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Morphological slips of the tongue

Abstract: This chapter presents an overview of naturally occurring morphological slips of the tongue. The empirical focus is on German speech errors, but data from other languages are also considered. A classification scheme is devised along five dimensions. In addition to the traditional division of morphology into compounding, derivation, and inflection and the distinction between free and bound morphemes as well as that between prefixes and suffixes, the contrast between contextual and non-contextual influences and the morphological nature of the words in which the error morphemes are embedded take center stage. These five dimensions are shown to affect error rates. In line with linguistic analyses, the distinction between inflection and derivation is not sharply drawn in language processing. Productivity facilitates the occurrence of non-contextual errors. Morphological and phonological processing display significant differences. Whereas phonological processing is mainly a sequencing problem, morphological processing grapples more strongly with issues of selection. Additionally, the selection problem is more acute in inflectional than in derivational morphology.

Keywords: morphological processing, error classification, derivation-inflection continuum, selection vs. sequencing, German, productivity

1 Introduction

Speech errors, ordinarily defined as deviations from the speaker's intention, constitute interdisciplinary evidence *par excellence*. They are the result of a processing breakdown, i.e., the output of a production system which has gone awry. Inevitably, these disruptions involve linguistic elements and thereby tap into a representational system which makes available the information to be processed. Thus, speech errors derive their interdisciplinary status from the fact that they owe their psychological nature to the generative system which gives rise to them, and their linguistic nature to the “raw material” which they operate on.

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It stands to reason that the units suffering a malfunction can be identified as the units contained in the mental lexicon. This assumption is based on the hypothesis that the representational system accords a place to certain units but not to others or, couched in a probabilistic framework, gives more prominence to some units rather than others. The argument is then that the more support a given unit receives from the psycholinguistic system, the more prone it is to error. Duly interpreted, error rates may consequently serve as a window on the content of the representational system, which is standardly considered to consist of units and levels.

On this logic, morphological slips of the tongue attest to the reality of a morphological processing level. By the same token, the occurrence of affix slips attests to the psychological reality of affixes. The same argument applies at a fine-grained level. An error on the prefix *pre-* or the stem *nuptial* in *prenuptial* would lend credence to the reality of a morphological boundary between the two constituent morphemes.¹ This argument capitalizes on the fact that speech errors are local phenomena. They tend to involve single rather than double or multiple units. That is to say, they break off one unit at a subordinate level from a unit at a superordinate level while leaving other subordinate-level units untouched. For example, the single morpheme *pre-* is broken off from *prenuptial*, or the single word *prenuptial* is broken off from *prenuptial agreement*.

Note that the units in the mental lexicon need not be identical to those postulated by linguists. This is because of a lack of consensus between linguists and psycholinguists on both research objectives and methodology. Generally speaking, linguistic investigations conceive of language as a product whereas the psycholinguistic view of language is in processual terms. While the gold standard in psycholinguistics is the search for psychological reality, theoretical linguists do not consider themselves bound by any extrinsic evaluation metric. Of course, it is highly unlikely that the units posited by linguists and those in the mental lexicon form non-overlapping sets. However, this does not by any means justify taking their identity for granted.

One of the most basic dichotomies in the study of language is Saussure's distinction between the syntagmatic and the associative (paradigmatic) dimension of language. In speech error research, these terms are often replaced by the more transparent labels "contextual" and "non-contextual", and this practice is followed here. We begin by exemplifying these two error types.

¹ We will not go deeply into the question of how many errors of one type are required to support the psychological reality of a particular unit. Singleton occurrences can be no more than illustrative. Reliable claims have to demonstrate that the rate of a particular error type exceeds chance levels.

- (1) This longish woodish – longish wooden object (from Stemberger 1998: 437)
- (2) You have chown – chewed on ice. (from Stemberger 1985a: 178)

Case (1) illustrates a suffix substitution slip (*-en* > *-ish*). It is assigned to the class of contextual errors because the error unit has in all likelihood been “borrowed” from the adjacent word *longish*. Case (2) highlights a temporary processing difficulty during the formation of the past participle of *to chew*. Although as a regular verb it requires the suffix *-ed*, it was inflected like an irregular verb and underwent ablaut and irregular suffixing. As there is no “external” motivation for this error, it is classified as non-contextual.

Roughly speaking, contextual errors reveal a sequencing problem while non-contextual errors reveal a selection problem. Essentially, contextual slips arise from the early or late intrusion of units which should have occurred, or actually occurred, elsewhere in an utterance. Thus, the units as such were correctly selected but inserted at the wrong place (or time). By contrast, in non-contextual slips, a wrong element was selected at the right place (or time). Selection may be envisioned as a process where a pool of candidate items is available to the language user, where only one of these items can be produced at any one time and where therefore a decision has to be made for one unit and against all others.

Contextual and non-contextual errors shed light on different aspects of the morphological system. Non-contextual slips grant insight into the degree of competition among the members of a paradigm, as illustrated in (2), where the irregular past participle competes with the regular one. The higher the error rate, the stronger the competition in the paradigm. However, competition in contextual slips is of a different nature. It is not brought about by structural alternatives offered by a particular language in an effort to express a certain intention or satisfy certain syntactic constraints, but rather by a more or less accidental co-occurrence of morphologically complex words in the linear representation of speech. Contextual errors provide evidence of the cohesiveness of morphologically complex words. The higher the error rate, the lower the degree of cohesion. The logic is simple enough. The more strongly a given morpheme is tied to another, the less easy it is for this morpheme to break free and undergo misordering. Thus, contextual slips of the tongue reveal the salience of the morphological representation, i.e. the extent to which morphemes “stick out” in words. For instance, the error in (1) highlights a morphological boundary in *wood-en* as well as in *long-ish*.²

² A single dash in the orthographic representation indicates a morpheme boundary.

It is worth emphasizing that, in line with recent developments in experimental morphology (see Hay and Baayen 2005), all central notions used in this chapter, in particular competition, salience and boundary, are of a gradient rather than categorical nature. While this is unremarkable for concepts such as competition, it represents a radical break with tradition when it comes to linguistic structure. A given word is traditionally regarded as either monomorphemic or polymorphemic. It either contains a morpheme boundary or it does not. In contradistinction to the received view, the notion of salience embodies the idea that the constituent morphemes of a word may have a variable representational strength. Similarly, the binary notion of a linguistic boundary is re-interpreted in terms of gradient boundary strength.

In this conceptual framework, there is a certain independence between contextual and non-contextual morphology. The size of paradigms and the relationship of the elements within them may be somewhat independent of the cohesiveness of morphemes in words. The factors that lead to the formation of paradigms are unlikely to be identical to those which determine the cohesiveness of morphologically complex words. However, this is not to say that these factors are completely different. Both contextual and non-contextual slips crucially rely on morphological structure. It may very well be that a vibrant paradigmatic morphology invigorates syntagmatic morphology.

The hypothesis of relative independence can be empirically tested by comparing the rates of contextual and non-contextual tongue slips across languages. It is also worthwhile examining the frequency of contextual and non-contextual errors from a language-specific perspective. It is known from the analysis of phonological slips of the tongue in many languages that contextual slips dwarf non-contextual ones (e.g. Stemberger 1989 on English; Berg 2003 on German; Wan 2007 on Mandarin Chinese; Pérezet et al. on Spanish 2007; Liu 2013 on Min). It is not known, however, whether this strong asymmetry can be replicated at the morphological level.

Given that inflection is generally more productive than derivation and that productivity implies heightened availability, inflectional errors may be less dependent on contextual triggers than derivational errors. Hence, non-contextual slips may be expected to have a higher share among inflectional than derivational errors.

The paradigmatic axis stands or falls on the notion of paradigms. In linguistics, paradigms are standardly understood to be comprised of elements of the same category. Typical examples include the case paradigm of nouns and the person paradigm of verbs. These paradigms are categorical in nature. It is an open question whether the psycholinguistic notion of paradigm has the same content as the linguistic notion. While the linguistic definition builds on

alternative options which are all well-formed in certain contexts, it has not as yet been investigated whether the psycholinguistic conception is similarly constrained. Depending on the extent to which slips of the tongue exceed the limits of well-formedness, it might be that the processing system operates on a looser conception of paradigm than the one that prevails in linguistic theory.

The nature of paradigms raises major issues in the organization of the basic morphological components. Numerous studies have argued for a non-categorical boundary between derivation and inflection (e.g. Dressler 1989, Bertram, Schreuder, and Baayen 2000; Dressler 1989; González Torres 2010). This hypothesis allows one to predict that interactions between inflectional and derivational morphemes should not be ruled out in slips of the tongue.

Bybee (1985) went a step further by including lexical morphemes. She proposed a lexicon-grammar continuum and arranged lexical morphemes towards the lexical end, inflectional morphemes towards the grammatical end and derivational morphemes in-between the two. Such a continuum entails far-reaching predictions for tongue slips. Whatever the speech error patterns may be, they are expected to form a monotonic increase or decrease on the lexicon-grammar cline. By way of example, suppose there is a decrease in contextual substitution slips from lexical to derivational morphemes. We would then predict an even lower rate of contextual substitutions involving inflectional morphemes. When the rate of lexical slips is higher than that of grammatical slips, we will speak of a *lexicalness bias*.³ Inversely, when the rate of grammatical slips outweighs that of lexical slips, we will speak of a *grammaticalness bias*.

This opening section raises more questions than this paper can possibly answer. The major aim of this chapter is to present a survey of the types of morphological errors that occur and to document certain influences to which these errors are subject. This tour will take us to the three major morphological components, viz. compounding, derivation and inflection. The empirical focus is on speech error data from German. The principal reason for this choice is that German is highly productive of compounding and derivational slips – two important error classes on which English scores rather low (see Stemberger 1998 on compounding and Melinger 2003 on derivation). Further motivation for this decision derives from the fact that no comprehensive analysis of morphological slips of the tongue has so far been undertaken. However, other languages will not be completely ignored. Besides English, slips from half a dozen additional languages will be

³ We introduce the label “lexicalness bias” here to avoid confusion with the simpler term “lexical bias”, which is used in speech error research to describe an effect in phonological slips whereby the likelihood of a phonological error is heightened if the higher-level unit is a real word in the language (e.g. Hartsuiker et al. 2006).

discussed, however cursorily. This more inclusive perspective allows us to transcend the limitations imposed by the analysis of a single language.

The present chapter concentrates on the speech of linguistically competent adults using their native language – or rather their derailments. The empirical evidence on which it draws mainly comes from a corpus of more than 6000 slips of the tongue I collected over a four-year period by noting down what I judged to be a deviation from the speaker's intention. I recorded as much context as I could accurately remember and as I deemed necessary for adequate categorization. The errors were gleaned from natural communicative situations in which I took part or from radio and television broadcasts (see Berg 1988 for further details). Given the focus of this study on naturalistic data, only passing reference is made to the experimental literature. All of the data presented in this study come from oral production. Written production appears to generate too few genuinely morphological slips for a detailed examination (Ellis 1979). While morphological errors occur in perception, they are in the vast majority of cases the result of phonological misperceptions (Bond 1999) and therefore largely unsuitable for morphological analysis. In this study, the terms “speech error” and “slip of the tongue” are used interchangeably.

2 An analysis of morphological slips of the tongue

It is only natural for an examination of morphological errors to respect the tripartite distinction between compounding, derivation and inflection. A further relevant distinction is that between free and bound morphemes, i.e. stems and affixes. In slips of the tongue, these two dimensions interact in ways which do not play a prominent role in theoretical morphology. In particular, stems in derived words do not behave like stems in inflected words in speech errors. It is therefore necessary to consider stems in derivational and inflectional morphology separately. More generally put, the behavior of lower-level units depends on the nature of the higher-level unit of which they are a part. This is why the headings of the following three subsections reflect the perspective of the superordinate unit, to wit: the word.

The error analysis will begin with compounding, proceed to derivation and then turn to inflection. All three subsections distinguish between contextual and non-contextual errors. Possible interactions between derivational and inflectional affixes will be subsequently examined. Finally, the roles of selection and sequencing will be considered.

2.1 Errors in compound words

A key issue in compound research is the level at which compounds are represented. Are they lexical objects and as such holistically represented or morphological objects and as such analytically represented?⁴ These alternatives invite disparate predictions regarding the cohesiveness of compounds in speech errors. As lexical objects, they are expected to be cohesive, i.e. to act as units; however, as morphological objects, they are expected to fall apart, i.e. the preferred error locus would be the individual morpheme.

To arbitrate between these options, all tongue slips involving a nominal compound were subjected to scrutiny. German (G.) has a strong propensity for nominal compounding (Berg 2017) and thus generates this error type in sufficiently large numbers. There are 71 contextual and 66 non-contextual items in my database. Let us begin with the former set.

2.1.1 Contextual slips

The most insightful tongue slips are those in which the structure of the utterance imposes the least bias on the error outcome. This requirement is met by the co-occurrence of two compounds in a linear string, with both of these being involved in the malfunction. The main question is whether the compound as a whole or one of its constituent morphemes undergoes misordering (in this connection, see also Chapter 9, Libben, Gagné and Dressler 2020, this volume). There are 9 relevant cases in my data two of which are given in (3) and (4). The first line provides the error as it occurred, the second line the interlinear gloss and the third line the translation into English. The critical parts are set in bold for easy identification. A dash marks the abortion of the utterance following error detection. The corrected utterance occurs to the right of the dash.

- (3) G. Gestern hat die chemische Industrie auf der
 yesterday has the chemical industry at the
Pressekonferenz– auf der **Hannovermesse** eine
 press conference at the Hanover fair a

⁴ That they can also be phonological objects was experimentally shown by Jacobs & Dell (2014).

Pressekonferenz gegeben

press conference given

'Yesterday the chemical industry gave a press conference at the Hanover Fair.'

- (4) G. Wir haben morgen **Elternabend** vom **Kinderabend**–
 we have tomorrow parent evening of.the children's evening
 vom **Kindergarten**.
 of.the nursery school
 'Tomorrow we'll have a parent-teacher meeting at the nursery school.'

Example (3) documents the interaction of two compounds at the word level. The compound *Presse-konferenz* 'press conference' ousts the compound *Hannover-messe* 'Hanover Fair'. In (4), by contrast, single morphemes are implicated. The second morpheme in *Eltern-abend* 'parent-teacher meeting' supplants the second morpheme in *Kinder-garten* 'nursery school'. There are 4 cases where it cannot be determined whether the entire compound or one of its constituents is involved in the malfunction. Eliminating these ambiguous cases brings down the number to 5 slips. Of these, one leaves the compounds intact while the compounds are broken up in the other 4 cases.

In the light of the low number of pertinent errors, the following conclusions should be regarded as tentative. Compounds are processed and represented at both the lexical and the morphological level. Thus, the issue is not whether they are lexical *or* morphological objects. In fact, they are both. This duality can be made more precise by considering error rates. The higher number of single-morpheme slips suggests that compounds fall apart rather easily. That is to say, they exhibit a relatively low degree of cohesiveness.

This conclusion is confirmed by a look at the next error type, in which a nominal compound interacts with a non-compound noun. Logically, there are three possibilities: (i) the compound may replace the simple noun, (ii) the simple noun may replace the compound noun, and (iii) the simple noun may replace one part of the compound. The first two options argue for a holistic representation, the third option for an analytic representation of compounds. Here are two relevant cases.

- (5) G. Die **Schiedsrichter**– die **Zuschauer** sind nicht so zufrieden
 the referee(s) the spectators are not so happy

mit **Schiedsrichter** Robert Welz.
 with referee (proper noun)
 'The spectators are not really happy about referee Robert Welz.'

- (6) G. Man hat vor'm Zahnarzt schon **Arzt- Angst**.
 one has of.the dentist even doctor fear
 'Some people are even afraid of the dentist.'

The two errors show how a compound may intrude upon a non-compound noun. In (5), the compound *Schieds-richter* 'referee' replaces the non-compound noun *Zuschauer* 'spectators' in full whereas the target word *Angst* 'fear' in (6) is replaced by the second morpheme in *Zahn-arzt* 'dentist'. There are 49 anticipatory and perseveratory errors of this type in my collection. Subtracting 23 ambiguous slips leaves us with 26 critical cases of which 9 evince cohesive and 17 incohesive behavior.

This distribution tallies nicely with the previous results. Compounds can act both cohesively and incohesively. However, these two options are not equiprobable. Compounds are more on the incohesive than on the cohesive side.

The constellation of a compound and a simple noun also generates exchanges, i.e. bipositional errors. Again, we witness both holistic and analytic behavior, as exemplified by (7) and (8), respectively.

- (7) G. mit dem **Bus** im **Kinderwagen**. for: mit dem
 with the bus in.the pram with the
Kinderwagen im **Bus**.
 pram in.the bus
 'with the pram on the bus'

- (8) G. **Bürger Bremer**meister– **Bremer** **Bürgermeister**
 (adjectival name of town) mayor
 'the mayor of Bremen'

The entire compound *Kinder-wagen* 'pram' trades places with the simple noun *Bus* 'bus' in (7). In contrast, the compound *Bürger-meister* 'mayor' is split in (8). Its first morpheme switches position with the adjective *Bremer* 'of Bremen', which can also be a noun referring to a citizen of the town of Bremen. There are 3 cohesive and 3 incohesive exchanges involving compounds in my data, which is largely in harmony with the findings reported above.

A further difference between (7) and (8) is worth mentioning. While the interacting elements are adjacent in (8), they are separated by the complex

preposition *im* ‘in the’ in (7). These two tongue slips may give us a clue as to when a compound is processed holistically or analytically. It may be speculated that the larger the linear distance between the interacting elements, i.e. the larger the processing window, the more likely the compound is to act as a unit. Inversely, a smaller processing window may be claimed to support analytic behavior. Actually, there are too few errors in my corpus to make this hypothesis anything more than suggestive.

The remaining 7 contextual slips allow one to catch a glimpse of the internal structure of compounds. They demonstrate that the linear order of the constituents of compounds has to be computed online even though it may be supposed to be lexically fixed. As linear order is generated anew in each production of a compound, morphological ordering errors such as (9) and (10) may see the light of day.⁵

- (9) G. Dann machen wir uns ‘n **Quarkobst**–
 then make we ourselves a cream.cheese.fruit
 Obstquark.
 fruit.cream.cheese
 ‘We’ll prepare cream cheese with fruit later.’

- (10) G. **Bezirksregierung**– **Regierungsbezirk** Lüneburg ist es
 district.government government.district (name of town) is it
 ja.
 PARTICLE
 ‘This area is administered by the local government of the town of
 Lüneburg.’

In both (9) and (10), the internal morpheme order was reversed in the compounds. The resulting compound *Quark-obst* in (9) is not lexicalized while *Bezirks-regierung* ‘local government’ in (10) is impeccable. These ordering errors lend additional support to the claim that the morphemes inside compounds are rather loosely connected and that, by implication, compounds are relatively incohesive objects.

⁵ Kindred errors were reported for English by Stemberger (1985a). Note as well that similar sequencing errors have been observed in language acquisition (e.g. Rainer 2010: 35) and aphasia (e.g. Badecker 2001).

2.1.2 Non-contextual slips

The non-contextual slips by and large replicate the patterns in contextual slips. The following logical possibilities exist: (i) a bipartite compound noun (AB) is replaced by a different compound noun (CD), (ii) an entire compound (AB) replaces, or is replaced by, a non-compound noun (C), and (iii) one constituent of a compound (A in AB) is replaced by a single lexeme (C) whereas the other constituent (B) is left untouched. While options (i) and (ii) argue for a holistic representation, option (iii) supports an analytic representation.

In contrast to the contextual tongue slips, option (ii) is not attested in my database. Because such an error type presupposes a high degree of cohesion within compounds, the absence of this error class is compatible with the claim that nominal compounds are of limited cohesiveness. Note that this error type is further discouraged by the unequal morphological status of a compound and a non-compound word. Option (i) is exemplified in (11), option (iii) in (12) and (13).

- (11) G. Habt ihr mal ‘n **Stroh**halm– **Streich**holz?
 have you PARTICLE a straw.blade match
 ‘Have you got a straw – a match?’
- (12) G. Nächsten Montag müssen wir unsere Baukonstruktions**zeitung**–
 next Monday must we our construction.newspaper
 zeichnung abgeben.
 draft hand in
 ‘We have to hand in our construction newspaper – draft next Monday.’
- (13) G. Das sind Streikkosten, die wir bei Beginn des
 that are strike.costs which we at beginning of.the
 Arbeits**amtes**– Arbeits**kampfes** kalkuliert hatten.
 employment.office– labor.dispute calculated had
 ‘These are strike costs which we counted at the beginning of the labor
 dispute.’

The intended compound *Streich-holz* ‘match’ is supplanted by the non-intended compound *Stroh-halm* ‘straw’ in (11). In (12), by contrast, the final constituent of the compound *Baukonstruktions-zeichnung* ‘construction draft’ is ousted by the similar-sounding lexeme *Zeitung* ‘newspaper’. The fact that the resultant compound *Baukonstruktions-zeitung* is a possible, albeit unlikely word provides strong support for the hypothesis that the malfunction arose at the morphological rather

than the lexical level. However, determining the error locus proves more difficult in (13). This slip is ambiguous between the interaction of two entire compounds or the interaction of the final constituents of the two compounds. The fact that the word *Arbeitsamt* used to be the ordinary German word for ‘employment office’ argues for the former possibility. On the other hand, the observation that compounds as units are seldom involved in errors argues for the latter possibility. Ultimately, it may be wrong to conceive of this classification problem in strictly binary terms. A more adequate analysis may hold that the error occurred at the morphological level but that it was facilitated by the item *Arbeitsamt* in the mental lexicon – a lexical bias effect at the morphological level (see footnote 3). In this spirit, it was decided to classify cases like (13) for example as single-morpheme slips.

Leaving aside 1 blend error and 3 ambiguous cases, we count 62 non-contextual slips of which 6 are whole-word errors and 56 single-morpheme errors. This strong predominance of the latter error type further strengthens our earlier hypothesis that the constituents of nominal compounds do not stick together well.

The standard analysis of hierarchical (or determinative) compounds is in terms of the head-modifier distinction. What role does this distinction play in slips of the tongue? By definition, heads are more important constituents than modifiers because they provide a semantic frame for the interpretation of modifiers and because they pass on their formal properties to the entire compound. Transposing this difference into the world of psycholinguistics, we may expect heads to be more powerful, that is, more strongly activated in the processing network. Since tongue slips result from excessive competition, i.e. too small a difference in the activation levels of competing units, a larger number of errors may be predicted to occur on heads than on modifiers. A modifier slip is shown in (14), a head slip in (15) (see also (12)).

- (14) G. Sie wollte **Reaktions**lehrerin– **Religion**slehrerin werden.
 she wanted.to reaction.teacher religion.teacher become
 ‘She was going to be a religion teacher.’

- (15) G. Der Pass ist aus Sicherheits**gurten** gesperrt. *for:* aus
 the pass is for safety.belts blocked for
 Sicherheits**gründen**.
 safety.reasons
 ‘The pass has been blocked for safety belts.’ intended: ‘for safety reasons’

The modifier *Religion* ‘religion’ in *Religion-s-lehrerin* ‘religion teacher’ was substituted for by the phonologically similar lexeme *Reaktion* ‘reaction’ in (14). In (15),

however, the head *Gründe(n)* ‘reasons’ in *Sicherheit-s-gründen* ‘safety reasons’ made way for the lexeme *Gurte* ‘belts’, possibly with some lexical support from the lexicalized compound *Sicherheit-s-gurt* ‘safety belt’ (in addition to the phonological similarity between *Gurt* [gurt] and *Grund* [grunt]).

The 56 single-morpheme errors divide into 22 modifier and 34 head slips. The ratio of one-third to two-thirds is statistically significant (binomial, $p < 0.03$). Thus, the above prediction is confirmed: heads are psycholinguistically more active than modifiers. A related asymmetry emerges in contextual errors although the number of relevant slips is much lower. It is worthy of note that the naturalistic speech error data replicate the head-modifier asymmetry observed in experimental studies (e.g. Isel, Gunter, and Friederici 2003; Juhasz, Starr, Inhoff, and Placke 2003; Marelli, Crepaldi, and Luzzatti 2009).

To conclude, the error evidence shows that compounds straddle the boundary between the lexical and the morphological level. They are represented at both and therefore behave as units or fall apart, as the case may be. The fact that the latter behavior predominates suggests that nominal compounds are relatively incohesive objects in German. In other words, the constituents of compounds are separated by a distinct morphological boundary. Even though nominal compounds were treated indiscriminately in the foregoing, it is not claimed here that they form a totally homogeneous group. In fact, it is most likely that the strength of the morphological boundary is compound-specific.

2.2 Errors in derived words

The distinction between non-contextual and contextual slips is not identical to the contrast between derivational errors proper (e.g. *philosophist* for *philosopher*; Stemberger 1985a) and stem or affix errors unrelated to word-formation processes (e.g. *dealsman* < *dealer* x *salesman*; Fromkin 1973). While, as noted previously, errors of word formation are non-contextual in nature, this is not the only non-contextual error type. In particular, blend errors, which are not identical to word-formation processes as conventionally understood, are of the non-contextual kind. Note also that whereas (non-contextual) derivational word formation is restricted to affixing, contextual slips may involve both free and bound morphemes.

2.2.1 Contextual slips

Let us begin with stem errors in derived words. It is notable that stems in derived words undergo misordering rather easily. In (16), the two interacting

stems are adjoined to derivational affixes. Error (17) shows the interaction of two stems of which one is integrated into a derived word while the other is not.

- (16) G. **leer**ende **Gähne**. for: **gähn**ende **Leere**
 – – yawning emptiness
 ‘gaping void’

- (17) G. Es war albern von de Gaulle, mit der **Drohung**– mit der
 it was stupid of de Gaulle with the threat with the
Spaltung zu **drohen**.
 splitting to threaten
 ‘It was a stupid idea of de Gaulle’s to threaten to effect a splitting.’

Example (16) involves the bimorphemic noun *Leer-e* ‘emptiness’ and the trimorphemic adjective *gähn-end-e* ‘yawning’, where the inflectional suffix *-e* may be put to the side. The error documents an exchange of the two stems *leer* ‘empty’ and *gähn* ‘yawn’. The stem *leer* attaches to the participial/adjectival suffix *-end*, which stays in its original location. The stem *gähn* attaches to the nominal suffix *-e*, which is also stranded. The reversal of the two stems yields the nonce adjective *leerend* and the nonce noun *Gähne*. Thus, both *gähn-end* and *Leer-e* have been broken up into their constituent morphemes. Case (17) involves the bimorphemic noun *Spalt-ung* ‘splitting’ and the bimorphemic verb *droh-en*, ‘to threaten’. The verbal stem *droh* ‘threaten’ intrudes upon the nominal stem of *Spalt-ung* to yield *Droh-ung* ‘threat’. This error, then, relies on a morphological analysis of *Spalt-ung* into a stem and a suffix.

In order to determine the cohesiveness of derived words, it is necessary to compare the rate of stem errors in derived words to the rate of whole-word errors where the stem and the derivational affix are misordered in tandem. The higher the ratio of the former to the latter error type, the lower the degree of cohesion of derived words. The following tongue slips may serve as exemplification. Case (18) illustrates a prefix-stem structure, (19) a stem-suffix structure.

- (18) G. Er wird diesen **Vorschlag**– diese Ankündigung vor
 he will this proposal this announcement prior.to
 seinem Rücktritt verbinden mit dem **Vorschlag**...
 his resignation combine with the proposal
 ‘Prior to his resignation, he will combine this announcement with the proposal...’

- (19) G. die **Mutter** meiner **Freundin**– die **Freundin** meiner **Mutter**
 the mother of.my female.friend the female.friend of.my mother
 ‘my mother’s friend’

In (18), the prefix-stem sequence *Vor-schlag* ‘proposal’ is dislocated as a unit.⁶ So is the noun *Freund-in* ‘female friend’, which consists of the stem *Freund* and the feminine suffix *-in* in (19). Some measure of association between stems and derivational affixes has to be reckoned with.

The following count is based on all contextual substitutions in which the error word is morphologically complex (while the target word need not be). There are 27 whole-word slips and 50 stem slips in my error collection. The proportion of 35% to 65% suggests that derived words form moderately incohesive units. Clearly, an intermediate level of cohesion has to be acknowledged. As far as their cohesiveness is concerned, derived words and compounds appear to pattern similarly.

We proceed to the analysis of affix errors, which are quite common in German. The anticipatory addition of a prefix is illustrated in (20), that of a suffix in (21).

- (20) G. Ich habe mich für Rollen-**ent**-spiel **entschieden**. *for*:
 I have myself for role-PREFIX-play decided
 Rollenspiel
 role play
 ‘I have decided on role play.’

- (21) G. Da müsste man mal genauer in die
 PARTICLE would.have.to you PARTICLE more.closely in the
 Klatschspaltungen der Zeitungen schauen. *for*:
 gossip.splittings of.the newspapers look
 Klatschspalten
 gossip.columns
 ‘You would have to take a closer look at the gossip columns of the newspapers.’

In (20), the prefix *ent-* in *ent-scheiden* ‘to decide’ was copied into the compound *Rollen-spiel* ‘role play’ to produce the non-word *Rollen-ent-spiel*. Similarly, the nominal suffix *-ung* in *Zeit-ung* ‘newspaper’ was inserted between the stem *Spalte*

⁶ It is unlikely that the preposition *vor* as a free-standing closed class item played a major role in bringing about this speech error.

‘column’ and the plural marker /n/ in (21). While the local error word *Spalt-ung-en* ‘splittings’ is lexicalized, the compound *Klatsch-spaltungen* is nonsensical.

The error rates disclose a significant contrast. A total of 165 contextual prefix slips accompany 53 contextual suffix slips in my sample (76%–24%). This is a surprising result. Berg (2016) reports that the token frequency of suffixes is almost twice as high as that of prefixes in the CELEX database. General language usage would therefore lead us to expect more suffix than prefix errors. This contrast cements the validity of the prefix-suffix asymmetry in the error data.

The lower number of suffix slips compared to prefix slips suggests that stem-suffix sequences form a more tightly knit unit than prefix-stem sequences. Put another way, there are different morphological linkages at work: a weaker link between prefixes and stems and a stronger link between stems and suffixes. This weaker link grants prefixes a certain independence from stems, which allows prefixes to be rather freely involved in errors. Suffixes, by contrast, are so intimately connected to their stems that they have difficulty in disconnecting. This asymmetry lends credence to a right-branching analysis of prefix-stem-suffix structures such as *unthinkable* (Berg 2012). There is a functional difference between prefixes and suffixes which may explain their differential involvement in slips of the tongue. On the basis of English and German data, Berg (2015) argued that prefixes are more lexical and suffixes more grammatical in nature. This disparity leads us back to the lexicalness bias, which states that the higher the lexicalness of a unit, the more often it is involved in errors. Because prefixes are more lexical than suffixes, there are far more prefix slips than suffix slips.

The English (E.) error patterns resemble the German data closely. Let us highlight the category of exchanges. While stem exchange errors do occur, affix exchanges are almost non-existent. I spotted a single case (22) in Fromkin’s entire (unpublished) corpus and another singleton case (23) in Jaeger’s (2005: 400) error collection.

(22) E. He is not very forc**y** and push**ful**. *for*: force**ful** and push**y**.

(23) E. The seemingly insecure professor is actually a witting**g** and char**my** – witty and charming**g** conversationalist.

The suffixes *-ful* and *-y* are reversed in (22), the suffixes *-y* and *-ing* in (23). It is probably no coincidence that the words in which the malfunction occurred are both adjectives in (22) and (23). This word-class identity is a likely facilitator of the attachment of the suffixes to the inappropriate stems.

As in compounds (see Section 2.2.1), ordering problems may arise inside derived words. According to the like-with-like constraint, prefixes interact with

other prefixes and suffixes with other suffixes. This constraint thus presupposes prefix (or suffix) sequences in language structure for prefix (or suffix) misorderings to occur. Because stems may be preceded by two derivational prefixes, the theoretical possibility of prefix misorderings exists in German. And in fact, errors like (24) for example have found their way into my corpus.

- (24) G. Das kann uns auch noch **vorbestehen**– **bevorstehen**.
 that may us also still – lie ahead
 ‘The worst may still be to come.’

The target word *be-vor-stehen* ‘to lie ahead’ consists of the two prefixes *be-* and *vor-* and the stem *stehen*. The two prefixes reverse their order in (24). The supra-segmental level is also implicated. The stressed prefix *vor-* takes its stress value along, thereby yielding a different rhythmic structure (from amphibrachic to dactyl in the phonological representation). It is worth noting that suffix misorderings are not attested in my data although suffix sequences do occur in the language. This disparity is congruent with the lexicalness bias.

The previous analysis relied on the notion of word classes and thus was predicated on the tacit assumption that word-class information is available at the level at which morpheme slips arise. This is an important assumption which touches on the richness of the morphological representation. Are morphological errors really sensitive to word class? Opinions are divided on this issue. Whereas MacKay (1979) claims that stem slips are almost always of the same word class as the target, Garrett (1980) argues that there is no such sensitivity. In Garrett’s corpus, slips of the tongue involving different word classes occur slightly more often than those involving the same word class. As Garrett does not calculate a null hypothesis, this empirical difference is difficult to evaluate. He assigns morphological errors to a processing level at which word class is not represented and thereby implicitly denies a word-class effect.

Stemberger (1985b) objects to Garrett’s conclusions, arguing that it is necessary to distinguish between errors involving inflected words and errors involving derived words. His data reveal no difference in word-class sensitivity between uninflected and inflected words. Both sets of errors are highly sensitive to word class. This finding is consistent with the view that word class is part of the representation of lexical morphemes.

Note that the issue of a general word-class sensitivity cannot be easily settled for English because English lexemes are notorious for their word-class ambiguity. This problem brings us back to German where word class can usually be determined unambiguously. We consider stem substitution errors which may involve the same word class, as in (25), or different word classes, as in (26).

- (25) G. Ich kenne **Schüler**– **Kinder**, die zur **Schule** gehen.
 I know pupils– children who to.the school go
 ‘I know pupils – children who attend school.’
- (26) G. Finde ich gar nicht gut, dass er noch
 find I certainly not good that he PARTICLE
Feiertag– **Vatertag** **feiert**.
 bank.holiday– father’s.day celebrates
 ‘I really don’t like him celebrating bank holiday – father’s day.’

While the interacting units *Kinder* ‘children’ and *Schule* ‘school’ in (25) are both nouns, the verb *feiern* ‘to celebrate’ ousts the noun *Vater* ‘father’ in (26).

An analysis of all stem substitution errors in my German collection brings forth a majority of word-class-identical interactions. A total of 310 slips divide into 194 word-class-identical and 116 word-class-divergent cases (62.6%–37.4%). The null hypothesis was derived by perusing 33 pages (pp. 221–253) of Steger et al.’s (1971) compilation of samples of spoken German and extracting all theoretical possibilities of stem interaction. An attempt was made to respect real error characteristics such as the distance between error and source as faithfully as possible. In this set of 79 potential interactions, only 20 (25%) were found to involve word-class-identical elements. The actual error patterns are significantly different from chance (binomial, $p < 0.001$). It may thus be concluded, in keeping with Stemberger’s results for English, that stems in German are subject to a word-class constraint at the moment that they undergo misordering.

Up to now, the analysis has been exclusively based on languages with a concatenative morphology. It is highly remarkable that basically the same error patterns emerge in languages with a non-concatenative morphology such as Arabic. In this language, all morphology is bound. Oversimplifying somewhat, lexical morphemes take the shape of discontinuous strings of consonants while grammatical morphemes take the shape of discontinuous strings of vowels. For example, the word *faraba* ‘to drink/he drank’ consists of the lexical morpheme *f-r-b* ‘drink’ and the third person singular past tense marker *a-a-a*. A lexical-morpheme error would accordingly involve the consonantal skeleton and leave the vowel pattern unscathed. In point of fact, such cases occur quite commonly in a corpus of Jordanian Arabic (A.) speech errors collected by Hassan Abd-El-Jawad. Two of these cases are reported in (27) and (28).

- (27) A. faaðu **baali**. for: baalu faaði.
 – head.my head.his empty
 ‘His head is empty.’

- (29) G. dass sie die Augenschüsse– die Augenzeugen einfach
 that they the eye.shots the eye.witnesses simply
 niedergeschossen haben.
 down.shot have
 ‘that they just shot the eye witnesses.’
- (30) G. Auswärts getorene Schosse– geschossene Tore zählen doppelt.
 away – – kicked goals count twice
 ‘Goals scored in an away match count twice.’

This pair of examples has been selected with special care. It presents a rare case of the same unit being involved in different errors (and in different ways at that). This unit is the verb *schieß-en* ‘to shoot/to kick’ with its past participle *geschoss-en*. The corresponding noun is *Schuss* ‘shot/kick’ in the singular and *Schüsse* ‘shots/kicks’ in the plural. The tonic vowels /i:/, /ɔ/, /u/ and /y/ are therefore indicative of word class (and more specific features).

In (29), the verbal stem *schoss* intrudes upon the second constituent of the nominal compound *Augen-zeuge-n* ‘eye witnesses’. The “outgoing” noun *Zeuge* ‘witness’ imposes its nominal nature on the “incoming” verbal stem and therefore changes the vowel from /ɔ/ to /y/. The resulting word is the lexicalized plural noun *Schüsse* ‘shots’. The entire compound *Augenschüsse* is not an established word. This is a clear case of morphophonological accommodation.

In (30), the past participle *ge-schoss-en* ‘kicked’, which functions as an adjective, trades places with the noun *Tor* ‘goal’. As the stem of this adjective enters a nominal slot, it might be expected to adopt nominal properties, as was the case in (29). However, this does not happen. The tonic vowel /ɔ/ of *geschossen* does not turn into /u/ or /y/. This is thus an instance of a failure to accommodate. The conditions under which accommodation does or does not take place await a more detailed investigation.

Accommodation does not only involve the segmental but also the suprasegmental level. Ferreira and Humphreys (2001) and Wardlow Lane and Ferreira (2010) capitalized on a notable interaction between word class and stress placement in English. For example, the lexeme *record* is initially stressed as a noun but finally stressed as a verb. The authors experimentally elicited stem exchanges on VPs such as *taped the record*. They found that when the target VP was mispronounced as *recorded the tape*, the lexeme *record* typically underwent a stress shift. This is another case of word-class-specific accommodation.

The second type of accommodation induces a change on a neighbor of the error unit, not on the error itself. Due to syntagmatic constraints, a conflict may arise between the error unit in its new location and the “old” context. If the

processing system manages to resolve this conflict, accommodation takes place; if it does not, accommodation fails. Curiously enough, I did not find any such accommodation failures in my error sample. Three cases of accommodation are provided below, with (31) from German and (32) and (33) from English.

- (31) G. Dann haben sie Schwierigkeiten, die **Formulierungen**– die
 then have they difficulties the formulations the
Schwierigkeiten zu **formulieren**.
 difficulties to formulate
 ‘Then they have difficulties putting the difficulties into words.’
- (32) E. I think it’s **careful** to measure with **reason**. for: **reasonable** to measure
 with **care**. (from Fromkin 1973)
- (33) E. People still see Libya as a **national danger** – as a **dangerous nation**.
 (from Pfau 2009: 246)

Example (31) testifies to the intrusion of the verbal stem *formulier* ‘formulate’ on the noun *Formulierungen* ‘formulations’. The critical feature of this tongue slip is the alternative ways of nominalization. The suffix *-keit* nominalizes the adjective *schwierig* ‘difficult’ whereas the suffix *-ung* nominalizes the verbal stem *formulier* ‘formulate’. As can be seen in (31), the intruding stem selects the appropriate suffix *-ung* and thereby does away with the suffix *-keit*.

The two English slips attest to the interaction of a denominal adjective and a noun. In (32), the noun *care* enters the *X-able* slot. There is no phonological obstacle to *care-able*, given the orthodoxy of such forms as *bear-able*. Also the morphological rules of English do not ban *care-able*. This stem-suffix combination is just unusual and certainly much less frequent than *care-ful*. The change from *-able* to *-ful* may thus be understood as a way of generating an output which is lexically unobjectionable. The accommodation in (33) seems to be governed by similar principles. The non-accommodated hypothetical output *nation-ous* creates neither a phonological nor a morphological anomaly, given the existence of cases such as *cavern-ous* and *fam-ous*.

2.2.2 Non-contextual slips

Before we consider errors of word formation, it is fitting to discuss blend errors in which two stem-affix sequences are blended into one, i.e. stem₁-affix₁ x stem₂-

affix₂ → stem₁-affix₂ or stem₂-affix₁. A prefix-stem blend is given in (34), a blend involving a suffix in (35).

- (34) G. Das ist ein häufiger **Vorwand**– **Einwand** gegen die
 that is a common excuse objection against the
 Reiseunternehmen.
 tourist companies
 ‘That is an excuse – an objection which is commonly levelled against
 tourist companies.’
- (35) G. Bemerke– **Bemerkungen**
 – comments

Example (34) illustrates a blend of the semantically related words *Ein-wand* ‘objection’ and *Vor-wurf* ‘reproach’ which share the morphological structure of prefix + stem. The error word *Vor-wand* preserves this structure by combining the prefix of *Vor-wurf* with the stem of *Ein-wand*. The fact that the error word *Vor-wand* ‘excuse’ is a real word may have facilitated this processing failure. Case (35) is an uncommon blend of two plural words with a different morphological structure, to wit: the prefix-stem word *Ver-merke* ‘notes’ and the prefix-stem-suffix word *Be-merk-ung-en* ‘comments’. In view of the fact that *Bemerkungen* was the intended item, the error word *Bemerke* may be interpreted as involving the deletion of the nominalizing suffix *-ung*. This loss may be understood as an interference of the suffixlessness of *Vermerk* ‘note’.

The quantitative patterns in blends confirm the asymmetry between prefixes and suffixes observed in contextual slips. In fact, this asymmetry is even more pronounced in blends. There are 69 clear and 44 ambiguous prefix blends but hardly any suffix blends in my error corpus. Case (35) is the only pertinent case and singleton cases are almost always open to alternative analyses.

We move on to word formation proper. Word-formation errors provide evidence of the competition between alternative strategies of deriving words, strategies which are appropriate in one particular context, though not in another. The greater the similarity, both formal and semantic, among these options, the stronger the competition and hence, the higher the probability of a malfunction. Such a conflict is nicely illustrated in English by the choice between the Germanic negative prefix *un-* and the Romance negative prefix *il-*, as in *unlawful* and *il-legal*. It is therefore no wonder that errors involving negative prefixes figure prominently in Fromkin’s corpus. Here are two relevant cases.

- (36) E. I’m **in**able to walk – I’m **un**able to walk.

(37) E. I'm physically **dis**comfortable. *for*: **un**comfortable.

Both slips illustrate the confusion between negative prefixes. The prefix *un-* is substituted for by *in-* in (36) and by *dis-* in (37). It is likely that the occurrence of these two slips was promoted by the related nouns *inability* and *discomfort*, respectively. In fact, the same stem (i.e. *able* and *comfort*) is expanded by different prefixes in different word classes.

These word-formation errors raise the intriguing issue of how similar they are to blend errors such as (34) above. Is it even possible to argue that word-formation errors actually are blend errors? For instance, is *inable* the outcome of blending *unable* and *inability* together? A provisional answer is that the two error types are similar, though not identical. Empirically, the two error types pattern differently. While true blends almost invariably involve interacting units from the same word class, word-formation errors are less constrained. As can be seen in (36) and (37), they may show an interference from a different word class. Furthermore, somewhat disparate mechanisms appear to underlie the two error types. Whereas genuine blends require the activation of all four morphemes (i.e. affix₁, stem₁, affix₂, stem₂), word-formation errors make do with the activation of the intended affix₁ and stem₁ as well as the inadvertent affix₂. The strong activation of a particular unintentional stem may not be necessary although it is quite possible that the weak activation of a number of inadvertent stems (a so-called gang effect) plays a role in this game.

There is some evidence that the patterns of word-formation errors are asymmetrical. There are more errors in which a less regular form is replaced by a more regular form than vice versa. One measure of irregularity is the extent of morphophonological adjustment attendant upon affixation. Thus, the more regular suffix *-ment* intrudes upon its rival *-ity* more often than vice versa. Cases such as (38) are accordingly more frequent than cases such as (39) (both from the Fromkin corpus). Similar slips were experimentally induced by MacKay (1978).

(38) E. His sincereness is unquestionable. *for*: his sincerity.

(39) E. comfortability. *for*: comfortableness.

Word-formation errors can be found in corpora from several other languages including German (Berg), Spanish (del Viso, Igoa, and García-Albea 1987) and French (Rossi and Peter-Defare 1998). Rather than documenting these cases in any detail, we will pick out a word-formation process which involves a stem-internal change as a concomitant of affixation, as in (38) above. In German,

suffixing may be accompanied by a vowel change named umlaut.⁸ The issue is how reliably this vowel change is implemented in speech errors. The notable answer is “not very”. Here are two pertinent examples.

(40) G. sauberlich– säuberlich.
 – ‘neat’

(41) G. ohnmächtig– ohnmächtig.
 – ‘unconscious’

As can be seen from these errors, suffixing may operate smoothly while umlauting may fail. In (40), the adjective *sauber* ‘clean’ takes the suffix *-lich*. The attendant vowel change from /aʊ/ to /ɔɪ/ does not, however, take place. The same problem can be observed in (41) where the vowel /a/ is not umlauted to /e/ following the attachment of the suffix *-ig* to the noun *Ohnmacht* ‘fainting’.

These slips demonstrate that suffixing and umlaut are two distinct processes. Umlaut is rather independent of suffixing. The probable reason that makes umlaut so vulnerable is the inherent processing difficulty involved in stem-internal changes. On the assumption that the base is drawn on for the generation of the morphologically complex word, the umlaut vowel competes with the non-umlauted vowel. If the latter is strong, the former may have a hard time asserting itself. In (40), for example, the base *sauber* ‘clean’ is far more frequent than the derived word *säuberlich* ‘neat’. On the assumption that high lexical frequency strengthens the phonological representation (e.g. Dell 1990), it is to be expected that the umlaut vowel may occasionally lose to the vowel of the base.

2.3 Errors in inflected words

The categories that are relevant to the study of inflected words are similar, though not identical to those relevant to the description of derived words. In particular, there are no blends of the type $\text{stem}_1\text{-affix}_1 \times \text{stem}_2\text{-affix}_2 > \text{stem}_1\text{-affix}_2$ or $\text{stem}_2\text{-affix}_1$ in inflectional morphology. This is very different from what was observed in derivational morphology. The reason for this non-occurrence

⁸ The term “umlaut” is used here mainly for convenience. It is not intended to describe an orthographic device. As slips of the tongue are by definition spoken-language phenomena, the term refers to a morphologically conditioned vowel change in the stem.

lies in the low semantic content in inflectional affixes. This prevents the competition between words with different stems and different inflectional suffixes. Thus, the critical precondition for blending is not fulfilled.

2.3.1 Contextual slips

The major behavioral difference between stems in inflected and stems in derived words is that the former are more autonomous vis-à-vis their bound morphemes than the latter. Hence, stem slips occur more frequently in inflected than in derived words. In all probability, two related effects combine to boost the rate of stem slips. For one thing, the low degree of cohesion in inflected words grants stems their independence; for another, the grammatical nature of inflectional morphemes makes them reluctant to undergo misordering. As a result, the typical error in inflected words is a stem slip which leaves inflectional material behind. The frequency of this error type is impressive. It is well represented in large and small corpora from diverse languages. Following is a cross-section of tongue slips from English, German, Norwegian (N.), Spanish (S.) and Italian (I.).

- (42) E. Make it so the **apple** has less **trees**. *for*: so the **tree** has less **apples**.
(from Garrett 1975: 159)
- (43) G. Bill Haley, der **Rock** des **Königs**– der **König** des **Rocks**.
Bill Haley the rock of.the king– the king of.the rock
'Bill Haley, the king of rock'
- (44) N. ikke ei **sol** for **skya**. *for*: ikke ei **sky** for
not a sun in.front.of cloud-the not a cloud in.front.of
sola. (from Foldvik 1979: 119)
sun.the
'not a sun in front of the cloud' *for*: 'not a cloud in front of the sun'
- (45) S. Lo que pasa es que, hoy en día, una **cuera**
it what happens is that nowadays a –
de **suelo**– una **suela** de **cuero**
of floor– a sole of leather
(from del Viso, Igoa, and García-Albea 1987: 96)
'Nowadays, a leather sole. . .'

- (46) I. I **parole** di **errora**. *for:* gli **errori** di
 the.PL speech.PL of.the error.SG the.PL error.PL of.the
parola
 speech.SG
 (from Magno Caldognetto, Tonelli, and Pinton 1987)
 ‘speech errors’

All five errors exemplify the reversal of nominal stems. The inflectional material which stays put is quite diversified. The plural suffix is stranded in (42), the case marker in (43), the definiteness marker in (44), the gender (or inflectional class) marker in (45) and again the number marker in (46). There is a noteworthy difference between the slips from the Germanic and those from the Romance languages. Roughly speaking, the former language group has a word-based morphology whereas the latter group has a stem-based morphology. While the suffixes are attached to free-standing words in English and Norwegian, they are epoxied to bound stems in Spanish and Italian. On the face of it, this disparity does not seem to play a major part in error generation. However, whether the morphological status of the stem has an effect on the incidence of stem slips (and suffix slips, for that matter) remains to be ascertained. An informed guess would be that, *ceteris paribus*, the rate of stem slips is higher in a word-based than in a stem-based morphology because bound stem + suffix sequences are probably more cohesive than free stem + suffix sequences.

Errors involving inflectional suffixes display an amazing variety of functions. Among the many features that may be misordered are case, person, number, tense, finiteness and comparison.⁹ In point of fact, no grammatical category appears to be immune to malfunction. Two examples from German are provided in (47) and (48).

- (47) G. Groc**ken**– Grog trink**en** nie 12 (Personen).
 – grog drink never 12 (people)
 ‘There will never be 12 people drinking grog.’
- (48) G. Du möchst’, dass ich schön gerie**cht**– rie**che** und gepflegt bin.
 you like.to that I nicely – smell and neat am
 ‘You like me to smell good and be neat.’

⁹ Linking elements inside compounds (e.g. *Arbeit-s-zeit* ‘working time’) may also be involved in errors. However, they are not considered here because they have mostly lost their morphological status (see e.g. Nübling & Szczepaniak 2013).

The third person plural suffix *-en* is anticipated in (47) while the past participle marker is anticipated in (48). More specifically, the suffix */-ən/* (phonetically a syllabic nasal) of the verb form *trink-en* '(they) drink' is inadvertently attached to the noun *Grog* 'grog' in (47). The error word *Grocken*, in which the devoicing of final <g> is preserved, is a non-word. Case (48) shows the intrusion of the past participle circumfix *ge_**t* of *ge-pfleg-t* 'neat' upon the first person singular form *riech-e* '(I) smell'. This slip leads to the ungrammatical form *ge-riech-t* 'smelt', which would be the regular formation of the past participle of *riech-en* 'to smell'. However, *riechen* is an ablaut verb and as such requires a vowel change in non-present tenses (and a different suffix in the past participle). There is a notable parallel here between this misordering error and errors of word formation in which an irregular verb form is replaced with a regular one (see below).

Exchanges involving inflectional suffixes are quite rare, thus paralleling the behavior of derivational affixes. There is not a single such error in my German sample. Two relevant cases, one from Spanish and the other from Finnish (F.) are reproduced below. It is probably no coincidence that Hokkanen's (2001) Finnish corpus contains a few such items as Finnish makes heavy use of inflections. Example (50) has been slightly shortened. (INE = inessive; ELA = elative)

- (49) S. He cantado líneo y binga. for: línea y bingo. (from Igoa, I have cried – and – line and bingo
García-Albea and Sánchez-Casas 1999: 179)
'I cried line and bingo.'

- (50) F. mukana ... on ... (ihmiset) ... eri
in.it are (people) various
ryhmissä kertomasta näkemyksiään. for: ryhmistä
group.PL.INE tell.3rdINF.ELA view.PL.their group.PL.ELA
kertomassa. (from Hokkanen 2001: 98–99)
tell.3rdINF.INE
'In the debate, there are people from various groups who are expressing their views.'

The two gender (or noun class) markers *-o* for masculine and *-a* for feminine trade places in (49). This slip compares in an interesting way to (45) above in which the stems were reversed and the gender markers stayed put. The same structures may give rise to stem or suffix slips. It is not known which factors decide for the one and against the other error type. The Finnish tongue slip

illustrates a reversal of two case markers. (The concomitant vowel harmonic changes need not concern us here.) The elative suffix *-stä* 'from' swaps places with the inessive suffix *-ssa*, which codes durational aspect on the verb. Not surprisingly, this reversal creates an ungrammatical utterance.

Slips of the tongue raise an interesting issue pertaining to error localization. Compare the two plural errors in (51) and (52).

- (51) G. ein Song, den Sie sicherlich kennen als Tanznummern–
 a song which you certainly know as dance.numbers–
 Tanznummer auf Parties und auf Feten.
 dance number at parties and at parties
 '(This is) a song which you know as dance music played at parties.'

- (52) G. Klaus Schlappner, der Väter– Vater der Erfolge der
 (proper noun) the fathers father of.the successes of.the
 Waldhöfer.
 (proper noun)
 'Klaus Schlappner, the man to whom the Waldhof team owe their success'

In (51), the plural suffix /n/ of *Feten* 'parties' appears on the head of the compound *Tanznummer* 'dance music'. Because both constituents take the same plural allomorph, the allomorph /n/ may be argued to be involved in the error. However, such an analysis is not available for the plural error in (52). The two nouns *Vater* 'father' and *Erfolg* 'success' select quite different allomorphs. The noun *Vater* is pluralized by umlaut alone while the noun *Erfolg* is pluralized by suffixing a schwa. If schwa had been tacked onto *Vater*, the nonce word *Vater-e* would have been outputted. What happened instead is that the abstract plural morpheme was anticipated. So *Vater* was pluralized by means of umlaut and the correct form *Väter* saw the light of day.

A similar phenomenon can be observed in verbs. Contrast (53) to (54).

- (53) G. ... ins 3 zu 2 ummündeten. Und daraus machtete–
 to 3 to 2 changed. and from.that –
 machte dann Dieter Zimmer wenigstens noch das 3 zu 3.
 made then (proper noun) at.least PARTICLE the 3 to 3.
 '... changed the score to 3 – 2. Dieter Zimmer finally turned this score
 into 3 – 3.'

- (54) G. Und wir damit auch anfangen, Jazzelemente zu **mochten**–
 and we with.it also began jazz.elements to –
mögen.
 like
 ‘And so we began to like jazz elements.’

The two interacting verbs *ummiind-en* ‘to change’ and *mach-en* ‘to make’ in (53) form their regular past tenses by adding the suffix *-te*. This suffix could therefore be easily added to the error verb. What makes this slip remarkable is that the suffix is added to the past tense form *mach-te*, thereby creating double past tense marking. However, the main point in the present context is that the same allomorph appears on the two interacting verbs. This is not so in (54), which also involves past tense marking. While the verb *anfang-en* ‘to begin’ is an ablaut verb, the verb *mög-en* ‘to like’ is completely irregular and has the suppletive past tense form *mochte* ‘liked’. What happened in (54) is that the past tense of *anfang-en* intruded upon the infinitive *mög-en* and thereby distorted it to *mochten*.¹⁰

Structural linguistics offers a straightforward account of the contrast between (51) and (53) on the one hand and (52) and (54) on the other: the former error pair originates at the allomorphic level whereas the latter originates at the morphemic level. This view nicely accommodates the impression that the former error pair arises at a more concrete and the latter at a more abstract processing level. While this account seems to make good sense, it is not obvious that it is the correct one. It could also be argued that all four slips arise at the same processing level. This would be the more abstract rather than the more concrete one. The morphemic account adopts a different take on the concrete errors and claims that they look as if they occurred at the concrete level but actually do not. The seemingly concrete errors are also compatible with the view that they arise at the morpheme level although no morphophonological changes are needed. It is an open question whether two error loci are required to account for the full spectrum of slips or whether a single error locus suffices.

Little is known about the vulnerability of individual grammatical categories. The null hypothesis would be that they are all equally error-prone, but this is unlikely to be true. One alternative hypothesis is that the error rate increases with increasing lexicalness of a grammatical category. Igoa, García-Albea, and Sánchez-Casas (1999) report that there are more number than gender reversals

¹⁰ Note as an aside that German infinitives are not inflected for past tense.

in their Spanish corpus of tongue slips.¹¹ Unfortunately, they do not report whether the same asymmetry emerges in other error categories. As no frequency information is provided on the occurrence of gender and number suffixes in general language usage, this result is at best suggestive.

2.3.2 Non-contextual slips

Inflectional errors tend to be asymmetrical. There are usually more substitutions from A to B than from B to A. In some domains, omissions outnumber additions. This has to do with the unequal status of the elements in the paradigm. Stronger inflections replace weaker inflections rather than vice versa. Strength is determined by regularity and by the ratio of formally marked to formally unmarked forms. The higher this ratio, the higher the number of additions; the lower this ratio, the higher the number of omissions.

The processing problems besetting inflected words are quite similar for nouns, verbs and adjectives. The focus of the analysis will be on verbs, which allow for the greatest inflectional range and which therefore provide more insight than other word classes. However, nouns will be briefly touched on.

Probably the best known asymmetry is that between regularly and irregularly inflected verbs. Past tense formation may serve as an illustration. As in English, German verbs may form their past tenses by adding a suffix or by changing the stem vowel. The former strategy is standardly described as a regular, the latter as an irregular process. A regularization error is reported in (55), an irregularization error in (56).

- (55) G. Er pfeifte– er pfiff.
 he – ‘he whistled’

- (56) G. weil sie so richtig auf stur **schielt**.
 because she so completely to obstinate –
 for: schaltete
 switched
 ‘because she was being utterly obstinate’

¹¹ This is consistent with Burani’s (1992) experimental study of Italian, in which gender was found to constrain errors more strongly than number. Gender is more closely associated with its noun than number and hence, gender markers break free less easily in malfunctions than number markers.

In (55), the ablaut verb *pfeif-en* ‘to whistle’ was inflected as if it was a regular verb. It is notable that the regular past tense form (i.e. the error) does not sound wide of the mark, thus possibly foreshadowing incipient language change. Inversely, the regular verb *schalt-en* ‘to switch’ underwent an ablaut change from /a/ to /i:/ in (56). Such a vowel change is certainly not unmotivated in the morphology of German. Several verbs including *halten* ‘to hold’ and *schlafen* ‘to sleep’ have an /i:/ in their past tense forms. It may be assumed that the irregularity of these verbs exerts pressure on the regularity of the target verb. A malfunction occurs when the competitor verbs are momentarily more highly activated than the target verb. The larger number of regularization slips relative to irregularization slips ensues from the higher type frequency of regular than irregular verbs.¹²

In the creation of past tense forms, regular morphology competes with irregular morphology. If this competition leads to an error, the resultant error type is necessarily a substitution. However, this is not the only possible error type. If past tenses are derived from base forms, it is to be expected that the process of past tense formation may occasionally fail to occur. This happened in (57). Because this error type is missing from both Meringer’s (1908) and my data set, an example from English was chosen. Of course, omission errors are not confined to verbal morphology. As shown in (58), plural formation on German nouns is subject to the same error process (called no-marking by Stemberger and MacWhinney 1986).

- (57) E. Boy, that **draw** him out – **drew** him out (from Stemberger and MacWhinney 1986: 20)

- (58) G. Sie meinen, dass die Museum– Museen die Werbung
 you believe that the.PL museum museums the advertising
 entdeckt haben.
 discovered have
 ‘So you believe that the museums have discovered advertising for themselves.’

The context of both slips leaves no doubt that an overtly inflected form was intended. The form *draw* in (57) is ungrammatical without the third person singular marker. The definite article *die* in (58) is unambiguously plural and hence

¹² On the basis of English experimental data, Stemberger & Middleton (2003) argue that phonological asymmetries contribute to shaping morphological error patterns.

incompatible with the following singular noun *Museum* ‘museum’. In my corpus, all no-marking slips involving plural occurred on nouns with highly irregular plural formation. In German, there are a few nouns which form the plural by a stem-final change from [-um] to [-en], as in (58). This strongly suggests an interaction between irregularity and error-proneness. The higher the irregularity of a particular form, the higher the risk of faulty production.

The opposite of an omission is an addition error, i.e. the addition of material to a position where it is inappropriate. Such errors are found in English and German verbs, as illustrated in (59) and (60), respectively.

(59) E. They behaves in a certain way. *for*: behave. (from Stemberger 1985c: 251)

(60) G. Weißt du, warum ich das gut fante? *for*: gut fand?
 know you why I that good – good found
 ‘Do you know why I liked it?’

Example (59) shows the addition of the morpheme /z/, which functions as the third person singular marker on present tense verbs. Addition errors presuppose a paradigm structure where some cells are filled (i.e. explicit marking) and others are empty (no marking). This is the case in present tense verb inflection in English where the third person singular is marked while the other persons are not. The German error shows the addition of the first person singular suffix /-ə/ to the past tense form of the ablaut verb *finden* ‘to find’. Even though the subject *ich* ‘I’ indeed requires a first person singular verb form, past tenses of ablaut verbs do not mark the first person singular. There is thus a gap in the paradigm of past tense verbs (though not in present tense verbs), which may be erroneously filled, as in (60).¹³

Ablaut verb forms may not only be replaced with suffixed verb forms, as in (55), one ablaut pattern may also be supplanted by another. This possibility typically arises from the fact that a given verb may have more than one ablaut

¹³ A sideways glance at the phonological level is appropriate here. The erroneous addition of the vocalic person suffix shifted the stop in the verb form from word-final (*fand*) to word-medial position. This shift is of some theoretical interest in the phonology of German. If, as is standardly assumed, the stop is underlyingly voiced and undergoes devoicing in word- or syllable-final sites, it would be expected to be pronounced voiced (i.e. *fande*). However, it was pronounced voiceless (i.e. *fante*) in (60) (see error (47) above, which shows a similar effect). That is, it preserved its voiceless quality from the time before the error happened. This casts doubt on the claim that it was ever underlyingly voiced.

vowel in its paradigm, as in English *to write, wrote, written*. However, this is not a necessary condition. Refer to (61) and (62).

- (61) G. als es um Formsachen gang. for: ging
 when it about formalities – went
 ‘when formalities were at issue’

- (62) G. als die uns einlied– einlud.
 when she us – invited
 ‘when she invited us’

The verb *geh-en* ‘to go’ has an /ɪ/ in the past tense and an /a/ in the past participle form. The substitution of /ɪ/ by /a/ in (61) probably reflects the intrusion from this alternative ablaut vowel. Remarkably, there is no form with /i:/ in the paradigm of the ablaut verb *einlad-en* ‘to invite’ which could account for the vowel change from /u:/ to /i:/ in (62). It is therefore likely that this slip was caused by other verbs. In fact, such an account was proposed for error (56) above. Other verbs such as *bleib-en* ‘to stay’ and *lauf-en* ‘to run’ make /i:/ a highly available past tense vowel, which may occasionally interfere with the target vowel of an ablaut verb which does not have /i:/ in its past tense form.¹⁴

The next type of verb error reveals a further asymmetry. If, as is generally held, inflected verbs are formed on the basis of infinitival stems, there is a certain dependence of ablaut vowels on base vowels in ablaut verbs. From this dependence we may derive the prediction that the vowel of the infinitive will replace the vowel of the finite form more frequently than vice versa. This prediction is borne out by the error data. While the vowel of the infinitive is largely immune to malfunction, inflected forms often contain the vowel of the infinitive, as can be seen in (63) and (64).

- (63) G. Ähnliches gelt– gilt hier.
 something.similar – applies here
 ‘Something similar applies here.’

¹⁴ There is one minor complication to be noted. The prefix part of the circumfix is subject to an independent error bias which facilitates the loss of word-initial unstressed prefixes. As the prefix part of the circumfix is formally identical to a genuine prefix, the former behaves like the latter. However, this does not undermine the empirical claim that the components of circumfixes act in unison because both may be argued to have been generated together before the deletion error on the prefix took place.

- (64) G. Die *spring*– *sprang* auf den Teppich.
 she – jumped on the carpet
 ‘She jumped onto the carpet.’

The infinitive *gelt-en* ‘to apply’ requires a change from /e/ to /ɪ/ in the third person singular present tense form *gilt* ‘(it) applies’. This change fails to materialize in (63). Similarly, the verb *spring-en* ‘to jump’ requires a change from /ɪ/ to /a/ in all past tense forms. The erroneous form *spring* in (64) also preserved the vowel of the infinitive.

To make the case for this asymmetry convincing, it has to be shown that the direction of influence from inflected forms to infinitives is appreciably weaker than from infinitives to inflected forms. In fact, this is so. There is only a single such case in my database, which is reproduced below.

- (65) G. Das kann man noch nicht *weissen*– *wissen*.
 that can one yet not – know
 ‘We cannot know beforehand.’

The ablaut verb *wiss-en* ‘to know’ has the diphthong /aɪ/ in its present tense singular forms. This diphthong blotted out the monophthong /ɪ/ of the infinitival stem. Coupled with the relative frequency of errors such as (63) and (64), the extreme uncommonness of slips like (65) for example lends strong support to the claim that inflected verb forms are not directly retrieved from the mental lexicon but generated with the aid of the infinitive.

Ablaut verb forms undergo two kinds of change. A verb may not only undergo a vowel change but also receive a suffix which marks person and number (or a circumfix in past participles). The necessity of two changes allows us to study the relationship between these changes. Are these implemented independently of each other or are these part of the same underlying process? In the latter case, we would expect malfunctions to implicate both parts simultaneously. In the former case, the malfunction may affect one part but leave the other intact. If the two processing operations are independent of each other, the possibility of an asymmetry arises. One part may be more error-prone than the other. Such an asymmetry is illustrated in (66) and (67). No. (66) involves present tense, (67) past participle formation.

- (66) G. Der *leest*– *liest* da.
 he – reads there
 ‘He is reading over there.’

- (67) G. wenn ich was getrunken habe. for: getrunken habe.
 when I something – have drunk have
 ‘when I have had a drink’

Third person singular verb forms are marked by the suffix /-t/. In order to generate the intended form *liest* ‘(he) reads’ in (66), the infinitival stem *les* ‘read’ has to undergo ablauting and suffixing. What we actually observe is the selection of the correct suffix but the misselection of the vowel. A similar pattern can be seen in (67). The past participle circumfix *ge_en* was correctly produced while the production of the correct ablaut vowel /u/ failed.

These two slips are entirely typical. Whenever two operations have to be carried out and one of them fails, the one involving affixes succeeds whereas the one involving ablaut does not. This is not to say that affixing is immune to error. It may of course be misapplied, but when this happens, it occurs independently of ablaut processing. We may therefore conclude that the different changes involved in the creation of finite forms are independently effected (see also MacKay 1976) and thoroughly asymmetrical. The correct production of the ablaut vowel entails the correct production of the affix. However, the correct production of the affix does not predict the correct production of the ablaut vowel.

How can this asymmetry be accounted for? The answer is not entirely clear. Errors are known to result from competition. The general explanation would accordingly be that ablaut vowels face more serious competition than affixes do. This is certainly true of English, where affixes compete with “nothing” (no marking, as in present tense verb inflection) and hence “have nothing to fear”. In German, by contrast, most regular verb forms require inflectional marking. Thus, inflectional suffixes have a large number of competitors, which would lead us to expect strong competition. There are two possible solutions to this problem. Contra Bybee and Newman (1995), ablaut may be *inherently* more difficult to process than affixing. As their name suggests, ablaut vowels have a strong phonological component which appears to be weaker in affixes. If phonological units are more error-prone than morphological units, we would have an explanation for the differential behavior of ablaut and affixes. Alternatively, affixes may be hypothesized to have competitors which are largely innocuous. It is conceivable that syntax constrains the replacement of, let us say, one person affix by another and thereby renders affix errors unlikely. As no such constraints apply to ablaut, ablaut is more vulnerable than affixing.

The preceding analysis, which uncovered a certain independence between affixing and vowel alternation, raises the more general issue of whether any two modifications of a base form are carried out independently of each other.

Let us go back to (67). Circumfixes provide an intriguing test case to which the affix-ablaut asymmetry may be compared. By definition, circumfixes consist of two parts of which one precedes and the other follows the stem. If the two components are processed independently of each other, we would expect to find slips of the tongue in which one component is correctly produced whereas the production of the other goes wrong; if, by contrast, there is no processing independence between the two components, such errors would be impossible. In actual fact, neither my own nor Meringer's German corpus includes a single pertinent item. The non-attestation of this error type strongly suggests that the two operations involved in circumfixing are tightly integrated into a single processing routine and hence do not run independently.

Why do we observe symmetrical processing of the two parts of circumfixes but asymmetrical processing between affixes and ablaut vowels? The answer to this question is complementary to the account previously proffered of the asymmetry between affixing and ablaut. Attaching a circumfix is a symmetrical procedure which involves the addition of a prefix and that of a suffix. Both the prefix and the suffix compete with nothing, so the two processing operations can be performed with equal accuracy. These near-identical processing constraints on the prefix part and the suffix part are responsible for the non-independent generation of the prefix and the suffix and hence the non-occurrence of tongue slips in which only one of these units is uttered. Note that this account does not categorically rule out such errors. It merely claims that these slips have an extremely low probability of materializing.

The above analysis of circumfixing has shown that the absence of certain slips can be as theoretically illuminating as their actual occurrence. As we turn to phonologically conditioned allomorphy, we are struck by the extreme uncommonness of allomorphic errors. Apparently, people hardly ever err on the selection of the appropriate allomorph. There are no such errors in my German corpus, but Stemberger (1998: 436), while noting the unusualness of this error type, reports the following case.

(68) E. Queen Elizabeth's **es** – Queen Elizabeth's **s** mother

Although the dental fricative /θ/ requires a non-syllabic allomorph, the syllabic possession marker /ɪz/ was selected. Phonotactic constraints may be partly responsible for the rarity of such cases, but only partly so because we do not observe the misselection of the voiceless allomorph /-s/ in the third person singular form of verbs ending in sonorants even though such clusters would be phonotactically legal (as in *else* and *fence*).

The rarity of allomorphy errors stands in marked contrast to the relative commonness of (ir)regularization errors in (55) and (56) above. Of course, regularizations are also allomorphic errors in that the irregular past tense allomorph is replaced with the regular one. The difference between the two types of allomorphy is that the possessive and the third person singular inflection in English are phonologically conditioned whereas the decision between regular and irregular past tense formation in German and English is lexically conditioned. We thus come across a striking processing disparity between phonologically and lexically motivated allomorphy. The former is largely immune while the latter is prone to error.

A possible explanation of the extraordinary accuracy with which phonologically determined allomorphy is processed is its high degree of automaticity. Tongue slips involving phonemes which serve as input to allomorphic processes are a powerful demonstration of this claim. Consider (69).

(69) E. The infant tucks – touch**es** the nipple (from Stemberger 1985b: 176)

Example (69) exemplifies the non-contextual substitution of morpheme-final /tʃ/ by /k/. What makes this slip remarkable is that the target and the error phoneme require different third person singular allomorphs. As can be seen, the allomorph which is appropriate to the error context is chosen. Given that such an accommodation is the rule, it allows one to argue that phonologically conditioned allomorph selection is a highly automatized process and as such largely invulnerable to malfunction. In contrast, lexically conditioned allomorphy is less automatized. By definition, it involves a decision which is particular to each verb and where phonology is of little help. Highly similar phonological structures may support regular or irregular verbs, as in English *to mend* versus *to send*. This similarity may be argued to increase competition between the two verb classes. Thus, the selection of lexically determined allomorphs involves a certain processing effort and is therefore more error-prone than phonologically determined allomorphy.

The preceding analysis was simplified by the fact that morphological processes tend to leave the stem unruffled (putting umlaut to the side). However, there are also more complex cases where the selection of stems and affixes is interdependent. Such interaction is rife in Finnish. Two pertinent cases, taken from Hokkanen (2001: 103), are shown in (70) and (71).

(70) F. **tämä**-llä. for:**tä**-llä
 this-ADE this-ADE
 ‘with this’

- (71) F. **tarkempi-n**. for: **tarkemmi-n**
 accurate.COMPARATIVE-ADV accurate.COMPARATIVE-ADV
 ‘with greater accuracy’

When the demonstrative pronoun *tämä* 'this' in (70) is uninflected, it is disyllabic. However, when combined with suffixes such as inessive *-llä*, the second syllable of *tämä* disappears. This did not happen in (70). Case (71) is a stem selection error. Finnish stems may distinguish between a strong and a weak form. In the case at hand, *tarkempi* (from *tarka* 'accurate' and *empi* 'more') is the strong form and *tarkemmi* the weak form. The adverbializing suffix *-n* requires the weak form. What went wrong in (71) is that the strong form was selected instead of the weak form.

3 On the interaction of derivational and inflectional morphemes

It has repeatedly been claimed that speech errors respect linguistic categories. For instance, consonants do not interact with vowels in phonology and prefixes do not interact with suffixes in morphology (e.g. Wells-Jensen 2007, but see Meijer 1997). If derivation and inflection constitute strictly separated processing components, the interaction of derivational and inflectional morphemes is categorically ruled out. Of course, a non-categorical framework makes the opposite prediction, provided certain structural requirements are met. In particular, both types of morphemes should be admitted to the same morphological position and be allowed to occur in the same morphological context. German fulfils these requirements perfectly and thus offers an ideal opportunity to study the relationship between inflection and derivation.

As in the previous section, it is fitting to distinguish between contextual and non-contextual slips. As a matter of fact, non-contextual slips respect the boundary between inflection and derivation. However, contextual slips crossing this boundary do occur in my corpus. The following two errors are paired in that the same prefixes with opposite directionality are implicated.

- (72) G. Hätt' ich mich darauf **g**elassen– **ver**lassen, was die anderen
 had I myself on.it let relied what the others
gesagt haben.
 said have
 'If I had relied on what the others told me'

- (73) G. Das **verschiebt** sich ja; guck mal, wie die
 that displaces itself PARTICLE; look PARTICLE how it
verdrückt– **gedrückt** ist.
 – compressed is
 ‘It gets displaced, you see; look how compressed it is.’

The two tongue slips involve the same prefixes *ge-* and *ver-*. The first intrudes upon the second in (72) and the second upon the first in (73). Hence, the interaction is both ways. The prefix *ge-* is the initial part of the past participle circumfix (see Section 2.3.2) and as such indubitably of an inflectional nature. By contrast, the prefix *ver-* is part of the complex verb (*sich*) *ver-lass-en* ‘to rely’ in (72) and (*sich*) *ver-schieb-en* ‘to displace’ in (73) and as such unquestionably of a derivational nature. As the errors demonstrate, the differing status of these prefixes does not preclude their interaction.

Fromkin’s English corpus contains the following suffix exchange.

- (74) E. coldy and winder. for: colder and windy

The comparative marker *-er* is clearly inflectional while the adjectival suffix *-y* is clearly derivational. Again, this difference does not stop the two suffixes from interacting. Such slips can only occur if inflectional and derivational morphemes represent partially overlapping processing vocabularies. This hypothesis finds a natural place in a conceptual frame which locates inflection and derivation along a continuum.

By the same logic, there would be no reason to categorically rule out the interaction of stems and affixes. One such error is found in my data. It is given in (75).

- (75) G. Eins**sal**– Eins**sicht** in das Schicks**sal**.
 – insight into the fate
 ‘the acceptance of fate’

Example (75) involves the prefix-stem word *Ein-sicht* ‘insight’ and the stem-suffix word *Schick-sal* ‘fate’. The (unproductive) suffix *-sal* in *Schick-sal* supplants the stem *Sicht* ‘sight’ in *Ein-sicht*, yielding the nonsensical word *Ein-sal*, which supposedly consists of a prefix and a suffix (and nothing but). Since this is a solitary error, it would be unwise to base a far-reaching argument on it. What it does suggest, however tentatively, is that also the distinction between lexical and derivational morphemes is a fuzzy one. This would be in keeping with Bybee’s (1985) proposal of a lexicon-grammar continuum.

On the other hand, the fact that non-contextual slips do not allow “cross-talk” between lexical, derivational and inflectional morphemes suggests that a lexicon-grammar continuum may be too simplistic a model of the mental lexicon. There is more structure than is captured by a continuum. The critical question is how to reconcile the notion of continuum with the notion of paradigm. In any event, paradigms have a clear psycholinguistic analogue in that they may be held responsible for the absence of non-contextual cross-talk errors.

4 Putting some of the pieces together

After the separate analysis of the three major morphological components, it is appropriate to take a bird’s-eye perspective and put together some of the parts of the puzzle. Our focus will be on the rate of contextual and non-contextual slips in the three morphological components. Refer to Table 1, which excludes deletions because contextual and non-contextual deletions do not compare easily.

Table 1: Rate of contextual and non-contextual slips (including blends) as a function of morphological component.

morphological process	error type	contextual	non-contextual	(blend)	total
compounding		72 (51.8%)	67 (48.2%)	(1)	139
derivation		268 (59.2%)	185 (40.8%)	(143)	453
inflection		74 (45.1%)	90 (54.9%)	(0)	164
total		414 (54.8%)	342 (45.2%)	(144)	756

The first observation to make about Table 1 is that blend errors distribute extremely unevenly across the different morphological structures. Whereas they almost never occur in compound and inflected words, they abound in derived words. In the light of this unevenness, it was decided to neglect them in the following discussion. Note, however, that the conclusions would not be different if blends had been included. The totals and the percentages in Table 1 also ignore this error category.

As can be seen, contextual slips are in the majority, although non-contextual slips are fairly well represented. This share is much higher than what is observed at the phonological level where non-contextual slips form a small minority (see Section 1). While the ratio of contextual to non-contextual slips does not vary excessively from one morphological component to another, the rate of non-contextual errors is significantly higher in inflection than in derivation ($\chi^2(1) = 9.7$, $p < 0.01$). This is as was predicted in the beginning section. There is thus a decline in the incidence of non-contextual slips as we go from inflectional to derivational morphology to phonology.

The two differences, viz. that between morphology and phonology as well as that between inflection and derivation, can probably be accounted for in a similar fashion. Non-contextual inflectional slips are boosted by two factors – the conflict between paradigmatic options such as regular and irregular past tense formation and the conflict between the base and inflected words such as the infinitive and the present tense forms. Both conflicts create competition, which is especially strong when the base has to be changed to form an inflected word (by ablaut, for example). As argued above, adding an affix creates less competition. It is claimed here that inflection makes heavier use of highly competitive morphological processes than derivation. As a result, non-contextual inflectional slips outnumber non-contextual derivational slips.

There is probably an additional factor which amplifies the disparity between non-contextual inflectional and derivational slips. As widely agreed upon, derived words display a higher degree of lexicalization than inflected words do. This difference implies that there is less competition between the base and a derived form than between the base and an inflected form because a morphologically complex word is more autonomous vis-à-vis its base in derivation than in inflection.

The behavior of derived and inflected words may also be approached from the perspective of productivity. A link may be postulated between non-contextuality and productivity. The higher the productivity of a component, the higher the rate of non-contextual slips. It is generally agreed that inflection is more productive than derivation. It is also uncontroversial that segmental phonology is a largely unproductive system. This hierarchy is reflected in the diminishing rate of non-contextual slips from inflectional to derivational morphology to phonology.

Why does productivity boost non-contextuality? Productivity may be argued to accord a given unit or process an elevated resting level of activation, thereby granting it a certain autonomy and increasing its availability. This heightened availability allows the inadvertent intrusion of such a unit at

relatively low noise levels, hence its relatively frequent involvement in slips of the tongue.

As was pointed out in Section 1, contextual errors are an index of a sequencing problem whereas non-contextual errors highlight a selection problem. The larger number of non-contextual slips in morphology than in phonology suggests that selection is only a minor issue in phonology but more of an issue in morphology. How can this difference be accounted for? I maintain that paradigms vary in their internal structure, with more paradigmatic pressure in morphological than in phonological paradigms. For instance, there is more competition between regular and irregular verbs than between the phonemes /p/ and /b/. This explanation can be straightforwardly extended to the difference between inflection and derivation. Because derivational paradigms are uncommon, selection errors are also uncommon in derived words. And because paradigms are typically found in inflectional morphology, selection errors are rather more frequent in inflected words.

It is not clear whether sequencing presents the same challenge in morphology and phonology. It may be that the lower number of units to be serialized per time unit in morphology than in phonology makes morphological ordering a less difficult task than phonological ordering.

To conclude, there is a stronger link between morphological processes and non-contextual slips than between morphological processes and contextual slips. Errors of productive morphology are generally of the non-contextual type. The fact that they do not require contextual support attests to the high availability of morphological processes. In contrast, contextual slips do not depend that strongly on morphological processes. All that they require is morphological structure.

5 Conclusion

The predominance of phonologically oriented analyses of speech errors has led to a certain neglect of morphological slips of the tongue. Notwithstanding Stemberger's highly significant speech error work on English, the impoverished morphology of English renders it a less than ideal language to study. In fact, hardly any in-depth studies of morphological slips from languages other than English have been performed. The present contribution was written with the aim of developing a classification scheme which provides an insightful organization of the multitude of major error types. If this attempt is accepted, it may serve as a point of departure for more detailed analyses.

If little is known about morphological processing in languages other than English (and German), even less is known about cross-linguistic differences between morphological slips of the tongue. It is highly likely that the rates of error types are strongly language-specific. As long as this is a simple spin-off of different language structures and different language use, this may not come as much of a surprise. However, when the cross-linguistic error patterns are not a trivial spin-off of language-specific opportunities, they gain theoretical significance.

A cross-linguistic comparison might discover that some error types are present in one language but (virtually) absent from another (see the discussion of addition and deletion errors in verbs in Section 2.3.2). For obvious reasons, attention has hitherto been focused on attested error types. However, it is likely that the absence of a given error type is also theoretically significant. Only a cross-linguistic investigation can sharpen our awareness of what to expect and thereby direct our attention to error types which do not occur even though they might.

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