fashion. The flow of information may very well proceed in both directions but the flow towards the articulator naturally has the greatest share in speech production (Schade 1992).

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67 An analysis of meaning-based noun substitutions from the Frankfurt corpus with respect to phonological similarity of target and intruder is presented in Wiegand (1994). She concludes that semantic substitutions do not display phonological facilitation.

68 In a ‘truly’ connectionist (or parallel distributed processing (PDP)) model of language production, this restriction does not hold. Like the spreading activation models, the PDP approach makes use of spreading activation in a network. But it adds the important concepts of distributed representations and learning (Rumelhart & McClelland 1986). The PDP and the spreading activation approach differ from each other with respect to the question of the representation of linguistic rules. In the spreading activation model (as in the serial and modular model), the rules that specify acceptable sequences at the phonological and syntactic levels, are kept distinct from the words and sounds present in the mental lexicon, i.e. there is a distinction between linguistic structure and linguistic content. In the PDP approach, it is assumed that there is no such distinction; rather, linguistic structure arises out of the massed effects of the stored vocabulary (cf. Dell & Juliano (1991) for a PDP model of word production).
In the present thesis, I shall not try to argue for or against one or the other type of model, since the question of strictly serial versus interactive processing is not at issue here. What I take to be particularly important about the modular as well as the spreading activation architectures in the present context is the fact that both endorse processing at several levels with different information being available at each level.

What is at issue here, is the question of how a particular formal grammar can be mapped onto a processing model. Garrett (1980) notes that the terms which find use in his psycholinguistic framework (i.e. functional level and positional level) “are studiously neutral with respect to their correspondence to levels of description in a formal grammar” (p.190). Still, if we take the idea of a psychologically real grammar seriously, then it is of course desirable to have at one’s disposal a model of grammar which (more or less) corresponds to the psycholinguistic model.

At that point, remember that Distributed Morphology, too, supports a separationistic view in that it assumes that the mechanisms which are responsible for producing the form of syntactic expressions are distinct from the mechanisms which produce the form of the corresponding phonological expressions. For that very reason, I take an attempt to match the psycholinguistic theory of multi-stage sentence processing with a multi-level theory of grammar to be very promising.

4.2 Semantic Features in Language Production

La parole serait donc aux choses de l’esprit
leur état de rigueur, leur façon de se tenir
d’aplomb hors de leur contenant.*

( Francis Ponge, De la modification
des choses par la parole)

I am going to start with what I take to be a particularly intricate issue, namely the question of how semantic features are accounted for in the DM model.

In chapter 3, I have shown that (noncompositional) semantic features do not play any role within the computational system, i.e. they need not be present within that system. Alternatively, a lexical entry might contain all sorts of information, including

* “Therefore, the word would be for the things of the mind their inevitable state of firmness, their way to keep the balance outside of what they are contained in.”
phonological, compositional syntactic and semantic, and noncompositional semantic properties. But then much of that information would be carried along through the derivation to the PF and LF interface levels like “excess baggage” (Marantz 1995) without doing any work.

Consequently, the structure of grammar as implied by DM clearly distinguishes between the computational system of the grammar proper and the operation of semantic interpretation, i.e. the operation which determines the meaning of a sentence. The syntactic and compositional semantic features that condition the insertion of particular Vocabulary items at Phonological Form are present in the computational system while the idiosyncratic properties of lexical items are not. The latter are available only at the conceptual interface and are retrieved from the Encyclopedia (List 3), i.e. only here may derived constituents be paired with noncompositional meanings. Harley & Noyer (1999) assume that the PF level is also linked to the conceptual interface (and therefore indirectly linked to the Encyclopedia) but this link can only be established after Vocabulary insertion has taken place.

It is clear that, as far as language processing is concerned, the postulated non-availability of semantic features is problematic. In subsection 4.2.2 below, I am going to discuss a number of speech errors that clearly contradict this assumption. Before doing so, however, I am going to show that there are also aspects internal to the model which require that semantic features are present before Vocabulary insertion is executed (subsection 4.2.1). In subsection 4.2.3, I am going to have a brief look at the availability and processing of compositional semantic features. Finally, in subsection 4.2.4, a feature which may play different roles in a derivation will be subject to discussion, viz. the Neg feature.

### 4.2.1 Non-Random Insertion: Distinguishing Cats from Dogs

As mentioned above, in DM, the Vocabulary presumably does not contain any items in which category information (i.e. syntactic information), noncompositional semantic information, and phonological features are different aspects of a single entity. Rather, Vocabulary items link phonological features to (possibly underspecified) sets of syntactic and semantic category features which occupy terminal nodes in the syntax (Marantz 1995). Still, as Marantz (1997) notes, it is an important and open question how much information about roots is present in what he calls the “narrow lexicon” (List 1). In particular, it is not
at all clear if the narrow lexicon contains sufficient information to precisely identify roots or if it only contains information about classes of roots.

According to Marantz, only compositional semantic features, i.e. features like [count noun] and [animate], are present in the syntax; other semantic features that play no role in the computational system are excluded as lexical features (for instance, the semantic difference between “dog” and “cat” feeds no syntactic principle, rule, or constraint). But a full feature description of a Vocabulary item in terms of general syntactic and compositional semantic features does not suffice to unambiguously individuate it. For instance, in a sentence like “The cat is sleeping”, the slot of “cat” might as well be taken by e.g. “dog”, “fish”, or “porcupine”, since at the moment of Vocabulary insertion, there is no distinction whatsoever between these items with respect to the features which determine the insertion of one or the other item. This dilemma is illustrated by the figure in (4-7):

(4-7) Selection of appropriate Vocabulary item

In the DM framework, the distinction between the competing items is made only on the basis of semantic features in the Encyclopedia. But how can the appropriate Vocabulary item be inserted when all information the terminal node contains at MS are features like [root], [-pl], [animate], etc.? Looking up further information in the Encyclopedia does not
seem to help because from the features of the terminal node alone it is not even clear where
to look. Even if distinguishing semantic features (like e.g. [miaouws] or [furry]) are linked
to the concept cat in the Encyclopedia, then how do I know that it is that very concept I
am looking for in the first place? Certainly not on the basis of the features present in the
computational system. Moreover, at the point at which the Encyclopedia is consulted, it is
simply too late to make a decision about the insertion of a particular Vocabulary item.

Consistently, Marantz acknowledges that

“[f]or an N node that has the features, “count noun” and “animate” (among
perhaps perhaps others), presumably the Vocabulary entries for “cat” and “dog”
would be equally specified with the relevant syntactic and compositional
semantic features and either might be inserted at that node.” (Marantz
1995:401)

Since the difference between “cat” and “dog” is a matter of encyclopedic knowledge, the
use of the Encyclopedia to interpret sentence elements must involve knowledge of
Vocabulary insertion at PF. But once again, we are caught in the same trap. Note that
Encyclopedia entries connect the output of the grammar to noncompositional meanings.
That is, the correct interpretation of a sentence in which /kQt/ has been inserted in the
phonology (at a node at which /dçg/ could just as well have been inserted) is guaranteed.
But still, the particular choice of one item over the other in the course of the derivation is in
principle a random one.

I therefore claim that - at least from a processing point of view - we need to assume
that semantic/conceptual features are available at a very early point in the derivation in
order to guide the choice of a particular root from List 1. Further evidence for that
assumption comes from the analysis of speech error data which will be subject to
discussion in the following subsection.

4.2.2 Semantic Features in Speech Errors

The two types of slips involving semantic features I am going to consider in this subsection
are meaning-based substitutions and anticipations/perseverations of semantic features.
Consider first the examples given in (4-8) which serve to illustrate some of the possible semantic relations that may hold between a target word and an intruding word in a noun substitution:

(4-8) **Different types of meaning-based substitutions**

a. hast du einen **Radiergummi** da ← einen Spitzer
   *have you an eraser there ← a pencil sharpener*

b. in welcher Höhe, äh, Tiefe haben sie gegraben
   *in what height, er, depth have they dug*

c. damit kommst du auf keinen grünen **Baum** ← grünen Zweig
   *with that come you on no green tree ← green branch*
   “With that you’ll never get anywhere.”

d. ich habe keine **Tafel** mehr ← keine Kreide
   *I have no blackboard more ← no chalk*

The nouns involved in the slip in (4-8a) - **Radiergummi** “eraser” and **Spitzer** “pencil sharpener” - are cohyponyms; they are both members of the class of writing implements. In example (b), the intruder Höhe “height” is the opposite of the target noun Tiefe “depth”. The error in (c) exemplifies a case where target and intruder stand in a part-whole relationship: a branch (Zweig) is part of a tree (Baum). Finally, in (d), the involved nouns **Tafel** “blackboard” and **Kreide** “chalk” have a somewhat more loose associative connection with each other.\(^6\)

In all of the above examples, an intended word has activated a semantically related item which for some reason happens to replace the target word in the utterance. This phenomenon is not readily explained in DM terms, since DM endorses late (post-syntactic) semantic interpretation of lexical items but not early selection of items on semantic grounds.

As mentioned above, in the Garrett model, meaning-based substitutions are assumed to occur at the functional level when the lexicon is accessed for the first time, at that time retrieving a lemma, i.e. an item which is only syntactically and semantically (but not phonologically) specified. By definition, meaning-related items are ‘close’ to each other.

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\(^6\) Hotopf (1980) claims that words are never replaced by synonyms or sub- and superordinate expressions, respectively. However, this observation is probably an artifact, since such substitutions would for the most part go unnoticed. Imagine e.g. the substitution of *town* for *city* or of *dog* for *poodle.*
that, is, activation spreads from one to the other - and therefore, a wrong item may be picked.

However, a somewhat different view is taken by Levelt et al. (1999). The authors also conceive language production as a staged and strictly feed-forward process, leading from a preverbal message to the initiation of articulation. But in contrast to Garrett (and others), they assign greater importance to the stage of conceptual preparation (i.e. the “conceptualizer” in figure (4-5) above). Conceptual preparation is the process which leads to the activation of lexical concepts, the “terminal vocabulary of the speaker’s message construction” (Levelt et al. 1999:8); it is triggered by a speaker’s communicative intention. Apart from possible pragmatic causes of lexical concept activation, the theory emphasizes semantic causes of activation. Within a conceptual network, concept nodes may be linked to other concept nodes, and the links are labelled in order to express the character of the connection (e.g. “X is a Y”, “X is the opposite of Y”, “X is part of Y”, and so on). In that sense, the concept cat which stands for the meaning of the word “cat” will be linked to other concepts such as tomcat, dog, animal, and miaow, and it will spread activation via the links to the semantically related concepts.

Moreover, lexical concepts which are active in the conceptual stratum spread activation to corresponding lemma nodes at the lemma stratum. Levelt et al. (1999) assume that lemma selection is a statistical mechanism which favors the selection of the highest activated lemma. Most importantly, in that conception of speech production, lemma nodes are not semantically but only syntactically specified; their selection, however, is triggered by semantic factors. The figure in (4-9) illustrates the lexical network underlying lexical access:

(4-9) The lexical network (adapted from Levelt et al. (1999:4))

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Levelt et al. (1999) do not base their theory on speech error evidence. Rather, they have developed and tested their model almost exclusively by means of reaction time experiments. They argue that the ultimate test for models of speech production cannot lie in how they account for infrequent derailments of the process but rather must lie in how they account for the normal process. Still, their theory is not neutral with respect to speech errors. Ultimately, it should be able to account for error patterns as well as for the results from the reaction time experiments.
Note that the division of lemma stratum and form stratum is maintained in this model, i.e. the phonological form of a given lemma is accessed only at a later stage of the derivation. Consequently, in the model, a lexical entry is not a unique entity but rather consists of a lexical concept, a lemma, and a corresponding phonological form (including morpho-logical, segmental, and metrical structure).

It is that very property of the model, viz. the separation of semantic, syntactic, and phonological properties of a given word, which brings us very close to the assumptions made in the DM framework. Remember that DM does not assume the existence of a lexicon in the familiar sense. Rather, there are distributed lists which take over the jobs assigned to the lexicon component in earlier theories, i.e. List 1 (the lexicon) which contains those (morpho)syntactic features which are relevant to the principles of syntax, List 2 (the Vocabulary) which contains phonologically specified Vocabulary items, and List 3 (the Encyclopedia) which connects the output of the grammar to noncompositional meanings.

My claim is that in this respect, the processing model and the grammar theory can be mapped onto each other. On the one hand, we may think of List 1 as being the lemma stratum in the processing model, containing only roots and (morpho)syntactic features drawn from a universal set. On the other hand, List 2 can be seen as the form stratum...
containing phonologically specified elements which are to be inserted into terminal nodes according to their featural specification.\textsuperscript{71}

From a processing point of view, however, an important alteration - or rather an important enrichment - of the DM conception concerns the selection of items from List 1. DM does not mention on what grounds items are selected from this list. Implicitly, it must be assumed that items are retrieved on the basis of what message a speaker wishes to convey. In a processing model, we need to make that assumption explicit. That is, in conceptual preparation, lexical concepts are activated according to a preverbal message intention. Activation spreads through the conceptual network and is fed into List 1, the lemma stratum, where the most highly activated lemma node is selected and enters the computational system. The elements drawn from List 1 are roots as well as syntactic features (e.g. [noun]; but cf. section 4.5 below) and morphosyntactic features (e.g. [+pl] if a concept node \textit{MULTIPLE(X)} is active at the conceptual level).

In contrast to DM, I propose that the roots which are selected bear indices according to what lexical concept they refer to, a fact which, of course, makes List 1 much more extensive. Therefore, what is retrieved from List 1 is not simply [root] but rather e.g. \texttt{[\text{root}_{\text{cat}}]} . I wish to emphasize that this does not at all imply that roots have any semantic features. With DM, I assume that such features do not play any role within the computational system and therefore do not enter that system.\textsuperscript{72}

I will now turn to the second error type involving semantic features, the discussion of which I announced at the beginning of this subsection, viz. anticipations and perseverations involving semantic competitors. Here, target and intruder do not compete for the same slot but rather a target activates a meaning-related concept whose corresponding lemma then

\textsuperscript{71} Of course, the Vocabulary is not an unstructured list either. Like the conceptual stratum, it is a multi-linked network where activation flows from target items to phonological neighbors. Form-based substitutions arise whenever a phonological competitor happens to receive more activation than the target element.

\textsuperscript{72} Alternatively, we may conceive the computational system and the semantics as working in parallel (Heidi Harley, p.c.). That is, you form e.g. the intention to communicate the message “The cat is sleeping”. This intention talks to two separate modules: (1) It instructs the computational system to construct an intransitive frame for a state verb, also indicating what (morpho)syntactic features and what number of root morphemes it will need. (2) At the same time, it consults the Encyclopedia, inquiring what the roots are that it needs to talk about the concept \texttt{cat} and the concept \texttt{sleep}, and the Encyclopedia will make available the roots “cat” and “sleep”. When the frame has been constructed, the roots that the Encyclopedia has selected are slotted into the appropriate place, and the whole thing is sent off to PF for Vocabulary insertion.

The advantage of the parallel conception is that we do not need to enrich List 1. A serious disadvantage, however, is that we allow semantics to enter the computational system, since the roots drawn from the Encyclopedia are available for semantic interpretation. Moreover, it is not clear how insertion of roots into the appropriate slots is guaranteed.
takes another slot in the sentence, a fact which indicates that indeed the slots themselves are not semantically specified. Possible instances of such errors need to be carefully analyzed. What may look like a semantic anticipation/perseveration at first glance, might e.g. also be a blend. This ambiguity is illustrated by the examples in (4-10).

(4-10) Semantic anticipation/perseveration or blend?

a. die müssen die Toten auch in die Leichen tun ← in die Särge
   *they must the dead also* into *the corpses put ← into the coffins*

b. ich habe die Wäsche, äh, die Woche so viel zu bügeln
   *I have this laundry, er, this week so much to iron*

c. beim Reden sprechen wir nicht ← beim Laufen
   *at.the talking speak we not ← at.the running*
   “When we run, we don’t speak.”

In example (4-10a), the two nouns Toten “dead” and Leichen “corpses” are obviously semantically related. Still, the appearance of Leichen in the slot of Särge “coffins” does not necessarily constitute the perseveration of a semantic competitor. Rather, we may also speculate that the two sentence frames ... die Toten auch in die Särge tun and ... die Leichen auch in die Särge tun were activated in parallel. This, however, did not give rise to a word blend like die Teichen “the dorpses” but to a substitution of Leichen for Särge. Similar analyses are conceivable for (4-10b) and (c). In (b), the competing frames might have been ... die Woche so viel zu bügeln ‘this week so much to iron’ and ... diese Woche so viel Wäsche zu machen ‘this week so much laundry to do’, and in (c), beim Laufen sprechen ... ‘at.the running speak’ and beim Laufen reden ... ‘at.the running talk’.

A competing frame analysis is not available for the following examples, since it is hard if not impossible to conceive of a competing frame containing the anticipated or perseverated elements. In (4-11a), for instance, the appearance of bellen “to bark” is definitely due to activation of the concept BELLEN by the semantically related concept HUND “dog” within the conceptual stratum.

(4-11) Unambiguous cases of semantic anticipations/perseverations

a. ich wollte den Hund anbellen ← anbinden
   *I wanted the dog bark.at ← tie.up*
b. ich hätte meine **Bohne** mit Karotten und Erbsen mitbringen
   *I have*._COND_ my bean with carrots and peas bring*
   können ← meine Dose
can ← my can
   “I could have brought my can with carrots and peas.”

c. they even **fly** on the wing ← sleep on the wing  (Harley 1984:201)
d. a branch falling on the **tree** ← on the roof  (Fromkin 1973b:262)

The same line of reasoning is applicable to the other three slips in (4-11). In (b), **Bohne** “bean” receives activation from **karotte** “carot” as well as from **erbsen** “pea”, in (c), the anticipation of **fly** is obviously due to its semantic relation to **wing**, and finally, in (d), a part-whole relation holds between **branch** and **tree**, i.e. **branch** sends activation to the lexical concept **tree**.

In this subsection, I have investigated the possibility of bringing into accord the theory of lexical access in speech production with the idea of a distributed lexicon as assumed in the DM framework. My claim is that the psycholinguistic and the grammatical conception are very well compatible with each other when we supplement the DM model with a pre-syntactic conceptual level, this level determining the activation and selection of items from List 1. Without the inclusion of lexical concepts and labelled roots, it is neither warranted that the appropriate Vocabulary item will be inserted in a given terminal node (“random insertion”; cf. figure (4-7) above) nor can speech errors involving semantic features be accounted for in a straightforward way.

### 4.2.3 A Short Note on Compositional Semantics

Above, we have already seen that lemma nodes are directly connected not only to a set of syntactic properties (including the grammatical category of the word and possibly the grammatical functions it can take) but also to certain (morpho)syntactic features; the latter are called “diacritic parameters” by Levelt (1989). Diacritic parameters are of two kinds. They can either be selected on the basis of the speaker’s intention - as is true e.g. for the number feature - or they can be lexically specified - as is true for the gender feature in many languages (cf. section 4.3). Another lexically specified diacritic parameter is the count/mass distinction. The lemma for “cat” e.g. will specify that this word is a count noun; therefore,
it can either be combined with a singular or with a plural number feature. In contrast, the
lemma for “water” will specify that this is a mass noun and may therefore not be pluralized.

In Distributed Morphology, gender as well as count/mass are assumed to be features
drawn from List 1, the former being a morphosyntactic, the latter a compositional semantic
feature (like e.g. animacy which presumably is not an active feature in English or
German). Consequently, both features are available at an early stage of the derivation and
play a role within the computational system.

Convincing evidence for this assumption comes from tip-of-the-tongue experiments
conducted by Vigliocco et al. (1999). They show that participants who are not able to
retrieve the phonological form of a word are still able to retrieve information on the count
vs. mass status of that word (target words e.g. *mysogynist* (count noun) vs. *asparagus*
(mass noun)). This was tested by asking the participants in which of the following contexts
they would use the word (where the first one is appropriate for mass nouns and the second
one for count nouns): (a) “There is ____/There is a ____”; (b) “There won’t be much
____/There won’t be many ____”; (c) “There is some ____/There are a few ____”.
Therefore, the experimental results constitute evidence for the early availability of
compositional semantic features which - according to DM assumptions - are drawn from
List 1.

Unfortunately, there is no convincing further evidence for that assumption from
spontaneous speech errors. Noun substitutions involving mass and count nouns might be a
touchstone for the processing of a count/mass feature in production. Depending on where
that feature is specified and processed, we expect the interacting nouns to match with
respect to that feature. We must, however, take into account that count nouns are much
more frequent in German (as well as in English). Consequently, we hardly find any errors
involving mass nouns in the Frankfurt corpus (only 12 out of 554 noun substitutions).
Four examples are given below:

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73 In the present context, the term “compositionality” is not used in its Fregean sense. According to Frege’s
Principle of Compositionality, the meaning of a sentence is computed on the basis of the meaning of its
well-formed parts and the syntactic relations of these parts to each other. For the (non-syntactic)

74 Results from recent experiments suggest that these features are selected only when actually needed in the
local syntactic environment of the noun. That is, they are selected only when the speaker has to produce a
phrase but not when he has to produce a bare noun (Schriefers 1993; van Berkum 1997). Roelofs et al.
(1998) distinguish between the activation and the selection of a feature. For example, the gender of a noun is
selected when needed to choose the correct definite determiner, but in producing a bare noun, the gender
information will only be activated but not selected.
(4-12) **Noun substitutions involving mass nouns**

a. Thermoskanne mit Kaffee, Thermoskanne mit Milch
   vacuum.flask with coffee, vacuum.flask with milk

b. ich will heute die Wäsche abziehen ← das Bett
   I want today the linen strip.off ← the bed

c. ich bin froh, dass ich keinen Spinat kann ← keinen Spagat
   I am happy that I no spinach(m.) can ← no splits(m.)

d. Soll ich schon die Brötchen aufsetzen ← den Kaffee
   Shall I already the rolls put.on ← the coffee

In the meaning-based substitution in (4-12a), the mass noun Kaffee “coffee” is substituted for the mass noun Milch “milk”, while in (b), the mass noun Wäsche “linen” replaces the count noun Bett “bed” (note that Wäsche may also mean “laundry”; therefore, the error could also be analyzed as a blend of “to do the laundry” and “to strip off the bed”). In the form-based substitution in (c), too, a mass noun (Spinat “spinach”) is substituted for a count noun (Spagat “splits”). In (4-12d), it is the other way round: the count noun Brötchen “roll” appears in the position of the mass noun Kaffee “coffee”.

Possibly, the error in (4-12d) is somewhat more informative than the other ones. Interestingly, the noun Brötchen appears in its plural form (as is indicated by the plural article die). However, the slot in which it intrudes is either marked for [-pl] or not marked for number at all (since presumably mass nouns are unspecified for number). So, where does the plural feature come from? We may speculate that the mass feature of Kaffee which is incompatible with the featural specification of the intruder, the count noun Brötchen, is responsible for the appearance of the [+pl] feature.

In my corpus, there are two exchange errors which show a similar property; these are given in (4-13a) and (b). Obst “fruit” and Post “mail” are both mass nouns implying the presence of a set of items (viz. different kinds of fruit and some letters or cards, respectively). In both examples, the mass noun changes place with a singular count noun which subsequently surfaces in its plural form. Again, it seems reasonable to assume that the mass feature is to be held responsible for the appearance of the plural forms of the count nouns (suppressing the expected strings Obst aus Saft “fruit from juice” and viel

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75 As a matter of fact, the noun substitution in (4-12d) is the only one in the Frankfurt corpus in which a plural noun is substituted for a singular noun.
Briefkasten in meiner Post “a lot of mailbox in my mail”). Admittedly, however, these two cases as well as the one given in (4-12d) may very well be seen as artifacts, although there is no explanation then for the appearance of the plural forms.

Note that in (4-13b), there are also various accommodation processes at work: the quantifier viel “a lot of” accommodates to the plural of Briefkästen “mailboxes”, the possessive pronoun “my” accommodates to the feminine gender of Post “mail”, and the verb appears in the required plural form.
(4-13) **Errors (possibly) involving compositional semantic features**

a. Obst aus Säften schmeckt oft besser als Obst selbst,
   fruit from juices tastes often better than fruit proper,
   äh, Saft aus Obst
   er, juice from fruit

b. es waren total viele Briefkästen in meiner Post, quatsch,
   there were really a lot of mailboxes in my mail, nonsense,
   total viel Post in meinem Briefkasten
   really a lot of mail in my mailbox

c. es war wie bei ihrer Mutter ⇐ seiner Mutter
   it was like with her mother ⇐ his mother

d. la femme de son père ⇐ la mère de son mari
   the wife of her father ⇐ the mother of her husband
   (Cutler 1980b:692)

Now, consider the examples in (4-13cd). Both errors involve nouns indicating different kinds of relations within a family. For all of these nouns, gender is assigned on semantic grounds (this kind of gender assignment being the exception in German and French; cf. subsection 4.3.1 below). In (4-13c), the possessive pronoun *seiner* “his” agrees with the noun *Mutter* “mother” with respect to grammatical gender in the intended utterance. It is only the (compositional) semantic feature [female] which turns *seiner* into *ihrer* “her”, i.e. grammatical gender is not capable of triggering that change since *seiner* already is of feminine grammatical gender.

I assume that the French exchange error in (4-13d) also involves semantic gender features. We may think of *mère* “mother” as being a combination of a concept *PARENT* plus a semantic gender feature [female]; similarly, *mari* “husband” may be a combination of *SPOUSE* and [male]. The concepts will activate the corresponding lemmas at the lemma level. For English, in case, there is no semantic gender specification, the Vocabulary items /spaUs/ and /pQr´nt/, respectively, will be inserted at PF. However, in case such semantic features are present, the more specified items /mvD¨t/ and /hvzb´nd/ will be chosen from the Vocabulary. Consequently, the slip in (4-13d) may be analyzed as an exchange of two concepts and stranding of semantic gender features. The concept *SPOUSE* is combined with
[female] and the matching Vocabulary item /fam/ is inserted, and the concept PARENT combines with [male] giving rise to the insertion of /pəːr/.77

Interesting as these data may be, it is still clear that the very small number of relevant errors and the somewhat speculative character of their interpretation do not allow for any safe conclusions about the processing of compositional semantic features. Moreover, I wish to point out that an analysis like the one sketched for (4-13cd) above is not available in the processing model suggested by Levelt et al. (1999), since a basic trait of their theory is its nondecompositional character. They claim that lexical concepts are not represented by sets of semantic features because that would create a number of counterintuitive problems for a theory of word production (also cf. Roelofs (1997)).

The question whether conceptual vocabulary is a set of lexical concepts or, rather, the set of primitive conceptual features that make up these lexical concepts is of course a classical and controversial issue (Fodor et al. 1980). Still, there is one particular feature whose presence in speech errors suggests that at least sometimes conceptual vocabulary must contain separable primitive features; this is the Neg feature which will be considered in some detail in the next subsection.

4.2.4 A Special Case: The NEG Feature

Levelt et al. (1999) give an interesting example in order to illustrate that a lexical concept is usually activated as part of a larger message that captures the speaker’s communicative intention. If a speaker of English wishes to talk about a female horse, he may effectively do so by producing the word “mare”. Alternatively, he might also use the words “female” and “horse”. However, when the intended referent is a female elephant, no such choice is available. The speaker will have to resort to a phrase because no unitary lexical concept exists for a female elephant. The problem of mapping the notions to be expressed onto messages consisting of lexical concepts is called the “verbalization problem” (Bierwisch & Schreuder 1992).

The verbalization problem is also apparent with negation. For instance, if one wants to convey the message that something is not clear, one may either decide to use the

77 A similar analysis may be applied to the German slip die Ehefrau, der Ehemann der Olympiasiegerin “the wife, the husband of the Olympic winner(FEM)”. The feature [female] (which triggers the selection of the suffix -in) is anticipated and combines with the concept SPOUSE. However, this error may, of course, also be analyzed as a meaning-based substitution.
morphologically complex word “unclear” or one may choose the phrase “not clear”. Still, speech error data suggest that there is no unitary concept UNCLEAR but rather that “unclear” is a combination of CLEAR and a semantic feature [+neg] which may be morphologically or syntactically realized. The four slips in (4-14) constitute good evidence for the claim that the Neg feature is in fact separable from a lexical concept (the Neg elements are in boldface).
In (4-14a), the adjectival root in the embedded sentence is associated with a Neg feature. In the error, this feature is accessed and shifted leftwards. In the matrix clause, it is not combined with any other root but rather enriches the hierarchical structure. The English slip in (4-14b) is somewhat different in that in the error, the Neg feature which originates from an adjectival slot combines with a verb stem resulting in the complex negative verb *disregard*. Note that the shift might also have given rise to the sequence *I don’t regard this as precise*, with the Neg feature extending the syntactic structure in the same way as in (4-14a). In (4-14a), however, there is no way of combining the shifted Neg feature with another terminal node, since in German there is no negative counterpart of the verb *sagen* “to say”.

Fromkin (1973) does not give an analysis for the error in (4-14c), but I suppose that we are dealing with a blend here. Semantically, *crazy* and *insane* are very close to each other; the former is a root only, while the latter is a combination of a root with a Neg feature. In the error, [root_{crazy}] takes the place of [root_{sane}]. Consequently, the terminal node contains [root_{crazy}] as well as [+neg]. There is, however, no Vocabulary item to match this feature combination (i.e. there is no Vocabulary item like *uncrazy*), and therefore Vocabulary insertion must resort to a syntactically complex paraphrase.

Another particularly interesting German slip is cited in (4-14d). The verb *vermeiden* “to avoid” possesses an inherent Neg feature which, however, is not realized by a separate morpheme. In the error, this inherent feature is perseverated and enriches the syntactic structure of the infinitival complement by adding the negative element *nicht* (also c.f. Fodor et al. (1975)).
Below, I give syntactic structures for the errors in (4-14ab). Note that the embedded CP in (4-14a’) is extraposed and adjoins to TnsP. In the present context, I leave open the question if in (4-14a’), Neg adjoins to an XP - be it VP or TnsP - or if it projects a phrase of its own, a NegP. The resulting erroneous sentence is *er hat nicht gesagt, dass es möglich ist* ‘he has not said that it possible is’. In (4-14b’), the sequence *this as imprecise* probably constitutes a small clause. Since the analysis of small clauses is a matter of debate, I have labelled that constituent XP, its exact status being irrelevant in the present context.

(4-14) *Simplified structures for errors involving shift of the Neg feature*

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78 Chomsky, (1981), for instance, assigns sentential status to small clauses. Williams (1983), however, argues against such an analysis and points out obvious inconsistencies with X-bar theory.
Remember that English main verbs do not raise to Tns. Rather, Tns merges with V resulting in the structure \([V [V] [Tns]]\). As far as the error (4-14b) \((I \text{ disregard this as precise})\) is concerned, it is impossible to decide if the shift has occurred before or after merger of Tns with the main verb.

The Vocabulary items to be inserted in the respective terminal nodes which were supplemented by the shifted Neg feature are given in (4-15). For the German error in (4-14a), that terminal node contains the Neg feature only (cf. (4-15a)); for the English one in (4-14b), it contains a combination of a verbal root and the Neg feature (cf. (4-15b)).

(4-15) **Vocabulary items to be inserted after Neg shift**

a. \([\text{neg}] \leftrightarrow /\text{Ict}/\) (German)

b. \([\text{root}_{(\text{regard})}] \leftrightarrow /\text{IsrIga:d}/\) (English)

Another option concerning the structure of the relevant terminal node in (4-14b’) is to assume that V has a branching structure with [neg] being the sister node of [root], i.e. [neg] being a verbal prefix. The relevant Vocabulary item for [neg] would then be /dIs-/ For this item, of course, it would be necessary to specify possible contexts for insertion, one such context being \([\text{root}_{(\text{regard})}]\).
To complete the picture, I cite two more examples involving Neg shift in (4-16). These examples are different from the ones discussed above in that the Neg element does not change its form after the shift. Neither before nor after the shift does the Neg feature combine with a root, i.e. the Neg element retains its status as an independent particle. In the German example (4-16a), the feature is shifted from the matrix into the embedded clause, for the English example (4-16b) the opposite is true.

(4-16) More errors involving shift of the Neg feature

a. mir gelingt es, ihn nicht zu erreichen
   *me succeed it, him not to reach
   ← mir gelingt es nicht, ihn zu erreichen
   ← *me succeed it not, him to reach
   “I don’t succeed in getting in touch with him.”

b. the bonsai didn’t die because I watered it
   ← the bonsai died because I didn’t water it  (Fromkin 1973b:268)

I take the English slip in (4-16b) to be particularly illuminating because after the shift has occurred, the presence of the Neg feature triggers do-insertion in the matrix clause. This insertion is due to the fact that Neg prevents merger of Tns and the main verb; therefore, the dummy element do is inserted in order to pick up the Tns feature [+past]. Consequently, this particular error suggests that the Neg shift has taken place before merger of Tns and V has occurred, since otherwise do-insertion would not have been triggered in the matrix clause and the ungrammatical utterance *the bonsai not died because I did water it would have surfaced.

In this section, I have investigated the role of semantic features in language production. I have argued that due to conceptual problems (how can the choice of the appropriate items from the Vocabulary be guaranteed?) as well as due to psycholinguistic evidence (the existence of meaning-based substitutions), we must assume that the selection of abstract roots from List 1 is determined by the activation of lexical concepts at a preceding conceptual level which connect to the roots in List 1. This, however, does not imply that the roots which enter the computational system carry any semantic features.

In the theory of Levelt et al. (1999), lexical concepts are taken to be noncompositional in nature, i.e. they are not represented by sets of semantic features. Above, I presented a few speech errors which seem to involve the isolation of semantic
features such as SPOUSE or PARENT, but the scarcity of these errors does not allow for any safe conclusions. In tip-of-the-tongue experiments, compositional semantic features like [mass] and [count] have been shown to be available at an early processing stage. Still, these features do not figure prominently in speech errors either.

Things are different concerning the Neg feature: Obviously, in speech errors, that feature is separable from concepts like UNCLEAR and IMPRECISE; it may shift and attach to other roots. We may therefore conclude that such concepts are in fact combinations of a more basic concept and a Neg feature, by that allowing at least some decomposition at the conceptual stratum.

4.3 Processing of Grammatical Gender

der bauch / die tür / the chair / l’amour
le tür / d’amour / der chair / the bauch
le chair / der tür / die bauch / th’amour

(Ernst Jandl, Chanson)

In this section, I will be concerned with the representation and processing of one morphosyntactic feature, viz. grammatical gender, in language production. In languages which make use of a gender system, gender agreement relations are frequently established. On the basis of a corpus analysis, van Berkum (1997) estimates that a native speaker of Dutch must retrieve a noun’s gender approximately every ten seconds in spontaneous speech. And Dutch, one must say, is a language with a relatively poor degree of gender marking limited to singular nouns; many languages have a much more extensive gender system (Corbett 1991).

In their overview article, Schriefers & Jescheniak (1999) point out several considerations which motivate the psycholinguist’s interest in the investigation of grammatical gender. Two of these are of major importance in the present context: Firstly, grammatical gender is a lexical, i.e. an inherent, property of words (nouns). Since theories of language production as well as the morphosyntactic theory of Distributed Morphology make clear predictions about the storage and retrieval of such properties, we may investigate whether they converge with respect to gender processing. Secondly, grammatical gender is also a paradigmatic case for studying the actual use of
morphosyntactic information in grammatical encoding. Consequently, speech errors may give us clues about the establishment of agreement relations.

In the present context, a first question concerns the storage versus computation of gender. We need to ask if grammatical gender in German is simply stored as a syntactic property of nouns or if rather, it is computed on the basis of certain semantic, morphological, and phonological characteristics of a given noun. This question will be dealt with in subsection 4.3.1. If it turns out that gender in German is in fact stored information, then a second question emerges, namely where and how it is stored. In particular, since DM allows for the underspecification of certain features (or feature values), we also need to consider that possibility; this will be done in subsection 4.3.2. Finally, the course of the syntactic derivation assumed in the DM framework makes clear predictions about the possibility of gender accommodations. These predictions will be subject to investigation in subsection 4.3.3. Again, I am going to show how the morphosyntactic theory can be matched to the assumptions made in psycholinguistic models of language production.

### 4.3.1 Definition and Assignment of Gender

Following Matthews (1997:248), grammatical gender may be defined as a system in which the class to which a noun is assigned is reflected in the forms that are taken by other elements syntactically related to that noun. In German, for instance, the masculine nouns *Mann* “man” and *Löffel* “spoon” require the masculine form *der* of the definite article in the nominative case, while the feminine nouns *Frau* “woman” and *Gabel* “fork” require the feminine form *die*, and neuter nouns like *Kind* “child” and *Messer* “knife” require the neuter form *das*. Thus, agreement in gender between a noun and other related items is crucial to the concept of grammatical gender.

It is important to carefully distinguish grammatical gender from the related concept of natural gender, or sex. Although gender systems exist in which grammatical gender is closely correlated with sex, in many others, we observe mismatches between gender and sex. In his brilliant essay on “The awful German language” (1878), Mark Twain gives some particularly dramatic examples for such mismatches in German:

> “Every noun has a gender, and there is no sense or system in the distribution; so the gender of each must be learned separately and by heart. [...] In German, a young lady has no sex, while a turnip has. Think what
overwrought reverence that shows for the turnip, and what callous disrespect for the girl. [...] In the German it is true that by some oversight of the inventor of the language, a Woman is a female; but a Wife (Weib) is not, - which is unfortunate.” (Twain 2000:24ff)

Obviously, in German, gender as a grammatical category must be kept distinct from sex as a semantic, or perhaps conceptual, category.

As far as the assignment of nouns to genders is concerned, there are two major principles involved, namely semantic principles and formal principles (Corbett 1991). By a semantic principle, nouns are assigned to a gender according to their meaning. In Avar, a Northeastern Caucasian language spoken in the Caucasus, e.g., the assignment of gender is straightforward: male human denotation implies masculine gender, female human denotation feminine gender, all other nouns are neuter (Comrie 1999). English has a very similar system. As is well known, gender plays only a small part in the grammar of English, but nonetheless the third person singular pronouns require the distinction between masculine he, feminine she, and neuter it (in contrast to e.g. Turkish, where, in the total absence of a gender system, only one third person singular pronoun is used). As in Avar, nouns denoting male humans are masculine, nouns denoting female humans are feminine, and other nouns are neuter.

Moreover, in some languages, there is an important correlation between the phonological form of a noun and its grammatical gender, i.e. nouns may also be assigned to gender according to a formal principle. In Italian and Spanish, for instance, most nouns ending in -o are masculine, while most nouns ending in -a are feminine. However, there are many exceptions to this pattern (e.g. Spanish drama “drama” is masculine, while radio “radio” is feminine). In German, certain derivational suffixes make a noun’s gender predictable. For example, nouns derived by the diminutive suffixes -chen and -lein are neuter (irrespective of the gender of the base noun) while nouns bearing the noun forming suffix -ung are always of feminine gender.

However, in German, the gender of only a very small percentage of the nouns can be predicted on the basis of semantic and phonological properties of the noun. As Mark Twain notes, “there is no sense or system in the distribution”, i.e. the German gender system is largely arbitrary. With the exclusion of the relatively few cases in which gender is a semantic feature of the concept (e.g. die Mutter “the.f mother”, der Onkel “the.m uncle”, die Kuh “the.f cow”), there is no obvious semantic basis for the gender taken by a noun. In
addition to that, the gender of a noun may vary across languages: “flower” and “flute” e.g. are masculine in Italian but feminine in French and in German.79

4.3.2 Underspecification of Grammatical Gender

The above discussion suggests that grammatical gender in German is not computed on the basis of a noun’s semantic, morphological, or phonological properties each time it is needed anew. Rather, a word’s gender is autonomously specified with respect to its semantic features and its phonological form, i.e. grammatical gender is stored as a syntactic property of nouns.

If grammatical gender is in fact stored information, then, of course, the question emerges of how and where it is stored. In Levelt’s model of language production (Levelt 1989; Levelt et al. 1999; cf. section 4.1), all nouns of a given grammatical gender are taken

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79 The assumption of an essentially arbitrary relation between a German noun and its grammatical gender has not remained unchallenged. Complex rule systems have been proposed that may guide the assignment of a noun’s gender once certain phonological, morphological, and semantic information about that noun are taken into account (cf. Zubin & Köpcke 1986; MacWhinney et al. 1989; Konishi 1993). However, in some cases the principles that are adduced are of such complexity that it is questionable whether they are valid.
to be linked to one gender node specifying this grammatical gender. That is, instead of specifying each noun’s grammatical gender separately in the corresponding lexical entry, there is only one abstract node for each grammatical gender. To be more precise, it is not the noun which is linked to the gender node but rather the noun’s lemma, i.e. an abstract entry which is not specified for phonological features but only connects to nodes representing the word’s syntactic properties (syntactic category and morphosyntactic features). The phonological form of a target word becomes activated only after the lemma of the target word was selected.

This conception of language production, however, does not facilitate any predictions about the precise nature of the connection between the lemma node and its gender feature. It is simply assumed that a language-specific number of gender nodes exists and that lemmas are always linked to a gender node. As mentioned above, within the theoretical framework I adopt, we need to investigate the possibility that there are gaps with respect to these links.

In chapter 3, I have already pointed out that Vocabulary items which are inserted at the postsyntactic level of Morphological Structure may be underspecified for the morphosyntactic feature complexes that they realize. One possible candidate for underspecification is the gender feature. However, in the following, I am going to argue that a closer examination of speech error data in which the gender feature plays a role (i.e. noun substitutions and gender accommodations) strongly suggests that actually this feature must be present, i.e. specified, throughout.

In principle, there are two options for the underspecification of certain features, both of which will be subject to investigation below. First, a feature may be underspecified within the computational system, i.e. it is not among those features which are relevant to that system and consequently, it is not drawn from the universal feature set (List 1). Consequently, such a feature can neither have any function within the computational system nor is it capable of influencing the insertion of a Vocabulary item. Gender is a potential candidate for that kind of underspecification because it does not figure prominently within the computational system (it does, for instance, not trigger movement operations). Therefore, we may hypothesize that it need not be present in this system.

Underspecification of Vocabulary items with respect to a feature constitutes a second possibility. For instance, as noted by Halle & Marantz (1993), the English past participle ending /-d/ in a sentence like I had played tennis all day will correspond only to the feature [+past] in its Vocabulary entry although in that example, it is inserted at a node with the
feature [+participle] in addition to the feature [+past]. In case a Vocabulary item is underspecified for gender, it may be inserted at a terminal node no matter what gender specification that node has (remember that it is only important for the Vocabulary item not to conflict with any of the features contained in the terminal node).

I will first consider the option that the gender feature is not amongst the universal features contained in List 1 and does therefore not play any role in the derivation of a sentence before Vocabulary insertion takes place at the level of Morphological Structure. This option is easily ruled out by the fact that gender specifications do, of course, influence this derivation. Before Vocabulary insertion applies, the gender feature of a given noun must be copied onto the other elements within the DP, such as the article and adjectives, and onto pronouns which refer to that noun. Otherwise, the correct insertion of Vocabulary items is not guaranteed. Consider, for instance, the following three slips of the tongue, all of which involve accommodation of certain elements with respect to gender (the accommodated elements are in bold-face):

(4-17) Accommodation of grammatical gender

a. irgendwie habe ich heute eine Zunge im Knoten
   somehow have I today a.f tongue(f.) in.the.m knot(m.)
   ← einen Knoten in der Zunge
   ← a.m knot(m.) in the.f tongue

b. der Unterschied von Fragesatz und normaler Frage
   the difference of interrogative.clause and normal.f question(f.)
   ← von Fragesatz und normalem Satz
   ← of interrogative.clause and normal.m sentence(m.)

c. ob dein Irrtum genauso ausfällt wie meiner
   if your error(m.) exactly turn.out as mine.m
   ← ob dein Urteil genauso ausfällt wie meines
   ← if your judgement(n) exactly turn.out as mine.n

In the error in (4-17a), two nouns with different gender specifications have been exchanged. In both positions, the material in D, one definite and one indefinite article, accommodates to the gender feature of the new noun (moreover, in the erroneous utterance, the definite masculine dative article dem cliticizes to the preposition in). Consequently, the ungrammatical utterance *einen Zunge in der Knoten is suppressed. In (4-17b), the non-head element Frage “question” of the compound Fragesatz “interrogative clause” is perseverated and the adjective normal is spelled out according to the gender feature of the
The slip in (c) exemplifies an instance of a meaning-based substitution: the masculine noun *Irrtum* “error” replaces *Urteil* “judgement” which is of neuter gender. Subsequently, the possessive pronoun in the elliptic comparative phrase is adjusted according to the masculine feature of the noun it refers to.

Below, I supply an exemplary syntactic structure for the object DP in the error (4-17a). Note that the case feature - which according to DM assumptions is implemented at MS - also plays a crucial role: accusative case is assigned to the DP *eine Zunge* ‘a.f tongue(f.)’ by the verb *haben* “to have” while dative case is assigned to the DP *dem Knoten* ‘the.m knot(m.)’ by the preposition *in*; both case specifications influence the surface forms of the respective articles.\(^{80}\)

(4-17) *Copying of agreement features within DP in example (4-17a)*

\[
\begin{align*}
\text{(4-18) *Vocabulary items to be inserted in } D^\circ & \\
\text{a. } & [-\text{def}]_{[\text{ACC}]} [+\text{fem}] & \leftrightarrow & /\text{ain}^\prime/ \\
\text{b. } & [+\text{def}]_{[\text{DAT}]} [-\text{pl}] [+\text{masc}] & \leftrightarrow & /\text{de:m}/ \\
\end{align*}
\]

\(^{80}\) As is well-known, the status of prepositions is a matter of debate. In the present context, I shall therefore leave open the question if \(P\) constitutes an l-node or an f-node, or, to put it differently, if \(P\) is occupied by a root or by some feature (or feature combination).
The tree in (4-17a’) represents the structure of the relevant part of the utterance after the root exchange has taken place. At MS, the morphosyntactic features of the roots will be copied onto the respective determiners. In (4-18), the Vocabulary items to be inserted into the D⁰-positions are given. If the roots were not specified for gender, then correct insertion of determiners would not be guaranteed. For example, a determiner position which is characterized only by the features [+def], [DAT], and [-pl] might as well be taken by the
definite article *der.*\textsuperscript{81}

Note that within the DM framework, we may not assume that the gender feature is copied from the noun - the respective Vocabulary items being specified for that feature onto D⁰ after the noun has been inserted. This is due to the fact that all operations which alter the arrangement and content of terminal nodes (e.g. merger, fusion, feature copy, and morphosyntactic readjustment) are taken to apply before Vocabulary insertion is performed.

Besides the fact that the gender feature must be available before Vocabulary insertion takes place in order to facilitate insertion of the correct Vocabulary item, there is another good reason for assuming that the gender feature must be specified within the computational system. At PF, a terminal node without a gender specification could in principle be taken with equal probability by every Vocabulary item irrespective of its gender feature. We would therefore predict that in noun substitutions, the gender of the intruding noun should not have any influence on the probability of its insertion.

However, researchers studying noun substitution errors in languages with grammatical gender systems have reported that intended and intruding noun are of the same grammatical gender more often than one would expect by chance. This phenomenon is called the “identical gender effect”. Berg (1992) reports that in his corpus of German slips of the tongue, in 118 out of 175 noncontextual word substitutions, the involved nouns are of the same grammatical gender (30 meaning-based errors, 79 form-based errors, and 9 situation-based errors). The identical gender effect is also observed by Marx (1999): In her collection of German errors, 206 out of 260 noun substitutions obey the identical gender constraint (135 meaning-based errors and 71 form-based errors). Similar tendencies of the role of grammatical gender in noun substitution errors have been reported for Spanish and Italian by Vigliocco et al. (1999). They give figures from a corpus of Spanish speech errors collected by Del Viso, Igoa & Garcia-Albea. In that corpus, 171 out of 180 noun substitutions obey the identical gender constraint.

In order to further evaluate this effect, I checked the noun substitutions from the Frankfurt corpus with respect to gender features. In that corpus, there are 728 noun substitutions. For a fair number of these substitutions, however, it turned out that the

\textsuperscript{81} Note that the Vocabulary item for the indefinite article need not be specified for number. I also wish to emphasize that Vocabulary items are most probably not specified for the number value [-pl] and that insertion of the appropriate determiner is guided by the Elsewhere Principle (cf. subsection 4.4.1 for discussion).
analysis was not unambiguous; they could e.g. as well have been analyzed as sound errors or blends. These ambiguous cases, as well as errors involving proper names, were crossed out from the list. After that, 554 errors remained.

In order to get a non-biased picture, further errors were removed from the list. First of all, all errors involving plural nouns were put onto a different list. This decision is due to the fact that in the plural, all nouns appear with the same article, namely the article die which is isomorphous to the feminine singular article (e.g. die Männer “the men(m.)”, die Frauen “the women(f.)”, and die Kinder “the children(n.)”). Consequently, it cannot be decided if the language processor treats a basically masculine noun as such even if it is used in the plural. Rather, it is very well conceivable that plural nouns are not specified for gender at all. I will, however, come back to the errors involving plural nouns below. For illustration, two meaning-based noun substitutions which involve nouns of different gender are given in (4-19); in (4-19a), the plural masculine noun Monate “months” is substituted for the plural feminine noun Wochen “weeks”, while in (4-19b), the singular masculine noun Magen “stomach” takes the slot of the plural neuter noun Augen “eyes”.

(4-19) Gender mismatch in substitutions involving plural noun(s)

a. er hatte schon fünf Monate Urlaub, nee, fünf Wochen
   he had already five months(m.) vacation, no, five weeks(f.)

b. aus dem Magen, aus dem Sinn ← aus den Augen
   out.of the.m stomach(m.), out.of the.m mind(m.) ← out.of the.n eyes(n.)
   “Out of sight, out of mind.”

The second group of errors which was not taken into consideration includes noun substitutions involving compounds for which it could not be decided if the whole compound was substituted for or rather the first element of the compound only. In case the whole compound was replaced, the gender of target and intruder is necessarily identical since the gender of the compound is determined by the gender specification of its head. The following two examples illustrate the procedure:

(4-19) Noun substitutions involving compounds

c. Dosenmilch ← Sonnenmilch
   canned.milk(f.) ← sun.milk(f.)
   “suntan lotion”

d. Materialwasser, äh, Mineralwasser
Since Dosenmilch “canned milk” is an existing German compound, in (4-19c), it is quite likely that the whole compound was substituted for and not only its non-head part Sonne “sun” (Dose “can” as well as Sonne are feminine). The same line of reasoning does, however, not hold for the error in (4-19d). Here, the resulting compound Materialwasser “material.water” is not an existing one and therefore we have to assume that only the first element Mineral “mineral” of the target word was replaced on phonological grounds (Mineral as well as Material are neuter). Consequently, the former error was not taken into consideration but the latter was.

For the same reason, a third group of slips, namely those involving derived nouns, was removed from the list of substitutions. Derivational suffixes, too, determine the gender of the derived noun. For instance, all nouns ending in -ion are [+feminine] (cf. (4-19e)) while nouns carrying the suffix -mus are always [+masculine] (cf. (4-19f)).

(4-19) Noun substitutions involving derived nouns

e. ich gehe zur Rezension ← Rezeption
   I go to.the review(f.) ← reception(f.)

f. das ist ein Dörfchen, über das der Terrorismus manchmal
   this is a small village upon which the.m terrorism(m.) sometimes
   hereinbricht ← der Tourismus
   descends ← the.m tourism(m.)

In the Frankfurt corpus, there are 114 noun substitutions in which target and/or intruding noun are plural, 35 ambiguous compound errors, and 54 slips involving derived nouns. Consequently, 203 noun substitutions were removed from the list. The 351 errors which remained after applying that procedure show the following distribution with respect to the gender features involved:

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82 Berg (1992) did not exclude derived nouns from his count. In his corpus, he observes an unusually high rate of form-based errors in which both interactants are of feminine gender (49 instances in contrast to only 8 instances of meaning-based f ← f substitutions). He states that while many rules of gender assignment based on the formal characteristics of nouns are of a probabilistic nature, some extremely frequent derivational suffixes like e.g. -ion and -ung are invariably found with feminine nouns and this fact may help to explain the high rate of form-based f ← f substitutions.
Table 6: Grammatical gender in singular noun substitutions (N=351)

Apparently, the identical gender effect is observed in the Frankfurt corpus, too. For 255 out of 351 noun substitutions, i.e. for 72.6% of the data, it is true that the intended word and the intruding word have the same gender feature. For the purpose of illustration, in (4-20), I give two examples each for errors involving identical and for errors involving different gender specification of the target noun and the intruder.

(4-20) Gender (mis)match in meaning- and form-based substitutions

a. das **Brett**, äh, das **Tablett**, äh, das **Blech** ist sowieso voll
   *the.m board(n.), er, the.m tray(n.), er, the.m baking.tray(n.) is anyway full*

b. ich bin froh, dass ich keinen **Spinat** kann ← keinen **Spagat**
   *I am happy that *no.m spinach(m.) can ← no.m splits(m.)*

---

In Berg’s (1992) corpus, the identical gender effect is observed in 67.4 % of the noun substitutions, and in Marx’s (1999) collection in 79.2 %. Interestingly, while Berg reports a higher percentage of form-based and Marx a higher percentage of meaning-based substitutions within the set of identical gender errors, in my set, the difference between meaning- and form-based errors is quite small (118 meaning-based and 137 form-based substitutions).
c. ich erfrier fast vor **Hunger** ← vor Kälte

*I freeze.to.death almost of* hunger(m.) ← of cold(f.)
d. die Wahl zwischen Pech und Cholera
the choice between bad.luck(n.) and cholera
← Pest und Cholera
← pestilence(f.) and cholera

All three nouns participating in the meaning-based substitution (a conduite d’approche) in (4-20a) are of neuter gender. In the form-based error in (b), target noun and intruder share the gender feature [+masculine]. In example (c), the semantically related nouns Hunger “hunger” and Kälte “cold” are masculine and feminine, respectively, while in the form-based slip in (d), the intruder Pech “bad luck” is neuter and the target Pest “pestilence” is feminine.

Now, what does the above distribution of noun substitutions tell us about the specification of the gender feature? Obviously, the terminal nodes in which the Vocabulary items are inserted must be specified for gender. Otherwise, the identical gender effect can not be accounted for. As mentioned before, a terminal node without a gender specification could in principle be taken with equal probability by every Vocabulary item irrespective of its gender feature. Therefore, gender mismatch between target and intruder (as in (4-20c) and (d)) would be expected to be more likely.84

The same line of reasoning of course excludes the second option for underspecification, viz. underspecification of Vocabulary items with respect to the gender feature. It is this kind of underspecification that has been claimed by Lumsden (1992) to be the case in e.g. Old English and Romanian, both of which also have a three-way distinction of gender.

“A more coherent account of the distribution of these forms [i.e. Old English personal pronouns] would say that the positions where the affixes are inserted are fully specified (at S-Structure). The affixes themselves, however, are underspecified. [...] The morphological signal is always nondistinct from the specification of the underlying position, but it does not always express every distinction that is specified in that position.” (Lumsden 1992:473)

84 Further evidence for the early availability of gender features comes from the so-called tip-of-the-tongue (TOT) phenomenon. In TOT states, speakers have the feeling of knowing a word but are unable to retrieve the (complete) phonological form of that word (cf. Brown (1991) for an overview). Still, as various studies have recently attested, speakers in a TOT state can provide correct information about the gender of a noun whose phonological form they are unable to access (Caramazza & Miozzo 1997; Miozzo & Caramazza 1997; Vigliocco et al. 1997). There is, however, an ongoing controversy whether wordform access occurs only upon successful gender retrieval or not (cf. Caramazza & Miozzo 1997; Roelofs et al. 1998; Caramazza & Miozzo 1998).
With the help of his underspecification analysis, Lumsden accounts for certain gender disagreement facts in Romanian. In Romanian, adjectives agree in number and gender with
the nouns they modify and demonstrative pronouns agree in number and gender with their antecedent. In case a demonstrative pronoun refers to an event, it appears in its feminine form (cf. (4-21a)). However, when a demonstrative pronoun referring to an event appears in a construction with a predicate adjective, the pronoun behaves as though it had a feminine antecedent, whereas the adjective behaves as though it had a masculine or neuter antecedent. In other words, although a subject DP usually agrees in gender with a predicative adjective, in (4-21b) this is not the case (Lumsden (1992:474f) cites examples from Farkas (1990)). According to Lumsden, this instance of gender disagreement is due to the fact that the inserted elements are underspecified with respect to certain gender features.

(4-21) *Gender mismatch in Romanian* (Lumsden 1992)

a. Petru e acasa, dar asta nu o stie decit Maria
   *Peter is home but this.SG.f not CL knows only Maria*
   “Peter is home, but this is known only to Mary.”

b. Petru e acasa. Asta e uluitor
   *Peter is home. This.SG.f is amazing.SG.m/n*
   “Peter is home. This is amazing.”

As far as the German speech errors are concerned, full underspecification of the Vocabulary items with respect to gender is definitely not an option. Again, insertion of underspecified Vocabulary items into gender-marked terminal nodes could proceed at random, since no choice of Vocabulary item would ever result in a feature mismatch. Therefore, no identical gender effect should be observed.

Lumsden (1992) does not assume full underspecification of positions and morphological signals. He claims that positions (i.e. terminal nodes) become fully specified with respect to the binary features [+feminine] and [±neuter] by means of redundancy rules. The morphological signals (i.e. the Vocabulary items), however, are underspecified with respect to certain feature values. For example, the masculine and neuter singular are specified as [-feminine] only while the feminine singular is completely unspecified.

I shall not consider the different possibilities of single feature value underspecification in detail here. Just a few comments are in place: Whatever feature value (if any) happens to be the unspecified one, a Vocabulary item which lacks that value should be more likely to be inserted into a fully specified slot, since no feature clash is caused by its insertion. For instance, if neuter as well as masculine Vocabulary items were
marked as [-feminine] only (as assumed by Lumsden (1992)), then both could be freely inserted into slots marked by the feature [-feminine], no matter if the respective slot also has the feature [+neuter] or [-neuter]. Such an analysis, however, cannot be inferred from the distribution of (singular) noun substitutions given in table 6 above. The number of neuter/masculine-interactions (N = 16+24) may be slightly higher than that of e.g. feminine/masculine-interactions (N = 19+13) but the total number of mixed gender substitutions is too small to allow for safe conclusions. Therefore, I will leave that question open.

I will now come back to substitutions involving plural nouns. Above, I left them out of consideration, since plural forms do not trigger gender agreement on accompanying determiners, adjectives, and pronouns. For instance, the only plural article is the one also used for the feminine singular nouns. Consequently, it is quite possible that plural nouns are not specified for gender at all and that the specification [+plural] alone is sufficient for selecting the appropriate determiner.

Within the DM framework, however, underspecification of plural nouns is not easily accounted for. Presumably, when a noun root is selected from List 1 (containing the morphosyntactic features), it brings along a certain gender feature which is an inherent feature of that noun. This means that gender information becomes available only by means of the noun itself, a fact that makes it unnecessary to find a correlate for gender at the conceptual level. But this is not true for the plural feature which has no inherent relation to the noun root, its presence being determined by the speaker’s intention only. There is no such thing as a plural root; rather, the plural feature is drawn separately from List 1. Therefore, a particular noun root is either always or never specified for gender. Above, I have argued that the former is true. In DM, the only possibility for gender underspecification on plural nouns is to postulate an impoverishment rule like the one in (4-22) which deletes the gender feature in the context of [+plural] prior to Vocabulary insertion (this is a simplified version, of course; the exact rule format, however, need not concern us here):

(4-22) *An impoverishment rule deleting gender features*

\[
\text{[gender feature]} \rightarrow \emptyset / [+\text{plural}]
\]

---

85 This bias towards neuter/masculine interactions is also observed in Berg’s (1992) corpus. In Marx’s (1999) error sample, however, feminine/masculine interactions make up the highest percentage.
If such an impoverishment rule was in fact active at MS, then two predictions could be made concerning the identical gender effect for plural nouns. First, there should be less instances of form-based same gender substitutions, since at the point of Vocabulary insertion, the gender feature would no longer be present and should therefore not have any influence on the selection of plural nouns. Secondly, for the same reason, there also should be more instances of form-based substitutions in which target and intruding noun are of
different gender.

The table below illustrates that only the first prediction is borne out; that is, the number of form-based plural noun substitutions is smaller throughout. In view of the available data, we may therefore not conclude that an impoverishment rule like the one in (4-22) alters the featural content of terminal nodes at MS in German.

<table>
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<td>form-based</td>
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</tbody>
</table>

Table 7: Grammatical gender in plural noun substitutions (N=106)

Admittedly, the numbers for plural noun substitutions are not as clear as the ones for singular noun substitutions presented in table 6. But still, there is a strong tendency for same gender interactions (at least with nouns of feminine and masculine gender) and I therefore assume that German plural nouns, too, are specified for their gender feature.

On the basis of spontaneous speech error data, I have argued in the above subsection that German singular as well as plural nouns are specified for their gender feature throughout, i.e. in the computational system as well as in the Vocabulary. In the subsection to follow, I
will have a closer look at what predictions the DM model of grammar makes concerning gender accommodations.

4.3.3 Gender Accommodation

The fact that not only meaning-based but also form-based noun substitutions show an identical gender effect is somewhat problematic for language production models which postulate a strict division between the lemma level (syntactic stratum) and the word form (phonological) level (e.g. Garrett 1975ff, Level 1989, Levelt et al. 1999). Remember that in these models, it is assumed that only lemma nodes connect to a word’s syntactic and morphosyntactic properties and that the flow of activation from lemma to phonological form is unidirectional. Therefore, once the processing of a sentence has reached the word form level, information about (morpho)syntactic features of a word should be no longer available.

On the other hand, production models which allow for feedback between processing levels (e.g. Dell & Reich 1981, Dell 1986, Berg 1988, Dell & O’Seaghdha 1992) can account for the identical gender effect in form-based substitutions in a straightforward way, since these models take morphosyntactic information to be still available at the word form level. Berg (1992), for instance, claims that formal similarity need not stop short of phonological criteria but might also encompass morphosyntactic criteria. However, Marx (1999) who favours a modular two-step retrieval model states that these models, too, are capable of explaining the behavior of form-based errors. In a line with Berg, she claims that gender is also a formal property of nouns in German and that one may assume that nouns of the same gender are lexical neighbors not only on the lemma level but also on the lexeme level. Still, she stresses that at the latter level, gender is just an organizational criterion; it is neither activated nor processed at that level.

A similar assumption can be made within the Distributed Morphology framework. In that theory, Vocabulary items (i.e. word forms) are selected from the Vocabulary along with certain morphosyntactic features. Since these features are checked against the featural content of terminal nodes, they are essential for selecting the appropriate Vocabulary item for a given node. Therefore, in DM, it is quite natural to assume that gender has an influence on form-based substitutions, too.
Still, there is one important difference between meaning- and form-based noun substitutions. This difference concerns the establishment of agreement relations in the course of language production. Presumably, semantic substitutions take place when roots are selected from List 1, i.e. before the level of MS. In contrast, form-based substitutions occur when Vocabulary items are inserted into terminal nodes, i.e. after the level of MS. According to DM assumptions, implementation of agreement nodes and copying of agreement features takes place at MS. We therefore predict that preceding articles (as well as other material within DP and pronouns) can accommodate to the gender of the erroneous noun only after meaning-based noun substitutions. Following form-based substitutions, accommodation should not be observed, since at this point of the derivation, copying of agreement features is no longer possible. An erroneous form-related noun may be inserted but it cannot pass on its gender feature onto other elements.

From table 6 above, we can infer that there are 49 meaning-based and 47 form-based singular noun substitutions in which target and intruding noun happen to have different gender features, i.e. 96 instances in which accommodation could in principle be observed. However, a number of these substitution errors is not informative in the present context, since there either is an ambiguous gender cue in the environment, no gender cue at all or the error occurs within a compound. The slips given in (4-23) illustrate these phenomena:

(4-23) **Noun substitutions with ambiguous or without gender cue**

a. sie ist nicht ohne **Wunder** bekannter ← ohne Zufall
   *she is not without miracle(n.) more known ← without chance(m.)*

b. überall gibt's **Erotik** ← Aerobic
   *everywhere is there eroticism(f.) ← aerobic(n.)*
   “There’s aerobic everywhere.”

c. aufgrund von **Verzögerungen der Stadtplanung**
   *because of delays of the f. city(f.). planning*
   ← der **Satzplanung**
   ← of the **sentence(m.). planning**

d. eher geht ein **Kanal**, äh, ein Kamel durchs **Nadelöhr**
   *more likely goes a.m canal(m.), er, a.n camel(n.) through the eye of a needle*

In the meaning-based substitution in (4-23a) as well as in the form-based substitution in (4-23b), there is no agreeing material whatsoever, i.e. the gender features from the erroneous nouns **Wunder** “miracle” and **Erotik** “eroticism”, respectively, need not be copied onto any
other material (the same is true for the errors cited in (4-20cd) above). In (4-23c), a compound is involved in the error. Even if we assume that only the specifier of the compound is affected by the substitution (cf. the discussion of the compound errors in (4-19cd)), it is clear that the genitive article need not be accommodated since the gender determining head of the compound is the same. In German, the indefinite articles for masculine and neuter nouns happen to be the same in the nominative, genitive, and dative case. Consequently, in (4-23d) where the masculine noun *Kanal* “canal” is substituted for the neuter noun *Kamel* “camel” in a nominative slot, we can not decide if feature copy onto the determiner has in fact taken place.

Let us now consider the clear cases of accommodation and non-accommodation after substitutions. In the meaning-based substitution in (4-24a) as well as in the form based substitution in (b), the definite articles accommodate to the gender feature of the intruding nouns. The slip (4-24c), on the other hand, exemplifies an instance of a form-based substitution without subsequent accommodation.

(4-24) *(Non-)accommodation following meaning- and form based substitutions*

\begin{align*}
a. \text{ aber du musst die Tüür dann festhalten, Quatsch, das Fenster} & \quad \text{but you must the.f door(f.) then hold, rubbish, the.n window(n.)} \\
b. \text{ wo sie über den Kalender guckt ← über das Geländer} & \quad \text{where she over the.m calendar(m.) looks ← over the.n railing(n.)} \\
c. \text{ oh, ein neuer Luft, āh, Duft} & \quad \text{oh, a.m new.m air(f.), er, fragrance(m.)}
\end{align*}

Interestingly, in the Frankfurt corpus, there is not a single slip in which a meaning-based substitution is not followed by an accommodation.\(^{86}\) Moreover, the error in (4-24b) is the only clear instance of a form-based substitution that triggers accommodation.\(^{87}\) On the other hand, accommodation is observed in 21 meaning-based substitutions while 11 form-

\(^{86}\) There is, however, one such error in my corpus which - as mentioned earlier - contains some slips which are not (yet) part of the Frankfurt corpus, viz. *als er bei *der Bruder, āh, bei der Schwester von R. in London war ‘when he with the.f brother(m.), er, with the.f sister(f.) of R. in London was’. Obviously, the nouns *Bruder* “brother” and *Schwester* “sister” are semantically related. Still, accommodation of the definite (dative) article does not take place.

\(^{87}\) Moreover, there is the following unclear case: *gekochter Kompost ← gekochtes Kompott* ‘cooked.m compost(m.) ← cooked.n compote(n.)’. Note that in Standard German, the intruder *Kompost* is masculine while the form-related target noun *Kompott* is neuter (as indicated in the error). In some German dialects, however, *Kompotti* is of masculine gender. Since it is unclear whether the speaker used the Standard German or the dialect variant, we can not decide with certainty whether we are in fact dealing with a gender accommodation in this error.
based ones result in an ungrammatical utterance. Table 8 provides you with an overview of the distribution of the relevant errors in the Frankfurt corpus:

<table>
<thead>
<tr>
<th>NOUN SUBSTITUTION</th>
<th>ACCOMMODATION?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>meaning-based</td>
<td>21</td>
</tr>
<tr>
<td>form-based</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 8: Distribution of accommodations after noun substitutions

The prediction made above is therefore confirmed: Only meaning-based substitutions are capable of triggering accommodatory processes because only these substitutions occur before the level of Morphological Structure, i.e. at a stage of the derivation at which agreement relations have not yet been established. When Vocabulary items are inserted, all operations of feature copying have been executed and agreement relations are definitely established. Consequently, form-based substitutions can not be followed by accommodations, since feature copy is a necessary prerequisite for accommodation to take place.  

Note that within the DM framework, one can not assume that whole DPs are replaced. If, for instance, we analyzed example (4-24a) as a DP-substitution - i.e. the DP das Fenster “the window” was substituted for by the DP die Tür “the door” - then no accommodatory process would have to be assumed. In DM, however, this kind of replacement is not an option. Remember that Vocabulary insertion targets terminal nodes. Of course, there neither is a terminal node nor a Vocabulary item with the relevant features corresponding to a constituent like e.g. [DP die Tür].

Still, there are some very few exceptions; however, all of them involve idiomatic expressions. Consider, for instance, the examples given in (4-25). In (a), rote Bete “beetroot”, the name of a vegetable (Bete alone is not attested), is substituted for Grüne

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88 The same observation is made by Marx (1999). The data from her corpus show that both types of substitutions behave unambiguously complementarily: Whereas accommodation never occurs in the case of form-related noun substitutions, it always takes place after meaning-related noun substitutions (with one single exception).
Sauce “green sauce”, the name of a typical dish from Frankfurt.\textsuperscript{89} Therefore, we may safely assume that the internal structure of these DPs is not computed in on-line language production.

(4-25) Substitution of idiomatic DPs

\begin{itemize}
  \item a. rote Bete $\leftrightarrow$ grüne Soße
      \textit{red beet} $\leftrightarrow$ \textit{green sauce}
  \item b. so kommst Du doch auf keinen \textbf{grünen Punkt}
      \textit{so come you really on no green point}
      \textit{auf keinen grünen Zweig}
      \textit{on no green branch}
      “This will really get you nowhere!”
  \item c. in our academic \textbf{ivy league} $\leftrightarrow$ academic ivory tower (Fromkin 1973b:262)
\end{itemize}

The same is true for the slip in (4-25b). The two nouns \textit{Punkt “point”} and \textit{Zweig “branch”} have neither a semantic nor a form-based relation. The error is definitely due to the fact that both are parts of idiomatic expressions involving the adjective \textit{grün “green”}. A \textbf{grüner Punkt} need not be green at all; it simply is a little sign on packagings indicating the possibility of recycling. And the internal structure of the idiom \textit{auf keinen grünen Zeig kommen “to get nowhere”} is computed just as little as that of an English expression like e.g. “to kick the bucket”. I assume that the same is true for the English slip in (4-25c) in which the DP \textit{ivy league} is substituted for \textit{ivory tower}; again, both DPs are fixed constructions. Therefore, the slips in (4-25) do not constitute counterexamples to the generalization that only words but not phrases are subject to substitution errors.

4.4 Copying Agreement Features

Wenn man es nur versucht, so geht’s,
das heißt mitunter, doch nicht stets.\textsuperscript{*}

(Wilhelm Busch, Aphorismen)

\textsuperscript{89} The greenish color of this delicious dish comes from several herbs (borage, cress, parsley, sorrel, chives, and chervil) which are combined with egg yolks, oil, sour cream, and possibly mayonnaise (cf. Scherenberg & Stier 1990:18). Interestingly, there are two slips in the corpus involving the replacement of \textit{Grüne Soße}. But after all, it is a Frankfurt corpus, isn’t it?

\textsuperscript{*} “If one just tries, it works, that is, sometimes but not always.”
In this section, I shall be concerned with processes of feature copying. As mentioned before, in DM, it is assumed that within the computational system, terminal nodes consist only of bundles of abstract features. Before Vocabulary insertion takes place, some features must be passed on to other, not necessarily adjacent, nodes. According to DM, this feature transmission involves a copy mechanism. In German e.g., features of an NP such as number and gender must be copied onto D°, the head of DP, and features of a subject DP such as person and number must be copied onto the verb. Both kinds of copy mechanisms may be defective, giving rise to instances of anti-agreement within DP or TnsP, respectively.

In the following, however, I will concentrate on subject-verb agreement (SVA) errors only. This limitation is due to the fact that for the most part, agreement errors within DP arise when a noun happens to appear in an erroneous slot (due to an anticipation, perseveration, exchange or blend) and subsequent accommodation of the material in D° does not take place. That is, after the error has occurred, feature copy does not take place.\(^9\) In SVA-errors, on the other hand, the feature copy process itself causes the error. An item here: the verb - which must be specified for some morphosyntactic feature receives that very feature from a wrong source.\(^9\)

In the present context, it is particularly interesting to investigate the structural position of the source with respect to the verb. There are two options which I will consider in turn. First, it is possible that the error source is linearly closer to the verb than the ‘real’ subject; this possibility, which I will refer to as “local agreement”, is subject to discussion in subsection 4.4.1. The second option is that the error source is more distant from the verb than the subject of the sentence; this option, which I will consider in subsection 4.4.2, is termed “long-distance agreement”. Finally, in subsection 4.4.3, I will consider if and how syntactic transformations interact with processes of feature copy. Transformations might have an impact on the establishment of agreement, since a DP which is a distant one at surface structure may well be a local one at deep structure.

\(^9\) There are a few exceptions to that generalization. Consider e.g. the following slip: *ihr Bus ist uns zum Heimat geworden ← zur Heimat ‘their.m bus(m.) has for.us to.the.m home(f.) become ← to.the.f home(f)’ (“their bus has become home for us”) where the gender feature of Bus is perseverated, i.e. it is copied onto the non-local determiner of Heimat “home” (which subsequently cliticizes to the preposition zu “to”).

\(^9\) Blends are an exception. In an error like e.g. *weil man das Kind nicht fragen könn-en ← weil man … nicht fragen kann // weil wir … nicht fragen könn-en ‘because one the child not ask can-2.PL ← because one … not ask can-3.SG // because we … not ask can-2.PL’, an element from a competing planning frame intrudes but accommodation does not take place. That is, in this example, just as in the DP agreement errors, feature copy does not play any role.
4.4.1 Taking the Short Way: Local Agreement

As is well known, number/person marking on a verb (or on other constituents within a sentence) is an essential part of encoding grammatical relations in sentences; it is used to signal that linguistic constituents which are specified for the same number/person features are linked regardless of whether they appear adjacent or apart in an utterance. Bock et al. (1999:330) illustrate the effect of such marking by the different interpretations of sentences (4-26) and (b):

(4-26) *Linking of constituents by means of agreement marking*

a. Descriptions of the massacre that *were* discovered yesterday ...

b. Descriptions of the massacre that *was* discovered yesterday ...

Obviously, the two sentences mean different things: While example (a) mentions the discovery of descriptions, example (b) is concerned with the discovery of a massacre. This contrast in interpretation is due to the distinct number specification of the verb in the relative clause.

Crosslinguistically, agreement features such as number, person, grammatical gender and others are used in order to signal which of the individual words of an utterance are related to each other. In German, person and number features are determined by the message intention of a speaker. These features have important consequences for the syntax
of an utterance (i.e. for establishing subject-verb agreement).92

According to an inflectional account of agreement, agreement is the product of implicit matching operations between the features of linguistic units, which take place during the generation of an utterance. Subject-verb agreement, for instance, is the product of an operation which evaluates the person and number of the subject and sets person and number on the verb to the same values. Within their computational model of language production, Kempen & Hoenkamp (1987) propose that agreement involves a feature copy mechanism whereby the features of one constituent in a syntactic tree are copied onto another constituent. In the case of subject-verb agreement, the features person and number are copied from the subject DP onto the verb. This, of course, is an assumption which is familiar from generative treatments of agreement (Chomsky 1981) in which the feature copying transformations are sometimes replaced by a coindexing relation between the nominal source and Agr.

In chapter 3 above, we already saw that feature copy operations are also assumed in the Distributed Morphology framework. However, there is an important difference: while in other generative theories, agreement is taken to consist of a feature-transmission from a noun onto Agr and subsequent movement of the verb to Agr (or affix hopping, respectively, in earlier transformational analyses), verb movement to Agr is impossible in DM, since Agr nodes are not assumed to be present in the syntax. Rather, Agr is inserted at the level of Morphological Structure (AgrS, for example, is implemented as sister of the Tns node) and features from the noun will be copied onto this newly inserted node.

Consider the following structure which represents a part of the embedded clause *(weil) die Kinder weinten* “(because) the children cried”:

---

92 A series of experimental studies was conducted in order to investigate if and how the conceptual (notional) number of a noun is capable of influencing verb agreement (cf. Bock & Cutting (1992), Bock et al. (1999), and Eberhard (1999) for English, Berg (1998) for a comparison of English and German, Vigliocco et al. (1995) for Italian, Vigliocco et al. (1996a) for Spanish, and Vigliocco et al. (1996b) for French and Dutch). Most of these studies employ the same sentence completion task (a singular head noun followed by a PP ending in a plural local noun) as introduced by Bock & Miller (1991). A representative pair of sentence preambles (complex subject DPs) used in these experiments is the jury for the trials versus the judge for the trials, where jury is a grammatically singular but notionally plural collective noun.

One particularly interesting study which investigated how speakers create number agreement for collective nouns is the one by Bock et al. (1999). In their experiments, the agreement targets were verbs and pronouns, produced in a sentence-completion task. Interestingly, verbs and pronouns behaved differently: while verbs tended to reflect the morphological number of the collective controller, the pronouns were more likely to reflect the notional number (in a sentence like e.g. The cast in the soap opera rehearsed, didn’t they? where cast is a collective noun; the tag question was to be supplied by the speaker). Since collective nouns do not figure prominently in my speech error corpus, I do not wish to go into that matter any further (but see the short discussion of count vs. mass nouns in subsection 4.2.3).
(4-27) **Copying of number feature onto AgrS**

Once again, this is a simplified structure. In the syntax, the verb is moved and adjoins to Tns. At Morphological Structure, AgrS will be inserted as sister of the Tns node and the relevant features of the subject DP will subsequently be copied onto AgrS. In this case, the only relevant feature is the number feature since, except for the 2nd person, German plural DPs are not specified for person.

The discussion in subsection 2.2.1 has already made clear that this feature copy mechanism may be defective. We have seen that now and then a wrong source for feature copy is chosen. For the most part, that source is a local plural noun, as is illustrated by the spontaneous speech errors cited in (4-28):

(4-28) **Verbs agreeing with local plural nouns in English and German**

a. [the full impact of the cuts] haven’t hit hard as yet
   \[\leftarrow \text{the full impact ... hasn’t hit} \quad \text{(Francis 1986:318)}\]

b. [eine beträchtliche Anzahl von Gebärden] sind lexikalisch markiert
   a considerable number of signs are lexically marked
   \[\leftarrow \text{eine beträchtliche Anzahl ... ist lexikalisch markiert}\]
   \[\leftarrow a \text{ considerable number ... is lexically marked}\]

In both of the above slips, a plural feature is erroneously copied from a DP (the cuts and Gebärden “signs”, respectively) which is part of a PP within a complex subject DP. The
structure below illustrates the defective copy process for the German example (4-28b); instead of the [-plural]-feature of *Anzahl* “number”, the [+plural]-feature of the local DP *Gebärden* is copied onto AgrS.

(4-28) *Wrong feature copy in example (4-28b)*

In fact, for the English slips, this kind of erroneous feature copying is the most widespread pattern; for your convenience, I will repeat the numbers here: In all of the 25 spontaneous English SVA-errors I found in the literature, the wrong DP is part of a complex subject DP. Moreover, in all 25 cases, the verb agrees with a local DP which in 21 of the cases is specified for plural.

The reader will remember that things are somewhat different for the German errors: In my corpus, the verb happens to agree with a wrong DP within the subject DP in only 17 out of 82 SVA errors; in 14 out of these 17 cases, the wrong DP is plural. In all but one of the errors, the wrong DP is more local to the verb than the nominal head of the subject DP. The only exception is given in (4-29a). In that slip, the verb precedes the subject DP due to verb second and therefore, the agreement triggering plural DP *Wörtern* “words” is not local to the verb. In three other slips, we observe agreement of the verb with a semi-local DP, i.e. another DP intervenes between the erroneous source of agreement and the verb. In (4-29b)
e.g., the verb agrees with the plural DP *Knoten* “nodes” which, however, is followed by a PP which contains the singular DP *Schwellenwert* “threshold”.
(4-29) **Other types of German SVA-errors**

a. für jedes geäußerte Wort **müsst-en** dann [**eineMehrzahl** an Wört-ern] aktiviert werden

   \[ \text{word-PL activated get} \]

   \[ \text{must.COND-SG then a multitude of word-PL activated get} \]

b. was passiert, wenn [**dieAktivierung** aller Knoten] unter den Schwellenwert **sink-en**

   \[ \text{the threshold sink-PL} \]

   \[ \text{if the activation of all nodes \ldots sink-3.SG} \]

c. dass **es** hier konzeptuelle **Einflüsse** **geb-en** \[\text{that it here conceptual influences give-PL \ldots give-3.SG}\]

In 28 errors from my collection, the verb does not agree with a DP which is part of a complex subject phrase but rather with an object DP or a DP which is part of an adjunct PP. One such case is given in (4-29c) where the verb agrees with the direct plural object **Einflüsse** “influences”. The tree structure for the slip in (4-29c) is given below:

(4-29) **Feature copy from the object DP in example (4-29c)**

![Feature copy from the object DP](image-url)
Object agreement, of course, is the rule in many spoken languages. We may therefore say that in errors such as (4-29c), the speaker relies on an agreement strategy which may not be part of the grammar of his/her language but which is very well attested in a number of natural languages.

It is, however, worth noting that from a structural point of view neither the error source in (4-28b’) nor the error source in (4-29c’) is in fact local to the verb. If we assume - as e.g. Nicol (1995) and Vigliocco & Nicol (1998) do - that agreement features percolate from a noun to the verb and that the above errors are due to the plural feature percolating too far, then the path the plural feature in (4-28b’) and (4-29c’) has to take is obviously longer than the path the respective feature from the (nominal head of the) subject DP would have to take for percolation.

It is only from a strictly linear point of view that the error sources are closer to the agreement target. Since the linear order of constituents is assumed to be crucial for many syntactic and morphosyntactic operations in the DM framework (e.g. adjacency; cf. Bobalijk (1994)), we may assume that the linear proximity of two constituents is sometimes capable of cancelling the structural prerequisites (Spec-head relation) for the establishment of agreement.

One aspect of the SVA-errors we still need to consider is the question why, for the most part, it is the plural feature of a local noun which triggers erroneous agreement. Spontaneous slips in which the verb agrees with a local singular DP - be it part of a complex subject DP or part of an object XP - are only rarely observed. In fact, there are only eight such cases in my corpus and four such cases amongst the 25 English slips. Two examples are given in (4-30). In (4-30a), the verb agrees with the DP jemand jüngerem “someone younger” which is part of a PP modifying the subject93, and in (4-30b), the agreement source problem is part of a reduced relative clause within the subject DP.

(4-30) Agreement of the verb with a local singular DP

a. wenn es [Texte von jemand jüngerem] ist ← wenn es Texte ... sind

   if it texts of someone younger is ← if it texts ... are

b. [the educational systems needed to correct the problem] is lacking

---

93 Alternatively, this error might be analyzed as agreement of the verb with the (non-local) expletive es “it”.
Bock & Eberhard (1993), Nicol (1995), and Eberhard (1997) claim that the observed bias receives a straightforward explanation by assuming that there is an asymmetry in the grammatical representation underlying singular and plural count nouns. The authors
propose that the asymmetry is due to plural nouns possessing a grammatical feature for number that singular nouns lack. Thus, verb agreement is implemented by a mechanism which checks whether the head noun of the subject phrase possesses a number feature. If there is no such feature (as in the case of singular nouns), the mechanism interprets the head noun as singular by default and a singular verb is retrieved. However, if there is an activated number feature (as in the case of plural nouns), this information overrides the default assignment and a plural verb will be retrieved.

On this account, local plural nouns (as in (4-28ab) and (4-29bc)) may occasionally disrupt the agreement process because the mechanism mistakenly detects the plural feature on the local noun and retrieves a plural verb. In contrast, singular local nouns (as in (4-30ab)) do not as easily disrupt the agreement process, since they do not possess a number feature which might interfere in the agreement process.\footnote{In her investigation, Eberhard (1997) somewhat refined Bock & Miller's original experimental setting. For instance, she compared sentence preambles like the ones in (i) and (ii):
(i) The key to the cabinets ...
(ii) One key to the cabinets ...
Consistent with Bock & Miller's investigation, her results showed that plural local nouns elicited more agreement errors. The new result, however, was that plural nouns were less likely to elicit erroneous agreement when the subject noun was explicitly marked as singular by a quantifier (as in (ii)) in comparison to when it remained unmarked by the determiner the (as in (i)). Eberhard claims that this finding supports}

In DM terms, this means that singular nouns are not specified for number, i.e. there is no morphosyntactic feature [-plural] in List 1. Consequently, there is no such feature to be copied onto AgrS. In case AgrS is void of features when Vocabulary insertion takes place, the default item /-t/ (representing 3rd person singular) will be chosen from the Vocabulary. The Vocabulary items which compete for insertion under the AgrS node in German are listed in (4-31):

(4-31) \textit{Vocabulary items to be inserted under AgrS in German}

\begin{itemize}
  \item a. $\emptyset \leftrightarrow /-t/$
  \item b. [1st] $\leftrightarrow /-´/$
  \item c. [2nd] $\leftrightarrow /-st/$
  \item d. [+pl] $\leftrightarrow /-´n/$
  \item e. [2nd][+pl] $\leftrightarrow /-t/$
\end{itemize}

For the SVA-errors, the line of reasoning is the same as sketched above: An intervening plural DP makes available a number feature (which may be copied onto AgrS by mistake)
while an intervening singular DP has no such feature to offer. In the rare instances in which a verb happens to erroneously agree with a singular noun, we must assume that we are dealing with the unlikely case of a copy failure, i.e. no number feature whatsoever is transmitted to the AgrS node and consequently, the default value will be selected for insertion.\(^{95}\)

In subsection 2.2.1, I have already pointed out that the results obtained in various experimental studies dealing with SVA in English are consistent with the pattern observed in the English spontaneous data, that is, in most of the elicited errors, the verb agrees with a local plural noun. Note that in these experiments, the only relevant morphosyntactic feature was the number feature. However, in a subsequent study, Vigliocco & Franck (1999) used a similar error induction procedure in order to investigate the computation of gender agreement between a noun and a gender marked predicative adjective in French and Italian.

In this experiment, the participants first saw an adjective in its feminine and masculine form (e.g. rosso/rossa “red.m/red.f”). Then a sentence preamble with a masculine or feminine noun was presented in which this noun was always followed by a local noun of different gender. Two Italian sentence preambles used in the experiment are given in (4-32):

(4-32) Sentence preambles used in the experiment by Vigliocco & Franck (1999)

\[
\begin{align*}
\text{a. } & \text{ il cero in ciesa (e rosso)} \\
& \text{the.m candle(m.) in church(f.) (is red.m)} \\
\text{b. } & \text{ la macchina nel parcheggio (e rossa)} \\
& \text{the.f car(f.) in.the.m parking.lot(m.) (is red.f)}
\end{align*}
\]

The hypothesis that the absence of number marking for singular count nouns is a contributing factor in the asymmetry in agreement errors.

\(^{95}\) Henry (1995) reports very interesting defective agreement patterns from Belfast English which can be accounted for along the same lines. In Belfast English, plural subjects may optionally occur with singular verbs, but the opposite pattern, i.e. singular subjects occurring with plural verbs, is ungrammatical. Therefore, sentences (i) and (ii) are grammatical while (iii) is not (Henry 1995:16f):

(i) The students was late.
(ii) The eggs is cracked.
(iii) *The egg are cracked.

If the insertion of singular verbs required the presence of a feature [+plural], sentences (i) and (ii) could not be explained. Obviously, it is possible in Belfast English not to copy a [+plural] feature onto Agr. Whenever this happens, the default singular form of the verb will be inserted. In contrast, example (iii) is ungrammatical since here the subject DP has no number feature to offer, but insertion of a plural verb requires the presence of a plural feature (see Mohammad (1990) for similar patterns of partial agreement in Arabic). I am indebted to Eric Fuß for bringing these data to my attention.
The participants were asked to repeat the sentence preamble and to make a complete sentence out of it using the specified adjective. As in the experiments dealing with number mismatch, it turned out that errors were induced by the local noun’s grammatical gender, i.e. the subjects tended to produce errors like e.g. *il cero in ciesa e rossa* in which the adjective agrees in gender with the local noun *ciesa* “church”. All the nouns used in the experiments were singular. Therefore, the only feature that was available for copy was the gender feature.  

A similar study which investigated the production of gender-marked pronouns in Dutch was conducted by Meyer & Bock (1999). Dutch has only two grammatical genders, one neuter (comprising those nouns that take the definite determiner *het*) and the other common (comprising those nouns that take the definitive determiner *de*). The corresponding gender-marked singular demonstrative pronouns are *dat* (neuter) and *die* (common). In the experiments, participants heard a preamble sentence like the one given in (4-33):

(4-33) *Sentence preamble used in the experiment by Meyer & Bock (1999)*

> Look there lies a potato next to a swimsuit

After hearing the preamble, an adjective appeared on the computer screen which was chosen such that it could only refer to one of the two nouns (e.g. *gaar* “cooked” which could only be applied to “potato”). In one experiment, the participants were asked to produce a second sentence using a demonstrative pronoun and the adjective. Consequently, for the example in (4-33), the appropriate response would be *Die is gaar ‘it.c is cooked’. The main questions were whether participants would use a pronoun whose gender is appropriate for the intended antecedent (the common noun *aardappel*) and whether the choice of pronoun would be influenced by the gender specification of an interfering (nonantecedent) noun phrase (the neuter noun *badpak*).

The results showed that gender errors on the demonstrative pronoun were more likely whenever the two nouns of the preamble had different grammatical gender. This

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96 Vigliocco & Franck’s results also show that errors of gender agreement were significantly more frequent when the head noun had only grammatical gender than when it had matching grammatical and conceptual gender (like e.g. *lo sposo* ‘the.m groom(m.)’ where gender reflects the sex of the referent).

The role of conceptual information was further assessed in a study by Vigliocco & Zilli (1999) who conducted experiments not only with unimpaired speakers of Italian but also with two Broca’s aphasics.
effect was particularly strong when the demonstrative pronoun referred to the first noun in the preamble. That is, following a preamble like the one in (4-33), subjects showed a tendency to respond with the odd sequence *Dat is gaar* ‘it.n is cooked’, implying that it is the swimsuit which was cooked. So, once again, we are dealing with a case of local agreement, viz. between-sentence agreement of a demonstrative pronoun with a DP which is part of an object PP.

Interestingly, there are three slips in my corpus which are comparable to the errors elicited by Meyer & Bock (1999), i.e. errors in which a demonstrative pronoun agrees in gender with a local DP. Two of these slips are given in (4-34).

(4-34) *Agreement of demonstrative pronoun with local DP in German*

- a. [das Dilemma bei der ganzen Sache] ist die, the.n dilemma(n.) about the.f whole matter(f.) is that.f dass man überhaupt nicht weiß ... that one at.all not knows ...
  ← das Dilemma ... ist das, dass ...
  ← the.n dilemma(n.) ... is that.n that ...

- b. [die Farbe des Rocks] ist genau der, den the.f colour(f.) of.the.m skirt(m.) is exactly the.one.m which.m ich suche, äh, ist genau die, die ich suche I look.for, er, is exactly the.one.f which.f I look.for

In (4-34a), the demonstrative pronoun *die* agrees in gender with the feminine local noun *Sache* “matter”, while in (4-34b), the demonstrative pronoun *der* as well as the accusative relative pronoun *den* agree in gender with the local masculine noun *Rock* “skirt”. In both cases, the local nouns are part of a complex subject DP, viz. a PP and a genitive complement, respectively.

In this subsection, I have considered different instances of local agreement in German and English slips of the tongue. In the German examples I discussed, the verb either agrees with a DP which is part of a complex subject DP (i.e. a genitive or PP complement modifying the head), with a direct object DP, or with a DP which is part of a PP adjunct. Interestingly, for all three types of errors, we observe a striking tendency of agreement with a plural noun. Within DM, this tendency is accounted for by assuming that singular

Moreover, Vigliocco & Zilli investigated if morphophonological regularities of gender marking have an influence on the occurrence of agreement errors.
nouns are not specified for a number feature. Therefore, they are not as likely to interfere with the agreement process. Moreover, I have reported data from experimental studies which verify that local agreement is also observed concerning the gender feature in languages such as French and Italian (gender agreeing adjectives) as well as Dutch (gender agreeing pronouns).

4.4.2 Taking the Long Way: Long-Distance Agreement

While defective agreement of a verb with a local noun is probably the more expected case, there is also a number of errors in my collection in which the verb happens to agree with a noun that is more distant to the verb than the actual subject of the sentence. One such case was given in (4-29a) above in which - due to a topicalized object PP - the verb is not local to the agreement source.

However, in all the errors discussed in subsection 4.4.1, the verb erroneously agrees with a DP which is not assigned nominative case. The slips which I am going to discuss in this subsection are different in that the agreement feature is copied onto AgrS from a nominative DP; that is, a wrong subject is selected for copy of the agreement feature. In my corpus, there are 22 such cases. In 18 of these, the verb agrees with a non-local subject, i.e. either with the subject of a matrix clause, the subject of an embedded clause, or with the subject of the second conjunct in a coordination structure.

One of the four exceptions is given in (4-35). In that error, the verb sein “to be” is inflected for 2nd person singular. Obviously, these features have been transmitted from the pronoun du “you” which is part of a comparative construction within an adverbial phrase. In that construction, the pronoun receives nominative case.

(4-35) Agreement of verb with wrong but local nominative DP

das gab’s noch nie, dass ich später als du aufgestanden bist
that gave.it yet never that I later than you got.up be.2.sg
← dass ich später als du aufgestanden bin
← that I later than you got.up am
“That never happened before, that I got up later than you did.”

In the other 18 slips, however, the wrong nominative DP the verb agrees with is not local to the verb; in the following, I will refer to these instances as “long-distance agreement”.

The first cases I wish to discuss are those in which either a matrix verb agrees with the subject of an embedded clause or the verb of an embedded clause agrees with a matrix subject. Long-distance agreement is exemplified by the four slips in (4-36).

In (4-36a), the verb *angehen* “to start” of the topicalized conditional sentence agrees with the matrix subject. Note that this example might also be analyzed as a phonological anticipation; such an analysis, however, is not available for the other three errors in (4-36). In (b), the verb *sein* “to be” of the embedded sentence receives its [+plural]-feature from the subject pronoun of the matrix clause, while in example (c), the verb of the relative clause anticipates the agreement features of the matrix subject *ich* “I”. In the anticipation in (d), the situation is just the other way round: Here, the verb of the matrix clause (*wissen* “to know”) agrees with the subject of the embedded clause.
(4-36) *Long-distance agreement in speech errors*

a. wenn das Auto nicht angeh-**st**,  
   when the car not start-2.SG  
   wenn das Auto nicht angeh-t, schieb-st du  
   when the car not start-3.SG push-2.SG you

b. sie seh-en, dass **ich** selbst eher flachbrüstig **sind**  
   they see-PL that **I** myself more flat-chested be-PL  
   ← dass ich selbst eher flachbrüstig bin  
   ← that **I** myself more flat-breasted be-1.SG

c. für das ganze Tohuwabohu, **das** in unser Leben gekommen **bin**,  
   for the whole chaos that in our life come be-1.SG  
   dank-e ich ihm eigentlich  
   thank-1.SG I him actually  
   ← das ganze Tohuwabohu, das in unser Leben gekommen ist  
   ← the whole chaos that in our life come be-3.SG  
   “I actually thank him for all the chaos that has come into our life.”

d. **ich** wiss-t, dass ihr nicht Recht hab-t ← ich weiß, dass  
   **I** know-2.PL that you.PL not right have-2.PL ← I know.1.SG, that

Below, you will find a syntactic structure for the error (4-36b). Since the matrix as well as the embedded verb happen to agree with the matrix subject, we must assume that the agreement features of the matrix subject are copied twice. The same is, of course, true for the other three examples in (4-36); in all of them two verbs agree with one subject DP, be it the one of the matrix or the one of the embedded clause.
It is worth pointing out that long-distance agreement phenomena, as unusual as they may seem, are not unattested in spoken languages. Below, I will present some informative data from Godoberi and Tsez, two Daghestanian languages spoken in the northeastern part of the Caucasus which – according to Haspelmath (1999) – are not closely related to each other.
In Godoberi, matrix verbs may agree in gender and number with the absolutive (direct object) argument of a complement clause. Haspelmath (1999) refers to these constructions as “long-distance agreement”, pointing out that he uses the term in a pretheoretical sense, referring to a phenomenon that involves an unusually great distance between the agreement controller (i.e. the source of agreement) and the agreement target. He also points out that only two kinds of sentential complements, viz. converbals (used with the complement-taking verbs “begin” and “finish”) and infinitival complements, ever show long-distance agreement. Two examples involving infinitival complements are given in (4-37). As you can see, in both examples, the matrix verb e?uc‡ “to forget” is gender/number-marked for the absolutive neuter argument gyazeti “newspaper” of the embedded clause (CONT = contessive case).

\[(4-37) \text{Long-distance agreement in Godoberi (Haspelmath 1999:131)}\]

\begin{itemize}
  \item a. ¿ali-c‡’u gyazeti b-ax-i b-e?uc‡-a
    \textit{Ali} 
    \textit{CONT}  \[\text{paper.ABS n-take-INF}] \textit{n-forget-AOR}
    “Ali forgot to buy a newspaper.”
  \item b. ¿ali-c‡’u gyazeta-be r-ax-i r-e?uc‡-a
    \textit{Ali} 
    \textit{CONT}  \[\text{paper-PLABS PL.n-take-INF}] \textit{PL.n-forget-AOR}
    “Ali forgot to buy newspapers.”
\end{itemize}

A similar phenomenon is observed in Tsez (Polinsky & Comrie 1999). Tsez has four noun classes. Noun class (as gender in German) is a covert category which, however, shows itself in agreement prefixes on verbs, modifiers and demonstrative pronouns. An important restriction is that verbal agreement can only be triggered by a DP with absolutive case. In those cases where the absolutive argument of a verb is expressed by a sentential complement, Tsez offers two possibilities for agreement: either the matrix verb agrees with the sentential complement as a single complex NP, thus assigning it class 4, or the matrix verb agrees with the absolutive nominal inside the complements clause, as illustrated by (4-38a). In this example, class 3 agreement on the matrix verb can only be triggered by the absolutive DP magalu “bread” within the sentential complement (note that in Tsez, most proposition-attitude verbs (such as “to know”) take the experiencer argument in the dative). Example (4-38b) shows that Tsez also permits long-distance agreement out of
infinitival constructions: class 2 agreement on the predicative adjective *igu* “good” is triggered by the embedded absolutive argument *ka yat* “letter”.$^{97}$

$^{97}$ Similar cases of long-distance agreement (sometimes also termed “agreement climbing”) have been reported for Hunzib, another Daghestanian language (Van den Berg 1995), for Hindi-Urdu (Wunderlich 1994), and Chukchee (Spencer 1991).
(4-38) *Long-distance agreement in Tsez* (Polinsky & Comrie 1999:117,121)

a. eni-r uz‡-a magalu b-ac’-ru-λi b-iy-xo
   *mother-DAT* [boy-*ERG* bread.*ABS.3* CL3-*eat-*PSTPRT-*NMLZ*] CL3-*know-*PRES
   “The mother knows that the boy ate the bread.”

b. z‡a kayat cax-a y-igu zow-si
   *[this letter.*ABS.2* write-*INF*] CL2-*good* be-*PAST*
   “It was good to write that letter.”

I should stress that by citing the examples in (4-37) and (4-38), I do not wish to claim that the erroneous copy process in the German speech errors and regular long-distance agreement in Godoberi and Tsez are the same thing. In fact, they are definitely not. First of all, long-distance agreement in the two Daghestanian languages is restricted to certain syntactic constructions (in Tsez, for instance it is impossible if the embedded clause has an overt complementizer or if it contains a wh-word). Secondly, regular long-distance agreement is always agreement of a matrix verb with an embedded DP. This, however, is not true for the slips of the tongue, as is exemplified by the examples in (4-36).

Still, I take the Daghestanian examples to be illuminating in that they illustrate that verbal agreement in natural languages is not necessarily confined to a single clause. Rather, agreement features may be transferred across clause boundaries, and it is exactly this kind of transfer which also manifests in the speech error data.

The same restriction also holds for the second type of erroneous long-distance agreement I want to discuss. In this type of error, two clauses are conjoined in a coordination structure and the verb of the first conjunct mistakenly agrees with the subject of the second conjunct. That is, we are not dealing with a relation between a matrix and an embedded clause here; rather, the two clauses involved are of the same kind. I am referring to this special case of long-distance agreement as “anticipatory agreement”. There are only four such errors in my collection, two of which are given in (4-39). In (4-39a), two TnsPs are coordinated while in (b) two CPs are involved in the error.

(4-39) *Anticipatory agreement in speech errors*

a. weil er wütend *bin* und ich keine Lust hab’
   *because he angry* be-*1.SG* and I* no inclination have-*1.SG*
   ← weil er wütend ist
   ← *because he angry* be-*3.SG*

b. wir schuft-*est* und du vergnüg-st dich ← wir schuft-en
we graft-2.SG and you enjoy-2.SG yourself ← we graft-1.PL

A syntactic structure for the agreement anticipation in (4-39a) is given in (4-39a’). Presumably, we are dealing with a coordination of two TnsPs, with the second conjunct being adjoined to the first. In the error, the agreement feature of the second conjunct subject is copied onto both verbs.98

(4-39) Agreement copy in example (4-39a)

Interestingly, anticipatory agreement, too, is attested as being a regular mechanism in a number of spoken languages. Below, I present some examples from the two Papuan Highland languages Tairora and Fore.

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98 In the tree structure (4-39a’), BP stands for Boolean Phrase, the head of which may be occupied by Boolean operators such as und “and”, oder “or”, and sowie “as well as”. For further aspects of the syntax of coordination cf. Hartmann (2000).
In Tairora (Vincent 1973; McKaughan 1973), for instance, first conjunct verbs in a coordination structure which have an actor different from the actor of the second conjunct verb require not only a (portmanteau) suffix which indicates person and number of their own actor as well as tense; they also require an anticipatory actor suffix, i.e. a suffix which specifies person and number of the actor of the following verb. Therefore, in (4-40a), the suffix -manta indicates that the actor of the second conjunct is first person singular while the suffix -ro in (4-40b) makes clear that the third person singular actors of the two conjuncts are not the same. In the following examples, all anticipatory actor suffixes are in bold-face.

(4-40) Anticipatory agreement in Tairora

a. t-i-manta ir-una-ra
   *say*-3.SG.PAST-1.SG *hear*-1.SG.PAST-FOC
   “He spoke and I heard.” (Vincent 1973:572)

b. na-iba-ro bi-ro
   *eat*-3.SG.PAST-3.SG *go*-3.SG.PAST
   “He1 ate and he2 left.” (McKaughan 1973:592)

The different-actor dependent verbs of Fore (Scott 1978) are somewhat more complex in that they require the presence of the conjoiner morpheme (or dependent verb suffix) -ki. In Fore, marking for switch-reference is achieved through the use of a specific pronominal subject morpheme which indicates the subject of the verb, the tense of the verb, and also that the subject of the following conjoined verb will be different. This switch-reference subject morpheme is followed by the conjoiner morpheme -ki which in turn is followed by another suffix which anticipates the subject of the next clause. The anticipatory agreement suffix -nisì in (4-41a) e.g. indicates that the subject to follow is second person dual. The more complex example in (4-41b) illustrates that in fact every verb containing a conjoiner morpheme must also include an anticipatory subject marker.99

(4-41) Anticipatory agreement in Fore (Scott 1978:121,125)

a. kana-isí-ki-nisì a-ka-’kubu-a:s-e
   “They(dual) will come and you (dual) will see it.”

99 Similar clause chaining strategies are observed in Awa (Loving & McKaughan 1973) and Hua (Haiman 1980). Cf. Foley (1986:175ff) for a comprehensive survey of clause chaining in Papuan languages.
b. kana-a:-ki-ni’ ka-ka-i-ki-na’
   come-2.SG.FUT-CONJ-3.PL 2.SG.OBJ-see-3.PL.FUT-CONJ-2.SG
   u-wai-mu-’kubu-a:N-e
   say-3.PL.OBJ-give-FUT-2.SG-IND
   “When you come and they see you, you shall tell (it) to them.”

Actually, the Papuan examples more closely resemble the speech error data than did the Daghestanian examples. That is, the structural conditions for anticipatory agreement are the same for the regular and the erroneous process. Moreover, agreement features are always anticipated but never perseverated in coordination constructions. Still, it is noteworthy that
in the speech errors, anticipatory agreement overrides regular subject agreement while in the Papuan examples, anticipatory agreement supplements regular subject agreement, i.e. in Tairora and Fore, the first conjunct verbs are inflected for their own subject as well as for the subject of the second conjunct. Such double marking is not observed in the errors; that is, there is no error like e.g. *wir schuft-en-st und du vergnüg-st dich* ‘we graft-PL-2.SG and you enjoy-2.SG yourself’.

In the preceding two subsections, I have been considering processes of feature copy in subject-verb agreement errors. We have seen that in the German errors, verbs may not only exhibit defective agreement with a local DP - be it part of a complex subject DP or part of an object phrase - but also with the subject of another clause. Agreement of a verb with its object is, of course, also attested in many spoken languages. But some of the long-distance error patterns, too, have interesting parallels in various natural languages. For instance, long-distance agreement of a matrix verb with an argument of an embedded clause is attested in some Daghestanian languages while anticipatory agreement of a first conjunct verb with a second conjunct subject is observed in some languages spoken in Papua New Guinea.

In the following subsection, I will be concerned with the interaction of syntactic transformations and agreement feature copy. In particular, I will be considering the question if the DM idea of post-syntactic implementation of agreement nodes is supported by the error data.

### 4.4.3 Transformations and Feature Copy

In section 1.2.2, I have already discussed some psycholinguistic studies which are concerned with the psychological reality of syntactic transformations. Fay (1980a,b), for instance, cites a number of errors which he takes to be best analyzed as the result of the wrong or non-application of a transformational rule. Consider e.g. the following slip:

(4-42) **Non-application of a transformational rule**

```
Look at those clouds are moving [how fast]
← Look at how fast those clouds are moving  (Fay 1980b:114)
```
The above error is analyzed by Fay (1980b) as involving an incorrect decision not to apply a rule. In particular, wh-fronting has not applied so that the wh-phrase *how fast* appears in
its deep structure position. Fay claims that the position of the wh-phrase in the error follows naturally from a transformational explanation, since an element not moved by a transformation must remain in its deep structure position.

Syntactic transformations and their interaction with slips of the tongue are the topic of this subsection. I will, however, not be dealing with transformational errors of any kind. Rather, I am going to investigate the interplay of syntactic movement and agreement feature copy. In the model of language production sketched in section 4.1 (Garrett 1975ff; Levelt 1989), agreement is assumed to be computed at the level of grammatical encoding (functional level). At this level, lemmas are retrieved from the mental lexicon (depending on the message the speaker wants to convey) and are assigned to slots in a hierarchical structure. That processing stage is followed by the stage of phonological encoding at which the phonological form of a sentence is spelled out.

So far, as we have seen, the course of processing is very well compatible with DM ideas, since in DM, too, the assignment of phonological forms (Vocabulary items) follows all processes of grammatical encoding. Pictures diverge, however, with regard to the precise locus of agreement computation. Within many syntactic and psycholinguistic theories (Chomsky 1981; Kempen & Hoenkamp 1987; Levelt 1989), it is assumed that agreement is computed during the construction of the hierarchical structure. But this is not true within the DM framework. Remember that in DM, late insertion of agreement nodes is assumed. Agreement nodes are adjoined to functional nodes at the level of Morphological Structure, that is, after syntactic operations have taken place but before Vocabulary insertion is executed.

This assumption has important consequences for the interpretation of speech error data. In particular, a DP which is local to a verb at deep structure may be separated from the verb by a syntactic movement operation, i.e. it is no longer local to the verb when agreement feature copy takes place at Morphological Structure. Linear proximity of a verb and a DP is, of course, not a prerequisite for agreement processes to take place. For SVA-errors, however, my prediction is that whenever the verb happens to agree with a wrong DP, the agreement error is due to the fact that the wrong DP is linearly closer to the verb at surface structure than the ‘true’ subject DP.

Unfortunately, there are only a few errors in my corpus which are informative in that context. First of all, 61 out of the 82 SVA-errors occur in embedded clauses in which no XP-movement has applied (except for movement of the subject DP from SpecvP to SpecTnsP). As is well-known, word order in German embedded clauses (SOV) is the
underlying word order. Therefore, in example (4-43a), the plural DP *Vergebärdler* “slips of the hand” which is a genitive complement within the subject DP is local to the verb at deep and at surface structure, i.e. at both levels, there is no other DP that is (linearly) closer to the verb. And even in a derived matrix clause (which would read *ein Teil der Vergebärdler sind dadurch entstanden*), the plural DP *Vergebärdler* would still be local to the verb. Only the former observation but not the latter is true for the agreement error in (4-43b) in which the verb agrees with the plural DP *Linguistiksätze* “linguistic sentences” which is part of an object PP. In this example, the singular demonstrative pronoun *das* “that” would be closer to the verb than the plural DP *Linguistiksätze* in the corresponding matrix clause *das sind mit Linguistiksätzen ab und zu so*.

(4-43) **SVA-errors in embedded clauses**

a. dass *ein Teil der Vergebärdler dadurch entstanden sind*, äh, ist that *a part of the slip of the hand.PL from that resulted are, er, is*

b. dass *das mit Linguistiksätz-en ab und zu so sind*

   *that that with linguistic.sentence-PL from time to time like that are*

   ← dass das ... ab und zu so ist

   ← *that that ... from time to time like that is*

Moreover, there are six instances of matrix clause errors in my collection in which the error-triggering DP is local to the verb before and after XP movement has taken place. In (4-44a), the verb agrees with a plural DP inside the subject DP and in (b), the verb agrees with a topicalized object DP.

(4-44) **The agreement triggering DP is local at surface and deep structure**

a. *ein Ende der Unruhen sind* nicht abzusehen

   *an end of the disturbances are not in sight*

   ← *ein Ende der Unruhen ist nicht abzusehen*

   ← *an end of the disturbances is not in sight*

b. *die unschönen Sachen vergess-en ich, vergess-e ich*

   *the not.nice things forget-PL I forget-1.SG I*

   *meist ziemlich schnell*

   *mostly quite fast*

   *“Mostly, I forget the unpleasant things quite fast.”*
One particularly interesting property of the error in (4-44a) is that the DP which passes on its agreement feature to the verb is *more* local, i.e. adjacent, to the verb at surface structure. The deep structure of sentence (a) is *ein Ende der Unruhen nicht abzusehen sind*. In (4-44b), the plural DP *die unschönen Sachen* is adjacent to the verb at deep and surface structure. The deep structure of sentence (b) reads *ich meist ziemlich schnell die unschönen Sachen vergessen*. In the syntax, both verbs raise to Tns and then to C; in (a), the subject subsequently raises from SpecTnsP to SpecCP, while in (b), it is the direct object which moves to SpecCP. It is only after these movement operations have taken place that agreement nodes are implemented and features are copied onto AgrS.

Even more illuminating are, of course, those cases in which the erroneous agreement source is not local at deep structure - i.e. another DP with different number specification intervenes between that DP and the verb at that level - but is proximal to the verb at surface structure. In my corpus, there are seven such cases. Consider e.g. the error in (4-45a). At surface structure, the PP which contains an enumeration of three plural nouns is adjacent to the verb *suchen* “to look for”. At deep structure, however, the singular DP *den Weg* “the way” appears between the subject phrase and the verb (*eine endlos lange Schlange von Transportern, Lastwagen und anderen Fahrzeugen den Weg hinaussuchen*). The slip in (4-45b) has different characteristics. Note that this is an embedded clause in which XP-movement (extraposition) has applied. Due to the extraposed relative clause, the object DP *Sachen* “things” is proximal to the verb at surface structure. At deep structure, this relative clause separates the DP and the verb and therefore, the singular DP *Arbeit* “work” is closest to the verb at that level (*weil da öfters über Sachen, die für seine Arbeit wichtig sind, geredet wurden*).

(4-45) *Verb agrees with local DP on surface structure*

a. *eine endlos lange Schlange von Transportern, Lastwagen und anderen Fahrzeugen such-en den Weg hinaus*

   ← *eine endlos lange Schlange von Transportern ... such-t ...*

   ← *an endless long line of transporters ... look.for-3.SG ...*

b. *weil da öfters über Sachen geredet wurden, die für seine Arbeit wichtig sind* ← *weil da ... geredet wurde*

   *because it quite.often about things talked were which for his work important are* ← *because it ... talked was*
c. What things are this kid, is this kid going to say correctly?
(Levett & Cutler 1983:206)

An English slip with similar properties is given in (4-45c). In that utterance, wh-movement of the direct object what things has applied. Due to that movement operation, the auxiliary to be appears adjacent to the plural noun things. At deep structure, however, adjacency of the agreement source and the auxiliary is not given, the deep structure of that sentence being this kid are going to say what things correctly.\(^{100}\)

Therefore, the prediction made above is borne out. The errors cited in (4-45) - and to a lesser extent the one given in (4-44a) - suggest that agreement is computed after syntactic operations have been executed. As argued above, this is exactly the view taken by DM where agreement nodes are assumed to be inserted at the postsyntactic level of Morphological Structure.

There are only two slips in my corpus which point to the opposite direction, that is, slips in which the DP transmitting its agreement feature is local to the verb only at deep structure. Consider, for instance, example (4-46a). Once again, we are dealing with an extraposed relative clause here. The matrix verb sein “to be” agrees with the subject er “he” of the relative clause which is local to the verb only at deep structure (wenn zwanzig Sprachen, die er untersucht hat, so ist).\(^{101}\) In (4-46b), the comparative phrase wie du “as you” has been extraposed out of an object DP, i.e. the underlying structure of that sentence reads weil sie fast wortgetreu dasselbe wie du gesagt hast. Therefore, the pronoun du “you” is proximal to the verb only at deep structure.

(4-46) Verb agrees with local DP on deep structure

a. wenn zwanzig Sprachen so ist, die er untersucht hat
   when twenty languages like that is which he investigated has
   \(\leftarrow\) wenn zwanzig Sprachen so sind
   \(\leftarrow\) when twenty languages like that are

b. weil sie fast wortgetreu dasselbe gesagt hast wie du,

\(^{100}\) In two slips from my collection, the DP that is local to the verb is a different one at deep and at surface structure. However, the important difference to the errors given in (4-45) is that both local DPs are plural. Consider, for example, the following error: die Höhe ihrer Unterhaltszahlungen richt-en sich nach der Höhe ihrer Einkünfte ‘the size of your maintenance payments depend on the size of your income’ where the plural noun Unterhaltszahlungen “maintenance payments” is adjacent to the verb at surface structure but the plural noun Einkünfte “income” is adjacent to the verb at deep structure.

\(^{101}\) Note that (4-46a) might also be analyzed as a blend of the two competing frames wenn zwanzig Sprachen so sind ‘when twenty languages like that are’ and wenn es in zwanzig Sprachen so ist ‘when it in twenty languages like that is’. 
because she almost verbatim \textit{the same said} have-2.SG as you,
dasselbe gesagt hat
\textit{the same said} has

The remaining four SVA-errors in matrix clauses are blends which are not informative in the present context, since in blends, no triggering local or non-local DP is involved.

I therefore conclude that the local SVA errors in my corpus - except for the ones given in (4-46) - are compatible with DM assumptions.\footnote{Remember that different structural prerequisites hold for the long-distance agreement errors from my corpus discussed in subsection 4.4.2. Apparently, long-distance agreement is possible only when the agreement triggering DP has a certain case specification, viz. nominative case. As we have seen, the same is true for regular long-distance agreement in the Daghestanian languages which is observed only with absolutive arguments.} That is, the verb tends to erroneously agree with a DP which is local to it either at deep and at surface structure or at surface structure only. We may therefore assume that the implementation of agreement nodes is in fact executed only after syntactic movement operations have taken place, i.e. at the level of Morphological Structure. Due to the scarcity of relevant errors, however, one should acknowledge that the above slips do not constitute particularly strong evidence for or against one or the other hypothesis concerning the locus of agreement implementation.

The influence of surface adjacency on SVA-errors was also assessed in an experiment conducted by Vigliocco & Nicol (1998). In a first experiment, in which participants were presented the familiar Bock & Miller-style sentence preambles (e.g. \textit{the helicopter for the flights}), Vigliocco & Nicol were able to replicate the asymmetrical distribution of errors following singular vs. plural local nouns reported in the earlier studies. In a second experiment, however, participants were asked to make up questions from the material used in experiment 1. That is, they saw, for example, the adjective \textit{safe} and then the phrase \textit{the helicopter for the flights} and their task was to form the question \textit{Is/ was the helicopter for the flights safe?}

Interestingly, the frequency and distribution of agreement errors in the two tasks were similar although in the second experiment - due to subject-auxiliary inversion - the verb was not local to the plural noun. The fact that the participants tended to produce proximity concord errors like e.g. \textit{Are the helicopter for the flights safe?} suggests that indeed linear proximity of the local noun to the verb does not matter. Therefore, Vigliocco & Nicol hypothesize that the errors arise as a consequence of syntactic proximity, i.e. deep
structure proximity. A surface structure representation for the erroneous response cited above is given in (4-47):
According to DM, the auxiliary which is base-generated under Tns raises and adjoins to C in the syntax and AgrS will be inserted as sister node of Tns at MS. Obviously, the plural noun *flights* is not local to AgrS when copy of the agreement feature takes place. This noun is only local to the agreement node if we assume that agreement is actually computed before Tns-to-C movement applies.

Therefore, the agreement errors elicited in the second experiment by Vigliocco & Nicol (1998) are not consistent with the spontaneous speech error data from my corpus. One may, however, question the validity of the experimental paradigm. First of all, while the errors obtained in the sentence completion task (experiment 1) resemble English errors from spontaneous speech (cf. subsection 2.2.1.2), evidence for spontaneous SVA-errors occurring in producing yes/no-questions is scanty if not non-existent. Possibly, in the experimental setting, participants use an agreement strategy that is different from the online strategy used in spontaneous speech. Since the participants knew that they were to produce a question, we may, for example, hypothesize that they were already computing an inflected auxiliary while the sentence preamble appeared on the computer screen.
(duration: one second) and that they subsequently used that auxiliary in question formation after the preamble disappeared. That is, they were in fact computing the auxiliary for the declarative sentence and not for the syntactic question structure given in (4-47).

Consequently, the errors elicited in Vigliocco & Nicol’s second experiment do not represent unambiguous counterevidence to the DM analysis sketched above for the spontaneous speech errors. I therefore conclude that in the light of the slip data, late insertion of Agr nodes at MS and subsequent feature copy can and should be assumed.

### 4.5 Local Licensing of l-Nodes in Language Production

My soul will rejoice when your lips speak what is right.  
(Proverbs 23,16)

Traditionally, many theories of (morpho)syntax emerging from Chomsky (1981) and subsequent work rely on the assumption that syntactic categories such as N, V, and A - each possibly being a combination of features of a more abstract sort (Chomsky 1970) - are labels of items in the lexicon and that these categories are also essential in building syntactic tree structures following an X-bar scheme. That is, nouns which are inserted into a terminal node project a noun phrase, verbs project a verb phrase, and so on.

As already pointed out in chapter 3, Distributed Morphology departs from this view in that words are not equated with syntactic terminals. Rather, phrase markers are constructed freely out of a set of universal abstract features such as tense, number, person, definiteness and so forth. Consequently, different argument structures are not determined by properties of lexical items - since presumably there is no such such thing as a “lexical item” within the computational system - but rather by different syntactic configurations.

In addition to that, Harley & Noyer (1998a,b) investigate the interesting possibility that categorial features are not amongst the features drawn from the universal set in order to enter the computational system. They adopt the view that syntactic terminals are of two basic types. The first type of terminal node consists of feature bundles for which the speaker has no choice regarding Vocabulary insertion; these are called “f-nodes”. For the second type, which they call “l-nodes”, a speaker’s choice of Vocabulary item is not constrained in such way. Most importantly, l-nodes are not specified for syntactic category; that is, there is only one type of l-node whose categorial status is determined by
its syntactic context. l-nodes are said to be licensed in a given syntactic context, i.e. they are locally licensed by c-commanding f-nodes.

In subsection 3.2.1, I have already given an illustration of that assumption involving the different uses of the verb *sinken* “to sink”. The same line of reasoning can be applied to the (acategorial) root *explode* (adopted from Harley & Noyer (1998a)). In any case, [root(explode)] will be inserted into an l-node which heads an LP, this LP being locally licensed by a light verb. In its transitive use (as in *The terrorists exploded the embassy*), the l-node combines with a *CAUSE* morpheme in the head of the light verb phrase. The specifier of the vP is filled by an external argument while the complement of LP is filled by a direct object DP. In the intransitive unaccusative use (as in *The embassy exploded*), however, the light verb morpheme heading little v must be something like *BECOME*. Choosing *BECOME* as the head of vP will preclude the possibility of having an external argument in SpecvP (since *BECOME* does not select an external argument). Rather, *embassy* is an internal argument of the l-node. The chart in (4-48) displays the different choices for the available slots in a vP-structure. It also shows that for a verb like *give*, we must assume that all three DP slots are filled:103

(4-48) *Choices for slots in vP/LP-structure*

<table>
<thead>
<tr>
<th>Verb</th>
<th>SpecvP</th>
<th>v</th>
<th>SpecLP</th>
<th>CompLP</th>
</tr>
</thead>
<tbody>
<tr>
<td>explode (tr)</td>
<td>DP</td>
<td><em>CAUSE</em></td>
<td>Ø</td>
<td>DP</td>
</tr>
<tr>
<td>explode (intr)</td>
<td>Ø</td>
<td><em>BECOME</em></td>
<td>Ø</td>
<td>DP</td>
</tr>
<tr>
<td><em>give</em></td>
<td>DP</td>
<td><em>CAUSE</em></td>
<td>DP</td>
<td>DP</td>
</tr>
</tbody>
</table>

In this section, I will consider the consequences of abandoning lexical categories from a psycholinguistic point of view. As pointed out earlier (section 4.1), within psycholinguistic models of language production, it is assumed that lemmas, i.e. those items which are selected from the lexicon at the functional level in a first step of lexical retrieval, bear a category label. As we will see, abandoning these labels has important implications for a theory of language production.

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103 Harley & Noyer (1998a) point out that, since linear relations play no role in the syntax, there can be no distinction between an LP with just a complement and an LP with just a specifier, the sisterhood relation between the head and its single argument being identical in both cases after Merge has applied. Consequently, they note all these examples as having a complement only.
In the following, I will first have a look at how insertion of Vocabulary items into appropriate slots is achieved (subsection 4.5.1). We will see that Vocabulary items must be specified for certain context features in order to allow for their appropriate assignment to terminal nodes. In subsection 4.5.2, I am going to present some speech error data which receive a straightforward explanation under the assumptions that roots are acategorial in nature. However, there are also some problematic cases; these will be subject to discussion in subsection 4.5.3.
4.5.1 Local Licensing of Vocabulary Items

Following the assumption that terminal nodes as well as Vocabulary items lack categorial information, there must, of course, be another way to constrain the insertion of Vocabulary items into terminal nodes in a principled way in order to prevent them from appearing in inappropriate syntactic contexts (as e.g. in *They cat Mary, where the item /kQt/ appears in an inappropriate context). In DM, this is achieved by listing appropriate syntactic environments for each Vocabulary item. That is, a Vocabulary item will come with subcategorization information specifying the possible syntactic contexts in which it may appear. Whenever a Vocabulary item appears in a syntactic context that meets its subcategorization requirements, it is said to be licensed.

Harley & Noyer (1998a) suggest that a Vocabulary item may be specified for \([±v]\), \([±be]\), \([±cause]\), \([±DP1]\), and \([±DP2]\), at least. They also point out that an item may be underspecified for a given syntactic possibility, permitting it to appear with or without that particular syntactic element. For instance, an item which is not specified for \([±v]\) may appear in a context where it is licensed by a light verb or it may appear in an l-node where it is licensed by a determiner. This is true, for example, for the element shock which may be licensed by a light verb as well as by D°. Some implications between features are straightforward: if a Vocabulary item is specified for \([-v]\) then obviously it may not be specified for \([+cause]\). Moreover, while a \([+be]\) item is necessarily non-eventive, a \([-be]\) item may be further specified for type of event with \([±cause]\).

Now, what consequences do these differing featural specifications have for the traditional notion of categories? Obviously, the licensing environment for a verb is \([+v]\) (or possibly \([+Asp]\) for continuative forms) with whatever further specification. In contrast, the licensing environment for a noun (or a nominalization) is \([-v]\), implying that the closest licenser is a determiner. For instance, the element arrive is specified for the environment \([+v]\), \([+DP]\), \([-cause]\) (indicating that there is no agent DP in Spec\(vP\)), while an element like cat is specified for a \([-v]\) environment only.

These are the simple cases, of course. There are also some unclear issues and a particular problematic one concerns the licensing of the elements formerly known as adjectives. Harley & Noyer take elements such as sink and open to be characterized by the same set of features, viz. \([±v]\), \([±DP]\), and \([±cause]\). This assumption, however, leaves unexplained why in a non-verbal environment, open is realized as an adjective while in the
same environment, *sink* is realized as a noun.\textsuperscript{104} The authors admit that this question is a thorny one; still, they stick to the “intuitively wrong” assumption that the two elements do not differ in their feature specification.

Possibly, this problem can be resolved using a proposal brought forward by Corver (1991, 1997). As is well known, a functional head analysis has been successfully applied in recent years to the verbal and nominal domain. As for the verbal system, it has been proposed that the lexical VP projection is included within a functional projection (Pollock 1989; Chomsky 1995) - be it vP, AgrP, or TnsP - while the nominal system has been reanalyzed as being a projection of the determiner which takes a lexical NP as its complement (Abney 1987). The general scheme for the functional head analysis is the following: [FP Spec [F: F LP ]](where F stands for “functional” and L stands for “lexical”).

Focusing on the internal syntax of Dutch adjective phrases, Corver concludes that there is strong evidence for extending the functional head analysis to the adjectival system. That is, degree words which traditionally have been analyzed as occupying the specifier position of AP (Jackendoff 1977) should rather be interpreted as heading a functional degree phrase (DegP).\textsuperscript{105} Consequently, using the scheme given above, the internal structure of the DegP is: [DegP Spec ![Deg′ Deg ![AP A XP ]]] in which the specifier position of DegP can be occupied by various elements qualifying the degree word. Consider the two Dutch examples given in (4-49ab) and their syntactic structure given in (4-49c):

(4-49) \textit{Examples illustrating the structure of DegP (Corver 1997:292)}

\begin{itemize}
\item[(a)] twee centimeters te lang\textit{two centimeters too tall} \item[(b)] veel minder lang dan Peter \textit{much less tall than Peter} \item[(c)]
\begin{itemize}
\item DegP
\item Spec
\item Deg′
\end{itemize}
\end{itemize}

\textsuperscript{104} Following Halle & Marantz (1993) and Marantz (1997), Harley & Noyer (1998a) assume that in fact pairs like *sink*-sinking or *arrive*-arrival reflect single Vocabulary items which are related in a post-syntactic readjustment component. This readjustment component performs a variety of functions including not only the partial modification of stems (as in destroy-\textit{destruction}; cf. subsection 3.2.4) but also the addition of morphemes which are not present in the syntax.

\textsuperscript{105} Corver (1997) also argues that quantifier-like degree items behave differently from other degree words in various respects. He therefore claims that besides DegP, a functional quantifier phrase (QP) projection should be distinguished within the functional domain of the extended adjectival projection.
In his extensive study, Corver (1997) covers a broad variety of examples involving head-to-head movement within DegP, extraction from DegP, distribution of adverbs, and so on. In the present context, however, it suffices to note that, following Corver’s analysis, we may conclude that - in a line with v and D - the functional head Deg° can also be a licensing element for l-nodes and that the licensing environment for Vocabulary items may also be specified for [±deg]. I assume the following implication: a Vocabulary item that is specified for [+v] may not be specified for [+deg], but a Vocabulary item that is specified for [-v] can either be [-deg] (i.e. a noun-like element) or [+deg] (i.e. an adjective-like element).

Consequently, in non-verbal environments, we are dealing with different licencers for the above mentioned elements open and sink, Deg for the former and D for the latter. I assume that the licensing environment for the Vocabulary item open is [-v], [+deg], [+DP] (i.e. open is locally licensed by a degree element and subcategorizes a complement DP) while the appropriate environment for sink is [-v], [-deg] (i.e. sink may be locally licensed by a determiner). In the latter case, insertion of the nominalizing suffix -ing is also required. In the next subsection, I am going to argue that this distinction also allows for an elegant explanation of some of the speech error data.

4.5.2 Licensing and Spell-out of Roots in Speech Errors

There is a number of quite intricate speech errors which can be accounted for in a straightforward way if we stick to the DM assumption that roots do not have category labels and that spell-out of roots as well as the insertion of suffixes crucially depend on the licensing environment in which a given root appears. That is, a root which participates in a speech error - be it in an exchange, anticipation or perseveration - may change its phonological form in its new position (due to a different licensing element) and it may trigger the insertion of a suffix different from the one required by the replaced element.
I will consider phonological readjustment of roots first; three examples illustrating this phenomenon are given in (4-50). In (4-50a), [root\textit{schreib}] “write” is perseverated and appears in a slot where it is licensed by a determiner. In this licensing environment, a readjustment rule applies which changes the root to \textit{Schrift}. The facts are quite similar in (4-50b) except for that we are dealing with an anticipation here: after the error has taken place, [root\textit{zieh}] “drift”, too, appears within the domain of D (an empty determiner) and therefore changes its phonological form to \textit{Zug} (umlaut being triggered by the plural morpheme).
(4-50) *Phonological readjustment triggered by new licensing environment*

a. schreib-t man das mit Binde-*schrift* ☐ mit Binestrich
   write-3.SG one that with connect-writing ☐ with connect.line
   “Do you write that with a hyphen?”

b. Rauch-*züg-e, äh, Rauch-wolk-en zieh-en Richtung Westen
   smoke-drifting-PL, er, smoke-clouds-PL drift-3.PL direction West
   “Clouds of smoke drift westwards.”

c. the gardener has to *die* the **pulled up** flowers
   ☐ to pull up the dead flowers  (Fromkin 1973a:31)

Finally, in the English slip given in (4-50c), two roots are exchanged. Interestingly, the phonological shape of both of them changes. [root_{die}] lands in a position licensed by a light verb in which no phonological readjustment rule applies; [root_{pull up}] is shifted to a slot where the root is spelled out in its participial form, just as required by the [+deg] licenser. The structures below illustrate the licensing environments for the slips in (4-50a) and (c).

(4-50) *Licensing environments for the examples (4-50a) and (c)*

```
a'. PP
   |     
   P    DP
   [mit]
   D     LP
   Ø      L
   L      L
   [root_{bind}] [root_{schreib}]
```
The Vocabulary items that realize the error elements in (4-50) are given in (4-51), these items also indicate that the elements may be inserted into various different licensing environments. Consider, for instance, the Vocabulary item /_raib/ in (4-51a): this item may be inserted in a [+v] environment (remember that [+v] is [-deg] by implication) but only in case the light verb head is filled by a CAUSE morpheme, as e.g. in Claus schreibt einen Brief “Claus is writing a letter”. It may also be inserted in a [-v][-deg] environment (which, of course, is unspecified for [cause]), as in die Schrift “the writing”. And finally, it may also appear in a [-v][+deg] context, as in eine schriftliche Einladung “a written invitation”.106

The same is true for the Vocabulary item in (4-51b), the only exception being that in a [+v] environment, the head of vP may contain either a CAUSE morpheme (i.e. it is further specified [+cause], as in Peter zieht an dem Seil “Peter pulls the rope”) or it may contain a BE morpheme (i.e. it is further specified for [-cause] and [+be], as in Die Wolken ziehen “The clouds drift”). The Vocabulary item /dal/, too, may appear in various environments (4-51c). In a [+v] environment, however, it is only licensed when v is filled by a BECOME morpheme, as in The victim died. It is this very restriction which makes the slip in (4-50c)

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106 In passing, I wish to point out that - as often enough - things are probably more intricate than this analysis may suggest. In particular, there are at least two other related phonological forms for [root_{schreib}] which may be inserted in a [-v][-deg] environment, one involving the nominalizing suffix -er (der Schreiber
quite awkward, since in that error, the element *die* appears in a [+cause] environment after the exchange has taken place.\textsuperscript{107}

Finally, the Vocabulary item in (4-51d) is not licensed in a [-v][-deg] environment, that is, there is no nominalization of *pull up*. When appearing in a [+v] context, the light verb head must be filled by a CAUSE morpheme.

(4-51) *Vocabulary items for error elements in (4-50)*

\begin{enumerate}
\item \([\text{root}_{(schreib)}] \leftrightarrow /_raib/ \\quad \text{(licensing environment:} [\pm v], [\pm \text{deg}], [+\text{cause}])
\item \([\text{root}_{(zieh)}] \leftrightarrow /tsi:/ \\quad \text{(licensing environment:} [\pm v], [\pm \text{deg}], [+\text{cause}], [+\text{be}])
\item \([\text{root}_{(die)}] \leftrightarrow /daI/ \\quad \text{(licensing environment:} [\pm v], [\pm \text{deg}], [-\text{cause}])
\item \([\text{root}_{(pull \; up)}] \leftrightarrow /pU1 \sqrt{p}/ \\quad \text{(licensing environment:} [\pm v], [+\text{deg}], [+\text{cause}])
\end{enumerate}

Above, I have already mentioned that some of these Vocabulary items undergo phonological readjustment in certain licensing environments. For instance, in the perseveration in (4-50a), the Vocabulary item /_raib/ is shifted from a [+v] environment to an environment in which it is licensed by a determiner. In the latter environment, the readjustment rule given in (4-52a) will apply at the level of Phonological Form. A similar change of environment is observed with respect to the Vocabulary item /tsi:/ in the anticipation error cited in (4-50b); the relevant readjustment rule is given in (4-52b). In the exchange in (4-50c), a different kind of rule applies. The rule in (4-52c) does not affect the phonological shape of the stem; rather, it adds a feature to the featural description of the terminal node. Consequently, the Vocabulary item /pU1 \sqrt{p}/ will be spelled out in its participial form in a [+deg] environment. With respect to the Vocabulary item /daI/, the situation is different. After the error has occurred, this element appears in an environment in which it is not affected by a readjustment rule.

(4-52) *Readjustment rules for the speech errors in (4-50)*

\textsuperscript{107}Adopting ideas of Generative Semantics, the combination of the atomic predicates *cause* and *die* - i.e. CAUSE and [root\textsubscript{(die)}] - should give rise to the insertion of the Vocabulary item *kill*, since it is exactly the combination of these two predicates that paraphrases the meaning of *kill* (Katz 1970; Lakoff 1971).
a. \_raib/ → \_rift/ / [-v][-deg]

b. /tsi:/ → /tsu:g/ / [-v][-deg]
c. /pU1√p/ → /pU1√p/ / [+deg] [+part]

Apparently, the (extended) functional head analysis in combination with the notion of local licensing of l-nodes allows for a straightforward explanation of the speech error data in (4-50). Irrespective of the licensing environment, there is only one Vocabulary item for a given root. This item, however, may be subject to the application of a readjustment rule at Morphological Structure or Phonological Form.

I now turn to those speech errors in which the post-error environment of a shifted element triggers the insertion of a suffix that is different from the one required by the replaced element. In subsection 2.4.2, I have termed that phenomenon “morphological accommodation”. Four such slips are given in (4-53).

In the root exchange (4-53a), the element befriedig “satisfy” appears with the appropriate nominalizing suffix -ung after the error has taken place, i.e. the ungrammatical sequence seine Befriedig-nis zu bedürfen does not surface. Since the error in (4-53b) is self-corrected by the speaker, we are not in a position to decide if we are dealing with an anticipation or (part of) an exchange (Stemberger’s (1989) error category “incomplete”). The interesting fact about this slip is that [root_{farb}] “colour” appears with the adjectival ending -ig, this ending not being part of the intended utterance.

(4-53) *Choice of appropriate suffix in speech errors (morphol. accommodation)*

a. er war nur darauf aus, seine Befriedig-ung zu bedürf-en
   *he was only interested in his satisfy-INF to need-INF*
   ← sein Bedürf-nis zu befriedig-en
   ← *his need-N to satisfy-INF*
   “He was only interested in satisfying his need.”

b. das ist aber eine farb-ig-e, äh, eine schön-e Farbe
   *that is really a.f colour-ADJ-f, er, a.f nice-f colour(f.)*

c. I think it’s care-ful to measure with reason
   ← it’s reasonable to measure with care (Fromkin 1973a:31)

d. people still see Libya as a nation-al danger, as a danger-ous nation

In the English exchanges in (4-53cd), too, the appropriate adjectival suffixes are inserted. While in (4-53c), reason takes the suffix -able, care derives its adjectival form by
attachment of the suffix -ful. And in (4-53d), spell-out mechanisms insert the suffix -al in a position that was meant to host the adjectival suffix -ous.

Traditionally, it has been assumed that suffixes subcategorize certain lexical categories; the German suffix -ig as well as the English Suffix -ful, for instance, were taken to subcategorize [+N] elements. In the DM framework, however, category labels are no longer available. We must therefore assume that in the examples in (4-53), the insertion of the respective suffixes crucially depends on the licensing environments, [-v][-deg] in (a) and [+deg] in (bcd). Moreover, suffixes must have certain subcategorization properties, since obviously neither the suffix -ig nor the suffix -ful, for example, attach to all elements in a [+deg] environment (and neither is it true that they attach to all traditional [+N] elements). Consequently, the Vocabulary items for the suffixes do not only indicate the licensing environment in which they are inserted but also to what roots they attach. 108

In (4-54), I supply morpheme insertion rules which determine the appearance of the relevant suffixes in the examples in (4-53).

(4-54) Morpheme insertion rules

a. Insert /-uN/ / X + [-v][-deg]
   (where X = [root_{befriedig}], ...)

b. Insert /-Ig/ / X + [+deg]
   (where X = [root_{farb}], ...)

c. Insert /-fUl/ / X + [+deg]
   (where X = [root_{care}], [root_{beauty}], ...)

d. Insert /-l/ / X + [+deg]
   (where X = [root_{nation}], ...)

Suffixes like the ones mentioned in (4-54cd) are in competition with each other as well as in competition with all other suffixes that are specified for insertion in a [+deg] environment. It is only the additional specification of the context X which guides the selection of one suffix over the other.

In the light of these remarks, let us briefly reconsider the error in (4-53d). In this slip, [root_{nation}] is anticipated into a terminal node where it is licensed by a [+deg] element. The Vocabulary item /neI_´n/ states that this is a possible licensing environment for this root. In

108 Phonological and semantic factors as well as blocking effects may, of course, also play an important role in the selection of suffixes. In German, for instance, regular nominalization of the transitive verb stehlen “to steal” with the suffix -er (*Stehler) is blocked by the existence of the lexical item Dieb “thief.”
contrast to the elements listed in (4-52) which are affected by phonological readjustment rules, no such rule applies in (4-53d). In this particular case, however, the morpheme insertion rule in (4-54d) will be triggered by the appearance of \([\text{root}_{\text{nation}}]\) in a \([+\text{deg}]\) environment.\(^{109}\) Consequently, the utterance which surfaces is neither \(*a\ nation\ danger\) nor \(*a\ nationous\ danger\) but rather the fully grammatical string \(a\ national\ danger\). A similar line of reasoning can be applied to the other errors presented in (4-53).

### 4.5.3 Accounting for Categorial Identity

In the preceding subsection, I have argued that some quite complex speech errors are readily accounted for when we stick to the DM assumption that only abstract, categorically non-specified elements are manipulated within the computational system. Most importantly, we do not need to call upon the service of costly accommodatory processes in order to rectify possible morphological or phonological inconsistencies (see section 4.7 for further discussion).

Besides the examples given in (4-50) and (4-53) which involve derivational morphology (stem change and/or choice of the appropriate affix), this observation also holds true for plural and participial allomorphy in German. This is exemplified by the following two examples:

(4-55) **Correct spell-out of plural and participial allomorph**

a. die **silben**tragenden **Akzent**-e \(\leftarrow\) die akzenttragenden **Silbe**-n  
   *the syllable-bearing accent-PL \(\leftarrow\) the accent-bearing syllable-PL*

b. ich habe einen **Wurf** ge-**blick**-t \(\leftarrow\) einen Blick ge-worf-en  
   *I have a throw glance-PART \(\leftarrow\) a glance throw-PART*

In (4-55a), \([\text{root}_{\text{akzent}}]\) is spelled out with the appropriate plural suffix \(-e\), while in (4-55b), \([\text{root}_{\text{blick}}]\) appears with the correct participial circumflex \(ge-\ldots-t\) (moreover, \([\text{root}_{\text{werf}}]\) is subject to a different readjustment rule in a \([-v][-\text{deg}]\) environment).

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\(^{109}\) Harley & Noyer (1998a) state that for roots like *destroy*, a combination of a phonological readjustment and a morpheme insertion rule must be assumed when appearing in a \([-v][-\text{deg}]\) environment. The readjustment rule will modify the phonological form of the stem to *destruct*, the insertion rule will add the nominalizing suffix \(-ion\) (also cf. Marantz 1997).
Abandoning category labels, however, also gives rise to some serious conceptual problems. Most importantly, it is a well-known fact that the grammatical category of the involved elements plays a prominent role in word exchanges. In particular, there is a strong tendency for the exchanged elements to be of the same category (the same category constraint: nouns change place with nouns, verbs with verbs, and so on). However, this observation does not hold for stranding errors and sound exchanges which typically involve words belonging to different grammatical categories. It is that very property of exchange errors which lead Garrett (1975, 1980a) to the assumption that different types of exchanges occur at different processing levels: word exchanges arise at the functional level at which phrasal membership and grammatical category of words are determined while sound exchanges and stranding errors arise at the positional level at which the serial order of words as well as aspects of their form are specified. Three representative exchange errors from Garrett (1980a:179,188) are given in (4-56), a word exchange in (4-56a), a stranding error in (b), and a sound exchange in (c).

(4-56) **Different types of exchange errors**

a. I left the **briefcase** in my **cigar** ← the cigar in my briefcase

b. I thought the **park** was **truck**-ed ← the truck was parked

c. on a **soldering iron** ← a hot soldering iron

Garrett (1980a:189) states that out of a number of 200 word exchanges from his corpus, 85 per cent satisfy the same category constraint; out of a number of 100 stranding errors, the same is true for only 43 per cent, and out of a number of 200 sound exchanges, the constraint is satisfied in only 39 per cent of the errors.

To date, there are 163 clear instances of word exchanges in the Frankfurt corpus. Of these, only twenty (i.e. 12.3 per cent) involve words of different grammatical categories. With respect to sound exchanges, however, percentages are different from what Garrett reports. There are 394 sound exchanges in the corpus. 190 of these sound exchanges occur within a word, be it morphologically complex like e.g. *Wesserbisser* ← *Besserwisser* “know-all” or monomorphemic like e.g. *Kwalier* ← *Klavier* “piano”, and were therefore not considered. Of the remaining 204 sound exchanges, 107 involve words of different categories (i.e. 52.5 per cent). Interestingly, for the 88 stranding errors, the bias towards mixed-category errors is much stronger: in 76 of them (i.e. 86.4 per cent), words of
different categories are involved. For your convenience, these numbers are summarized in table 9.

<table>
<thead>
<tr>
<th></th>
<th>SAME CATEGORY</th>
<th>DIFFERENT CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORD EXCHANGES (N = 163)</td>
<td>143</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>(87.7 %)</td>
<td>(12.3 %)</td>
</tr>
<tr>
<td>STRANDING ERRORS (N = 85)</td>
<td>9</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>(10.6 %)</td>
<td>(89.4 %)</td>
</tr>
<tr>
<td>SOUND EXCHANGES (N = 204)</td>
<td>97</td>
<td>107</td>
</tr>
<tr>
<td></td>
<td>(47.5 %)</td>
<td>(52.5 %)</td>
</tr>
</tbody>
</table>

Table 9: Grammatical category constraint in exchanges

Leaving sound exchanges aside for the moment, we still need to account for the fact that the same category constraint obviously holds for word exchanges but not for stranding errors. Remember that following DM assumptions, we can not assume that words are exchanged before Vocabulary insertion takes place, since the only elements available for exchange prior to Vocabulary insertion are abstract features and roots. Consequently, word exchanges resemble stranding errors in that in both roots are exchanged, the only difference being that in word exchanges, both roots tend to have the same kind of licenser while in stranding errors, the licensing elements tend to be different ones for the two roots.

I assume that the licensing elements have an important influence on the probability of two roots to interact in an error. That is, roots are not randomly exchanged. Rather, there is a strong tendency for roots to take a position in which they are licensed by the same kind of functional head as in the position where they come from. This constraint on interacting elements, however, only holds for errors that occur before Vocabulary insertion takes place. After insertion of Vocabulary items - possibly being accompanied by phonological readjustment and/or morpheme insertion -, the job of the licensing elements is done. All errors occurring after that point can no longer be constrained by the licensing environment of the involved elements; that is, they are purely phonological. These different phenomena are exemplified by the slips in (4-57).

(4-57) Exchanges before and after Vocabulary insertion
a. eine Theorie ist eine Grammatik des Wissens
   \( a.f \) theory(f.) is \( a.f \) grammar(f.) of the knowledge
   \( \Leftarrow \) eine Grammatik ist eine Theorie des Wissens
   \( \Leftarrow \) \( a.f \) grammar(f.) is \( a.f \) theory(f.) of knowledge

b. ich weiß nicht, wie man eine Nadel in den Faden kriegt
   I know not how one \( a.f \) needle(f.) in the.m thread(m.) gets
   \( \Leftarrow \) wie man einen Faden in die Nadel kriegt
   \( \Leftarrow \) how one \( a.m \) thread(m.) in the.f needle(f.) gets

c. es ist nicht alles glänz-t, was Gold \( \Leftarrow \) Gold, was glänz-t
   it is not all glitter-3.SG that gold \( \Leftarrow \) gold that glitter-3.SG

d. da wird mancher Neid vor blass werden \( \Leftarrow \) blass vor Neid
   there will some,people envy with pale become \( \Leftarrow \) pale with envy

In (4-57ab), two roots are exchanged which are licensed by the same kind of functional element, viz. D. In (4-57b), the exchange is accompanied by an accommodation of the material in D, i.e. the respective gender features of the exchanged roots are copied onto D. This accommodatory process unambiguously indicates that the roots are exchanged before Vocabulary insertion takes place, since after Vocabulary insertion, copy of the gender features is no longer possible (and therefore, the expected outcome would be *wie man einen Nadel in die Faden kriegt ‘how one a.m needle(f.) in the.f thread(m.) gets’).

In contrast to that, the exchanges in (4-57cd) affect elements from different licensing environments. In (4-57c), an inflected verb takes a noun slot, and vice versa. The root of the shifted element glänzt “glitters” is actually glanz, with umlaut formation being triggered in a [+v] environment but not in a [-v][-deg] environment. For \([\text{root}_{\text{gold}}]\), it is not clear if it can be licensed by a light verb at all (possibly, it could be spelled out as vergolden “to gold-plate” in case the light verb head is filled with a CAUSE morpheme). Therefore, if in fact two roots had been exchanged in (4-57c) prior to Vocabulary insertion, the expected (properly licensed) outcome would be es ist nicht alles Glanz, was Gold or perhaps es ist nicht alles Glanz, was vergoldet. However, the fact that the verb is shifted in its inflected form (with umlaut) suggests that we are dealing with a phonological error here; that is, the error occurs at a stage at which implementation of the agreement node, licensing, Vocabulary insertion, and phonological readjustment have already applied.

In (4-57d), a noun and an adjective are exchanged but neither of the two elements is properly spelled out in its new licensing environment. According to the licensing specifications, the expected outcome would be neid-isch vor Bläss-e “envious with
paleness”, with [root{neid}] triggering the insertion of the suffix -isch in a [+deg] environment, and [root{blAss}] undergoing stem change (umlaut) and triggering the insertion of the suffix -e in a [-v][-deg] environment. For that error, we can either assume that we are dealing with a root exchange plus subsequent failure of rule application (for whatever reason) or - in a line with (4-57c) - that the error occurs after Vocabulary insertion and application of rules, i.e. that the two spelled out phonological forms /blas/ and /naid/ are exchanged.

With respect to “word exchanges”, I therefore conclude that they come in two different types. The first one is actually a root exchange which happens before Vocabulary insertion is carried out. This kind of exchange is constrained by the licensing environments of the elements involved in the error. Moreover, it triggers accommodatory processes (as e.g. observed in (4-57b)). The second type is an exchange of phonological material (phonological words) which occurs after Vocabulary insertion. With respect to this type, similar licensing environments are not relevant. Since all processes of feature copy, readjustment, and morpheme insertion have been completed at this point, the exchanged elements can not be adjusted to their new environment (as exemplified by (4-57c) and (d)).

The situation is different for stranding errors which appear not to be subject to the licensing environment constraint: in almost 90 per cent, the exchanged elements are of different grammatical category (cf. table 9). This observation implies that stranding errors (like exchanges of phonological words) occur at a stage at which licensing elements are not relevant. We therefore predict that neither adjustment of the exchanged phonological strings to the new licensing environment nor adjustment of stranded material to the exchanged elements should be observed. As a matter of fact, this is true for most of the stranding errors. Consider, for instance, the two errors in (4-58).

(4-58) **Stranding without adjustment of exchanged or stranded elements**

a. der Mann hat mich **Straf-en** ge-lüg-t ← Lüg-en ge-straf-t
   the man has me punish-PL lie-PART ← lie-PL punish-PART
   “The man has given the lie to me.”

b. ein **kolleg-ish-er** Malai-e ← malay-ish-er Kolleg-e
   a colleague-ADJ-m Malay-N(m.) ← Malay-ADJ-m colleague-N(m.)
The utterance in (4-58a) is ungrammatical because the participial form of *lügen* “to lie” is *gelogen*. Obviously, the required phonological readjustment rule which affects the vowel of the Vocabulary item for [root₃₄] in a [+v] environment has not applied. Moreover, the appropriate participial allomorph for that item was not inserted. In (4-58b), the stranded adjectival suffix gives rise to ungrammaticality, since the correct sequence would be *ein kolleg-ialer Malai-e*. The fact that in a large number of stranding errors, the exchanged elements are not spelled out correctly follows automatically from the assumption that these errors occur after Vocabulary insertion.

There is, however, a group of slips, which do not receive a straightforward explanation following the assumptions made so far. These are the stranding errors in which an exchanged element changes its phonological shape in the new environment and/or a contextual accommodation takes place. In contrast to the slips in (4-58), these errors definitely occur prior to Vocabulary insertion; still, for the most part, they involve elements from different licensing environments. Altogether, there are 14 such problematic slips in my corpus. Some of these have already been presented above (cf. (4-50), (4-53), and (4-55)), two more are given in (4-59) (IMP = imperative).

(4-59) *Stranding prior to Vocabulary insertion*

a. da war der **Bruch ge-bann-t** ← der Bann ge-broch-en
   *there was the break spell-PART ← the spell break-PART*

b. **nerv-e die Nahr-ung, nähr-e den Nerv**
   *nerve-IMP the.f food-N(f.) feed-IMP the.m nerve(m.)*

In (4-59a), two things are of interest: firstly, [root₃₄] “break” is phonologically readjusted to *Bruch* in a [-v][-deg] environment; secondly, the correct participial suffix -t is chosen for the new element in the [+v] environment. In (4-59b), too, we observe two striking changes. On the one hand, [root₃₄] “feed/food” is shifted from a [+v] environment to a [-v][-deg] environment where the required nominalizing suffix -ung for this root is inserted; on the other hand, the gender feature of *Nahrung* “food” is copied onto the determiner. If these two errors had occurred following Vocabulary insertion, the
two ungrammatical sequences *da war der Broch ge-bann-en and *nerv-e den Nähr should have surfaced.¹¹⁰

How can these errors be accounted for if we stick to the assumption that a similar licensing environment is a precondition for the exchange of roots. One way might be to somewhat loosen the same-licenser constraint. It is a well-known fact that the so-called word exchanges typically involve elements from different phrases, while stranding errors (as well as sound exchanges) typically involve elements which appear under the same maximal projection (Garrett 1980a:189). We may therefore hypothesize that the closer the exchanged elements are to each other in a syntactic tree structure, the less influence the same-licenser constraint has. This is exemplified by the bracketed structures for the two representative root exchanges in (4-57a) and (4-55b), respectively, given in (4-60).

(4-60) **Bracketed structures for (4-57a) and (4-55b)**

a. \([\text{CP} [\text{DP eine [\text{LP Theorie}]}] [\text{TnsP ist [\text{LP [DP eine [\text{LP Grammatik ...]]]}}]\\]

b. \([\text{LP2 [DP einen [\text{LP1 Wurf}] [L ge-blick-t]}]\\]

These are simplified structures, of course. In fact, Garrett’s statement that stranding errors typically involve members of a single phrase is not completely adequate. In (4-60b), for instance, a lexical phrase (LP₁) and a DP separate the two error elements, which, however, appear under the same maximal projection LP₂. Still, it is true that in almost all of the exchanges which affect roots from similar licensing environments, these roots are separated from each other by a larger number of maximal projections.

Interestingly, a closer look at the root exchanges reveals that in almost all of them, the roots which interact are adjacent to each other in the sense that no other root - i.e. no other possible candidate for exchange - intervenes between the exchanged elements. In my corpus, there are only two stranding errors in which the exchanged elements appear in considerable distance from each other; in both of them, however, the exchanged roots are licensed by the same kind of element. In (4-61a), for instance, \([\text{root_{(trink)}}] and \([\text{root_{(fahr)}}] are

¹¹⁰ For some of the stranding errors, it is impossible to unambiguously decide if they occur before or after Vocabulary insertion. For instance, in the slip *der erste fleisch-liche Weiber-geselle ← der erste weib-liche Fleischer-geselle* ‘the first female-ADJ butcher-journeyman’, the resulting sequence is semantically awkward but still fully grammatical without readjustment or morpheme insertion of any kind. We may therefore be dealing with a root exchange or with an exchange of phonological material.
both licensed by a light verb. You will notice that another root ([root_{etwas}] “something”) appears between the exchanged elements, this root, however is licensed by a determiner.\footnote{In this error, the intervening pronoun \textit{sie} “they”, too, occupies a position which is licensed by D. Still, it is not a possible candidate for an exchange, since it is not a root. The terminal node in which it is inserted is characterized only by the morphosyntactic features [3rd] and [+pl]. This is not to say that pronouns may not be exchanged; consider e.g. the slip \textit{sie war 21, als ich gestorben bin} $\leftarrow$ \textit{ich war 21, als sie gestorben ist} ‘I was 21 when she died be-3.SG’. Presumably, in that error, only person features are exchanged. That is, roots may interact with other roots in errors and features may interact with other features, but roots may not interact with features.}

(4-61) \textit{Intervening roots in root exchanges}

a. Männer können noch trink-en, wenn sie etwas ge-fahr-en haben
   \begin{align*}
   & \text{men can still drink-INF when they something drive-PART have} \\
   \leftrightarrow & \text{noch fahr-en, wenn sie etwas ge-trunk-en haben} \\
   \leftrightarrow & \text{still drive-INF when they sth. drink-PART have}
   \end{align*}

b. der Affe stammt vom Mensch ab
   \begin{align*}
   & \text{the ape descends from man PARTICLE} \\
   \leftrightarrow & \text{der Mensch stammt vom Affen ab} \\
   \leftrightarrow & \text{the man descends from ape PARTICLE}
   \end{align*}

c. ein Sommer macht noch keine Schwalbe
   \begin{align*}
   & \text{one summer makes yet no swallow} \\
   \leftrightarrow & \text{eine Schwalbe macht noch keinen Sommer} \\
   \leftrightarrow & \text{one swallow makes yet no summer}
   \end{align*}

Moreover, there are twelve “word exchanges” - i.e. root exchanges without stranded material - in my corpus, in which another root intervenes between the exchanged elements. But for those, too, it is true that the intervening root is licensed by a different functional head. Two examples are given in (4-61bc). In both of them, the exchanged elements are licensed by a determiner while the intervening roots - [root_{stamm}] “descend” in (4-61b) and [root_{mach}] “make” in (4-61c) - are licensed by [+v].

A short discussion of certain English nominalizations in Marantz (1997) possibly opens up another way to account for the problematic data involving the exchange of differently licensed roots. Marantz claims that light verb heads which serve to “verbalize” roots in their environment also occur in certain nominalizations. Therefore, these nominalizations do not only contain a nominalizing environment (D) but also a verbalizing environment (v). The internal structure of a noun like \textit{destroying} (as in \textit{John’s destroying the city}), for instance, should be the one given below:
Suppose that other nominalizations have a comparable internal structure involving light verb projections. With respect to the error in (4-55b) - *ich habe einen Wurf ge-blick-t ← einen Blick ge-worf-en* ‘I have a throw glanced ← a glance throw-n’ -, we could, for instance, assume that in its original position [root(blick)] is not (directly) licensed by D but rather by a light verb (possibly containing a BECOME morpheme). Consequently, the two elements which are exchanged in that error, i.e. [root(blick)] and [root(wurf)], are both licensed by a light verb, as is illustrated by the structure in (4-55b').

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112 Such an assumption could also help us to account for tricky cases like those mentioned in footnote 43 in which different nominalizations of a given root are available. The difference between *Schreiber* “writer”, *Schrift* “writing”, and *Schreiben* “letter” - all derived from [root(schrei)] - might be that the first involves a CAUSE morpheme within the DP, the second a BE morpheme, and the third a BECOME morpheme.
Such an analysis may look promising at first sight, but it immediately gives rise to new problems. Most importantly, in a structure like (4-55b’), correct spell-out of roots is no longer guaranteed. Note that in this structure \([\text{root}_{\text{werf}}]\) is shifted to a position in which it is licensed by a light verb. In this licensing environment, however, no phonological readjustment rule applies - just as little as such a rule applies in the original position of this root - and consequently the expected output would be *einen Werf geblickt.

Maybe this problem could be settled for good by assuming fusion operations within DP. Suppose, for instance, that the root exchange occurs at a point of the derivation at which both roots are licensed by the same kind of element, i.e. a light verb. Before Vocabulary insertion takes place, the l-node within DP will fuse with the light verb and only one Vocabulary item which meets the specification of the fused node will be inserted. In the above example this will be the item /vUr\(\text{f}\)/ “throw”; if the light verb contained a \emph{CAUSE} morpheme, the related item /v\(\text{erf}\)\(\text{a}\)/ “thrower” might be selected from the Vocabulary.

Still, so far this costly analysis only allows us to account for the interaction of nouns with verbs. It is not at all clear if a similar analysis is applicable to errors involving adjectives and nouns or adjectives and verbs. We could of course consistently stick to the above proposal and assume that DegPs, too, contain a light verb phrase. This would amount to the claim that in fact all roots are licensed by light verbs. This, however, is
definitely an unwelcome consequence since then the observed differences between “word exchanges” and stranding errors could no longer be explained.

In conclusion of this subsection, I want to present two root exchanges which are not readily accounted for following the analysis sketched above. One such problematic case is the English stranding error in (4-53c), repeated here as (4-63a). In that error, the appropriate adjectival suffix -ful is inserted, and we must therefore assume that the error occurs before Vocabulary insertion. Since the exchanged roots appear in considerable distance from each other - i.e. in different clauses - we would expect them to be licensed by the same kind of element (as in (4-61a) above). This, however, is not the case. Moreover, there is another root - [root_{measure}] - intervening between the exchanged elements which, again, has a different licenser. In this sequence, we would therefore either expect [root_{reason}] to interact with [root_{measure}] or [root_{measure}] to interact with [root_{care}], but not [root_{reason}] to change place with [root_{care}].

(4-63) *Two problematic root exchanges*

a. I think it’s care-ful to measure with reason
   ← it’s reasonable to measure with care (Fromkin 1973a:31)

b. das ist Marc-s Bruder Anke, Anke-s Bruder Marc
   that is Marc-GEN brother Anke Anke-GEN brother Marc

In (4-63b), the same-category constraint is satisfied, since the exchanged elements are both licensed by a determiner. What is peculiar about this error is that [root_{bruder}] which is also licensed by D separates the exchanged elements. Above, however, I have argued that whenever another root intervenes between two elements which are exchanged prior to Vocabulary insertion, this intervening root should be one from a different licensing environment (cf. (4-61bc)). Possibly, in this error, we need to take into account that the exchanged elements *Marc* and *Anke* are not really roots but rather proper names.

Let me briefly recollect the facts: In this subsection, I have tried to give an account for the well-known fact that in word exchanges but not in stranding errors, elements of the same grammatical category tend to interact. I have argued that this tendency can be explained without bothering category labels, when we assume that before Vocabulary insertion, the interaction of roots in an error is constrained by the licensing environment of these roots.
This constraint, however, may become ineffective whenever the affected roots are sufficiently close to each other and are not separated by another root.

Moreover, I have claimed that word exchanges and stranding errors are actually not that different from each other. In fact, both types of errors may occur before and after the insertion of Vocabulary items into terminal nodes. When they occur before Vocabulary insertion, we are actually dealing with instances of root exchanges (since words are not manipulated within the computational system). When the error occurs at this point, the exchanged roots are subsequently subject to phonological readjustment and morpheme insertion while the new environment of the exchanged elements is subject to morphosyntactic accommodation (e.g. feature copy onto D).

As we have seen, word exchanges as well as stranding errors may also occur after Vocabulary insertion. In these cases, however, we are actually dealing with an exchange of phonological material. Neither does the grammatical category of the error elements constrain the error at this stage of the derivation nor do we observe stem adjustment, morpheme insertion, or accommodation.\(^{113}\)

### 4.6 Feature Shift and Feature Stranding

*Man muss sich sehr hüten, sich über einen Fehler geringschätzig hinwegzusetzen.*

(Erasmus von Rotterdam)

In the preceding section, I have argued that within the computational system, i.e. before Vocabulary items are inserted into terminal nodes, neither word exchanges nor stranding errors in the true sense exist. Rather both types of errors must be interpreted as root exchanges. It is clear that spell-out of roots from different licensing environments (as in (4-59)) is much more likely to involve phonological readjustment or the insertion of morphemes than that of roots from similar licensing environments (as in (4-57ab)).

\(^{113}\) In this respect, these two types of exchanges resemble sound exchanges. There is, for instance, no sound exchange in the Frankfurt corpus in which the exchange accidentally results in an existing word which subsequently triggers accommodation on an adjacent element. Consider e.g. the following slip: *ihr dürft die Kraut büßen ← die Braut küssten* ‘you(pl.) may the bride kiss’. Here, the first word resulting from the exchange of /k/ and /b/ happens to be an existing German word: *Kraut* means “cabbage”. But in contrast to *Braut* “bride” which is feminine, *Kraut* is of neuter gender. Still, the definite article is not changed from *die* ‘the.f’ to *das* ‘the.n’. Such an accommodation would be quite surprising, of course, since all processes of feature copy have already been executed when the error occurs.
This is not to imply, however, that before Vocabulary insertion takes place, only roots can be affected by errors. We have seen that terminal nodes consist of roots and morphosyntactic features. A fair amount of the errors discussed above already made clear that it is not necessarily the whole content of a given terminal node which is affected in an error. On the one hand, morphosyntactic features may be left behind in their original position, that is, they are capable of stranding; on the other hand, they may also be shifted in various ways, i.e. exchanged, perseverated, or anticipated.

In this section, I will consider instances of stranding and shift involving the morphosyntactic features number, gender, tense, and case. The number feature shall be subject to investigation first. Consider the following examples.

(4-64) Stranding vs. non-stranding of the number feature

a. dafür werde ich mir nicht die Ohren um die Nacht schlagen

for that will I me not the ear-PL around the night hit

← die Nacht um die Ohr-en

← the night around the ear-PL

“For that, I will not make a night of it.”

b. examine the horse of the eyes ← the eyes of the horse

(Fromkin 1971:43)

c. ich habe der Hilfe für ihre Kind-er gedankt

I have the.SG.f.DAT help(f.) for their.PL child-PL thanked

← den Kind-er-n für ihre Hilfe

← the.PL.DAT child-PL-DAT for their.f help(f.)

d. ein Buchstabe ist vier Wört-er lang, äh,

a letter is four word-PL long, er,

ein Wort ist vier Buchstabe-n lang

a word is four letter-PL long

e. a hole full of floor-s ← a floor full of hole-s (Fromkin 1973b:258)

In the examples (4-64ab), the roots are exchanged along with their number ([+plural]) and gender ([+fem]) features which are copied onto the determiners at the respective landing sites. Note that these two examples can also be analyzed as the exchange of complete DPs (e.g. [DP the horse] and [DP the eyes] in (4-64b)).\footnote{The error cited in (4-64c), on the other hand, is an example of stranding.}

\footnote{“One must take good care not to contemptuously disregard an error.”}

\footnote{That the exchange of whole DPs is in fact an option, is illustrated by the following slip in which the respective determiner positions contain different material: I got into this guy with a discussion ← into a
hand, is an unambiguous case of a root exchange in which the roots take along their number features.\footnote{In (4-64c), a DP exchange would have resulted in \textit{ich habe ihrer Hilfe für die Kinder gedankt} while a root exchange with stranding of number (as in (4-64de)) would have given rise to the sequence \textit{ich habe den Hilfe-n für ihr Kind gedankt}. I did not come across an error in which two DPs are exchanged but the number feature strands, i.e. \textit{ich habe ihren Hilfe-n für das Kind gedankt}.

Finally, the two errors in (4-64de) are clear instances of number stranding. The German slip in (d) illustrates in an impressive way that we are not dealing with suffix stranding, since after the exchange has taken place, the appropriate plural allomorph is chosen for [root\textsubscript{(wort)}] and umlaut formation is triggered. Stemberger (1985) reports that stranding of the plural, as in (4-64de), is about four times as frequent in his corpus as non stranding cases, such as (4-64abc). In the Frankfurt corpus, there are only 18 informative errors, i.e. errors in which a plural and a singular root interact; in 14 of these, however, the plural feature strands.

Below, I give an exemplary structure for the root exchange in (4-64d) (neglecting the light verb phrase below Tns’):

(4-64) \textit{Structure (prior to root exchange) for (4-64d)}

\hspace{1cm}

\begin{tikzpicture}[scale=0.8,transform shape]
    \node (root) {\textit{root exchange}};
    \node (DP) [below of=root] {\texttt{DP}};
    \node (CP) [left of=DP] {\texttt{CP}};
    \node (C) [right of=DP] {\texttt{C}};
    \node (C') [right of=C] {\texttt{C'}};
    \node (TnsP) [right of=C'] {\texttt{TnsP}};
    \node (Tns) [below of=TnsP] {\texttt{Tns}};
    \node (t_{DP}) [below of=Tns] {\texttt{t}_{DP}};
    \node (t_{Tns}) [below of=TnsP] {\texttt{t}_{Tns}};
    \node (LP) [left of=DP] {\texttt{LP}};
    \node (D) [left of=LP] {\texttt{D}};
    \node (L) [below of=D] {\texttt{L}};
    \node (DegP) [below of=D] {\texttt{DegP}};
    \node (Deg') [below of=DegP] {\texttt{Deg'}};
    \node (Tns') [left of=TnsP] {\texttt{Tns'}};
    \node (t_{L}) [below of=DegP] {\texttt{t}_{L}};
    \node (root\textsubscript{(wort)}) [left of=L] {\textit{root\textsubscript{(wort)}}};
    \node (root\textsubscript{(sein)}) [left of=root\textsubscript{(wort)}] {\textit{root\textsubscript{(sein)}}};
    \node ([-past]) [left of=root\textsubscript{(sein)}] {[-past]};
    \node ([-def]) [left of=-past] {[-def]};
    \node (t) [below of=-def] {t};

    \draw (root) -- (DP);
    \draw (DP) -- (C);
    \draw (CP) -- (D);
    \draw (D) -- (L);
    \draw (L) -- (DegP);
    \draw (DegP) -- (DP);
    \draw (C) -- (Tns);
    \draw (Tns) -- (t_{DP});
    \draw (TnsP) -- (Tns');
    \draw (Tns') -- (t_{Tns});
    \draw ([-def]) -- (root\textsubscript{(wort)});
    \draw ([-past]) -- (root\textsubscript{(sein)});
    \draw (root\textsubscript{(sein)}) -- (t);
\end{tikzpicture}

\footnote{Discussion with this guy (Garrett 1980a:192). This error can only be analyzed as an exchange of \textit{[wp a discussion]} and \textit{[wp this guy]}.}
After the exchange has taken place, [root_{wort}] will share a terminal node with the stranded plural feature and will be spelled out accordingly. The above examples make clear that a given root may either be exchanged together with its number feature or leave its number feature behind in its initial position. Moreover, there are two slips in my corpus in which a plural feature is shifted or perseverated, respectively.
Shift and perseveration of plural feature

In (4-65a), the plural feature is shifted from \([\text{root}_{\text{buch}}]\) “book” to \([\text{root}_{\text{schuber}}]\) “slipcase”. From \([\text{root}_{\text{schuber}}]\), the plural feature is passed on to the definite article which is spelled out correctly and does not cliticize to the preposition. The DP \([\text{DP} \text{vier Buch}]\) “four book”, however, is ungrammatical, simply because there is no way to adjust the numeral \(\text{vier}\) to a singular noun. In (4-65b), the plural feature from \(\text{Punkt} \) “point” is perseverated. The fact that \(\text{Vorsprung} \) “lead” appears with umlaut proofs that we are not dealing with a mere sound perseveration here.

So far, we have only been concerned with the number feature (i.e. the [+plural]-feature). But what about other morphosyntactic features? Are they capable of shifting and stranding, too? Let us next have a look at the gender feature. In section 4.3, I have argued that gender is an inherent feature of roots and that roots are inserted into a syntactic structure along with their gender feature. That is, roots are more closely related to their gender feature than they are, for instance, to the number feature (the choice of which is due to the message intention of a speaker, i.e. to the activation of a conceptual node MULTIPLE(X) at the conceptual level). It is therefore very unlikely that roots are accessed, e.g. exchanged, in an error leaving their gender feature behind.

What should such an error look like? In contrast to plural stranding, a displaced root would, of course, not be spelled out differently because of a stranded gender feature. The only errors which could possibly be analyzed as instances of gender stranding are those in which two roots are exchanged without subsequent accommodation of the material in \(D\) to the new root. There are eight such cases in my corpus, two of which are given in (4-66).\(^{116}\)

\(^{116}\) Moreover, there are two root anticipations that result in a gender conflict, e.g. \(\text{Holst du mir in der Handtuch das Küchenhandtuch?} \leftarrow \text{in der Küche das Küchenhandtuch} \) ‘Fetch you for.me in the.f. towel(n.) the.n. kitchen. towel(n.)’. The analyses sketched below for the root exchanges in (4-66) can also be applied to the root anticipations.
Errors possibly involving stranding of the gender feature

a. da bringt er dem Hasen den Kind
   there brings he the.SG.m/n.DAT rabbit(m.) the.SG.m.ACC child(n.)
   ← dem Kind den Hasen
   ← the.SG.n.DAT child(n.) the.SG.m.ACC rabbit(m.)

b. ich hab’ ein Nase auf der Haar, äh,
   I have a.SG.n.ACC nose(f.) on the.SG.f.DAT hair(n.), er,
   ein Haar auf der Nase
   a.SG.n.ACC hair(n.) on the.SG.f.DAT nose(f.)

b’.

In both of the above examples, two roots change place, the determiners, however, appear with the gender features of the original roots. Consequently, both of the utterances are ungrammatical (only the DP [dp dem Hasen] in (4-66a) happens to be fully grammatical because in the dative, the definite article is the same for neuter and masculine nouns). A possible analysis for the slip (4-66b) is sketched in the structure in (4-66b’). Assuming that the gender features have stranded, these features will be copied onto the D-positions and the matching Vocabulary items will be inserted: /ain/ for [-def][+neut][ACC] and /de:å/ for [+def][+fem][DAT]. Note that following this interpretation of the facts, the errors in (4-66) do not constitute instances of anti-agreement within DP (cf. subsection 2.2.2), since the (stranded) gender feature associated with the root and the gender feature of the determiner are the same.
A serious problem, however, concerns the insertion of Vocabulary items for the exchanged roots. Remember that in section 4.3, I have argued that Vocabulary items, too, are specified for grammatical gender. But following this assumption, the two Vocabulary items /haː/ and /naː/ do, of course, not match their respective terminal nodes with respect to the gender feature. Halle & Marantz (1993) point out that at the point of Vocabulary insertion, the Vocabulary is searched for the entry that best matches the content of a given terminal node. It is true that Vocabulary items may be underspecified for a given feature in a terminal node but none of their morphosyntactic features may conflict with a morphosyntactic feature present in that node. Consequently, the insertion of the entries /haː/ and /naː/ should be blocked.\(^{117}\)

Alternatively, we might think of the root exchanges in (4-66) as taking place at the level of MS after the respective gender features have been copied onto the determiners. Only then are we in fact dealing with instances of anti-agreement within DP, since the exchanged roots (which take along their gender feature) do not agree with their determiners with respect to the gender feature.\(^{118}\)

As far as other types of displacement of the gender feature are concerned, there are hardly any informative errors in my corpus. Three out of nine errors which may be analyzed as a gender perseveration, anticipation, or exchange, respectively, are given in (4-67). These errors are different from the ones discussed above in that they all involve pronouns. While Vocabulary insertion for a root is not influenced by the gender feature of that root (i.e. the phonological form of the Vocabulary item is not affected by the gender feature), the phonological form of a pronoun crucially depends on the gender feature contained in the terminal node.

(4-67) **Perseveration and exchange of the gender feature**

a. die Frau hat **ihren** ganzen Kram, hat seinen ganzen Kram  
   *the woman(f) has her whole stuff(m) has his whole stuff*  
   auf die Straße gestellt  
   *on the street put*

b. er kommt aus einem Ort, **das** aus drei Häusern besteht  
   *he comes from a m village(m) which n of three houses(n) consists*

\(^{117}\) The only way to save the gender stranding analysis would be to assume a flaw at Vocabulary insertion. That is, the Vocabulary items which best match the features of the terminal node are selected and inserted in spite of the feature conflict that arises. However, an explanation along these lines, i.e. the assumption of a second error, seems to be very unlikely.

\(^{118}\) A third possibility might be to analyze slips like the ones given in (4-66) as phonological errors occurring after Vocabulary insertion has taken place.
einem Ort, der besteht

a.m. village(m.) which.m ... consists
c. er hat ihr einen Schock versetzt,  
3.SG.m.NOM has 3.SG.f.DAT a shock given  
sie hat ihm einen Schock versetzt  
3.SG.f.NOM has 3.SG.m.DAT a shock given

“She has given him a shock.” (Berg 1987:282)

In (4-67a), the possessive pronoun erroneously appears in its feminine form. One might hypothesize that this gender feature is perseverated from [root\(_{\text{frau}}\)] “woman”. Note that the possessive pronoun has two distinct gender features. Firstly, the gender feature [+feminine] of the wrong antecedent Frau is responsible for the selection of ihr “her” over sein “his”. Secondly, within DP, the [+masculine] feature of [root\(_{\text{kram}}\)] “stuff” is copied onto D, this feature (in combination with the case feature) being responsible for the appearance of the suffix -en.

In the singular, spell-out of a relative pronoun also depends on the gender feature that is copied onto that relative pronoun. In the example (4-67b), a wrong root was selected as antecedent, viz. [root\(_{\text{haus}}\)] “house” which follows the pronoun in the relative clause and which is associated with a [neuter] feature. Consequently, the neuter pronoun das is inserted.\(^{119}\)

For the error in (4-67c), two alternative analyses are available. On the one hand, this slip can be analyzed as an exchange of only the gender features of the two pronouns. On the other hand, however, we may also assume that the whole content of the two terminal nodes is exchanged, one node containing [3rd] and [+fem], the other containing [3rd] and [+masc]. At both landing sites, case features will be added and the appropriate Vocabulary items will be inserted.

Due to the scarcity of data and to the unclear status of the examples discussed in connection with the gender feature, it is - in contrast to the [+plural] feature - not at all clear if this feature can in fact be manipulated separately, i.e. if roots can be exchanged leaving their gender feature behind or if the gender feature alone can be exchanged or shifted in an error. At least for pronouns - i.e. whenever feature copy is involved - perseveration and anticipation of a gender feature seems possible.

The third feature to be considered in this section is the tense feature. The tense feature behaves, of course, somewhat differently from the features discussed so far, since it does

\(^{119}\) Erroneous copy of a gender feature onto a relative pronoun is also involved in the errors in (4-34) at the end of subsection 4.4.1 (“Local Agreement”). However, in the two slips cited in (4-34), the pronouns agree in gender with a local noun that is part of a phrase that modifies the head noun.
not share a terminal node with a root; rather, it heads a projection of its own. In the syntax, a root that is licensed by a light verb will raise and adjoin to Tns and consequently, this root and Tns are sisters under a Tns node. In an error, two such roots may be exchanged leaving the adjacent Tns nodes behind. We may therefore speak of the Tns information as being stranded, but still we should keep in mind that this kind of stranding is structurally different from the one discussed before (in the context of the number and the gender feature).

For exemplification consider the following three exchange errors:

(4-68) “Stranding” of tense features

a. es **droh-te** zu **schein-en** ← es **schi-en** zu **droh-en**
   it **threat-PAST** to seem-INF ← it seem.PAST to **threat-INF**

b. du **komm-st** zu **versprech-en** ← versprich-st zu **komm-en**
   you **come-2.SG** to promise-INF ← promise-2.SG to **come-INF**

c. I don’t know that I’d **hear** one if I **knew** it
   ← that I’d know one if I heard it (Garrett 1980b:264)

All examples in (4-68) are biclausal and involve the exchange of roots. In (a), [root_{schein}] “seem” and [root_{droh}] “threat” change place and are combined with the “stranded” tense information of the other root. For the former root, ablaut formation (/i:n/) is not triggered in the new [-tns] environment. The error in (b) is very similar: [root_{versprech}] “promise” and [root_{komm}] “come” are exchanged, and again, the former root does not surface in its ablaut form (/fæk-prlç/) in the new environment. In the English example in (c), [root_{know}] and [root_{hear}] are exchanged and both appear in their correct phonological form. Moreover, [root_{know}] does not take the regular past tense suffix -d in the error.

A syntactic structure for the error in (4-68b) is given in (4-68b’):
We are not in a position, though, to unambiguously decide whether the two roots are actually exchanged after having been adjoined to Tns (as indicated in the above structure) or whether they are exchanged before head movement has applied, i.e. while still taking the positions $t_{L1}$ and $t_{L2}$, respectively, in which they are in fact structurally closer to each other. The same is true for the other two root exchanges in (4-68).

There are only very few instances in which tense features are perseverated or exchanged. Fay (1980b) and Stemberger (1985) report some errors of this kind; in my corpus the only relevant slip is the one given in (4-69a). In this error, the feature [+past] is
perseverated and is substituted for the [-tns] feature. Consequently, both verbs appear in their past tense form which is realized by ablaut on the verb kommen “to come”.

(4-69) *Perseveration and exchange of tense features*

a. er wollte *kam*, äh, er wollte *komm-en*  
    *he wanted* came, *er, he wanted* come-INF

b. I *wind* up *rewrot-ing* twelve pages  
    ← I wound up rewriting (Stemberger 1985:163)

c. they’re just clouds that are *been divert-ing*, that are being divert-ed  
    from the north (Stemberger 1985:163)

In the very interesting and extraordinary slip in (4-69b), the [+past] feature is shifted from *wind* to *rewrite*. In the intended utterance, however, [root(rewrite)] is not supposed to appear with any tense feature at all; rather, it is adjoined to an aspectual head (containing a [continuative] feature). In the error, the aspectual feature is not substituted for by the tense feature (which would have given rise to *I wind up rewrote twelve pages*); rather it enriches the featural make-up of the structure under the Asp node. The tense feature (or the Tns node) is adjoined to the L-node containing [root(rewrite)] and this root is spelled out accordingly. Still, the aspectual feature - which, of course, is incompatible with the feature [+past] - is also spelled out.

(4-69c) is the only good example from the corpus of Stemberger (1985) in which two features (according to Stemberger “two affixes”) fully exchange, namely a tense and an aspectual feature. In this error, a [+past] feature takes the place of a [continuative] feature, and vice versa.

With regard to stranding and shift of the tense feature, there are also some problematic cases which do not receive a straightforward explanation in the present framework. One such tricky case is cited in (4-70a). At first sight, this error looks like an anticipation of [root(kauf)] “buy” with stranding of the tense feature [+part]. However, the participle form of *kaufen* is *gekauft* while *verkauf* (as it appears in the error) is the participle form of the verb *verkaufen* “to sell”. Consequently, anticipation of [root(kauf)] should have given rise to the sequence *was ich ge-kauft habe* ‘what I buy-PART have’. Obviously, a part of the intended verb *vergessen* “to forget” was left behind. But this implies that [root(versess)] as a whole is not substituted for by [root(kauf)] (note that ver- in *vergessen* is a pseudo-prefix). Alternatively, we may argue that we are dealing with a
merely phonological anticipation here, i.e. anticipation of /kauf/. But then we are facing the problem that there is no way to account for the insertion of the appropriate participle morpheme. If the error had in fact occurred after Vocabulary insertion, then the utterance *was ich verkauf-en habe should have surfaced. Therefore, this error - as simple as it may look at first sight - remains unexplained.
(4-70) Two intricate errors

a. ich weiß, was ich verkauf-t habe, was ich vergess-en habe zu kaufen
   I know what I sell-PART have what I forget-PART have to buy

b. Rosa only date shranks ← Rosa only dated shrinks  (Fromkin 1973a:32)

Another particularly intricate error is the one given in (4-70b). This was Victoria Fromkin’s favourite slip, probably one of the most-cited errors of all times. In this error, the [+past] feature is shifted. In a model in which categorial specification of nodes is assumed, this feature is shifted from a verb to a noun (which possibly has a verbal base); in DM terms, however, the Tns node which - after merger of Tns with the l-node L₁ - is sister to L₁ is shifted and adjoins to the acategorial l-node L₂, as indicated in the structure below:

(4-70) Structure for the error (4-70b) after shift of the tense node

Note that in this example, we cannot assume that only the tense feature is shifted, since there is no other Tns node the place of which it might take. Rather, we must assume that the Tns node is shifted and adjoins to L₂. At Morphological Structure, the Vocabulary item /_rINk/, which is licensed by a determiner, will be inserted; this Vocabulary item will subsequently undergo phonological readjustment (ablaut) in a [+past] context. Still, due to
the [+plural] feature, Vocabulary insertion will also supply a plural suffix. Probably, the most awkward thing about this particular error is that the Tns node is adjoined to an l-node which is licensed by a determiner, a fact that is definitely unexpected. Possibly the adjunction process - in contrast to Vocabulary insertion - is blind with respect to the licensing environment of the node it targets.

Last but not least, I shall have a look at the case feature in language production. Once again, we are dealing with different structural facts. Originally, a case feature is neither associated with an l-node (as e.g. the gender and number features are) nor is it base-generated under an f-node (as e.g. the tense feature). Rather, a case feature is assigned to a DP according to the case-assignment properties of a lexical item. From the DP, the case feature will percolate down to all elements dominated by this DP.

In connection with errors such as those given in (4-71) below, I have been speaking of “case stranding” in subsection 2.4.1. However, as with the tense feature discussed before, the term “stranding” is not quite accurate in this context, since the case feature does not necessarily share a terminal node with other features when the error occurs. In other words, for the errors in (4-71), it is quite possible that the exchanges take place before the respective case features have percolated down to the terminal nodes. Use of the term “stranding” is therefore only justified insofar as in the erroneous utterance, the same case features are assigned to the same DPs as in the intended utterance.

(4-71) “Stranding” of case features

a. was mich zu mir führt ← mich zu Ihnen führt
   “what 1.SG.ACC to 1.SG.DAT brings ← 1.SG.ACC to 3.PL.DAT(polite) brings
   “what brings me to you”

b. bis er’s bei dir abhol-t,
   until 3.SG.m.NOM’it from 2.SG.DAT pick.up-3.SG
   bis du’s bei ihm abhol-st
   until 2.SG.NOM’it from 3.SG.m.DAT pick.up-2.SG
   “until you pick it up from him” (Berg 1987:282)

c. you must be too tight for them ← they must be too tight for you
   (Stemberger 1982a:345)

The slip in (4-71a) is a perseveration of the person feature [1st]; in combination with the case feature [DAT], which is assigned by the preposition zu “to”, this person feature will be
spelled out as /mi:ã/. In (b), the person feature [2nd] changes place with the person feature [3rd] and the gender feature [+masc], the case properties, however, remain unaltered. The Vocabulary item for a terminal node containing the features [3rd], [+masc], and [NOM] is /e:ã/, while the item for the feature complex [2nd] and [DAT] is /di:ã/. Moreover, after the exchange, the appropriate feature is copied onto the AgrS node, i.e. the verb appears in its 3rd person singular form in the erroneous utterance. Finally, in (4-71c), the feature [2nd] (and possibly [+plural]) changes place with the features [3rd] and [+plural]. Once again, case (nominative and accusative, respectively) is assigned to the same DP positions as in the intended utterance.

Below, I present a syntactic structure for the slip in (4-71b). Note that the case specification of the DPs is indicated in brackets, since it is also possible that the features are exchanged before case assignment has taken place.

(4-71) Syntactic structure for (4-71b) before feature exchange

While in the above examples, case features are assigned to the same positions within a syntactic structure before and after the exchange of person and number features has taken place, there are also some instances in which case features are assigned to a different DP projection in the error. In (4-72), you will find one perseveration of a case feature as well as one exchange of case features.
(4-72) *Perseveration and exchange of case features*

a. ich bin mir fast sicher, dass er sie mich, äh,
   *I am almost sure that he wanted to pinch her from me.*
b. (er/sie) stellte mich ihm vor,  
(he/she) introduced 1.SG.ACC 3.SG.m.DAT PARTICLE  
mir ihn vor  
1.SG.DAT 3.SG.m.ACC PARTICLE  
“He/she) introduced him to me.” (Berg 1987:283)

In (4-72a), the verb *ausspannen* “to pinch” requires three case-marked arguments, one nominative, one accusative, and one dative. In the error, however, the accusative feature is perseverated, i.e. accusative is assigned twice, thereby violating the subcategorization properties of the verb. The verb *vorstellen* “to introduce” in (4-72b), too, requires a nominative, an accusative, and a dative argument. In the slip, all three of them are assigned, the accusative and dative, however, change place. Since in German, the order of accusative and dative arguments is fairly free, the erroneous utterance in (b) is not ungrammatical; it just reverses who is introduced to whom: in the error, it is said that I was introduced to someone, while in the intended utterance, someone was introduced to me.

In this section, I have considered the possibilities of shift and stranding of abstract features in language production. Since prior to Vocabulary insertion, abstract features are manipulated and assigned, respectively, it is worthwhile investigating if their manipulation or assignment may be subject to errors.

As expected, errors involving morphosyntactic features are observed. Firstly, all features except the gender feature may be left behind when a root or other features are exchanged. However, there are qualitative differences: Only the number feature shares a terminal node with a root, while the tense feature heads a projection of its own and the case feature is assigned to an argument DP. The different structural conditions for the three features are sketched in (4-73) (the exchanged elements are in bold-face).

(4-73) *Schematized structures for stranding of number, tense, and case features*

a. number feature:

```
  W [+X]  Z [-X]  ⇒  Z [+X]  W [-X]
```

I assume that stranding of gender features is not observed, since gender is an inherent feature of a root and can therefore not be separated from that root in a root exchange.

Secondly, abstract features may also be displaced in various ways. Note that the structures in (4-73) only represent root exchanges (only in (4-73c) may W and Z also be features, as e.g. in (4-71) above). However, the examples discussed in this section have made clear that all features - gender as well as number, tense, and case - may also be anticipated, perseverated, shifted, or exchanged in an error. With respect to the structures in (4-73), this implies that the elements W and Z stay in their original position but \([\pm X]\) or case(X/Y) are affected by the error.

### 4.7 Rethinking Accommodation

Ein Wort, das hilft,
ist nie ein schlimmes Wort.*

(Sophokles, Elektra)

Before concluding this chapter with the detailed discussion of three particularly intricate speech errors, I shall once again consider the notion of accommodation. Accommodation is

* “A word that helps is never a bad word.”
a phenomenon that has fascinated psycholinguists for a long time and it is therefore worthwhile to carefully reconsider this phenomenon in the light of the remarks made in the previous sections.

In subsection 2.4.2, I have already pointed out the important difference between “context accommodations” and “error accommodations”. Let me briefly repeat the basic facts. According to Berg (1987:279), in a context accommodation, the error unit - be it a phoneme, a morpheme or a word - affects the context, while in an error accommodation, the context affects the error unit. The two types of accommodation are illustrated by the examples in (4-74).

(4-74) “Context accommodation” versus “error accommodation”

a. der Unterschied von Frage-satz und normaler Frage
   the difference between question-sentence and normal.f question(f.)
   ← und normalem Satz
   ← and normal.m sentence(m.)

b. der Sprung, äh, der Funke spring-t hier über
   the jump, er, the spark jump-3.SG here over

c. du behinder-st sie, sie behinder-t dich
   2.SG.NOM hinder-2.SG 3.SG.f.ACC, 3.SG.f.NOM hinder-3.SG 2.SG.ACC
   “You hinder her, she hinders you.”

In example (4-74a), Frage “question” (which is part of a compound) is perseverated. At its landing site, the context, i.e. the adjective normal, accommodates to the gender feature of the error element Frage. Therefore, we are dealing with a context accommodation here. In (4-74b), [root_{spring}] is anticipated. In contrast to the first example, the root itself changes its phonological form at the landing site, i.e. the error element is spelled out according to the requirements of the new environment. Therefore, this slip exemplifies a so-called “error accommodation”. Finally, the error cited in (4-74c) is a combination of both types of accommodation: both pronouns are realized according to the respective case specifications (error accommodation); moreover, the verb accommodates to the new pronoun in subject position with respect to its person specification (context accommodation).

In subsection 4.7.1, I will once again be dealing with the so-called context accommodations. Most importantly, I am going to propose that no repair strategies are involved in context accommodations. Subsequently, I am going to consider error instances
in which accommodation is not observed, i.e. errors that violate well-formedness restrictions, in subsection 4.7.2.

4.7.1 Against Repair Strategies

In subsection 2.4.2, I claimed that only context accommodations really deserve to be called accommodations, since only they allow for an interpretation as errors involving two steps: firstly, the error itself; secondly, the adaptation of the environment to certain grammatical well-formedness restrictions (e.g. agreement within DP, subject-verb agreement). Error accommodations, I have argued, are in fact a special type of stranding errors (cf. section 4.6). The slip in (4-74c), for instance, is of the type schematized in (4-73c) above: person/gender features are exchanged, but the case features are assigned to DPs as intended. The combination of the exchanged features with the respective case features gives rise to the insertion of the appropriate Vocabulary items; no second error step is involved. The situation in (4-74b) is somewhat different: in that error, an abstract root is anticipated. Spell-out of this root depends on the licensing environment in which it appears; in a [+d] environment, it will be spelled out as /_prUN/. In that case, we may therefore speak of a “stranded” licenser which is responsible for the accommodatory process. Again, no second error step is involved.

In the following, I am going to reconsider context accommodations. In doing so, the concept of accommodation will be further modified, or, to put it differently, it will be further weakened. Berg (1987:277) states that an accommodation is “a process whereby a processing conflict between the actual error and the context of the original utterance is reconciled”. He assumes that this is evidence for the fact “that the processing system is sensitive to the eventual output” and that “[a]ccommodation can thus be viewed as a blind repair process which brings utterances in line with linguistic constraints”. In contrast to Berg, I am going to claim (a) that no processing conflict is reconciled in a context accommodation, (b) that therefore no repair strategy is involved (not even a “cost-free” adaptation; cf. Leuninger & Keller 1994:89), and (c) that output-oriented processing need not be assumed for context accommodations.

In principle, we are dealing with a processing conflict whenever two nodes stand in an agreement relationship, but a feature contained in one node does not match the feature
contained in the other. Moreover, such a conflict may arise when a stem appears with a suffix - be it derivational or inflectional - that does not meet the stem’s subcategorization requirements. Consider the following examples:

(4-75) *Reconciliation of processing conflicts?*

a. *you’re* too good for *that* ← that’s too good for you

   *(Stemberger 1982a:344)*

b. er hat das **Geld** voller **Tasche-n**

   *he has the.SG.n.ACC money(n.) full.of bag-PL*

   ← die **Tasche-n voller Geld**

   ← *the.PL.ACC bag-PL full.of money(n.)*
c. ich bin mir sicher, dass noch viele Christen an den **Glaub-e-n**

*I am REFL sure that still many Christians in the.m.ACC belief-N-ACC aufersteh-en ↔ an die Aufersteh-ung glaub-en*

**resurrect-3.PL ↔ in the.f.ACC resurrect-N believe-3.PL**

d. angesichts des **Haus-es** unserer **Farbe-n**

**in.view.of the.SG.n.GEN house(n.)-GEN of.our colour(f.)-PL**  
↔ der Farbe unserer Haus-er

↔ **the.SG.f.GEN colour(f.) of.our house-PL**

According to Berg’s (1987) analysis, the following processing conflicts are reconciled in the above examples: a feature conflict between the subject pronoun *you* and the copula verb in (4-75a), a feature conflict between the noun *Geld* “money” and the definite article in (b), conflicts between the stem *glaub* “believe” and the intended nominalizing suffix\(^{120}\) as well as between the noun *Glaube* and the definite article in (c), and, finally, conflicts between the noun *Farbe* “colour” and the plural suffix as well as between the noun *Haus* “house” and the definite article in (d). Presumably, in each of the examples, the processor ‘sees’ the conflict that - due to the error - is about to arise and applies a repair strategy in order to prevent the conflict. Consequently, in each of the examples, the appropriate verb, determiner, and/or suffix is chosen.

However, following DM assumptions, the reasoning is different. Most importantly, none of the elements that are responsible for the processing conflict - be it a feature or a suffix - is present when the error takes place. The verb is not yet specified for person/number features, the determiner is not yet specified for a gender feature, and plural as well as derivational suffixes have not yet been inserted.

In all of the slips given in (4-75), a root (or feature) exchange occurs within the computational system, i.e. before the level of Morphological Structure. After the exchange has taken place, various operations are executed at MS and PF. Firstly, an agreement node is implemented as sister of the Tns node and features of the subject DP are copied onto the AgrS node. In (4-75a), the relevant feature in subject position is [2nd] (or possibly [+pl]); the appearance of this feature in AgrS gives rise to the insertion of the item /A:^r/ at PF (which subsequently cliticizes to the pronoun). Secondly, in the German examples

\(^{120}\) Wurzel (1970) as well as Wiese (1996) assume that the noun-final schwa in words such as *Glaub-e* is a derivational, noun-forming suffix. Wiese (1996) points out that -e, just like any other derivational suffix, determines its plural marker, the corresponding plural suffix being -n. Moreover, word-final schwa does not occur if another derivational suffix is attached (e.g. *gläub-ig* “devout”, *glaub-haft* “believable”).

Alternatively, one might, of course, assume that schwa is deleted under certain circumstances (cf. Kloeke 1982). But even then, a processing conflict is reconciled in (4-75c), since the conflicting nominalizing suffix -ung is deleted.
(4-75bcd), gender features of an exchanged root are copied onto the determiner. The [+def] feature in D together with the copied gender feature, the case and the number feature
triggers the insertion of the respective Vocabulary items (note that in (4-75b), two roots are exchanged along with their number features while in (4-75d), we observe number stranding). Thirdly, morpheme insertion rules apply at PF; these rules take into account the subcategorization properties of roots. For \([\text{root}_{\text{glaub}}]\) in (4-75c), for instance, the suffix 
\(-\text{´}/\) is inserted in a [-v][-deg] environment. Moreover, at MS, the appropriate plural allomorph \(-n/\) is selected in (4-75d). The insertion of this plural suffix, however, is not due to a morpheme insertion rule but rather to a competition amongst a number of allomorphs all of which realize the [+pl] feature.

All of these operations apply anyway, no matter which root appears in a given terminal node. For the processor, it does not make any difference (in terms of a processing effort) what feature is copied (onto AgrS or D) or what morpheme is inserted. Consequently, the errors in (4-75) above do not involve the application of control mechanisms or repair strategies of any kind. Rather, it is only the application of regular MS operations that gives rise to a fully grammatical surface form.

This, in turn, implies that context accommodations are not accommodations at all, as was claimed in subsection 2.4.2, and neither are they cost-free adaptations of errors to grammatical well-formedness restrictions. Still, different types of mechanisms are to be held responsible for the well-formedness of the errors that were classified as context accommodations. On the one hand, the slips that I have subsumed under the term “morphosyntactic accommodation” all involve processes of feature copy. That is, no verbs, adjectives, or determiners are accommodated in these errors; these elements just receive a different feature (either from the subject DP or from a root within DP) and are spelled out accordingly. On the other hand, the errors that were termed “morphological accommodation” either involve the application of morpheme insertion rules or a competition amongst allomorphs. That is, no affix accommodates to a new stem, but rather a different suffix is inserted which meets the subcategorization properties of a given root.

But what about the other two types of context accommodations that were distinguished in subsection 2.4.2, namely “phonological” and “morphophonological accommodations”? As a reminder, consider the following three errors:

(4-76) Phonological and morphophonological accommodations

a. pankeren \(\leftarrow\) kamperen \((\text{Cohen 1965:183})\)
   \((\text{error})\) \(\leftarrow\) to camp

b. you just count wheel-s [-z] on a light \(\leftarrow\) light-s [-s] on a wheel
As a matter of fact, I only came across very few phonological accommodations, i.e. errors in which the context adjusts to an error element with respect to phonological features. In (4-76a), you find a Dutch within-word sound exchange. The phonemes /k/ and /p/ change place and subsequently, the nasal /m/ assimilates to the place features of the adjacent /k/ and surfaces as [N]. If the phoneme /m/ was in fact fully specified for all phonological features, then we had to assume that in the slip, one feature value is changed, that is, that we are dealing with a true context accommodation here. But this is most probably not the case. Within underspecification theory (e.g. Archangeli 1988; Yu 1992; Steriade 1995), it is assumed that certain feature values may be underlyingly unspecified. These values will either be inserted by complement or default rules or they will be determined by processes of assimilation (feature spreading). In Dutch and German, for instance, nasal consonants are not specified for place of articulation; rather, they assimilate to a neighboring obstruent with respect to the place feature. Consequently, in the error in (4-76a), the nasal receives its place feature [velar] from the neighboring /k/ and surfaces as the velar nasal, while in the intended utterance it would have received the feature [labial] from the segment /p/.

Presumably, a similar line of reasoning can be applied to the few other cases of “phonological accommodation”. Therefore, these errors, too, need not be analyzed as involving a repair strategy (change of a feature value). Rather, a process of feature spreading that fills in an unspecified feature guarantees that the appropriate phoneme surfaces.

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121 Cf. Yu (1992:187ff) for an account of nasal assimilation in German. Note that a similar process of assimilation is observed in English, as is exemplified by the two prefixed forms in-definite vs. im-perfect.

122 In speech errors, feature spreading is not only observed from an error element onto the context but also from the context onto an (underspecified) error element. There is one phonological error accommodation in my corpus which involves the perseveration of a nasal, i.e. not the segment adjacent to the error element assimilates (as in (4-76a)) but rather the moved segment itself: Bauerntömpel ← Bauerntölpel “country bumpkin”, where the perseverated /n/ assimilates to the place features of /p/ and surfaces as [m].

A similar phenomenon is exemplified by the following slip: Ich habe den Buch [bUx], Butt und die Blechtrommel [bleç] geschrieben ‘I have the “Butt” and “Die Blechtrommel” written’ (Berg 1993:61). In this error, the anticipated palatal [ç] appears as the velar [x] in its new position. The distribution of the two dorsal fricatives is fully predictable: [x] appears after back vowels only, while [ç] appears in all other positions, i.e. [x] and [ç] assimilate to the feature [x back] of the preceding segment.

Therefore, Yu (1992) and Wiese (1996) propose to use /X/ as an abbreviatory symbol for the underspecified segment from which the dorsal fricatives [ç] and [x] are derived, this underlying segment being specified only for the features [+cons], [+cont], and [dorsal] (cf. Berg (1991) and Stemberger (1991) for discussion of redundant features and underspecification in language production).
In morphophonological accommodations, the choice of a particular allomorph is determined by phonological factors. In English, such conditioned allomorphy is observed e.g. for the plural suffix (4-76b) and for the past tense suffix (4-76c). In the examples (4-76bc), number and tense features, respectively, strand and at PF, the appropriate suffixes are selected from the Vocabulary.

There are two possibilities to account for the correct spell-out of these suffixes. Firstly, we may assume that there is only one underlying (tense or plural) morpheme that is underspecified for a certain feature (e.g. $\pm$voice for the plural morpheme), the specification of this feature depending on the context of insertion. Moreover, a default vowel insertion rule will apply in certain contexts. Alternatively, the Vocabulary may contain several items that compete for insertion under a given node, each item specifying the context in which it may be inserted (e.g. $[+\text{past}] \leftrightarrow /-t/ \ Z +\ldots$, where $Z = \text{cook}$, $\text{dwell}$, $\text{buy}$ ...; cf. Halle & Marantz 1993:125f). No matter which of the two positions one adopts, for both it is true that accommodation of the suffix need not be assumed. Once again, we must not call upon the service of a costly repair strategy. Rather, we are either dealing with a spreading rule (option 1) or with competition amongst Vocabulary items (option 2), both of which are not triggered only in the erroneous utterances but would have been effective in the intended utterances in exactly the same way.\footnote{It is not entirely clear if the same strategy can be applied to the accommodation of definite and indefinite articles, as e.g. observed in \textit{if you give the [T'] nipple an infant \leftrightarrow the [Ti:] infant a nipple} (Garrett 1976:238). That is, it is not clear if there are two allomorphs for each article, the insertion of which depends on the first segment of the following word, or if we are dealing with a phonetic phenomenon here, comparable e.g. to liaison in French. It is clear that in the former case, the insertion of Vocabulary items for nouns must precede the insertion of the articles, the Vocabulary items for the articles specifying the appropriate phonological context for insertion.}

Since all the processes that determine the surface form of the slips in (4-76) depend on the phonological form of Vocabulary items, it is clear that they must apply after Vocabulary insertion has been executed. We must further assume that roots are spelled out before morphosyntactic features (such as $[+\text{pl}]$ of $[+\text{past}]$), since spell-out of the latter may depend on phonological properties of a root. Consequently, the sequence of PF operations is roughly the following: Firstly, Vocabulary items for roots are inserted. Secondly, phonological readjustment rules apply; these may either be triggered by a licensing element (e.g. $\text{destroy} \rightarrow \text{destruct}$ in a $[-v][-\text{deg}]$ environment) or by a
morphosyntactic feature (e.g. *swim* → *swam* / [+past]). Thirdly, morpheme insertion rules apply. Fourthly, morphosyn-tactic features are spelled out and fifthly, within-word assimilation rules apply.

This sequence of operations is exemplified by the German noun *Kränk-ung-en* ([krɛNkUN´n]) ‘insult-N-PL’ (note that the /N/ in the Vocabulary item indicates that this segment is underspecified for place features).\(^{124}\)

(4-77) *PF operations for the German noun “Kränkungen”*

\[\begin{align*}
\text{a. } \text{[root}_{krank}] & \quad \text{Vocabulary insertion (root):} \quad \Rightarrow \ /\text{kraNk}/ \\
\text{b. } [+\text{back}] & \quad \rightarrow \ [-\text{back}] / [-v][-\text{deg}] \quad \text{Phonological readjustment:} \quad \Rightarrow \ /\text{kr}\Nk/ \\
\text{c. } \text{Insert } /-\text{UNg/ } / X + [-v][-\text{deg}] & \quad \text{Morpheme insertion rule:} \quad \Rightarrow \ /\text{krNkUNg/} \\
\text{d. } [+\text{pl}] & \quad \leftrightarrow \ /-`\text{n/ } / X-\text{UNg} + ___ \quad \text{Vocabulary insertion:} \quad \Rightarrow \ /\text{krNkUNg´n/} \\
\text{e. } \text{X} & \quad \text{X} \quad \text{Nasal assimilation} \\
& \quad \big| \quad \big| \\
& \quad [+\text{nas}] \quad [-\text{son}] \quad \text{(and g-deletion):} \quad \Rightarrow \ /\text{krNkUN´n/} \\
& \quad \big| \\
& \quad \big[\text{place}]
\end{align*}\]

To sum up: In this subsection, I have argued against repair strategies in language production. In particular, I have claimed that the different types of context accommodations that were distinguished in subsection 2.4.2 in fact result from the application of various mechanisms and rules, all of which apply anyway in the derivation of an utterance. Consequently, no second error step or control mechanism must be assumed for these errors.

I have shown that morphosyntactic accommodations are due to processes of feature copy at MS (e.g. gender copy onto D in German). In contrast to that, morphological, morphophonological, and phonological accommodations all involve the application of different PF operations. Morphological accommodations, for instance, are due to morpheme insertion rules (choice of appropriate derivational suffix) or to competition

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\(^{124}\) Etymologically, the verb *kränken* “to insult” is a causative of the adjective *krank* “sick”, meaning “to make sick”. Still, it is very well possible that there is a separate root [root\(_{krank}\)]. If this is the case, then the operation (b) in (4-77) is superfluous. Also note that the sequence of the operations (b) and (c) might be reversed, i.e. morpheme insertion might apply before phonological readjustment (here: umlaut) of the stem.
amongst Vocabulary items which realize the same features but have different context specifications (e.g. choice of plural suffix in German). The reason for morphophonological accommodations, I have claimed, is either a competition amongst alternative Vocabulary items or assimilation of an underspecified suffix (e.g. English past tense and plural allomorphs). Finally, phonological accommodations result from underspecification and feature spreading (e.g. nasal assimilation).

Still, there is one important exception to the generalization made above that repair strategies play no role in language production; these are the slips involving lexical construal (or lexical control). Consider the following two examples:
(4-78) *Errors involving lexical construal*

a. und die macht keinen **Kummer**, keinen Finger krumm
   *and she makes no grief no finger bent*
   “and she does not lift a finger”

b. durch die **Kutsche** latschen ← durch die Küche
   *through the coach wander ← through the kitchen*

Both errors in (4-78) are anticipations that occur after Vocabulary insertion. In (4-78a), the word (or possibly the syllable) /krUm/ is anticipated while the pseudo suffix -er is stranded.\(^{125}\) The expected non-word /krUmâ/, however, does not surface. Similarly, in (4-78b), the sequence /t_/ is anticipated but the non-word /kYt_/ is not uttered. Note that both forms could have arisen, since neither of them violates the phonotactic restrictions of German. Still, they are replaced by the existing words Kummer “grief” and Kutsche “coach”, respectively, i.e. by forms that are part of the Vocabulary.

Presumably, these errors involve two computational steps. Firstly, after Vocabulary insertion, a contextually induced error occurs. Secondly, the resulting non-word is matched with an existing Vocabulary item. As was pointed out by Leuninger & Keller (1994), this second step is of the type of a formal substitution. That is, the Vocabulary is accessed a second time and an item is selected that is phonologically similar to the non-word. In contrast to the different types of accommodations discussed above, this second step is definitely not cost-free, i.e. it does not involve a mechanism that applies anyway. We must therefore assume that instances of lexical construal do in fact result from a costly repair strategy.

### 4.7.2 Adaptation Failures

After having discussed slips of the tongue in which the application of various MS and PF mechanisms guarantees that a fully grammatical utterance surfaces, I shall now have a brief look at those errors in which the application of these mechanisms fails, i.e. errors that violate certain well-formedness restrictions. In the following, I am going to examine how these violations can be accounted for within the model sketched above. Three types of

\(^{125}\) If the error had occurred before Vocabulary insertion, that is, if [root(krumm)] “bent” had been anticipated, then the expected (properly licensed) outcome would have been *die macht keine Krümm-ung, äh, keinen Finger krumm*, with gender feature copy onto D, phonological readjustment, and morpheme insertion.
errors will be considered in this context: agreement errors within DP, errors of subcategorization, as well as certain errors involving stranding of morphemes.

Let us first have a look at agreement errors within DP. There are 101 such errors in my corpus. In 76 of them, the feature conflict is due to the fact that a feature is not copied from a noun onto other elements within DP after the error has taken place. Such a feature conflict may result from several types of errors. First of all, there are thirteen noun substitutions in my corpus in which the noun does not agree with the determiner; twelve of these substitutions are form-based (e.g. (4-79a)) while only one is meaning-based (4-79b).

(4-79) Feature conflict (gender) due to a substitution

a. immer der gleiche Chaos, äh, Kasus
   always the.m same chaos(n.), er, case

b. als er bei der Bruder, äh, bei der Schwester
   when he with the.f.DAT brother(m.), er, with the.f.DAT sister(f.)
   von R. in London war
   of R. in London was

In subsection 4.3.3, I have already pointed out that this distribution actually is the expected one. Remember that meaning-based substitutions occur when roots are selected from List 1, i.e. at a point at which agreement relations have not yet been established. In contrast, form-based substitutions occur when Vocabulary items are selected for insertion at PF. At this point, the implementation of agreement nodes and the copying of agreement features have already been executed and therefore, there is no way for the gender feature of the erroneously selected Vocabulary item to be copied onto the determiner. Consequently, the reason for the observed feature conflicts in noun substitutions is that these errors simply occur too late for the conflicts to be smoothed out. The meaning-based substitution in (4-79b), however, does not receive a straightforward explanation under this analysis. If we assume that [root_{bruder}]] is selected from List 1, then we cannot account for the appearance of the feature [feminine] on the determiner. Alternatively, we may hypothesize that we are dealing with a blend here, that is, that two competing roots enter the computational system. Feature conflicts resulting from blends will be further discussed below (cf. (4-81)).

The second type of error that may lead to anti-agreement within DP are exchanges and anticipations of roots (in my corpus, there is no root perseveration that gives rise to a feature conflict). In most cases of root displacement, features of the affected root are
properly copied onto other material within DP at the root’s landing site (cf. the examples in (4-75bcd) in the preceding subsection). Sometimes, however, feature copy fails. In my corpus, there are eight exchanges and two anticipations in which a gender conflict is observed. Two of the exchanges were already cited in (4-66) in section 4.6, one more exchange and an anticipation are given in (4-80).
(4-80) **Feature conflict (gender) due to exchange or anticipation of roots**

a. das **Mund** läuft mir im **Wasser** zusammen  
   *the.n mouth(m.) runs me in.the.m/n water(n.) together*  
   ← das Wasser läuft mir im Mund zusammen  
   ← *the.n water(n.) runs me in.the.m mouth(m.) together*  
   “It makes my mouth water.”

b. holst du mir in der **Handtuch** das **Küchenhandtuch**?  
   *fetch you for.me in the.f.DAT towel(n.) the.n.ACC kitchen.towel(n.)*  
   ← in der **Küche** das **Küchenhandtuch**  
   ← *in the.f.DAT kitchen(f.) the.n.ACC kitchen.towel(n.)*

In (4-80a), Mund “mouth” and Wasser “water” change place; Mund, however, appears with a definite article that is marked for the [neuter] feature of Wasser (the element im which is the result of cliticizing the definite article dem to the preposition in is ambiguous with respect to the gender feature). In (4-80b), the neuter compound Handtuch “towel” is anticipated and combines with the feminine dative article of Küche “kitchen”.

In section 4.6, I have argued that there are two ways to account for these errors. Since the determiner positions are marked for the gender feature of the original roots, the errors must occur after the copying of agreement features has been executed. We may therefore assume that first the gender features are copied onto D at MS, that after gender copy, the roots are exchanged or anticipated, respectively (also at MS), and that finally, Vocabulary items are inserted. Alternatively, we may think of these errors as occurring at PF, i.e. after Vocabulary items were inserted. This, of course, implies that not roots are affected in these errors but rather words. Once again, these PF errors can not be followed by adaptation processes of any kind (just as the formal substitutions discussed before).

Blends have by far the highest share in DP agreement errors. There are 53 blends in my corpus that give rise to a feature conflict, two of which are given in (4-81).

(4-81) **Feature conflict (gender) due to a blend**

a. das wird ein ganz spannend-es **Wettkampf**, äh, Finale  
   *that be.FUT a.m/n very exciting-n competition(m.), er, final(n.)*  
   ← ein ganz spannend-es Finale // ein ganz spannend-er Wettkampf  
   ← *a very exciting-n final(n.) // a very exciting-m comp.(m.)*

b. er hat uns durch diesen **Weingewölbe** gejagt  
   *he has us through this.m wine.vault(n.) chased*  
   ← durch diesen Weinkeller // durch dieses Weingewölbe
In these blends, two roots which are semantically close to each other receive activation from the conceptual level; both of them enter the computational system and compete for one single terminal node. At first, no decision is made. When feature copy takes place at MS, only one of the competing roots can transmit its gender feature to the adjective and/or the determiner: in (4-81a), [root_{stuck\_nomin}] transmits its feature [neuter], in (4-81b), [root_{keller}] transmits its feature [masculine]. However, when Vocabulary insertion takes place, the Vocabulary item corresponding to the other root is inserted. That is, it is only at PF that a decision between the two roots is made.

In passing, I wish to point out that this is not true for all blends. Rather, in a number of blends, a decision between two alternatives is made at an earlier point of the derivation. All of these, however, involve a competition amongst phrases. Consider the following two slips:

(4-82) **Blends involving accommodation**

a. das ist wirklich ein dick-es Stück
   that is really a.n thick-NOM piece(n.)

b. er hat eine Menge Leute, die ihm nach der Fahne reden
   he has a lot.of people who him after the.f.DAT flag(f.) speak

Both of the above errors involve idiomatic expressions. In (4-82a), the two idiomatic expressions - both meaning “That’s really a bit much” - receive activation from the conceptual level. Then [root_{stuck}] for some reason replaces [root_{hund}] in the competing planning frame. This replacement takes place before agreement features are copied. Consequently, the gender feature of [root_{stuck}] will be copied onto the indefinite article and the adjective. At PF, the Vocabulary item /_tYk/ will be inserted and a fully grammatical utterance surfaces. Note that if replacement of [root_{stuck}] for [root_{hund}] had occurred after
feature copy at MS, then the ungrammatical utterance *das ist wirklich ein dicker Stück* ‘that is really a.m thick.m piece(n.)’ would have surfaced.\textsuperscript{126}

In subsection 2.4.2, I have already pointed out that blends like (4-82a) allow for two

\textsuperscript{126} Since in (4-81), two roots compete and not two phrases, replacement of one root for the other before feature copy would of course not have given rise to an error. Maybe, the speaker would have uttered *ein spannender Wettkampf* instead of *ein spannendes Finale*, but only the self-repair would have given a clue that something went wrong.
different interpretations. The alternative interpretation is to assume that not [root_{stück}] is the intruder whose gender feature will be copied onto the adjective, but rather that [root_{dick}] takes the place of [root_{stark}]. A similar analysis, however, is not available for the blend in (4-82b). In this error, it is unambiguously [root_{fahne}] (without the diminutive feature) which intrudes into the competing planning frame and takes the position of another root that is licensed by a determiner. Again, the gender feature of [root_{fahne}] will be copied and a perfectly well-formed sentence is uttered.\(^\text{127}\)

The second type of error that may lead to a feature conflict are errors of subcategorization. In my corpus, there a 81 slips of this type, 70 of which result from a blend. Two examples for these are presented in (4-83).

(4-83) **Feature conflict (case) due to a blend**

a. dass wir keine Sprache erwerben, die bestimmten UG-Prinzipien *verletzt*  

   that we no language acquire that certain.DAT UG-principles violates  
   ← die bestimmten UG-Prinzipien widerspricht //  
   ← that certain.DAT UG-principles contradicts //  
   die bestimmte UG-Prinzipien verletzt  
   that certain.ACC UG-principles violates

b. wer hat dich am meisten *imponiert* ← dich am meisten  

   who has 2.SG.ACC the most impressed ← 2.SG.ACC the most  
   beeindruckt // dir am meisten imponiert  
   impressed // 2.SG.DAT the most impressed

The explanation for these two errors is quite similar to the one given above for the DP agreement errors resulting from blends (cf. (4-81)). Once again, two roots compete for one single terminal node (this time being licensed by a light verb) and, once again, no decision is made prior to PF. At MS, one of the two competing roots assigns case to the argument DPs. At PF, however, the other root is selected for insertion from the Vocabulary. Consequently, a case conflict arises.

In (4-83a), [root_{verletzt}] “violate” and [root_{widersprech}] “contradict” are in competition, the former assigning accusative case, the latter assigning dative case. In the error,  

\(^{127}\) The remaining 25 cases of anti-agreement within DP are not due to the fact that a gender feature was not copied from a root onto other elements within DP. Rather, they either result from erroneous feature copy (comparable to erroneous feature copy in SVA errors; see footnote 27 and (4-88a) below for examples) or from anticipation, perseveration, or exchange of material in D (as e.g. in *den Hand vor die Mund, äh, die*
[root(widersprech)] assigns case to the object DP at MS, but [root(veralz)] is inserted at PF. Obviously, the English interlinear translation for (4-83b) is not very helpful, since the
German verbs *imponieren* and *beeindrucken* are both translated as “to impress”. Still, *imponieren* assigns dative case to the object DP (here: the pronoun) while *beeindrucken* assigns accusative case. At MS, the pronoun receives case from \([\text{root}_{\text{beeindruck}}]\), at PF, however, the Vocabulary item /imponi:/ is inserted.\(^{128}\)

Finally, failures of adaptation may also be observed in stranding errors. In these errors, the conflict is not due to a case or gender mismatch. Rather, the reason for the conflict is either that a suffix does not meet the subcategorization properties of a stem or that a stem is not properly spelled out in its new environment. Two relevant examples were presented in (4-58) in subsection 4.5.3, two more are given below:

(4-84) *Failure of adaptation in stranding errors*

a. im Wolk-en nord-ig \(\leftarrow\) im Norden wolk-ig  
\(\text{in.the.m.DAT\ cloud(f.)\ north-ADJ\ \leftarrow\ in.the.m.DAT\ north(m.)\ cloud-ADJ}\)

b. um ihre Kräft-er zu bänd-ig-en  
\(\text{in.order her strength-PL to ligament-ADJ-INF}\)  
\(\leftarrow\) ihre Bänd-er zu kräft-ig-en  
\(\leftarrow\) her ligament-PL to strength-ADJ-INF

Apparently, in both of the errors in (4-84), no roots are exchanged. In (4-84a), the stranded element -en happens to be the plural suffix of *Wolke* “cloud”, but this is a mere coincidence, since no plural feature is present in the intended utterance. The stranded element -ig is an adjective-forming suffix; still, it is not the appropriate one for \([\text{root}_{\text{nord}}]\). Moreover, there is a feature mismatch between the cliticized article and the noun. All these characteristics indicate that the error occurs after Vocabulary insertion, that is, that phonological material has been exchanged at PF. If two roots had been exchanged before Vocabulary insertion, the expected outcome would have been *in der Wolke nörd-lich* (or possibly *nord-ish*) ‘in the.f.DAT cloud(f.) north-ADJ’.

\(^{128}\) Some of the subcategorization errors resulting from blends are more intricate. Consider e.g. the following slip: *diesen Ausdruck gefällt mir gut\(\leftarrow\) diesen Ausdruck finde ich gut // dieser Ausdruck gefällt mir gut* ‘this.ACC expression pleases 1.SG.DAT good \(\leftarrow\) this.ACC expression find 1.SG.NOM good // this.NOM expression pleases 1.SG.DAT good (“I think this expression is good // this expression pleases me very much”). In order to explain this error, we must assume that each of the competing roots assigns one case at MS, \([\text{root}_{\text{find}}]\) assigns accusative case to [\text{for diesen Ausdruck}] while \([\text{root}_{\text{gut}}]\) assigns dative case to the first person singular pronoun. Consequently, there is no nominative argument in the error.

The eleven remaining errors of subcategorization that do not result from blends are either due to case anticipations/perseverations, to the anticipation/exchange of definite articles, or to the anticipation/exchange of words.
The same is true for the exchange in (4-84b). If two roots had been exchanged, we would expect [root_{kraft}] to appear with the appropriate plural suffix (the plural form of Kraft “strength” is Kräfte). It is, however, not entirely clear if bändigen “to tame” would be
the expected outcome for $\text{root}_{\text{band}}$ in a position that is licensed by v. In any case, stranding of the plural suffix of Band “ligament” implies that we are not dealing with a root exchange prior to Vocabulary insertion but rather with a PF error.

In conclusion of this subsection, let me emphasize the following facts: There is a considerable number of errors in my corpus in which adaptation of either the affected element(s) or of the environment to post-error conditions is not observed. Failure of adaptation may concern feature copy within DP, case assignment, and proper spell-out of stems and affixes.

I have claimed that the reason for the various failures of adaptation is that the errors occur too late for adaptation to take place. Most of the feature conflicts within DP (blends and form-based substitutions) arise at the point of Vocabulary insertion, i.e. at a point of the derivation at which features have already been copied. The only exception are the few exchanges and anticipations that lead to a feature conflict. I have argued that those are probably due to a root exchange/anticipation after feature copy but before Vocabulary insertion. Blends leading to a subcategorization error - just as blends leading to anti-agreement within DP - are due to a late decision between two elements competing for one terminal node. That is, at PF, the Vocabulary item corresponding to the competitor that has not transmitted its feature (case or gender) at MS is inserted. Finally, adaptation failures in stranding errors are also due to the phonological character of these errors. Such slips occur at PF and therefore, they can not have any impact on morpheme insertion rules or phonological readjustment rules.

Consequently, the errors presented in this subsection contrast sharply with the morphosyntactic, morphological, and morphophonological “accommodations” presented in subsection 4.7.1, all of which involve the manipulation of abstract roots (or features) before or at the level of MS. I therefore conclude that whenever an adaptation to grammatical well-formedness restrictions is observed in an error, this error must have occurred before Vocabulary insertion is executed.

At the end of this section, I do not want to fail to present another particularly intricate error, the explanation of which is a challenge for every theory:

(4-85) Another problematic error

\begin{verbatim}
man muss die Wurzel an der Übel packen
one must the.f.ACC root(f.) at the.f.DAT evil(n.) grab
\end{verbatim}
The problematic property of this exchange error is that adaptation to well-formedness restrictions, i.e. copy of the gender feature, is observed in only one position. While the DP \[\text{DP die Wurzel}\] is fully grammatical, there is a feature mismatch in the DP \[\text{DP der Übel}\]. To be honest, I see no elegant way to account for these facts. On the one hand, if two roots had been exchanged before feature copy (just as in (4-75bd) above), then the grammatical sequence \textit{die Wurzel an dem Übel packen} should have surfaced (with feature copy within both DPs). On the other hand, if the root exchange had taken place after gender features of the roots were copied onto the respective determiners (just as in (4-80a) above), then the ‘even more ungrammatical’ utterance \textit{das Wurzel an der Übel packen} (which involves feature mismatches within both DPs) would be the expected one. In order to somehow handle this slip, we have to assume that firstly, the gender feature of \[\text{root}_\text{wurzel}\] but not that of \[\text{root}_\text{übel}\] is copied onto the determiner, secondly, the roots are exchanged, and thirdly, the gender feature of \[\text{root}_\text{wurzel}\] is copied for a second time at its landing site. That is, the gender feature of \[\text{root}_\text{wurzel}\] is copied twice while the gender feature of \[\text{root}_\text{übel}\] is not copied at all.

### 4.8 Three Complex Cases

... l’irrégularité, c’est-à-dire l’inattendu, la surprise, l’étonnement sont une partie essentielle et la caractéristique de la beauté.\(^*\)

(Charles Baudelaire, Fusées)

In the final section of this chapter, I shall present a detailed analysis and discussion of three particularly interesting slips of the tongue, thereby summarizing the mechanisms argued for in the preceding sections and illustrating how the derivation of (erroneous) utterances proceeds. Note that the errors analyzed below are definitely exceptional cases with respect to the number of MS and PF operations that need to be referred to in order to account for them. Still, such errors - rare as they may be - are processed and require an explanation.

\(^*\) “...the irregular, that is, the unexpected, the surprise, the astonishment are an essential part and the characteristic of beauty.”
The first slip I want to discuss is the one given in (4-86a). This is an instance of an incomplete, i.e. the erroneous utterance is self-repaired immediately after the error element klägliches (meaning “miserable”). Still, in this particular case, we can say with certainty that we are dealing with a root exchange (and not an anticipation), since in the error, the indefinite article as well as the adjective appear in their neuter form. This adaptation of the article and the adjective is due to the fact that the second error element [rootₜ(übl)] “bad”, i.e. the one that is not part of the erroneous utterance due to the self-repair, is of neuter gender. Therefore, we may assume that the complete erroneous utterance that was planned actually was das ist wirklich ein ganz klägliches Übel ‘this is really a very miserable evil(n.)’. A syntactic structure for the DP after root exchange is given in (4-86b).

(4-86) Slip #1: Syntactic structure after root exchange

a. das ist wirklich ein ganz kläglich-es, äh, this is really a.n.NOM very charge-ADJ-n, er, eine ganz übl-e Klage a.f.NOM very bad-f charge  
   “This is really a very miserable, er, a very bad charge.”

b. 

\[
\begin{array}{c}
\text{DP} \\
\text{D} \\
\text{[-def]} \\
\text{DegP} \\
\text{Deg} \\
\text{[rootₜ(ganz)]} \\
\text{LP} \\
\text{L} \\
\text{[rootₜ(übl)]} \\
\text{[+neut]} \\
\text{[rootₜ(klag)]} \\
\text{[+fem]} \\
\end{array}
\]

root exchange

Note that due to the assumption that roots are acategorial in nature, we must also assume that they are always selected from List 1 along with their inherent gender feature, no matter what licensing environment they appear in. Still, this inherent feature plays a role only when a given root takes a position that is licensed by a determiner; that is, only in these cases will the gender feature be transmitted to other elements at MS. In (4-86b), the gender
feature of \([\text{root}_{\text{klag}}]\) does not play any role in a [+deg] environment; it may therefore be deleted at MS. This deletion is accounted for by the morphosyntactic readjustment (impoverishment) rule in (4-86c). In contrast to that, it is clear that \([\text{root}_{\text{übl}}]\) must bring along its gender feature in the exchange, since it is that very feature that is copied onto other elements within DP at MS. If we assumed that roots that are not licensed by a determiner do not possess a gender feature, then the post-error adaptation in (4-86a) could not be explained.

After the root exchange has taken place, feature copy will be executed. Moreover, at MS, the DP will receive nominative case. These operations are indicated in the structure in (4-86d) below.

(4-86) *Slip #1: MS operations (readjustment, case assignment, feature copy)*

c. Morphosyntactic readjustment rule:

\[
\begin{align*}
\text{[gender feature]} & \rightarrow \emptyset / [+\text{deg}] \\
\end{align*}
\]

d. The structure (4-86d) is the basis for Vocabulary insertion at PF. As you can see, the Vocabulary item for \([\text{root}_{\text{klag}}]\) is licensed in all environments, in a [+v] environment, however, only if the light verb is filled by the feature [+cause] (i.e. except for certain poetic contexts, \(\text{klagen}\) only takes agentive arguments in SpecvP). The feature complex in D - the [+def] feature taken from List 1, the [+neut] feature that was copied, and the [NOM] feature that percolated down from DP - is realized by the Vocabulary item /ain/. Finally, a
combination of the features [+neut] and [NOM] will trigger the insertion of the suffix /-´s/.

\[129\] Note that the feature combination [+neut] and [NOM] may also appear in a [-v][-deg] environment (i.e. in a position licensed by a determiner). In this environment, however, these features will necessarily cooccur with the feature [3rd] and consequently, the more specified Vocabulary item /s/, the third person singular neuter nominative pronoun, will be inserted.
**Slip #1: PF operations**

e. Vocabulary insertion:

\[
\begin{aligned}
\text{[root}_{\text{kla:g}]} & \iff /\text{kla:g/} \\
(\text{licensing environment: } [\pm v], [\pm \text{deg}], [+\text{cause}]) \\
[-\text{def}][+\text{neut}] & \iff /\text{ain/} \\
[\text{NOM}] & \\
[+\text{neut}][\text{NOM}] & \iff /-\dot{s}/
\end{aligned}
\]

f. Phonological readjustment rule for /kla:ɡ/

\[
[+\text{back}] \rightarrow [+\text{-back}] /[-v][-\text{deg}]
\]

g. Morpheme insertion rule

Insert /-IIX/ / Y + [+\text{deg}]

(\text{where } Y = [\text{root}_{\text{kla:ɡ}]}, ...)

Moreover, at PF, the phonological readjustment rule (4-86f) will trigger umlaut formation in the Vocabulary item /kla:ɡ/ and the morpheme insertion rule (4-86g) will insert /-IIX/ in a [+deg] environment (as argued for in footnote 59, the underspecified segment /X/ will surface as /ç/ after front vowels). Note that we may also assume that the morpheme is inserted first and that umlaut is triggered in Y in the context Y + /-IIX/ (there are, however, exceptions to that rule; cf. \textit{Frage} “question” \rightarrow \textit{fraglich} “questionable” (*fräglich)).

The second slip that will be subject to discussion is the one cited in (4-87a). This is a root exchange, too, but one without self-repair. The structure in (4-87b) indicates that I assume that [\text{root}_{\text{folg}]} “follow” and [\text{root}_{\text{versuch}]} “tempt/try” change place before movement of [\text{root}_{\text{folg}]} to v, Tns, and C. This assumption - albeit unprovable - is based on the fact that at deep structure, the two roots are adjacent to each other (within LP₁) while at surface structure, they are in considerable distance from each other.

(4-87) **Slip #2: Syntactic structure after root exchange (at DS)**

a. ich \textbf{versuch-e} die \textbf{Folg-e} \leftarrow \text{folg-e} der \textbf{Versuch-ung}  

\begin{quote}
I tempt-1.SG the.f.ACC follow-N(f.) \leftarrow follow-1.SG the.f.DAT tempt-N(f.)
\end{quote}

“I try the order/sequence \leftarrow I follow the temptation.”
After error occurrence, it is \([\text{root}_{(\text{versuch})}]\) that is raised to the light verb, then to Tns, and finally to C. Once again, a fully grammatical utterance surfaces, the translation of *ich versuche die Folge* being something like “I try the order/sequence”.

At MS, various things happen: Firstly, AgrS is implemented as a sister node of Tns and features of the subject DP are copied onto AgrS (subsequently, Tns and AgrS will probably fuse, since no Vocabulary item is inserted for [-past]). Secondly, the gender feature of \([\text{root}_{(\text{folg})}]\) is transmitted to the determiner (here, I neglect the deletion of the gender feature of \([\text{root}_{(\text{versuch})}]\)). One particularly interesting property of this error, however, is that after the exchange, the object DP is assigned a different case feature. While in the intended utterance, \([\text{root}_{(\text{folg})}]\) assigns dative case to the object DP, in the erroneous utterance, accusative case is assigned by \([\text{root}_{(\text{versuch})}]\).
At PF, Vocabulary items are inserted into terminal nodes (4-87d). The items for [root\textsubscript{folg}] and [root\textsubscript{versuch}] are both licensed in all three possible environments. One difference, however, concerns the insertion in a [+v] environment. While [root\textsubscript{versuch}] is only permissible in a [+cause] context, [root\textsubscript{folg}] is also allowed in a [-cause] context (as e.g. in genuanere Informationen folgen ‘more.precise informations follow’).

The features [1st] and [NOM] are realized by the Vocabulary item /ιε/ (neglecting underspecification). The feature complex in D - the only difference to the intended utterance being the case feature - triggers insertion of the item /di:/.

Moreover, the feature [1st] under the fused Tns/AgrS node is responsible for insertion of the suffix /’/. 
d. Vocabulary insertion

\[
\begin{align*}
\text{[root}\text{(_folg)]} & \quad \leftrightarrow \quad /\text{fçlg}/ \\
\text{(licensing environment: \[\pm v\], \[\pm \text{deg}\], \[\pm \text{cause}\])} \quad & \\
\text{[root}\text{(_versuch)]} & \quad \leftrightarrow \quad /\text{feåzu:x}/ \\
\text{(licensing environment: \[\pm v\], \[\pm \text{deg}\], \[\pm \text{cause}\])} \quad & \\
\text{[1st][NOM]} & \quad \leftrightarrow \quad /\text{Iç}/ \\
\text{[+def][+fem]} & \quad \leftrightarrow \quad /\text{di}/ \\
\text{[ACC]} & \\
\text{[1st]} & \quad \leftrightarrow \quad /\-'/
\end{align*}
\]

e. Morpheme insertion rule:

```
Insert /-'/ / X + [-v][-deg]
(where X = [root(_folg)], ...)
```

If we follow Wiese’s (1996) analysis of schwa as a noun-forming suffix (see footnote 57), then we must postulate the morpheme insertion rule in (4-87e) which suffixes /-'/ in case [root(_folg)] is licensed by a determiner. Alternatively, we might assume that the Vocabulary item realizing [root(_folg)] (or [root(_folge)]) is actually /fçlg'/, with schwa being deleted in certain contexts.

The third and final slip of the tongue I wish to present in this section is quite different from the ones analyzed above. Firstly, the error in (4-88a) is not a root exchange but rather a combination of two errors, namely of a root anticipation (or exchange) and a copy failure. Secondly, the resulting utterance is ungrammatical. In the structure in (4-88b), I choose to analyze the first error step as a root anticipation at deep structure. Due to the self-repair, however, the slip might also be analyzed as an incomplete root exchange. Moreover, the error may also have occurred at surface structure. Note that - except for head movement of [root(_hab)] “have” to v and then to Tns - the structural conditions within LP₁ are exactly the same at deep and at surface structure.

As argued for in subsection 4.2.2, concepts are activated at the conceptual stratum according to a preverbal message intention. Due to the network character of the conceptual stratum, activation may spread from activated concepts to neighboring concepts. The two concepts WAND “wall” and MAUER “wall” in (4-88a) are obviously semantically related to
each other. Therefore, they both receive activation at the conceptual stratum. Activation is feeded forward to List 1 where no decision between the two competitors is made. Rather, both roots are selected and compete for insertion in one terminal node, as is indicated by the rectangle in (4-88b) (note that \([\text{root}_{(\text{wand})}]\) and \([\text{root}_{(\text{mauer})}]\) are specified for the same gender feature).

(4-88) **Slip #3: Anticipation of competing root (at DS)**

a. weil sie im Hof auf dem Wand, äh, because she in.the.m.DAT courtyard(m.) on the.m.DAT wall(f), er, auf der Seite eine Mauer hat on the.f.DAT side(f.) a.f.ACC wall(f) has

b. 

```
        vP
       /    \ 
      DP₁    v' 
        /  \  /
       [3rd] [+fem] v  LP₁
          /  \
         /   \ 
        P    PP  
         /\   /
        [in] D  \  
       /\     /
      [+def] D  \  
     /\       /
    LP      D  \  
   /\     [+def]  \  
  [root_{(hof)}] [root_{(mauer)}] \  
  [+masc] [root_{(wand)}] [+fem]  
```
In the error, one of the competitors - namely \([\text{root}(_{\text{wand}})]\) - is anticipated into another position that is licensed by a determiner, i.e. it is substituted for \([\text{root}(_{\text{seite}})]\) “side”.

Subsequently, the subject DP (DP₁) is moved from SpecvP to SpecTnsP, while \([\text{root}(_{\text{hab}})]\) raises to v and then to Tns (the structure above v’ is neglected in (4-88c) below). At MS, the usual operations are executed: AgrS is inserted, case features are assigned to DPs by the two prepositions and by \([\text{root}(_{\text{hab}})]\), and features are copied. At this point, however, a second error occurs: the gender feature [+masc] of \([\text{root}(_{\text{hof}})]\) “courtyard” is erroneously copied onto the definite article of \([\text{root}(_{\text{wand}})]\). Consequently, we observe anti-agreement within the lower DP.

\(\text{(4-88)}\) \textit{Slip #3: MS operations (case assignment, feature copy)}

\[
\begin{array}{c}
v' \\
\text{L} \\
\text{PP} \\
\text{P} \\
\text{D} \\
\text{DP}_{\text{DAT}} \\
\text{DP}_{\text{ACC}} \\
\end{array}
\]

At PF, the Vocabulary items given in (4-88d) are inserted. \([\text{root}(_{\text{hof}})]\) and \([\text{root}(_{\text{mauer}})]\) can appear in each of the possible licensing environments, in a [+v] environment, however, only when the light verb is filled by a [+cause] feature (as e.g. in \textit{ich hofiere dich} “I court
"you" and in er mauert eine Wand “he builds a wall”). In contrast, \[\text{root}_{\text{wand}}\] cannot appear in a \[+v\] environment and its appearance in a \[+\text{deg}\] environment is questionable (the only possible forms in a \[+\text{deg}\] context are some very few derived compounds like dünnwandig “thin-walled”; note, however, that the noncompound adjective wandig is not attested).

Moreover, Vocabulary items are inserted that match the feature complexes (case, gender, and definiteness) in D.

(4-88) **Slip #3: PF operations**

d. Vocabulary insertion

\[
\begin{align*}
\text{[root}_{\text{hof}] \quad & \leftrightarrow \quad /\text{ho:f}/ \quad \text{(licensing environment: } [\pm v], [\pm \text{deg}], [+\text{cause}])} \\
\text{[root}_{\text{wand}] \quad & \leftrightarrow \quad /\text{vaNd}/ \quad \text{(licensing environment: } [-v], [\pm \text{deg}])} \\
\text{[root}_{\text{mauer}] \quad & \leftrightarrow \quad /\text{mau}å/ \quad \text{(licensing environment: } [\pm v], [\pm \text{deg}], [+\text{cause}])} \\
\text{[+def][+masc]} \quad & \leftrightarrow \quad /\text{de:m}/ \quad \text{[DAT]} \\
\text{[+def][+fem]} \quad & \leftrightarrow \quad /\text{ain´}/ \quad \text{[ACC]}
\end{align*}
\]

In this example, no readjustment or morpheme insertion rules apply. However, various phonological rules are at work. For the purpose of illustration, I will consider only the Vocabulary item /\text{vaNd}/. As argued in subsection 4.7.1, nasals are not underlyingly specified for place features and assimilate to the place feature of a following obstruent (regressive spreading). Therefore, the underspecified segment /\text{N}/ will receive the place feature [coronal] from the segment /d/. The segment /d/ itself is also affected by a phonological rule, namely final devoicing. Consequently, the phonetic form of the Vocabulary item that surfaces is [vant].

The error in (4-88a) is definitely not of the sort that Cutler (1988) would call a “perfect speech error”, since other interpretations than the one sketched above are also conceivable. We could, for instance, analyze the error as a phonological perseveration of the segment /m/ at the level of PF. Moreover, since cliticization of the definite article dem to the preposition in is a late process, we might also hypothesize that the whole article is perseverated at PF. The same qualification does, of course, hold for many of the other slips discussed in this thesis.
Nevertheless, all of the errors presented and discussed in this chapter - as well as those presented in chapter 2 - make an important contribution to our understanding of the processing and manipulation of morphosyntactic and syntactic features in language production. In particular, the above discussion of three complex speech errors has illustrated how the interplay of syntactic operations (e.g. head movement), morphosyntactic operations (e.g. feature copy), Vocabulary insertion, phonological readjustment rules, and morpheme insertion rules - the last three determined and constrained by licensing elements - allows us to give an account for these and many other speech errors.

5 Conclusion: The Grammar as Processor

From the fruit of the mouth
one’s stomach is satisfied;
the yield of the lips brings satisfaction.
(Proverbs 18,20)

In this chapter, I will come back to the psycholinguistic multi-level model of language production (as sketched in section 4.1). I shall first show how the DM model of grammar (cf. (3-1)) can be integrated into the production model (cf. (4-5)). Basically, I assume that the DM model takes the place of the formulator in Levelt’s (1989) model of language production. In order to exemplify the basic mechanisms that are active in the generation of an utterance, I will sketch the derivation of a simple intransitive sentence. Secondly, I will consider where the psycholinguistic processing levels are to be situated in this integrated model and at which stages of the grammatical derivation the various types of spontaneous speech errors occur. In conclusion of this final chapter, I am going to claim that there is no distinction between the grammar and the processor.

In chapter 2 of this thesis, I have presented various types of speech errors all of which alter the grammatical structure of an utterance. Some of these errors result in an ungrammatical utterance due to a feature conflict (e.g. gender mismatch within DP, feature mismatch between subject DP and verb), while in others, a fully grammatical string surfaces due to the adaptation of either the error element itself or of the error environment to the new facts (e.g. choice of appropriate determiner or affix, stem change).