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Cheap Repairs: A Distributed Morphology Toolkit for Sentence Construction*

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Spontaneous speech errors involving accommodation are a particularly intriguing error type and have received much attention in the literature. In accommodations, an utterance is brought in line with some grammatical (e.g. morphological, morphosyntactic) constraint after the error has taken place. They are therefore often assumed to involve two steps: the actual error and a repair process. In this article, I will show how grammar theory can help us in accounting for these complex errors. In particular, I will claim that accommodations receive a straightforward explanation when we use the tools as made available by the Distributed Morphology framework.

1. Introduction

It is quite appropriate, in the year of Sigmund Freud's 150th birthday, to take a fresh look at spontaneous speech errors. Although the perspective taken in the present paper is very different from the Freudian one, a central idea is driving both the psychoanalytic and the linguistic analysis of speech errors: in both, slips are taken to provide insight into processes that are not open to introspection. While Freud was convinced that a subconscious thought or desire surfaces in a speech error (Freud 1901), linguists take slips to provide valuable information about the time course in language production, that is, the processes mediating between a communicative intention and the articulation of an utterance (Fromkin 1971, Garrett 1975, 1980a; Dell 1986; Berg 1988; Levelt 1989).

Besides the identification of processing levels and their interaction with each other (Dell and Reich 1981; Harley 1984), slips are also taken to be revealing when it comes to the role that grammatical units and rules play in on-line production. In this context, slips of the tongue are of interest because of the assumption that the rules of grammar enter into the processing mechanism such that "evidence concerning production, recognition, [...] and language use in general can [...] have bearing on the investigation of rules of grammar" (Chomsky

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1980:200f). Crucially, “the essential factor in linguistic behavior is linguistic competence, so that all phenomena of language production, even pathological phenomena, can be related to competence” (Bierwisch 1982:31).

In line with these assumptions, I will consider how a set of speech error data—errors involving accommodation—can be accounted for within a particular grammar theory, the theory of Distributed Morphology (DM). To that end, I adopt the ideas of weak mentalism (Katz 1964; Chomsky 1980). That is, I am not going to claim that every detail of the theory—theoretical constructs like e.g. V-to-Tns movement or fusion of terminal nodes—must be isomorphic to some psychological counterpart. Rather, I shall demonstrate that DM makes for a psychologically real theory of grammar in the sense that it allows for an elegant explanation of the data under investigation and, moreover, makes correct predictions about possible and impossible errors.

I will proceed as follows: I head off by sketching (some of) the central ideas of DM in section 2, thereby introducing the tools I need to account for the speech errors. In section 3, I introduce the concept of accommodation. This concept will figure prominently in the remainder of the paper, since all of the errors I will be concerned with involve some kind of accommodation. In sections 4 to 6, I show how the tools provided by DM help us to account for some quite intricate error data. In section 7, I will briefly address the problem of competing nominalization for one and the same root. Finally, in section 8, I discuss two particularly complex errors to further illustrate the application and interaction of the proposed tools.

2. Distributed Morphology

In this section, I will first describe the general make-up of grammar, as assumed in Distributed Morphology (Halle 1990; Halle and Marantz 1993; Harley and Noyer 1998, 2003). In section 2.2, I will introduce the operations that will turn out to play an important role in accounting for the speech error data: local licensing, phonological readjustment, and morpheme insertion.

2.1 The structure of grammar

The theory of Distributed Morphology is separationistic in nature in that it adopts the idea that the mechanisms which are responsible for producing the form of syntactically and semantically complex expressions are separate from the mechanisms which produce the form of the corresponding phonological expressions. The model of grammar as adopted in Halle and Marantz (1993) and subsequent work is sketched in Figure 1. One of the core assumptions of DM is that syntax proper does not manipulate anything resembling lexical items, but rather, generates structures by manipulating and combining abstract roots and morphosyntactic features (taken from List 1, the “narrow” lexicon) by means of various syntactic operations (such as movement and merger).

At the post-syntactic level of Morphological Structure (MS), the arrangement and number of terminal nodes may be changed, for instance, by insertion of agreement nodes, feature copy, and morpheme insertion. Phonological matrixes are assigned to terminal nodes only after syntax at the level of Phonological Form (PF); this is referred to as “late insertion” (Marantz 1995).

Phonologically specified forms, Vocabulary items (VIs), are drawn from List 2, the Vocabulary. A VI is not merely a phonological string; rather, it also contains information about where that particular string may be inserted. Note that various VIs may compete for insertion in a given terminal node, with the most highly specified item that does not conflict in features with the specification of this terminal node winning the competition. Moreover, at PF, phonological readjustment rules may apply that change the phonological form of already inserted Vocabulary items (VIs) in certain syntactic contexts.

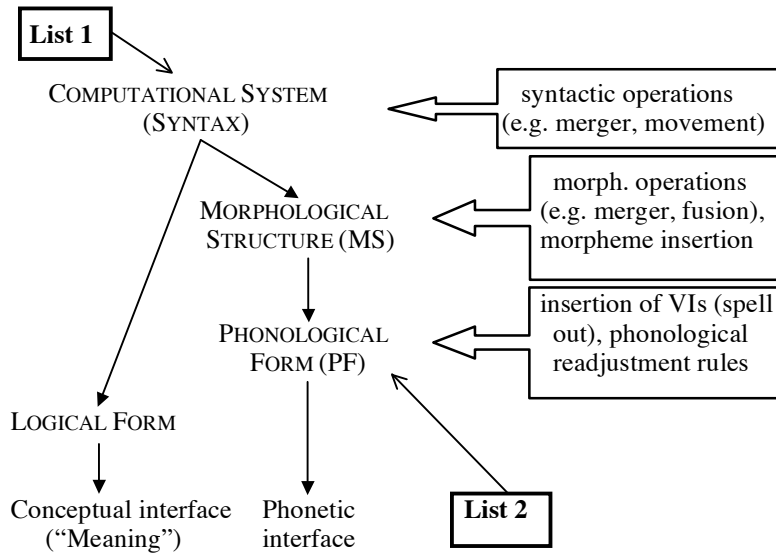


Figure 1
Structure of the grammar in DM

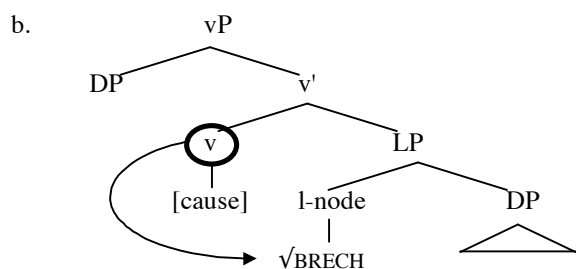
2.2 Local licensing, phonological readjustment, and morpheme insertion

One assumption that will turn out to be crucial in the discussion of speech errors below is that the roots drawn from List 1 have no categorial specification. Rather, the traditional terms for sentence elements (such as noun, verb, and adjective) are taken to be essentially derivative from more basic morpheme types (Marantz 1997; Harley and Noyer 1998). That is, in syntax, there is only one type of lexical node (l-node) whose categorial status is defined by its context. A noun, for instance, is a root whose nearest c-commanding functional head is a determiner, or put differently, a noun is a root which is locally licensed by a determiner. Similarly, a verb is a root which is locally licensed by a light verb and

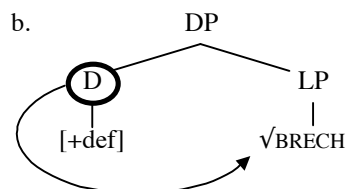
an adjective is a root which is locally licensed by a degree element (Corver 1997).¹

Consider the examples in (1a) and (2a) and the corresponding (simplified) structures in (1b) and (2b), respectively. In both structures, the I-node hosts the same categorially unspecified root $\sqrt{\text{BRECH}}$ 'break'. In (1b), the verbal status of this root is the result of inserting a VI into a terminal node that is governed by v. In contrast, in (2b), the nominalization of the same root is the result of the VI appearing in a node that is governed by D. In the structures below, licensing is indicated by an arrow.

- (1) a. Peter brich-t den Stock
Peter break-3.SG the stick



- (2) a. der Bruch
the breaking



In both examples, the VI that is inserted at PF to spell out $\sqrt{\text{BRECH}}$ will be the same, namely /brɛX/.² The relevant VIs for (1a) and (2a) are given in (3), where the first one spells out a root and the second one a feature complex. Note that the relevant agreement features must have been copied onto the agreement node be-

¹ The idea of acategorial roots is also adopted in Marantz (2001); his implementation, however, is different. According to Marantz, the construction in which a root occurs is assigned a category through merger with a category node (a head) called "little x," in which x can be a verb (little v), a noun (little n), or an adjective (little a). Little x determines the edge of a cyclic domain at which a derivation is shipped off to PF and LF. In accounting for the speech errors below, I follow the ideas as formulated in Harley and Noyer (1998). However, the data in which local licensing comes to fruition could as well be accounted for in Marantz's little x theory.

² Following Wiese (1996), in (3a) and (4), I use capital X for an underspecified fricative. A phonological rule will turn /X/ into palatal [ç] after front vowels and into velar [x] after back vowels.

fore Vocabulary insertion takes place. Depending on the syntactic environment, however, different phonological readjustment rules will apply after Vocabulary insertion has taken place. The readjustment rule in (4a) is responsible for the surface form in (1a), while the rule in (4b) derives the surface form in (2a)³; cf. section 6.2 for further discussion.

- (3) a. $\sqrt{\text{BRECH}}$ \leftrightarrow /brɛX/
b. [3.SG] \leftrightarrow /-t/
- (4) a. /brɛX/ \rightarrow /brɪX/ / [+v] [3.SG]
b. /brɛX/ \rightarrow /brʊX/ / [+d]

Frequently, a root is accompanied by some derivational morpheme, depending on the licensing environment. Such morphemes are inserted at MS by means of a morpheme insertion rule. Consider, for instance, the German nominalization *Trenn-ung* (‘separation’) which is composed of $\sqrt{\text{TRENN}}$ (taken from List 1) and the abstract morpheme [ung]_μ which is inserted only at MS by means of the rule in (5); see section 5 for details.⁴

- (5) Insert [ung]_μ / \sqrt{X} licensed by [+d]
(where X = $\sqrt{\text{TRENN}}$, $\sqrt{\text{HALT}}$, $\sqrt{\text{ACHT}}$...)

3. Resolving conflicts by means of accommodation

The speech errors that I will be concerned with in the remainder of this paper are all errors “in which the phonetic shape of elements involved in errors accommodates to the error-induced environment” (Garrett 1980b:263). This phenomenon is commonly referred to as “accommodation” in the literature. Accommodations have been described as involving a sort of post-error repair process. In this section, I will first briefly discuss the distinction between error and context accommodation (section 3.1) and then present a typology of accommodations (section 3.2).

3.1 Error vs. context accommodation

The element which may be subject to an accommodation may either be the shifted element itself or the environment in which a shifted element happens to land. The former case, called error accommodation, is illustrated in the exchange

³ Note the specification of agreement features in the readjustment rule in (4a). Crucially, the rule does not apply in the presence of a plural feature or in the presence of the feature [1.SG]. It does apply, however, in the presence of [2.SG].

⁴ Note that square brackets followed by subscript “μ” represent a morpheme, not a phonetic transcription.

in (6a).⁵ In this slip, the exchanged verbs both undergo a phonological change in their new positions. The latter case, referred to as context accommodation, is exemplified by (6b). Here two pronouns change place and the verb accommodates to the featural specification [2.SG] of the new pronoun in subject position. The exchange (6c) shows that both types can co-occur in one error: clearly, the exchanged pronouns and the verbal inflection accommodate.

- (6) a. I don't know that I'd hear one if I knew it (Garrett 1980b:264)
 ← that I'd know one if I heard it
- b. you're too good for that ← that's too good for you
 (Stemberger 1982:344)
- c. 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'
 (Meringer 1908, in Berg 1987:282)

In the following, I will for the most part be concerned with context accommodations, since error accommodations, in my opinion, are just a special kind of stranding. While usually, in stranding errors, it is an affix that is stranded in its original position (7), in error accommodations, we are dealing with stranding of abstract features.

- (7) ich glaube, mein *Stirb*-chen *bäum*-t ← mein Bäum-chen stirb-t
 I think my die-DIM tree-3.SG my tree-DIM die-3.SG
 'I think my little tree is dying.'

In other words, and adopting DM terminology, in (6a), $\sqrt{\text{KNOW}}$ and $\sqrt{\text{HEAR}}$ are exchanged and the tense specification is stranded while in (6c), the feature complexes [2.SG] and [3.SG.M] are exchanged and the case specification is stranded.

⁵ In the slip examples, the erroneous utterance is given first, while the intended utterance is given on the right (tail) side of the arrow. Whenever there is no arrow in an example, the error was self-corrected by the speaker. The error elements (i.e. the exchanged, anticipated, perseverated, substituted, or blended elements) are in *bold italic* type while the elements that undergo post-error accommodation are underlined. In all non-English errors, a translation is given only for the intended utterance.

Note that whenever no source is given for an error, it is taken from my own error corpus. At the moment of writing this article, my corpus consists of 612 spontaneous slips. These are not only slips I collected myself but also relevant errors taken from the Frankfurt corpus (comprising at present approximately 6000 slips). By "relevant" I mean errors that involve some sort of feature mismatch, a post-error accommodation, or shift or stranding of some morphosyntactic feature. This, of course, implies that my corpus is extremely—albeit deliberately—biased in that certain error types are not represented (e.g. phonological errors).

At PF, the appropriate VIs are inserted and readjustment rules apply. More errors of this type will be discussed in section 6.

3.2 A typology of accommodations

Let us now consider context accommodations in more detail. In general, accommodations are capable of reconciling processing conflicts at different grammatical levels. The Dutch error in (8) is an instance of a *phonological* accommodation: after exchange of the phonemes /k/ and /p/, the nasal assimilates to the place feature of the following velar.

- (8) *pa[ŋ]keren* ← *ka[m]peren* (Cohen 1965:183)
 (error) to camp

Phonological accommodations are generally the result of the application of a phonological rule. Obviously, when we assume underspecification, we are not dealing with accommodation in the real sense, since a feature is filled in rather than changed.

In (9), two examples of *morphophonological* accommodations are given. In the English root exchange (9a), the noun surfaces with the plural allomorph [z] appropriate for the exchanged root; in the Turkish example (9b), all three suffixes harmonize with the stem vowel in backness after vowel exchange.

- (9) a. *track cow*-[z] ← *cow track*-[s] (Fromkin 1973:27)
- b. *hukümet kür-ül-me-si*
 (error) (error)-PASS-NMLZ-POSS
 ← *hükümet kur-ul-ma-sı*
 government form-PASS-NMLZ-POSS
 ‘formation of a government’

Thirdly, in a *morphological* accommodation, after the error has taken place, a morpheme appears which is not part of the intended utterance. In the English exchange (10a), the adjectivizing suffix *-ful* replaces *-able*, thereby suppressing the nonexistent form **careable*.

- (10) a. I think it's *care-ful* to measure with *reason*
 ← reasonable to measure with care (Fromkin 1973:31)
- b. *das war zufällig die Wohn-ung,*
 that was coincidentally the.F live-NMLZ(F),
äh, die Straße, in der er wohnt
 er, the.F street(F) in which.F he live-3.SG
 ‘Coincidentally, it was the street in which he lives.’

Similarly, in the German example (10b), the anticipated root $\sqrt{\text{WOHN}}$ appears with a nominalizing suffix that is not part of the intended utterance. Note that,

since this slip was self-corrected by the speaker, it cannot be decided whether we are dealing with an anticipation or with an incomplete exchange.

Finally, in a *morphosyntactic* accommodation, the structure of an utterance is adjusted with respect to some morphosyntactic feature(s) after the error has taken place. An example involving the feature [2.SG] has been given in (6b) above. In (11), I cite two examples—one German, one Spanish—which involve the gender feature. In both slips, two nouns of different gender are exchanged; still, both the indefinite and the definite determiner (the latter being cliticized to the preposition) in (11a) as well as the indefinite determiner in (11b) surface in the form appropriate for the context created by the error.

- (11) 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(F)
 ‘Somehow I have a knot in my tongue today.’
- b. un **duro** de veinte **moneda-s**
 a.M 5.peseta(M) of twenty coin(F)-PL
 ← una moneda de veinte duro-s
 a.F coin(F) of twenty 5.peseta(M)-PL
 ‘a one hundred peseta coin’ (Garcia-Albea et al. 1989:152)

It is commonly assumed that errors such as those given above involve two error steps. The error itself occurs at an early processing level while accommodation (be it of the error element and/or its environment) to certain grammatical well-formedness restrictions takes place at a subsequent processing level (Garrett 1980a,b; Levelt 1989). Berg (1987:277), for instance, states that an accommodation is “a process whereby a processing conflict between the actual error and the context of the original utterance is reconciled.” This is taken to be evidence for the fact “that the processing system is sensitive to the eventual output.” Hence, accommodation can be seen as “a blind repair process which brings utterances in line with linguistic constraints.”

In the following, I am going to show that accommodations—above all, those of the morphological and morphosyntactic type—receive a straightforward explanation when we apply the tools as made available by DM. I am going to claim 1) that no processing conflict is reconciled in an accommodation; 2) that therefore no repair strategy is involved; and 3) that output-oriented processing need not be assumed.

4. Tool #1: Feature copy at MS

The first tool, feature copy, has only been briefly mentioned in section 2. In DM, feature copy is assumed to apply at MS, that is, before Vocabulary insertion takes place. In the present context, two types of feature copy are of interest: copy of person and number features from the subject onto the verb (or, to be

more precise, onto the AgrS node) and copy of gender and number features within DP. Subject-verb agreement will be discussed in section 4.1 while in section 4.2 I turn to gender agreement. In section 4.3, I will consider instances of feature mismatch within DP.

4.1 Subject-verb agreement

Almost all of the errors in which we observe accommodation with respect to subject-verb agreement involve the exchange of pronouns, see (6bc) above and (12a) below. Since, according to DM, only roots and abstract features are manipulated in the syntax, we must assume that in these cases, feature bundles are exchanged. Subsequently, at MS, subject features are copied onto the agreement node.

- (12) a. *sie* war 21, als *ich* gestorben bin
 3.SG.F.NOM was 21 when 1.SG.NOM die.PART be.1.SG
 ← *ich* war 21, als *sie* gestorben ist
 1.SG.NOM was 21 when 3.SG.F.NOM die.PART be.3.SG
 ‘I was 21 when she died.’
- b. die *Student-en* hab-en, äh, der Dik hat
 the.PL student-PL have-PL, er, the.M Dik have.3.SG
 einige seiner Student-en durchfall-en lass-en
 some of.his.PL student-PL fail-INF let-INF
 ‘Dik has failed some of his students.’

The slip in (12b) is the only case from my corpus in which a root is shifted (here: anticipated) together with the plural feature. Again, this plural feature is copied onto AgrS at MS and at PF, the VI /-ən/ spells out the feature [+PL]. In (13), the Vocabulary items that spell out the roots and the agreement information in the errors in (12) are listed.⁶

- (13) a. √SEIN ↔ /bɪn/ / [1.SG]
 b. √HAB ↔ /ha:b/
 [+PL] ↔ /-ən/

4.2 Gender agreement

In German, the roots that are selected from List 1 must be specified for gender, i.e. they must be linked to a gender feature to which the feature copy mechanism at MS has access. Crucially, correct insertion of a VI into a terminal node (e.g. D) underspecified for gender could not be guaranteed. Additional evidence for the early availability of gender information comes from the so-called “identical gender effect”. In various studies (Berg 1992; Marx 1999; Pfau 2000), it has been shown that nouns interacting in semantic substitutions tend to be of the

⁶ Note that for the 3rd person singular form of √HAB (i.e. *hat*, as in the intended utterance (12b)), we must either assume a more specified Vocabulary Item or a readjustment rule.

same gender. Since semantic substitutions are taken to occur when roots (“lemmas” in Levelt’s (1989) terminology) are retrieved from List 1, this is a further argument for the assumption that these roots are specified for gender.

In (11), the gender features of the exchanged roots are copied onto the respective determiner positions after the root exchange has taken place. At PF, the VIs that best match the feature bundles hosted by the D heads will be inserted. The relevant VIs for the slip in (11a) are given in (14ab), the VI for (11b) is given in (14c).

- (14) a. [ACC][−DEF][+FEM] ↔ /ainə/
 b. [DAT][+DEF][+MASC] ↔ /de:m/
 c. [−DEF][+MASC] ↔ /un/

Although the identical gender effect has been shown to constrain the interaction of nouns in semantic substitutions, it sometimes happens that intended and substituting noun are of different gender. In these cases, too, gender feature copy facilitates the insertion of the appropriate determiner at PF, as is illustrated in (15). Note that in (15b), the possessive pronoun *dein* ‘your’ need not accommodate since its phonological form is the same for neuter and masculine. It is only the sentence-final possessive pronoun—and only since the noun is elided—that undergoes accommodation.

- (15) a. du muss-t die **Tür** dann festhalten,
 you must-2.SG the.F door(F) then hold
 Quatsch, das Fenster
 rubbish the.N window(N)
 ‘You’ll have to hold the window then.’
- b. ob dein **Irrtum** genauso ausfällt wie mein-er
 whether your.M error(M) exactly turn.out like mine-M
 ← ob dein Urteil genauso ausfällt wie mein-es
 whether your.N judgment(N) exactly turn.out like mine-N
 ‘whether your judgment will turn out to be exactly like mine’

Interestingly, based on the locus of copy-operations as assumed in the DM-model, a prediction with respect to gender accommodation can be formulated. Gender accommodation should only be observed after semantic substitutions but not after form-based substitutions. Form-based substitution occur when VIs are drawn from List 2, the Vocabulary, at PF. However, at this stage, it is simply too late for accommodating the gender feature, since all feature copy operations apply before Vocabulary insertion takes place.

At least for the substitution errors in the Frankfurt corpus, this prediction is borne out. In this corpus, there are 49 meaning-based and 47 form-based singular noun substitutions in which target and intruding noun have different gender specifications. As it turns out, however, a fair number of these substitutions are not informative, since there is either an ambiguous gender cue in the envi-

ronment, as in (16a) where the indefinite determiner is the same for masculine and neuter, or no gender cue at all, as in (16b).

- (16) a. eher geht ein **Kanal**, äh, ein Kamel
 more.likely goes a.M canal(M), er, a.N camel(N)
 durchs Nadelöhr
 through.the eye.of.a.needle
 ‘it is more likely for a camel to go through the eye of a needle’
- b. sie ist nicht ohne **Wunder** bekannter
 she is not without miracle(N) more.known
 ← nicht ohne Zufall
 not without chance(M)
 ‘It is not without coincidence that she is more well-known.’

For the clear cases of gender accommodation and non-accommodation across substitution types, the distribution given in Table 1 is found: all meaning-based substitutions are followed by accommodation, while the same is true for only one out of 11 phonological substitutions (see Pfau 2000 for details).

Table 1
 Accommodation across substitution types

<i>Noun substitution</i>	<i>Accommodation?</i>	
	Yes	No
Meaning-based	21	0
Form-based	1	11

In (17a), the only case of gender accommodation following a phonological substitution is given. Note that this exceptional case cannot be explained without further stipulation (e.g. some kind of interaction between PF and MS) in the DM-model. One of the cases of non-accommodation after a form-based substitution, that is, a substitution resulting in a gender feature mismatch, is given in (17b).

- (17) a. wo sie über den **Kalender** guck-t
 where she over the.M calendar(M) look-3.SG
 ← über das Geländer
 over the.N railing(N)
 ‘where she looks over the railing’
- b. * oh, ein neu-er **Luft**, äh, Duft
 oh, a.M new-M air(F), er, fragrance(M)
 ‘Oh, a new fragrance!’

4.3 Gender mismatch

In sum, we have seen that copy operations at MS ensure surface strings with properly inflected verbs and determiners. It should be pointed out, however, that gender accommodation is not observed in all errors. In (18a) for instance, two roots are exchanged, just as in (11a), but the second definite determiner does not accommodate to the gender of *Kind* ‘child’. Note that in the dative (i.e. in the first error position), the determiner has the same phonological form for masculine and neuter gender. If following the error, gender copy had applied, the output for the second DP would have been *das Kind* ‘the.N.ACC child(N)’. Similar non-accommodated errors have been reported by Berg (1987). Consider, for instance, the slip in (18b), an anticipation or incomplete exchange, for which the grammatical output would have been *die Welt* ‘the.F.ACC world(F)’.

- (18) a. * dann bring-t er dem Hasen *den* *Kind*
 then brings-3.SG he the.M/N.DAT hare(M) the.M.ACC child(N)
 ← dem Kind den Hasen
 the.N.DAT child(N) the.M.ACC hare(M)
 ‘Then he brings the hare to the child.’
- b. * die woll-en auch *das* *Welt*,
 they want-PL also the.N.ACC world(F)
 das Licht der Welt erblick-en
 the.N.ACC light(N) the.F.GEN world(F) see-INF
 ‘They want to see the light of day, too.’ (Berg 1987:296)

Berg (1987) even states that non-accommodation of determiners is the rule in his corpus of German speech errors. While this is not true for my corpus, where non-accommodation after root shift is the exception, it still has to be admitted that errors of the type in (18) are problematic. Within the framework adopted here, we either have to assume that the actual error is accompanied by a copy failure or that the error does not affect an abstract root but rather a phonological word, i.e. that it occurs at PF after feature copy has applied (also see the discussion of (19b) and (38)).

Besides the above errors and form-based substitutions (17b), there are other errors which may give rise to a feature mismatch within DP. Amongst these are blends of DPs which contain nouns of different gender (19a), and shifts of determiners (19b).

- (19) a. * wir seh-en uns dann bei *dies-er* *Fest*
 we see-PL us then at this-F.DAT party(N)
 ← bei dies-er Party // bei dies-em Fest
 at this-F.DAT party(F) // at this-N.DAT party(N)
 ‘We will see each other at this party then.’

- b. * ein Nagelstudio für **den** Dame, äh,
 a.N nailstudio(N) for the.M.ACC lady(F), er,
 für die Dame und den Herrn
 for the.F.ACC lady(F) and the.M.ACC gentleman(M)
 ‘a studio for nail care for ladies and gentlemen’

Presumably, both these errors happen late in the derivation. In the blend (19a), two DPs are computed in parallel and at MS, both gender features are copied onto the respective D-positions. It is only at PF that a compromise between the two alternatives is reached in that the determiner of one of the competitors is spelled out (endowed with a gender feature) but the root of the other. Finally, for (19b), I assume that it is a phonological error; that is, the error occurs after Vocabulary insertion has taken place.

5. Tool #2: Morpheme insertion at MS

The second important tool in accounting for context accommodations is morpheme insertion. As already pointed out in section 2.2, at MS, morphemes may be inserted in certain syntactic environments, where syntactic environment means licensing environment. Morphological accommodation has already been illustrated in (10) above, three more examples are given in (20). (20a) is an exchange while (20b) and (20c) are incomplete errors, self-corrected by the speaker immediately after the erroneous word.

- (20) a. people still see Libya as a **nation-al danger**,
 as a danger-ous nation
- b. **Einfach-heit**, äh, Pünktlich-keit ist einfach
 simple-NMLZ, er, punctual-NMLZ is just
 nicht seine Stärke
 not his strength
 ‘Punctuality just isn’t his strength.’
- c. dass ein **Tänz-er**, äh, dass ein Linguist
 that a dance-NMLZ, er, dass a linguist
 so wild tanz-t, erwartet man nicht
 so wildly dance-3.SG expects one not
 ‘One doesn’t expect a linguist to dance so wildly.’

Again, abstract roots that are manipulated in the syntax happen to be misplaced in the errors. At MS, derivational morphemes will be inserted in certain licensing environments; the relevant morpheme insertion rules can be found in (21). Note that the insertion of one morpheme over another crucially depends on the root contained in the terminal node (see section 7 for discussion of competing nominalizations of one and the same root). Also note that the morphemes which

are inserted are abstract and may come with a gender feature, since in German, nominalization suffixes determine the gender of the word; words ending in *-ung* (10b) and *-heit* (20b), for instance, are always of feminine gender. This also implies that morpheme insertion precedes feature copy. Just like roots and feature bundles, these abstract morphemes will be spelled out at PF.

- (21) a. Insert [al]_μ / √X licensed by [+deg]
 (where X = √NATION, √COAST, √HERB ...)
 b. Insert [heit]_μ / √X licensed by [+d]
 (where X = √EINFACH, √SICHER, √SCHÖN ...)
 c. Insert [er]_μ / √X licensed by [+d]
 (where X = √TANZ, √SING, √SPIEL ...)

German slips in which, after an error, a noun surfaces with the appropriate plural allomorph (22a), as well as cases in which the grammatically correct participial allomorph—a circumfix the first part of which is identical in both allomorphs—is inserted for a verb (22b), have to be treated differently. Actually, these allomorphs do not spell out abstract morphemes inserted at MS but rather morpho-syntactic features drawn from List 1.

- (22) a. die silben-tragend-en **Akzent-e**
 the.PL syllable-bearing-PL accent-PL
 ← die akzent-tragend-en Silbe-n
 the.PL accent-bearing-PL syllable-PL
 ‘the syllables that bear accent’
- b. er hat mich ge-**dräng-t**,
 he has me PART-push-PART
 ge-bet-en ihn nicht zu dräng-en
 PART-ask-PART him not to push-INF
 ‘He has asked me not to push him.’

The examples in (22) exemplify yet another tool, as provided by DM, namely the context-sensitive spell-out of morphosyntactic features such as [+PL] and [+PART]. As far as accommodation of the plural suffix is concerned, note that the phenomenon is of a different nature in German (22a) and English (9a). While in German, choice of the appropriate plural allomorph cannot be predicted on the basis of phonological properties of the root (Köpcke 1993), in English, we are dealing with phonologically triggered allomorphy. In other words, the responsible accommodation process is morphophonological in English while it is morphosyntactic in German.

6. Tool #3: Phonological readjustment

The third and final tool that can be brought to use in order to account for the spontaneous speech errors is phonological readjustment at PF. Remember that phonological readjustment may alter the phonological form of already inserted VIs in certain contexts. Readjustment may be driven by various forces; in particular, it may be triggered by the presence of some morphosyntactic feature (section 6.1) or may depend on the licensing environment (section 6.2).

6.1 Readjustment due to morphosyntactic features

In some errors, a root appears in an erroneous slot where it combines with some morphosyntactic feature which was stranded in this slot (or its environment). At PF, this feature triggers a stem-internal change. Note that slips of this type—as well as those to be discussed in section 6.2—are error accommodations, since it is the error element itself that undergoes accommodation, not the context. Amongst the morphosyntactic features that may trigger phonological readjustment in German are [+PAST] (23a), [+PART] (23b)⁷, [+PL] (23c), and [3.SG] (see (1a) and the rule (4a) above). All of these cases involve feature stranding followed by phonological readjustment at PF (PTCL = modal particle).

- (23) a. ich *las* ihr fürs, äh, ich dank-te ihr
 I read.PAST her for.the, er, I thank-PAST her
 fürs Korrektur les-en meines Handout-s
 for.the correction read-INF of.my handout-GEN
 ‘I thanked her for proofreading my handout.’
- b. du hast doch ge-*log*-en, nicht mehr zu versprech-en,
 you have PTCL PART-lie-PART not anymore to promise-INF
 äh, versproch-en, nicht mehr zu lüg-en
 er, promise-PART not anymore to lie-INF
 ‘But you promised not to lie anymore.’
- c. im Schwimm-bad könn-en sich die *Bäd*-er,
 at.the swim-bath can-PL REFL the bath-PL
 äh, die Kind-er, richtig austoben
 er the child-PL really romp.about
 ‘At the swimming pool, the children can really romp about.’

At PF, the VIs listed in (24) spell out the abstract roots affected in the errors. After Vocabulary insertion, the phonological readjustment rules in (25) apply. The application of all of these rules depends on the presence of some morphosyntactic feature.

⁷ Note that on prefixed verbs, such as *versprechen* (‘to promise’), the participial is marked by a suffix only.

- (24) a. $\sqrt{\text{LES}} \leftrightarrow /le:z/$
 b. $\sqrt{\text{LÜG}} \leftrightarrow /ly:g/$
 c. $\sqrt{\text{BAD}} \leftrightarrow /ba:d/$
- (25) a. $/e:/ \rightarrow /a:/ / X [+PAST]$
 (where X = *les, geb, tret ...*)
 b. $/ü:/ \rightarrow /o:/ / X [+PART]$
 (where X = *lüg*)
 c. $/a:/ \rightarrow /ε:/ / X [+PL]$
 (where X = *Bad, Vater, Plan ...*)

Consequently, all error elements surface in the form appropriate for their new slot. The resulting utterances (all of which are self-corrected by the speaker) may be semantically nonsensical but they are grammatically correct.

6.2 Readjustment due to licensing environment

The second type of phonological readjustment is not due to morphosyntactic features but rather to the fact that a root appears in a different licensing environment after the error has taken place. This phenomenon is exemplified by the two slips in (26) in both of which a “verb” is anticipated into a “noun” slot.

- (26) a. der ***Sprung***, äh, der Funke spring-t über
 the jump, er, the spark jump-3.SG over
 ‘It clicks (between them).’
- b. ihr-e ***Gab***-e, äh, ihr-e Nummer
 her-F gift-NMLZ(F), er, her-F number(F)
 geb’ ich dir morgen
 give.1.SG I you tomorrow
 ‘I’ll give you her number tomorrow.’

As explained in section 2, in DM, the syntax does not manipulate nouns or verbs but only acategorial roots. Hence, for both errors in (26), we must assume that a root that was planned to appear in a position locally licensed by a light verb is anticipated into a position where it is licensed by a determiner. In the latter environment, stem-internal changes (ablaut) are triggered; cf. the simplified readjustment rules in (27). Note that, in addition, in (26b) a morpheme insertion rule must have applied at MS, inserting the abstract nominalizing suffix [e]_u.

- (27) a. $/ʃprɪŋ/ \rightarrow /ʃprʊŋ/ / [+d]$
 b. $/ge:b/ \rightarrow /ga:b/ / [+d]$

While the examples in (23) and (26) clearly involve the application of a phonological readjustment rule, we are probably dealing with instances of suppletion in the anticipations in (28) where the phonological form of the error ele-

ment in its post-error position differs more dramatically from that in its intended position.⁸

- (28) a. auf ein-em Stand, auf ein-em Bein
on one-DAT.M stand(M), on one-DAT.N leg(N)
kann man nicht steh-en
can one not stand-INF
‘You can’t stop at one!’ (lit. ‘One cannot stand on one leg.’)
- b. dass er immer mit dem Zug zieh-t,
that he always with the.M move.NMLZ(M) move-3.SG
äh, mit der Masse zieh-t
er, with the.F crowd(F) move-3.SG
‘that he always moves with the crowd’

That is, instead of assuming that a phonological readjustment rule changes the form of the error elements in an environment where they are locally licensed by D, I suggest that different (i.e. more specified) VIs are inserted in a [+d]-environment, as indicated in the VIs in (29a) and (29b). For means of comparison, I give the VIs for the default forms of both roots in (29c) and (29d).

- (29) a. √STEH ↔ /ʃtand/ / [+d]
b. √ZIEH ↔ /tsu:g/ / [+d]
c. √STEH ↔ /ʃte:/
d. √ZIEH ↔ /tsi:/

I want to conclude this section with a brief note on categorial identity in word exchanges. It is a well-known fact that there is a strong tendency in word exchanges for the exchanged elements to be of the same grammatical category (Garrett 1975, 1980a).⁹ Obviously, this raises the question how this tendency can be accounted for within a framework that assumes the manipulation of acategorial roots. In Pfau (2000), I suggest that the identical category constraint can be reformulated in terms of licensing environment. That is, despite categorial underspecification, 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 originate from. Most of the time, the interacting roots are also adjacent, in the sense that only functional material, i.e. features or feature bundles, intervene. Notably, in the few

⁸ Note that the verb *ziehen* as well as the noun *Zug* have various meanings: *ziehen* can mean ‘to pull’ but also ‘to move, march, wander, roam’, amongst other things; *Zug* can mean ‘train’ but also ‘tension’, ‘procession’, and ‘draft’, amongst other things. In (28b), the verb has the ‘move’ semantics while the anticipated root (glossed as ‘move.NMLZ’) would probably best be translated as ‘procession’.

⁹ Garrett (1980a:189) states that out of a total of 200 word exchanges from his corpus, 85% satisfy the same category constraint. In the Frankfurt corpus, out of the 163 clear instances of word exchanges, 88% involve words of the same grammatical category.

cases where another root intervenes, this root is virtually always a root licensed by another functional element (see Pfau 2000 for details and for discussion of stranding errors).

7. Competing nominalizations and DP-internal structure

Closer inspection of some of the errors discussed above reveals that things are somewhat more complex. Consider, for instance, again the slip in (28b). Interestingly, in this case, there are (at least) three different conceivable nominalizations of the abstract root $\sqrt{\text{ZIEH}}$. We must therefore ask why, after the error has taken place, the root is spelled out as *Zug* ‘procession’ and not as *Zieh-er* ‘puller’ or *Zieh-ung* ‘draw’?

Following Abney (1987), Szabolcsi (1994), Marantz (1997), and Harley and Noyer (1998), I assume that the functional structure within DP is much more complex than indicated in (2b), actually paralleling the functional structure of the clause and involving light verb phrases and/or aspectual projections (see, for instance, Marvin (2002) for Slovenian nominalizations).

Without going into details of the syntactic representation of nominalizations, I argue that the nominalization which is spelled out in the error is usually the one that best fits the internal semantics, i.e. the DP-internal functional structure, of the intended noun. For this reason, $\sqrt{\text{ZIEH}}$ in (28b) is spelled out as *Zug*, which, just like the intended noun *Masse* ‘crowd’, has stative/existential semantics, and not as *Zieher* (which is agentive) or *Ziehung* (which is eventive).

More examples that can be explained along similar lines are given in (30). In (30a), $\sqrt{\text{TERROR}}$ is anticipated but is neither spelled out as *Terror* ‘terror’ nor as *Terrorismus* ‘terrorism’ in the new slot. Crucially, both the intended noun *Direktor* ‘director’ and *Terrorist* ‘terrorist’ have agentive semantics and refer to individuals, i.e. *Terrorist* best fits the slot into which it is anticipated. Note that a similar argument can be made for the error in (20c) above, in which $\sqrt{\text{TANZ}}$ surfaces as *Tänzer* ‘dancer’ and not as e.g. *Tanz* ‘dance_{NOUN}’.

- (30) a. dass der ***Terror-ist***, äh, dass der Direktor
 that the.M terror-ist(M) er, that the.M director(M)
 die gesamte Belegschaft terror-isier-t
 the.ACC.F whole staff terror-ize-3.SG
 ‘that the director terrorizes the whole staff’
- b. der ***Tour-ismus***, die Ignoranz der Tour-ist-en
 the.M tour-ism(M), the.F ignorance(F) of.the tour-ist(M)-PL
 nimm-t von Jahr zu Jahr zu
 increase-3.PL from year to year PARTICLE
 ‘The ignorance of the tourists increases from year to year.’
- c. schreib-t man das mit Binde-***schrift*** ← mit Binde-strich
 write-3.SG one that with connect-writing with connect-line
 ‘Do you write that with a hyphen?’

The slip in (30b) is particularly interesting because here, $\sqrt{\text{TOUR}}$ originates from a position where it is licensed by a determiner and is anticipated into another position where it is also licensed by D. Still, it combines with a different derivational morpheme at its landing site. In its original slot, $\sqrt{\text{TOUR}}$ combines with the suffix $[\text{ist}]_{\mu}$ and receives an agentive interpretation ‘tourist’. In contrast, both the intended noun *Ignoranz* ‘ignorance’ and the resulting nominalization *Tourismus* ‘tourism’ can be argued to be stative. This line of reasoning also explains why the anticipated root $\sqrt{\text{TOUR}}$ is not simply spelled-out as *Tour* ‘tour’, which has eventive semantics.

Finally, in (30c), $\sqrt{\text{SCHREIB}}$ surfaces as *Schrift* ‘(hand)writing’ although at least two other nominalizations of the same root are available, namely *Schreiber* ‘writer’ and *Schreibung* ‘spelling’. I suggest that *Schrift*, just like *Strich* ‘line’, has stative semantics and therefore best fits the functional make-up of the slot it is perseverated into. In contrast, *Schreiber* is agentive and *Schreibung* eventive. Note that while the latter two nominalizations involve the insertion of a morpheme at MS, *Schrift*, just like the cases presented in (28), is probably an instance of suppletion (not the result of phonological readjustment).¹⁰

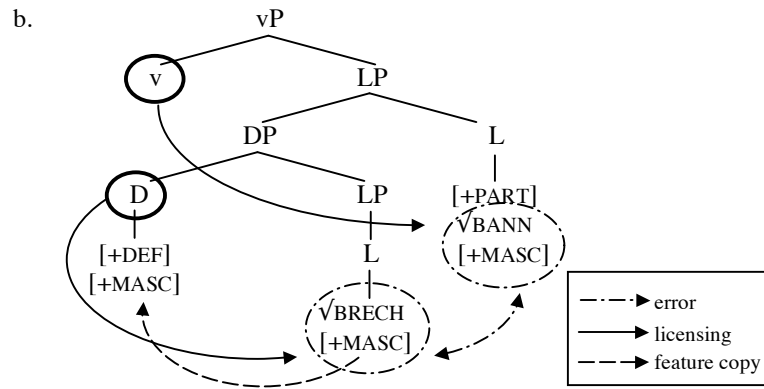
8. The toolkit in action: two complex cases

Before concluding this article, I would like to take the reader through two particularly intricate speech errors in order to summarize the mechanisms introduced in the preceding sections and to further illustrate how the different tools may join forces in the derivation of an erroneous utterance.

The error in (31a) is an exchange affecting the two roots $\sqrt{\text{BANN}}$ and $\sqrt{\text{BRECH}}$. The relevant (and very much simplified) part of the syntactic structure is given in (31b). Note the legend on the right side of the structure. After the error has taken place, the gender feature of $\sqrt{\text{BRECH}}$ is copied onto the determiner position at MS. Obviously, this implies that acategorical roots are always inserted together with their gender feature even if they are merged in a position where they are not licensed by a determiner, as is true for the rightmost position in (31b) which is licensed by a light verb. Here, I leave open the question whether in this case, the gender feature simply doesn’t become active or whether it is deleted at MS by means of an impoverishment rule (Halle 1997; Noyer 1998).

- (31) a. da war der ***Bruch*** ge-*bann-t*
 there was the.M break(M) PART-spell-PART
- ← der Bann ge-broch-en
 the.M spell(M) PART-break-PART
- ‘And then the spell was broken.’

¹⁰ In addition, it could be argued that the phonological similarity of *Strich* and *Schrift* contributes to the selection of *Schrift* over the other two forms.



In (32), the relevant VIs are listed; (32a,b) spell out roots while (32c,d) spell out morphosyntactic features. Note that, as far as the participial circumfix is concerned, the VI must be further specified to ensure insertion of the grammatically adequate allomorph (cf. the discussion of (22b) above).

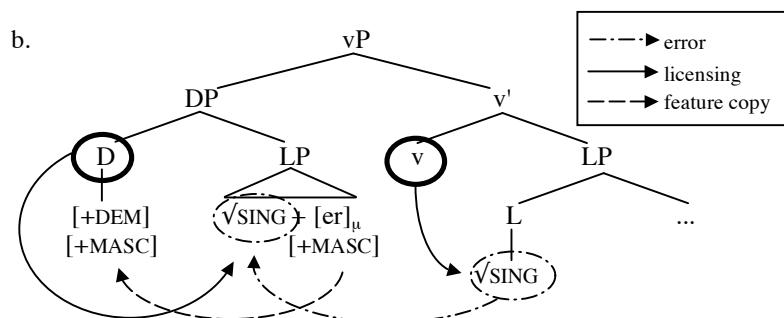
- | | | | | |
|------|----|----------------------|---|----------|
| (32) | a. | √BRECH | ↔ | /brɛX/ |
| | b. | √BANN | ↔ | /ban/ |
| | c. | [+DEF] [+MASC] [NOM] | ↔ | /de:ɐ/ |
| | d. | [+PART] | ↔ | /ge-X-t/ |
- (where X = √BANN, SUCH ...)

After Vocabulary insertion has taken place, the phonological readjustment rule in (4b), repeated here as (33), which is triggered in a [+d] licensing environment, changes the phonological form of the first error element.

- (33) /brɛX/ → /bruX/ / [+d]

Let us now turn to the second example. At first sight, the slip in (34a) may look rather simple. On closer inspection, however, it turns out to be one of the most complex slips in my corpus—a real gem, so to speak. This error is exceptional in that feature copy, morpheme insertion, and phonological readjustment join forces to yield an erroneous yet grammatical output string. In this slip, √SING is anticipated into a slot where it is licensed by D, as is illustrated in the structure in (34b).

- (34) a. dies-er Säng-er, äh, dies-e Diva
 this-M sing-NMLZ(M), er, the-F diva(F)
 sing-t echt wie ein-e rostig-e Rassel
 sing-3.SG really like a-F rusty-F rattle(F)
 ‘This diva really sings like a rusty rattle.’



In this environment, the morpheme insertion rule in (35) is triggered. As discussed in section 5, we must assume that the abstract morpheme $[er]_{\mu}$ comes with a gender feature, namely [+MASC]; this feature is copied onto D at MS, as is also illustrated in (34b).

- (35) Insert $[er]_{\mu}$ / \sqrt{X} licensed by [+d]
(where $X = \sqrt{TANZ}, \sqrt{SING}, \sqrt{SPIEL} \dots$)

In (36), the relevant VIs are given that spell out the feature bundle in D after case assignment (36a), the root (36b), as well as the abstract morpheme (36c). Subsequently, the VI that spells out the root will be subject to the phonological readjustment rule given in (37), which, again only applies in a certain licensing environment.¹¹

- (36) a. [+DEM] [+MASC] [NOM] ↔ /di:ze/
b. \sqrt{SING} ↔ /ziŋ/
c. $[er]_{\mu}$ ↔ /-ər/

- (37) /ziŋ/ → /zeŋ/ / [+d]

While the above description of this error may look quite cumbersome, we must keep in mind that no operations are postulated that would not also apply in the generation of a non-erroneous utterance. In other words: whenever one wants to utter a DP containing the nominalization *Sänger*, a morpheme has to be inserted, the gender feature has to be copied onto D, and phonological readjustment must apply.

¹¹ The reader may wonder why \sqrt{SING} is not spelled out in its feminine form *Säng-er-in* ‘sing-NMLZ-FEM’, given that it takes the position of the feminine noun *Diva*. To explain this apparent idiosyncrasy let me add a few words about the discourse context in which the error was uttered. The slip was produced while watching the European Song Contest, a yearly camp competition held to elect the best European pop song. Actually, the utterance was a comment on a particularly poor contribution, probably Malta or Austria. What is of importance here is the fact that the interpreter was a man whose flamboyant style (in combination with his far from perfect vocal performance) provoked the statement.

9. Conclusion

The spontaneous speech errors I have discussed in this paper illustrate how some of the operations as assumed in the DM framework allow for a straightforward account for the surface form of the erroneous utterances. Crucially, all of the mechanisms that I claim to be involved in the emergence of the erroneous yet grammatical utterances—that is, feature copy, morpheme insertion, Vocabulary insertion, and phonological readjustment—are mechanisms which, according to DM, apply in the derivation of an utterance anyway. Therefore, when making use of the DM toolkit, we need not assume costly repair strategies of any kind in order to explain such errors. It now turns out that, strictly speaking, the repairs (mentioned in the title of this paper) are not “cheap”; rather, they are not repairs at all. What we are actually dealing with is the blind application of grammatical operations. For this very reason, output-oriented processing need not be assumed (but see Albright 2007 for arguments against the claim that “repairs” come for free).

I should point out that there are some errors in my corpus in which the above operations seem not to apply; consider, for instance, the ungrammatical exchanges in (38).

- (38) a. * da wird mancher *Neid* vor *bläss* werden
 there will some envy with pale become
 ← bläss vor Neid
 pale with envy
 ‘Some (people) will become pale with envy.’
- b. * er *pfeif*-te nach sein-er *Tanz*-e, äh,
 he whistle-PAST to his-F.DAT dance-NMLZ(F), er,
 er tanz-te nach sein-er Pfeif-e
 he dance-PAST to his-F.DAT whistle-NMLZ(F)
 ‘He_i danced to his_j tune.’

If the slip in (38a) was a root exchange—just like the ones discussed above—then the expected outcome, after morpheme insertion and phonological readjustment, would be *neid-isch vor Bläss-e* ‘envy-ADJ with pale-NMLZ’. Similarly, in (38b), one would expect the surface string *pfiff nach sein-em Tanz* ‘whistle.PAST to his-M.DAT dance(M)’ where feature copy and phonological readjustment have applied. I therefore have to assume that in these rare cases, we are not dealing with a root exchange but rather with an exchange of phonological words (VIs) at PF (as has also been claimed for (19b) and—albeit more speculatively—for the errors in (18)).

Note finally, that it is not my aim to claim that DM is the *only* model of grammar that can account for the data discussed in this paper.¹² Rather, my intention was to show how the operations as assumed in DM can be mapped onto the language production process. In this sense, DM makes for a psychologically real model of grammar.

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¹² See, for instance, Pfau and Bakker (2004) and Bakker and Pfau (in press) for analysis of agreement errors within the Functional Grammar framework and Franck, Frauenfelder and Rizzi (2007) for an account of subject-verb agreement errors within the Minimalist Program.

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